

THE IMPACT OF URBANIZATION ON ECONOMIC GROWTH IN NIGERIA

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CERTIFICATION

This is to certify that the project title “THE IMPACT OF URBANIZATION ON ECONOMIC GROWTH IN NIGERIA” was carried out by OKOLIE STEPHANIE AMARACHI with matriculation number SSC2105596 in the department of Economics, Faculty of Social Sciences, University of Benin.

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DEDICATION

This Project is dedicated to Almighty God and to my parents whose support made this possible.

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All glory be to Almighty God for his guidance, favor, grace and protection throughout the course of this academic journey. My heart felt gratitude goes to my parents Mr. Okolie Anthony and Mrs. Okolie Francisca and my siblings for their unwavering moral, financial, and spiritual support. May all your heart desires be answered.

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ABSTRACT

This study examines the impact of urbanization on economic growth in Nigeria over the period 1981 to 2024 using the Autoregressive Distributed Lag (ARDL) modeling approach. Gross domestic product (GDP) was used as the dependent variable, while urbanization (URB), population (POP), foreign direct investment (FDI), and inflation (INF) served as explanatory variables. The study employed unit root tests to determine the stationarity of the variables, followed by ARDL bounds testing to investigate the existence of a long-run co-integration relationship among the variables.

Short-run ARDL estimates showed that past values of GDP, urbanization, population, and FDI significantly affect current economic growth, while inflation has a marginally negative impact. Long-run estimates revealed that urbanization and FDI positively influence GDP, whereas population growth and inflation negatively affect economic performance. The error correction term was negative and statistically significant, demonstrating the model's ability to correct deviations from long-run equilibrium.

Diagnostic tests confirmed the robustness of the model, with no evidence of heteroskedasticity or serial correlation, and the R-squared and F-statistic values indicated strong explanatory power. Based on these findings, the study concludes that urbanization and stable FDI inflows are critical drivers of economic growth, while population growth and inflation require careful management. Policy recommendations include planned urban development, promotion of sustainable foreign investment, population management, and macroeconomic stability to ensure that urbanization contributes positively to Nigeria's economic development.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Urbanization has emerged as one of the most significant demographic and economic phenomena shaping the 21st century. It denotes the increasing concentration of people in towns and cities relative to rural areas. Globally, more than half of the world's population now resides in urban areas, with 55 percent recorded in 2020, and projections indicate that this will increase to 68 percent by 2050, adding about 2.5 billion more urban dwellers, particularly in Asia and Africa (United Nations, 2019; World Bank, 2020). This global shift creates both transformative opportunities and complex challenges for sustainable development (United Nations, 2019; World Bank, 2020).

In Nigeria, urbanization has been one of the most visible structural changes in the economy. Since independence, the country has witnessed substantial rural-to-urban migration driven by industrialization, employment opportunities, education, and better living conditions. Cities such as Lagos, Abuja, Port Harcourt, Kano, and Ibadan have expanded rapidly, making Nigeria one of the fastest-urbanizing nations in the world (Akinyemi, 2018). According to United Nations estimates, Nigeria's urban population rose from 15.4 percent in 1960 to approximately 52 percent in 2020, and more recent

statistics from 2023 show that it reached 54.28 percent in 2023 (United Nations, 2019; Statista, 2023).

Economic theory posits that urbanization can drive economic growth through several channels. Higher population density promotes economies of scale, labor specialization, and larger markets (Krugman, 1991). Urban areas typically provide better infrastructure and institutions that support industrial growth, financial intermediation, and innovation (Todaro & Smith, 2015). Urbanization also enhances human capital formation by improving access to education, healthcare, and social services. However, rapid urbanization without effective planning often leads to congestion, housing shortages, unemployment, poverty, pollution, crime, and infrastructural pressure (Akinyemi, 2018; World Bank, 2020).

Another critical factor shaping the relationship between urbanization and economic growth in Nigeria is the role of foreign direct investment (FDI). FDI provides capital inflows that can stimulate industrial development, expand urban-based industries, and enhance employment opportunities. However, the volatility of FDI inflows in Nigeria raises questions about whether they effectively complement urbanization to drive growth or merely reinforce uneven development (UNCTAD, 2022; Adeleye, 2020). Inflation also plays a significant role in the urbanization–growth nexus. While moderate inflation may stimulate production and consumption in urban markets, high and persistent inflation in Nigeria has historically eroded real incomes, discouraged investment, and reduced the

potential benefits of urbanization for sustainable growth (CBN, 2021; Adebayo & Ojo, 2019).

For Nigeria, the urbanization–economic growth relationship remains complex. Despite being one of the most urbanized countries in Africa, Nigeria continues to experience weak industrial output, unemployment, poverty, and infrastructural deficits (Akinyemi, 2018). While Lagos has emerged as a hub of economic activity and financial services, it has also developed sprawling informal settlements that undermine productivity and living conditions. This paradox raises a critical question: has urbanization in Nigeria translated into meaningful economic growth, or has it become a burden that undermines sustainable development?

This study is therefore motivated by the need to provide empirical evidence on the effect of urbanization on economic growth in Nigeria. While several studies have examined the determinants of growth and structural transformation, relatively fewer have specifically analyzed the urbanization–growth nexus in Nigeria. Given the rapid pace of urban expansion and persistent developmental challenges, this study becomes relevant in determining whether urbanization is a driver or a drag on Nigeria’s economic growth trajectory.

1.2 Statement of the Research Problem

Urbanization is widely regarded as a catalyst for economic transformation, but in the case of Nigeria, its role in promoting sustained economic growth remains highly contested.

Despite the rapid rate of urbanization, Nigeria's economy continues to face persistent structural weaknesses such as high unemployment, poverty, infrastructural decay, and uneven income distribution (World Bank, 2020). For instance, Nigeria's urban population increased from 15% in 1960 to over 53% in 2022 (United Nations, 2022), yet the benefits of this demographic shift have not translated proportionately into economic prosperity.

Moreover, while urbanization should ordinarily drive job creation and innovation, Nigeria continues to grapple with an unemployment rate of 33.3% as of 2021, one of the highest in Africa (International Labour Organization, 2021). Another dimension of the problem is the role of FDI and inflation in shaping the urbanization– growth relationship. Although FDI is expected to provide capital for urban-based industries and infrastructure, inflows to Nigeria have been inconsistent, often concentrated in oil-related sectors that do not significantly absorb urban labor or foster inclusive development (Adeleye, 2020; UNCTAD, 2022). Similarly, persistent inflation has undermined the purchasing power of urban dwellers, weakened investment incentives, and limited the potential of urbanization to translate into sustainable economic growth (CBN, 2021).

The existing literature also reflects mixed findings on the urbanization–growth nexus in Nigeria. While some scholars argue that urbanization has fostered agglomeration economies and growth (Akinyemi, 2016), others contend that it has exacerbated inequality, unemployment, and slum proliferation, thereby constraining growth (Egunjobi, 2017). These conflicting perspectives create an empirical gap that necessitates further

investigation into whether urbanization has been a driver of economic growth in Nigeria or a drag on sustainable development.

This study therefore seeks to address this gap by empirically analyzing the effect of urbanization on economic growth in Nigeria, with particular attention to whether the rapid pace of urban expansion has enhanced or hindered the country's economic transformation.

1.3 Research Questions

In line with the stated objectives, the following research questions are formulated to guide the study:

1. What is the impact of urbanization on economic growth in Nigeria?
2. How does population growth influence economic growth in Nigeria?
3. What role does foreign direct investment (FDI) play in Nigeria's economic growth?
4. What is the effect of inflation on economic growth in Nigeria?

1.4 Objectives of the Study

The main objective of this study is to examine the impact of urbanization on economic growth in Nigeria.

Specifically, the study aims to:

1. Determine the impact of urbanization on economic growth in Nigeria.

2. Examine the influence of population growth on economic growth in Nigeria.
3. Assess the role of foreign direct investment (FDI) in Nigeria's economic growth.
4. Evaluate the effect of inflation on economic growth in Nigeria.

1.5 Research Hypotheses

To provide empirical answers to the research questions, the following hypotheses are tested in the study:

Hypothesis One

H0: Urbanization has no significant impact on economic growth in Nigeria.

H1: Urbanization has a significant impact on economic growth in Nigeria.

Hypothesis Two

H0: Population growth has no significant influence on economic growth in Nigeria.

H1: Population growth has a significant influence on economic growth in Nigeria.

Hypothesis Three

H0: Foreign direct investment (FDI) has no significant role in economic growth in Nigeria.

H1: Foreign direct investment (FDI) has a significant role in economic growth in Nigeria.

Hypothesis Four

H0: Inflation has no significant effect on economic growth in Nigeria.

H1: Inflation has a significant effect on economic growth in Nigeria.

1.6 Scope of the Study

This study focuses on examining the effect of urbanization on economic growth in Nigeria over the period 1981 to 2024. The chosen time frame is relevant because it captures significant phases in Nigeria's economic trajectory, including the structural adjustment era of the 1980s, democratic transition in 1999, oil price fluctuations, and recent economic reforms. The analysis emphasizes the interrelationship between urbanization and key macroeconomic indicators such as real gross domestic product (RGDP), population growth, foreign direct investment (FDI), and inflation.

Annual time-series data will be employed, with variables sourced primarily from the Central Bank of Nigeria (CBN) Statistical Bulletin, the National Bureau of Statistics (NBS), the World Development Indicators (WDI) of the World Bank, and United Nations urbanization reports. The scope extends beyond measuring the direct effect of urbanization on growth to also consider how population dynamics, FDI inflows, and inflation interact with growth during the study period.

Methodologically, the study adopts econometric techniques suitable for time-series analysis. Unit root tests will be used to establish the stationarity properties of the data.

The Auto-Regressive Distributed Lag (ARDL) model will be applied to capture both short-run and long-run dynamics, while cointegration tests will help determine the existence of stable long-run relationships among the variables. Diagnostic tests such as autocorrelation, heteroscedasticity, and stability checks will also be employed to ensure robustness and reliability of the findings.

By clearly delineating the variables, data sources, and methodology, this study ensures that its findings are both contextually relevant and statistically valid for understanding the role of urbanization and related macroeconomic factors in shaping Nigeria's economic growth.

1.7 Significance of the Study

This study is significant in several respects, contributing to both academic knowledge and practical policy formulation regarding urbanization and economic growth in Nigeria.

From an academic perspective, the research provides updated empirical evidence on the urbanization–growth nexus in Nigeria, a topic that has received limited attention in the context of long-term macroeconomic analysis (Akinyemi, 2016; Todaro & Smith, 2015). By analyzing a comprehensive time series spanning 1981 to 2024, the study extends existing literature on structural transformation, demographic shifts, and their implications for economic performance in developing economies. The findings will enrich the body of knowledge on the channels through which urbanization, population growth, FDI, and inflation interact to influence growth outcomes.

From a policy perspective, the study is relevant to government agencies, urban planners, and development institutions. Insights into how urbanization affects economic growth can guide the formulation of policies on city planning, infrastructure development, investment attraction, and population management. Specifically, understanding the role of population growth, FDI, and inflation alongside urbanization provides policymakers with actionable information to balance urban expansion with sustainable economic development (World Bank, 2020; United Nations, 2022).

In terms of practical importance, private investors, financial institutions, and international development partners can benefit from the study's findings. Knowledge of urbanization trends and their economic implications allows for informed decision-making regarding investment locations, infrastructure projects, and industrial development strategies in Nigeria's rapidly growing cities (Akinyemi, 2018).

Finally, from a societal perspective, the study highlights the broader implications of urbanization on employment, housing, social services, and living standards. By identifying both opportunities and challenges associated with urban growth, the research contributes to strategies aimed at reducing urban poverty, improving quality of life, and fostering inclusive economic growth (African Development Bank, 2020; Egunjobi, 2017).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a comprehensive review of literature relevant to the study on the effect of urbanization on economic growth in Nigeria. The purpose of the chapter is to provide an understanding of the key concepts, theories, and empirical findings that underpin the research problem. By reviewing previous studies, this chapter highlights the relationship between urbanization, population growth, foreign direct investment, inflation, and economic growth, while identifying gaps in the literature that justify the present study. The chapter is organized into three main sections: conceptual review, theoretical review, and empirical review.

2.2 Conceptual Review

The conceptual review provides a clear understanding of the core concepts of the study, including urbanization, economic growth, population growth, foreign direct investment, and inflation, and how these variables interact in the Nigerian context. It also examines the mechanisms through which urbanization can influence economic performance, while highlighting the challenges associated with rapid urban expansion.

2.2.1 Urbanization

Urbanization refers to the process by which the population of a country increasingly concentrates in urban areas, resulting in the expansion of towns and cities relative to rural settlements (Todaro & Smith, 2015). It is a multidimensional phenomenon that involves demographic, social, economic, and spatial changes within a society. Urbanization is usually driven by factors such as rural-to-urban migration, industrialization, and the concentration of economic activities in cities (Akinyemi, 2016). In developing countries, urbanization often occurs rapidly, driven by the search for better employment opportunities, education, healthcare, and overall improved living conditions (Todaro & Smith, 2015).

Globally, urbanization has accelerated over the last century. More than half of the world's population now resides in urban areas, with projections suggesting that this proportion will increase to 68 percent by 2050, particularly in Africa and Asia (United Nations, 2019). In Nigeria, urbanization has been a key feature of structural transformation, with the urban population rising from 15.4 percent in 1960 to over 52 percent in 2020 (United Nations, 2022; Statista, 2023). Cities such as Lagos, Abuja, Kano, Port Harcourt, and Ibadan have experienced rapid expansion, largely driven by rural-to-urban migration, industrial development, and the search for better socio-economic opportunities.

Urbanization is considered a potential driver of economic growth because it facilitates economies of scale, labor specialization, market expansion, and innovation (Krugman, 1991). Urban areas often provide better infrastructure, access to financial services, and institutional support, which can enhance productivity and industrial output. Additionally, cities offer improved access to education, healthcare, and social services, contributing to human capital formation. However, rapid and unmanaged urbanization can also lead to challenges such as congestion, informal settlements, housing shortages, unemployment, and environmental degradation (Akinyemi, 2018; Egunjobi, 2017).

In the Nigerian context, the benefits of urbanization are mixed. While cities like Lagos serve as commercial and financial hubs, fostering economic activity and innovation, many urban centers struggle with inadequate infrastructure, slum proliferation, and social inequality, which can undermine the potential growth benefits of urbanization (African Development Bank, 2020). This dual nature of urbanization highlights the need for empirical investigation into its effect on economic growth in Nigeria.

2.2.2 Causes of Urbanization

Urbanization is driven by a combination of demographic, economic, social, and policy-related factors. One of the primary drivers is rural-to-urban migration, which occurs as individuals and households move from rural areas to cities in search of better employment opportunities, education, healthcare, and improved living standards (Todaro & Smith, 2015). Industrialization also plays a significant role, as the establishment of

factories, service centers, and commercial hubs in urban areas attracts labor from rural regions, thereby accelerating urban growth (Akinyemi, 2016).

Government policies and urban planning initiatives, including the development of new administrative capitals or urban infrastructure projects, have historically influenced patterns of urban expansion in Nigeria. For instance, the creation of Abuja as the nation's capital in the 1980s led to substantial population inflows and the rapid development of associated urban services and housing (Akinyemi, 2018). Additionally, natural population growth—resulting from higher birth rates relative to death rates—further contributes to the increasing urban population. In many Nigerian cities, this growth compounds the effects of migration, intensifying pressure on housing, transportation, and social services (Egunjobi, 2017).

Other factors such as technological advancement, better connectivity, and market opportunities also attract people to urban centers. Urbanization, however, is not uniform across the country; while megacities like Lagos and Abuja experience rapid expansion, smaller urban centers grow at slower rates due to limited industrial development and infrastructural investment. Understanding these causes is crucial for evaluating the implications of urbanization on Nigeria's economic growth.

2.2.3 Economic Growth

Economic growth refers to the sustained increase in the production of goods and services in an economy over a period, typically measured using real gross domestic product

(RGDP) or GDP per capita (Todaro & Smith, 2015). Growth indicates improvements in the standard of living, income levels, employment opportunities, and overall economic welfare. It is influenced by factors such as capital accumulation, labor force expansion, technological progress, investment, government policies, and the effective utilization of natural resources.

In the context of developing countries like Nigeria, economic growth is affected by structural and institutional factors. Nigeria's growth trajectory has historically been linked to the performance of the oil sector, agricultural production, infrastructure development, foreign investment, and macroeconomic policies (World Bank, 2020). However, periods of rapid economic growth have often been accompanied by challenges such as inflationary pressures, high unemployment, and income inequality, highlighting the need for sustainable and inclusive growth strategies.

The linkage between urbanization and economic growth is central to this study. Urbanization can promote growth by concentrating labor and capital, enhancing productivity, and facilitating innovation (Krugman, 1991). Cities serve as hubs for industrial activity, financial intermediation, and trade, providing environments conducive to business development. Moreover, urban areas improve access to education, healthcare, and social services, which are critical for human capital formation and long-term economic development. However, when urbanization is rapid and unmanaged, it can result in congestion, slums, environmental degradation, and social inequality, which may

undermine the potential benefits of urban growth (Akinyemi, 2018; African Development Bank, 2020).

2.2.4 Urbanization and Economic Development

Urbanization and economic development are closely linked, as the concentration of population and economic activities in cities can drive productivity and growth. Agglomeration economies, which arise from the clustering of firms and industries in urban areas, enhance efficiency, knowledge sharing, and innovation, ultimately contributing to higher output (Krugman, 1991). Urban areas often provide access to better infrastructure, financial services, transportation, and markets, creating an environment conducive to industrial expansion and investment (Todaro & Smith, 2015).

In Nigeria, urban centers such as Lagos and Abuja have become hubs for commerce, manufacturing, and services, attracting both domestic and foreign investments. Urbanization facilitates human capital development by improving access to education, healthcare, and social amenities, which strengthens the labor force and supports long-term economic growth (Akinyemi, 2018). Nevertheless, uncontrolled urbanization can lead to social and economic challenges, including congestion, informal settlements, unemployment, and environmental degradation, which may hinder sustainable development (Egunjobi, 2017).

2.2.5 Challenges of Urbanization

While urbanization can stimulate growth, it also presents significant challenges. Rapid population concentration in cities often exceeds the capacity of urban infrastructure, resulting in congestion, inadequate housing, poor sanitation, and environmental pollution (Akinyemi, 2016). Informal settlements and slums proliferate in major Nigerian cities, reflecting the inability of urban planning to keep pace with population growth (African Development Bank, 2020).

Urban unemployment is another pressing issue, particularly among youth and migrants who move to cities in search of jobs. High unemployment can exacerbate poverty, crime, and social unrest, undermining the economic potential of urban areas (Egunjobi, 2017). Furthermore, urbanization increases the demand for public services such as electricity, water, and transportation, placing enormous pressure on government resources. These challenges highlight the need for effective urban planning and policy interventions to maximize the benefits of urbanization while mitigating its negative effects.

2.2.6 Population Growth and Economic Growth

Population growth interacts closely with urbanization and economic growth. A growing population increases labor supply, expands domestic markets, and can stimulate production and investment, potentially accelerating economic growth (Todaro & Smith, 2015). In Nigeria, population growth has contributed to urban expansion and increased demand for goods, services, and infrastructure.

However, rapid population growth without corresponding increases in productivity and infrastructure can strain resources, reduce per capita income, and hinder economic development. High population growth in urban areas may exacerbate congestion, unemployment, and poverty, limiting the positive effects of urbanization on growth (World Bank, 2020). Therefore, understanding the interplay between population dynamics and urbanization is critical for evaluating Nigeria's growth trajectory.

2.2.7 Foreign Direct Investment (FDI) and Economic Growth

Foreign direct investment plays a crucial role in stimulating economic growth, particularly in urbanizing economies. FDI brings in capital, technology, managerial expertise, and access to international markets, complementing domestic investment and boosting productivity (Todaro & Smith, 2015). In Nigeria, FDI inflows have been concentrated in urban centers, supporting industrial growth, infrastructure development, and service sector expansion.

FDI can also generate employment, improve skills, and foster innovation in urban areas, contributing to overall economic development. However, the benefits of FDI depend on the capacity of local economies to absorb foreign investment effectively and the presence of supportive policies, infrastructure, and institutions (Akinyemi, 2018). Inadequate planning or mismanagement can reduce the potential growth impact of FDI and exacerbate urban challenges such as inequality and social displacement (African Development Bank, 2020).

2.2.8 Inflation and Economic Growth

Inflation, defined as a sustained increase in the general price level, can influence economic growth by affecting investment, consumption, and overall economic stability (Todaro & Smith, 2015). Moderate inflation may encourage spending and investment, while high or volatile inflation can erode purchasing power, reduce savings, and deter long-term investment.

In the context of urbanization, inflation can amplify the cost of living in cities, increasing the economic burden on households and potentially limiting the benefits of urban concentration (World Bank, 2020). High urban inflation may also affect production costs, reduce competitiveness, and constrain economic growth. Therefore, understanding the interaction between inflation and urbanization is essential for assessing Nigeria's economic performance and designing effective macroeconomic policies.

2.3 Theoretical Literature

The relationship between urbanization and economic growth has been analyzed through several theoretical lenses in economics, sociology, and development studies. Urbanization is understood not only as a demographic phenomenon but also as a driver of productivity, innovation, and structural transformation in developing countries. The following theories provide a broad foundation for understanding the urbanization–growth nexus in Nigeria.

2.3.1 Classical Growth Theory (Adam Smith, 1776)

Classical growth theory emphasizes that economic development is driven by capital accumulation, labor productivity, and technological progress (Smith, 1776). According to the theory, urbanization supports growth by concentrating labor and capital in cities, enabling economies of scale, specialization, and efficient allocation of resources. In Nigeria, cities such as Lagos and Abuja have become economic hubs because they concentrate industrial activity, financial services, and commercial enterprises. Urban centers facilitate market interactions and the mobility of labor, enhancing productivity. However, the classical model assumes a linear relationship between capital accumulation and growth, which may overlook the role of institutions, human capital, and governance in translating urbanization into sustainable economic growth. Moreover, urban congestion and informal settlements may reduce efficiency gains in Nigerian cities, highlighting a limitation of this theory in modern developing economies.

2.3.2 Lewis Dual-Sector Model (1954)

Lewis's dual-sector model argues that economic growth occurs when surplus labor is transferred from a low-productivity agricultural sector to a high-productivity industrial sector (Lewis, 1954). Urbanization is central to this process, as rural-to-urban migration supplies labor for industry and services. In Nigeria, rural-urban migration has fueled labor markets in cities, supporting manufacturing, commerce, and services. The model explains periods of industrial growth in Lagos, Port Harcourt, and Kano. Nevertheless,

the model assumes that urban employment can absorb all migrants, which is unrealistic in Nigeria. Rapid urbanization often results in unemployment, informal settlements, and pressure on social services, suggesting that labor absorption is a constraint on growth if not managed properly.

2.3.3 Urban Economics Theory (Alonso, 1964; Mills, 1967)

Urban economics theory focuses on the spatial and economic organization of cities, emphasizing how location, infrastructure, and clustering of economic activities influence growth. Concentrating productive activities in urban centers reduces transaction costs and facilitates access to markets, finance, and skilled labor (Alonso, 1964; Mills, 1967). In Nigeria, Lagos demonstrates this theory, functioning as a commercial and financial hub where firms benefit from proximity to suppliers, consumers, and skilled workers. However, rapid urban expansion without proper planning can lead to congestion, high land costs, and inadequate infrastructure, which can counteract the economic benefits of urban agglomeration. Thus, urban economics theory highlights both the growth-promoting and growth-constraining effects of urbanization.

2.3.4 Modernization Theory (Rostow, 1960)

Modernization theory posits that economies pass through stages of development from traditional societies to modern industrialized economies (Rostow, 1960). Urbanization represents a key marker of modernization, as cities concentrate industrial production, education, technology, and financial services. In Nigeria, metropolitan areas such as

Lagos, Abuja, and Port Harcourt illustrate this process, with industrial clusters and growing service sectors reflecting a transition from agrarian to modern economies. The theory also links urbanization to social transformation, improved governance, and enhanced human capital. However, it assumes uniform progress across regions and often neglects the persistence of poverty, inequality, and informal urban settlements, which are critical issues in Nigeria.

2.3.5 Endogenous Growth Theory (Romer, 1986; Lucas, 1988)

Endogenous growth theory emphasizes that growth arises from human capital, knowledge, innovation, and technology, rather than solely from physical capital accumulation (Romer, 1986; Lucas, 1988). Urbanization promotes growth by concentrating skilled labor, research institutions, and knowledge-intensive industries in cities. In Nigeria, urban centers enhance access to education, healthcare, and technology, which can improve labor productivity and stimulate entrepreneurship. Knowledge spillovers in urban areas encourage innovation and sustained growth. The theory also explains why urbanization contributes to long-term growth, not just short-term expansion, highlighting the importance of education, skills development, and institutional capacity in translating urban concentration into economic performance.

2.3.6 Structural Change Theory (Kuznets, 1966)

Kuznets' structural change theory posits that development occurs when labor and resources shift from low-productivity sectors, such as agriculture, to high-productivity

sectors, like industry and services (Kuznets, 1966). Urbanization facilitates this reallocation by providing industrial and service employment opportunities in cities. In Nigeria, cities absorb rural labor, contributing to GDP growth through industrial and service expansion. However, rapid urbanization without adequate social and physical infrastructure can create urban poverty, inequality, and slums. The theory emphasizes that structural change is necessary for sustained economic growth, but requires policy support and investment in education, infrastructure, and governance to maximize benefits.

2.3.7 Agglomeration and New Economic Geography Theory (Krugman, 1991)

The new economic geography theory highlights the advantages of spatial concentration of economic activities, called agglomeration economies (Krugman, 1991). Urbanization facilitates these agglomerations by clustering firms, suppliers, and workers, increasing productivity, reducing costs, and stimulating innovation. In Nigeria, industrial and commercial hubs like Lagos, Port Harcourt, and Kano benefit from agglomeration effects, attracting investment and promoting economic activity. Nevertheless, unplanned urban growth can result in congestion, rising land costs, and environmental degradation, which may reduce productivity. This theory demonstrates that urbanization can both stimulate growth and create bottlenecks if city planning and infrastructure development do not keep pace.

2.3.8 Human Capital and Urbanization Theory (Henderson, 2003)

Human capital and urbanization theory emphasizes the role of education, skills, and knowledge accumulation in promoting economic growth (Henderson, 2003). Cities enhance human capital formation by providing access to higher education, vocational training, healthcare, and professional networks. In Nigeria, urban centers attract skilled labor, foster knowledge exchange, and promote innovation, increasing labor productivity and supporting industrial and service sector growth. The theory also suggests that investment in education and social infrastructure amplifies the positive effects of urbanization on growth. Without adequate human capital, rapid urbanization may exacerbate unemployment, informal settlements, and social inequality, limiting economic benefits.

2.4 Empirical Literature Review

The empirical literature on urbanization and economic growth in Nigeria has grown significantly over the past decade. Several studies have examined the relationship between urban expansion, population dynamics, foreign direct investment, inflation, and economic performance using a variety of econometric and statistical methods. While some studies indicate that urbanization positively contributes to economic growth through increased productivity, industrialization, and human capital development, others suggest that rapid urbanization without adequate infrastructure and planning can hinder growth. This section critically reviews recent empirical studies conducted in Nigeria

between 2015 and 2024, highlighting their methodologies, key findings, and contributions to understanding the urbanization–growth nexus.

Agbeyangi, Makinde, and Odun-Ayo (2024) examined "Nigeria's ICT and Economic Sustainability in the Digital Age," focusing on the role of information and communication technology (ICT) in economic growth. They highlighted that urbanization facilitates ICT development, and bridging the urban-rural digital divide is crucial for inclusive economic growth. The study emphasized the potential of emerging technologies like artificial intelligence, blockchain, and the Internet of Things in driving sustainable economic development in Nigeria.

Aidi, Emecheta, and Ngwudiobu (2016) investigated the relationship between population dynamics and economic growth in Nigeria using time series data from 1970 to 2014. They applied the ordinary least squares (OLS) estimation technique and found that fertility, mortality, and net migration are inversely related to economic growth. The study emphasized the need for substantial investment in education and skills acquisition programs to improve productivity in Nigeria.

Ali et al. (2020), in their study "Trivariate Modelling of the Nexus between Electricity Consumption, Urbanization, and Economic Growth in Nigeria," employed Maki cointegration and causality tests to examine the interrelationships among electricity consumption, urbanization, and economic growth in Nigeria. The study found that while electricity consumption positively influences economic growth, urbanization's impact is

more complex, suggesting the need for policies that balance urban expansion with sustainable infrastructure development.

Anikeze and Egwuagu (2024) conducted a study titled "Urbanization and Youth Employment in South East of Nigeria: 2015 – 2023," focusing on five major urban areas in the South East region. Using questionnaires, in-depth interviews, and focus group discussions, the study revealed that urbanization did not positively correlate with youth job placement or empowerment. The authors highlighted challenges such as increased competition for limited jobs and higher living costs, leading to social vices among youths.

Bekun and Nathaniel (2020), in their research "Electricity Consumption, Urbanization, and Economic Growth in Nigeria: New Insights from Combined Cointegration amidst Structural Breaks," utilized bounds testing and Bayer-Hanck cointegration tests to explore the relationships among electricity consumption, urbanization, and economic growth. The study found that while electricity consumption positively affects economic growth, urbanization appears to inhibit growth, suggesting the need for policies that ensure efficient electricity supply and manage urbanization's pace.

Boniface (2024) conducted a study titled "Urbanization and Economic Growth in Lagos (Nigeria) and Its Surrounding Areas, 1980-2020," focusing on Lagos, Nigeria. Using a historical research methodology, the study found that rapid urbanization in Lagos has led to increased economic growth, but also to challenges such as infrastructure deficits and

social inequalities. The study emphasized the need for sustainable urban planning to balance economic growth with social development.

Falade (2022), in the "Nigeria: 2021 Abridged Summary - Urban Agenda Platform," discussed the impact of urbanization on economic growth in Nigeria. The report noted that Nigeria experienced two economic recessions between 2015-2016 and in 2019, which affected urban development and economic growth. It emphasized the importance of sustainable urban development for social inclusion and poverty eradication.

Hassan and Utulu (2022), in their study "Socio-economic and Technological Factors Influencing Financial Inclusion among Indigenous Peoples in Bauchi State, Nigeria," explored how urbanization and technological advancements impact financial inclusion. The study found that while urbanization facilitates access to financial services, technological factors and socio-economic status significantly influence financial inclusion among indigenous populations.

Malumfash and Gambo (2018) conducted a study titled "Urbanization and Economic Growth in Nigeria: An Application of ARDL Bounds Testing Approach," focusing on Nigeria using annual data from 1980 to 2016. They employed the ARDL bounds testing approach to cointegration and found that urbanization has a positive and significant influence on GDP in the short run, but its impact is not significant in the long run. The study recommended proper urban planning and development to promote even spread and emergence of new cities across all regions of the country.

Majekodunmi (2015) analyzed "Population Dynamics and Economic Growth in Nigeria," focusing on the economic relationship between population dynamics and economic growth. Using data from 1970 to 2011, the study found a unidirectional relationship between population growth and economic growth. The study recommended maintaining the average population growth rate and focusing on growing Nigeria's economy to positively impact economic growth.

Matthew and Patrick (2024), in their study "Population, Urbanization, and Economic Growth in Nigeria," examined the effects of population growth and urbanization on economic growth in Nigeria using secondary data from the Central Bank of Nigeria's statistical bulletin from 1986 to 2023. The study employed the autoregressive distributed lag (ARDL) model and found that while population growth negatively affects economic growth, urbanization has a positive relationship with economic growth. The study recommended prioritizing educational programs and vocational training to equip the growing population with necessary skills and promoting effective urban planning to manage urban sprawl and ensure access to basic services.

Nasution and Al Ihsan (2021) investigated "Population Migration and The Challenges of Economic Growth in North Sumatera in Year (1988-2020)," focusing on the challenges posed by population migration on economic growth. They found that rapid population migration leads to increased demand for resources and services, straining existing

infrastructure and hindering economic growth. The study suggested implementing policies to manage migration and ensure sustainable economic development.

Omimakinde (2021) investigated the "Nexus Between Population Variables and Economic Growth in Nigeria: Direction of Causality," focusing on the direction of causality between population variables and economic growth. Using the VAR Granger Causality/Block Exogeneity Wald Tests, the study found feedback effects among economic growth, death rate, birth rate, and secondary school enrollments. The study concluded that higher population growth rates did not translate to higher economic growth in Nigeria.

Omoju et al. (2023), in their empirical review "Empirical Review of Youth-Employment Policies in Nigeria," examined the effectiveness of various youth employment programs. The study found that despite the implementation of several programs, youth unemployment remained high due to challenges such as lack of proper governance, inadequate funding, and limited political inclusivity.

Omoju et al. (2024), in "Nigeria's ICT and Economic Sustainability in the Digital Age," analyzed the role of information and communication technology (ICT) in economic growth. The study highlighted that while urbanization facilitates ICT development, bridging the urban-rural digital divide is crucial for inclusive economic growth.

Raihan et al. (2022) explored the nexus between economic growth, energy use, urbanization, agricultural productivity, and CO₂ emissions in Bangladesh. Using time

series data from 1972 to 2018 and employing the Dynamic Ordinary Least Squares (DOLS) approach, they found that economic growth, energy use, urbanization, and reduced agricultural productivity increase CO₂ emissions. The study recommended establishing strong regulatory policy instruments to reduce environmental degradation.

Uloma and Anikeze (2024), in their study "Analyzing How Urbanization Impacts Economic Growth in Nigeria," employed unit root testing and vector error correction models to investigate the relationship between urbanization and economic growth. The study found that urbanization positively impacts economic growth, but the effect is moderated by factors such as infrastructure development and governance.

The World Bank (2022), in its "Nigeria Overview: Development News, Research, Data," discussed the economic challenges faced by Nigeria, including those related to urbanization. The report noted that during 2015-2022, growth rates declined, and real GDP per capita fell, driven by policy missteps and shocks, affecting urban development and economic growth.

2.5 Gaps to Be Filled in the Literature Review

Although numerous studies have investigated the relationship between urbanization and economic growth in Nigeria, significant gaps remain that this study aims to address. First, many empirical studies primarily focus on the bivariate relationship between urbanization and economic growth, neglecting the potential combined effects of other macroeconomic variables such as population growth, foreign direct investment (FDI), and inflation. This

limits understanding of how these factors jointly influence economic growth in the context of Nigeria.

Second, several studies have employed time-series econometric techniques but have not fully utilized the Auto-Regressive Distributed Lag (ARDL) approach, which is particularly suitable for analyzing both short-run and long-run dynamics, especially when variables are integrated of different orders. By applying ARDL, this study can capture the dynamic interactions between urbanization, population growth, FDI, inflation, and economic growth more robustly.

Third, most existing studies cover data only up to 2020 or earlier, leaving a gap in examining recent developments in urbanization and economic growth in the post-COVID-19 period. The period 1981–2023, used in this study, provides a longer time frame that allows for a more comprehensive assessment of trends, structural shifts, and policy impacts over time.

Lastly, previous research often fails to provide policy-relevant recommendations based on empirical evidence derived from multivariate models incorporating urbanization and key macroeconomic variables. By integrating urbanization, population growth, FDI, and inflation in a single ARDL framework, this study will provide updated insights and practical guidance for policymakers on leveraging urbanization to stimulate sustainable economic growth in Nigeria.

CHAPTER THREE

THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Theoretical Framework

This study is anchored on the Structural Change and Dual-Sector Theory developed by W. Arthur Lewis (1954). The theory explains economic growth as the outcome of a gradual reallocation of labour from the traditional agricultural sector, which is characterized by surplus labour and low productivity, to the modern urban sector, which is capital-intensive, technologically advanced, and more productive. Urbanization, therefore, becomes the mechanism of this structural transformation, as it represents the shift of labour and resources into the modern sector where they contribute more effectively to national output.

In formal terms, the total labour force in the economy, L_T is divided between the agricultural sector, L_A and the modern urban sector, L_M such that:

$$L_T = L_A + L_M \dots \dots \dots (1)$$

The level of urbanization can thus be expressed as the proportion of labour in the modern sector:

$$u(t) = \frac{L_M(t)}{L_T}, 0 \leq u(t) \leq 1 \dots \dots \dots (2)$$

As $u(t)$ increases, urbanization intensifies, indicating a larger share of workers engaged in higher-productivity activities.

The productive structure of the two sectors can be represented by Cobb-Douglas production functions. For the agricultural (traditional) sector:

$$Y_A(t) = A_A(t) K_A(t)^{\alpha_A} L_A(t)^{1-\alpha_A} \dots\dots\dots (3)$$

and for the modern (urban) sector:

$$Y_M(t) = A_M(t) K_M(t)^{\alpha_M} L_M(t)^{1-\alpha_M} \dots\dots\dots (4)$$

Where $A_i(t)$ represents total factor productivity, K_i is capital, and $0 < \alpha_i < 1$ Aggregate national output is then:

$$Y(t) = Y_A(t) + Y_M(t) \dots\dots\dots (5)$$

Within this framework, the marginal product of labour (MPL) differs across sectors. In agriculture, due to surplus labour, the marginal product of labour is close to zero for a range of L_A such that:

$$MPL_A \approx 0 \dots\dots\dots (6)$$

In contrast, the marginal product of labour in the modern sector is positive and higher, that is:

$$MPL_M > MPL_A \dots\dots\dots (7)$$

Thus, so long as the wage paid in the modern sector (W_M) exceeds the rural subsistence wage (W_A), workers will migrate from agriculture to urban industries. This migration process reflects urbanization and is the engine of economic growth in developing countries like Nigeria.

In the Nigerian context, this means that as labour moves from low-productivity rural agriculture into urban areas, where industries and services dominate, total output rises. The process also attracts foreign direct investment (FDI) into the modern sector and expands the size of markets. Provided that there is adequate investment in infrastructure, education, housing, and technology, urbanization will foster higher productivity and faster economic growth. However, if urban growth is poorly managed, the gains may be offset by challenges such as unemployment, congestion, and inflationary pressures.

Therefore, the Structural Change and Dual-Sector Theory provides a solid theoretical explanation for the relationship between urbanization and economic growth in Nigeria. It formalizes the argument that economic growth is positively influenced by the reallocation of labour and resources from the low-productivity rural sector to the high-productivity urban sector. This theoretical position also underpins the empirical specification of this study, which models economic growth as a function of urbanization, population growth, foreign direct investment, and inflation.

3.2 Methodology

3.2.1 Model Specification

Following the theoretical framework, the econometric model to examine the impact of Urbanization on economic growth in Nigeria is specified as:

$$GDP_t = \beta_0 + \beta_1 \cdot URB_t + \beta_2 \cdot POP_t + \beta_3 \cdot FDI_t + \beta_4 \cdot INF_t + \mu_t \dots \dots \dots (8)$$

Where

GDP_t is the gross domestic product growth rate at time t.

URB_t is the urban population growth rate at time t.

POP_t is the population growth rate at time t.

FDI_t is the Foreign Direct Investment at time t.

INF_t is Inflation Rate at time t.

β_0 is the intercept,

$\beta_1, \beta_2, \beta_3,$ and β_4 are coefficients of the independent variables, and

μ is the error term.

This formulation helps analyse the impact of urbanization on economic growth in Nigeria and tests the hypothesis regarding their influence.

3.2.2 Apriori Expectation

The a priori expectations for the model refer to the expected signs and magnitude of relationships between the dependent variable (GDP) and each independent variable based on economic theory. These expectations guide the interpretation of estimated coefficients.

Given the model specification:

$$GDP_t = \beta_0 + \beta_1 \cdot URB_t + \beta_2 \cdot POP_t + \beta_3 \cdot FDI_t + \beta_4 \cdot INF_t + \mu_t \dots \dots \dots (9)$$

The expected signs of the coefficients are: $\beta_1 > 0$, $\beta_2 \leq 0$, $\beta_3 > 0$, $\beta_4 < 0$.

The expectations for each variable are discussed below:

Urbanization (β_1): The expected sign is positive. This is because urbanization typically drives economic growth by concentrating labor, fostering industrialization, and creating larger markets. Urban centers often serve as hubs of innovation, infrastructure development, and service expansion, which enhances productivity and output. However, in situations where urbanization is rapid and unmanaged, it can lead to overcrowding, unemployment, and pressure on infrastructure, potentially resulting in a negative impact. Nonetheless, in theory and under proper management, the expected relationship between urbanization and economic growth remains positive.

Population growth (β_2): The expected sign is ambiguous, as it can be either positive or negative. On one hand, population growth can contribute positively to economic growth if it is accompanied by improvements in productivity, human capital development, and

labor supply, thereby expanding the market size and workforce. On the other hand, if population growth outpaces resource availability, infrastructure, and job creation, it creates dependency burdens and strains economic capacity, leading to negative effects on growth. Hence, the expected sign for population growth is context-dependent.

Foreign direct investment (β_3): The expected sign is positive. FDI is generally seen as a catalyst for growth because it provides capital inflows, facilitates technology transfer, enhances managerial know-how, and generates employment opportunities. These factors boost domestic production capacity and contribute to higher GDP growth. Thus, the theoretical expectation is that foreign direct investment positively impacts economic growth.

Inflation (β_4): The expected sign is negative. High inflation is detrimental to growth as it erodes the purchasing power of households, discourages savings and investment, and introduces uncertainty into the economy. It also creates macroeconomic instability that undermines long-term growth prospects. While very mild inflation might stimulate spending and investment, in most cases, especially in developing economies like Nigeria, inflation is expected to have a negative relationship with economic growth.

3.2.3 Estimation Technique

This study employs a multiple regression approach using the Autoregressive Distributed Lag (ARDL) model. The ARDL model is well-suited for economic research because it effectively captures both short-term dynamics and long-term relationships among

variables. Unlike other methods, ARDL can handle a mix of stationary and non-stationary variables within a single framework, making it versatile and practical, particularly for smaller datasets common in developing economies. Its straightforward interpretation further enhances its value for researchers and policymakers. The model's adaptable specification allows for the inclusion of diverse variables, enabling tailored analyses that support robust policy formulation and forecasting.

To address data stationarity, this research will apply the Augmented Dickey-Fuller (ADF) test, acknowledging the volatility often seen in data from developing nations. A bounds test for cointegration within the ARDL framework will be used to assess long-term relationships among variables. To ensure model robustness, the Breusch-Godfrey test will check for autocorrelation, while the Breusch-Pagan-Godfrey test will evaluate heteroscedasticity.

3.3 Data Sources

This study examines a 43-year period spanning 1981 to 2024, utilizing secondary data sourced specifically from the World Development Indicators (WDI) database provided by the World Bank. While acknowledging the potential for minor measurement inaccuracies, the data is deemed sufficiently reliable for the analysis of the impact of urbanization on economic growth in Nigeria

All variables for this study is gotten from the World Development Indicators (WDI) database provided by the World Bank.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF EMPIRICAL RESULTS

4.1 Introduction

This chapter provides the descriptive statistics of the model and conducts a correlation analysis to examine the relationships among the variables. It also includes a preliminary assessment of multicollinearity to determine the degree of interdependence among the explanatory variables. Furthermore, a unit root test was carried out to confirm the stationarity properties of the data series. To investigate the existence of a long-run equilibrium relationship and assess the speed of adjustment toward equilibrium, the ARDL bounds co-integration approach was employed. Additionally, residual and stability diagnostic tests were performed to ensure the reliability and validity of the empirical results. The analysis focuses on gross domestic product growth, urbanization growth, population growth, foreign direct investment, and inflation rate, utilizing data covering a 44-year period from 1981 to 2024.

4.2 Descriptive Statistics

Table 4.1: Descriptive Statistics

| Statistic | GDP | URB | POP | FDI | INF |
|------------------|------------|------------|------------|------------|------------|
| Mean | 3.051 | 4.698 | 2.611 | 1.207 | 19.401 |
| Median | 3.339 | 4.681 | 2.657 | 0.961 | 13.127 |
| Maximum | 15.329 | 6.216 | 3.075 | 4.282 | 72.836 |
| Minimum | -13.128 | 3.450 | 2.083 | -0.039 | 5.388 |
| Std. Deviation | 5.195 | 0.736 | 0.236 | 0.940 | 16.232 |
| Skewness | -0.854 | 0.230 | -0.990 | 0.982 | 1.796 |
| Kurtosis | 4.963 | 2.166 | 3.520 | 3.832 | 5.275 |
| Jarque-Bera | 12.411 | 1.664 | 7.679 | 8.344 | 33.137 |
| Probability | 0.002 | 0.435 | 0.022 | 0.015 | 0.000 |
| Sum | 134.239 | 206.698 | 114.878 | 53.088 | 853.660 |
| Sum Sq. Dev. | 1160.340 | 23.313 | 2.399 | 37.981 | 11329.300 |
| Observations | 44 | 44 | 44 | 44 | 44 |

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

The descriptive statistics presented above provide an overview of the characteristics of the variables used in the study, namely Gross Domestic Product (GDP), Urbanization (URB), Population Growth (POP), Foreign Direct Investment (FDI), and Inflation (INF) over the period under review.

The mean values indicate the average levels of the variables throughout the study period. GDP has an average value of 3.051, showing moderate economic growth on average. Urbanization recorded a mean of 4.698, suggesting a relatively high urban population rate. Population growth averaged 2.611, reflecting a steady demographic expansion. FDI had a mean of 1.207, indicating modest inflows of foreign investment, while inflation recorded an average of 19.401, signifying a high level of price instability during the period.

The median values, which measure the central tendency of the data, are close to the means for most variables, indicating that the distributions are fairly symmetric except for GDP and inflation, which display greater variability. The maximum and minimum values reveal the range of the data. GDP ranged from -13.128 to 15.329, suggesting significant fluctuations in economic performance. Urbanization ranged between 3.450 and 6.216, and population growth varied from 2.083 to 3.075. FDI ranged from -0.039 to 4.282, indicating that there were periods of both inflow and minimal outflow of foreign investment. Inflation showed the widest variation, from 5.388 to 72.836, demonstrating the volatility of Nigeria's price level over time.

The standard deviation measures the extent of variability around the mean. GDP, with a standard deviation of 5.195, exhibits high volatility, while urbanization (0.736) and population growth (0.236) show relatively low variability. FDI has a moderate dispersion of 0.940, while inflation displays substantial volatility with a standard deviation of 16.232.

The skewness and kurtosis values provide insight into the shape of the data distribution. GDP (-0.854) and population growth (-0.990) are negatively skewed, implying a longer tail on the left side of their distributions, while FDI (0.982) and inflation (1.796) are positively skewed, indicating a longer right tail. The kurtosis values show that GDP and inflation are leptokurtic (4.963 and 5.275 respectively), meaning their distributions are more peaked than the normal distribution, while urbanization (2.166) is platykurtic, suggesting a flatter distribution.

The Jarque-Bera statistics and their corresponding probabilities indicate the normality of the data distributions. The probability values for GDP (0.002), population growth (0.022), FDI (0.015), and inflation (0.000) are less than 0.05, implying that these variables are not normally distributed. However, urbanization (0.435) has a probability greater than 0.05, suggesting it follows a normal distribution.

Overall, the descriptive statistics reveal that while urbanization and population growth remained relatively stable over the years, GDP, FDI, and inflation experienced high fluctuations, reflecting Nigeria's exposure to economic volatility, investment uncertainty, and persistent inflationary pressures during the study period.

4.3 Correlation Analysis

Table 4.2: Correlation Analysis

| Variables | GDP | URB | POP | FDI | INF |
|------------------|------------|------------|------------|------------|------------|
| GDP | 1.000 | 0.163 | 0.419 | 0.444 | -0.248 |
| URB | 0.163 | 1.000 | 0.738 | 0.245 | -0.153 |
| POP | 0.419 | 0.738 | 1.000 | 0.509 | -0.303 |
| FDI | 0.444 | 0.245 | 0.509 | 1.000 | -0.007 |
| INF | -0.248 | -0.153 | -0.303 | -0.007 | 1.000 |

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

The correlation matrix above shows the strength and direction of the linear relationships among the variables used in the study, namely Gross Domestic Product (GDP), Urbanization (URB), Population Growth (POP), Foreign Direct Investment (FDI), and Inflation (INF). The correlation coefficient values range between -1 and +1, where a positive value indicates a direct relationship and a negative value indicates an inverse relationship.

GDP shows a weak positive correlation with urbanization (0.163) and population growth (0.419), implying that as urbanization and population increase, GDP also tends to rise slightly. The relationship between GDP and FDI (0.444) is moderately positive,

indicating that foreign investment inflows contribute positively to economic growth in Nigeria. However, GDP has a weak negative correlation with inflation (-0.248), suggesting that higher inflation may reduce economic growth.

Urbanization is strongly and positively correlated with population growth (0.738), reflecting that urban expansion in Nigeria is closely associated with population increases. It also shows a weak positive correlation with FDI (0.245) and a weak negative correlation with inflation (-0.153), meaning that while increasing foreign investment slightly supports urban growth, inflationary pressures may hinder it.

Population growth has a moderate positive correlation with FDI (0.509), implying that as population rises, it may attract more foreign investment due to increased market size and labor availability. Conversely, population growth has a weak negative relationship with inflation (-0.303), suggesting that high inflation may dampen population welfare and economic stability.

FDI shows a very weak negative correlation with inflation (-0.007), indicating that changes in inflation have almost no effect on foreign investment inflows. In general, the correlation results suggest that GDP, urbanization, population growth, and FDI are positively related to one another, while inflation maintains a negative relationship with most of the variables. This implies that inflationary pressures in Nigeria may have an adverse effect on economic performance and investment, while population and urbanization growth appear to support economic expansion.

4.4 Pre-Test Assessments

These evaluations are carried out to check and confirm certain assumptions and conditions before estimating the model, ensuring that the resulting outcomes are both valid and dependable. This phase is a crucial component of econometric and statistical analysis, as it helps identify possible problems that might affect the precision of the model's estimates. The tests performed include the unit root test, which assesses the stationarity of the data series, and the ARDL bounds co-integration test, which examines whether the time series variables maintain a long-run equilibrium relationship.

4.5 Unit Root Test

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

Table 4.3a: Unit Root Test (At Levels)

| Variables | ADF Test Statistics Prob value | ADF Critical Value (prob value) | Order of Integration | Remarks |
|-----------|-----------------------------------|---------------------------------|----------------------|----------------|
| | | 5% Level | | |
| GDP | 0.0219 | 0.05 | I(0) | Stationary |
| URB | 0.5385 | 0.05 | I(0) | Non-stationary |
| POP | 0.3856 | 0.05 | I(0) | Non-stationary |
| FDI | 0.0051 | 0.05 | I(0) | Stationary |
| INF | 0.0376 | 0.05 | I(0) | Stationary |

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

The Augmented Dickey-Fuller (ADF) unit root test was conducted to determine the stationarity of the time series variables used in the model. Stationarity is important in time series analysis because non-stationary data can produce misleading regression results. The test was carried out at the 1%, 5%, and 10% significance levels, and the decision to accept or reject the null hypothesis of non-stationarity was based on the probability values.

The results show that GDP, FDI, and inflation are stationary at level $I(0)$ with probability values of 0.0219, 0.0051, and 0.0376 respectively, which are less than the 5% significance level. This implies that these variables do not contain a unit root and are stable over time. Conversely, urbanization and population have probability values of 0.5385 and 0.3856 respectively, which are greater than 0.05, indicating that they are non-stationary at level, suggesting the need for differencing to achieve stationarity. These mixed integration orders justify the application of the Autoregressive Distributed Lag (ARDL) model, which accommodates variables integrated at both $I(0)$ and $I(1)$ levels, making it suitable for this study's estimation.

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

| Variables | ADF Test Statistics Prob value | ADF Critical Value (prob value) | Order of Integration | Remarks |
|-----------|-----------------------------------|---------------------------------|----------------------|------------|
| | | 5% Level | | |
| GDP | 0.0000 | 0.05 | I(1) | Stationary |
| URB | 0.0001 | 0.05 | I(1) | Stationary |
| POP | 0.0000 | 0.05 | I(1) | Stationary |
| FDI | 0.0000 | 0.05 | I(1) | Stationary |
| INF | 0.0000 | 0.05 | I(1) | Stationary |

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

The Augmented Dickey-Fuller (ADF) unit root test was conducted on all variables after first differencing to confirm their stationarity. This test is essential for time series analysis as it helps to determine whether the variables have a constant mean and variance over time, which is necessary to avoid spurious regression results. The test was performed at the 1%, 5%, and 10% significance levels, with the decision rule based on the probability values.

The results show that GDP, urbanization, population, foreign direct investment, and inflation all became stationary after first differencing, as their respective probability values (0.0000, 0.0001, 0.0000, 0.0000, and 0.0000) are less than the 0.05 significance

level. This indicates that each of the variables is integrated of order one, $I(1)$, meaning they were non-stationary at level but became stationary after differencing once.

In summary, the findings reveal that all the variables achieved stationarity at first difference, suggesting the absence of unit roots in their differenced forms. This outcome validates the appropriateness of the Autoregressive Distributed Lag (ARDL) modeling approach, which can efficiently handle variables that are integrated of order $I(0)$ and $I(1)$.

4.6 Co-Integration Tests

After establishing that all the variables are integrated of order $I(1)$, the Autoregressive Distributed Lag (ARDL) bounds test was employed to investigate whether a long-run co-integrating relationship exists among them. Given that the variables became stationary after first differencing, the bounds test is appropriate for determining if a stable and meaningful long-term equilibrium relationship is present in the model. The main objective of this co-integration test is to evaluate whether the variables tend to move together in the long run, even though short-run fluctuations may occur. The presence of co-integration implies that a long-run equilibrium relationship exists among the variables. The detailed outcomes of this test are presented in the following tables.

4.6.1 ARDL Bound Test

Table 4.4: ARDL Bound Test

| Test Statistic | Value | k |
|----------------|----------|---|
| F-statistic | 8.306652 | 4 |

| Critical Value Bounds | | |
|-----------------------|----------|----------|
| Significance | I0 Bound | I1 Bound |
| 10% | 2.45 | 3.52 |
| 5% | 2.86 | 4.01 |
| 2.5% | 3.25 | 4.49 |
| 1% | 3.74 | 5.06 |

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

The ARDL bounds test was conducted to determine whether a long-run co-integrating relationship exists among the variables. The calculated F-statistic value of 8.307 exceeds the upper critical bounds (I(1)) at all conventional significance levels of 10%, 5%, 2.5%, and 1%. This indicates that the null hypothesis of no long-run relationship can be rejected. Therefore, the result confirms the presence of a long-run co-integrating relationship among the variables in the model. This means that, despite short-term fluctuations, the variables tend to move together toward a stable long-run equilibrium over time. The existence of such a relationship suggests that changes in one variable are associated with corresponding long-term adjustments in the others, highlighting the interdependence of the variables within the economic system being analyzed.

Hence, the result justifies proceeding with the estimation of both long-run and short-run ARDL models to capture the dynamic interactions among the variables and to evaluate how short-term adjustments align toward the established long-term equilibrium.

4.6.2 Error Correct Model Analysis

Table 4.5a: ARDL ECM and Long Run Form

| Cointegrating Form | | | | |
|---------------------------|-------------|------------|-------------|--------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(GDP(-1)) | -0.296550 | 0.133421 | -2.222660 | 0.0345 |
| D(URB) | 5.396452 | 2.225775 | 2.424527 | 0.0220 |
| D(URB(-1)) | 5.194386 | 1.928757 | 2.693127 | 0.0118 |
| D(POP) | 14.595011 | 8.007733 | 1.822615 | 0.0791 |
| D(FDI) | -0.815554 | 0.609333 | -1.338437 | 0.1915 |
| D(FDI(-1)) | -0.463836 | 0.629767 | -0.736520 | 0.4675 |
| D(FDI(-2)) | -1.718834 | 0.623369 | -2.757330 | 0.0101 |
| D(INF) | -0.050665 | 0.026875 | -1.885199 | 0.0698 |
| CointEq(-1) | -0.642988 | 0.153967 | -4.176154 | 0.0003 |

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

The results from the ARDL cointegrating form reveal both the short-run dynamics and the adjustment mechanism toward long-run equilibrium. In the short run, urbanization (URB) and its lagged value (URB(-1)) have positive and statistically significant effects on GDP, with coefficients of 5.396 and 5.194 respectively, indicating that increases in urbanization contribute positively to economic growth in both the current and previous periods. Population growth (POP) also shows a positive relationship with GDP, though it

is significant only at the 10% level, implying a moderate short-run influence on economic output.

Foreign direct investment (FDI) has negative coefficients in both current and lagged forms, but only the second lag (FDI(-2)) is statistically significant at the 5% level. This suggests that the impact of FDI on GDP may take time to materialize and that in the short run, fluctuations in FDI could initially exert a dampening effect on growth. Inflation (INF) has a negative coefficient (-0.0507) and is marginally significant at the 10% level, indicating that rising inflation slightly reduces GDP in the short run.

The error correction term (CointEq(-1)) is negative (-0.643) and highly significant ($p = 0.0003$), which confirms the existence of a stable long-run relationship among the variables. The magnitude of this coefficient implies that about 64.3% of short-run disequilibrium is corrected within one period, meaning the system adjusts fairly quickly back to long-run equilibrium after a shock.

Overall, the results indicate that urbanization and population growth drive short-run increases in GDP, while inflation and lagged FDI exert negative influences. The significant error correction term further validates the presence of a long-run equilibrium relationship between GDP, urbanization, population, FDI, and inflation in the Nigerian economy.

Table 4.5b: Long Run Form

| Long Run Coefficients | | | | |
|------------------------------|-------------|------------|-------------|--------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| URB | 5.309500 | 2.243334 | 2.366789 | 0.0251 |
| POP | -15.865004 | 7.276576 | -2.180284 | 0.0378 |
| FDI | 3.210322 | 1.326811 | 2.419578 | 0.0223 |
| INF | -0.078796 | 0.038271 | -2.058905 | 0.0489 |
| C | 19.633649 | 11.058551 | 1.775427 | 0.0867 |

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

The long-run ARDL estimates reveal the magnitude and direction of the relationships between GDP and its explanatory variables urbanization, population growth, foreign direct investment, and inflation.

The error correction term (CointEq(-1)) is negative (-0.643) and highly significant ($p = 0.0003$), which confirms the existence of a stable long-run relationship among the variables. The magnitude of this coefficient implies that about 64.3% of short-run disequilibrium is corrected within one period, meaning the system adjusts fairly quickly back to long-run equilibrium after a shock.

The coefficient of urbanization is 5.3095, which is positive and statistically significant at the 5% level ($p = 0.0251$). This indicates that a one-unit increase in the level of urbanization leads to a 5.31-unit increase in GDP, assuming all other variables remain constant. This result implies that as more people migrate to urban centers, economic activities expand due to better access to infrastructure, markets, skilled labor, and

technological innovations typically concentrated in cities. Urbanization enhances industrial productivity and service delivery, contributing to overall economic growth. Hence, the findings underscore the importance of policies that promote balanced urban development and efficient urban planning to sustain economic expansion.

The coefficient of population is -15.8650 and statistically significant at the 5% level ($p = 0.0378$), suggesting that a one-unit rise in population results in a 15.87-unit decline in GDP in the long run. This negative relationship may be attributed to the pressure of rapid population growth on existing resources, infrastructure, and job opportunities, which can hinder productivity and slow economic performance. When population growth outpaces economic capacity, it can lead to higher dependency ratios, lower per capita income, and reduced living standards. The finding suggests that unless adequately managed through investments in education, healthcare, and job creation, population expansion may constrain long-term economic growth in Nigeria.

The coefficient for FDI is 3.2103 and statistically significant at the 5% level ($p = 0.0223$), implying that a one-unit increase in FDI inflows leads to a 3.21-unit increase in GDP. This positive and significant relationship aligns with economic theory, which posits that FDI contributes to capital accumulation, technology transfer, managerial expertise, and employment generation, thereby fostering productivity and output growth. The result highlights the critical role of a conducive investment climate, macroeconomic stability, and transparent regulatory frameworks in attracting and sustaining foreign investment to boost Nigeria's economic performance.

The inflation coefficient is -0.0788, which is negative and statistically significant at the 5% level ($p = 0.0489$). This indicates that a one-unit rise in the inflation rate results in a 0.0788-unit decline in GDP. The inverse relationship suggests that inflationary pressures distort price stability, reduce purchasing power, discourage investment, and create uncertainty in the macroeconomic environment — all of which hinder long-term economic growth. Persistent inflation can also erode savings and limit access to credit, thereby constraining capital formation. Hence, maintaining a moderate and stable inflation rate is essential for fostering sustainable growth and macroeconomic stability.

The constant term (19.6336) represents the baseline value of GDP when all explanatory variables are held at zero. Although it is not directly interpretable in economic terms, its positive sign implies that GDP would remain at a positive base level even in the absence of changes in the independent variables. This may reflect the combined effect of other unobserved or structural factors supporting output in the economy.

The long-run results demonstrate that urbanization and foreign direct investment serve as key drivers of GDP growth in Nigeria, while population growth and inflation exert constraining effects. These outcomes are consistent with theoretical expectations: productive urbanization and capital inflows enhance economic activity, whereas unchecked population expansion and price instability reduce output efficiency. Consequently, policies aimed at controlling inflation, managing population growth, and promoting FDI-friendly environments alongside strategic urban development are vital for achieving sustained long-run economic growth.

4.7 Interpretation of ARDL Model Estimate

Table 4.6: Raw Output Analysis

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|--------------------|-------------|-----------------------|-------------|----------|
| GDP(-1) | 0.060462 | 0.126824 | 0.476738 | 0.6372 |
| GDP(-2) | 0.296550 | 0.133421 | 2.222660 | 0.0345 |
| URB | 5.396452 | 2.225775 | 2.424527 | 0.0220 |
| URB(-1) | 3.211880 | 2.938925 | 1.092876 | 0.2838 |
| URB(-2) | -5.194386 | 1.928757 | -2.693127 | 0.0118 |
| POP | 14.59501 | 8.007733 | 1.822615 | 0.0791 |
| POP(-1) | -24.79602 | 8.068298 | -3.073265 | 0.0047 |
| FDI | -0.815554 | 0.609333 | -1.338437 | 0.1915 |
| FDI(-1) | 0.697083 | 0.570606 | 1.221654 | 0.2320 |
| FDI(-2) | 0.463836 | 0.629767 | 0.736520 | 0.4675 |
| FDI(-3) | 1.718834 | 0.623369 | 2.757330 | 0.0101 |
| INF | -0.050665 | 0.026875 | -1.885199 | 0.0698 |
| C | 12.62421 | 6.635000 | 1.902668 | 0.0674 |
| R-squared | 0.712620 | Mean dependent var | | 4.026680 |
| Adjusted R-squared | 0.589457 | S.D. dependent var | | 3.765440 |
| S.E. of regression | 2.412655 | Akaike info criterion | | 4.852111 |
| Sum squared resid | 162.9853 | Schwarz criterion | | 5.395439 |
| Log likelihood | -86.46828 | Hannan-Quinn criter. | | 5.049961 |
| F-statistic | 5.785991 | Durbin-Watson stat | | 1.926875 |
| Prob(F-statistic) | 0.000064 | | | |

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

The Autoregressive Distributed Lag (ARDL) model with the selected optimal lag structure ARDL(2, 2, 1, 3, 0) was estimated to examine the impact of urbanisation on economic growth in Nigeria from 1981 to 2024. The model was automatically selected using the Akaike Information Criterion (AIC), which ensures a balance between model fit and simplicity. The results reveal the short-run dynamic relationship between gross

domestic product (GDP) and its determinants, including urbanisation (URB), population (POP), foreign direct investment (FDI), and inflation (INF).

The coefficients of the lagged GDP variables show how current GDP responds to its past values. The first lag of GDP (GDP(-1)) has a positive coefficient of 0.0605 but is statistically insignificant, indicating that the immediate past level of GDP does not have a significant influence on current output. However, the second lag, GDP(-2), is positive and significant with a coefficient of 0.2966 and a probability value of 0.0345, suggesting that economic growth responds positively to its value two years earlier. This implies that Nigeria's GDP growth exhibits persistence, meaning past economic performance continues to influence current growth outcomes.

Urbanisation (URB) has a positive and statistically significant contemporaneous effect on GDP with a coefficient of 5.3964 and a probability value of 0.0220. This means that a one-unit increase in urbanisation raises GDP by approximately 5.40 units in the short run, reflecting that urban development promotes economic activities through improved access to infrastructure, labor concentration, and technological innovation. However, the second lag of urbanisation (URB(-2)) is negative and significant at -5.1944 with a probability of 0.0118. This indicates that while urbanisation initially stimulates growth, excessive or poorly managed urban expansion could have adverse effects over time due to congestion, infrastructure pressure, or rising unemployment in urban areas.

The coefficient of population (POP) is positive at 14.5950 and marginally significant ($p = 0.0791$), indicating that an increase in population contributes positively to economic

growth in the short run, possibly through an expanded labor force and market size. Nevertheless, the lagged population variable POP(-1) is negative and significant (-24.7960; $p = 0.0047$), showing that over time, rapid population growth can hinder economic growth, likely because of resource strain, underemployment, and reduced productivity per capita.

Foreign direct investment (FDI) has an insignificant negative short-run effect with a coefficient of -0.8156 ($p = 0.1915$), suggesting that immediate FDI inflows do not translate directly into higher GDP. This may result from profit repatriation, capital flight, or the time required for investment projects to become productive. Interestingly, the third lag of FDI (FDI(-3)) has a positive and statistically significant coefficient of 1.7188 ($p = 0.0101$), implying that the growth-enhancing effect of FDI manifests after a delay of about three years, consistent with the notion that foreign investments take time to generate productive returns.

Inflation (INF) has a negative and marginally significant effect on GDP with a coefficient of -0.0507 ($p = 0.0698$). This indicates that a one-unit rise in inflation reduces GDP by about 0.05 units, suggesting that high inflation undermines growth by eroding purchasing power and raising production costs. Hence, maintaining price stability is essential for supporting sustainable economic growth.

The constant term (C) is positive at 12.6242 ($p = 0.0674$), representing the baseline level of GDP when all explanatory variables are held constant. This suggests that other

structural factors not captured in the model also contribute positively to Nigeria's economic output.

The overall model fit is strong, with an R-squared value of 0.7126, showing that about 71 percent of variations in GDP are explained by the explanatory variables. The adjusted R-squared of 0.5895 confirms the reliability of the model after accounting for the degrees of freedom. The F-statistic (5.7860) with a probability value of 0.000064 indicates that the overall model is statistically significant, meaning that the included variables jointly explain GDP growth in Nigeria. The Durbin-Watson statistic (1.9269) suggests that there is no problem of serial correlation among the residuals, which strengthens the validity of the model estimates.

In summary, the short-run ARDL results show that urbanisation exerts a positive and significant impact on Nigeria's economic growth, confirming that increasing urban development enhances productivity and output. However, unregulated population expansion and inflation tend to dampen growth performance, while the benefits of FDI are only realized after some years. These findings imply that Nigeria's economic performance is closely linked to effective urban planning, controlled population growth, and stable macroeconomic conditions.

4.8 Post-Estimation Assessments

Assessing a model after estimation is a vital stage in econometric analysis, as it helps to confirm the precision and dependability of the estimated results. These diagnostic checks are conducted to ensure that the model adheres to the fundamental assumptions necessary

for sound statistical inference and reliable forecasting. Within this framework, post-estimation evaluations are performed to validate the model’s consistency and robustness.

4.8.1 Heteroskedasticity Test

The heteroskedasticity test examines whether the variance of the error terms remains constant across all observations (a condition known as homoskedasticity) or varies from one observation to another (heteroskedasticity). The presence of heteroskedasticity can result in inefficient parameter estimates and weaken the validity of statistical conclusions. In this study, the Breusch-Pagan-Godfrey test is applied to identify whether heteroskedasticity exists within the model, thereby ensuring that the estimated coefficients and inferences drawn are reliable.

Table 4.7: Breusch-Pagan-Godfrey Heteroscedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

| | | | |
|---------------------|----------|----------------------|--------|
| F-statistic | 0.672677 | Prob. F(12,28) | 0.7623 |
| Obs*R-squared | 9.174873 | Prob. Chi-Square(12) | 0.6879 |
| Scaled explained SS | 3.245492 | Prob. Chi-Square(12) | 0.9935 |

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

The Breusch-Pagan-Godfrey heteroskedasticity test was conducted to determine whether the variance of the residuals is constant across observations. The test results show an F-statistic value of 0.6727 with a probability of 0.7623, an Obs*R-squared value of 9.1749 with a probability of 0.6879, and a Scaled explained sum of squares statistic of 3.2455 with a probability of 0.9935.

Since all the probability values are greater than the 5 percent significance level, the null hypothesis of homoskedasticity cannot be rejected. This indicates that the model does not suffer from heteroskedasticity, meaning the variance of the error terms remains constant across observations. Therefore, the estimated parameters are efficient, and the model provides reliable statistical inferences.

4.8.2 Autocorrelation Test

This test evaluates whether the residuals from the estimated model are correlated across time periods. If autocorrelation exists, it suggests that the model may have omitted some dynamic relationships, leading to biased standard errors and unreliable statistical results. In this study, the Breusch-Godfrey Serial Correlation LM test is applied to determine whether serial correlation is present in the residuals of the estimated model.

Table 4.8: Breusch-Godfrey Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|---------------|----------|---------------------|--------|
| F-statistic | 1.762290 | Prob. F(2,26) | 0.1915 |
| Obs*R-squared | 4.894490 | Prob. Chi-Square(2) | 0.0865 |

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

The Breusch-Godfrey Serial Correlation LM test was conducted to check for the presence of serial correlation in the residuals of the estimated model. The results show an F-statistic value of 1.7623 with a probability of 0.1915, and an Obs*R-squared value of 4.8945 with a probability of 0.0865.

Since both p-values exceed the conventional 5% significance level, we fail to reject the null hypothesis of no serial correlation. This indicates that the residuals are free from autocorrelation, confirming that the dynamic specification of the model is appropriate. Consequently, the parameter estimates are efficient, and the statistical inferences drawn from the model remain valid and reliable.

4.9 Possible Policy Implications of Findings

The findings of this study, which examined the impact of urbanization on economic growth in Nigeria, have several important policy implications for sustainable economic development. First, the positive and significant relationship between urbanization and economic growth indicates that the process of urban expansion, when properly managed, can serve as a strong catalyst for economic transformation. Therefore, policymakers should adopt urban planning policies that encourage the development of productive urban centers with adequate infrastructure, housing, transportation networks, and efficient public services to sustain the positive impact of urbanization on growth.

Secondly, since rapid urbanization without corresponding industrial and infrastructural development may strain existing resources and lead to urban poverty, unemployment, and congestion, the government should strengthen institutions responsible for urban management. Policies should be directed toward improving the absorptive capacity of urban areas by investing in social amenities, promoting affordable housing schemes, and ensuring effective waste management systems to support growing urban populations.

Thirdly, the study's results imply that industrialization policies should align with urban growth patterns to maximize the productive potential of cities. Encouraging the establishment of industries and small and medium enterprises (SMEs) in emerging urban areas would enhance employment opportunities, reduce rural-urban migration pressure, and support inclusive growth. Fiscal and monetary incentives could be provided to industries that locate in urban centers with high growth potential, thus reinforcing the positive link between urbanization and economic performance.

Moreover, since urbanization is also linked with human capital concentration, policymakers should focus on improving access to quality education, vocational training, and healthcare services in urban regions. This will ensure that the labor force remains healthy, skilled, and productive, thereby increasing the contribution of urban labor to national output.

Finally, the government should strengthen decentralization and regional development policies to ensure balanced urban growth across the country. This would reduce overdependence on major cities like Lagos and Abuja while promoting the emergence of secondary cities capable of contributing meaningfully to Nigeria's overall economic growth. Through such targeted and well-coordinated policies, Nigeria can harness the full economic benefits of urbanization and promote sustainable and inclusive development.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Summary of Findings

This study investigated the impact of urbanization on economic growth in Nigeria over the period 1981 to 2024 using the Autoregressive Distributed Lag (ARDL) model. Gross domestic product (GDP) was the dependent variable, while urbanization (URB), population (POP), foreign direct investment (FDI), and inflation (INF) were the explanatory variables. The model also included a constant term to capture other unobserved influences on economic growth.

The stationarity tests confirmed that all variables became stationary at first differences, justifying the use of the ARDL bounds testing approach. The bounds test revealed a long-run co-integration relationship among GDP, urbanization, population, FDI, and inflation, indicating that these variables move together over time and jointly influence economic growth in Nigeria.

The short-run ARDL estimates showed that past values of GDP, urbanization, population, and FDI significantly affect current economic growth. Urbanization had a positive and significant effect on GDP, suggesting that a unit increase in urbanization raises output by approximately 5.40 units. However, the second lag of urbanization was negative and significant, indicating that excessive or poorly managed urban growth can have adverse

effects in subsequent periods due to congestion, pressure on infrastructure, or unemployment.

Population had a positive short-run impact, reflecting the role of an expanding labor force in promoting growth. Yet, the lagged population variable was negative and significant, showing that over time, high population growth can strain resources and hinder sustainable economic development. FDI displayed a delayed positive effect on GDP, with the third lag significant, suggesting that the benefits of foreign investment materialize after some time as projects become productive. Inflation had a marginally negative effect, implying that rising prices can reduce economic performance by increasing production costs and lowering purchasing power.

In the long run, urbanization and FDI had positive coefficients, confirming that properly managed urban growth and stable foreign investment inflows support sustained economic growth in Nigeria. Population and inflation exhibited negative long-term effects, highlighting the importance of resource management and price stability. The error correction term was negative and statistically significant, indicating that deviations from long-run equilibrium are corrected over time.

The diagnostic tests confirmed the robustness of the model. The Breusch-Pagan-Godfrey test showed no heteroskedasticity, and the Breusch-Godfrey LM test revealed no serial correlation in the residuals. The R-squared value of 0.71 indicates that the explanatory variables accounted for a substantial portion of GDP variation, and the F-statistic

confirmed the overall significance of the model. The Durbin-Watson statistic indicated no issues of autocorrelation, ensuring reliable estimation results.

5.2 Conclusion

The findings of this study establish that urbanization significantly drives economic growth in Nigeria, both in the short and long term. Urban development promotes industrial activities, increases labor concentration, and enhances access to infrastructure, all of which contribute to higher GDP. Foreign direct investment also plays a key role in supporting growth, but its benefits appear with a time lag.

Population growth has a dual impact; while a larger labor force can initially support growth, excessive population expansion can strain resources and reduce per capita productivity. Inflation has a dampening effect on economic growth, emphasizing the need for price stability to maintain sustainable development.

Overall, the study concludes that Nigeria's economic growth depends on a combination of effective urban planning, managed population growth, stable FDI inflows, and macroeconomic stability. Coordinated policy efforts in these areas are critical to enhancing productivity and promoting long-term economic growth.

5.3 Recommendations

Based on the results of the study, the following recommendations are proposed:

1. Policymakers should promote planned urbanization by investing in infrastructure, housing, and public services to support productive urban growth and avoid congestion-related challenges.
2. The government should attract and maintain sustainable foreign direct investment by providing a stable policy environment, improving infrastructure, and offering targeted incentives to investors in productive sectors.
3. Population growth management strategies should be implemented, including education and family planning programs, to ensure that population expansion does not outpace economic capacity.
4. Macroeconomic policies should aim to maintain price stability, controlling inflation through coordinated fiscal and monetary measures to protect the productive capacity of the economy.
5. Industrial and regional development policies should align with urban growth, encouraging the establishment of industries and SMEs in urban areas to absorb labor and boost output.

6. Investments in human capital, such as education and vocational training, should be prioritized in urban regions to enhance the productivity and employability of the workforce.
7. Decentralization policies should be strengthened to promote balanced urban development across Nigeria, reducing the overconcentration of resources and economic activities in a few major cities.

In conclusion, sustainable economic growth in Nigeria requires a holistic approach that integrates urban planning, investment promotion, population management, and macroeconomic stability. Policymakers must adopt strategies that ensure urbanization acts as a driver of growth rather than a source of economic strain.

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APPENDICES

APPENDIX 1

DESCRIPTIVE STATISTICS

| | GDP | URB | POP | FDI | INF |
|--------------|-----------|----------|-----------|-----------|----------|
| Mean | 3.050875 | 4.697689 | 2.610869 | 1.206539 | 19.40136 |
| Median | 3.339060 | 4.680956 | 2.657389 | 0.961468 | 13.12650 |
| Maximum | 15.32916 | 6.215822 | 3.074953 | 4.282088 | 72.83550 |
| Minimum | -13.12788 | 3.449717 | 2.082978 | -0.039127 | 5.388008 |
| Std. Dev. | 5.194675 | 0.736322 | 0.236212 | 0.939830 | 16.23182 |
| Skewness | -0.853851 | 0.229776 | -0.989757 | 0.982213 | 1.795631 |
| Kurtosis | 4.963053 | 2.165543 | 3.519820 | 3.831958 | 5.275433 |
| Jarque-Bera | 12.41135 | 1.663764 | 7.679255 | 8.343732 | 33.13706 |
| Probability | 0.002018 | 0.435229 | 0.021502 | 0.015423 | 0.000000 |
| Sum | 134.2385 | 206.6983 | 114.8782 | 53.08771 | 853.6598 |
| Sum Sq. Dev. | 1160.340 | 23.31329 | 2.399223 | 37.98105 | 11329.30 |
| Observations | 44 | 44 | 44 | 44 | 44 |

APPENDIX 2

CORRELATION STATISTICS

| | GDP | URB | POP | FDI | INF |
|-----|------------------------|------------------------|------------------------|------------------------|-------------------------------|
| GDP | 1 | 0.1627906976744 186 | 0.4187455954897 814 | 0.4443974630021 141 | - 0.2480620155038 759 |
| URB | 0.1627906976744 186 | 1 | 0.7379844961240 309 | 0.2452431289640 591 | - 0.1530655391120 507 |
| POP | 0.4187455954897 814 | 0.7379844961240 309 | 1 | 0.5088090204369 274 | - 0.3031712473572 938 |
| FDI | 0.4443974630021 141 | 0.2452431289640 591 | 0.5088090204369 274 | 1 | - 0.0071881606765 32769 |

| | | | | | |
|-----|------------------------|------------------------|------------------------|--------------------------|---|
| | - | - | - | - | |
| INF | 0.2480620155038 759 | 0.1530655391120 507 | 0.3031712473572 938 | 0.0071881606765 32769 | 1 |

APPENDIX 3

UNIT ROOT TEST/ STATIONARY TESTS

AT LEVELS

GDP

Null Hypothesis: GDP has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=9)

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -3.286572 | 0.0219 |
| Test critical values: | | |
| 1% level | -3.596616 | |
| 5% level | -2.933158 | |
| 10% level | -2.604867 | |

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP)

Method: Least Squares

Date: 08/29/25 Time: 03:03

Sample (adjusted): 1983 2024

Included observations: 42 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|------------|-------------|------------|-------------|--------|
| GDP(-1) | -0.426443 | 0.129753 | -3.286572 | 0.0022 |
| D(GDP(-1)) | -0.321035 | 0.129944 | -2.470574 | 0.0180 |
| C | 1.827256 | 0.706395 | 2.586734 | 0.0135 |

| | | | |
|--------------------|-----------|-----------------------|----------|
| R-squared | 0.397286 | Mean dependent var | 0.243567 |
| Adjusted R-squared | 0.366378 | S.D. dependent var | 4.563378 |
| S.E. of regression | 3.632467 | Akaike info criterion | 5.486450 |
| Sum squared resid | 514.5977 | Schwarz criterion | 5.610569 |
| Log likelihood | -112.2155 | Hannan-Quinn criter. | 5.531945 |
| F-statistic | 12.85367 | Durbin-Watson stat | 1.914241 |
| Prob(F-statistic) | 0.000052 | | |

URB

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

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -1.471154 | 0.5385 |
| Test critical values: | | |
| 1% level | -3.592462 | |
| 5% level | -2.931404 | |
| 10% level | -2.603944 | |

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(URB)
 Method: Least Squares
 Date: 08/29/25 Time: 03:04
 Sample (adjusted): 1982 2024
 Included observations: 43 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|-----------|
| URB(-1) | -0.077505 | 0.052683 | -1.471154 | 0.1489 |
| C | 0.302017 | 0.251818 | 1.199347 | 0.2373 |
| R-squared | 0.050141 | Mean dependent var | | -0.064328 |
| Adjusted R-squared | 0.026974 | S.D. dependent var | | 0.248907 |
| S.E. of regression | 0.245527 | Akaike info criterion | | 0.074578 |
| Sum squared resid | 2.471631 | Schwarz criterion | | 0.156495 |
| Log likelihood | 0.396567 | Hannan-Quinn criter. | | 0.104786 |
| F-statistic | 2.164295 | Durbin-Watson stat | | 1.864350 |
| Prob(F-statistic) | 0.148883 | | | |

POP

Null Hypothesis: POP has a unit root
 Exogenous: Constant
 Lag Length: 7 (Automatic - based on SIC, maxlag=9)

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -1.776781 | 0.3856 |
| Test critical values: | | |
| 1% level | -3.626784 | |
| 5% level | -2.945842 | |
| 10% level | -2.611531 | |

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(POP)
 Method: Least Squares
 Date: 08/29/25 Time: 03:04
 Sample (adjusted): 1989 2024
 Included observations: 36 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|-----------|
| POP(-1) | -0.116039 | 0.065309 | -1.776781 | 0.0869 |
| D(POP(-1)) | 1.061968 | 0.173598 | 6.117399 | 0.0000 |
| D(POP(-2)) | -0.449043 | 0.219308 | -2.047547 | 0.0504 |
| D(POP(-3)) | 0.505687 | 0.159637 | 3.167721 | 0.0038 |
| D(POP(-4)) | 0.031743 | 0.160873 | 0.197318 | 0.8451 |
| D(POP(-5)) | 0.324299 | 0.130979 | 2.475964 | 0.0199 |
| D(POP(-6)) | -0.116127 | 0.094602 | -1.227534 | 0.2302 |
| D(POP(-7)) | 0.138700 | 0.073461 | 1.888089 | 0.0698 |
| C | 0.308028 | 0.175234 | 1.757806 | 0.0901 |
| R-squared | 0.768756 | Mean dependent var | | -0.016429 |
| Adjusted R-squared | 0.700240 | S.D. dependent var | | 0.042025 |
| S.E. of regression | 0.023009 | Akaike info criterion | | -4.493553 |
| Sum squared resid | 0.014294 | Schwarz criterion | | -4.097673 |
| Log likelihood | 89.88395 | Hannan-Quinn criter. | | -4.355380 |
| F-statistic | 11.21999 | Durbin-Watson stat | | 1.858643 |
| Prob(F-statistic) | 0.000001 | | | |

FDI

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

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -3.843259 | 0.0051 |
| Test critical values: | | |
| 1% level | -3.592462 | |
| 5% level | -2.931404 | |
| 10% level | -2.603944 | |

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(FDI)
 Method: Least Squares
 Date: 08/29/25 Time: 03:05

Sample (adjusted): 1982 2024
 Included observations: 43 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|----------|
| FDI(-1) | -0.524599 | 0.136499 | -3.843259 | 0.0004 |
| C | 0.646362 | 0.209923 | 3.079048 | 0.0037 |
| R-squared | 0.264846 | Mean dependent var | | 0.005712 |
| Adjusted R-squared | 0.246916 | S.D. dependent var | | 0.964155 |
| S.E. of regression | 0.836698 | Akaike info criterion | | 2.526687 |
| Sum squared resid | 28.70258 | Schwarz criterion | | 2.608603 |
| Log likelihood | -52.32377 | Hannan-Quinn criter. | | 2.556895 |
| F-statistic | 14.77064 | Durbin-Watson stat | | 2.243373 |
| Prob(F-statistic) | 0.000414 | | | |

INF

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

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -3.057212 | 0.0376 |
| Test critical values: | | |
| 1% level | -3.592462 | |
| 5% level | -2.931404 | |
| 10% level | -2.603944 | |

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(INF)
 Method: Least Squares
 Date: 08/29/25 Time: 03:06
 Sample (adjusted): 1982 2024
 Included observations: 43 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|----------|
| INF(-1) | -0.379805 | 0.124232 | -3.057212 | 0.0039 |
| C | 7.535536 | 3.100689 | 2.430278 | 0.0196 |
| R-squared | 0.185644 | Mean dependent var | | 0.289053 |
| Adjusted R-squared | 0.165782 | S.D. dependent var | | 14.35181 |
| S.E. of regression | 13.10831 | Akaike info criterion | | 8.029764 |
| Sum squared resid | 7044.935 | Schwarz criterion | | 8.111681 |
| Log likelihood | -170.6399 | Hannan-Quinn criter. | | 8.059973 |
| F-statistic | 9.346548 | Durbin-Watson stat | | 1.581690 |

Prob(F-statistic) 0.003922

APPENDIX 4

UNIT ROOT TEST/ STATIONARY TESTS

AT FIRST DIFFERENCE

GDP

Null Hypothesis: D(GDP) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -10.82001 | 0.0000 |
| Test critical values: | | |
| 1% level | -3.596616 | |
| 5% level | -2.933158 | |
| 10% level | -2.604867 | |

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP,2)

Method: Least Squares

Date: 08/29/25 Time: 03:03

Sample (adjusted): 1983 2024

Included observations: 42 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|-----------|
| D(GDP(-1)) | -1.470124 | 0.135871 | -10.82001 | 0.0000 |
| C | 0.422529 | 0.627550 | 0.673299 | 0.5046 |
| R-squared | 0.745341 | Mean dependent var | | -0.137102 |
| Adjusted R-squared | 0.738974 | S.D. dependent var | | 7.933256 |
| S.E. of regression | 4.053154 | Akaike info criterion | | 5.683316 |
| Sum squared resid | 657.1223 | Schwarz criterion | | 5.766062 |
| Log likelihood | -117.3496 | Hannan-Quinn criter. | | 5.713645 |
| F-statistic | 117.0727 | Durbin-Watson stat | | 1.966552 |
| Prob(F-statistic) | 0.000000 | | | |

URB

Null Hypothesis: D(URB) has a unit root

Exogenous: Constant

Lag Length: 9 (Automatic - based on SIC, maxlag=9)

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -5.325027 | 0.0001 |
| 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(URB,2)

Method: Least Squares

Date: 08/29/25 Time: 03:03

Sample (adjusted): 1992 2024

Included observations: 33 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|-----------|
| D(URB(-1)) | -1.214190 | 0.228016 | -5.325027 | 0.0000 |
| D(URB(-1),2) | 0.282818 | 0.220317 | 1.283685 | 0.2126 |
| D(URB(-2),2) | 0.402555 | 0.212421 | 1.895077 | 0.0713 |
| D(URB(-3),2) | 0.439195 | 0.198623 | 2.211202 | 0.0377 |
| D(URB(-4),2) | 0.391074 | 0.183269 | 2.133880 | 0.0442 |
| D(URB(-5),2) | 0.436898 | 0.170870 | 2.556909 | 0.0180 |
| D(URB(-6),2) | 0.469472 | 0.154647 | 3.035767 | 0.0061 |
| D(URB(-7),2) | 0.482565 | 0.134150 | 3.597193 | 0.0016 |
| D(URB(-8),2) | 0.475704 | 0.108998 | 4.364348 | 0.0002 |
| D(URB(-9),2) | 0.463024 | 0.078712 | 5.882494 | 0.0000 |
| C | -0.034635 | 0.024749 | -1.399461 | 0.1756 |
| R-squared | 0.886713 | Mean dependent var | | 0.036550 |
| Adjusted R-squared | 0.835219 | S.D. dependent var | | 0.301003 |
| S.E. of regression | 0.122187 | Akaike info criterion | | -1.105333 |
| Sum squared resid | 0.328451 | Schwarz criterion | | -0.606497 |
| Log likelihood | 29.23799 | Hannan-Quinn criter. | | -0.937490 |
| F-statistic | 17.21974 | Durbin-Watson stat | | 1.559018 |
| Prob(F-statistic) | 0.000000 | | | |

POP

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

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -5.461214 | 0.0000 |
| Test critical values: | | |
| 1% level | -3.596616 | |
| 5% level | -2.933158 | |
| 10% level | -2.604867 | |

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(POP,2)
 Method: Least Squares
 Date: 08/29/25 Time: 03:04
 Sample (adjusted): 1983 2024
 Included observations: 42 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|-----------|
| D(POP(-1)) | -0.848372 | 0.155345 | -5.461214 | 0.0000 |
| C | -0.018125 | 0.013714 | -1.321663 | 0.1938 |
| R-squared | 0.427138 | Mean dependent var | | 0.001601 |
| Adjusted R-squared | 0.412817 | S.D. dependent var | | 0.111890 |
| S.E. of regression | 0.085739 | Akaike info criterion | | -2.028562 |
| Sum squared resid | 0.294049 | Schwarz criterion | | -1.945816 |
| Log likelihood | 44.59981 | Hannan-Quinn criter. | | -1.998233 |
| F-statistic | 29.82486 | Durbin-Watson stat | | 1.593243 |
| Prob(F-statistic) | 0.000003 | | | |

FDI

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

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -10.20710 | 0.0000 |
| Test critical values: | | |
| 1% level | -3.596616 | |
| 5% level | -2.933158 | |

10% level

-2.604867

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(FDI,2)

Method: Least Squares

Date: 08/29/25 Time: 03:05

Sample (adjusted): 1983 2024

Included observations: 42 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|------------|-------------|------------|-------------|--------|
| D(FDI(-1)) | -1.445181 | 0.141586 | -10.20710 | 0.0000 |
| C | 0.008478 | 0.136507 | 0.062107 | 0.9508 |

| | | | |
|--------------------|-----------|-----------------------|----------|
| R-squared | 0.722578 | Mean dependent var | 0.002115 |
| Adjusted R-squared | 0.715643 | S.D. dependent var | 1.658983 |
| S.E. of regression | 0.884656 | Akaike info criterion | 2.639211 |
| Sum squared resid | 31.30462 | Schwarz criterion | 2.721957 |
| Log likelihood | -53.42343 | Hannan-Quinn criter. | 2.669541 |
| F-statistic | 104.1848 | Durbin-Watson stat | 2.139028 |
| Prob(F-statistic) | 0.000000 | | |

INF

Null Hypothesis: D(INF) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

| | t-Statistic | Prob.* |
|--|-------------|--------|
| Augmented Dickey-Fuller test statistic | -5.996500 | 0.0000 |
| Test critical values: | | |
| 1% level | -3.596616 | |
| 5% level | -2.933158 | |
| 10% level | -2.604867 | |

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INF,2)

Method: Least Squares

Date: 08/29/25 Time: 03:06

Sample (adjusted): 1983 2024

Included observations: 42 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|----------|
| D(INF(-1)) | -0.940124 | 0.156779 | -5.996500 | 0.0000 |
| C | 0.602715 | 2.240930 | 0.268957 | 0.7893 |
| R-squared | 0.473393 | Mean dependent var | | 0.516610 |
| Adjusted R-squared | 0.460228 | S.D. dependent var | | 19.76691 |
| S.E. of regression | 14.52259 | Akaike info criterion | | 8.235735 |
| Sum squared resid | 8436.220 | Schwarz criterion | | 8.318481 |
| Log likelihood | -170.9504 | Hannan-Quinn criter. | | 8.266065 |
| F-statistic | 35.95801 | Durbin-Watson stat | | 1.860903 |
| Prob(F-statistic) | 0.000000 | | | |

APPENDIX 5

ARDL MODEL ESTIMATE

RAW OUTPUT

Dependent Variable: GDP
 Method: ARDL
 Date: 08/29/25 Time: 03:08
 Sample (adjusted): 1984 2024
 Included observations: 41 after adjustments
 Maximum dependent lags: 3 (Automatic selection)
 Model selection method: Akaike info criterion (AIC)
 Dynamic regressors (3 lags, automatic): URB POP FDI INF
 Fixed regressors: C
 Number of models evaluated: 768
 Selected Model: ARDL(2, 2, 1, 3, 0)

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|-----------|-------------|--------------------|-------------|----------|
| GDP(-1) | 0.060462 | 0.126824 | 0.476738 | 0.6372 |
| GDP(-2) | 0.296550 | 0.133421 | 2.222660 | 0.0345 |
| URB | 5.396452 | 2.225775 | 2.424527 | 0.0220 |
| URB(-1) | 3.211880 | 2.938925 | 1.092876 | 0.2838 |
| URB(-2) | -5.194386 | 1.928757 | -2.693127 | 0.0118 |
| POP | 14.59501 | 8.007733 | 1.822615 | 0.0791 |
| POP(-1) | -24.79602 | 8.068298 | -3.073265 | 0.0047 |
| FDI | -0.815554 | 0.609333 | -1.338437 | 0.1915 |
| FDI(-1) | 0.697083 | 0.570606 | 1.221654 | 0.2320 |
| FDI(-2) | 0.463836 | 0.629767 | 0.736520 | 0.4675 |
| FDI(-3) | 1.718834 | 0.623369 | 2.757330 | 0.0101 |
| INF | -0.050665 | 0.026875 | -1.885199 | 0.0698 |
| C | 12.62421 | 6.635000 | 1.902668 | 0.0674 |
| R-squared | 0.712620 | Mean dependent var | | 4.026680 |

| | | | |
|--------------------|-----------|-----------------------|----------|
| Adjusted R-squared | 0.589457 | S.D. dependent var | 3.765440 |
| S.E. of regression | 2.412655 | Akaike info criterion | 4.852111 |
| Sum squared resid | 162.9853 | Schwarz criterion | 5.395439 |
| Log likelihood | -86.46828 | Hannan-Quinn criter. | 5.049961 |
| F-statistic | 5.785991 | Durbin-Watson stat | 1.926875 |
| Prob(F-statistic) | 0.000064 | | |

APPENDIX 6

ARDL BOUND CO-INTEGRATION TEST

ARDL Bounds Test

Date: 08/29/25 Time: 03:09

Sample: 1984 2024

Included observations: 41

Null Hypothesis: No long-run relationships exist

| Test Statistic | Value | k |
|----------------|----------|---|
| F-statistic | 8.306652 | 4 |

Critical Value Bounds

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

Test Equation:

Dependent Variable: D(GDP)

Method: Least Squares

Date: 08/29/25 Time: 03:09

Sample: 1984 2024

Included observations: 41

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|------------|-------------|------------|-------------|--------|
| D(GDP(-1)) | -0.296550 | 0.133421 | -2.222660 | 0.0345 |
| D(URB) | 5.396452 | 2.225775 | 2.424527 | 0.0220 |
| D(URB(-1)) | 5.194386 | 1.928757 | 2.693127 | 0.0118 |
| D(POP) | 14.59501 | 8.007733 | 1.822615 | 0.0791 |
| D(FDI) | -0.815554 | 0.609333 | -1.338437 | 0.1915 |
| D(FDI(-1)) | -2.182670 | 0.800971 | -2.725029 | 0.0110 |
| D(FDI(-2)) | -1.718834 | 0.623369 | -2.757330 | 0.0101 |
| C | 12.62421 | 6.635000 | 1.902668 | 0.0674 |

| | | | | |
|--------------------|-----------|-----------------------|-----------|--------|
| URB(-1) | 3.413946 | 1.075176 | 3.175245 | 0.0036 |
| POP(-1) | -10.20101 | 3.942983 | -2.587130 | 0.0152 |
| FDI(-1) | 2.064199 | 1.063015 | 1.941835 | 0.0623 |
| INF | -0.050665 | 0.026875 | -1.885199 | 0.0698 |
| GDP(-1) | -0.642988 | 0.153967 | -4.176154 | 0.0003 |
| <hr/> | | | | |
| R-squared | 0.804642 | Mean dependent var | 0.350013 | |
| Adjusted R-squared | 0.720917 | S.D. dependent var | 4.566974 | |
| S.E. of regression | 2.412655 | Akaike info criterion | 4.852111 | |
| Sum squared resid | 162.9853 | Schwarz criterion | 5.395439 | |
| Log likelihood | -86.46828 | Hannan-Quinn criter. | 5.049961 | |
| F-statistic | 9.610545 | Durbin-Watson stat | 1.926875 | |
| Prob(F-statistic) | 0.000001 | | | |

APPENDIX 7

ARDL BOUND TEST

LONG AND SHORT RUN

ARDL Cointegrating And Long Run Form

Dependent Variable: GDP

Selected Model: ARDL(2, 2, 1, 3, 0)

Date: 08/29/25 Time: 03:10

Sample: 1981 2024

Included observations: 41

| Cointegrating Form | | | | |
|--------------------|-------------|------------|-------------|--------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(GDP(-1)) | -0.296550 | 0.133421 | -2.222660 | 0.0345 |
| D(URB) | 5.396452 | 2.225775 | 2.424527 | 0.0220 |
| D(URB(-1)) | 5.194386 | 1.928757 | 2.693127 | 0.0118 |
| D(POP) | 14.595011 | 8.007733 | 1.822615 | 0.0791 |
| D(FDI) | -0.815554 | 0.609333 | -1.338437 | 0.1915 |
| D(FDI(-1)) | -0.463836 | 0.629767 | -0.736520 | 0.4675 |
| D(FDI(-2)) | -1.718834 | 0.623369 | -2.757330 | 0.0101 |
| D(INF) | -0.050665 | 0.026875 | -1.885199 | 0.0698 |
| CointEq(-1) | -0.642988 | 0.153967 | -4.176154 | 0.0003 |

Cointeq = GDP - (5.3095*URB -15.8650*POP + 3.2103*FDI -0.0788*INF + 19.6336)

| Long Run Coefficients | | | | |
|-----------------------|-------------|------------|-------------|-------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |

| | | | | |
|-----|------------|-----------|-----------|--------|
| URB | 5.309500 | 2.243334 | 2.366789 | 0.0251 |
| POP | -15.865004 | 7.276576 | -2.180284 | 0.0378 |
| FDI | 3.210322 | 1.326811 | 2.419578 | 0.0223 |
| INF | -0.078796 | 0.038271 | -2.058905 | 0.0489 |
| C | 19.633649 | 11.058551 | 1.775427 | 0.0867 |

APPENDIX 8

DIAGNOSTIC TEST

BREUSCH-GODFREY AUTOCORRELATION

Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|---------------|----------|---------------------|--------|
| F-statistic | 1.762290 | Prob. F(2,26) | 0.1915 |
| Obs*R-squared | 4.894490 | Prob. Chi-Square(2) | 0.0865 |

Test Equation:

Dependent Variable: RESID

Method: ARDL

Date: 08/29/25 Time: 03:11

Sample: 1984 2024

Included observations: 41

Presample missing value lagged residuals set to zero.

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|-----------|-------------|------------|-------------|--------|
| GDP(-1) | -0.176527 | 0.179180 | -0.985194 | 0.3336 |
| GDP(-2) | 0.232235 | 0.183808 | 1.263470 | 0.2176 |
| URB | -1.008996 | 2.257081 | -0.447036 | 0.6586 |
| URB(-1) | 2.591936 | 3.295266 | 0.786563 | 0.4386 |
| URB(-2) | -1.416612 | 2.096741 | -0.675625 | 0.5052 |
| POP | 6.966826 | 8.675946 | 0.803005 | 0.4293 |
| POP(-1) | -7.730507 | 8.883712 | -0.870189 | 0.3922 |
| FDI | -0.131032 | 0.609527 | -0.214973 | 0.8315 |
| FDI(-1) | -0.019591 | 0.558763 | -0.035061 | 0.9723 |
| FDI(-2) | 0.089604 | 0.625746 | 0.143195 | 0.8872 |
| FDI(-3) | -0.181159 | 0.615257 | -0.294445 | 0.7708 |
| INF | -0.001920 | 0.026196 | -0.073310 | 0.9421 |
| C | 1.540887 | 6.543651 | 0.235478 | 0.8157 |
| RESID(-1) | 0.243138 | 0.269593 | 0.901870 | 0.3754 |
| RESID(-2) | -0.488647 | 0.262649 | -1.860454 | 0.0742 |

| | | | |
|--------------------|-----------|-----------------------|----------|
| R-squared | 0.119378 | Mean dependent var | 5.82E-15 |
| Adjusted R-squared | -0.354803 | S.D. dependent var | 2.018572 |
| S.E. of regression | 2.349537 | Akaike info criterion | 4.822546 |
| Sum squared resid | 143.5285 | Schwarz criterion | 5.449462 |
| Log likelihood | -83.86219 | Hannan-Quinn criter. | 5.050834 |

| | | | |
|-------------------|----------|--------------------|----------|
| F-statistic | 0.251756 | Durbin-Watson stat | 2.237409 |
| Prob(F-statistic) | 0.995296 | | |

APPENDIX 9

BREUSCH-PAGAN-GODFREY HETEROSCEDASTICITY

Heteroskedasticity Test: Breusch-Pagan-Godfrey

| | | | |
|---------------------|----------|----------------------|--------|
| F-statistic | 0.672677 | Prob. F(12,28) | 0.7623 |
| Obs*R-squared | 9.174873 | Prob. Chi-Square(12) | 0.6879 |
| Scaled explained SS | 3.245492 | Prob. Chi-Square(12) | 0.9935 |

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 08/29/25 Time: 03:12

Sample: 1984 2024

Included observations: 41

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|--------|
| C | -5.722916 | 14.35481 | -0.398676 | 0.6932 |
| GDP(-1) | -0.190638 | 0.274383 | -0.694788 | 0.4929 |
| GDP(-2) | 0.089767 | 0.288657 | 0.310983 | 0.7581 |
| URB | -3.137430 | 4.815459 | -0.651533 | 0.5200 |
| URB(-1) | 10.86293 | 6.358358 | 1.708448 | 0.0986 |
| URB(-2) | -7.429841 | 4.172861 | -1.780515 | 0.0858 |
| POP | -11.47123 | 17.32471 | -0.662131 | 0.5133 |
| POP(-1) | 14.83922 | 17.45575 | 0.850105 | 0.4025 |
| FDI | 0.039165 | 1.318292 | 0.029709 | 0.9765 |
| FDI(-1) | -0.033541 | 1.234506 | -0.027169 | 0.9785 |
| FDI(-2) | -2.448861 | 1.362500 | -1.797329 | 0.0831 |
| FDI(-3) | 1.677884 | 1.348657 | 1.244115 | 0.2238 |
| INF | 0.053815 | 0.058144 | 0.925542 | 0.3626 |

| | | | |
|--------------------|-----------|-----------------------|----------|
| R-squared | 0.223777 | Mean dependent var | 3.975251 |
| Adjusted R-squared | -0.108889 | S.D. dependent var | 4.956871 |
| S.E. of regression | 5.219774 | Akaike info criterion | 6.395564 |
| Sum squared resid | 762.8892 | Schwarz criterion | 6.938892 |
| Log likelihood | -118.1091 | Hannan-Quinn criter. | 6.593414 |
| F-statistic | 0.672677 | Durbin-Watson stat | 2.225619 |
| Prob(F-statistic) | 0.762269 | | |