IMPACT OF GOVERNMENT SIZE ON ECONOMIC GROWTH IN NIGERIA

BY

AGHEDO IYOBOSA SONIA
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BEING A PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS,
FACULTY OF SOCIAL SCIENCES,
UNIVERSITY OF BENIN, BENIN CITY

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CERTIFICATION

This is to certify that this project was carried out by Aghedo Iyobosa Sonia. It was done under my supervision.

We certify that the work is in partial fulfillment of the Degree of Bachelor of Science in Economics, University of Benin, Benin city.

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PROF A. MONYE-EMINA **Date:**_____
Project Supervisor

_____

DR S.O IGBINEDION **Date:**_____
Project Coordinator

_____

DR S.O IGBINEDION **Date:**_____
Head of Department.

DEDICATION

This project is dedicated to Jehovah God, who gave me the wisdom, knowledge, and understanding to carry out this work and his grace upon me in successfully completing my B.Sc. programme.

I also want to dedicate this work to my parents MR. & MRS. AGHEDO for their immeasurable contribution to my academics. Thank you for your love, care and support both financially and morally.

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ABSTRACT

This study investigated the impact of government size on economic growth in Nigeria. The research investigated various variables, including government expenditure, population growth, inflation, and exchange rates, to unravel their impact on the country's economic development.

The analysis begins by examining the role of government size, proxied by Total Government Expenditure (TGEX), in shaping economic growth dynamics. The findings reveal a significant and positive relationship between government expenditure and economic growth, emphasizing the pivotal role of fiscal policies in Nigeria's development. These results underscore the importance of prudent fiscal management and the strategic allocation of public resources as crucial drivers of economic growth.

Furthermore, the study highlights the demographic dividend inherent in Nigeria's youthful population. Population growth, represented by the population growth rate (POP), emerges as a substantial driver of economic expansion, particularly in the long run. Policymakers are encouraged to focus on investments in education, skills development, and job creation programs that cater to the unique needs of the youthful population, recognizing their potential as contributors to sustained economic growth.

Conversely, the analysis suggests that the relationships between inflation (INF) and exchange rates (EXR) with economic growth are less robust within the specific models employed. Nevertheless, the study underscores that these variables continue to exert significant influence over economic dynamics, necessitating effective inflation management and exchange rate stability for overall economic stability.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Government size is an important instrument for managing the economy of a nation by the government. Economists believe that government expenditure, notably on social and economic infrastructure, can enhance growth (Olukayode, 2009). In almost all economies today, the role of government occupies a position of paramount importance. One reason for this is that it directs the process of achieving a country's macroeconomic objectives such as full employment, economic growth and development, price stability and poverty reduction (Ibietan, 2013). By means of appropriate economic policies, the government is expected to promote the economic well-being and general welfare of the citizens. In addition to maintaining law and order, the government is expected to play an important role in economic affairs (Udabah, 2002).

In Nigeria, the federal government's expenditures are broadly divided into capital and recurrent expenditure. The recurrent expenditure consists of government expenditure on administration such as wages, salaries, interest on loans, maintenances whereas the capital expenditure is on projects like roads, airport, health, education, electricity generation, telecommunication, water etc.

Capital expenditures are investments with multiplier effects on the economy in terms of public benefits. In most cases, government intervention has brought stability in income

and employment in the economy (Obinna, 2003). The size of government expenditures and its effect on economic growth, and vice versa, has been an issue of sustained interest for over decades now. The relationship between government expenditure and economic growth has continued to generate series of debate among scholars (Momodu and Ogbole, 2014). Government performs two major functions- protection (and security) and provisions of certain public good (Al-Yousif cited in Olorunfemi, 2008) .

Scholars argue that increase in government expenditure on socio-economic and physical infrastructures encourage economic growth. For example, government expenditure on health and education raises the productivity of labour and increase the growth of national output (Nwaeze, et al.,2014). Similarly, expenditure on infrastructure such as roads, communications, power, etc, reduces production costs, increases private sector investment and profitability of firms, thus fostering economic growth (Al-Yousif cited in Olorunfemi, 2008). There are important sectors of the economy of which Government expenditure could channel to promote economic growth. The sectors like defense Agriculture, transportation and communication, health and education could have essential potential to move an economy forward. Defense government expenditure could help to protect an economy from external attack, agriculture government expenditure could help to provide food security for citizenry and raw material for industrial use.

Transportation and communication government expenditure could enhance business activities (Olajide, Akinlabi, & Tijani 2013). Health and education government

expenditure could help to keep workforce healthy, have knowledge and information, creative skills and good conduct to promote business activities. The growth of education sector in the development process of any economy cannot be over-emphasized because only well-educated and healthy people produce optimally and contribute to national output. The importance government places on education in Nigeria has led to the increase in public expenditure allocation to education sector over the years with the aim that this would in turn generate returns that will further enhance the growth and development of the country (Olajide, Akinlabi, & Tijani 2013) . Therefore, the concern of this study is to verify the relationship between government expenditure and economic growth, the direction of relationship between government expenditure and economic growth if any exist and the type of government expenditure that contributes most to economic growth in Nigeria.

Nigeria is currently undergoing a recession and there are calls from some citizens for increased government expenditure in order to end the recession and bring about positive turnaround of the economy. It is believed that Government expenditure has the potential to stimulate the economy and restore economic growth. The existing theoretical literature such as Wagner's theory of government expenditure, Keynes' theory of public expenditure, and Musgrave Rostow's theory showed that government expenditure enhances economic growth but this seems to be at variance with empirical findings in Nigeria (Echekoba & Amakor, 2017). Moreover, macroeconomic indicators like balance of payments, import obligations, inflation rate, exchange rate, and national savings reveal

that Nigeria has not fared well in the last couple of years. (Olugbenga & Owoye, 2008). A crucial question that requires an urgent answer is whether the government aggregated, disaggregated expenditures impact positively on economic growth in Nigeria.

1.2 Statement of the Problem

In the last decade, Nigerian economy has metamorphosed from the level of millions of naira to billions naira and postulating to trillion naira on the expenditure side of the budget (Aladejare, 2013). Despite the rise in government expenditure in Nigeria over these years, there are still public outcries over decaying infrastructural facilities. It seems that rising government expenditure has not translated to meaningful growth and development of Nigerian economy as Nigeria ranks among the poorest in the world. In addition, many Nigerians have continue to wallow in abject poverty, while more than 50 percent live on less than US $2 per day and couple with this is dilapidated infrastructure (especially roads and power) that has led to the collapse of many used together to mean a positive change in the standard or quality of life of the people. Balami, (2006) postulates growth is a steady process which involves raising the level of output of goods and services in the economy. Jhingan, (2003) further explained that growth is related to a quantitative sustained increase in a country's per capita output accompanied by an expansion in manpower and volume of trade. This implies that economic growth is the sustained increase in an economy's output followed by other factors that influence

growth such as infrastructural development, technological advancement as well as human capital development.

Economic growth is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time; it is measured as the percentage rate of increase in the real gross domestic product (IMF, 2012). In the same vein the World Bank (1993), identified economic growth as more rapid output and productivity in growth; and by growth, it, therefore, implies the expansion of a country's potential GDP.

1.3 Objectives of the Study

The aim of this study is to determine the impact of government size on economic growth in Nigeria. The specific objectives include to:

1. Examine trend in government size in Nigeria.
2. Examine trend in economic growth in Nigeria.
3. Estimate the relationship between government size and economic growth in Nigeria.
4. Make recommendations on appropriate policies.

1.4 Research Hypothesis

The following hypothesis guided the study:

Ho_1: The impact of government size on economic growth is not significantly different from zero.

Ho_2: The impact of government size on economic growth is significantly different from zero.

1.5 Scope of the Study

The scope of this study entails a comprehensive examination of the influence of government size on economic development in Nigeria, with a particular focus on its impact on the economy and the standard of living of its citizens. The selected time frame for this analysis spans from 1981 to 2020, encompassing a 40-year period that holds significant historical importance for Nigeria, including transitions in governance from military rule to democracy, long-term economic trends, policy changes, and economic reforms. This extended time frame is essential for assessing the nuanced and long-term impact of government size on the Nigerian economy, allowing for the investigation of various economic conditions, policy shifts, and fluctuations in economic performance. Additionally, the availability of comprehensive data over this period ensures the study's robust empirical foundation, while the assessment of the standard of living requires a longer time frame to observe the effects of economic policies on the well-being of the population. Ultimately, this study aims to provide valuable insights for both academics and policymakers by offering a historical perspective on the relationship between government size and economic development in Nigeria.

1.6 Justification of the Study

Understanding the relationship between government size and economic growth is of paramount importance for policymakers, particularly for countries like Nigeria. Governments play a central role in shaping economic policies, and decisions regarding the size and scope of government can have significant implications for a nation's economic performance. For this study, Nigeria will serve as the case study country, providing valuable insights into the impact of government size on economic growth in the context of an emerging economy.

Government expenditure constitutes a substantial portion of Nigeria's budget, and decisions on how public funds are allocated can greatly influence economic outcomes. By examining the impact of government size on economic growth in Nigeria, policymakers can make informed choices on public spending priorities, ensuring that investments are directed toward sectors that contribute most effectively to economic development.

Nigeria, as a developing country, faces various challenges related to fiscal sustainability and debt management. Understanding the trade-offs between government expenditure and economic growth can help Nigerian policymakers strike a balance between supporting economic development and maintaining fiscal discipline. By avoiding excessive borrowing and unsustainable deficits, Nigeria can safeguard the long-term health of its economy.

The role of government in shaping the business environment is particularly significant for Nigeria, which is striving to enhance its global economic competitiveness. By analyzing the impact of government size on economic growth, policymakers in Nigeria can identify areas where regulatory burden and bureaucracy might impede private sector development. This knowledge can aid in crafting policies that foster entrepreneurship, attract investment, and promote a thriving business climate.

In Nigeria, the size of government and its expenditure choices can also have implications for income distribution and poverty alleviation. By examining the impact of government size on economic growth, policymakers can identify strategies that foster more inclusive growth, reduce income disparities, and address poverty challenges effectively.

A study on the impact of government size on economic growth in Nigeria can enable policymakers to learn from the country's experiences and compare its economic performance with other countries. By analyzing cross-country evidence and case studies, Nigeria can identify best practices and tailor its economic policies to align with its unique economic, social, and political contexts.

Conducting research on this topic contributes to the broader academic understanding of economics and public policy, while providing tailored insights for Nigeria's specific economic challenges. As scholars delve deeper into the relationship between government size and economic growth in Nigeria, they can identify new research areas, develop more

nuanced theoretical frameworks, and propose evidence-based policy recommendations to support the country's sustainable and inclusive economic growth.

1.7 Limitations of the Study

The study on the impact of government size on economic growth in Nigeria encountered certain limitations. One significant constraint was time, as the research was conducted alongside other demanding coursework within the program. This time constraint restricted the extent of data collection, analysis, and the scope of the study. Despite these limitations, the study aimed to provide valuable insights into the relationship between government size and economic growth in Nigeria.

CHAPTER TWO

LITERATURE REVIEWS

2.1 Government Size: Conceptual Issues

Wagner conceptually defined government size as the "organic growth of the state" (Wagner, 1872). He argued that government size represented the expansion of government activities and spending in response to the increasing needs and demands of society, laying the foundation for what is now known as Wagner's Law.

Friedman proposed a more tangible definition of government size (Friedman, 1955). He suggested that government size could be measured as "the number of government employees multiplied by their average wage." This straightforward definition emphasized the workforce and expenditures associated with government activities.

Buchanan viewed government size as the result of collective decision-making within a political system (Buchanan, 1962). He believed that government size represented the outcome of political choices made by individuals seeking to maximize their own utility.

Laffer contributed to the discussion of government size (Laffer, 1979). He defined government size in relation to the "tax burden" on the economy, arguing that it increases when tax rates are raised beyond a certain point, leading to reduced economic activity and tax revenue.

Barro brought a fiscal perspective to the definition of government size (Barro, 1980). He conceptualized it as the ratio of government consumption expenditure to gross domestic product (GDP), often using this ratio to assess the impact of government size on economic growth.

The Fraser Institute included government size as one of the dimensions of economic freedom in their Economic Freedom of the World Index (Fraser Institute, 1996). Their definition encompassed "the size of government expenditures, including consumption, transfers, and subsidies."

These conceptual definitions from different eras and perspectives offer a comprehensive understanding of government size, spanning from its organic growth in response to societal needs to its quantification in terms of workforce and expenditures, its connection to political choices and taxation, and its impact on economic freedom. Together, they contribute to the multifaceted discussion of the role and influence of government in the economy and society.

Government size can be first defined in terms of expenditure, revenue, or employment. However, the expenditure measure is the most commonly used indicator. This expenditure is derived from the national accounts. On an aggregate basis, total government expenditure is often used to signify the size of the government. The less the government spends, the smaller its size, and the more the government spends in aggregate terms, the larger its size. Although this measure is commonly used, it can be

argued that it is an appropriate measure of government size in some instances but not in others, due to impact differentials associated with the components of government expenditure (Cusack & Fuchs, 2002; Sedrakyan & Varela-Candamio, 2019).

Cusack and Fuchs (2002) further split government expenditure into five components—investment and consumption expenditure, as well as subsidies, social transfers, and interest payments. Some studies have gone beyond the overall government spending when analyzing the relationship between government size and various macroeconomic variables. The consideration of various components of government expenditure by various researchers is premised on the understanding that different government expenditure categories may have a different impact on various macroeconomic variables. Even when components of government expenditure are considered, the more expenditure on the considered category, the larger the government size, and the opposite holds.

A small government is considered advantageous based on the crowding-out effect principle. On the consumption front, governments can only spend what they have taken out of the real economy via taxes or they can alternately finance their spending through borrowing. An increase in tax revenue means reduced private consumption by the same amount of tax increase. The result is stagnation in overall demand and subsequently no wealth creation. However, on the flipside are the pro-big government size proponents who argue that a big government is good for the economy as it provides jobs and financial security to a number of people—to the tune of millions in most cases. Big

governments are also known to create economies of scale and to provide infrastructural development, which is a precursor to private investment.

2.2 Determinants of Government Size

Determining the size and scope of government is influenced by a myriad of factors, and understanding these determinants is crucial for effective policymaking. Several recent scholarly studies have explored the key determinants of government size to include Economic Development Level, Political Ideology and Public Preferences, Institutional Factors, Fiscal Capacity, Economic Stability and Demographic Trends, Globalization and International Agreements and Historical and Cultural Factors.

A recent study by Dreher and Schneider (2010) found that economic development positively affects government size. As economies grow and become more complex, the demand for public services, social safety nets, and regulatory functions increases. This leads to larger governments in developed countries. Similarly, Teets and Yanikkaya (2010) argued that higher levels of income allow citizens to demand more public goods and services, leading to increased government size.

Empirical studies by Pettersson-Lidbom and Lindqvist (2011) highlighted the role of political ideology and public preferences in determining government size. Countries with a more egalitarian and socially-minded political culture tend to have larger governments, as citizens demand income redistribution and social welfare programs. Conversely,

Alesina et al. (2013) found that countries with a preference for limited government intervention and free-market policies have smaller governments.

Institutions play a critical role in shaping government size. Recent research by Potrafke (2013) showed that democratic institutions tend to lead to larger governments as elected officials respond to public demands for more public services and welfare programs. Furthermore, political systems with strong checks and balances may influence the size of government by constraining or encouraging expansionary policies (Dincecco et al., 2016).

Fiscal capacity, determined by tax revenues and borrowing capabilities, is a significant determinant of government size. High fiscal capacity allows governments to finance more extensive public services and infrastructure projects (Crivelli et al., 2019). A study by Bergh and Fink (2017) demonstrated that countries with higher levels of taxation typically have larger governments.

Recent studies by Ashraf et al. (2014) and Hsieh and Klenow (2019) found that economic stability and demographic trends can influence government size. During economic downturns or periods of high unemployment, there may be a greater demand for government intervention to stimulate the economy and provide social safety nets. Additionally, demographic changes, such as an aging population, may lead to increased spending on pensions and healthcare, contributing to a larger government.

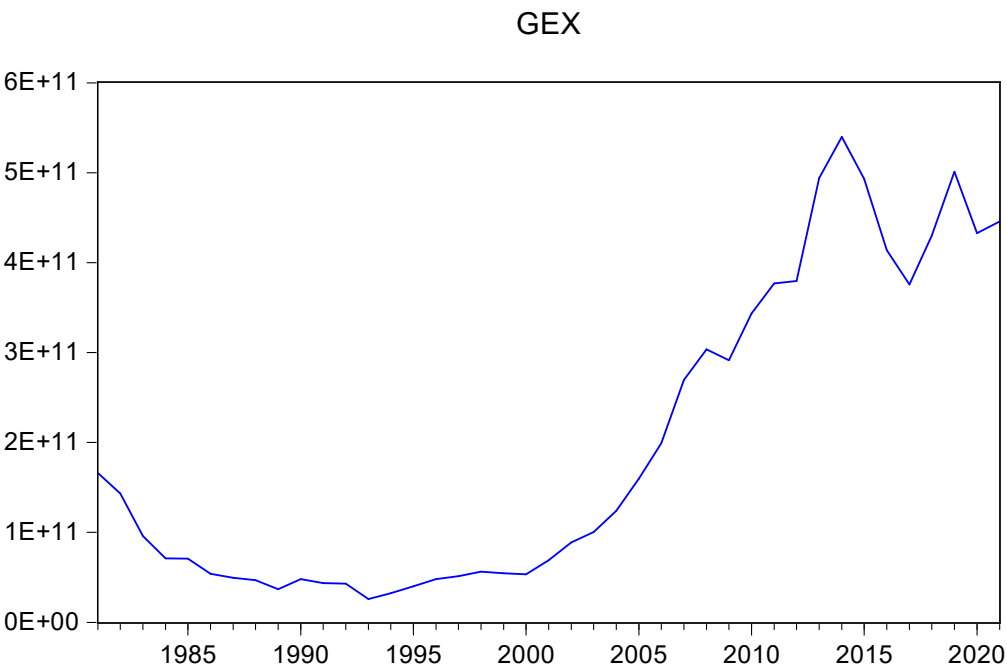
Participation in international trade and agreements can influence government size. A recent study by Libman et al. (2019) showed that countries engaged in extensive

international trade and investment may need to maintain larger regulatory and administrative structures to meet international standards and regulations.

Historical and cultural factors can shape attitudes toward the role of government. A study by Aidt and Jensen (2017) suggested that countries with a long history of state intervention and public ownership tend to have larger governments. Additionally, cultural norms regarding individualism versus collectivism can influence preferences for government intervention and welfare programs (Mo et al., 2015).

2.3 Trend in Government Size in Nigeria

Fig. 1.4. Trend of Government size



As government expenditure is often used as a proxy for government size, the values indicate the financial resources allocated by the government to carry out its activities and fulfill its responsibilities.

The trend analysis reveals that the size of the Nigerian government has experienced an overall growth pattern from 1981 to 2021. The government expenditure values show a consistent increase over time, reflecting the expansion of the government's financial commitments and activities. This growth indicates that the government has taken on more responsibilities and has been engaged in a broader range of programs and initiatives over the years.

In the early 1980s, government expenditure was relatively stable, with some fluctuations. This period might indicate a government of moderate size, not experiencing significant expansion during those years. However, from the late 1980s to the early 1990s, there was a noticeable growth phase, with government expenditure steadily increasing. This period signifies a period of government expansion and increased involvement in various sectors and projects.

The mid-1990s to the mid-2000s marked a remarkable period of growth in government size. The consistent rise in government expenditure during these years suggests that the government took on larger roles in the economy and society, investing in infrastructure, social development programs, and other initiatives.

Despite facing economic challenges during the global financial crisis in the late 2000s and early 2010s, the Nigerian government sustained its growth trend. This period indicates that the government remained committed to maintaining its size and involvement in the economy, even during challenging economic circumstances.

In the mid-2010s, the government continued to increase its size and financial commitments, reaching a peak in government expenditure in 2018 and 2019. These high values indicate that the government expanded significantly during this period, taking on more responsibilities and implementing ambitious projects.

The slight decline in government expenditure in 2020 might be attributed to various factors, including global economic challenges or policy adjustments due to the COVID-19 pandemic.

2.4 Economic Growth: Conceptual Issues

Romer (1990) defined economic growth as "the process of accumulation of knowledge." He emphasized the role of technological progress and innovation as drivers of long-term economic growth. According to Romer, economic growth occurs when societies invest in research, education, and innovation to increase their productivity.

Solow (1956) offered a definition that focuses on the outcome of economic growth. He defined it as "the sustained increase in the standard of living of a society over a prolonged period of time" (Solow, 1956). Solow's growth model, known as the Solow-Swan model,

highlights the importance of factors like capital accumulation and technological progress in achieving sustained economic growth.

Schumpeter (1912) viewed economic growth as a dynamic process driven by entrepreneurship and creative destruction. He defined it as "the carrying out of new combinations of means of production" (Schumpeter, 1912). In Schumpeter's view, innovation and the introduction of new products and processes are essential for economic growth.

Sen (1980) brought a human development perspective to economic growth. He defined it as "the process of expanding the real freedoms that people enjoy" (Sen, 1980). Sen's capability approach focuses on improving people's well-being by increasing their access to education, healthcare, and economic opportunities.

Rostow, during the 1960s, proposed a stages-of-growth model and defined economic growth as "the transition from traditional to modern society through a series of stages" (Rostow, 1960s). Rostow's model suggests that economic growth involves a sequence of stages, including traditional society, preconditions for take-off, take-off, drive to maturity, and age of high mass consumption.

Economic growth, the sustained increase in the production and consumption of goods and services in an economy over time, is a central focus for economists and policymakers (Costanza et al., 2009). However, accurately measuring economic growth poses a fundamental conceptual challenge. Traditional measures like Gross Domestic Product

(GDP) capture only the market value of goods and services produced within a country's borders, disregarding factors such as income distribution, environmental degradation, and the quality of life (Stiglitz et al., 2009). Alternative measures, such as the Human Development Index (HDI) and the Genuine Progress Indicator (GPI), have been proposed to provide a more comprehensive understanding of economic well-being and sustainability. These alternative metrics take into account factors like education, healthcare, income distribution, and environmental factors, allowing for a more nuanced evaluation of economic growth and its impact on society (Costanza et al., 2009).

Another critical conceptual issue revolves around the distinction between the quantity and quality of economic growth. While GDP growth is a common measure of economic performance, it does not necessarily translate into improvements in living standards or human development. Achieving sustainable and inclusive growth requires a focus not only on output and income growth but also on factors like education, healthcare, and environmental protection. The concept of inclusive growth emphasizes the importance of ensuring that the benefits of economic growth are distributed equitably across different segments of society, with a particular emphasis on reducing poverty and inequality (IMF, 2013).

Closely related to the issue of inequality is the challenge of establishing causality between economic growth and its distributional impact. Economic growth can contribute to poverty reduction, but it can also exacerbate inequalities. The relationship between

growth and inequality is complex and can be influenced by various factors, including the structure of the economy, the design of fiscal and social policies, and the quality of institutions. Identifying the causal relationships between economic growth and inequality is critical for designing effective policies that promote more inclusive growth (World Bank, 2017).

One of the fundamental determinants of economic growth is productivity, which refers to the efficiency with which inputs are transformed into outputs. Understanding the sources of productivity growth and technological progress is a conceptual challenge. Technological advancements can drive innovation, enhance productivity, and stimulate economic growth. However, the drivers of innovation and the channels through which it affects economic growth are not fully understood. Recent studies, such as Durlauf and Quah (1999), have emphasized the importance of human capital, research and development (R&D) activities, and knowledge spillovers in fostering technological progress and long-term economic growth.

Moreover, the pursuit of economic growth must be balanced with environmental sustainability. Unsustainable exploitation of natural resources and environmental degradation can undermine long-term growth prospects. Conceptual issues arise in understanding how to promote green growth and integrate environmental considerations into economic policies. Green growth seeks to decouple economic growth from

environmental degradation by promoting resource efficiency, renewable energy, and sustainable production and consumption patterns (World Bank, 2012).

2.6 Determinants of Economic Growth

The determinants of economic growth include Human Capital and Education, Physical Capital and Infrastructure, Technological Innovation and Research & Development (R&D), Institutions and Governance, Trade and Globalization, Financial Development, Natural Resources and Environmental Sustainability:

Human capital refers to the knowledge, skills, and abilities that individuals acquire through education, training, and experience. Investment in education and the development of human capital are critical for economic growth. Recent studies have shown that countries with a well-educated and skilled workforce tend to experience higher levels of productivity and innovation, leading to increased economic output (Barro and Lee, 2013). Education equips individuals with the necessary skills to participate effectively in the labor market, promotes technological adaptation, and facilitates the adoption of new ideas and technologies. Moreover, a highly educated workforce attracts foreign investment and enhances a country's competitiveness in the global economy.

Physical capital refers to the stock of machinery, equipment, buildings, and other tangible assets that contribute to production. Adequate infrastructure, such as transportation networks, energy supply, and communication systems, is vital for economic growth. Recent research by the World Bank (2018) and Kamps (2018) has highlighted the role of

infrastructure in reducing transaction costs, improving market access, and enhancing productivity. Well-developed infrastructure encourages investment, facilitates the movement of goods and services, and attracts both domestic and foreign investors. It also creates a conducive environment for businesses to thrive, leading to increased economic activities and higher economic growth rates.

Technological innovation and research & development (R&D) are crucial drivers of economic growth in the modern economy. Recent studies by Hausmann and Hidalgo (2014) and Bloom et al. (2020) have emphasized the importance of innovation in boosting productivity and fostering economic expansion. Innovation leads to the development of new products, processes, and technologies, which enhance efficiency and create new economic opportunities. Investments in R&D and the promotion of innovation ecosystems facilitate the diffusion of knowledge and the creation of a competitive advantage for countries in the global market. Countries that prioritize innovation are more likely to achieve sustained economic growth and remain competitive in a rapidly changing world.

The quality of institutions and governance significantly impacts economic growth. Recent research by Acemoglu and Robinson (2012) and Rodrik (2020) has shown that well-functioning institutions, including the rule of law, property rights protection, and transparent governance, are associated with higher levels of economic growth. Strong institutions create a stable and predictable environment for businesses and investors,

which encourages long-term investments and entrepreneurship. Transparent and accountable governance reduces corruption and enhances the efficiency of public services, leading to better allocation of resources and improved economic performance.

International trade and globalization are critical determinants of economic growth. Research by Dollar and Kraay (2016) and Amiti and Weinstein (2018) reveals that countries that engage in open and liberalized trade policies tend to experience higher economic growth rates. Trade openness increases market access for goods and services, facilitates the exchange of ideas and technologies, and encourages specialization based on comparative advantage. By participating in the global market, countries can benefit from increased competition, technological spillovers, and access to a broader consumer base, which contribute to economic expansion.

Financial development plays a pivotal role in economic growth. Recent studies by Beck et al. (2018) and Greenwood and Smith (2015) demonstrate that well-developed financial systems facilitate investment, entrepreneurship, and risk-sharing, thereby positively impacting economic growth. A robust financial sector provides access to credit for businesses and individuals, enabling productive investments and promoting economic activities. Efficient capital markets allow for the mobilization and allocation of financial resources, supporting the growth of new ventures and innovations.

The management of natural resources and environmental sustainability is increasingly recognized as a critical determinant of economic growth. Research by Gennaioli et al.

(2016) and Heal (2017) highlights that sustainable resource use and environmental conservation are vital for long-term economic growth. Unsustainable exploitation of natural resources can lead to resource depletion, environmental degradation, and adverse economic consequences. In contrast, countries that invest in sustainable practices, renewable energy, and environmental conservation are likely to experience more resilient and inclusive economic growth.

2.6 Theories/Models of Economic Growth

The following economic growth theories were reviewed in the study: Solow-Swan Growth Model, Endogenous Growth Theory, New Growth Theory, Innovation-led Growth Theory, Convergence Theory, Human Capital Theory.

The Solow-Swan growth model, also known as the neoclassical growth model, is a fundamental framework that highlights the role of capital accumulation, labor, and technological progress in driving economic growth. According to this model, in the long run, the growth of an economy is primarily determined by its savings and investment rates, which lead to capital accumulation (Solow, 1956; Swan, 1956). As an economy accumulates more capital, it experiences diminishing returns, meaning each additional unit of capital contributes less to output growth. As a result, the model predicts that economies will converge to a steady-state equilibrium level of output per capita.

Recent studies, such as Jones (2015), have expanded on the Solow-Swan model by incorporating endogenous factors into the analysis. This includes considering the role of

technological progress as an endogenous variable influenced by factors such as research and development (R&D) investment, human capital development, and knowledge spillovers. Endogenous growth extensions of the Solow-Swan model provide insights into how innovation and technological advancements can lead to sustained economic growth.

Endogenous growth theory, pioneered by Romer (1986) and Lucas (1988), departs from the Solow-Swan model by emphasizing the importance of technological innovation and knowledge creation as endogenous drivers of economic growth. In this framework, economic agents actively invest in research and development (R&D) activities to generate new ideas and technologies. Unlike physical capital, knowledge is non-rivalrous, meaning it can be shared and utilized by multiple agents simultaneously, leading to increasing returns to scale (Romer, 1990).

Recent research by Aghion and Howitt (2009) further emphasizes the role of human capital accumulation in driving endogenous economic growth. Investments in education and training contribute to a more skilled and innovative workforce, enhancing the economy's capacity for technological progress and productivity improvements. Endogenous growth theory highlights the dynamic nature of economic growth, where knowledge creation and dissemination can lead to sustained increases in output and living standards.

New Growth Theory, introduced by Romer (1990), builds upon endogenous growth theory and incorporates the concept of increasing returns to scale. This theory posits that knowledge and ideas are non-rivalrous, meaning they do not deplete with use and can be used by multiple individuals or firms simultaneously. As a result, economies that promote knowledge creation and dissemination can experience increasing returns to scale, leading to sustained economic growth.

New Growth Theory emphasizes the role of institutions, intellectual property rights, and public policies in fostering innovation and knowledge accumulation. Recent research by Acemoglu and Linn (2004) highlights the significance of well-functioning institutions in creating an environment conducive to innovation, protecting intellectual property, and encouraging investment in knowledge-based activities. Additionally, policies that promote competition and facilitate knowledge spillovers can further enhance the potential for increasing returns and sustained economic growth.

Innovation-led growth theory, advanced by Grossman and Helpman (1991), focuses on the role of innovation and technology adoption as drivers of economic growth. This theory suggests that economies that invest in research and development (R&D) and adopt new technologies can enhance productivity and competitiveness, leading to higher economic growth rates.

Recent research by Bessen (2019) has highlighted the impact of specific types of innovation, such as artificial intelligence, automation, and digital technologies, in shaping

economic growth trajectories. Countries that embrace and invest in cutting-edge technologies are likely to experience productivity gains, improved industrial efficiency, and increased global competitiveness.

Convergence theory posits that economies with lower initial levels of income tend to grow faster than economies with higher initial income levels. The idea behind convergence is that less developed economies have more potential for rapid growth through capital accumulation, technology transfer, and productivity improvements, which can lead them to catch up to more developed economies over time.

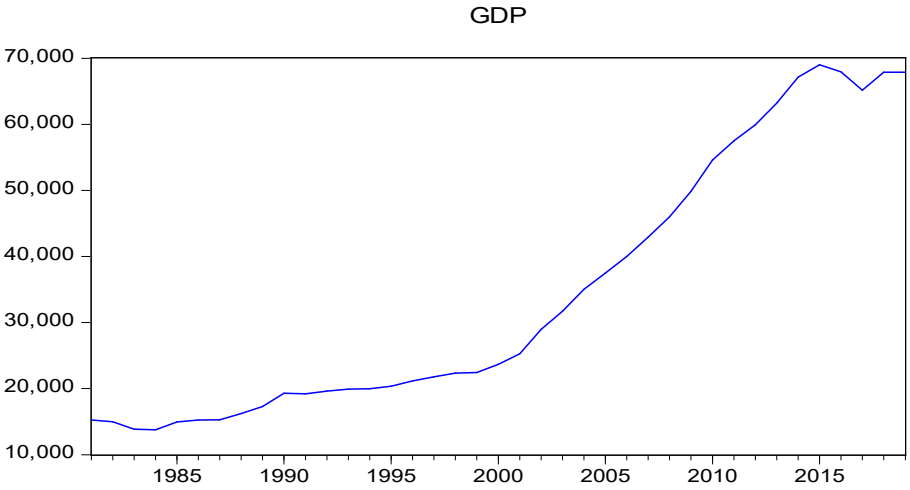
Recent studies, such as Comin and Mestieri (2019), examine the role of technological diffusion, trade openness, and institutional quality in influencing convergence patterns among countries. Factors that facilitate technology transfer, such as international trade and foreign direct investment, can contribute to convergence, while institutional quality and policies that support innovation and human capital development can influence the speed and sustainability of the convergence process.

Human capital theory, initially proposed by Gary Becker (1964), emphasizes the role of education, skills, and knowledge as crucial determinants of economic growth. This theory suggests that investments in human capital, through education and training, lead to higher labor productivity, technological innovation, and overall economic development.

Recent research by Hanushek and Woessmann (2015) explores the relationship between educational attainment, human capital accumulation, and economic growth. Countries

that prioritize education and invest in the development of human capital tend to experience higher rates of economic growth and improved well-being for their citizens.

2.7 Trend in Economic Growth in Nigeria



Source*: Author's Computation using Eviews 9.*

The Gross Domestic Product (GDP) serves as a crucial indicator and representation of economic growth in this comprehensive study. The analysis of GDP trends over the observational period reveals a notable trajectory. As depicted in the graph above, the GDP exhibited an overall upward trajectory. However, it is essential to dissect this trajectory into distinct phases for a more nuanced understanding.

Between 1981 and 1984, there was a marginal decline in the real GDP. This initial decline can be attributed to a confluence of factors, with one of the primary culprits being the early 1980s oil glut. The oil glut significantly impacted Nigeria's economy as it led to a contraction in oil receipts, which, in turn, triggered a chain reaction. This downturn in

oil revenue had severe consequences for the Nigerian economy, leading to a contraction in foreign debt, and subsequently causing a decline in economic activity.

However, the economy exhibited resilience as it began to rebound in 1984. The revival was marked by an upward trajectory that continued with minor fluctuations until 2015. During this extended period, the Nigerian economy demonstrated considerable growth and stability. It is noteworthy that this sustained growth was instrumental in various economic and social developments within the country.

The upward momentum in GDP growth came to a halt in 2015 as the real level of output registered a decline. This downturn can be primarily attributed to a significant event in the Nigerian economic landscape - a recession. A recession is characterized by negative economic growth, which translates to a contraction in the overall economic activity. Nigeria experienced a recession during this period, resulting in a temporary setback in its economic growth.

To gain a deeper understanding of Nigeria's economic journey, it's crucial to explore specific phases that have marked its development over the years.

The first phase, spanning from 1981 to 1984, was characterized by a marginal decline in the country's economic performance. This period was influenced by the early 1980s oil glut, which resulted in a reduction in oil receipts, foreign debt contraction, and an overall decline in economic activity. Nigeria faced economic challenges during this time, and these difficulties set the stage for subsequent developments.

From 1984 onwards, Nigeria entered a phase of sustained growth, marking the second phase. The economy rebounded, and it maintained an upward trajectory with minor deviations. Notably, this period was characterized by significant economic growth, contributing to various developmental initiatives. Nigeria's economy displayed resilience and began to recover from the challenges faced in the previous years.

The third phase, spanning from 2015 to 2017, represented a stark contrast as Nigeria entered a recession and faced a downturn. During this period, the real GDP declined, resulting in negative economic growth. The recession was a challenging time for the country, marked by a temporary slowdown in economic activity, which necessitated significant policy efforts to reverse the trend.

Following the recession, in the post-2017 period, the Nigerian government and its economic policies played a significant role in stabilizing the economy and facilitating its recovery. Although not explicitly mentioned in the provided text, this phase saw efforts to diversify the economy away from its heavy reliance on oil, reflecting a strategic approach to promote economic stability and growth.

The graphical representation accompanying these phases illustrates the dynamics of Nigeria's economic growth over the years. Particularly noteworthy is the period from 1990 to 2010 when GDP exhibited an accelerating growth rate, indicating robust economic expansion. However, from 2010 onwards, there was a sharp increase in GDP, followed by a decline in 2015, marking the onset of the recession.

Analyzing these GDP trends offers valuable insights into Nigeria's economic history. It highlights the country's ability to overcome economic challenges, the impact of external factors such as oil prices, and the consequences of policy decisions. Moreover, the transitions from decline to growth and back to decline underscore the dynamic nature of Nigeria's economy. This underscores the importance of sound economic policies and diversification efforts to ensure sustained and stable growth, a critical consideration for the nation's future economic development.

2.8 Government Size and Economic Growth: Theory and Evidence

The relationship between government size and economic growth has been a subject of considerable interest and debate among economists and policymakers. Various theories and empirical studies have explored this relationship, providing valuable insights into how the size and role of the government can impact economic growth.

One of the earliest theories related to government size and economic growth is Wagner's Law, proposed by the German economist Adolph Wagner in the 19th century. Wagner's Law suggests that as economies develop, there is a tendency for government spending to increase relative to GDP due to the rising demand for public goods and services. This growth in government size is driven by the need to provide essential services such as education, healthcare, infrastructure, and social welfare programs. According to this theory, larger government expenditure is a natural consequence of economic growth and societal needs.

On the other hand, some theoretical perspectives argue that large and inefficient governments may hinder economic growth. When government spending is allocated inefficiently or used to support unproductive sectors, it can lead to resource misallocation and reduced private sector investment. Excessive regulations and bureaucratic inefficiencies can create distortions in the economy, inhibiting entrepreneurship and innovation, and ultimately negatively impacting economic growth.

However, another theoretical perspective suggests that government spending on public goods and infrastructure can positively influence economic growth. Public goods, such as education, healthcare, and transportation networks, are essential for improving human capital, labor productivity, and overall economic efficiency. Government investments in public goods can lead to higher levels of human capital accumulation and technological advancement, contributing to economic growth.

Empirical studies examining the relationship between government size and economic growth have yielded mixed results, reflecting the complexities involved in assessing this relationship across different countries and time periods. The relationship is influenced by various factors, including the efficiency of public spending, institutional quality, and the specific composition of government expenditure. For example, Shih-Ying (2010) examined the causal relationship between government expenditure and economic growth by conducting the panel Granger causality test panel data set which includes 182 countries that cover the period from 1950 to 2004. The empirical results strongly support

both Wagner's law and the hypothesis that government spending is helpful to economic growth regardless of how we measure the government size and economic growth. When the countries are disaggregated by income levels and the degree of corruption, our results also confirm the bi-directional causality between government activities and economic growth for the different subsamples of countries, except for the low-income countries. It is suggested that the distinct feature of the low-income countries is likely owing to their inefficient governments and inferior institutions.

Arpaia & Turrini (2008) studied the long run relationship between Government Expenditure and economic growth for 75 countries between 1970 to 2003. They utilized panel data and pooled mean group estimation. The result showed that the relationship between government Spending and Economic growth for younger and catching-up countries was higher than unity but lower than unity for fast ageing and low debt countries.

Nwaeze (2014) study on the Impact of Government Expenditure on Nigeria's economic growth utilized OLS on time series data during the study period. The results of this study show that the Federal Government Expenditure has a positive and insignificant impact on the economic growth of Nigeria for the period under study.

Emerenini & Ihugba (2014), examined the relationship between Nigeria's total government expenditure and economic growth 1980 to 2012. They employed the Engle-Granger two step modeling (EGM) procedure to co-integration based on unrestricted

Error Correction Model and Pair wise Granger Causality tests. Their findings indicate that GDP and total government expenditure are cointegrated in long run equilibrium. The speed of adjustment to equilibrium is 44% within a year when the variables wander away from their equilibrium values. Based on the result of granger causality, the paper concludes that a very weak causality exist between the two variables used in this study.

Siew-Peng & Yan-Ling (2015) examined whether public debt contributed to the economic growth in Malaysia over the period 1991 to 2013. It also examines whether other indicators of debt burden, such as budget deficit, budget expenditure, and external debt service and government consumption, have an impact on economic growth. The results of this study are consistent with the existing literature that found a negative association between debt and growth. The results indicate that public debt over time has a negative impact on GDP.

Chude (2013) investigated the effects of public expenditure in education on economic growth in Nigeria over a period from 1977 to 2012, with particular focus on disaggregated and sectoral expenditures analysis. Government expenditures are very crucial instruments for economic growth at the disposal of policy makers in developing countries like Nigeria. The objective of this study is to determine the effect of public expenditure on economic growth in Nigeria using Error Correction Model (ECM). The study used Ex-post facto research design and applied time series econometrics technique to examine the long and short run effects of public expenditure on economic growth in

Nigeria. The results indicate that Total Expenditure Education is highly and statistically significant and have positive relationship on economic growth in Nigeria in the long run.

Akpan et al. (2013) investigated the impact of government spending on economic growth in Nigeria. Utilizing annual time series data from 1970 to 2010, they applied OLS technique to a modified Ram (1986)'s two-sector production growth model. Overall, the results show that at the aggregate level, government spending in Nigeria is growth promoting, although the impact is very small and less than unity (0.16%). At the disaggregated level, only recurrent spending is significantly and positively related to growth, while the impact of capital spending is negative and insignificant.

Osuji, Ehirim, Ukoha, and Anyanwu, (2017) conducted a study that examined the effect of government expenditure on economic growth and development in Nigeria for the period of 1990–2012. Time series data for twenty-two years were sourced from secondary data such as the CBN statistical bulletin and other relevant publications using the desk survey method. Ordinary Least Square (OLS) multiple regression technique was used to estimate the effect of government expenditure on economic growth and development in Nigeria. Gross Domestic Product, proxy for economic growth and development was adopted as the dependent variable while Total Recurrent Expenditure and Total Capital Expenditure constitute the independent variables. The results of this study showed that the Federal Government Expenditure on Education, Health, General Administration, and Road Construction for the period; 1990–2012 has a positive and

significant impact on the economic growth and development of Nigeria. The result further showed that government expenditure on Agriculture for the period investigated had been undulating and this resulted in an inverse relationship with GPD. It therefore follows that Government should put in place adequate control measures/techniques to ensure that funds allocated to the different sectors of the economy especially the agricultural sector are judiciously used for the projects for which they are allocated.

Echekoba, and Amakor, (2017) conducted a research work to explore the impact of government expenditure such as expenditure on General administration, Defense, Education and Health on GDP of Nigeria (1983-2016). Time series data were generated from the Central Bank of Nigeria (CBN) statistical bulletins of various years spanning from 1983 to 2016. The Ordinary Least Square (OLS) method of estimation was used in the multiple regression analysis.

Salami, Olabode, Atoyebi, Lawal and Danmola, (2017) conducted a study that empirically examines the relationship between health and education expenditure on economic growth in Nigeria between 1917 and 2013. The study adopted ordinary least square to determine the relationship between health and education expenditure on economic growth in Nigeria. Contrary to our expectation our result did not conform with our apriori expectation where all the variables are expected to be positively related to economic growth but rather capital expenditure and recurrent expenditure showed a negative sign which implies that as more of the variables increase, economic growth

reduces. The study also observed that little attention was paid to health sector as the percentage of budgetary allocation to the sector ranged from the 1.07% 1980 to 5.24% in 2007 compared with education. However, Government commitment to education fluctuated within the period. It reaches the peak in 2013. Upon all this observations, the study therefore recommended that Government should devoted more resources to the sector.

Gupta, (2017) investigated the impact of government expenditure on economic growth in Nepal. Annual series data between 2002/03 to 2015/16 is used for the study. Economic growth is dependent variable whereas total capital expenditure, total recurrent expenditure, agriculture, nonagriculture, industry, service and inflation are independent variables. Data are collected from economic survey of Nepal. The tools of analysis are the regression model between the variables, DW Test and for multicollonearity between the variables, VIF test is used. The empirical result shows that there is positive correlation between the dependent variable International Journal of Multidisciplinary Research and Growth Evaluation economic growth and the predictors like agricultural, nonagricultural, industry and service sector. The total current and recurrent expenditure and inflation are negatively related to economic growth. The beta coefficient is positively significantly for agricultural, non-agricultural, industry, and service sector, it implies that higher the investment in agricultural and non-agricultural sector higher would be economic growth. Similarly, higher the investment on industry and service sector of the country, higher would be economic growth.

Ogunjimi, and Adebayo, (2018) conducted a study that examined the relationship among health expenditure, health outcomes and economic growth in Nigeria for the period between 1981 and 2017. This study adopted the Toda Yamamoto causality framework to examine these relationships. The Augmented Dickey Fuller unit root test and Autoregressive Distributed Lag (ARDL) Bounds test approach was used for data analysis. The results of the Toda Yamamoto causality tests showed a unidirectional causality running from health expenditure to infant mortality while there is no causality between real GDP and infant mortality; a unidirectional causal relationship running from health expenditure and real GDP to life expectancy and maternal mortality; and a unidirectional causal relationship running from real GDP to health expenditure. This study therefore recommended that the Nigerian government should make concerted efforts geared towards increasing the health expenditure at least to meet up with the WHO's recommendation that all countries should allocate at least 13 per cent of their annual budget to the health sector for effective funding.

Yusuf (2018) conducted a study that empirically examined the relationship between government health expenditure on economic growth in Nigeria, using Gross Domestic Product (GDP) as a proxy to economic growth which is the dependent variable and the independent variables are Capital Expenditure on Health (CAPEXP) and Recurrent Expenditure on Health (RECEXP). The Error Correction Mechanism results showed that the system corrects to equilibrium at a speed of 43.40%. The study also employed the

OLS regression analysis to estimate the model and the R2 showed a 94% significant relationship between government health expenditure and economic growth.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter discusses the research methodology comprising theoretical framework, model specification and methodology.

3.1 Theoretical Framework

This study is built on Endogenous theory of growth. The endogenous growth theory was developed as a reaction to omissions and deficiencies in the Solow-Swan neoclassical growth model. It is a new theory which explains the long-run growth rate of an economy on the basis of endogenous factors as against exogenous factors of the neoclassical growth theory.

As the long-run growth rate depended on exogenous factors, the neoclassical theory had few policy implications. As pointed out by Romer, “In models with exogenous technical change and exogenous population growth, it never really mattered what the government did.” The new growth theory does not simply criticise the neoclassical growth theory. Rather, it extends the latter by introducing endogenous technical progress in growth models. The endogenous growth models have been developed by Arrow, Romer and Lucas, among other economists. We briefly study their main features, criticisms and policy implications.

Arrow (1962) was the first economist to introduce the concept of learning by doing in 1962 by regarding it as endogenous in the growth process. His hypothesis was that at any

moment of time new capital goods incorporate all the knowledge then available based on accumulated experience, but once built, their productive deficiencies cannot be changed by subsequent learning. Arrow's model in a simplified form can be written as

$$Yi= A (K) F (Ki,Li) \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (3.1)$$

Where Yi denotes output of firm i, Ki donates its stock of capital, Li, denotes its stock of labour, K without a subscript denotes the aggregated stock of capital and A is the technology factor. He showed that if the stock of labour is held constant, growth ultimately comes to a halt because socially very little is invested and produced. Therefore, Arrow did not explain that his model could lead to sustained endogenous growth.

3.2 Model Specification

The model for this study captures the impact of government size on economic growth in Nigeria. The independent variables used in this study are: inflation rate, exchange rate, total government expenditure, population size. The functional form is given as:

$$GDP= f (INF, EXR, TGEX, POP) \quad - \quad - \quad - \quad - \quad - \quad (3.2)$$

While the parametric model is:

$$GDP = \beta0 + \beta1\Delta INFt\text{-}i+ \beta2\Delta EXRt\text{-}i+ \beta3\Delta TGEXt\text{-}i+ \beta4\Delta POPt\text{-}i\ \varepsilon ECMt\text{-}i+Ut \quad (3.3)$$

Where

GDP= Gross Domestic product

INF = Inflation level

EXR = Exchange Rate

TGEX = Total Government Expenditure

POP = Population

μt = error term

βo = intercept term

$\beta 1 - \beta 4$= co-efficients.

Apriori expectation:

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

3.3 Methodology

3.3.1 Unit Root Testing

Testing for unit root checks whether a time series variable is stationary or otherwise. Augmented Dickey fuller (ADF), which is the most widespread unit root test, will be used for the purpose of this analysis since it measures the lagged values in regression for the independent variables. ADF manages big and complicated models. In determining the stationarity of a time series data, this first step using the ADF which is the most significant step is the stationarity test. Using a non stationary time series

3.3.2 Co-integration Analysis

Cintegration tests in econometric analysis is used to identify scenarios where two or more than two non-stationary time series variables are integrated in such a way that they cannot deviate from equilibrium in the long term period. The tests are used to check the level of sensitivity of two or more variables over a specified period of time.

3.3.3 Error Correction Mechanism

This study adopts Error Correction technique. Error correction model (ECM) is a time series regression model that is based on the behavioral assumption that two or more time series exhibit an equilibrium relationship that determines both short-run and long-run behavior. Since that time, the ECM has become associated with cointegrated time series.

The term error-correction relates to the fact that last-period's deviation from a long-run equilibrium, the error, influences its short-run dynamics. Thus ECMs directly estimate the speed at which a dependent variable returns to equilibrium after a change in other variables.

3.4 Sources of Data

Secondary data were used for the study, and for the analysis for the following variables gross domestic product, Inflation rate, and Interest rate, within the period under review that is from 1981-2021.

The data were extracted from the annual publications of the Central Bank of Nigeria (Statistical Bulletin) and the World Development Indicators (WDI) of the World Bank.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Empirical Analyses

In this section, the descriptive statistics is first of all carried out showing co-efficient that summarizes the variables. Then the variables are rigorously tested for their stationarity using the Augmented-Dickey Fuller test. They were further tested to check the existence of long run relationship using the Johansen Co-Integration Test. Finally, the error correction model was developed and the speed of adjustment between the long and short run period was determined. The various analyses alongside their results are stated below:

4.1.1 Descriptive Statistics

Descriptive statistics basically gives descriptive coefficients that summarizes a given set of variables. It includes measures of central tendency and measures of variability (spread). Measures of central tendency include the mean, median, and mode while measures of variability include standard deviation, variance, minimum and maximum variables, kurtosis and skewness. The table below shows the summary statistics for the variable of this study:

Table 4.1: Summary of Descriptive Statistics

YEAR	*RGDP*	*Interest Rate*	*Population*	*Exchange Rate*	*Inflation*	*Total Government Expenditure*
Mean	2.75E+11	0.465	37.369	147.042	21.152	2770.551
Median	2.05E+11	3.667	36.089	101.039	10.752	1018.087
Standard Deviation	1.49E+11	14.084	9.143	114.384	34.326	3623.853
Kurtosis	-1.36315	11.723	-1.145	3.750	28.145	1.948
Skewness	0.553407	-2.856	0.184	2.047	4.986	1.571
Range	4.21E+11	84.037	30.850	487.134	218.317	14086.931
Minimum	1.15E+11	-65.857	22.671	49.776	0.686	9.637
Maximum	5.35E+11	18.180	53.521	536.911	219.003	14096.567
Count	42	42	42	42	42	42

Source: Author's compilation using Eviews 10.0

The table 4.1 above is interpreted thus:

For RGDP (Real Gross Domestic Product), the mean value over the study period is approximately 275 billion USD, indicating substantial economic activity. The median RGDP falls below the mean, suggesting a skewed distribution with some exceptionally high values. This skewness implies that there may have been periods of rapid economic growth that significantly exceeded the average. The standard deviation is relatively high, indicating significant variability in economic growth over the years. The kurtosis is negative, suggesting a distribution with lighter tails compared to a normal distribution, while the skewness is positive, indicating that the distribution of RGDP is slightly

skewed to the right. The range shows a substantial variation in RGDP values, from 115 billion USD to 535 billion USD.

Moving to interest rates, the mean interest rate during the study period was relatively low at 0.465, but the median interest rate was considerably higher at 3.667. This difference between mean and median values implies a skewed distribution with some periods experiencing significantly higher interest rates. The presence of a negative minimum interest rate of -65.857 is unusual and may require further investigation. The standard deviation is quite high, indicating significant variability in interest rates. The kurtosis is positive, suggesting a distribution with heavier tails compared to a normal distribution, and the skewness is negative, indicating that the distribution of interest rates is slightly skewed to the left. The range is wide, spanning from the unusual minimum to a maximum of 18.180.

Concerning population, the mean population growth rate in Nigeria during the study was 37.369. The median population growth rate is slightly lower than the mean, suggesting a distribution with a central tendency towards population growth. The relatively low standard deviation implies less variability in population growth rates. The negative kurtosis suggests a distribution with lighter tails compared to a normal distribution, while the positive skewness indicates a mild right-skew in the distribution. The range is relatively narrow, ranging from 22.671 to 53.521.

For exchange rates, the mean exchange rate during the study period was 147.042 USD/NGN, while the median exchange rate was considerably lower at 101.039 USD/NGN, indicating a skewed distribution with some periods having more favorable exchange rates. The substantial standard deviation underscores significant exchange rate volatility. The kurtosis is positive, indicating a distribution with heavier tails compared to a normal distribution, and the skewness is positive, confirming the right-skewed distribution. The range shows wide variation, from 49.776 to 536.911 USD/NGN.

Regarding inflation, the study reveals an average inflation rate of 21.152% over the study period, with a distribution showing skewness, with some periods experiencing significantly higher inflation. The standard deviation is relatively high, indicating significant variability in inflation rates. The kurtosis is positive, suggesting a distribution with heavier tails compared to a normal distribution, and the skewness is positive, indicating a right-skewed distribution. The range is wide, ranging from 0.686% to 219.003%.

Lastly, total government expenditure, representing government size, exhibits a mean of 2770.551 billion USD. However, the median TGEX falls significantly below the mean, indicating a skewed distribution with certain periods featuring higher government spending than the average. The standard deviation underscores significant variability in government expenditure. The kurtosis is positive, indicating a distribution with heavier tails compared to a normal distribution, and the skewness is positive, confirming the

right-skewed distribution. The range is broad, ranging from 9.637 billion USD to 14096.567 billion USD.

4.2 Unit Root Test

In order to carry out the co-integration test, there is need to first of all perform a stationarity test on the variables. Therefore, this study employs the use of the Augmented Dickey Fuller test to check for the stationarity of the variables employed in the model. In carrying out a unit root test, the order of integration is important as it helps in determining long run relationships among variables. Therefore, the null hypothesis that the variable has a unit root is tested and if the absolute values of the test statistics is greater than the critical values, the null hypothesis is rejected implying that the variable is stationary. If the absolute values of the test statistics is however less than the critical value, we fail to reject the null hypothesis implying the presence of a unit root and that the variable is non-stationary. The unit root tests as well as the order of integration of the variables are shown in the table below.

Table 4.2 Augmented Dickey Fuller Tests At Level

VARIABLES	ADF TEST STATISTICS	ADF CRITICAL VALUE			ORDER OF INTEGRATION	REMARKS
		1% Level	5% Level	10% Level		
RGDP	-0.526628	-3.646342	-2.954021	-2.615817	I(0)	NOT STATIONARY
INF	-2.236241	-3.639407	-2.951125	-2.614300	I(0)	NOT STATIONARY
TGEX	-1.078953	-3.639407	-2.951125	-2.614300	I(0)	NOT STATIONARY
POP	-1.969519	-3.639407	-2.951125	-2.614300	I(0)	NOT STATIONARY
EXR	1.071873	-3.639407	-2.951125	-2.614300	I(0)	NOT STATIONARY

Source: Author's computation

From Table 4.2, it can be seen that the absolute values of the ADF Test Statistics for all the variables are lower than the critical values. Hence, we fail to reject the null hypothesis implying that RGDP, INF, TGEX, POP and EXR all have unit roots and are non-stationary at levels.

Table 4.3 Augmented Dickey Fuller Tests At First Difference

VARIABLES	ADF TEST STATISTICS	ADF CRITICAL VALUE			ORDER OF INTEGRATION	REMARKS
		1% Level	5% Level	10% Level		
RGDP	-3.032111	-3.646342	-2.954021	-2.615817	I(1)	STATIONARY
INF	-6.197248	-3.646342	-2.954021	-2.615817	I(1)	STATIONARY
TGEX	-6.043243	-3.646342	-2.954021	-2.615817	I(1)	STATIONARY
POP	-7.978060	-3.646342	-2.954021	-2.615817	I(1)	STATIONARY
EXR	-4.080248	-3.646342	-2.954021	-2.615817	I(1)	STATIONARY

Source: Author's computation

From Table 4.3, it can be seen that the absolute value of the ADF Test Statistics for all the variables are higher than the critical values. Hence, we reject the null hypothesis implying that RGDP, INF, TGEX, POP and EXR do not have unit roots and are stationary at first difference or of order I(1) at the 5% and 10% level of significance

4.2.1 Co-Integration Test

Having performed the unit root tests, the next test to be carried out is the co-integration test which tests if the two or more non-stationary time series are stationary over time and move in the same direction in the long run. It can therefore be seen as the statistical implication of the existence of a long run relationship between economic variables. The Johansen co-integration test results are given below:

Table 4.4a: Johansen co-integration test (Trace)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.677830	81.73455	69.81889	0.0042
At most 1	0.488180	45.48888	47.85613	0.0820
At most 2	0.395809	24.05587	29.79707	0.1981
At most 3	0.211921	7.932164	15.49471	0.4727
At most 4	0.009675	0.311122	3.841466	0.5770

Trace test indicates 1 co-integrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's compilation using Eviews 10.0

From Table 4.4a, it can be seen that the trace test indicates that there is one co-integrating equation at the 0.05 significance level implying a long run relationship among the variables utilized in this study.

Table 4.4b: Johansen co-integration test (Maximum Eigenvalue)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.677830	36.24567	33.87687	0.0256
At most 1	0.488180	21.43301	27.58434	0.2509
At most 2	0.395809	16.12370	21.13162	0.2177
At most 3	0.211921	7.621042	14.26460	0.4185
At most 4	0.009675	0.311122	3.841466	0.5770

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's computation using Eviews 10.0

From Table 4.4b, the max-eigenvalue test indicates the presence of one co-integrating equation at the 0.05 significance level implying a long run relationship among the variables utilized in this study.

Having determined that the variables are co-integrated using the Johansen Co-Integration Test, the long run model of this study is therefore estimated using lagged values of the dependent and explanatory variables. The results are shown in the table below:

4.2.2 Error Correction Model

To determine the error correction model which is also referred to as the short run model, the variables need to be in differences in their stationary form. The error correction term, which are the residuals of the long run equation, are then incorporated into the model. The error correction term is however to be lagged one period. The results are shown in the table below:

Table 4.6: Short Run Model

Dependent Variable: D(RGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002965	0.011228	-0.264082	0.7940
D(INF(-1))	-0.013875	0.014351	-0.966834	0.3433
D(TGEX(-1))	0.032696	0.012958	2.523154	0.0187
D(POP(-1))	0.028537	0.008619	3.310771	0.0029
D(EXR(-1))	-0.008693	0.027139	-0.320325	0.7515
ECM(-1)	-1.086799	0.328841	-3.304934	0.0030
R-squared	0.657029	Mean dependent var		0.048207
Adjusted R-squared	0.556996	S.D. dependent var		0.035739
S.E. of regression	0.023787	Akaike info criterion		-4.427034
Sum squared resid	0.013580	Schwarz criterion		-4.060600
Log likelihood	78.83254	Hannan-Quinn criter.		-4.305571
F-statistic	6.568109	Durbin-Watson stat		2.038405
Prob(F-statistic)	0.000216			

Source: Author's computation using Eviews 10.0

The short-run regression results presented in Table 4.6 offer valuable insights into the dynamic relationships between the change in Real Gross Domestic Product (D(RGDP)) and a set of independent variables, each lagged by one period, thereby capturing the short-term dynamics of Nigeria's economy.

Commencing with the constant term (C), it bears a coefficient of -0.002965. This indicates the estimated change in RGDP when all other variables remain constant. However, it's noteworthy that this coefficient is not statistically significant at conventional significance levels (p-value of 0.7940), which implies that the baseline change in RGDP is not significantly different from zero. In essence, the model does not provide strong evidence of an inherent upward or downward trend in RGDP in the short run.

Transitioning to the change in lagged inflation variable (D(INF(-1))), its coefficient is -0.013875. This coefficient implies that an increase in inflation in the previous period is associated with a decrease in the change in RGDP in the current period, potentially reflecting the detrimental effects of inflation on economic stability. Nevertheless, it's crucial to note that this coefficient is not statistically significant (p-value of 0.3433), indicating that the relationship between inflation changes and RGDP changes lacks robustness within the confines of this model.

In stark contrast, the change in lagged total government expenditure (D(TGEX(-1))) exhibits a positive coefficient of 0.032696, signifying that an increase in government expenditure in the previous period is linked to an increase in the change in RGDP in the current period. This result is statistically significant (p-value of 0.0187), implying that changes in government expenditure can indeed have a short-term positive impact on

RGDP changes. This finding underscores the potential effectiveness of countercyclical fiscal policies in stimulating economic growth during periods of economic downturn.

Similarly, the change in lagged population growth (D(POP(-1))) showcases a positive coefficient of 0.028537, indicating that an increase in population growth in the previous period is associated with an increase in the change in RGDP in the current period. This coefficient is statistically significant (p-value of 0.0029), suggesting that changes in population growth can have a short-term positive effect on RGDP changes. A growing population can bolster economic activity through an expanded labor force and potentially increased consumer demand, contributing to economic expansion.

In contrast to population growth and government expenditure, the change in lagged exchange rate (D(EXR(-1))) features a coefficient of -0.008693, suggesting that an increase in the exchange rate in the previous period is tied to a decrease in the change in RGDP in the current period. However, this coefficient is not statistically significant (p-value of 0.7515), highlighting the lack of a robust relationship between exchange rate changes and RGDP changes in this model. It's important to consider that exchange rate dynamics can be influenced by various external and internal factors that may not be fully captured by this model.

The incorporation of the error correction term (ECM(-1)) is a noteworthy addition to this model. The negative coefficient of -1.086799 implies that if RGDP deviates from its long-run equilibrium, it tends to decrease in the short run, indicating an adjustment

process. This coefficient is statistically significant (p-value of 0.0030), affirming the presence of a mechanism that brings RGDP back to its equilibrium level in the short run. This suggests that RGDP tends to revert to a stable long-run path following any significant deviations, contributing to economic stability.

Considering model fit, the R-squared value of 0.657029 signifies that the independent variables collectively explain approximately 65.70% of the variation in the change in RGDP. While this indicates moderate explanatory power for short-term RGDP changes, it's important to recognize the model's limitations, such as potential omitted variables or model misspecification. The adjusted R-squared accounts for model complexity, while the F-statistic confirms the overall statistical significance of the model.

4.2.3 Diagnostic Tests

Diagnostic tests are tests carried out on the model to check for the normality of the model, the stability of the model, and also the presence of serial correlation, heteroscedasticity and multi-collinearity. This is to ensure that the model passes the econometric criteria. The test results are summarized in the table below.

Table 4.7: Tabular Presentation of Diagnostic Tests

TEST	METHOD	Prob Value	CONCLUSION
Serial Correlation	Breusch-Godfrey Serial Correlation LM Test	0.8725	No serial correlation
Heteroskedasticity	Breusch-Pagan Serial Correlation LM Test	0.7185	Homoskedastic (equal spread)
Multi-collinearity	Variance Inflation Factor	None	No Multicollinearity

Source: Author's computation

After performing the diagnostic tests, the results are compiled in the table above and fully shown in appendix VII. The Breusch-Godfrey Serial Correlation LM Test was used to test for autocorrelation in the model and with a probability result greater than 0.05, it implies the absence of autocorrelation. This corroborates the Durbin-Watson statistics test already carried out earlier. The results of the Breusch-Pagan Serial Correlation LM Test indicate the absence of heteroscedasticity in the model.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

This section contains the summary of findings of the analyses carried out in the previous section. Based on these findings, policy recommendations are given for policy implementation.

5.1 Summary of Findings

The study's primary focus is to analyze the impact of government size on economic growth in Nigeria. It employs regression analysis techniques, examining both the long-run and short-run relationships using Real Gross Domestic Product (RGDP) as a proxy for economic growth. The study investigates various economic indicators, including Total Government Expenditure (TGEX), population growth (POP), inflation (INF), and exchange rates (EXR), to understand their impact on economic growth within the Nigerian context.

In the long-run regression analysis, the study uncovers several critical insights. It highlights the substantial influence of government size, proxied by TGEX. The positive and statistically significant coefficient for lagged TGEX(-1) underscores the critical role of government expenditure in fostering economic growth over time. As government spending increases in the previous period, it positively impacts current RGDP. This finding underscores the significance of prudent fiscal policies and strategic public investments in promoting sustainable economic development.

Additionally, population growth (POP) is identified as another key driver of economic growth. A higher population growth rate in the previous period is associated with increased economic growth in the long run, likely due to the expansion of the labor force and increased consumption opportunities. However, variables such as inflation (INF) and exchange rates (EXR) did not exhibit significant relationships with RGDP in this specific model. Overall, the long-run regression model displayed strong explanatory power, reaffirming the robustness of the model-data relationship.

Transitioning to the short-run regression analysis, the study explores the dynamic relationships between changes in RGDP (D(RGDP)) and lagged changes in economic variables. Notably, the findings reveal the pivotal role of government expenditure (TGEX) in driving short-term economic growth. Changes in government expenditure in the previous period have a statistically significant positive impact on changes in RGDP in the short run. This result underscores the potential effectiveness of countercyclical fiscal policies in stimulating short-term economic growth during periods of economic downturn.

Furthermore, population growth (POP) also emerges as a crucial driver of short-term economic fluctuations. Changes in population growth in the previous period exhibit a statistically significant positive effect on changes in RGDP in the short run, highlighting the role of demographics in shaping short-term economic dynamics. Conversely, variables like changes in inflation (INF) and exchange rates (EXR) do not demonstrate robust relationships with short-term changes in RGDP in this specific model.

An intriguing addition to the short-run model is the error correction term (ECM), signifying the presence of an adjustment mechanism that guides RGDP back to its long-run equilibrium in the short term, contributing to economic stability. While the short-run model displays a moderate level of explanatory power, it provides valuable insights into the drivers of short-term economic dynamics.

In summary, this study's comprehensive findings have significant implications for policymakers and researchers. They emphasize the critical role of government size, as proxied by Total Government Expenditure, in both the long run and short run. Effective fiscal policies and targeted public investments can play a pivotal role in fostering sustainable economic development in Nigeria. Additionally, population growth emerges as a key catalyst for economic growth, underlining the importance of demographic trends in shaping economic dynamics. Nonetheless, it's essential to recognize the study's limitations, such as potential omitted variables and model assumptions. Further research is warranted to capture the full complexity of Nigeria's economic dynamics. Nonetheless, these findings provide a robust foundation for informed decision-making in the pursuit of sustainable economic growth and stability in Nigeria.

5.2 Policy Implications

The study's analysis of the determinants of economic growth in Nigeria offers valuable policy insights with broader implications. These findings provide policymakers with a roadmap for fostering sustainable economic development and stability in the country. A fundamental policy implication revolves around prudent fiscal management. The positive

relationship identified between government expenditure, and economic growth underscores the pivotal role of fiscal policies. Policymakers should prioritize responsible fiscal management, directing public spending toward projects and initiatives that yield long-term economic benefits. Investments in infrastructure, education, healthcare, and technology can enhance productivity and create an environment conducive to economic growth. Simultaneously, maintaining fiscal discipline and transparency is essential to ensure that public resources are efficiently allocated, promoting economic stability.

Furthermore, one of the critical takeaways is the significance of demographic dynamics. The study's identification of population growth (POP) as a significant driver of economic growth underscores the need to leverage Nigeria's youthful demographic profile. Policymakers should focus on initiatives that harness the potential of this demographic dividend. Investments in education, skills development, and job creation programs can empower the youth to contribute actively to economic growth. Moreover, fostering an environment conducive to entrepreneurship and innovation can unlock new opportunities for sustainable economic development. Recognizing the demographic advantage is key to capitalizing on it fully.

While the study did not find strong relationships between inflation (INF) or exchange rates (EXR) and economic growth within the specific models used, it is essential to recognize the potential impact of these factors. Policymakers should remain vigilant in managing inflation to maintain price stability, as high inflation rates can erode purchasing

power and hinder economic growth. Additionally, exchange rate policies should prioritize stability to mitigate the negative effects of currency fluctuations on businesses and investments. These policy considerations ensure that economic stability and predictability are maintained, which are crucial for attracting investments and fostering sustainable growth.

The presence of an error correction term (ECM) in the short-run model highlights the resilience of the Nigerian economy in responding to short-term shocks. Policymakers should acknowledge and strengthen these adjustment mechanisms to enhance overall economic stability. Effective crisis management, responsive monetary policies, and a resilient financial sector are crucial components of this strategy. By ensuring that the economy can absorb and recover from short-term disruptions efficiently, policymakers can provide a stable environment for businesses to thrive and for long-term growth prospects to remain positive.

Lastly, the study underscores the need for ongoing research and data enhancement. The complexity of economic relationships necessitates continuous research efforts and improved data collection and analysis. Policymakers should support and collaborate with research institutions to ensure the availability of accurate and timely data. Comprehensive economic modeling that considers a broader range of factors, including external shocks and structural reforms, can provide a more holistic understanding of Nigeria's economic dynamics, informing more effective and evidence-based policymaking. In an ever-

evolving economic landscape, policymakers must stay informed and adapt their strategies based on sound empirical evidence.

The study's findings offer policymakers a comprehensive framework for advancing economic growth and stability in Nigeria. By prioritizing responsible fiscal management, harnessing the demographic dividend, managing inflation and exchange rates effectively, strengthening economic stability mechanisms, and promoting data-driven decision-making, policymakers can navigate the complex economic landscape and work toward a more prosperous and stable future for the nation. These policy considerations collectively contribute to Nigeria's economic resilience and growth prospects, ensuring that the nation can better withstand external shocks and sustain long-term prosperity.

5.3 Recommendations and Conclusions

Based on the study's findings and the policy implications discussed, several recommendations emerge for policymakers in Nigeria. First and foremost, there is a crucial need for strategic fiscal management. The positive relationship between government expenditure, represented by Total Government Expenditure (TGEX), and economic growth underscores the importance of prudent fiscal policies. Policymakers should develop and implement well-structured fiscal strategies that prioritize long-term economic growth. This includes targeted investments in critical sectors such as infrastructure, education, healthcare, and technology. Simultaneously, mechanisms for

fiscal discipline and transparency should be strengthened to ensure efficient and effective allocation of public resources.

Recognizing the significant role of population growth (POP) in driving economic growth, policymakers should design and implement strategies to harness the demographic dividend. This involves substantial investments in education and skills development programs tailored to the needs of Nigeria's youthful population. Additionally, initiatives that promote job creation, entrepreneurship, and innovation can unlock the full potential of the country's demographic advantage.

While the study did not establish strong links between inflation (INF) or exchange rates (EXR) with economic growth within the specific models, policymakers should remain vigilant in managing inflation to maintain price stability. Exchange rate policies should prioritize stability to mitigate the adverse effects of currency fluctuations on businesses and investments. Effective inflation targeting and exchange rate management mechanisms are essential for overall economic stability.

Enhancing economic stability mechanisms is also vital. The presence of an error correction term (ECM) in the short-run model highlights the resilience of the Nigerian economy in responding to short-term shocks. Policymakers should work to reinforce these adjustment mechanisms, which include responsive monetary policies, effective crisis management, and maintaining a resilient financial sector.

Moreover, investment in research and data infrastructure is crucial. Given the complexity of economic relationships, policymakers should continue to support research institutions and initiatives aimed at improving data collection, analysis, and economic modeling. A robust and timely data infrastructure is vital for informed policymaking and adapting to evolving economic conditions.

In conclusion, this study has provided valuable insights into the determinants of economic growth in Nigeria. The findings emphasize the critical importance of prudent fiscal policies, harnessing the demographic dividend, managing inflation and exchange rates effectively, strengthening economic stability mechanisms, and investing in research and data infrastructure.

These recommendations collectively contribute to the goal of fostering sustainable economic development and stability in Nigeria. By aligning policies with these insights and remaining flexible in response to changing economic conditions, Nigeria can navigate the complex economic landscape and work toward a more prosperous and resilient future.

It is essential to acknowledge that the study's scope is not exhaustive, and economic dynamics can evolve over time. Therefore, policymakers should continuously monitor economic trends, engage with experts, and adapt policies to ensure that Nigeria's economic growth remains on a positive trajectory, benefiting the nation and its citizens.

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APPENDIX I

YEAR	RGDP	Interest Rate	Population Growth	Exchange Rate	Inflation	Total Government Expenditure
1981	1.3953E+11	-65.857	22.671	320.830	219.003	11.4
1982	1.3004E+11	-4.586	23.389	329.026	14.803	11.9
1983	1.1583E+11	-8.022	24.122	389.420	19.569	9.6
1984	1.1454E+11	4.342	24.872	536.911	5.654	9.9
1985	1.2131E+11	2.343	25.635	482.758	6.928	13.0
1986	1.2139E+11	4.310	26.414	263.786	5.415	16.2
1987	1.2527E+11	-4.770	27.209	84.000	19.669	22.0
1988	1.3446E+11	-2.963	28.019	85.307	20.177	27.7
1989	1.3704E+11	-6.612	28.842	76.298	28.970	41.0
1990	1.5318E+11	17.466	29.680	71.059	6.669	60.3
1991	1.5373E+11	0.991	30.176	60.101	18.864	66.6
1992	1.6085E+11	-14.987	30.677	49.776	46.752	92.8
1993	1.5757E+11	-7.052	31.182	54.440	41.639	191.2
1994	1.5471E+11	-15.920	31.691	100.631	43.296	160.9
1995	1.546E+11	-31.453	32.205	160.178	75.402	248.8
1996	1.6109E+11	-5.261	32.725	207.510	26.491	337.2
1997	1.6582E+11	12.127	33.247	236.030	5.055	428.2
1998	1.701E+11	11.485	33.773	273.009	6.009	487.1
1999	1.7109E+11	6.047	34.304	69.197	13.431	947.7
2000	1.7968E+11	-1.141	34.840	70.161	22.674	701.1
2001	1.9031E+11	12.139	35.669	78.182	10.076	1,018.0
2002	2.1948E+11	3.024	36.508	78.419	21.109	1,018.2
2003	2.3561E+11	9.936	37.356	73.672	9.804	1,226.0
2004	2.574E+11	-2.605	38.212	75.318	22.368	1,504.2
2005	2.7397E+11	-1.594	39.074	86.268	19.858	1,919.7
2006	2.9058E+11	-5.628	39.943	91.441	23.864	2,038.0
2007	3.0973E+11	9.187	40.819	90.530	7.100	2,450.9
2008	3.3068E+11	6.685	41.702	99.562	7.921	3,240.8
2009	3.5726E+11	18.180	42.588	92.642	0.686	3,453.0
2010	3.8586E+11	1.068	43.480	100.000	16.343	4,194.6
2011	4.0634E+11	5.686	44.366	100.504	9.778	4,712.1
2012	4.2353E+11	6.225	45.246	110.499	9.948	4,605.3
2013	4.5178E+11	11.202	46.118	117.534	4.965	5,185.3
2014	4.8029E+11	11.356	46.982	124.818	4.663	4,587.4
2015	4.9303E+11	13.596	47.838	119.850	2.864	4,988.9
2016	4.8506E+11	6.686	48.683	110.860	9.544	5,858.6

2017	4.8896E+11	5.791	49.519	101.447	11.119	6,456.7
2018	4.9837E+11	6.056	50.344	109.903	10.228	7,813.7
2021	5.0937E+11	4.522	51.157	124.190	10.385	9,714.6
2020	5.0023E+11	5.371	51.958	119.510	7.849	10,231.7
2021	5.1848E+11	1.228	52.746	117.029	10.131	12,164.1
2022	5.3534E+11	0.919	53.521	133.163	11.31133494	14,096.6

Source: ***World Development Indicators (2022)***

APPENDIX II

UNIT ROOT TEST RESULTS

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.526628	0.8734
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDP)
Method: Least Squares
Date: 9/26/23 Time: 12:17
Sample (adjusted): 1982 2021
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP(-1)	-0.005511	0.010464	-0.526628	0.6023
D(RGDP(-1))	0.554460	0.152994	3.624075	0.0011
C	0.078071	0.108052	0.722528	0.4756

R-squared	0.304635	Mean dependent var	0.046798
Adjusted R-squared	0.258277	S.D. dependent var	0.036095
S.E. of regression	0.031086	Akaike info criterion	-4.017581
Sum squared resid	0.028991	Schwarz criterion	-3.881535
Log likelihood	69.29009	Hannan-Quinn criter.	-3.971806
F-statistic	6.571394	Durbin-Watson stat	2.152182
Prob(F-statistic)	0.004297		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.032111	0.0422
Test critical values:	1% level	-3.646342	

	5% level	-2.954021
	10% level	-2.615817

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDP,2)
Method: Least Squares
Date: 9/26/23 Time: 12:15
Sample (adjusted): 1982 2021
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	-0.455169	0.150116	-3.032111	0.0049
C	0.021362	0.008816	2.423101	0.0214

R-squared	0.228735	Mean dependent var	0.000111
Adjusted R-squared	0.203855	S.D. dependent var	0.034431
S.E. of regression	0.030722	Akaike info criterion	-4.068985
Sum squared resid	0.029259	Schwarz criterion	-3.978288
Log likelihood	69.13825	Hannan-Quinn criter.	-4.038468
F-statistic	9.193694	Durbin-Watson stat	2.121627
Prob(F-statistic)	0.004875		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.236241	0.1978
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF)
Method: Least Squares
Date: 9/26/23 Time: 12:18
Sample (adjusted): 1982 2021
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

INF(-1)	-0.067337	0.030111	-2.236241	0.0324
C	0.697880	0.226527	3.080780	0.0042

R-squared	0.135153	Mean dependent var	0.214871
Adjusted R-squared	0.108127	S.D. dependent var	0.421586
S.E. of regression	0.398142	Akaike info criterion	1.053004
Sum squared resid	5.072534	Schwarz criterion	1.142790
Log likelihood	-15.90107	Hannan-Quinn criter.	1.083624
F-statistic	5.000773	Durbin-Watson stat	2.292015
Prob(F-statistic)	0.032435		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.197248	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF,2)
Method: Least Squares
Date: 9/26/23 Time: 12:18
Sample (adjusted): 1983 2021
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-1.089018	0.175726	-6.197248	0.0000
C	0.250062	0.083404	2.998206	0.0053

R-squared	0.553352	Mean dependent var	0.007847
Adjusted R-squared	0.538944	S.D. dependent var	0.623339
S.E. of regression	0.423254	Akaike info criterion	1.177005
Sum squared resid	5.553473	Schwarz criterion	1.267702
Log likelihood	-17.42058	Hannan-Quinn criter.	1.207522
F-statistic	38.40588	Durbin-Watson stat	1.675906
Prob(F-statistic)	0.000001		

Null Hypothesis: TGEX has a unit root
Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.078953	0.7127
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TGEX)
Method: Least Squares
Date: 9/26/23 Time: 12:21
Sample (adjusted): 1982 2021
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TGEX(-1)	-0.034508	0.031983	-1.078953	0.2887
C	0.394008	0.147375	2.673504	0.0117

R-squared	0.035102	Mean dependent var	0.257831
Adjusted R-squared	0.004949	S.D. dependent var	0.444786
S.E. of regression	0.443684	Akaike info criterion	1.269613
Sum squared resid	6.299371	Schwarz criterion	1.359399
Log likelihood	-19.58343	Hannan-Quinn criter.	1.300233
F-statistic	1.164140	Durbin-Watson stat	2.155186
Prob(F-statistic)	0.288675		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.043243	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TGEX,2)
Method: Least Squares

Date: 9/26/23 Time: 12:21
Sample (adjusted): 1982 2021
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TGEX(-1))	-1.104438	0.182756	-6.043243	0.0000
C	0.287933	0.090720	3.173882	0.0034

R-squared	0.540882	Mean dependent var	0.021678
Adjusted R-squared	0.526072	S.D. dependent var	0.661741
S.E. of regression	0.455559	Akaike info criterion	1.324108
Sum squared resid	6.433550	Schwarz criterion	1.414806
Log likelihood	-19.84778	Hannan-Quinn criter.	1.354625
F-statistic	36.52078	Durbin-Watson stat	1.711670
Prob(F-statistic)	0.000001		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.969519	0.2982
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(POP)
Method: Least Squares
Date: 9/26/23 Time: 12:25
Sample (adjusted): 1983 2021
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POP(-1)	-0.107863	0.054766	-1.969519	0.0576
C	0.702452	0.276817	2.537603	0.0162

R-squared	0.108114	Mean dependent var	0.227681
Adjusted R-squared	0.080242	S.D. dependent var	0.827372
S.E. of regression	0.793483	Akaike info criterion	2.432252
Sum squared resid	20.14767	Schwarz criterion	2.522038
Log likelihood	-39.34829	Hannan-Quinn criter.	2.462872
F-statistic	3.879005	Durbin-Watson stat	2.684937

Prob(F-statistic)	0.057602

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.978060	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(POP,2)
Method: Least Squares
Date: 9/26/23 Time: 12:28
Sample (adjusted): 1983 2021
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POP(-1))	-1.341927	0.168202	-7.978060	0.0000
C	0.316498	0.143736	2.202140	0.0352

R-squared	0.672476	Mean dependent var	0.022218
Adjusted R-squared	0.661910	S.D. dependent var	1.372504
S.E. of regression	0.798049	Akaike info criterion	2.445399
Sum squared resid	19.74336	Schwarz criterion	2.536096
Log likelihood	-38.34908	Hannan-Quinn criter.	2.475916
F-statistic	63.64944	Durbin-Watson stat	1.800024
Prob(F-statistic)	0.000000		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.071873	0.9964
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR)
Method: Least Squares
Date: 9/26/23 Time: 12:29
Sample (adjusted): 1983 2021
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR(-1)	0.039832	0.037161	1.071873	0.2918
C	5.061169	4.849071	1.043740	0.3044

R-squared	0.034659	Mean dependent var	9.000000
Adjusted R-squared	0.004492	S.D. dependent var	18.48982
S.E. of regression	18.44824	Akaike info criterion	8.724837
Sum squared resid	10890.80	Schwarz criterion	8.814623
Log likelihood	-146.3222	Hannan-Quinn criter.	8.755457
F-statistic	1.148911	Durbin-Watson stat	1.498575
Prob(F-statistic)	0.291795		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.080248	0.0033
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR,2)
Method: Least Squares
Date: 9/26/23 Time: 12:31
Sample (adjusted): 1983 2021
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1))	-0.698878	0.171283	-4.080248	0.0003
C	6.460529	3.532373	1.828949	0.0770

R-squared	0.349401	Mean dependent var	-0.003030
Adjusted R-squared	0.328414	S.D. dependent var	22.13176
S.E. of regression	18.13705	Akaike info criterion	8.692482
Sum squared resid	10197.53	Schwarz criterion	8.783180
Log likelihood	-141.4260	Hannan-Quinn criter.	8.722999
F-statistic	16.64843	Durbin-Watson stat	1.939635
Prob(F-statistic)	0.000292		

APPENDIX III
CO-INTEGRATION TEST

Date: 07/19/21 Time: 10:07
Sample (adjusted): 1982 2021
Included observations: 41 after adjustments
Trend assumption: Linear deterministic trend
Series: RGDP INF TGEX POP EXR
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.677830	81.73455	69.81889	0.0042
At most 1	0.488180	45.48888	47.85613	0.0820
At most 2	0.395809	24.05587	29.79707	0.1981
At most 3	0.211921	7.932164	15.49471	0.4727
At most 4	0.009675	0.311122	3.841466	0.5770

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.677830	36.24567	33.87687	0.0256
At most 1	0.488180	21.43301	27.58434	0.2509
At most 2	0.395809	16.12370	21.13162	0.2177
At most 3	0.211921	7.621042	14.26460	0.4185
At most 4	0.009675	0.311122	3.841466	0.5770

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

RGDP	INF	TGEX	POP	EXR
-15.51928	-3.002413	2.861203	2.560102	0.021358
-12.61917	-3.370789	5.415332	1.127031	-0.014958
7.999896	0.599458	-1.990755	-0.781860	-0.010951
-11.09910	-0.131416	2.127485	-0.714960	0.036990
6.247437	2.143390	-2.312825	-0.185610	-0.036713

Unrestricted Adjustment Coefficients (alpha):

D(RGDP)	0.009185	-0.000227	-0.010250	0.004585	0.000836
D(INF)	0.242886	0.033892	0.112927	-0.019058	-0.003183
D(TGEX)	0.178623	-0.207722	-0.049883	-0.046267	0.002166
D(POP)	-0.128743	0.007296	0.195774	0.276956	-0.006996
D(EXR)	-4.343068	1.345980	5.148953	1.745314	0.859887

1 Cointegrating Equation(s): Log likelihood -83.53815

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	INF	TGEX	POP	EXR
1.000000	0.193463	-0.184364	-0.164963	-0.001376
	(0.02524)	(0.02622)	(0.02089)	(0.00048)

Adjustment coefficients (standard error in parentheses)

D(RGDP)	-0.142540
	(0.07579)
D(INF)	-3.769418
	(0.88727)
D(TGEX)	-2.772094
	(1.20424)
D(POP)	1.997991
	(2.38368)
D(EXR)	67.40129
	(45.3062)

2 Cointegrating Equation(s): Log likelihood -72.82165

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	INF	TGEX	POP	EXR
1.000000	0.000000	0.458571	-0.363676	-0.008105
		(0.12065)	(0.10432)	(0.00264)
0.000000	1.000000	-3.323293	1.027134	0.034779
		(0.56717)	(0.49038)	(0.01243)

Adjustment coefficients (standard error in parentheses)

D(RGDP)	-0.139678	-0.026812
	(0.09768)	(0.02204)
D(INF)	-4.197110	-0.843488
	(1.13348)	(0.25580)
D(TGEX)	-0.150818	0.163887
	(1.24333)	(0.28059)
D(POP)	1.905922	0.361945
	(3.07207)	(0.69330)
D(EXR)	50.41615	8.502672
	(58.0825)	(13.1079)

3 Cointegrating Equation(s): Log likelihood -64.75980

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	INF	TGEX	POP	EXR
1.000000	0.000000	0.000000	-0.174627	-0.003973
			(0.05313)	(0.00165)
0.000000	1.000000	0.000000	-0.342911	0.004840
			(0.33929)	(0.01055)
0.000000	0.000000	1.000000	-0.412255	-0.009009
			(0.14939)	(0.00464)

Adjustment coefficients (standard error in parentheses)

D(RGDP)	-0.221676	-0.032956	0.045456	
	(0.09290)	(0.01964)	(0.02777)	
D(INF)	-3.293705	-0.775793	0.653674	
	(1.09287)	(0.23101)	(0.32671)	
D(TGEX)	-0.549875	0.133985	-0.514502	
	(1.31734)	(0.27846)	(0.39382)	
D(POP)	3.472090	0.479303	-0.718586	
	(3.17142)	(0.67037)	(0.94809)	
D(EXR)	91.60723	11.58925	-15.38778	
	(57.4284)	(12.1392)	(17.1680)	

4 Cointegrating Equation(s): Log likelihood -60.94927

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	INF	TGEX	POP	EXR
1.000000	0.000000	0.000000	0.000000	-0.005190
				(0.00102)
0.000000	1.000000	0.000000	0.000000	0.002450
				(0.00794)
0.000000	0.000000	1.000000	0.000000	-0.011882
				(0.00497)
0.000000	0.000000	0.000000	1.000000	-0.006969
				(0.00807)

Adjustment coefficients (standard error in parentheses)

D(RGDP)	-0.272570	-0.033559	0.055212	0.027994
	(0.10150)	(0.01908)	(0.02841)	(0.01253)
D(INF)	-3.082181	-0.773289	0.613129	0.585343
	(1.22505)	(0.23029)	(0.34286)	(0.15120)
D(TGEX)	-0.036349	0.140065	-0.612935	0.295264
	(1.46054)	(0.27456)	(0.40877)	(0.18027)
D(POP)	0.398134	0.442907	-0.129367	-0.672451
	(3.23656)	(0.60842)	(0.90583)	(0.39948)
D(EXR)	72.23582	11.35989	-11.67465	-14.87533
	(63.9063)	(12.0134)	(17.8858)	(7.88778)

APPENDIX IV

LONG RUN EQUATION

Dependent Variable: RGDP
Method: Least Squares
Date: 09/26/23 Time: 08:05
Sample (adjusted): 1982 2021
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.834065	0.448050	4.093436	0.0004
INF(-1)	-0.022276	0.010089	-2.207902	0.0363
TGEX(-1)	0.034515	0.013688	2.521659	0.0181
POP(-1)	0.023213	0.006068	3.825141	0.0007
EXR(-1)	0.000152	0.000125	1.212906	0.2361
RGDP(-1)	1.138760	0.152205	7.481757	0.0000
RGDP(-2)	-0.322097	0.134870	-2.388196	0.0245

R-squared	0.998308	Mean dependent var	10.41929
Adjusted R-squared	0.997917	S.D. dependent var	0.529678
S.E. of regression	0.024173	Akaike info criterion	-4.421297
Sum squared resid	0.015193	Schwarz criterion	-4.103856
Log likelihood	79.95140	Hannan-Quinn criter.	-4.314488
F-statistic	2556.296	Durbin-Watson stat	2.142521
Prob(F-statistic)	0.000000		

APPENDIX V
ERROR CORRECTION MODEL

Dependent Variable: D(RGDP)
Method: Least Squares
Date: 9/26/23 Time: 22:51
Sample (adjusted): 1982 2021
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002965	0.011228	-0.264082	0.7940
D(INF(-1))	-0.013875	0.014351	-0.966834	0.3433
D(TGEX(-1))	0.032696	0.012958	2.523154	0.0187
D(POP(-1))	0.028537	0.008619	3.310771	0.0029
D(EXR(-1))	-0.008693	0.027139	-0.320325	0.7515
D(RGDP(-1))	1.133969	0.232924	4.868411	0.0001
D(RGDP(-2))	-0.266842	0.177847	-1.500404	0.1466
ECM(-1)	-1.086799	0.328841	-3.304934	0.0030

R-squared	0.657029	Mean dependent var	0.048207
Adjusted R-squared	0.556996	S.D. dependent var	0.035739
S.E. of regression	0.023787	Akaike info criterion	-4.427034
Sum squared resid	0.013580	Schwarz criterion	-4.060600
Log likelihood	78.83254	Hannan-Quinn criter.	-4.305571
F-statistic	6.568109	Durbin-Watson stat	2.038405
Prob(F-statistic)	0.000216		

APPENDIX VI
DIAGNOSTIC TESTS

Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.137296	Prob. F(2,22)	0.8725
Obs*R-squared	0.394482	Prob. Chi-Square(2)	0.8210

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 9/26/23 Time: 22:57
Sample: 1982 2021
Included observations: 41
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001367	0.012517	-0.109238	0.9140
D(INF(-1))	-0.001886	0.015371	-0.122715	0.9034
D(TGEX(-1))	-0.000248	0.013479	-0.018400	0.9855
D(POP(-1))	-0.000395	0.009211	-0.042836	0.9662
D(EXR(-1))	0.002459	0.029055	0.084642	0.9333
D(RGDP(-1))	-0.008666	0.247650	-0.034992	0.9724
D(RGDP(-2))	0.041790	0.230960	0.180940	0.8581
ECM(-1)	0.153170	0.736392	0.208001	0.8371
RESID(-1)	-0.176025	0.763611	-0.230516	0.8198
RESID(-2)	-0.107269	0.299789	-0.357815	0.7239

R-squared	0.012328	Mean dependent var	-1.41E-18
Adjusted R-squared	-0.391720	S.D. dependent var	0.020930
S.E. of regression	0.024691	Akaike info criterion	-4.314438
Sum squared resid	0.013412	Schwarz criterion	-3.856395
Log likelihood	79.03101	Hannan-Quinn criter.	-4.162610
F-statistic	0.030510	Durbin-Watson stat	1.993262
Prob(F-statistic)	0.999996		

Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.640169	Prob. F(7,24)	0.7185
Obs*R-squared	5.034830	Prob. Chi-Square(7)	0.6557
Scaled explained SS	4.703813	Prob. Chi-Square(7)	0.6961

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 9/26/23 Time: 23:00
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000152	0.000387	0.392769	0.6980
D(INF(-1))	-0.000704	0.000495	-1.422353	0.1678
D(TGEX(-1))	0.000337	0.000447	0.753510	0.4585
D(POP(-1))	9.65E-05	0.000297	0.324933	0.7480
D(EXR(-1))	0.000273	0.000935	0.292272	0.7726
D(RGDP(-1))	0.014659	0.008028	1.826067	0.0803
D(RGDP(-2))	-0.008524	0.006130	-1.390559	0.1771
ECM(-1)	-0.015163	0.011334	-1.337895	0.1935

R-squared	0.157338	Mean dependent var	0.000424
Adjusted R-squared	-0.088438	S.D. dependent var	0.000786
S.E. of regression	0.000820	Akaike info criterion	-11.16263
Sum squared resid	1.61E-05	Schwarz criterion	-10.79620
Log likelihood	186.6021	Hannan-Quinn criter.	-11.04117
F-statistic	0.640169	Durbin-Watson stat	2.063018
Prob(F-statistic)	0.718515		

Multi-collinearity Test

Variance Inflation Factors
Date: 09/26/23 Time: 09:45
Sample: 1982 2021
Included observations: 41

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
INF	0.283051	20.83936	10.88987
TGEX	8.059831	5.358046	3.889972
POP	21.72439	10.17711	5.408409
EXR	433.0815	10.05363	4.308868
C	2138384.	2.581244	NA