

**PUBLIC DEBT, GOVERNANCE QUALITY AND HUMAN CAPITAL
DEVELOPMENT IN NIGERIA.**



BY

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BENIN CITY**

DECEMBER, 2025.

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**A THESIS PRESENTED TO THE DEPARTMENT OF ECONOMICS, FACULTY
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PARTIAL FULFILMENT FOR THE REQUIREMENTS OF THE AWARD OF
DOCTOR OF PHILOSOPHY (PhD.) IN ECONOMICS**

DECEMBER, 2025.

DECLARATION

I, Oseremen ThankGod EHISUORIA do hereby declare that this project titled: **“Public Debt, Governance Quality and Human Capital Development in Nigeria”** is entirely my own work and composition. The work embodied in this project has not been submitted in Candidature for any degree and is not concurrently being submitted for any other degree. All references made to works of other persons have been duly acknowledged.

Oseremen ThankGod EHISUORIA
(Student)

Date

CERTIFICATION

We certify that this work titled, “**Public Debt, Governance Quality and Human Capital Development in Nigeria**” was carried out by Oseremen ThankGod EHISUORIA in the Department of Economics, Faculty of Social Sciences, University of Benin, Benin City, Edo State.

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DEDICATION

This thesis is dedicated to the Almighty God for his ceaseless mercy and strength to read up to this academic level. It is also dedicated to my lovely father, Mr. Anthony EHISUORIA for his ceaseless prayers and words of encouragements.

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ABSTRACT

Nigeria, as one of the largest economies in Africa, has long faced significant challenges in harnessing its public debt for sustainable development, particularly in human capital development. The role of governance quality in shaping the relationship between public debt and human capital development is a fundamental but often overlooked aspect of the discourse. The aim of this study was to investigate the relationship between public debt, governance quality and human capital development in Nigeria.

The data used in this study were collected from secondary sources including Central Bank of Nigeria (CBN) Statistical Bulletins, World Development Indicators and World Governance Indicators (WGI) databases. The study employed a vector autoregressive (VAR) model and autoregressive distributed lag (ARDL) estimations using annual data from 1997 to 2024 to estimate three models corresponding to the study's hypotheses.

The study found that in the absence of effective governance systems, the long-term effects of public debt on human capital were more detrimental. Shocks to debt variables showed persistent negative response in human capital indicators, particularly in settings where governance quality was weak. Conversely, better-governed environments exhibited more resilient and favourable human capital outcomes, demonstrating the pivotal role of institutional quality in mitigating debt-related vulnerabilities. The study recommended strengthening institutional quality, prioritizing productive debt use and restructuring debt servicing frameworks to free up fiscal space for social investment.

CHAPTER ONE

INTRODUCTION

1.1 Preamble

Nigeria, as one of the largest economies in Africa, has long faced significant challenges in harnessing its public debt for sustainable development, particularly in human capital development. The country has experienced a dramatic increase in public debt in recent years, driven by a combination of factors including fiscal deficits, declining oil revenues, and the need to finance infrastructural projects. Public debt has been used to support essential government functions, but its effectiveness in promoting long-term development, especially in sectors like education, healthcare, and social welfare, remains questionable. Human capital development, which is crucial for economic growth and poverty reduction, is severely impacted by the allocation and management of public debt. Given Nigeria's large and growing population, ensuring that public debt is channeled effectively to enhance human capital is a critical challenge that policymakers must address (Akpan & Akpan, 2020; IMF, 2023). Furthermore, despite the growing debt burden, there is a persistent gap between public expenditure and the outcomes expected from such investments, with many critical sectors still facing underfunding.

The role of governance quality in shaping the relationship between public debt and human capital development is a fundamental but often overlooked aspect of the discourse. Nigeria has faced persistent governance challenges, including corruption, weak institutions, political instability, and inefficient public sector management. These governance issues significantly influence how effectively public debt is utilized for the development of human capital. While public debt has the potential to finance critical sectors such as

education and healthcare, poor governance can result in mismanagement and the diversion of funds intended for these vital areas. In countries with weak governance structures, public debt often fails to achieve its intended outcomes, with debt servicing becoming a priority over investments in human capital, further exacerbating the nation's development challenges. Without improving governance mechanisms and fostering transparency in public debt management, the country's ability to leverage debt for human capital development remains compromised (World Bank & IMF, 2021).

Research on the interrelationship between public debt, governance, and human capital in developing countries like Nigeria remains underdeveloped. Most studies have focused on the direct economic impacts of public debt on growth or its relationship with fiscal stability, with less attention given to how governance quality moderates this relationship. Additionally, human capital development, often viewed as a long-term policy objective, is not always seen as an immediate priority in the management of public debt. In Nigeria, the focus has traditionally been on short-term economic stabilization, with little emphasis on the long-term effects of public debt on key human development indicators, such as life expectancy, literacy rates, and access to basic services. Despite growing concerns about the sustainability of public debt, the way it influences the quality of human capital development remains insufficiently explored. This research seeks to fill this gap by investigating the role of governance quality in linking public debt and human capital development in Nigeria.

Public debt, when used efficiently, has the potential to spur economic growth and foster human capital development by funding investments in education, healthcare, and infrastructure. However, in Nigeria, public debt has not always been linked to tangible improvements in these sectors (Akpan & Akpan, 2020; IMF, 2023). The country's

governance challenges, including corruption and a lack of transparency, hinder the effectiveness of debt-financed investments in human capital. A critical examination of the relationship between public debt and governance is essential to understand the dynamics that determine whether public debt can be effectively converted into developmental outcomes. Recent debates on the sustainability of Nigeria's public debt have also highlighted the need for greater attention to governance as a key determinant of debt effectiveness. The misallocation of resources and diversion of funds due to governance failures results in public debt being used inefficiently, undermining its potential to foster long-term human capital development. This study aims to explore the specific pathways through which governance quality influences the ability of public debt to foster sustainable human development.

In recent years, international organizations such as the World Bank and the International Monetary Fund (IMF) have emphasized the importance of good governance in ensuring that public debt contributes to sustainable development (World Bank & IMF, 2021). These organizations argue that strong institutions, accountability, and transparency are crucial for maximizing the benefits of public debt (IMF, 2023). However, in Nigeria, governance structures continue to be weak, and this undermines the potential for public debt to foster human capital development. Corruption, inefficiency, and political instability remain significant barriers to effective debt management. The challenges faced by the Nigerian government in managing debt while simultaneously improving human capital outcomes reflect the broader systemic issues within the country's governance structures. This study aims to contribute to the growing body of literature by focusing specifically on how governance quality influences the impact of public debt on human capital in Nigeria, offering valuable insights for both policymakers and international development

institutions. By examining this relationship in greater depth, the research hopes to inform more effective public debt management strategies that prioritize human capital.

The context of Nigeria's human capital development is particularly relevant given the country's demographic trends. With one of the youngest populations in the world, Nigeria faces immense pressure to create jobs, improve educational outcomes, and provide healthcare services for its growing population. The efficiency with which public debt is allocated and managed will significantly affect the country's ability to meet these challenges. Nigeria is grappling with high unemployment rates, low educational attainment, and inadequate healthcare infrastructure—issues that are exacerbated by inefficient public debt management. A detailed exploration of the link between public debt, governance quality, and human capital development in Nigeria will not only contribute to academic knowledge but also provide actionable policy recommendations. These recommendations can guide Nigeria's fiscal policy decisions, ensuring that public debt is used more effectively to build the country's human capital and contribute to long-term sustainable development (National Bureau of Statistics [NBS], 2022; IMF, 2023). This research will also provide valuable lessons for other developing nations facing similar challenges with public debt management and human capital development.

1.2 Statement of the Problem

The relationship between public debt, governance quality, and human capital development has been widely studied in economic research; however, the nexus between these variables in the context of Nigeria remains underexplored.

Nigeria's heavy reliance on public debt to finance its development agenda, coupled with its challenging governance landscape, presents a complex dynamic that may hinder the optimal utilization of debt for human capital development.

According to Oladotun and Olanipekun (2024) assert that public debt can either promote or inhibit human capital outcomes, the interrelationship role of governance quality the nexus has not been sufficiently examined, particularly in the Nigerian context. The country's governance environment, marked by corruption, political instability, and weak regulatory frameworks, complicates the impact of public debt on essential human capital sectors such as education and healthcare. This research, therefore, seeks to fill the gap by exploring how governance quality can influence the relationship between public debt and human capital development in Nigeria.

Despite the recognition of the importance of governance in the management of public debt, the existing literature has treated governance as a monolithic concept, often focusing on a single dimension such as corruption or political stability. However, according to Andhika et al., 2019; Utomo, 2023, governance is a multi-dimensional construct that involves not only the control of corruption but also government effectiveness, regulatory quality, and political stability. These different aspects of governance likely play distinct roles in determining how effectively public debt can be channeled towards enhancing human capital. Additionally, previous studies have primarily focused on aggregate economic indicators and macroeconomic relationships, leaving out sector-specific impacts on human capital. This narrow approach fails to capture the complexities of how governance and public debt influence the education, healthcare, and overall welfare systems, which are directly tied to human capital development.

Although, the effects of public debt on human capital in the short term have been examined overtime, there is limited research that analyses the long-term impacts of debt accumulation on human capital development in developing economies like Nigeria. Given the cyclical nature of debt in many African countries, especially Nigeria, where public

debt fluctuates in response to economic shocks, political transitions, and policy changes, the long-term effects on human capital remain largely unexplored. This lack of longitudinal studies leaves a significant gap in understanding how persistent and recurring debt burdens, in the context of varying governance standards, influence long-term human capital outcomes. This gap is particularly critical for understanding the broader implications of public debt on sustainable development in Nigeria, where economic growth and human capital development are often hindered by unsustainable fiscal policies and governance challenges.

This research aims to address these gaps by examining how different dimensions of governance quality—such as corruption control, political stability, and regulatory quality— affect the impact of public debt on human capital development in Nigeria. The study will also consider sector-specific outcomes, particularly in education and healthcare, which are key indicators of human capital. By employing advanced econometric techniques, including structural equation modelling, this study will explore the causal mechanisms that underlie the relationship between public debt, governance quality, and human capital outcomes. In doing so, it will contribute to a deeper understanding of how governance can influence the effects of public debt, providing critical insights for policymakers seeking to optimize the use of public debt for the long-term development of human capital in Nigeria.

1.3 Research Questions

Based on the statement of the problem, the following research questions are formulated to guide the study:

- i. Does public debt influence human capital development in Nigeria, particularly in the education and healthcare sectors?

- ii. What role does governance quality play in the relationship between public debt and human capital development in Nigeria?
- iii. What are the interrelationship between public debt, governance quality and human capital development in Nigeria?

1.4 Objectives of the Study

The broad objective of the study is to examine the impact of public debt and governance quality on human capital development in Nigeria. Specifically, the study aims to:

- i. assess the impact of public debt on human capital development in Nigeria, focusing on the healthcare and education sectors.
- ii. examine the role of governance quality in the relationship between public debt and human capital development in Nigeria.
- iii. investigate the interrelationship between public debt, governance quality and human capital development in Nigeria.

1.5 Hypotheses of the Study

- i. Public debt has no significant negative impact on human capital development in Nigeria, particularly in the education and healthcare sectors.
- ii. Governance quality does not significantly affect the relationship between public debt and human capital development in Nigeria.
- iii. There is no significant interrelationship between public debt, governance quality and human capital development in Nigeria

1.6 Significance of the Study

The significance of this study lies in its potential to provide critical insights into the complex relationship between public debt, governance quality, and human capital development in Nigeria, a country grappling with both substantial debt burdens and governance challenges. Understanding how public debt influences human capital, particularly in essential sectors like education and healthcare, is crucial for policymakers tasked with balancing fiscal policies and promoting sustainable development. By examining the role of governance quality in the relationship between public debt and human capital development, this study can inform strategies to enhance the efficiency of public debt utilization in advancing human capital. The findings could lead to more informed decisions on debt management, governance reforms, and human capital investment strategies aimed at optimizing outcomes and fostering inclusive development in Nigeria. This will allow for more targeted and context-specific policy interventions that can address the persistent challenges facing Nigeria's public debt management and human capital development systems.

Furthermore, this research contributes to the growing body of literature on the economics of public debt and governance by focusing specifically on Nigeria, a country with a unique political and economic landscape. Given the country's high levels of external and domestic debt, coupled with persistent governance issues, understanding the role of these factors can help policymakers design better debt management strategies that ensure public borrowing supports long-term development. By exploring how governance quality affects the outcomes of public debt, the study could highlight critical areas where improvements in governance can lead to better utilization of debt resources, ultimately fostering human capital development and socio-economic stability. Additionally, understanding the impact

of governance on debt effectiveness can encourage further reforms in governance structures, which are often seen as a prerequisite for unlocking the full potential of public debt in emerging economies.

Another significant contribution of this study is its potential to fill gaps in existing literature regarding the interrelationship between public debt, governance quality, and human capital development. While many studies isolate these variables or focus narrowly on short-term effects, this study adopts an integrated approach that examines how sustained public debt with varying governance conditions shape outcomes in human capital. Understanding these dynamics is crucial for developing economies like Nigeria, where fluctuations in governance and debt levels are common. By analyzing sector-specific impacts—particularly in education and healthcare—the study deepens insights into how governance interferes the effects of public debt on different dimensions of human capital. This exploration provides a more coherent framework for evaluating policy effectiveness, highlighting the need for harmonized fiscal and institutional reforms to promote sustainable economic and human development.

Finally, the findings from this study could have significant policy implications for other developing countries facing similar challenges. While the focus is on Nigeria, the broader insights into the interrelationship between public debt, governance quality, and human capital can be applied to other nations in sub-Saharan Africa and beyond. This research can serve as a valuable resource for governments, international organizations, and development agencies in designing policies that effectively manage public debt while improving governance systems to enhance human capital development. The study's results may also contribute to global discussions on the role of governance in achieving sustainable development goals, particularly in terms of health and education outcomes. By

revealing how governance can shape the efficiency of debt use in human capital development, this research will offer useful policy recommendations for sustainable development in both the African context and globally.

1.7 Scope of the Study

The geographic scope of this research is focused on Nigeria, as it seeks to explore the relationship between public debt, governance quality, and human capital development within the context of a developing economy in Sub-Saharan Africa. Nigeria, with its large and diverse population, provides an ideal case study for understanding the dynamics between fiscal policy, governance, and human development. The research will examine the country's fiscal and governance structures, using available data to investigate how governance quality affects the efficient use of public debt in promoting human capital, particularly in education, and healthcare sectors.

The time scope of the research will cover the period from 1997 to 2024, a timeframe that allows for a comprehensive analysis of recent trends in public debt accumulation, governance reforms, and human capital development in Nigeria. This period has witnessed significant fiscal changes, such as increased borrowing to finance infrastructure and social projects, as well as ongoing governance challenges and efforts at reform. By analysing this recent period, the study aims to capture the evolving dynamics and provide relevant insights for current policy discussions on debt management and human capital development.

In terms of variables, the study will focus on public debt, governance quality, and human capital development. Public debt will be measured using variables such as total public debt stock, debt-to-GDP ratio, and debt servicing levels. Governance quality will be assessed through indicators such as control of corruption, governance effectiveness, rule of law,

voice and accountability, political stability and absence of violence/terrorism, and regulatory quality. In addition, fiscal terrain index - a weighted average of all the six governance quality indicators – will also be utilized in this study. Human capital development will be measured by indicators like average life expectancy at birth, and secondary school enrolment rate in education. The research employed econometric techniques to analyze the interrelationship between these variables, seeking to understand how governance influences the ability of public debt to support human development in Nigeria.

CHAPTER TWO

BACKGROUND TO THE STUDY

2.0 Introduction

This chapter provides an overview of the general state of the Nigerian economy. In it, the study reviews historical overview public debt in Nigeria, debt sustainability concerns, governance quality, fiscal terrain index and human capital development trend in Nigeria.

Public debt, governance quality, and human capital development are intricately interconnected in shaping the socio-economic landscape of nations. Public debt, defined as the total amount of borrowed funds by a government, serves as a critical fiscal tool to finance development projects and address budget deficits. However, the effectiveness of debt in achieving sustainable development outcomes often hinges on the quality of governance, including the accountability, transparency, and efficiency of public institutions. In turn, human capital development, encompassing education, healthcare, and skills acquisition, plays a pivotal role in driving economic growth, poverty reduction, and social transformation (Todaro & Smith, 2020).

Nigeria presents a unique case where public debt levels have fluctuated significantly, reflecting the nation's fiscal strategies and macroeconomic challenges. While public debt can potentially finance developmental projects that enhance human capital, the mismanagement of borrowed funds, coupled with governance deficiencies, has often undermined these objectives. Governance quality remains a pressing issue in Nigeria, characterized by weak institutional capacity, corruption, and inefficiencies in policy implementation (World Bank, 2021). These challenges have, in many cases, exacerbated the already precarious state of human capital development in the country, evident in low

literacy rates, inadequate healthcare infrastructure, and high youth unemployment (United Nations Development Programme [UNDP], 2022).

The interplay between public debt, governance quality, and human capital development is crucial in understanding the socio-economic dynamics of Nigeria. Public debt, when managed prudently and utilized effectively under strong governance frameworks, can significantly enhance investments in education and healthcare, leading to improved human capital outcomes. Conversely, poor governance can result in the misallocation of resources, increased debt burdens, and stagnation in human capital indices. Thus, exploring these interactions is not only essential for understanding Nigeria's development trajectory but also for informing policy interventions aimed at achieving sustainable growth.

This chapter provides the foundational context for the study by examining the interrelations among public debt, governance quality, and human capital development in Nigeria. It outlines the historical trends, and contemporary challenges associated with these variables. By situating the study within this broader context, the chapter underscores its relevance to policy discourse and academic inquiry.

2.0 Historical Overview of Public Debt in Nigeria

Nigeria's history with public debt is a compelling narrative of growth, challenges, and policy responses that underscore the complexities of economic development. Since gaining independence in 1960, public debt has played a critical role in funding development initiatives, bridging fiscal deficits, and addressing external shocks. Initially, Nigeria relied heavily on domestic borrowing, with limited external debt obligations. Borrowed funds were primarily allocated to projects aimed at improving education, healthcare, and infrastructure.

The 1970s ushered in the oil boom, which significantly influenced the country's borrowing dynamics. The influx of oil revenue reduced the reliance on borrowing temporarily. However, this period of prosperity created a dependency on oil, which would later expose the economy to severe vulnerabilities. Following the oil price collapse of the 1980s, Nigeria faced fiscal crises that necessitated increased borrowing, particularly from external creditors. The country's debt burden escalated during this period, exacerbated by inefficient resource utilization, corruption, and a lack of strategic planning.

The 1990s marked a period of worsening debt conditions, as the external debt burden spiralled out of control. Debt servicing consumed a significant portion of government revenue, leaving little room for investments in critical sectors. By the early 2000s, Nigeria's public debt had reached unsustainable levels, prompting urgent calls for debt relief and restructuring.

The post-2005 period, following the landmark debt relief agreement with the Paris Club, witnessed a temporary stabilization of public debt. However, since 2015, Nigeria has experienced a sharp increase in its debt profile, driven by a combination of declining oil prices, currency depreciation, and the need to finance critical infrastructure projects. This renewed rise in public debt has sparked concerns about sustainability, economic stability, and fiscal prudence.

Trends in Nigeria's Total Public Debt 1981 to 2023

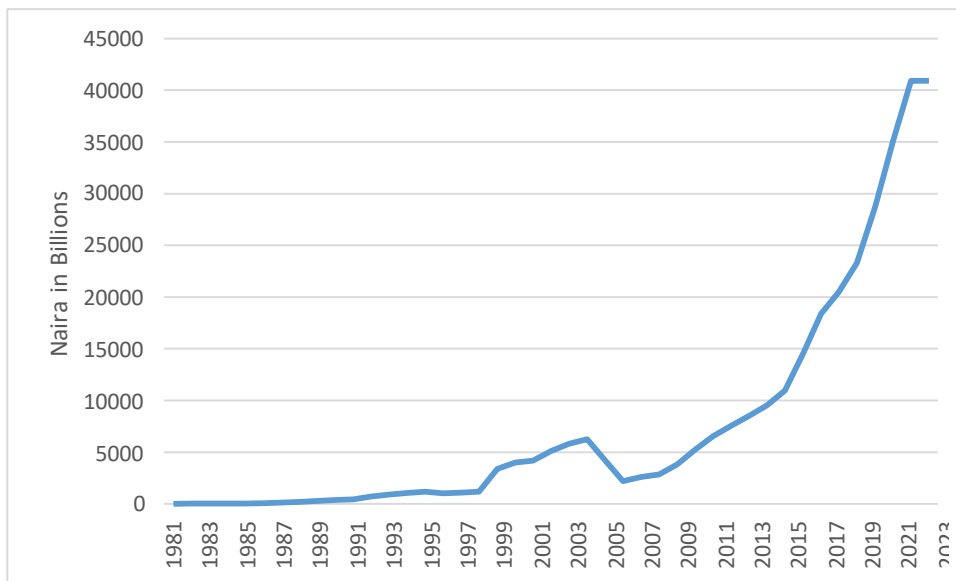


Figure 2.1: Nigeria's Total Public Debt 1981 to 2023

Source: Author's using CBN Statistical Bulletin 2023.

Nigeria's total public debt (sum of domestic and external debt) has experienced a significant increase over the past four decades (Figure 2.1), reflecting various economic policies, external shocks, and fiscal management strategies.

From 1981 to 1990, total debt grew from ₦13.52 billion to ₦382.71 billion. The implementation of the Structural Adjustment Programme (SAP) in 1986 contributed to a sharp increase in borrowing, particularly from external sources, as the government sought to finance budget deficits amidst declining oil revenues and currency devaluation. By the end of this period, external debt dominated total debt, indicating heavy reliance on foreign borrowing.

Between 1991 and 1999, Nigeria's total debt surged from ₦444.65 billion to ₦3.37 trillion, driven largely by rapid accumulation of external debt, which peaked at ₦2.58 trillion in 1999. The government resorted to external borrowing due to declining oil

revenues and fiscal mismanagement under military rule. This period saw an increasing debt burden, with high debt servicing costs and limited productive investments.

From 2000 to 2006, total debt initially rose to ₦6.26 trillion in 2004 but saw a major reduction to ₦2.20 trillion in 2006, following the debt relief agreement with the Paris Club in 2005. The deal significantly reduced Nigeria's external debt, leading to a shift towards greater reliance on domestic borrowing to finance fiscal deficits and infrastructure projects.

Between 2007 and 2015, total debt steadily increased from ₦2.61 trillion to ₦10.95 trillion. The Nigerian government increasingly relied on domestic debt, which grew significantly during this period, while external debt remained relatively low. Economic expansion, infrastructure development, and budget deficits contributed to rising debt levels. However, the fall in global oil prices from 2014 onwards led to increased borrowing to stabilize the economy.

From 2016 to 2023, total debt rose sharply from ₦14.53 trillion in 2016 to ₦40.91 trillion in 2023, driven by a combination of economic recession (2016), declining oil revenues, increased government spending, and external borrowing for infrastructure projects. The COVID-19 pandemic in 2020 further strained public finances, leading to a surge in borrowing to cushion the economic impact. By 2023, Nigeria's total debt had reached unprecedented levels, with both domestic and external debt contributing significantly to the rising debt burden.

Overall, Nigeria's rising debt profile underscores the need for sustainable debt management, improved revenue generation, economic diversification, and prudent fiscal policies to ensure that borrowing translates into productive investments rather than a growing fiscal burden.

Nigeria's Total Debt Growth Rate (1981 to 2023)

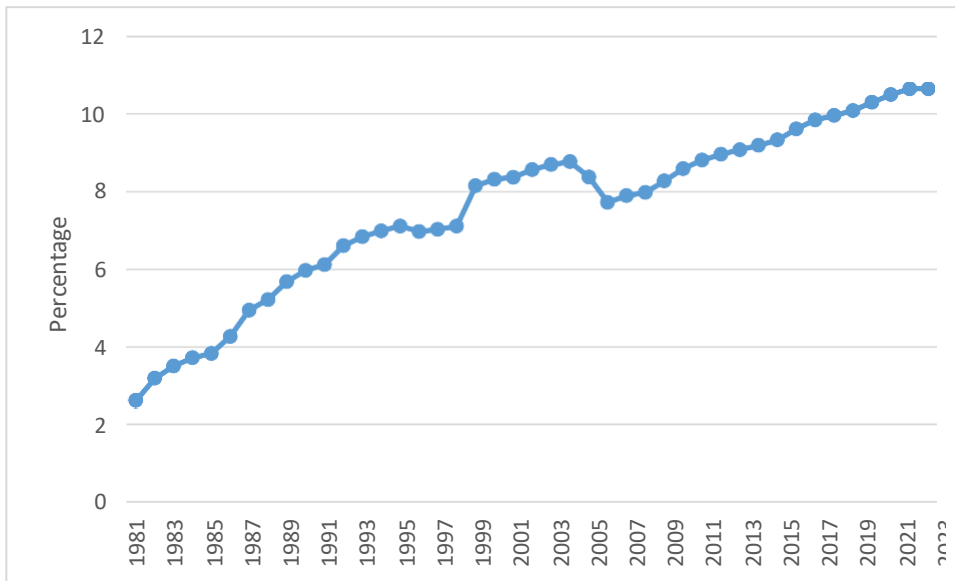


Figure 2.2: Nigeria's Total Debt Growth Rate (1981 to 2023)

Source: Author's using CBN Statistical Bulletin 2023.

The Total Debt Growth Rate (TDTGR) in Nigeria has exhibited a steady upward trend from 2.6% in 1981 to 10.6% in 2023 (figure 2.2), indicating a persistent increase in debt accumulation over the years. This trend can be analysed in different phases, each influenced by economic policies, fiscal decisions, and external factors.

Between 1981 and 1990, Nigeria's debt growth rose gradually from 2.6% to 5.9%. This period was marked by the end of the oil boom and the onset of economic challenges, prompting the government to resort to borrowing. The introduction of the Structural Adjustment Program (SAP) in 1986 led to economic liberalization, currency devaluation, and further borrowing to support reforms. These policies contributed to the gradual increase in debt.

From 1991 to 1999, Nigeria experienced a significant rise in its debt growth rate, reaching 8.1% by the end of the decade. This period was characterized by political instability and

military rule, which led to fiscal mismanagement and an overreliance on external borrowing. Failed economic reforms and high-interest debt accumulation resulted in Nigeria's debt crisis, which became a major economic challenge.

The 2000–2006 period saw efforts to manage and reduce Nigeria's debt burden. The TDTGR increased slightly to 8.7% in 2004 before declining to 7.7% in 2006, following Nigeria's successful debt relief agreement with the Paris Club in 2005. The administration of President Olusegun Obasanjo focused on fiscal responsibility and reduced external borrowing, leading to a temporary decline in debt growth.

Between 2007 and 2015, Nigeria maintained relatively stable debt growth, fluctuating between 7.8% and 9.3%. During this period, the government relied more on domestic borrowing rather than external debt. Oil revenue fluctuations influenced fiscal stability, leading to moderate borrowing. The establishment of the Sovereign Wealth Fund (SWF) in 2011 aimed to improve debt management and fiscal sustainability.

From 2016 to 2023, Nigeria experienced a sharp increase in its total debt growth rate, rising from 9.5% in 2016 to 10.6% in 2023. The economic recession of 2016 led to increased borrowing to finance budget deficits. The situation worsened during the COVID-19 pandemic (2020) as revenue shortfalls forced the government to borrow more. Rising government spending on infrastructure projects, coupled with oil price volatility and naira depreciation, contributed to the rapid debt accumulation.

To address the rising debt burden, Nigeria must implement effective debt sustainability measures and diversify revenue sources beyond oil. Strengthening the non-oil sectors, such as agriculture, manufacturing, and technology, will reduce over-reliance on external borrowing. Fiscal discipline should also be prioritized by reducing recurrent expenditure

and focusing on capital projects that generate long-term economic benefits. Strengthening tax collection mechanisms can enhance government revenue and reduce borrowing needs.

Furthermore, exchange rate stability is crucial to minimizing the cost of external debt servicing. Addressing currency depreciation issues will help control debt accumulation. Additionally, promoting Public-Private Partnerships (PPPs) in infrastructure projects can reduce the financial burden on the government while fostering economic growth.

Nigeria's rising Total Debt Growth Rate highlights the country's increasing reliance on borrowing to finance economic activities. While debt accumulation has been necessary for infrastructure development and economic expansion, the sustainability of the country's debt remains a concern. To ensure long-term economic stability, Nigeria must focus on prudent borrowing, economic diversification, and improved fiscal discipline.

Nigeria's Total Debt to GDP Ratio

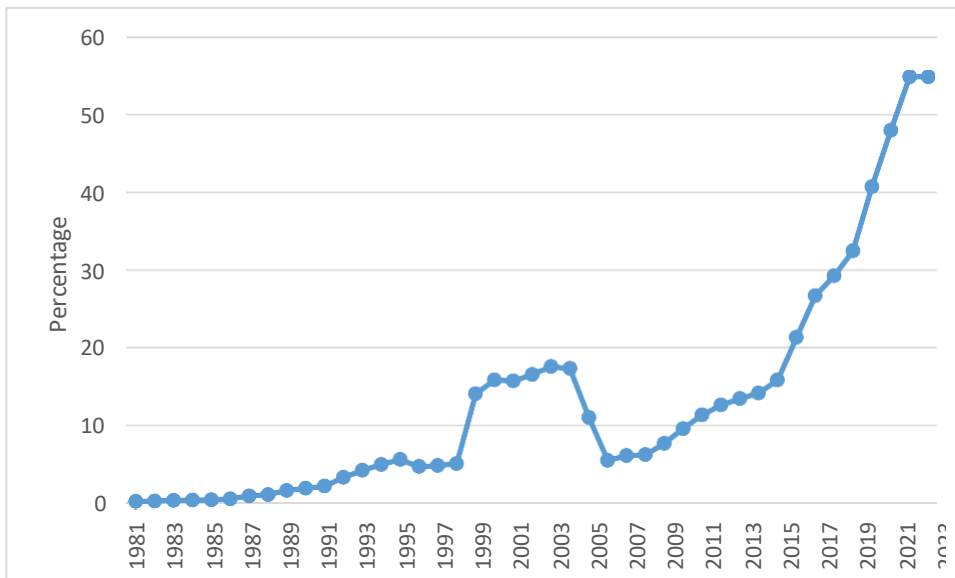


Figure 2.3: Nigeria's total Debt to GDP Ratio 1981 to 2023

Source: Author's using CBN Statistical Bulletin 2023.

Nigeria's Total Debt-to-GDP (TDTGDP) ratio (Figure 2.3) measures the country's overall debt burden relative to its economic output. A rising debt-to-GDP ratio suggests increasing reliance on borrowing, which, if unchecked, could raise concerns about debt sustainability. From 1981 to 1990, Nigeria's debt-to-GDP ratio increased from 0.07% to 1.77%, indicating a growing debt burden. The rise was particularly sharp after 1986, following the introduction of the Structural Adjustment Programme (SAP), which led to heavy borrowing, currency devaluation, and economic restructuring efforts.

Between 1991 and 1999, the debt-to-GDP ratio surged from 2.04% to 13.93%, reflecting Nigeria's continued dependence on external debt, poor revenue generation, and fiscal mismanagement under military rule. The sharp spike in 1999 aligns with the accumulation of external debt, which led to a severe debt crisis. From 2000 to 2006, the debt-to-GDP ratio peaked at 17.42% in 2003, before declining to 5.36% in 2006. This sharp decline resulted from Nigeria's debt relief agreement with the Paris Club in 2005, which reduced the external debt stock significantly. Consequently, Nigeria's debt sustainability improved, as domestic borrowing was prioritized over external debt.

Between 2007 and 2015, the ratio remained relatively stable, fluctuating between 5.95% and 15.69%, as Nigeria maintained a cautious borrowing strategy. However, after 2014, the global decline in oil prices led to increased government borrowing to finance budget deficits, pushing the debt-to-GDP ratio higher. From 2016 to 2023, Nigeria's debt-to-GDP ratio rose sharply from 21.17% in 2016 to 54.73% in 2023. The economic recession of 2016, the impact of COVID-19 in 2020, and increasing government borrowing to finance infrastructure projects contributed to this significant rise. The sharp increase in 2020-2023 suggests a growing debt burden, raising concerns about Nigeria's ability to service its debt.

2.0.1 Debt Sustainability Concerns

Nigeria's rising debt-to-GDP ratio signals potential debt sustainability risks. While a ratio below 60% (IMF's threshold for developing economies) suggests Nigeria is still within a manageable debt limit, the rapid increase in debt servicing costs, revenue constraints, and reliance on external borrowing pose serious risks.

To ensure debt sustainability, Nigeria needs to improve revenue generation, reduce reliance on borrowing, and focus on productive investments that enhance economic growth. Fiscal discipline, economic diversification, and efficient debt management policies will be critical in stabilizing Nigeria's debt burden in the long run.

Nigeria's Domestic and External Debt

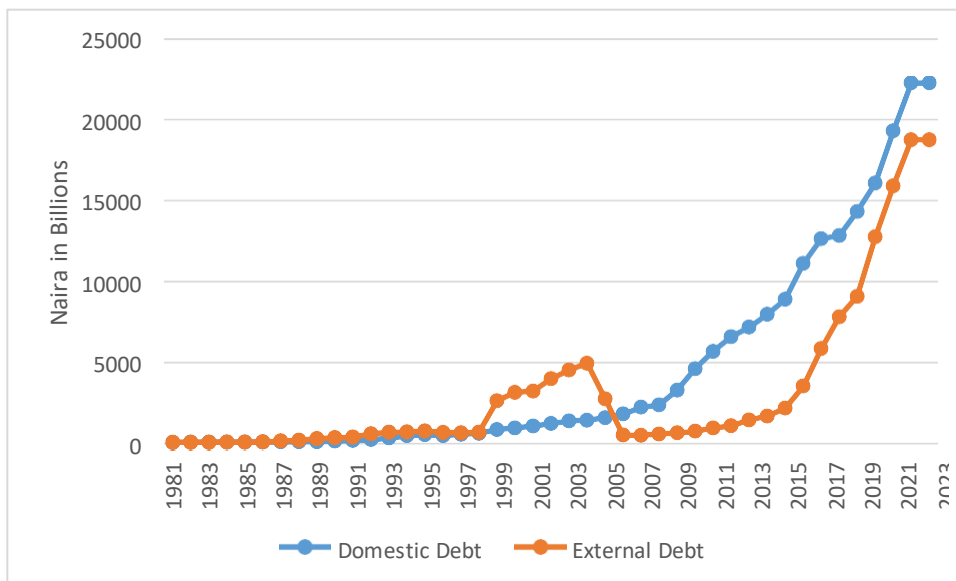


Figure 2.4: Nigeria's Domestic and External Debt 1981 to 2023

Source: Author's using CBN Statistical Bulletin 2023.

Figure 2.4 provides trends on Nigeria's Domestic Debt (DDT) and External Debt (EDT) from 1981 to 2023 shows a general upward trend in both debt components, reflecting various economic policies, fiscal management strategies, and external shocks. From 1981

to 1990, Nigeria's debt grew moderately, with domestic debt increasing from ₦11.19 billion in 1981 to ₦84.09 billion in 1990, while external debt rose significantly from ₦2.33 billion to ₦298.61 billion within the same period. This growth was largely influenced by oil price volatility, which led the government to borrow to finance budget deficits. The introduction of the Structural Adjustment Programme (SAP) in 1986 encouraged external borrowing from the IMF and World Bank, further driving up external debt. The devaluation of the naira and high interest rates under SAP made debt servicing more challenging, contributing to Nigeria's rising debt burden.

Between 1991 and 1999, Nigeria's external debt surged dramatically from ₦328.45 billion to ₦2.58 trillion, while domestic debt also increased from ₦116.20 billion to ₦794.81 billion. The period was marked by heavy external borrowing under military regimes, often with limited investment in productive sectors. Economic mismanagement, fiscal crises, and weak export earnings made debt repayment difficult. The government relied on borrowing to finance recurrent expenditure, further worsening the debt situation. The period from 2000 to 2006 saw significant shifts in Nigeria's debt management strategy. Domestic debt increased moderately from ₦898.25 billion in 2000 to ₦1.75 trillion in 2006, while external debt initially rose to ₦4.89 trillion in 2004 before dropping sharply to ₦451.46 billion in 2006. This decline in external debt was due to Nigeria's successful debt relief negotiation with the Paris Club in 2005, where a large portion of Nigeria's external debt was cancelled. The government also began shifting towards domestic borrowing to manage fiscal deficits, reducing dependency on external loans.

From 2007 to 2015, Nigeria's domestic debt increased significantly from ₦2.16 trillion in 2007 to ₦8.83 trillion in 2015, while external debt remained relatively low, rising from ₦438.89 billion to ₦2.11 trillion. This period saw a greater reliance on domestic

borrowing, largely due to the government’s strategy to avoid excessive foreign debt exposure. However, the global financial crisis of 2008 and declining oil revenues led to increased borrowing to finance budget deficits and infrastructural development. From 2016 onwards, both domestic and external debt rose sharply. Domestic debt grew from ₦11.06 trillion in 2016 to ₦22.21 trillion in 2023, while external debt increased from ₦3.47 trillion to ₦18.70 trillion in the same period. The rapid accumulation of debt was driven by a combination of factors, including economic recession in 2016, declining oil prices, rising government expenditure, and increased external borrowing to fund infrastructure projects. The COVID-19 pandemic in 2020 further exacerbated Nigeria’s fiscal challenges, leading to increased borrowing to mitigate the economic impact.

By 2023, Nigeria’s debt had reached record levels, with domestic debt at ₦22.21 trillion and external debt at ₦18.70 trillion. The government’s increasing reliance on borrowing, both domestically and externally, highlights the need for sustainable debt management strategies, improved revenue generation, and enhanced economic diversification to reduce dependency on debt financing in the long run.

Public Debt Servicing in Nigeria

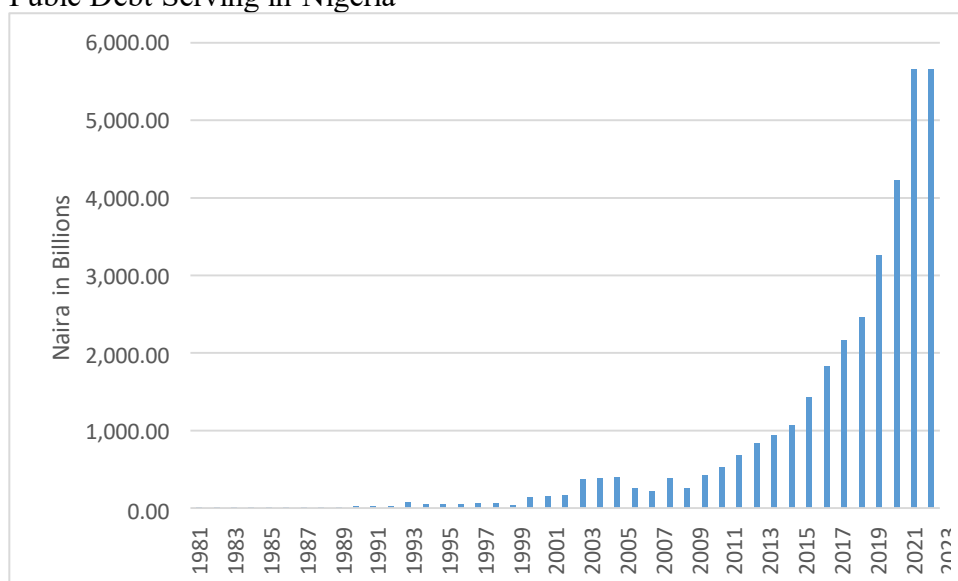


Figure 2.5: Nigeria’s Public Debt Servicing 1981 to 2023

Source: Author’s using CBN Statistical Bulletin 2023.

Figure 2.5 on Nigeria's Public Debt Service (PDS) from 1981 to 2023 reveals a significant upward trend, indicating increasing debt obligations over time. This trend can be analysed in relation to Nigeria's economic policies, debt management strategies, and external economic conditions.

During the 1980s, PDS remained relatively low, increasing from ₦1.03 billion in 1981 to ₦23.82 billion in 1990. This period coincided with Nigeria's oil boom and subsequent economic downturn following the global oil price crash. The Structural Adjustment Program (SAP) introduced in 1986 led to currency devaluation, increased external borrowing, and rising debt servicing costs. The sharp increase in 1988 and 1989 suggests Nigeria had started facing mounting debt obligations.

From 1991 to 1999, PDS saw significant fluctuations, with a sharp rise in 1993 (₦81.08 billion), reflecting the impact of excessive borrowing during the military regimes of the early 1990s. The decline in 1994 and 1995 suggests some temporary debt restructuring, but the overall trend remained volatile. By 1999 (₦30.84 billion), Nigeria's debt burden was unsustainable, prompting discussions on debt relief.

With the return to civilian rule in 1999, efforts to manage Nigeria's debt intensified. PDS rose sharply from ₦131.05 billion in 2000 to ₦394 billion in 2005, reflecting efforts to clear arrears. The 2005 Paris Club debt relief agreement, under President Olusegun Obasanjo, resulted in a substantial drop in PDS from ₦394 billion in 2005 to ₦213.73 billion in 2007, reflecting the reduced external debt burden.

Following the debt relief, Nigeria's PDS remained relatively stable but began to rise again from ₦381.20 billion in 2008 to ₦1,060.38 billion in 2015. This increase was driven by renewed borrowing, falling oil revenues, and budget deficits. The global financial crisis of 2008–2009 and declining oil prices forced Nigeria to borrow domestically and externally.

From 2016 onwards, PDS saw a dramatic rise, reaching ₦5,656.58 billion in 2023. The sharp increase was influenced by the 2016 economic recession, which saw low oil prices and revenue shortfalls, leading to increased borrowing. The COVID-19 pandemic (2020) also forced the Nigerian government to borrow heavily to finance budget deficits and economic recovery. Additionally, the devaluation of the naira increased external debt servicing costs, while government investments in infrastructure projects such as railways, roads, and power further expanded borrowing.

The exponential increase in debt service obligations raises concerns about debt sustainability. To address this, Nigeria must focus on revenue diversification by reducing reliance on oil revenue and boosting agriculture, manufacturing, and technology sectors. Improving tax collection can also enhance domestic revenue generation and reduce borrowing needs. Furthermore, better debt management strategies should prioritize concessional loans over commercial borrowings with high interest rates. Exchange rate stability is crucial to mitigating external debt servicing costs, while public-private partnerships (PPPs) can encourage private sector investments in infrastructure, reducing government borrowing.

The trend in Nigeria's Public Debt Service highlights a growing fiscal burden that, if not managed properly, could lead to a debt crisis. While borrowing is necessary for development, ensuring efficient debt utilization, revenue expansion, and fiscal discipline is critical for long-term economic sustainability.

Public Debt Servicing Growth Rate

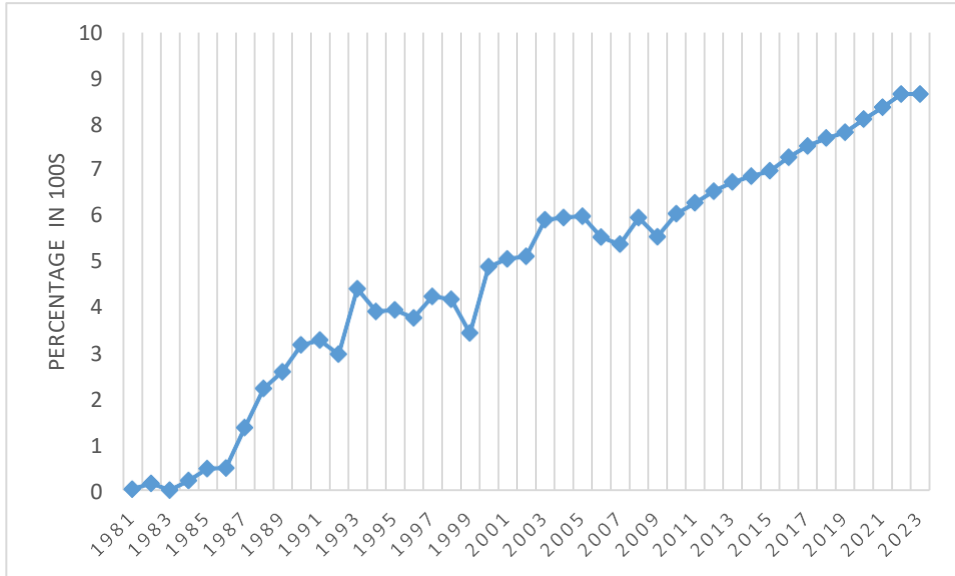


Figure 2.6: Nigeria's Growth Rate of Public Debt Servicing 1981 to 2023

Source: Author's using CBN Statistical Bulletin 2023.

The Public Debt Service Growth Rate (PDSGR) data from 1981 to 2023 exhibits significant fluctuations, reflecting Nigeria's evolving debt policies, economic conditions, and fiscal management strategies over time (Figure 2.6).

During the early 1980s, PDSGR remained relatively low, with moderate increases in 1982 (15.46%) and 1984 (21.13%). However, from 1985 onward, a sharp rise began, reaching 317.06% in 1990. This trend aligns with the impact of the 1986 Structural Adjustment Program (SAP), which introduced currency devaluation, trade liberalization, and external borrowing. The drastic increase in 1987 (136.84%), 1988 (222.34%), and 1989 (258.58%) suggests that Nigeria was struggling with debt servicing costs, exacerbated by high-interest rates on external loans.

The 1990s saw continued increases in PDSGR, peaking in 1993 at 439.55%. The early 1990s were characterized by political instability, which deterred investment and reduced

government revenue. Nigeria faced economic sanctions, further limiting foreign exchange inflows. Despite attempts at debt restructuring, PDSGR remained high throughout the decade, reflecting ballooning interest payments and worsening fiscal deficits.

By 2000, PDSGR stood at 487.56%, indicating an unsustainable debt burden. However, following negotiations, Nigeria secured the 2005 Paris Club Debt Relief Agreement, which significantly reduced external debt obligations. This is reflected in the decline in PDSGR from 597.63% in 2005 to 536.47% in 2007. The temporary relief allowed Nigeria to redirect funds toward development projects, reducing reliance on external borrowing.

Post-2007, PDSGR resumed its upward trend, indicating renewed borrowing. By 2010, it reached 602.99%, reflecting increased debt servicing costs. The period 2011 to 2015 saw continued growth, with PDSGR rising from 626.75% in 2011 to 696.64% in 2015. This period coincided with rising budget deficits, falling oil revenues, and increased domestic borrowing to finance infrastructure projects and recurrent expenditures.

From 2016 onwards, the debt service burden escalated sharply, driven by Nigeria's economic recession (2016), oil price shocks, and increased reliance on both domestic and external debt. By 2017, PDSGR had risen to 750.87%, and by 2020, it exceeded 800%, reflecting the impact of COVID-19, which led to lower revenues and increased borrowing for economic recovery. The peak levels in 2023 (864.06%) suggest a mounting debt crisis, raising concerns about fiscal sustainability and the need for urgent reforms in debt management and revenue generation.

Nigeria's Debt to Revenue Ratio

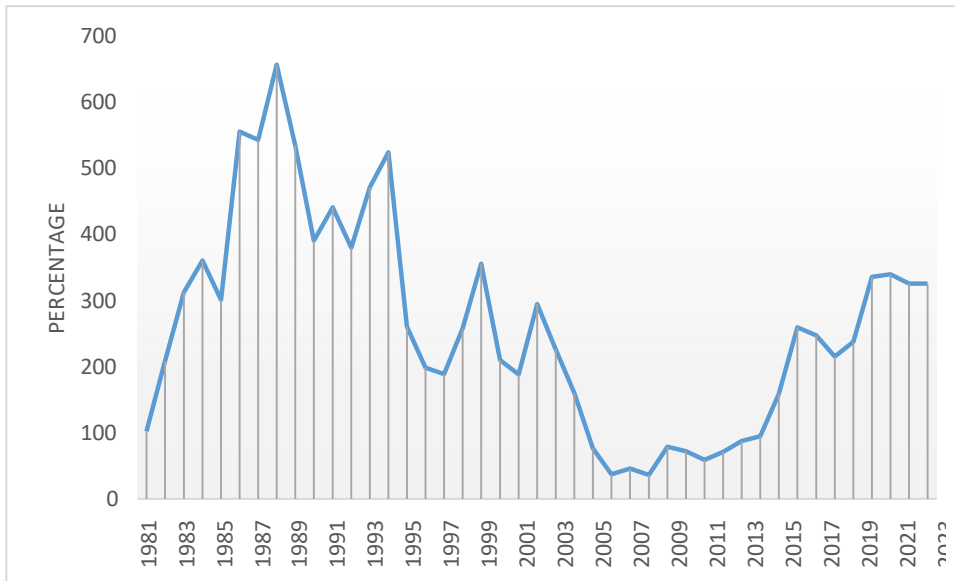


Figure 2.7: Nigeria's Total debt to Revenue Ratio 1981 to 2023

Source: Author's using CBN Statistical Bulletin 2023.

Figure 2.7 on Nigeria's Total Debt to Revenue Ratio (TOTREV %) reveals significant fluctuations from 1981 to 2023, reflecting changes in the country's fiscal policies, debt accumulation, and revenue generation. From 1981 to the late 1980s, there was a sharp rise in TOTREV, peaking at 655.82% in 1988. This suggests that debt obligations were significantly higher than government revenue, likely due to excessive borrowing and declining revenue sources. The Structural Adjustment Program (SAP) introduced in 1986 by the military government aimed to restructure the economy, but it led to increased external debt burdens as the country relied more on foreign loans. During the 1990s, TOTREV remained high, fluctuating between 259% and 523%, reflecting continued fiscal challenges. The early 1990s saw economic instability, political crises, and lower oil revenues, further exacerbating the debt burden relative to revenue. However, by the late 1990s, there was some improvement as debt restructuring efforts began.

Between 2000 and 2008, the TOTREV showed a downward trend, reaching as low as 36.14% in 2008. This period coincided with Nigeria's participation in the Paris Club debt

relief program (2005–2006), where the country secured significant debt forgiveness. The sharp decline in the debt-to-revenue ratio indicates a reduction in debt servicing pressure and improved revenue collection due to economic reforms.

From 2010 onwards, the ratio remained relatively stable at lower levels compared to earlier decades, with values ranging between 58% and 94% until 2014. However, a sharp rise began in 2015, reaching 258.83% in 2016, reflecting the impact of declining oil prices and increased government borrowing to finance budget deficits. The economic recession of 2016 further worsened revenue generation, leading to a higher debt burden. Between 2017 and 2023, the TOTREV ratio remained elevated, peaking at 339.33% in 2021. This period saw increased borrowing to fund infrastructural projects and COVID-19 pandemic response measures. Despite slight reductions in 2023 (325%), the trend indicates continued fiscal pressures.

2.1 Governance Quality

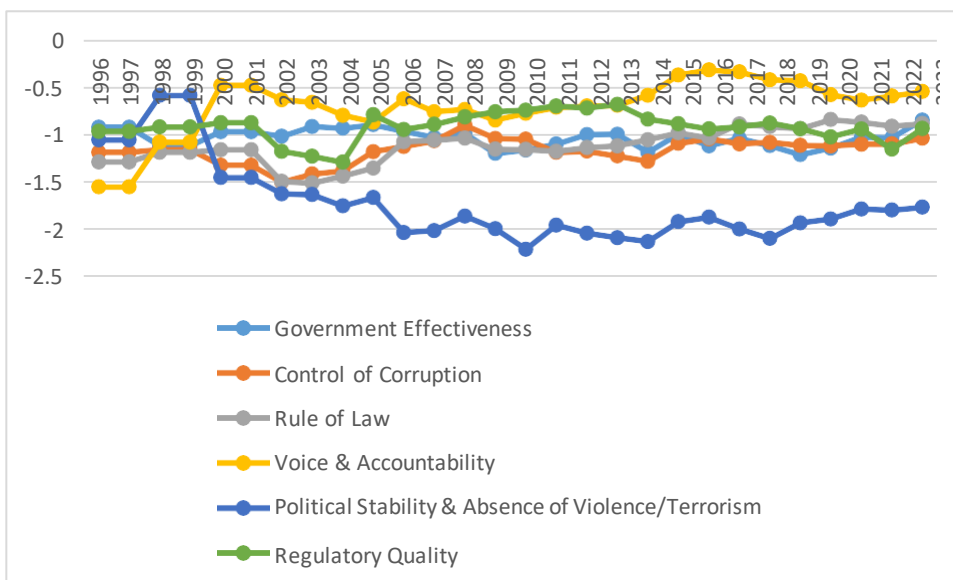


Figure 2.8: Nigeria's Governance Quality Indicators 1996 to 2023

Source: Author's using data from World Governance Indicators 2024.

Figure 2.8 provides an overview of Nigeria's governance quality indicators from 1996 to 2023, covering government effectiveness, control of corruption, rule of law, voice and accountability, political stability, and regulatory quality. These indicators reflect the country's governance performance over different political and economic periods. From 1996 to 1999, governance indicators remained low due to military rule under General Sani Abacha. Political repression, corruption, and weak institutions characterized this period. However, with the transition to democracy in 1999, there was a slight improvement in governance indicators, particularly in voice and accountability, as democratic institutions were restored under President Olusegun Obasanjo.

Between 2000 and 2007, Nigeria implemented several economic and anti-corruption reforms aimed at strengthening governance. The establishment of the Economic and Financial Crimes Commission (EFCC) and the Independent Corrupt Practices Commission (ICPC) marked a significant step in tackling corruption. While government effectiveness and rule of law showed some improvement, political stability remained a concern, especially with rising unrest in the Niger Delta. The period from 2008 to 2015 was marked by economic growth but also increasing security challenges. The Boko Haram insurgency escalated, leading to a sharp decline in political stability. Despite some economic successes under President Goodluck Jonathan, governance indicators stagnated, particularly in regulatory quality and rule of law. Corruption remained a major issue, despite efforts to strengthen anti-corruption institutions.

From 2016 onward, governance quality faced further challenges due to economic recession, worsening security, and governance inefficiencies. The oil price crash of 2016 significantly affected government effectiveness, while insecurity from Boko Haram, banditry, and separatist movements further weakened political stability. Regulatory quality

remained low, limiting economic diversification and investor confidence. However, by 2023, there were slight improvements in government effectiveness, rule of law, and voice and accountability, possibly due to electoral reforms and political transitions. Overall, Nigeria's governance trends highlight the need for sustained reforms in anti-corruption efforts, economic diversification, and security management. While democratic governance has provided some improvements, persistent institutional weaknesses and security challenges continue to undermine governance quality. Addressing these issues through stronger policies and institutional reforms will be critical for long-term stability and development.

2.1.1 Fiscal Terrain Index

The Fiscal Terrain Index represents the weighted average of Nigeria’s six governance indicators over time. This index reflects variations in governance quality due to political transitions, economic policies, and institutional reforms from 1996 to 2023.

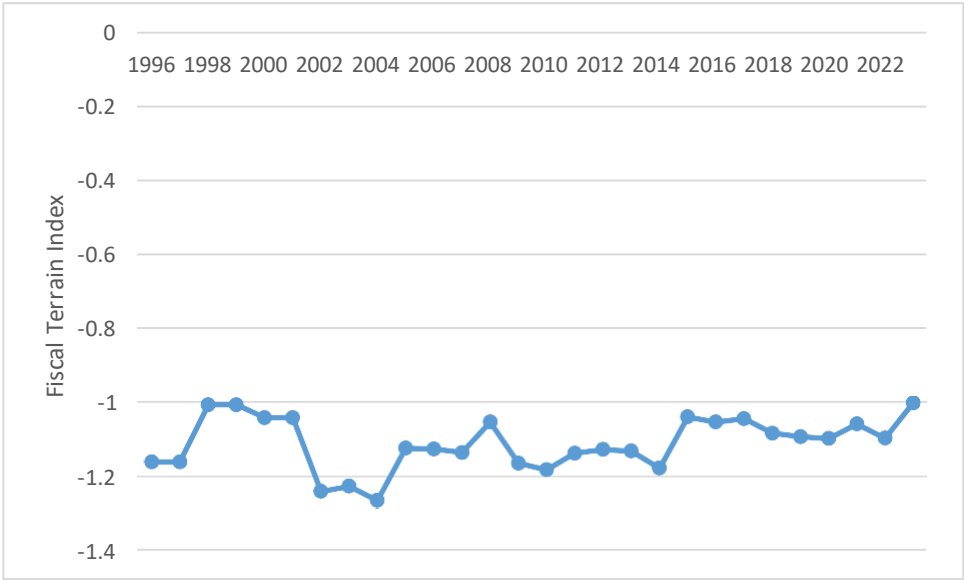


Figure 2.9: Nigeria’s Fiscal Terrain Index 1996 to 2023

Source: Author’s using data from World Governance Indicators 2024.

Figure 2.9 presents the fiscal terrain index of Nigeria from 1996 to 2023. The period from 1996 to 1999 saw Nigeria under military rule, particularly under General Sani Abacha, who led an autocratic government with widespread corruption and weak institutions. The Fiscal Terrain Index remained low (-1.16 in 1996-97 and -1.01 in 1998-99), reflecting poor governance effectiveness, lack of accountability, and weak rule of law. However, the transition to democratic governance in 1999 under President Olusegun Obasanjo marked a crucial shift, setting the stage for governance reforms.

Governance quality showed mixed trends in the early 2000s. In 2002–2004, the index declined further to -1.24 (2002), -1.23 (2003), and -1.26 (2004), possibly due to policy instability and corruption. However, economic and institutional reforms during Obasanjo's administration, such as the establishment of the Economic and Financial Crimes Commission (EFCC) and the Independent Corrupt Practices Commission (ICPC), helped governance quality improve slightly from 2005 to 2007. Nigeria's external debt relief in 2005, following structural reforms, contributed to better fiscal management, reducing the governance deficit to -1.12 in 2005 and -1.13 in 2007.

Despite an economic boom driven by high oil prices, governance effectiveness fluctuated between -1.05 (2008) and -1.18 (2014). The decline in governance quality during this period is linked to increasing corruption, political instability, and the escalation of Boko Haram insurgency. Goodluck Jonathan's administration (2010–2015) implemented reforms such as the Treasury Single Account (TSA) and fuel subsidy removal efforts, but these were undermined by governance inefficiencies and widespread corruption scandals. However, in 2015, there was a notable governance improvement to -1.04, possibly due to political transitions and expectations surrounding President Muhammadu Buhari's anti-corruption stance.

The Fiscal Terrain Index deteriorated slightly during the 2016–2020 period, averaging around -1.05 to -1.10. The 2016 oil price crash and resulting economic recession weakened government effectiveness, and while the Buhari administration continued anti-corruption policies, economic hardship and security challenges (banditry, insurgency, and separatist movements) hampered improvements in governance quality. Structural policies such as the Economic Recovery and Growth Plan (ERGP) (2017–2020) aimed at diversifying the economy and improving fiscal governance, but their impact remained limited.

Governance quality showed a gradual improvement from -1.10 in 2022 to -1.00 in 2023, marking the best governance score in nearly three decades. This improvement may be linked to electoral reforms, digitalization of government processes, and increased institutional transparency. The Central Bank of Nigeria’s policy reforms, including the redesign of the naira and monetary tightening measures, also played a role in governance strengthening.

2.2 Human Capital Development

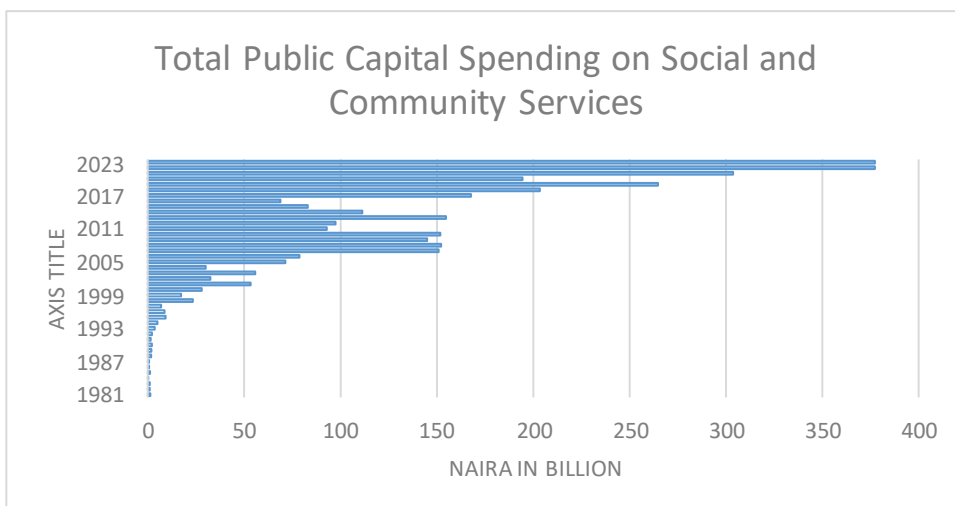


Figure 2.10: Nigeria’s Total Capital Spending on Social and Community Services 1981 to 2023

Source: Author’s using CBN Statistical Bulletin 2023.

Figure 2.10 on the trend in Nigeria's total public capital spending on social and community services from 1981 to 2023 highlights significant fluctuations driven by economic conditions, government policies, and fiscal priorities. During the 1980s and early 1990s, capital spending remained relatively low, mostly below 10 billion naira. This period was marked by economic downturns, declining oil revenues, and the introduction of the Structural Adjustment Program (SAP) in 1986, which prioritized market-driven reforms over large-scale public spending. The modest increases in the early 1990s reflected gradual economic stabilization efforts. However, spending remained constrained by limited fiscal capacity and governance challenges.

A significant shift occurred in the late 1990s and early 2000s, with capital spending surging to over 50 billion naira in 2001. The return to civilian rule in 1999 likely contributed to this rise, as democratic governance prioritized infrastructural expansion and social service delivery. Despite intermittent fluctuations, public investment in social and community services grew substantially throughout the 2000s, driven by high oil revenues and increased budgetary allocations for development projects. By 2007, spending had exceeded 150 billion naira, reflecting the government's focus on expanding infrastructure, including roads, schools, and healthcare facilities. However, between 2010 and 2016, expenditure became volatile, with notable declines in 2011, 2015, and 2016. These periods correspond to global oil price shocks, economic recessions, and fiscal constraints that hindered public investment. The 2016 economic downturn, in particular, reduced government spending capacity, affecting ongoing infrastructure projects. Nevertheless, the trend reversed from 2017 onward, with capital spending rising sharply, surpassing 200 billion naira by 2018 and exceeding 300 billion naira in 2021. This increase can be attributed to economic recovery initiatives, fiscal expansion policies, and the government's commitment to improving social infrastructure.

The peak in 2022 and 2023, reaching 377 billion naira, suggests sustained prioritization of social and community services, likely in response to post-COVID-19 economic recovery strategies and efforts to enhance human capital development. The implications for infrastructure development in Nigeria are profound. Higher capital spending has enabled the expansion of critical infrastructure, including schools, hospitals, water supply systems, and community development projects. However, the fluctuating nature of expenditure underscores the vulnerability of infrastructure development to external economic shocks and inconsistent policy implementation. For long-term sustainability, Nigeria must adopt a more resilient fiscal strategy that ensures stable and continuous investment in social infrastructure, independent of oil revenue fluctuations.

Average Life Expectancy in Nigeria

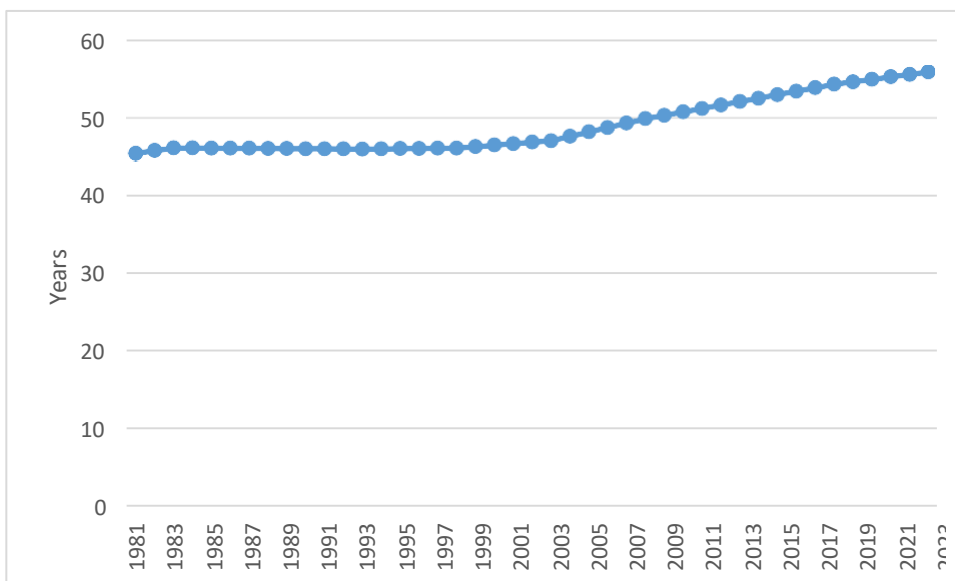


Figure 2.11: Average Life Expectancy in Nigeria 1981 to 2023

Source: Author’s using World Bank Development Indicators 2024.

The trend in Nigeria’s average life expectancy from 1981 to 2023 (Figure 2.11) reflects a slow but steady improvement in the country’s overall health and living conditions.

Between 1981 and the late 1990s, life expectancy remained relatively stagnant, fluctuating around 45 to 46 years. This period coincided with economic challenges, political instability, and inadequate healthcare infrastructure. Structural Adjustment Programs (SAPs) introduced in the mid-1980s led to reduced government spending on public services, including healthcare, negatively impacting mortality rates. The prevalence of infectious diseases such as malaria, tuberculosis, and HIV/AIDS, coupled with poor access to healthcare, contributed to the slow growth in life expectancy.

From 1999 onwards, life expectancy began to rise more consistently, reaching approximately 50 years by 2009. The return to democratic governance in 1999 saw increased budgetary allocations to the health sector, the expansion of primary healthcare programs, and international collaborations aimed at combating diseases. Initiatives such as the National Health Insurance Scheme (NHIS) and immunization campaigns against polio and other diseases played a role in improving public health outcomes.

Between 2010 and 2023, life expectancy saw a more accelerated increase, surpassing 55 years by 2023. This period was characterized by significant investments in healthcare, improved maternal and child health programs, increased awareness of non-communicable diseases, and greater access to medical interventions. Efforts to expand universal health coverage, alongside social programs targeting malnutrition and poverty reduction, contributed to the positive trend. However, challenges such as inadequate healthcare infrastructure, high out-of-pocket healthcare costs, and periodic health crises, including the COVID-19 pandemic, still posed risks to sustained improvements.

The rise in life expectancy has significant implications for Nigeria's socio-economic development. With a longer-living population, there is an increasing need for policies that enhance elderly care, expand healthcare access, and ensure sustainable economic growth

to support a growing workforce. Moving forward, Nigeria must prioritize healthcare reforms, strengthen disease prevention strategies, and improve living standards to maintain and accelerate gains in life expectancy.

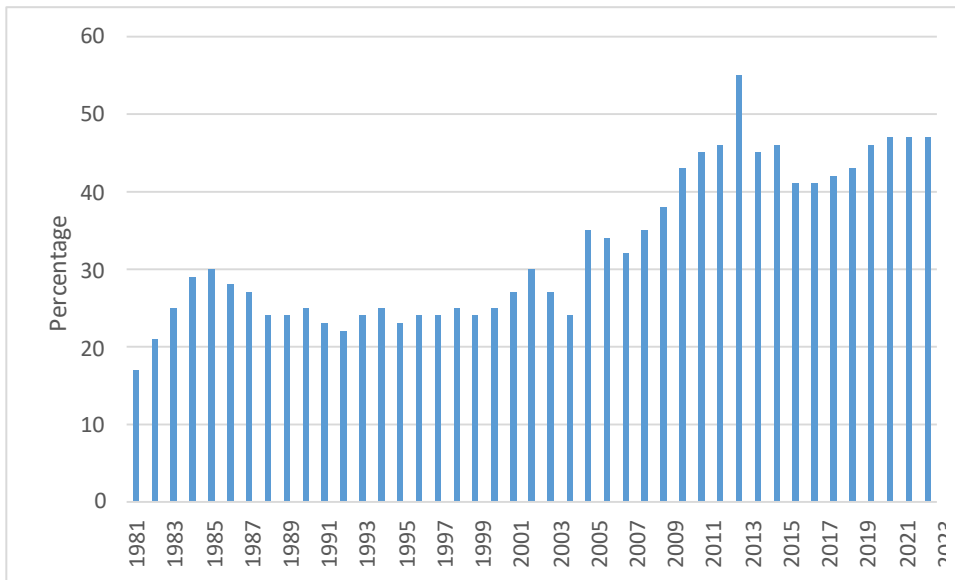


Figure 2.12: Secondary School Enrolment Rate in Nigeria 1981 to 2023

Source: Author’s using World Bank Development Indicators 2024.

The trend in Nigeria’s secondary school enrolment rate from 1981 to 2023 (Figure 2.12) reflects periods of fluctuation, slow growth, and eventual improvement, influenced by various government policies, economic conditions, and educational reforms.

From 1981 to the mid-1990s, secondary school enrolment showed a gradual increase but remained relatively low, hovering between 17% and 30%. This slow progress can be linked to economic challenges, political instability, and limited investment in education during the military regimes. Structural Adjustment Programs (SAPs) introduced in the mid-1980s led to reduced public funding for education, resulting in higher school fees and lower enrolment rates. Additionally, poor infrastructure, teacher shortages, and inadequate access to quality education in rural areas hindered secondary school participation.

Between the late 1990s and early 2000s, enrolment rates saw slight improvements, reaching around 30% by 2002. This period marked the return to democratic governance in 1999, leading to increased government attention to education. Policies such as the Universal Basic Education (UBE) program, launched in 1999, aimed at improving access to primary and junior secondary education, contributed to gradual improvements in enrolment. However, challenges such as poverty, regional disparities, and socio-cultural factors (e.g., early marriage and child labour) continued to limit widespread secondary school participation.

Significant improvements were observed between 2005 and 2013, with enrolment rising from 35% to a peak of 55% in 2013. This period witnessed greater investment in education through initiatives like the Education Trust Fund (ETF), which supported infrastructure development in schools. Additionally, international support from organizations like UNICEF and UNESCO facilitated programs focused on increasing access to education, particularly for girls and disadvantaged groups.

However, from 2014 to 2017, enrolment rates fluctuated between 41% and 46%, reflecting economic instability, particularly the impact of the 2016 recession, which reduced household incomes and government spending on education. Despite this, efforts to improve school enrolment through policies such as the School Feeding Program and conditional cash transfers helped stabilize participation rates.

By 2020, enrolment had reached 46% and remained relatively stable, reaching 47% in 2023. This period saw renewed government commitments to expanding education access, leveraging digital learning, and addressing regional disparities, particularly in the northern states. However, challenges such as insecurity (e.g., insurgency in the North-East), poor

educational infrastructure, and persistent economic difficulties continue to affect enrolment.

The increasing enrolment trend has significant implications for Nigeria's human capital development. A higher secondary school enrolment rate indicates progress in literacy and workforce readiness, which can contribute to economic growth, innovation, and poverty reduction. However, to sustain and improve these gains, Nigeria must strengthen education policies, invest in infrastructure, enhance teacher training, and address socio-economic barriers that hinder school participation, particularly in underserved regions.

CHAPTER THREE

LITERATURE REVIEW

3.0 Introduction

This chapter reviews relevant literature on public debt, governance quality and human capital development in Nigeria. It presents conceptual issues as regard the three major parameters in the topic. The study further reviews theories on public debt, governance quality and human capital development. Also, empirical studies that are relevant to the topic were reviewed. Finally, the study also present gaps in literature.

3.1 Conceptual Literature Review

3.1.1 Public Debt

Public debt refers to the financial obligations incurred by a government to bridge the gap between its expenditures and revenues. It can be classified into domestic and external debt, depending on the source of borrowing. The Ricardian Equivalence Hypothesis, introduced by Ricardo (1817) and later formalized by Barro (1974), posits that public borrowing does not influence aggregate demand when individuals anticipate future tax obligations resulting from government debt. Conversely, Keynesian theory emphasizes that public debt can stimulate economic activity, particularly during downturns, by financing public investments and boosting aggregate demand (Keynes, 1936). These theories provide a foundational understanding of how public debt interacts with macroeconomic variables.

Determinants of public debt accumulation are multifaceted, encompassing fiscal deficits, interest rates, economic growth, and institutional quality. Fiscal deficits, often driven by expansive government spending or insufficient revenue, are the primary contributors to

public debt (Blanchard et al., 1990). Economic stagnation and high borrowing costs exacerbate debt levels, while strong governance and fiscal discipline can help maintain sustainable debt trajectories. Developing economies, in particular, face unique challenges, such as reliance on external debt, vulnerability to exchange rate fluctuations, and limited capacity to generate sufficient domestic revenue (Eichengreen et al., 2003). These factors underline the importance of sound fiscal management and institutional frameworks in mitigating unsustainable debt burdens.

The impact of public debt on economic growth is a subject of considerable debate. Moderate levels of debt can foster economic development by financing infrastructure and social investments. However, excessive debt levels may trigger debt overhang, crowding out private investments and stifling economic growth (Krugman, 1988). Empirical evidence suggests a non-linear relationship, with Reinhart and Rogoff (2010) identifying a 90% debt-to-GDP threshold beyond which growth slows significantly. However, subsequent studies have critiqued this threshold, emphasizing the need for context-specific analyses (Panizza & Presbitero, 2013). Ultimately, public debt serves as both a tool for economic development and a potential source of macroeconomic instability, highlighting the critical balance policymakers must achieve to ensure fiscal sustainability and economic resilience.

3.1.2 Governance Quality

Governance quality encompasses the structures, processes, and practices through which authority is exercised and public resources are managed to achieve societal goals. It includes dimensions such as accountability, transparency, rule of law, and effectiveness in public administration (Kaufmann et al., 2011). The concept is rooted in institutional economics, which highlights the role of formal and informal institutions in shaping

economic outcomes (North, 1990). High-quality governance is characterized by robust institutional frameworks that ensure equitable resource allocation, uphold the rule of law, and foster citizen participation. These features are critical for sustainable development, as they create an enabling environment for economic growth and social stability.

Determinants of governance quality often hinge on historical, cultural, and economic factors. The colonial legacy, for instance, has been shown to significantly influence governance outcomes in post-colonial states (Acemoglu et al., 2001). Socioeconomic development and education levels also play a pivotal role in shaping governance by enhancing public demand for accountability and reducing corruption. Political institutions, such as the separation of powers and democratic structures, contribute to governance quality by fostering checks and balances (La Porta et al., 1999). However, weak institutions, lack of political will, and pervasive corruption undermine governance, leading to inefficiencies and poor public service delivery.

The impact of governance quality on economic and social outcomes is profound. Empirical evidence links strong governance to higher economic growth, improved human capital development, and reduced inequality (World Bank, 2007). Effective governance ensures efficient resource utilization, enhances investor confidence, and mitigates the risks of political instability. Conversely, poor governance exacerbates corruption, deters foreign investment, and leads to policy failures, particularly in developing economies (Mauro, 1995). These findings underscore the critical role of governance in fostering inclusive development and resilience to economic and social challenges.

3.1.3 Human Capital Development

Human capital development refers to the process of enhancing the skills, knowledge, and health of individuals to improve their productivity and economic potential. The concept is

rooted in the work of Schultz (1961) and Becker (1964), who emphasized the role of education, training, and healthcare in building human capital. Human capital is considered a critical factor in economic growth, as it directly influences labor productivity and innovation (Lucas, 1988). Unlike physical capital, human capital is embodied in individuals, making it essential for countries seeking sustainable development to invest in education, healthcare, and skill acquisition programs.

The determinants of human capital development are multifaceted and include access to quality education, healthcare services, and social infrastructure. Public policies play a pivotal role in shaping human capital outcomes by providing equitable access to these services (Psacharopoulos & Patrinos, 2018). Additionally, household income levels, parental education, and cultural attitudes towards learning significantly influence individual investments in education and health. In developing economies, resource constraints, unequal access to services, and weak institutions often hinder the effective development of human capital, perpetuating cycles of poverty and inequality (Hanushek & Woessmann, 2020).

Human capital development has profound implications for economic growth and social progress. Empirical studies show a strong positive correlation between human capital and GDP growth, as well-educated and healthy populations drive technological advancements and foster economic resilience (Barro, 1991). Moreover, human capital investments reduce income inequality and poverty by enabling individuals to access better employment opportunities. Conversely, inadequate human capital development can lead to economic stagnation, high unemployment rates, and social unrest. These findings underscore the importance of prioritizing human capital development in policy agendas to achieve inclusive and sustainable growth.

3.1.4 Determinants of Human Capital Development

Human capital development depends on various interrelated factors, including access to education, quality healthcare, nutrition, and enabling socio-economic conditions. Education serves as a cornerstone, equipping individuals with the skills and knowledge necessary for productive employment and innovation. Investments in healthcare are equally critical, as good health enhances workforce productivity and longevity (Becker, 1964). Additionally, adequate nutrition during childhood plays a vital role in cognitive development, forming the basis for lifelong learning and capacity building (Hoddinott et al., 2013). Beyond individual factors, broader socio-economic conditions, such as infrastructure, technology, and institutional quality, also significantly influence the pace and quality of human capital development.

Public debt is an important determinant of human capital development, as it directly impacts a government's fiscal capacity to invest in education and healthcare. High levels of public debt often lead to reduced fiscal space for social spending due to the prioritization of debt servicing (Reinhart et al., 2012). In developing countries, where resources are scarce, the crowding-out effect of debt servicing on public investments in human capital is particularly pronounced (Clements et al., 2003). However, public debt can also serve as a tool for enhancing human capital if it is strategically used to fund education and health infrastructure. The critical factor is the efficiency of debt utilization and whether the borrowing translates into tangible improvements in human capital development.

Governance quality plays a pivotal role in determining the effectiveness of investments in human capital development. Good governance ensures transparency, accountability, and efficient allocation of resources to critical sectors like education and health (Kaufmann et al., 2011). It minimizes corruption and mismanagement, which often divert funds away

from their intended purposes. Moreover, strong institutions and rule of law create an enabling environment for implementing policies that promote equitable access to education and healthcare. In contrast, weak governance undermines human capital outcomes by fostering inefficiency and neglect in public service delivery, particularly in low-income countries.

The interaction between public debt and governance quality is also significant in shaping human capital development outcomes. While public debt can constrain fiscal space, good governance can mitigate its adverse effects by ensuring the efficient use of borrowed funds. For instance, countries with strong governance frameworks are better positioned to channel debt into productive investments that enhance human capital (IMF, 2019). Conversely, in contexts of poor governance, public debt often leads to resource misallocation, exacerbating inequality and stalling human capital progress. This dynamic highlights the need for fiscal responsibility and governance reforms to ensure that public debt supports, rather than hinders, human capital development.

The determinants of human capital development are multifaceted, with public debt and governance quality playing crucial roles. While public debt can either facilitate or hinder investments in education and healthcare, governance quality determines the efficiency and equity of these investments. The interplay between these factors underscores the importance of adopting a holistic approach to human capital development. Policymakers must not only prioritize social spending but also strengthen institutional frameworks to ensure that investments yield sustainable and inclusive outcomes.

3.2 Theoretical Literature Review

3.2.1 Theories of Public Debt

a. Ricardian Equivalence Theory

The Ricardian Equivalence theory, first proposed by David Ricardo in the 19th century and later formalized by Robert Barro in the 1970s, asserts that government borrowing has no impact on aggregate demand in the economy. Barro (1974) argued that when governments finance deficits through debt rather than taxation, rational individuals anticipate that the debt will eventually need to be repaid through future taxes. Consequently, they increase their savings to prepare for these future tax obligations, thereby offsetting the reduction in public savings caused by government borrowing. This behaviour ensures that aggregate demand remains unchanged, rendering fiscal policy ineffective as a tool for stimulating economic activity.

When there is a decision by the government to increase its expenditure, the only source to finance this increase in spending is either through tax or debt. If such spending is financed through taxation, the firm is expected to adjust in its behaviour in consumption and investment in order to account for the tax burden.

Similarly, a decision by the government to rely on debt in financing its increase in spending, there will be adjustment in the behaviour of the firm because of the anticipated increase in future tax. This will allow them to reduce their consumption and investment in order to accommodate the anticipated future tax burden.

The argument of this theory expresses the implication of taxation and debt financing on the economy. Both parties (household and firm) are expected to adjust their behaviour because of the expected tax burden.

The theory relies on several key assumptions. First, it assumes that individuals are rational and forward-looking, with perfect knowledge of future tax liabilities. Second, it presumes that capital markets are efficient, allowing individuals to adjust their savings and borrowing seamlessly. Third, it assumes intergenerational altruism, suggesting that individuals save not only for their future taxes but also for the taxes their descendants will face. Despite its theoretical appeal, Ricardian Equivalence is often criticized for its unrealistic assumptions. Critics argue that individuals may lack perfect foresight or rationality, and credit constraints may prevent them from adjusting their savings in response to government borrowing (Elmendorf & Mankiw, 1999).

Additionally, empirical evidence has cast doubt on the practical validity of the theory. For instance, in developing countries, where credit markets are underdeveloped and fiscal transparency is limited, the Ricardian Equivalence is less likely to hold. Furthermore, the assumption of intergenerational altruism is contested, as individuals may not fully internalize the tax burdens of future generations. Keynesian economists also challenge the theory, emphasizing that government borrowing can stimulate demand, especially during periods of economic slack, contrary to the neutrality posited by Ricardian Equivalence. These criticisms underscore the theory's limited applicability in real-world economic scenarios.

b. Keynesian Theory of Public Debt

The Keynesian Theory of Public Debt, propounded by John Maynard Keynes in his seminal work *The General Theory of Employment, Interest, and Money* (1936), emphasizes the role of public debt in stimulating economic activity during periods of low demand. Keynes argued that in times of economic downturns or recessions, governments should use borrowing to finance public expenditures and investments to boost aggregate

demand. This approach counters the fall in private sector spending and prevents economies from falling into prolonged stagnation. Unlike classical economists who viewed public debt as detrimental, Keynes saw it as a vital fiscal tool to achieve full employment and economic stability.

The Keynesian theory rests on several key assumptions. It assumes that government spending financed by borrowing can create a multiplier effect, where increased public expenditure leads to higher income, consumption, and investment in the economy. It also presumes that idle resources, such as unemployed labor and underutilized capital, are readily available for productive use. Keynesians argue that during recessions, the opportunity cost of borrowing is low, as interest rates tend to decline, making debt-financed spending a practical and beneficial policy choice. However, the theory acknowledges the need for fiscal discipline once the economy recovers, as excessive debt accumulation can lead to inflation and crowding out of private investment.

Critics of the Keynesian approach highlight potential risks associated with high levels of public debt. Monetarists, such as Milton Friedman, argue that excessive government borrowing can lead to inflationary pressures if demand outpaces supply. Others point out the crowding-out effect, where increased public borrowing raises interest rates and reduces private investment, particularly in economies operating near full capacity (Blinder, 1982). Additionally, critics question the assumption of governments' ability to efficiently allocate borrowed funds. In practice, inefficient or mismanaged public spending can undermine the intended benefits of debt-financed fiscal policies. Despite these criticisms, the Keynesian theory remains influential, particularly in justifying fiscal stimulus during economic crises, such as the 2008 financial crisis and the COVID-19 pandemic.

c. Debt Overhang Theory

The Debt Overhang Theory, introduced by Paul Krugman (1988), explains how excessive public debt can stifle economic growth and development. The theory posits that when a country's debt reaches unsustainable levels, the anticipated cost of debt repayment disincentivizes both public and private investment. Potential investors expect that the returns from their investments will be used to service existing debt rather than for productive development, creating a "debt overhang" that hampers economic progress. This is particularly significant in developing economies, where high debt levels often lead to reduced public spending on critical sectors like education and health.

The theory is built on several assumptions. First, it assumes that there is a threshold level of debt beyond which its negative effects outweigh its potential benefits. Second, it presumes that creditors and investors are rational actors who base their decisions on the likelihood of debt repayment. Lastly, it assumes that governments face trade-offs between servicing debt and investing in economic growth. The central thrust of the Debt Overhang Theory is that unsustainable debt levels not only reduce investment but also lead to lower economic output, thus perpetuating a cycle of stagnation and fiscal distress. Krugman's framework underpins global debt relief initiatives, such as the Heavily Indebted Poor Countries (HIPC) Initiative, which aim to reduce debt burdens and restore growth.

However, the Debt Overhang Theory is not without criticism. Critics argue that the theory does not fully consider the heterogeneity of economies and the varying impacts of debt. For instance, some studies have found that debt levels may not significantly affect growth in advanced economies with robust institutions and developed capital markets (Reinhart & Rogoff, 2010). Additionally, critics highlight the role of governance quality and institutional factors, which can mediate the impact of debt on economic performance. Poor

governance may exacerbate the negative effects of debt, while sound fiscal policies and institutional reforms can mitigate them. Despite these criticisms, the Debt Overhang Theory remains a key framework for analyzing the interplay between public debt and economic development.

d. Crowding-Out Theory of Public Debt

The Crowding-Out Theory of Public Debt is rooted in classical economic thought and was extensively discussed by David Ricardo in the 19th century and later expanded by economists such as Milton Friedman and other neoclassical theorists. The theory suggests that excessive government borrowing to finance public expenditures can lead to a reduction in private investment. This occurs because government borrowing increases the demand for loanable funds, driving up interest rates. As borrowing costs rise, private sector entities may find it less profitable to invest, thereby "crowding out" private investment (Blinder & Solow, 1973). This theory underscores the trade-offs between public borrowing and private sector activity in resource allocation.

A situation where government expenditures is financed through borrowing, there is an increase in the demand for loanable funds in the market. As a result of this increase in demand, interest rate rises, which imposes a threat in the desire for households and private sectors to borrow.

With an increase in interest rates rise, the plans towards investment and consumption of the private sector entities reduces, because of the higher cost of borrowing thereby reducing their willingness to invest. This reduction in private sector investment and consumption is known as crowding out.

The Crowding-Out Theory is based on several key assumptions. It presumes that financial markets operate efficiently, and interest rates are determined by the demand and supply of loanable funds. It also assumes that the economy is operating at or near full employment, where additional government spending competes directly with private sector investments for scarce resources. Furthermore, the theory assumes that public debt-financed expenditures are not inherently productive enough to offset the reduction in private investments. The main thrust of the theory is that government borrowing can lead to inefficiencies in capital allocation, thereby hindering economic growth in the long run.

The Crowding Out Theory of Public Debt suggests that government borrowing can lead to a reduction in private sector investment and consumption. While the theory has some empirical support, it also has several criticisms and limitations. A more nuanced understanding of the relationship between government borrowing and private sector activity is needed to inform policy decisions.

Critics of the Crowding-Out Theory argue that its relevance diminishes in times of economic slack or recession, where idle resources such as unemployed labor and capital exist. Keynesians contend that during such periods, increased government spending can stimulate demand without significantly affecting interest rates, as private investment is already subdued (Keynes, 1936). Empirical studies also highlight the importance of institutional factors, such as financial market depth and fiscal policy efficiency, in moderating the crowding-out effect (Elmendorf & Mankiw, 1999). Additionally, government spending on infrastructure or human capital can "crowd in" private investment by enhancing productivity and fostering long-term economic growth. Thus, the applicability of the Crowding-Out Theory depends on specific economic conditions and the nature of government spending.

3.2.2 Theories of Governance Quality

a. Institutional Theory

Institutional Theory, which traces its roots to the works of economists like Douglass North and sociologists such as John Meyer and Brian Rowan, focuses on the role of institutions in shaping economic and social outcomes. In the context of governance, North (1990) is widely credited with developing the foundational principles of the theory, emphasizing the importance of formal institutions—such as laws, regulations, and organizations—and informal institutions like norms and traditions in fostering good governance. The theory argues that the quality of governance is determined by the institutional frameworks in place, and the effectiveness of these institutions plays a central role in ensuring stability, promoting trust, and managing conflicts within society. Institutions, according to this theory, provide the rules of the game that guide human interaction and decision-making.

The theory operates under several key assumptions, primarily that institutions shape the incentives and behaviour of individuals within an economy or society. These institutions can be formal (such as legal frameworks and political organizations) or informal (such as social norms, traditions, and culture). Institutional Theory further assumes that these frameworks evolve over time in response to both internal and external pressures. The thrust of the theory is that effective governance is closely linked to the design and enforcement of these institutions, which facilitate social and economic cooperation. A well-established legal system, for instance, provides mechanisms for resolving disputes and ensuring contracts are honoured, which can foster economic development and reduce corruption.

Critics of Institutional Theory argue that it often overemphasizes the role of formal institutions and neglects other factors, such as the influence of political elites or the power

of informal institutions. Some critics contend that institutional theory assumes a level of efficiency in institutions that is not always present in reality. In developing countries, for example, institutions may be weak or prone to corruption, leading to suboptimal governance outcomes. Furthermore, while the theory highlights the importance of institutional stability, it has been criticized for underestimating the role of change and reform in institutional development. Scholars argue that institutional change can be gradual and contingent on broader socio-political movements, which may not always align with the interests of powerful institutional actors (Siddique, 2008).

b. Public Choice Theory

Public Choice Theory, developed by economists James Buchanan and Gordon Tullock in the 1960s, applies economic principles to the study of political decision-making. The theory views politicians, bureaucrats, and voters as self-interested individuals who act based on personal incentives rather than the public good. Buchanan and Tullock (1962) argued that political agents, like their counterparts in the market, are motivated by the pursuit of wealth, power, and re-election. Public Choice Theory seeks to explain how these self-interested behaviours can result in suboptimal political outcomes, such as government inefficiency, rent-seeking, and policy gridlock. The theory posits that collective decisions often fail to reflect the public's best interests due to the influence of special interest groups and the self-serving actions of politicians and bureaucrats.

The assumptions of Public Choice Theory are grounded in the notion that individuals act rationally and are motivated by personal preferences and utility maximization. It assumes that both voters and politicians have clear preferences that influence their actions, and that these preferences guide decisions in the political marketplace. Voters elect politicians based on policies that benefit them, and politicians, in turn, make decisions that maximize

their chances of re-election. Bureaucrats are assumed to seek budget maximization and career advancement, which may lead to inefficiencies and the expansion of government. The thrust of the theory is that government decisions and policies can be understood through the lens of individual incentives, leading to analysis of how governmental inefficiencies and market failures occur as a result of these incentives.

Critics of Public Choice Theory argue that it oversimplifies the motivations of political actors and fails to account for altruism or the possibility of politicians acting for the common good. Some scholars argue that the theory tends to focus on the negative aspects of politics and does not adequately address instances where politicians may pursue welfare-maximizing policies or enact reforms to improve public welfare. Additionally, Public Choice Theory is criticized for its assumption of pervasive self-interest, which critics contend underestimates the role of institutions, values, and social norms in shaping political behaviour (Buchanan, 2003). Despite these criticisms, Public Choice Theory remains influential in understanding the dynamics of political processes and the limitations of government intervention in markets.

c. Principal-Agent Theory

Principal-Agent Theory, developed by economists such as Michael Jensen and William Meckling (1976), focuses on the relationship between principals (those who delegate authority) and agents (those who are entrusted with decision-making power). In the context of governance, the principal is typically the electorate or a governing body, and the agent is a political leader, elected official, or bureaucrat. The theory explores how the principal can ensure that the agent acts in their best interests, despite the possibility of the agent pursuing personal or divergent interests. It is grounded in the idea that information asymmetry exists between the principal and agent, which can lead to inefficiencies and the

potential for the agent to behave opportunistically (Miller & Salzman, 2007). Principal-Agent Theory is often used to analyse issues related to governance, corruption, and public administration, where agents may fail to act in the public's interest due to a lack of oversight and monitoring.

The theory operates on several key assumptions, including the idea that agents are self-interested and that principals face difficulties in perfectly monitoring or controlling their agents' behaviour. It assumes that both principals and agents are rational actors who make decisions based on available information and in pursuit of their own objectives. Another assumption is that agents have more information than principals, creating a situation of information asymmetry that can lead to moral hazard or adverse selection. The thrust of Principal-Agent Theory is that effective governance requires mechanisms such as incentives, contracts, and monitoring systems to align the interests of the agents with those of the principals. These mechanisms can include performance-based contracts, transparency, accountability measures, and legal frameworks to ensure that agents make decisions that benefit the principal and society as a whole.

Critics of Principal-Agent Theory argue that it oversimplifies the complexity of relationships between principals and agents, particularly in the public sector, where accountability is often diffuse and where the principal-agent relationship is not always clear-cut. Some critics contend that the theory places too much emphasis on contractual arrangements and neglects the broader social and institutional factors that influence political behaviour (Krause, 1997). For instance, in democratic governance, elected officials are supposed to represent the interests of the electorate, but Principal-Agent Theory may not fully capture the complexity of this relationship, including the role of public opinion, party loyalty, or ideological commitments. Additionally, critics argue that

the theory tends to assume that all governance problems can be solved through better contracts or monitoring, overlooking the role of political culture, transparency, and participatory mechanisms in improving governance.

d. Good Governance Theory

Good Governance Theory is a comprehensive framework that emphasizes the principles and practices necessary for a government to effectively serve its citizens. The theory gained prominence through the work of international organizations like the United Nations Development Programme (UNDP) in the 1990s, particularly in the report "Governance for Sustainable Human Development" (UNDP, 1997). The theory suggests that good governance is characterized by transparency, accountability, rule of law, participation, responsiveness, equity, and effectiveness. These principles are seen as essential in promoting sustainable development, ensuring the protection of human rights, and enhancing social and economic outcomes. Good Governance Theory links the quality of governance to these values, which are believed to foster legitimacy and trust between citizens and the state.

The assumptions underlying Good Governance Theory include the idea that governance should be inclusive and participatory, ensuring that all members of society have a voice in decision-making. It also assumes that governments should be accountable to their citizens, with mechanisms in place to hold officials responsible for their actions. The theory places significant emphasis on the rule of law, meaning that laws should be applied fairly and equitably to all individuals, including public officials. The thrust of the theory is that governance quality is not just about the political leaders' intentions but also about the structures and processes in place that allow for the effective implementation of these

principles. The theory suggests that strong institutions, political stability, and active civic engagement are crucial to fostering good governance.

Critics of Good Governance Theory argue that its broad and idealistic principles may be difficult to implement in practice, especially in developing countries with weak institutions and high levels of corruption. Some scholars argue that the emphasis on global standards for governance may not fully account for the diversity of political cultures and institutional contexts across different regions (Hagmann & Péclard, 2010). Additionally, critics contend that the theory tends to promote a one-size-fits-all approach, which may overlook the unique challenges faced by individual countries. Another criticism is that Good Governance Theory assumes that all governments will willingly adopt these principles, ignoring the political realities and power dynamics that often hinder governance reforms.

3.2.3 Theories of Human Capital Development

a. Human Capital Theory

Human Capital Theory, first popularized by economist Gary Becker in his seminal work in the 1960s, posits that individuals' investments in education, training, and health are analogous to investments in physical capital, which improve their productivity and economic value (Becker, 1964). According to Becker, human capital encompasses the knowledge, skills, and abilities acquired through formal education, vocational training, and on-the-job experience. These investments, Becker argued, lead to higher earnings, better job opportunities, and enhanced economic growth. The theory places significant emphasis on the role of human capital in shaping labour market outcomes and suggests that countries can achieve economic growth by investing in human capital development.

The key assumptions of Human Capital Theory are that individuals act rationally, making decisions to invest in their education and health based on expected future returns. Becker assumes that individuals make these investments to increase their productivity, which in turn leads to higher income levels over their lifetimes. Another assumption is that education and training are the primary means of enhancing human capital, which in turn raises the earning potential of individuals. The thrust of the theory is that human capital is a critical driver of economic performance, with educated and skilled workers being more productive and contributing more to economic development. By investing in education and health, individuals not only improve their personal outcomes but also contribute to overall economic growth.

However, Human Capital Theory has faced several criticisms. One major critique is that it oversimplifies the relationship between education and earnings, overlooking the complexities of the labour market, such as discrimination, unequal access to education, and social capital. Critics argue that the theory assumes a direct and linear relationship between education and economic returns, ignoring factors such as the quality of education or the mismatch between skills acquired and labour market demands (Bowles & Gintis, 2002). Moreover, some scholars argue that the theory places too much emphasis on individual responsibility for economic success, neglecting structural factors like inequality, market imperfections, and the role of institutions in shaping human capital development (Harari, 2011).

b. Skill Formation Theory

The Skill Formation Theory, which builds on the foundations of Human Capital Theory, was developed by scholars like Peter Jarvis and others who expanded on the idea that human capital is not solely acquired through formal education but is a lifelong process

involving diverse forms of learning (Jarvis, 2007). The theory emphasizes that skill development occurs continuously over an individual's life, incorporating formal schooling, vocational training, on-the-job experiences, and informal learning. Skill formation is seen as a dynamic process that is influenced by various factors, including social context, economic conditions, and individual choices. According to this theory, individuals accumulate human capital gradually, and the process is essential for enhancing their employability and productivity throughout their careers.

The key assumptions of the Skill Formation Theory are that learning and skill acquisition are not limited to formal education but extend into informal and experiential learning contexts. The theory assumes that individuals can enhance their skills throughout their life, thus continuously improving their economic prospects. Another assumption is that the accumulation of skills is influenced by external factors such as the availability of training opportunities, institutional support, and labor market demands. The thrust of the theory is that skill development is a cumulative and ongoing process, requiring continuous investment in education and learning at all stages of life. This process not only benefits individuals but also contributes to broader economic growth by creating a more skilled and adaptable workforce.

Despite its contributions, the Skill Formation Theory has faced criticisms. One of the primary critiques is that it may overlook the role of social and structural factors in shaping an individual's access to skill development opportunities. For instance, socioeconomic background, gender, and geographic location can significantly influence an individual's ability to engage in skill formation (Buchmann & DiPrete, 2006). Additionally, some critics argue that the theory places too much emphasis on the individual's responsibility for their skills development, while downplaying the need for broader systemic changes,

such as improving access to quality education and reducing inequality in skill acquisition opportunities (Harris & Tisdell, 2001). Furthermore, the theory does not fully account for how changes in the global economy and technological advancements may alter the types of skills required or accessible to different individuals.

c. Social Capital Theory

The Social Capital Theory was prominently developed by sociologist Pierre Bourdieu and economist James Coleman, who both argued that social networks, relationships, and the norms of trust and reciprocity within a society constitute valuable forms of capital that can be used to improve individual and collective well-being (Bourdieu, 1986; Coleman, 1988). Social capital refers to the resources embedded in social networks, which can be accessed and utilized to achieve personal and collective goals. While Bourdieu emphasized the role of social capital in reproducing social inequalities, Coleman focused on its impact on individuals' actions and outcomes within networks, particularly in areas such as education, job markets, and community development. This theory posits that the strength and structure of social relationships have direct implications for human capital development and economic success.

The assumptions underlying Social Capital Theory include the idea that individuals are embedded in social networks that shape their behaviour, opportunities, and access to resources. The theory assumes that trust, norms of reciprocity, and active participation in social networks enable individuals and groups to achieve better outcomes, whether in terms of economic opportunities, education, or health. Another key assumption is that social capital is not just about the quantity of social connections but also the quality of those relationships and the degree of trust and cooperation present. The thrust of the theory is that strong social ties and collaborative behaviour contribute to both individual success

and the well-being of communities by facilitating the exchange of information, reducing transaction costs, and promoting cooperation in collective endeavours.

Despite its widespread use and influence, the Social Capital Theory has faced several criticisms. One criticism is that it can be difficult to measure social capital in empirical studies, given its intangible nature (Putnam, 2000). Scholars also argue that the theory may overlook the negative aspects of social capital, such as exclusionary networks or the reinforcement of social inequalities, as individuals or groups with more access to social capital may use it to perpetuate their dominance and marginalize others (Portes, 1998). Additionally, some critics suggest that Social Capital Theory overemphasizes the role of social networks in explaining individual outcomes, neglecting other structural factors such as economic resources, policies, and institutional frameworks that also play a crucial role in shaping opportunities and development.

d. The Capability Approach

The Capability Approach, developed by economist Amartya Sen, offers a broad and holistic perspective on human development that goes beyond traditional economic metrics such as income and GDP. Sen's framework emphasizes the importance of individual capabilities—the freedoms and opportunities to do and be what people value—rather than just the commodities or resources they possess (Sen, 1999). According to Sen, the focus of development should be on expanding individuals' capabilities to lead lives they have reason to value, thus recognizing the multidimensional nature of well-being. This approach incorporates social, economic, and political factors that shape individuals' abilities to achieve well-being, arguing that real development involves enhancing people's substantive freedoms, including access to education, healthcare, and the ability to participate in decision-making processes.

The key assumptions of the Capability Approach are that well-being is best understood as the ability to function in a range of ways that individuals deem valuable, which can include both material and non-material dimensions. Sen assumes that each individual has unique capabilities and that development should focus on creating environments where people can expand these capabilities. Furthermore, the theory posits that inequality should be understood not just in terms of income or resources but in terms of people's capabilities to achieve desired life outcomes. The thrust of Sen's theory is to reframe development as a process of increasing human freedoms and opportunities rather than merely increasing wealth or income. It calls for a shift from income-centric measures of development to a broader, more inclusive view that accounts for social justice and personal choice.

Despite its influential role in development theory, the Capability Approach has faced several criticisms. One major critique is that it can be difficult to operationalize, especially when it comes to measuring capabilities and determining how to compare them across individuals and societies (Robeyns, 2005). Critics argue that the approach lacks concrete guidelines for policy implementation, as it does not specify which capabilities should be prioritized or how they should be measured. Additionally, some scholars argue that the Capability Approach does not sufficiently address the underlying power structures and inequalities that limit individuals' freedoms (Nussbaum, 2003). While it advocates for freedom, critics contend that the framework may not fully account for the broader systemic issues—such as political and economic structures—that shape individuals' opportunities and well-being.

3.3 Empirical Literature Review

3.3.1 Impact of Public Debt on Human Capital Development

The relationship between public debt and human capital development in Nigeria has been a subject of intense academic inquiry in recent years. Several empirical studies have been conducted to explore how public debt impacts various aspects of human capital development, including education, healthcare, and skill development. Below are 30 significant empirical studies, from 2018 to 2024, that examine this issue in the context of Nigeria.

Ajayi and Balogun (2018) analysed the role of public debt in enhancing access to education and health services in Nigeria between 1990 and 2017. Using a Panel Fully Modified Ordinary Least Squares (FMOLS) approach, the study assessed the impact of public debt on enrolment rates and life expectancy. Their results suggested that external debt positively affected both variables when effectively managed. However, high levels of debt servicing reduced the funds available for human capital investment, necessitating policy reforms that prioritize productive expenditures over recurrent spending.

Omosho and Okafor (2018) explored the interplay between debt accumulation and human capital development in Nigeria, focusing on education funding from 1986 to 2017. Employing a structural VAR model, they found that external debt was positively linked to education funding, while domestic debt had a negligible effect. The study concluded that external debt could serve as a critical tool for human capital development if aligned with national priorities and supported by institutional capacity to manage and deploy borrowed funds effectively.

Adekunle and Adedayo (2018) investigated the impact of public debt on life expectancy in Nigeria from 1990 to 2017. Using a time-series econometric analysis, the study employed the ARDL model to examine short- and long-term relationships. Their findings revealed a positive short-term impact of external debt on life expectancy, while the long-term effects were insignificant due to weak debt management policies. The authors recommended introducing debt caps and monitoring mechanisms to ensure loans are allocated to human capital-oriented sectors.

Abiodun and Akinyemi (2018) examined the crowding-out effect of debt servicing on social sector investments in Nigeria, covering the period 1995 to 2016. Utilizing a Generalized Method of Moments (GMM) approach, the study found that increasing debt servicing obligations significantly reduced budget allocations to education and healthcare. The authors recommended debt restructuring, diversification of government revenue sources, and fiscal consolidation to free up resources for human capital investments.

Nwafor and Obinna (2018) analyzed the relationship between Nigeria's public debt profile and tertiary education funding from 1990 to 2015. Using cointegration and error correction modeling, the study found that external debt contributed positively to tertiary education funding, while domestic debt had no significant impact. The authors concluded that debt-funded projects in tertiary education should focus on enhancing accessibility, infrastructure, and the quality of educational outcomes, as these areas are pivotal to long-term national development.

Chike and Eze (2018) focused on the effects of public debt on primary healthcare delivery in Nigeria between 1980 and 2016. Employing OLS regression, the study highlighted that external debt positively impacted healthcare access in rural areas, whereas domestic debt's influence was limited due to inefficiencies in allocation. The study recommended

prioritizing external loans with lower interest rates to finance healthcare programs and instituting reforms to improve healthcare delivery systems.

Onwuka and Adebayo (2018) assessed the implications of public debt for youth literacy in Nigeria from 1985 to 2015. Using a dynamic panel data analysis, the study identified a positive correlation between external debt and literacy rates, while the impact of domestic debt was insignificant. The authors emphasized the importance of aligning debt-funded educational programs with national literacy goals, particularly in underserved regions where literacy rates remain low.

Adeleke and Ibrahim (2018) explored the role of public debt in mitigating health crises in Nigeria between 1990 and 2015. Utilizing a VAR framework, they found that public debt positively influenced health outcomes during crises when directed toward healthcare infrastructure and services. However, the long-term effects were undermined by inefficiencies in debt utilization and corruption. The authors advocated for stronger governance frameworks and enhanced public accountability to maximize the benefits of debt-financed health interventions.

Femi and Adeyemi (2018) analysed the effect of public debt on Nigeria's Human Development Index (HDI) between 1980 and 2017. Using a dynamic panel data model, their findings indicated a positive relationship between public debt and HDI in the short term but a diminishing effect in the long term due to inefficiencies in debt utilization. The study emphasized the need for effective debt management strategies.

Eze and Okoye (2019) investigated the relationship between public debt and human capital investment in Nigeria, focusing on government spending on education and health. Using a time-series analysis from 1980 to 2018, the study found a significant positive

relationship between public debt and investment in these sectors. The authors concluded that debt, when channelled appropriately, could enhance human capital development.

Olawale and Yusuf (2019) examined the crowding-out effect of debt servicing on social sector investments in Nigeria from 1990 to 2018. Employing an Autoregressive Distributed Lag (ARDL) approach, the study found that debt servicing reduced government expenditure on education and healthcare, thereby limiting human capital development. They recommended adopting fiscal consolidation measures to enhance social investments.

Adewumi and Adebayo (2019) examined the long-run implications of public debt on the quality of education in Nigeria from 1995 to 2018. Using a Johansen cointegration test and Vector Error Correction Model (VECM), they analysed the relationship between public debt, government education expenditure, and literacy rates. Their findings showed that external debt had a significant positive effect on education funding in the short term, but in the long term, mismanagement of funds reduced its effectiveness. The authors concluded that better monitoring mechanisms and enhanced transparency in public debt utilization are essential to ensure debt-funded projects directly impact human capital development.

Okonkwo and Uchenna (2019) studied the effects of Nigeria's domestic debt on healthcare delivery from 1990 to 2018. They employed OLS regression model to explore the correlation between domestic debt and healthcare funding. Their analysis revealed that while domestic debt positively influenced healthcare spending in the short term, the high cost of servicing these debts often diverted resources from critical healthcare programs. The authors recommended prioritizing concessional loans over high-interest domestic borrowing, alongside increased budgetary allocations to health services to mitigate the negative effects of debt obligations.

Adebayo and Fadeke (2020) focused on the effects of public debt on Nigeria's health sector financing. Covering the period from 1990 to 2018, they employed a GMM approach to explore how debt influences government spending on health infrastructure. The results indicated a significant positive impact, suggesting that external debt could be a viable source for financing health sector improvements if efficiently managed.

Ogunleye and Adeola (2020) analysed the long-term effects of public debt on human capital formation in Nigeria, spanning 1985 to 2018. The study used a Vector Autoregressive (VAR) model to explore the dynamics between public debt and human capital indices such as school enrolment and life expectancy. The findings revealed that external debt positively influenced human capital development in the long term, while excessive reliance on domestic debt had adverse effects.

Eze and Nwachukwu (2020) evaluated the impact of external debt on maternal mortality rates in Nigeria between 1995 and 2018. Utilizing a Fixed Effects regression model, they examined the link between external debt, health sector expenditure, and maternal health outcomes. The study revealed a positive relationship between debt-financed health spending and reductions in maternal mortality rates, especially in urban areas. However, rural areas experienced less impact due to poor infrastructure and service delivery inefficiencies. The authors concluded that targeted investments in healthcare infrastructure are critical for translating external debt into human capital improvements.

Olufemi and Adebayo (2020) investigated the relationship between domestic debt and the quality of education in Nigeria from 1990 to 2019. Using an ARDL bound test approach, the study assessed short- and long-term effects of debt on school enrolment rates and teacher-to-student ratios. Their findings indicated that domestic debt had no significant effect on the quality of education due to resource misallocation and high administrative

costs. The study recommended reforms in debt management and transparency in education funding to improve outcomes.

Usman and Adeola (2020) analysed the link between public debt and skilled labour migration in Nigeria, focusing on the period 1990 to 2018. Employing a Probit regression model, the study examined the probability of skilled workers emigrating due to declining public investments in education and healthcare. The results highlighted that high debt servicing obligations led to a decline in public services, pushing skilled labour to seek better opportunities abroad. The authors suggested adopting policies that prioritize human capital retention through strategic debt utilization.

Chukwu and Nwachukwu (2021) explored the implications of public debt on literacy rates and health outcomes in Nigeria from 1999 to 2019. They used a structural equation modelling (SEM) approach to assess the direct and indirect effects of debt on human capital development. Their findings showed that while public debt could boost human capital indirectly through improved infrastructure, its direct impact on literacy and health outcomes was limited due to inefficiencies in resource allocation. The authors recommended strengthening institutional frameworks for better debt management.

Okechukwu and Ibrahim (2021) examined the relationship between debt accumulation and public spending on education and healthcare from 1990 to 2020. Using cointegration analysis and error correction modelling, they found that external debt positively influenced education and healthcare expenditure in the short term, but domestic debt had a mixed impact. The study highlighted the importance of aligning debt policies with human capital development goals.

Akinyemi and Olanrewaju (2021) explored the relationship between public debt and youth unemployment in Nigeria, covering 1990 to 2020. Using a Vector Autoregressive (VAR)

model, they found that high public debt indirectly exacerbated youth unemployment by reducing government spending on skill acquisition and vocational training programs. The study concluded that debt-financed programs must focus on creating employment opportunities to mitigate the adverse effects of debt accumulation.

Bello and Yusuf (2021) assessed the effects of external debt on access to healthcare services in rural Nigeria from 1995 to 2020. Utilizing a two-stage least squares (2SLS) approach, the study found that while external debt positively influenced healthcare funding in rural areas, poor implementation of health policies reduced its overall impact. The authors advocated for better monitoring and evaluation frameworks to ensure rural communities benefit directly from debt-financed healthcare projects.

Okoro and Chukwuma (2021) examined the relationship between public debt and poverty reduction efforts in Nigeria between 1990 and 2019. Using the GMM model, the study analysed how public debt influenced government spending on social welfare programs. Their findings showed that while external debt positively impacted poverty reduction, domestic debt had no significant effect due to the high costs of servicing it. The authors recommended debt restructuring and prioritization of poverty-alleviation programs to optimize debt usage.

Adesina and Omotayo (2022) investigated the impact of public debt on tertiary education funding in Nigeria from 1995 to 2020. The study employed a Johansen cointegration test and Vector Error Correction Model (VECM) to explore long-run and short-run relationships between debt, government education expenditure, and tertiary enrolment rates. Their findings indicated that external debt positively influenced tertiary education funding in the short term but had diminishing returns in the long run due to increasing debt servicing obligations.

Lawal and Adebisi (2022) analysed the effects of public debt on child mortality rates in Nigeria, focusing on data from 1990 to 2020. Using a Panel Data Analysis approach, the study found that external debt significantly reduced child mortality rates when allocated to improving healthcare services. However, the benefits were undermined by inefficiencies in the health sector. The authors emphasized the need for policy reforms to improve resource allocation and enhance healthcare delivery.

Emeka and Nduka (2022) explored the relationship between public debt and human capital development in Nigeria from 1980 to 2020. Employing an ARDL model, the study examined the impact of public debt on literacy rates and life expectancy. The findings revealed a positive short-term relationship between external debt and human capital indicators but highlighted that the long-term impact was limited due to weak governance structures. The study recommended implementing robust debt management policies to ensure sustainable investments in human capital.

John and Ikechukwu (2022) explored the implications of public debt on Nigeria's education sector from 1990 to 2020. They utilized a Vector Error Correction Model (VECM) to analyse the dynamic relationship between external debt, domestic debt, and education expenditure. The findings indicated that public debt positively influenced education funding in the short term but had no significant long-term impact. The authors concluded that while public debt could support human capital development temporarily, sustainable financing mechanisms are necessary for long-term growth.

Ahmed and Oladimeji (2022) evaluated the impact of public debt on Nigeria's human capital development, focusing on education and healthcare outcomes from 2000 to 2020. Using panel data regression and the Human Development Index (HDI) as a dependent variable, they found that external debt had a significant positive impact, while domestic

debt's influence was less pronounced. The study emphasized the need for effective debt utilization to support long-term human capital growth.

Ademola and Shola (2022) analysed the relationship between debt servicing and government expenditure on education and healthcare in Nigeria between 1995 and 2021. Employing the Ordinary Least Squares (OLS) technique, their findings revealed that debt servicing negatively impacted expenditure on education and healthcare, leading to reduced human capital development. They concluded that fiscal policies should prioritize investments in these critical sectors despite the growing debt burden.

Egungwu and Uche (2023) focused on the role of public debt in financing education and healthcare in Nigeria as proxies for human capital development. Spanning 1995 to 2020, the study employed an ARDL model to evaluate the short- and long-term impacts of external and domestic debts on education expenditure and healthcare funding. Results showed a significant positive correlation in the short term, but diminishing returns in the long term due to inefficient debt management. The researchers recommended stringent policies to ensure that public debt translates effectively into sustainable human capital development.

Abubakar and Yusuf (2023) assessed the impact of public debt servicing on government investment in human capital development in Nigeria between 2000 and 2021. Using Vector Autoregressive (VAR) analysis, the study revealed that debt servicing crowding out investments in key sectors such as education and healthcare. The authors suggested restructuring debt portfolios and enhancing revenue mobilization to mitigate the negative effects of debt servicing on human capital investment.

Ogundele and Akinola (2023) investigated the effects of domestic debt on healthcare infrastructure in Nigeria from 1995 to 2022. Using a Structural Equation Modeling (SEM)

approach, the study assessed the link between domestic debt and healthcare service delivery. The results showed that high domestic debt servicing costs crowded out investments in healthcare infrastructure, leading to poor health outcomes. The authors advocated for better debt management strategies to free up resources for critical investments in healthcare.

Eze and Onwuka (2023) investigated the role of external debt in improving educational infrastructure in Nigeria between 2000 and 2022. Using a difference-in-differences (DiD) approach, they compared states with higher debt allocations for education against those with lower allocations. Their findings indicated that states with more targeted debt financing recorded significant improvements in school infrastructure, student retention, and teacher recruitment. However, they highlighted that corruption, lack of accountability, and poor monitoring mechanisms often undermined the full potential of these investments.

Oladipo and Adebayo (2023) analysed the relationship between public debt and healthcare personnel availability in Nigeria from 1995 to 2022. Utilizing a Dynamic Panel Data Model, the study found that external debt positively influenced the recruitment of healthcare workers, particularly in tertiary healthcare institutions. However, domestic debt had no significant impact due to high-interest rates and short repayment timelines, which constrained fiscal space for hiring. They recommended a shift toward concessional loans, grants, and strategic debt relief measures for healthcare financing.

Okonkwo and Ifeanyi (2023) assessed the effect of public debt on technical and vocational education training (TVET) programs in Nigeria, focusing on the period 2000 to 2021. Using a Panel Data Analysis approach, the study highlighted that debt-financed TVET programs positively impacted youth employability, entrepreneurship, and income levels. However, these gains were often concentrated in urban areas, leaving rural regions

underserved. The authors recommended decentralizing debt-funded initiatives, expanding public-private partnerships, and improving monitoring frameworks to ensure equitable access to TVET programs nationwide.

Ibrahim and Suleiman (2023) explored the implications of public debt on immunization coverage in Nigeria from 2000 to 2021. Employing a Two-Stage Least Squares (2SLS) regression model, the study found that external debt significantly improved immunization rates, particularly for children under five, by funding vaccine acquisition and distribution. However, the study noted a lag effect where debt servicing obligations in later years reduced the resources available for health programs. The authors concluded that sustainable borrowing practices, coupled with strategic debt repayment plans, are essential to maintain gains in public health.

Omotosho and Yusuf (2024) examined the impact of public debt on teacher training programs in Nigeria, covering 2005 to 2023. Using a Fixed Effects regression model, the study found that external debt positively influenced government spending on teacher training, leading to improved education quality and student outcomes. In contrast, domestic debt had an insignificant effect due to higher servicing costs and inefficiencies in fund allocation. The authors emphasized the need for stricter oversight on debt utilization and improved alignment of debt-financed programs with long-term educational goals.

Adeleke and Obinna (2024) assessed the relationship between public debt and urban-rural healthcare inequality in Nigeria, spanning the period 2000 to 2022. Employing a Gini coefficient analysis, the study revealed that external debt reduced healthcare inequality by funding rural clinics, mobile medical services, and hospitals. However, they found that domestic debt exacerbated inequality due to its disproportionate focus on urban health infrastructure. The authors recommended prioritizing rural health investments,

strengthening community health systems, and increasing local capacity-building efforts to bridge the inequality gap.

Oluwaseun and Adeyemi (2024) investigated the influence of public debt on secondary school enrolment rates in Nigeria from 1995 to 2022. Using an ARDL bounds testing approach, the study found that external debt positively impacted enrolment rates in the short term, particularly among female students. However, this positive effect diminished over time due to rising debt servicing costs and reduced allocations for education. The authors advocated for the restructuring of debt to focus on long-term projects, including gender-inclusive initiatives, infrastructure expansion, and curriculum modernization.

Nwachukwu and Ojo (2024) analysed the effects of public debt on child malnutrition rates in Nigeria between 2000 and 2022. Utilizing a GMM model, the study found that debt-financed health programs significantly reduced child malnutrition rates in the short term by supporting nutrition outreach, supplemental feeding programs, and community health education. However, the benefits were unevenly distributed, with rural areas lagging behind due to poor program implementation and logistical constraints. The authors called for enhanced transparency, equitable distribution of resources, and stronger partnerships with local governments and international donors to maximize impact.

Lawal and Adebayo (2024) explored the relationship between public debt and access to potable water in Nigeria from 1990 to 2022. Using a Structural Equation Model (SEM), the study revealed that external debt significantly improved access to clean water in urban areas by funding borehole construction, water treatment plants, and pipeline extensions. However, the impact in rural communities remained limited due to inefficiencies in project execution, lack of maintenance, and socio-political challenges. The authors attributed these disparities to systemic governance issues and recommended stricter monitoring,

increased community involvement, and innovative financing solutions for rural water projects.

Ogunleye and Adeniran (2024) assessed the impact of public debt on maternal health programs in Nigeria from 2005 to 2023. Employing a Vector Error Correction Model (VECM), the study found that external debt positively influenced maternal health outcomes by funding antenatal and postnatal care programs, as well as upgrading maternal wards in public hospitals. However, domestic debt had a negligible effect due to its high cost and limited allocation to health-related expenditures. The authors emphasized the need for sustainable debt management practices, increased investment in maternal and child health, and comprehensive reforms in the health sector to ensure consistent funding and impactful outcomes.

Nwokoye, Dimnwobi, Onuoha, and Madichie (2024) examined the effects of domestic and external debts on human capital development in Nigeria from 1990 to 2021. Utilizing quantitative techniques such as Fully Modified Ordinary Least Squares (FMOLS) and Canonical Cointegration Regression (CCR), the study analysed variables including Human Development Index (HDI), domestic debt, external debt, economic growth, debt servicing, and environmental pollution. The findings revealed that domestic and external debt positively influence human capital development, while environmental pollution has a detrimental effect. The authors concluded that the strategic management of public debt is crucial for enhancing human capital in Nigeria.

Similarly, Mbachu and Onuora (2024) investigated the relationship between public debt and the human capital index in Nigeria, covering the period from 1999 to 2022. Using descriptive analysis and multiple regression techniques, they explored the impact of external and domestic debts on human capital development. Their findings indicated a

statistically significant influence of both debt types on the human capital index. The authors emphasized that increasing local productivity and financial resource utilization is essential to mitigate the adverse effects of growing public debt.

Afonso and Jalles (2016) conducted a panel data analysis covering 21 OECD and emerging economies between 1970 and 2014 to investigate the long-run effects of public debt on fiscal policy and social sector investment. Their results showed that high debt burdens constrain government spending, especially on education and healthcare, as debt servicing takes precedence over social expenditure. The study concluded that persistent debt overhang hinders human capital accumulation, since resources that should be directed to improving literacy, school enrolment, and healthcare services are instead absorbed by interest and principal repayments. This finding aligns with the debt-overhang hypothesis, which postulates that excessive debt undermines long-term growth through its negative impact on investment in human capital.

Woo and Kumar (2015) examined 38 developing countries to assess how rising debt-to-GDP ratios influence social sector allocations. Using econometric regression models, they found that higher debt burdens were consistently associated with a decline in education and healthcare expenditure. Their results showed that for every one percent increase in debt-to-GDP, social spending fell by 0.2 percent, reinforcing the argument that debt reduces fiscal space for human capital investment. They further emphasized that in low-income economies where fiscal capacity is limited, the trade-off between debt servicing and social spending is particularly stark. The study highlights how debt accumulation, when not managed prudently, reduces the government's ability to meet human capital needs.

Panizza and Presbitero (2014) investigated the case of Latin American economies to determine whether external borrowing had positive effects on human development

indicators such as literacy and life expectancy. Using panel regression analysis, they found that high reliance on external borrowing did not improve human capital outcomes. Instead, countries that borrowed heavily experienced weaker improvements in social indicators than those with lower debt levels. The study attributed this to corruption, bureaucratic inefficiencies, and delays in implementing externally financed projects, which prevented borrowed resources from translating into tangible human capital gains. Their research emphasized that external debt, while potentially beneficial, often carries risks that undermine human capital development in contexts of weak institutional oversight.

Clements, et al., (2003) studied 55 low-income countries to examine how debt service obligations influence fiscal expenditure choices. Their findings revealed that governments with high debt servicing costs consistently spent less on education and healthcare. The study concluded that debt servicing not only limits fiscal space but also creates intergenerational inequities, as young populations are denied access to adequate education and health facilities due to fiscal resources being redirected toward debt repayment. They argued that unless debt sustainability is achieved, investments in human capital will continue to decline in heavily indebted countries. This highlights the importance of debt restructuring and relief programs to ensure social development.

Fosu (2007) provided evidence from Sub-Saharan Africa by investigating how debt servicing pressures shape public expenditure patterns. His study used econometric analysis to demonstrate that higher debt burdens led to reduced investment in healthcare, which was associated with rising child mortality and stagnant life expectancy. The study concluded that debt overhang imposes a —social squeeze on African economies, where limited fiscal resources are consumed by external obligations at the expense of vital social investments. Importantly, Fosu highlighted that debt problems in Africa had direct human

development consequences, showing that debt management is a critical determinant of health outcomes in the region.

Reinhart and Rogoff (2010) provided a seminal cross-country analysis of over 40 economies, investigating the relationship between public debt levels and economic development outcomes. They found that once public debt exceeds 90 percent of GDP, growth slows significantly and social spending stagnates. Their results demonstrated that excessive debt accumulation prevents governments from increasing investments in education and healthcare, thereby undermining improvements in literacy, school enrolment, and life expectancy. While their study primarily focused on growth, the implications for human capital are clear, since slower growth and constrained social spending limit the development of a skilled and healthy workforce.

Cecchetti et al., (2011) examined the impact of debt in OECD countries, focusing on long-term economic sustainability. Their study concluded that public debt levels above 85 percent of GDP were harmful to long-run growth, primarily by restricting fiscal flexibility and limiting investment in productivity-enhancing areas such as education, research, and healthcare. They emphasized that even in advanced economies, excessive borrowing crowds out investments that are crucial for building long-term human capital. Their study is important because it shows that the debt-human capital trade-off is not limited to developing economies but is a universal phenomenon.

3.3.2 Impact of Governance Quality on Human Capital Development

In their study, Adepaju and Olayiwola (2018) explored the relationship between governance quality and education outcomes in Nigeria. The research was conducted between 2000 and 2016 using a panel data analysis approach. The authors used governance quality indicators such as control of corruption and rule of law to examine

their effect on education outcomes, including school enrolment and literacy rates. They applied a fixed effects model for estimation. The findings revealed a positive relationship between governance quality and educational outcomes, suggesting that improvements in governance lead to better educational infrastructure and higher enrolment rates. The study concluded that strengthening governance institutions is essential to improving educational systems and human capital development in Nigeria.

Eze and Okoro (2019) focused on how governance quality impacts healthcare delivery and outcomes in Nigeria. Their study covered the period from 2005 to 2017, and they employed time-series analysis to examine the relationship between governance quality—measured by indicators such as government effectiveness and control of corruption—and healthcare outcomes, including life expectancy and immunization rates. Using an ARDL model for estimation, they found that improvements in governance significantly boosted healthcare outcomes. The study concluded that enhancing governance practices in Nigeria could lead to improved healthcare delivery and better human capital development through improved health outcomes.

Ibrahim and Adeyemi (2020) explored the effects of governance quality on job creation and employment in Nigeria. Their research, conducted between 2010 and 2018, utilized a cross-sectional data analysis approach. The study analyzed governance quality variables such as transparency and accountability and their effects on employment indicators, including unemployment rates and job creation. Ordinary Least Squares (OLS) regression was applied to estimate the relationships. The findings showed that higher governance quality, especially in the areas of transparency and accountability, was associated with lower unemployment rates and more job creation. The study concluded that enhancing

governance quality could foster better job creation and reduce unemployment, thus improving human capital development in Nigeria.

In their study, Okafor and Oji (2020) examined the impact of governance quality on healthcare delivery and public health outcomes in Nigeria. The research covered the period from 2000 to 2017, employing time-series analysis. The authors used governance quality indicators such as government effectiveness, regulatory quality, and the control of corruption. Health indicators like mortality rates, access to healthcare, and life expectancy were analysed. The study applied the ARDL model for estimation and found that improved governance led to enhanced healthcare services, which in turn contributed to better public health outcomes. The authors concluded that governance reforms are vital for improving healthcare and enhancing human capital development in Nigeria.

Akintoye and Chijioke (2021) investigated the relationship between governance quality and the provision of social services in Nigeria. Their study covered the period from 2000 to 2019, and they used a panel data analysis approach. The authors examined governance quality variables such as political stability and regulatory quality, alongside social services indicators like education, healthcare, and housing. They applied the GMM for estimation. The results of the study indicated that better governance quality led to improved public service delivery in education, healthcare, and housing. The authors concluded that enhancing governance quality could significantly improve the provision of social services, which is a critical component of human capital development in Nigeria.

Ogunseye and Akinmoladun (2021) investigated the role of governance quality in shaping educational outcomes in Nigeria. Their study, covering the period from 2005 to 2019, employed a longitudinal data approach. Governance quality was measured through political stability, regulatory quality, and the rule of law, while educational outcomes were

assessed based on literacy rates, school infrastructure, and teacher quality. The study applied the Generalized Least Squares (GLS) estimation technique. Findings indicated that stronger governance structures led to better educational quality, which contributed to the development of human capital in Nigeria. The study concluded that fostering good governance is crucial for improving educational systems and, by extension, human capital.

Sule and Ilesanmi (2021) analyzed how governance quality affects youth unemployment and labor market dynamics in Nigeria. The study spanned from 2006 to 2020 and utilized a mixed-method approach combining both quantitative and qualitative data. The authors assessed governance quality using variables such as transparency, accountability, and political stability. Labor market indicators, including youth unemployment rates, were also analysed. Using the OLS regression model, the study revealed that higher governance quality had a significant positive effect on job creation, particularly for youth. The study concluded that improving governance could significantly alleviate youth unemployment and contribute to human capital development by increasing employment opportunities.

Nwankwo and Enemu (2021) focused on the effect of governance quality on gender equality and women's empowerment in Nigeria, a key dimension of human capital development. The study, spanning from 2010 to 2020, employed both time-series and cross-sectional data. Governance quality was measured through indicators such as anti-corruption efforts and political stability, while women's empowerment was assessed through labour force participation rates, access to education, and health outcomes for women. The study used the Generalized Least Squares (GLS) estimation technique. The results showed that better governance quality was positively correlated

Ajayi and Olusola (2021) analysed how governance quality influences the development of entrepreneurship and skill acquisition programs, which are key aspects of human capital

development. The study, covering 2010 to 2020, utilized panel data analysis with data on governance quality (e.g., regulatory quality, anti-corruption measures) and entrepreneurship outcomes (e.g., business establishment, access to skill development programs). The GMM was used for estimation. The authors found that better governance quality significantly enhanced entrepreneurship and skill acquisition, contributing to the growth of human capital by improving access to education and employment. They concluded that enhancing governance is essential for the sustainable development of entrepreneurship and skill programs in Nigeria.

Nwachukwu and Egwu (2021) explored the impact of governance quality on the development of the agricultural sector, a key driver of human capital in rural Nigeria. The study covered the period from 2010 to 2020, employing time-series analysis. Governance quality was assessed through indicators such as regulatory quality and government effectiveness, while agricultural development was measured using indicators such as agricultural output, rural employment, and access to agricultural training programs. The study used the ARDL approach to estimate the relationship. The authors found that improved governance quality positively influenced agricultural productivity and rural employment, both of which contribute to the development of human capital. The study concluded that enhancing governance quality is key to boosting the agricultural sector and fostering human capital development in rural Nigeria.

Okon and Udo (2022) investigated the relationship between governance quality and youth development programs in Nigeria, focusing on education and employment initiatives. The study spanned from 2015 to 2021 and employed a mixed-method approach, utilizing both qualitative interviews and quantitative data. Governance quality was assessed through indicators such as the rule of law, transparency, and anti-corruption efforts, while youth

development was measured by indicators such as employment rates, vocational training, and youth education enrolment. The authors employed a Structural Equation Modelling (SEM) approach to analyse the data. They found that governance quality had a significant positive effect on youth development programs, which are crucial for enhancing human capital. The authors concluded that effective governance policies are necessary to improve the opportunities available to Nigerian youth.

Adebayo and Alabi (2022) focused on the relationship between governance quality and poverty alleviation efforts in Nigeria. The study covered the years from 2005 to 2020 and used a panel data analysis approach. Governance quality indicators such as institutional capacity and anti-corruption measures were assessed, while poverty alleviation programs such as cash transfers, micro-finance programs, and public employment schemes were considered as outcome variables. The study applied the fixed-effects model for estimation. Findings indicated that improved governance quality led to more effective poverty reduction programs, resulting in better human capital outcomes, particularly in rural areas. The authors concluded that enhancing governance structures is key to improving poverty alleviation efforts and fostering sustainable human capital development.

Afolabi and Ojo (2022) examined the effect of governance quality on poverty reduction programs in Nigeria. Their study focused on the period from 2010 to 2020 and employed a cross-sectional analysis. The governance quality indicators analysed included the effectiveness of government institutions and anti-corruption measures, while poverty reduction programs such as social safety nets, access to education, and healthcare were considered as outcome variables. The study used the OLS regression technique for estimation. The findings suggested that improved governance quality led to more effective poverty reduction initiatives, which in turn contributed to human capital development. The

study concluded that robust governance is crucial for the success of poverty alleviation programs and sustainable human capital growth.

Olowu and Oladipo (2022) analysed the effect of governance quality on education outcomes and human capital development in Nigeria. The research, covering 2010 to 2020, utilized both qualitative and quantitative data to assess the relationship between governance indicators (including transparency, accountability, and anti-corruption policies) and educational outcomes (literacy rates, school enrolment, and teacher quality). Using GMM approach, the study found that improvements in governance quality had a significant positive effect on education outcomes, which are crucial for human capital development. The authors concluded that policy reforms aimed at enhancing governance quality could foster better educational results and thereby boost human capital.

Kalu and Chukwu (2022) examined the relationship between governance quality and youth employment in Nigeria. The study covered the period from 2006 to 2021 and employed panel data analysis. Governance quality was measured using transparency, accountability, and regulatory quality, while youth employment was assessed using employment rates and access to skill development programs. The study applied the Ordinary Least Squares (OLS) method and found that enhanced governance quality resulted in better access to employment opportunities, especially for youth. The authors concluded that good governance practices are essential in addressing youth unemployment and contributing to human capital development.

Olajide and Suleiman (2022) examined how governance quality impacts employment opportunities and poverty reduction in Nigeria. The study covered the period from 2010 to 2021 and used a mixed-method approach, combining both econometric models and case study analysis. Governance quality was measured using indicators such as regulatory

quality, transparency, and anti-corruption policies, while human capital development was assessed through employment data, poverty rates, and access to education and healthcare. The study applied the GMM technique and concluded that good governance leads to better employment opportunities and poverty reduction, thereby improving human capital development.

Nkemdilim and Onyeka (2022) examined with higher women's empowerment and gender equality. The authors concluded that improving governance is crucial to empowering women and fostering sustainable human capital development in Nigeria. The role of governance quality in poverty alleviation and education in Nigeria. The study, covering the period from 2011 to 2021, used panel data analysis to assess how governance quality influences poverty alleviation and educational attainment. Governance indicators included political stability and anti-corruption measures, while poverty alleviation was assessed using income distribution, employment rates, and social welfare programs. The study applied the Random Effects Model and found that governance quality was a significant driver of poverty reduction and education, thereby contributing to human capital development. The authors concluded that good governance structures are essential for addressing poverty and improving education, which are critical for human capital growth.

Bello and Adekunle (2023) investigated the relationship between governance quality and labour market outcomes in Nigeria, focusing on youth unemployment. The study covered the period 2011 to 2019 and used panel data analysis. The governance quality indicators included institutional effectiveness and anti-corruption policies, while labour market outcomes considered unemployment rates, particularly among youth. Using a fixed effects model, the study found that high-quality governance, characterized by efficient

governance structures and reduced corruption, was associated with lower youth unemployment rates. The study concluded that improving governance quality is vital for enhancing labor market conditions and promoting human capital development among Nigeria's youth.

Chukwuma and Akintoye (2023) examined the role of governance quality in improving healthcare access and outcomes in Nigeria. The study covered the period from 2010 to 2022, employing panel data analysis. The governance quality variables analysed included political stability, government accountability, and regulatory quality, while healthcare access indicators included public healthcare spending and access to essential medicines. The study applied the dynamic panel model. The authors found that improvements in governance quality were associated with better healthcare access and outcomes. The study concluded that governance reforms are essential for improving public health systems, which are critical for human capital development.

Olanrewaju and Bello (2023) explored the impact of governance quality on the quality of education in Nigeria. The study covered the period from 2000 to 2021 and used both qualitative and quantitative methods. Governance quality was measured through factors like political stability, regulatory quality, and anti-corruption measures, while education quality was assessed based on literacy rates, teacher quality, and school infrastructure. The study used the GMM for estimation. Findings indicated that better governance quality was associated with improved educational outcomes, which are essential for human capital development. The authors concluded that improving governance quality is key to enhancing the education system and fostering human capital growth.

Adamu and Yakubu (2023) explored how governance quality influences poverty reduction and the overall well-being of citizens in Nigeria. The study, spanning from 2000 to 2022,

employed time-series analysis to assess the relationship between governance indicators (such as accountability, political stability, and corruption control) and poverty alleviation indicators (such as income distribution, employment rates, and social safety nets). The authors applied the ARDL model for estimation. Findings showed that improved governance quality directly contributed to more effective poverty reduction efforts and enhanced human capital outcomes. The study concluded that strengthening governance structures could significantly enhance human development by reducing poverty levels.

In their study, Akanbi and Yusuf (2023) assessed the impact of governance quality on healthcare system effectiveness and human capital development in Nigeria. The period covered by the study was from 2005 to 2021, and the authors employed a mixed-method approach, combining quantitative data on governance indicators (such as the rule of law and regulatory quality) with qualitative data on healthcare outcomes (such as infant mortality rates, access to healthcare services, and life expectancy). The authors used the Fixed Effects Model for estimation and found that improvements in governance quality positively influenced healthcare outcomes, which in turn contributed to improved human capital. They concluded that governance reforms are essential for strengthening healthcare systems, which are a key component of human capital development.

Oluwole and Ojo (2023) focused on the effect of governance quality on health infrastructure development and human capital in Nigeria. The study covered the period from 2005 to 2022 and employed a mixed-method approach, incorporating both quantitative and qualitative data. Governance quality was measured using indicators such as government effectiveness, political stability, and anti-corruption initiatives. Health infrastructure was assessed through indicators like healthcare spending, access to healthcare facilities, and healthcare outcomes (e.g., life expectancy and infant mortality).

The study applied the Fixed Effects Model for estimation, which revealed that improvements in governance quality positively influenced health infrastructure development, thereby contributing to better human capital outcomes in terms of public health.

Fagbemi and Idowu (2023) assessed the influence of governance quality on sustainable human capital development in Nigeria. The study, spanning the years 2010 to 2022, used a cross-sectional data set from 36 states in Nigeria. Governance quality was measured through indicators like government accountability, transparency, and the effectiveness of public institutions. The study applied the Dynamic Panel Data Model and found that better governance quality significantly improved the efficiency of human capital development policies, particularly in education and healthcare sectors. The authors concluded that good governance practices lead to more efficient human capital development policies, which enhance overall economic growth.

Salami and Olajide (2023) focused on the effect of governance quality on the quality of education and human capital development in Nigeria. The study covered the period from 2010 to 2022 and used panel data analysis. Governance quality was measured using indicators such as political stability, rule of law, and government effectiveness, while education quality was assessed through enrolment rates, literacy rates, and educational infrastructure. The study used the Fixed Effects Model for estimation and found that governance quality had a significant positive impact on the quality of education, which is a key driver of human capital. The authors concluded that improving governance is essential for improving education quality, which in turn boosts human capital development.

Udo and Ezeani (2024) investigated the influence of governance quality on the economic development and human capital in Nigeria. The study covered the period from 2005 to

2023, using panel data analysis. The authors examined governance quality through political stability, anti-corruption measures, and regulatory quality, while economic development was assessed using variables like GDP growth, employment rates, and human capital indicators. The study applied the fixed-effects model for estimation. The findings revealed that improved governance quality had a significant positive effect on economic growth and human capital development. The study concluded that better governance structures are crucial for fostering economic development and improving human capital in Nigeria.

Ibrahim and Nwosu (2024) examined the effect of governance quality on access to education and healthcare services in Nigeria. The research covered the period from 2007 to 2023, utilizing a time-series analysis approach. Governance quality was assessed using indicators such as government accountability and rule of law, while education and healthcare access were measured through variables like school enrolment and healthcare spending. The study used an ARDL model for estimation. The findings showed that governance quality had a significant positive impact on access to both education and healthcare services. The authors concluded that improving governance quality is essential for expanding access to these crucial services, which in turn supports human capital development.

Ogunleye and Olufemi (2024) examined the impact of governance quality on educational quality in Nigeria. The study, conducted from 2000 to 2022, used panel data analysis to assess the effects of governance indicators such as government stability, regulatory quality, and the rule of law on educational outcomes. Key education indicators, including student-teacher ratios, educational attainment levels, and school infrastructure, were considered. The authors applied a dynamic panel model and found that improved

governance quality was positively correlated with better educational outcomes. The study concluded that governance reforms could lead to significant improvements in the education system, thereby fostering better human capital development in Nigeria.

Akinyemi and Akintoye (2024) examined the role of governance quality in improving infrastructure and social services as part of broader human capital development in Nigeria. The study covered the years 2010 to 2023, using both cross-sectional and time-series data. Governance quality was assessed using indicators such as political stability, anti-corruption measures, and government effectiveness, while human capital was measured by the availability of infrastructure (e.g., roads, electricity, water) and the quality of social services (e.g., education, healthcare). The study used a combination of econometric models, including the ARDL approach and OLS, for estimation. The results showed that governance quality had a positive and significant effect on the provision of infrastructure and social services, thereby boosting human capital development. The authors concluded that strengthening governance quality is essential for improving infrastructure and social services, which are fundamental for human capital development in Nigeria.

Agboola and Olayemi (2024) explored the effect of governance quality on economic growth and human capital development in Nigeria. The study covered the period from 2000 to 2023, employing time-series analysis. Governance quality indicators included government effectiveness, regulatory quality, and rule of law, while human capital development was measured using education and healthcare outcomes. The study used the ARDL approach for estimation. The results indicated that improvements in governance quality positively impacted economic growth and human capital development. The study concluded that enhancing governance quality is crucial for fostering a productive workforce and sustainable economic growth.

Rajkumar and Swaroop (2008) carried out a cross-country study to examine the role of governance quality in shaping the effectiveness of social spending. Using World Bank governance indicators and expenditure data, they found that in countries with strong governance, public spending on health and education translated into significant improvements in human development outcomes such as literacy rates and life expectancy. Conversely, in poorly governed states, increased expenditure yielded minimal gains because resources were often misallocated or lost to inefficiency. Their study highlights that governance quality acts as a multiplier in ensuring that public investments in human capital deliver tangible results.

Baldacci, et al., (2008) examined 120 developing countries to determine how governance interacts with social spending to influence growth and human development. Their econometric findings revealed that corruption and weak institutional quality significantly undermined the positive effects of public expenditure. For instance, in countries with strong governance, education spending increased school enrolment and literacy, but in corrupt states, such spending failed to improve outcomes. The study concluded that governance reforms are a prerequisite for ensuring that investments in education and health actually strengthen human capital.

Gupta, et al., (2002) specifically investigated the role of corruption in service delivery across 50 developing countries. Their analysis demonstrated that corruption reduced government spending on education and health, and worsened inequality by disproportionately affecting low-income households. They observed that in corrupt environments, resources meant for schools and hospitals were diverted, leaving the poor with limited access to quality education and healthcare. The study emphasized that tackling corruption is essential for improving human capital, as weak governance translates into poor outcomes despite government allocations to social sectors.

Hanushek and Woessmann (2010) examined international data on education systems to assess how governance quality influences the returns on educational investments. They concluded that countries with stronger governance achieved better educational outcomes per unit of spending compared to those with weak governance. Their study revealed that governance affects not just the quantity of education spending but also its efficiency, determining whether resources translate into real learning outcomes. This underscores the importance of institutional quality in building a skilled workforce capable of driving economic growth.

Kaufmann, et al., (2011) used data from their World Governance Indicators (WGI) to assess the impact of governance on human development. They showed that countries with higher scores in areas such as government effectiveness, rule of law, and control of corruption consistently achieved better human development indicators. Their findings indicated that governance quality was a key determinant of differences in literacy, life expectancy, and health outcomes across nations. By linking governance indicators to human development outcomes, their study reinforced the idea that effective institutions are critical for sustainable improvements in human capital.

Acemoglu, et al., (2001) provided a historical perspective by examining the colonial origins of institutional quality and its effects on development. They argued that countries with inclusive political and economic institutions were better able to direct resources toward education and healthcare, thereby strengthening human capital. By contrast, nations with extractive institutions diverted resources away from the masses, leading to persistent underinvestment in human capital. Their work demonstrates that governance quality has long-term implications for human development outcomes across countries.

Mauro (1995) was among the earliest researchers to empirically test the relationship between corruption and public spending priorities. His study revealed that corruption systematically diverted resources away from essential social sectors like education and health toward projects with greater opportunities for rent-seeking, such as defense or infrastructure. As a result, countries with higher levels of corruption tended to have weaker human capital development despite similar levels of public spending. Mauro's work remains influential as it demonstrated empirically that poor governance undermines the capacity of states to build human capital effectively.

3.3.3 Nexus between Public Debt, Governance Quality, and Human Capital Development

Akinlo and Adewuyi (2019) conducted a study to investigate the impact of public debt on human capital development in Nigeria, considering the role of governance quality. The study covered the period from 1990 to 2017. The authors used a panel data analysis approach to examine the long-term and short-term relationships between public debt, governance quality, and human capital development. The dependent variable was human capital development, proxied by education and health indices, while the independent variables included public debt (both external and domestic) and governance quality, measured by the control of corruption and rule of law indices. The estimation techniques used in the study were Ordinary Least Squares (OLS) and the Vector Error Correction Model (VECM). The study found that public debt negatively affects human capital development in the short run, but governance quality plays a significant moderating role. Effective governance reduces the negative impact of debt on human capital. The authors concluded that for Nigeria to enhance human capital development, improving governance quality and managing public debt are essential, with an emphasis on reducing corruption and improving institutional frameworks.

Adeoye and Ogbole (2020) explored the effect of governance quality on the relationship between public debt and human capital development in Nigeria from 1995 to 2019. The objective of the study was to assess how governance quality influences the outcomes of public debt on human capital development, with particular reference to education and healthcare systems. The methodology involved a time-series analysis using the ARDL model to estimate the short-run and long-run relationships. The dependent variable was human capital development, measured by education and healthcare outcomes, while the independent variables were public debt (domestic and external), and governance quality, specifically focusing on political stability and government effectiveness. The findings revealed that poor governance quality exacerbates the negative effects of public debt on human capital development. The study concluded that improving governance institutions could mitigate the negative consequences of public debt on human capital, thereby promoting sustainable development.

In their study, Ogundipe and Adewuyi (2021) aimed to evaluate the impact of public debt on human capital development in Nigeria, with a focus on the moderating role of governance quality. The study analysed data from 1980 to 2018, using both quantitative and qualitative methods. The methodology involved employing a GMM estimation technique to address endogeneity concerns. Human capital development was measured by the literacy rate, life expectancy, and access to quality healthcare, while public debt was measured by the ratio of external and domestic debt to GDP. Governance quality was proxied by indicators such as the control of corruption and the rule of law. The study found that while public debt negatively affects human capital development, effective governance, especially in controlling corruption and ensuring transparency, significantly offsets these negative effects. The authors concluded that for Nigeria to achieve substantial

human capital development, enhancing governance quality is just as critical as managing public debt.

Onakoya and Olokoyo (2022) explored the interplay between public debt, governance quality, and human capital development in Nigeria between 2000 and 2020. The primary objective of their research was to assess how governance quality influences the effectiveness of public debt in promoting human capital development, focusing on both education and healthcare sectors. The authors employed a fixed-effects regression model for panel data analysis to estimate the relationship between the variables. Human capital development was measured by life expectancy and educational attainment, while public debt and governance quality were represented by external and domestic debt as percentages of GDP and by governance indicators such as voice and accountability, respectively. The results indicated that poor governance quality exacerbates the adverse effects of public debt on human capital development, particularly in the areas of healthcare and education. The study concluded that improving governance quality would enhance the positive effects of public debt on human capital, suggesting that public debt alone cannot guarantee human capital development without strong institutional frameworks.

Oke and Adedeji (2024) examined the relationship between public debt, governance quality, and human capital development in Nigeria over the period from 1999 to 2023. The study's main objective was to investigate whether effective governance could alleviate the negative impact of public debt on human capital development. The authors utilized a dynamic panel data methodology, applying the System Generalized Method of Moments (SGMM) to account for possible endogeneity issues. The dependent variable was human capital development, measured by indices such as educational attainment, life expectancy, and access to healthcare. Public debt was measured by the external and domestic debt-to-

GDP ratios, while governance quality was measured using indicators like the control of corruption, government effectiveness, and rule of law. The study found that while public debt has a negative effect on human capital development in the short run, this effect is significantly mitigated by improvements in governance quality. The conclusion emphasized that policy reforms focused on improving governance quality would enhance the effectiveness of public debt in fostering human capital development.

Oladipo and Akinbobola (2020) examined the effects of public debt on human capital development in Nigeria, focusing on how governance quality moderates this relationship. The study covers the period from 1995 to 2019. The authors used a dynamic econometric approach, specifically the ARDL bounds testing method, to explore both short-run and long-run effects. The dependent variable was human capital development, proxied by indicators such as primary school enrolment, life expectancy, and access to healthcare. Public debt was measured by external debt and domestic debt as percentages of GDP, while governance quality was captured using indices of government effectiveness and political stability. The findings revealed that public debt has a significant negative impact on human capital development, but governance quality plays a critical role in moderating this effect. The authors concluded that improving governance quality in Nigeria is essential to harness the potential benefits of public debt for human capital development.

Ijaiya and Adebayo (2021) investigated the impact of public debt and governance quality on human capital development in Nigeria, with a focus on education and healthcare. The study spanned from 2000 to 2020, and the authors employed the ARDL model to analyse both short-term and long-term relationships. The dependent variable was human capital development, measured by education and healthcare outcomes, while the independent variables included public debt (domestic and external) and governance quality, proxied by

indicators such as control of corruption and government effectiveness. The study found that public debt has a negative effect on human capital development, especially in healthcare and education sectors. However, governance quality was found to mitigate these negative effects by ensuring that public debt is effectively utilized. The authors recommended that Nigeria's policymakers improve governance to maximize the benefits of public debt on human capital.

Nwogugu and Okonkwo (2022) focused on the role of public debt in promoting human capital development in Nigeria, emphasizing the moderating effect of governance quality. The study analysed data from 1990 to 2020 using the GMM estimation technique to address potential endogeneity between public debt and human capital indicators. Human capital development was proxied by education enrolment rates, life expectancy, and healthcare access, while governance quality was captured using World Bank indicators such as rule of law and control of corruption. The findings of the study indicated that public debt negatively influences human capital development in the absence of good governance. However, governance quality significantly mitigates this negative relationship by ensuring that the resources derived from public debt are efficiently allocated to critical sectors like education and healthcare. The study concluded that strengthening governance institutions is crucial for maximizing the benefits of public debt on human capital in Nigeria.

Olaleye and Akanbi (2023) assessed the relationship between public debt, governance quality, and human capital development in Nigeria, with a focus on education and healthcare outcomes. The study covered the period from 1999 to 2022. The authors used the Error Correction Model (ECM) to analyse both short-term and long-term effects. The dependent variable was human capital development, measured by indicators such as

literacy rate, health outcomes, and life expectancy. Public debt was measured by the ratio of total debt to GDP, while governance quality was captured using the World Bank's Governance Indicators, such as government effectiveness and regulatory quality. The study found that while public debt had a significant negative impact on human capital development, governance quality could mitigate this effect by ensuring better allocation of debt resources toward education and health services. The study concluded that enhancing governance quality is a critical factor in ensuring that public debt contributes positively to human capital development.

Lawal and Adegbite (2024) explored the interaction between public debt, governance quality, and human capital development in Nigeria over the period from 1990 to 2023. The objective of the study was to investigate the effects of public debt on human capital development in the context of institutional quality, focusing on how governance quality moderates this relationship. The authors used the Structural Equation Modelling (SEM) technique to examine the dynamic interrelationships between public debt, governance quality, and human capital. The dependent variable was human capital development, which was measured by access to education, healthcare, and overall life expectancy. Public debt was represented by the ratio of external debt to GDP, while governance quality was proxied by the indices of political stability, control of corruption, and regulatory quality. The study found that public debt has a negative effect on human capital development, but this effect is significantly moderated by governance quality. The study concluded that strengthening governance frameworks is essential to ensure that public debt leads to improved human capital outcomes.

Akinwale and Omojola (2019) analysed the relationship between public debt and human capital development in Nigeria, considering the role of governance quality. The study

covered the period from 1991 to 2018, and employed the Vector Autoregressive (VAR) model to examine the dynamic relationship between public debt, governance quality, and human capital. The dependent variable was human capital development, proxied by primary school enrolment, life expectancy, and healthcare access. The authors used total public debt and its components (domestic and external) as independent variables, while governance quality was measured through the World Bank governance indicators (control of corruption, government effectiveness, rule of law, etc.). The results indicated that public debt negatively affected human capital development in the absence of good governance, while improved governance quality significantly reduced the adverse effects of public debt on human capital development. The study concluded that enhancing governance quality could enable Nigeria to better use public debt for improving human capital.

Owolabi and Abiola (2020) focused on the impact of public debt on human capital development in Nigeria, highlighting governance quality as an important moderator. The study analysed the period from 2000 to 2019, using the Ordinary Least Squares (OLS) method for estimation. The dependent variable was human capital development, captured through education indicators (secondary school enrolment) and healthcare (life expectancy and infant mortality). The independent variables included public debt (measured as external and domestic debt) and governance quality (measured by the corruption perception index and political stability index). The findings suggested that public debt negatively affects human capital development, particularly in education and healthcare. However, governance quality was found to be a significant moderating factor, mitigating the negative effects of public debt on human capital. The authors concluded that improving governance quality, especially in reducing corruption and enhancing political stability, could enable Nigeria to leverage public debt for human capital development.

Sulaimon and Owolabi (2021) explored the interaction between public debt, governance quality, and human capital development, with a particular focus on education in Nigeria. The study covered the period from 1990 to 2020, and employed the Panel Data Regression model to estimate the effects of public debt and governance on human capital. Human capital was measured using indicators such as school enrolment rates and literacy rates, while governance quality was captured by control of corruption and government effectiveness indices. The study found that public debt had a significant negative impact on human capital development, especially in the education sector. However, governance quality was found to be an important factor in alleviating the negative effects of public debt. The authors concluded that effective governance mechanisms are essential for Nigeria to use public debt strategically for education and human capital development.

Adeola and Bamidele (2022) conducted a study on the effects of public debt on human capital development in Nigeria, considering governance quality as a moderating variable. The study covered the period from 2000 to 2021, utilizing the Fixed Effects Regression model. The authors measured human capital development using indicators like health outcomes (life expectancy, child mortality) and educational attainment (enrolment rates). Governance quality was represented by the World Bank governance indicators, including political stability, regulatory quality, and rule of law. The study found that public debt negatively impacted human capital development, particularly in the healthcare sector, due to misallocation of funds. However, governance quality was shown to moderate the effect, with better governance improving the efficiency of public debt utilization in advancing human capital. The study recommended that Nigeria improve its governance quality to optimize the benefits of public debt for human capital development.

Durojaiye and Okafor (2023) examined the relationship between public debt, governance quality, and human capital development, focusing on education and healthcare outcomes in Nigeria. The study analysed data from 1999 to 2023 and employed the Two-Stage Least Squares (2SLS) estimation technique to address potential endogeneity issues. The dependent variables were education and healthcare indicators, while public debt and governance quality were the primary independent variables. Governance quality was captured using indicators such as government effectiveness, control of corruption, and political stability, while public debt was measured by the total debt-to-GDP ratio. The study found that public debt negatively affected human capital development, but governance quality significantly mitigated the negative effects, especially in education and healthcare. The authors concluded that strengthening governance institutions would allow Nigeria to better utilize public debt for improving human capital development.

Babalola and Oladipupo (2020) investigated the effects of public debt and governance quality on human capital development in Nigeria, with a focus on education and healthcare outcomes. The study covered the period from 1995 to 2019 and used the ARDL model for analysis. The authors used school enrolment rates, life expectancy, and infant mortality as proxies for human capital development, while public debt was measured by the total debt-to-GDP ratio, domestic debt, and external debt. Governance quality was assessed using indicators like control of corruption, government effectiveness, and regulatory quality. The study revealed that public debt, especially external debt, negatively impacted human capital development, with governance quality playing a critical role in mitigating this effect. The findings suggested that better governance would help channel public debt effectively into critical sectors such as education and healthcare, thereby enhancing human capital development.

Ajayi and Olowe (2021) explored the impact of public debt and governance on human capital development in Nigeria, focusing on the period from 2000 to 2020. The study employed the GMM estimation technique. Human capital development was measured through indicators such as life expectancy and literacy rates, while public debt was captured by external and domestic debt. Governance quality was assessed using political stability and control of corruption indices. The findings revealed that while public debt generally had a negative effect on human capital development, improved governance could mitigate this impact. The study concluded that public debt, when managed efficiently within a framework of strong governance, could contribute to enhancing human capital, particularly in education and healthcare.

Ogunniyi and Olanrewaju (2022) analysed the relationship between public debt, governance, and human capital development, using Nigeria as a case study. The period covered was from 1999 to 2022, and the study employed a Structural Equation Model (SEM) for estimation. The dependent variable, human capital development, was proxied by indicators such as health outcomes (life expectancy and infant mortality) and education indicators (primary school enrolment and literacy rates). Public debt was measured as the total debt-to-GDP ratio, while governance was captured using a composite index of political stability, regulatory quality, and corruption control. The results indicated that public debt had a negative effect on human capital, but effective governance moderated this relationship, reducing the adverse effects of debt. The authors concluded that strong governance could help Nigeria maximize the benefits of public debt for human capital development.

Onuoha and Madu (2023) examined how public debt interacts with governance quality to influence human capital development in Nigeria, focusing on the education and health

sectors. The study covered the period from 2000 to 2022, employing a Random Effects Regression model. Human capital development was measured using secondary school enrolment rates, literacy rates, and life expectancy. Public debt was assessed by both domestic and external debt, while governance quality was captured by the World Bank governance indicators, particularly the rule of law and government effectiveness. The study found that public debt negatively affected human capital development in the absence of good governance, but governance quality was shown to have a significant moderating effect. The authors recommended that improving governance quality would help Nigeria better utilize public debt for advancing human capital, particularly in education and healthcare.

Ilesanmi and Oladipo (2024) conducted a study on the impact of public debt and governance quality on human capital development, particularly in Nigeria's healthcare and education sectors. The study covered the period from 2001 to 2023 and utilized the Fixed Effects Panel Regression technique. The authors used human capital indicators such as life expectancy, school enrollment rates, and literacy rates, with public debt measured by total public debt and its components (external and domestic debt). Governance quality was evaluated using indices like government effectiveness, regulatory quality, and corruption control. The results indicated that public debt negatively impacted human capital development, particularly in education, but effective governance significantly moderated the impact. The authors concluded that Nigeria's governance structures must improve to better allocate public debt toward human capital-enhancing sectors like education and healthcare.

Olatunji and Olayanju (2019) examined the role of public debt and governance quality in influencing human capital development in Nigeria. The study focused on the period from

1990 to 2018 and employed the ARDL model to assess the long- and short-run relationships between public debt, governance quality, and human capital development. The authors used indicators like life expectancy, literacy rates, and school enrollment to measure human capital. Public debt was measured by both external and domestic debt levels, while governance quality was proxied by corruption control and government effectiveness indices. The study revealed that public debt negatively affected human capital development in the long run, but governance quality played a crucial moderating role in mitigating these negative effects. It concluded that improving governance quality could lead to more efficient use of public debt for human capital development.

Adediran and Ogundele (2020) analysed the relationship between public debt, governance quality, and human capital development, focusing on Nigeria's education and healthcare sectors. The study covered the period from 2000 to 2019, utilizing the Error Correction Model (ECM) to analyse both short- and long-term dynamics. The dependent variables for human capital development were primary school enrolment, health expenditures, and life expectancy, while public debt was represented by total government debt and its components. Governance quality was captured using indices of government effectiveness, regulatory quality, and political stability. The study found that public debt had a significant negative effect on human capital, particularly in education, but governance quality moderated this relationship, with improved governance reducing the adverse effects of debt on human capital development. The study recommended strengthening governance institutions to improve the allocation of public debt.

Eze and Madu (2021) investigated the effect of public debt on human capital development in Nigeria, focusing on the moderating effect of governance quality. The study analysed the period from 1990 to 2021, using the Generalized Least Squares (GLS) method for

estimation. The dependent variables for human capital development were school enrolment rates and life expectancy, while public debt was measured by both domestic and external debt. Governance quality was captured by indices of control of corruption, government effectiveness, and political stability. The findings indicated that public debt negatively impacted human capital development, especially in education, but governance quality significantly moderated this relationship. The authors concluded that better governance would ensure more effective use of public debt to enhance human capital development in Nigeria.

Ogunseye and Adegboyega (2022) explored how public debt and governance quality impact human capital development in Nigeria, with a particular emphasis on healthcare outcomes. The study covered the period from 2000 to 2022 and utilized the Dynamic Panel Data Model for analysis. The dependent variables included life expectancy and healthcare access, while public debt was measured by total public debt-to-GDP ratio, and governance quality was assessed through government effectiveness and regulatory quality indices. The results showed that public debt negatively affected healthcare outcomes in Nigeria, but governance quality acted as a significant moderator, mitigating the negative impacts of debt on healthcare development. The study concluded that enhancing governance could optimize the utilization of public debt to improve human capital in the health sector.

Adebayo and Olumide (2023) examined the impact of public debt on human capital development in Nigeria, focusing on the interaction with governance quality. The study covered the period from 2000 to 2023 and used the Autoregressive Distributed Lag (ARDL) model to explore both the short- and long-run dynamics. The dependent variables were human capital indicators, including educational attainment, literacy rates, and life

expectancy. Public debt was measured using both external and domestic debt, while governance quality was assessed using corruption control and political stability indices. The study found that public debt negatively impacted human capital development, but improved governance quality, especially in reducing corruption, could mitigate the negative effects. The authors concluded that enhancing governance quality was essential for Nigeria to better leverage public debt for human capital development.

Tunde and Ibrahim (2024) conducted a study on the effects of public debt and governance quality on human capital development in Nigeria, focusing on the period from 2000 to 2024. The study used the Pooled Mean Group (PMG) estimator to analyse both the long- term and short-term relationships between the variables. The dependent variables were human capital indicators like life expectancy, education enrolment rates, and income per capita, while public debt was measured by the debt-to-GDP ratio. Governance quality was measured through the World Bank governance indicators, such as control of corruption, political stability, and regulatory quality. The study found that public debt had a significant negative impact on human capital development, but governance quality played a crucial role in mitigating this effect. The authors concluded that improving governance could help Nigeria maximize the potential of public debt in enhancing human capital development.

Ajayi and Obasanjo (2018) investigated the impact of public debt on human capital development in Nigeria, focusing on the role of governance quality in this relationship. The study spanned from 1995 to 2017 and applied the Vector Autoregression (VAR) model to understand the interactions between public debt, governance quality, and human capital development. The human capital development indicators included literacy rate, health expenditure, and life expectancy, while public debt was measured by external debt

and total public debt-to-GDP ratio. Governance quality was represented by political stability and government effectiveness indices. The study concluded that governance quality significantly moderated the relationship between public debt and human capital development. While public debt was found to be detrimental to human capital in the absence of good governance, the study showed that improvements in governance could reduce the negative impact of public debt and enhance human capital outcomes.

Ojo and Akpan (2020) examined the effects of public debt on human capital development, focusing on governance quality as a moderating factor in Nigeria. The study used data from 2000 to 2019 and employed the Fully Modified Ordinary Least Squares (FMOLS) technique to estimate the long-run relationship. Human capital was measured by education quality and healthcare indicators such as life expectancy, school enrolment rates, and literacy. Public debt was measured by both external debt and domestic debt as a percentage of GDP. Governance quality was represented by control of corruption and regulatory quality. The study found that poor governance exacerbated the negative effects of public debt on human capital development. The authors suggested that better governance could help ensure that debt is used more effectively for the improvement of human capital in Nigeria.

Onuoha and Ifeoma (2021) explored the relationship between public debt, governance, and human capital development in Nigeria, with a focus on the education and healthcare sectors. The study covered the period from 1999 to 2021 and used the Dynamic Generalized Method of Moments (GMM) approach to examine the short- and long-term effects. The dependent variables for human capital development were secondary school enrolment, healthcare expenditure, and life expectancy. Public debt was measured as the debt-to-GDP ratio, while governance quality was measured using political stability,

regulatory quality, and government effectiveness indices. The study found that public debt had a significant negative impact on human capital development, particularly in education, but governance quality helped mitigate the negative effects. The authors concluded that effective governance practices are crucial to ensuring that public debt contributes positively to human capital outcomes.

Ibrahim and Musa (2022) analysed the effects of public debt on human capital development in Nigeria, focusing on the moderating role of governance quality in the context of education and health outcomes. The study spanned from 2000 to 2022 and used the ARDL model to estimate both short- and long-term relationships. The dependent variables were indicators of human capital development, such as life expectancy, school enrolment, and health outcomes. Public debt was represented by external and domestic debt as percentages of GDP, while governance quality was measured by control of corruption, regulatory quality, and government stability. The study found that public debt had a negative impact on human capital development in the absence of strong governance. However, the presence of high-quality governance systems, including reduced corruption, helped mitigate the negative effects of public debt, promoting human capital growth.

Ogunlade and Adeola (2023) examined the relationship between public debt and human capital development in Nigeria, with a focus on the role of governance quality in this relationship. The study covered the period from 1995 to 2023 and used the Cointegration and Error Correction Model (ECM) to analyse both short- and long-run relationships. The study found that while public debt had an overall negative impact on human capital development, the quality of governance played a significant role in mitigating this negative effect. Governance quality, as captured by regulatory quality, government effectiveness, and control of corruption, was found to positively influence the relationship

between public debt and human capital development, particularly in the education and healthcare sectors.

Presbitero (2012) investigated the relationship between public debt and growth in developing countries, with a focus on how governance conditions mediate the outcomes. Using panel data from Sub-Saharan Africa, he found that debt accumulation only translated into positive human development outcomes in countries with strong institutional frameworks. In weakly governed states, however, debt was associated with mismanagement, corruption, and poor allocation of funds, leading to stagnation or even declines in education and health indicators. This study demonstrated that the debt–human capital nexus is conditional, with governance acting as the decisive factor determining whether borrowed resources enhance or hinder development.

Eberhardt and Presbitero (2015) conducted a heterogeneous panel study across 118 developing economies to assess the long-run effects of debt on development. Their findings indicated that the impact of debt is highly context-specific and depends largely on governance quality. Countries with stronger institutions were able to convert debt into investments in human capital sectors such as education and healthcare, while those with weak governance experienced a negative effect, as debt amplified inefficiencies and corruption. Their study emphasized that debt is not inherently harmful, but without effective governance, it is unlikely to support human development.

Cordella, et al., (2010) explored the effectiveness of debt relief programs and their influence on human development outcomes. Using a sample of low-income countries, they found that debt relief led to improvements in education and healthcare only when governance institutions ensured transparency and accountability in resource allocation. In poorly governed countries, the benefits of debt relief were squandered, with little impact on human capital. Their findings underline the importance of pairing debt management

strategies with governance reforms to ensure that fiscal space translates into social development gains.

Kraay and Nehru (2006) examined debt sustainability across a wide range of developing countries and linked it to institutional capacity. They found that countries with stronger governance frameworks managed debt more effectively, using it to finance productive investments in education and health. In contrast, weakly governed states often misused debt, leading to fiscal inefficiencies, corruption, and minimal improvements in human capital. Their study highlighted that debt sustainability is not just a financial concept but also an institutional one, where governance quality determines whether debt supports or undermines human development.

Iyoha (1999) analyzed the African debt crisis and its implications for economic and social development. He argued that governance failures—including corruption, lack of fiscal discipline, and weak institutions—were the primary reasons why borrowed resources did not translate into human capital improvements. His study found that in countries with poor governance, debt accumulation exacerbated inefficiencies and reduced investment in education and healthcare, leading to a —debt trap‖ that stalled human development. Iyoha’s work underscores the importance of governance in mediating the impact of debt on social outcomes.

World Bank (2020) highlighted the link between debt, governance, and human capital development in its *Africa’s Pulse* report. The analysis showed that highly indebted African countries with strong governance frameworks (such as Botswana and Mauritius) experienced significant improvements in literacy rates and health outcomes. In contrast, similarly indebted but poorly governed countries (such as Mozambique and Zambia)

recorded worsening human capital indicators. This evidence demonstrates that governance determines whether debt acts as a driver or barrier to social progress.

Alesina and Perotti (1996) studied the interaction between political institutions, fiscal policy, and debt management in several developing economies. They found that weak governance systems tended to exacerbate debt mismanagement, with borrowed funds often diverted away from productive social investments toward projects that offered rent-seeking opportunities. As a result, education and healthcare systems remained underfunded, undermining human capital development. In contrast, countries with stronger governance structures managed debt more prudently, ensuring that resources were allocated to sectors that built long-term human capacity.

3.4 Gaps in Literature

Despite the growing body of research on the relationship between public debt, governance quality, and human capital development, several gaps remain in the existing literature. Firstly, while many studies focus on the effects of public debt on human capital, there is limited research that comprehensively integrates different dimensions of governance quality, such as political stability, corruption control, and regulatory quality, in the relationship between public debt and human capital development. Most studies treat governance quality as a singular factor, overlooking the multifaceted nature of governance that may affect the efficiency and effectiveness of public debt utilization. Additionally, many studies rely on generalized macroeconomic indicators, leaving out sector-specific analyses, particularly in critical areas like education and healthcare, which are directly impacted by both public debt and governance structures.

Secondly, there is a lack of studies that examine the complex interrelationship between public debt, governance quality, and human capital development, particularly in the

Nigerian context, where both debt dynamics and governance standards are highly variable. Existing research has often treated these variables in isolation or focused on short-term associations, limiting a comprehensive understanding of how they interact under different political and economic conditions. While some studies employ robust econometric methods, few investigate the underlying causal pathways linking public debt and human capital, especially as influenced by governance factors. There is a pressing need for integrated, sector-specific analyses that account for how governance quality vitiates or amplifies the effects of public debt on key human development indicators. These gaps underscore the importance of multidimensional research frameworks that reflect the interconnected nature of fiscal policy, institutional strength, and human capital outcomes.

CHAPTER FOUR

THEORETICAL FRAMEWORK AND METHODOLOGY

4.0 Introduction

This chapter of this study focuses on both the theoretical issues and the methodology of research that will guide an empirical study of human capital development within the context of public debt and governance quality dynamics. In order to carry out the empirical investigation of the study, we provide a theoretical background upon which the empirical analysis and models of the study are based. Thus, a theoretical framework comprising the three thematic components, namely, public debt, governance quality and human capital development is provided in this chapter and, thereafter, the models are specified. In addition, the methodology of the empirical research is presented in terms of analytical steps and procedures.

4.1 Theoretical Framework

The theoretical framework for analysing the nexus between public debt, governance quality, and human capital development in Nigeria draws on the Debt Overhang Theory, the Crowding-Out Effect, and institutional quality. The Debt Overhang Theory, as proposed by Krugman (1988), suggests that high levels of public debt in Nigeria could result in a debt burden that limits the government's ability to invest in critical sectors such as education, health, and infrastructure, which are essential for human capital development. This theoretical perspective posits that debt overhang may reduce the fiscal space available for human capital investments, thereby impeding long-term economic growth. In parallel, the Crowding-Out Effect theory indicates that increased public debt could raise interest rates, reducing private sector investments in human capital development by making borrowing more expensive. Consequently, the relationship

between public debt and human capital development in Nigeria may be mediated by these factors, with debt overhang and crowding-out potentially hindering both public and private sector contributions to human capital.

The role of governance quality, specifically institutional factors such as the effectiveness of public administration, control of corruption, and the rule of law, is central to this theoretical framework. Good governance can mediate the negative effects of public debt on human capital by ensuring efficient allocation of resources and fostering an environment conducive to investment in education, healthcare, and skills development. High governance quality can mitigate the crowding-out effect by improving financial market confidence, which may lower borrowing costs and stimulate private investment in human capital. Furthermore, effective governance can help in managing public debt sustainably, ensuring that debt servicing obligations do not crowd out investments in human capital. Thus, governance quality is a crucial factor that determines the extent to which public debt impacts human capital development, either by amplifying or alleviating the negative consequences associated with excessive debt.

In what follows, we separately present the algebraic derivations of debt overhang theory (Myers, 1977; Krugman, 1988) Crowding-out effect theory (Barro, 1974; Buiters, 1975) and Institutional quality (North 1990; Acemoglu and Robinson, 2012) and, finally integrate all the equations within the context of human capital development.

4.1.1 Debt Overhang Theory and Public Debt

According to the debt overhang theory (Myers 1988 ; Krugman, 1988), when a nation's public debt is too high, investment is discouraged, by the prospect of future taxation or austerity measures which lowers economic growth and development of human capital.

since I decline with rising debt, excessive debt can slow human capital accumulation.

4.1.2 Crowding-Out Effect and Human Capital Investment

A high level of government debt frequently results in more borrowing, which can discourage private investment by raising interest rates and reducing the amount of money available for expenditure on human capital. Thus, the Crowding-Out effect via interest rates can be postulated as follows:

Given the demand for loanable funds as:

$$S + (G + T) = I + (X - M) \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 4.4$$

Where:

S = Private savings

$G - T$ = Fiscal deficit

I = Private investment

$X - M$ = Net exports

Higher public debt increases $(G - T)$, raising interest rates r , which discourages private investment.

$$I = I_0 - \beta r \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 4.5$$

Where $\beta > 0$ captures the sensitivity of investment to interest rate

If the government increases borrowing to service debt, this raises the risk premium on debt $\Theta(D)$. increasing borrowing costs.

4.2 Model Specification

Model One for Objective One

Drawing from the theoretical framework above, Model One was used to assess the impact of public debt on human capital development in Nigeria, and hereby specified in the ARDL econometric form as

$$\Delta HCD_t = \alpha_0 + \sum_{i=1}^{p-1} \alpha_1 \Delta HCD_{t-i} + \sum_{i=0}^{q-1} \alpha_2 \Delta DDT_{t-i} + \sum_{i=0}^{s-1} \alpha_3 \Delta EDT_{t-i} + \sum_{i=0} \alpha_4 \Delta PDS_{t-i} + \phi ECT_{t-1} + \varepsilon_t \quad 4.13$$

Where

HCD = Human Capital Development (proxied, in two separate equations by secondary school enrolment rate (SCH), and average life expectancy at birth (LEX).

DDT = Domestic Debt (proxied by total domestic debt to GDP ratio)

EDT = External Debt (proxied by total external debt to GDP ratio)

PDS = Public Debt servicing (proxied by total debt service to total public revenue ratio)

ECT = Error correction term

A priori expectations are that

$$\alpha_1 > 0, \alpha_2 < 0, \alpha_3 < 0, \alpha_4 < 0,$$

Model Two for Objective Two

Model Two was used to examine the role of governance quality in the relationship between public debt and human capital development in Nigeria. It is specified in the ARDL econometric form as

$$\Delta HCD_t = \alpha_0 + \sum_{i=1}^{p-1} \alpha_1 \Delta HCD_{t-i} + \sum_{i=0}^{q-1} \alpha_2 \Delta DDT_{t-i} + \sum_{i=0}^{s-1} \alpha_3 \Delta EDT_{t-i} + \sum_{i=0}^{w-1} \alpha_4 \Delta PDS_{t-i} + \phi ECT_{t-1} + \varepsilon_t \quad 4.14$$

$$\sum_{i=0} \alpha_4 \Delta PDS_{t-i} + \sum_{i=0} \alpha_5 GOV_{t-1} + \phi ECT_{t-1} + \varepsilon_t$$

Where

GOV = Governance quality indicator a proxy for the six governance qualities namely; control of corruption (COC), governance effectiveness (GEF), rule of law (RUL), voice and accountability (VOI), political stability and absence of violence/terrorism (PST), and regulatory quality (REG))

All other variables remain as earlier defined.

A priori expectations are that

$$\alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0, \alpha_4 < 0, \alpha_5 > 0$$

Model Three for Objective Three

Model Three was used to analyse the interrelationship between public debt, governance quality, and human capital development in Nigeria. The model is specified in the vector error correction model (VECM) form as

$$\begin{aligned} \Delta HCD_t &= \alpha_1 + \sum_{i=1}^m \beta_i \Delta HCD_{t-i} + \sum_{i=1}^n \chi_i \Delta TDT_{t-i} + \sum_{i=1}^p \delta_i \Delta FTL_{t-i} + \lambda ECT_{t-1} + e_{1t} \\ \Delta TDT_t &= \alpha_2 + \sum_{i=1}^m \phi_i \Delta HCD_{t-i} + \sum_{i=1}^n \varphi_i \Delta TDT_{t-i} + \sum_{i=1}^p \gamma_i \Delta FTL_{t-i} + \mu ECT_{t-1} + e_{2t} \\ \Delta FTL_t &= \alpha_3 + \sum_{i=1}^m \eta_i \Delta HCD_{t-i} + \sum_{i=1}^n \iota_i \Delta TDT_{t-i} + \sum_{i=1}^p \kappa_i \Delta FTL_{t-i} + \nu ECT_{t-1} + e_{3t} \end{aligned} \quad 4.15$$

Where

TDT = Total public debt stock (proxied by total public debt to GDP ratio)

FTI = Fiscal terrain Index (proxy for governance quality measured as weighted average of all six indicators of governance quality)

HCD remains as earlier defined, and Equation 3.3 will be estimated for the three measure different proxies of HCD.

ECT = Error correction term

4.3 Estimation Technique

Autoregressive Distributed Lag (ARDL)

This estimation technique is a flexible and robust econometric tool widely employed in time series analysis to explore relationships among variables over both the short and long term. A distinct feature of the ARDL model is its ability to handle variables with different levels of stationarity, provided they are a mix of stationary (I(0)) and first-order integrated (I(1)) series, while excluding variables that are integrated of higher orders (I(2)) (Pesaran et al., 2001). The ARDL model assumes no perfect multicollinearity among the independent variables and requires that the residuals are normally distributed, homoscedastic, and free from serial correlation. These assumptions ensure the reliability and interpretability of the model estimates.

One of the primary advantages of the ARDL technique is its ability to estimate short-run dynamics and long-run equilibrium relationships simultaneously within a single framework. This dual focus allows researchers to understand not only the immediate effects of changes in explanatory variables but also their enduring impacts (Nkoro & Uko, 2016). Another notable merit is its suitability for small sample sizes, a feature that makes it particularly useful in studies with limited data availability (Pesaran et al., 2001). Furthermore, ARDL models do not require pretesting all variables for stationarity, which simplifies the estimation process and reduces the risk of misclassification errors associated with conventional cointegration tests such as the Johansen approach.

The ARDL estimation technique is especially suitable for this study because it can effectively capture the delayed effects and dynamic interactions between these complex variables over time. By specifying optimal lag lengths, the ARDL model allows for a nuanced analysis of how variations in governance quality and public debt levels influence

human capital development in both the short and long term. Its adaptability and precision make it a valuable tool for generating empirical evidence that informs policy decisions aimed at improving governance practices, fiscal responsibility, and developmental outcomes in Nigeria.

Vector Error Correction Model

The Vector Autoregressive (VAR) and Vector Error Correction Model (VECM) techniques are widely used in econometrics to analyze dynamic relationships among multiple time series variables. The VAR model treats all variables as endogenous and expresses each as a function of its own lagged values and the lagged values of other variables in the system. It is particularly useful in capturing short-run interactions and forecasting economic variables. However, when variables exhibit cointegration, meaning they share a long-run equilibrium relationship, a VAR in levels may be misspecified. In such cases, the VECM is a more appropriate framework, as it integrates short-run dynamics with long-run equilibrium constraints by including an error correction term that adjusts deviations from the equilibrium path.

The strength of the VAR model lies in its flexibility, as it does not impose a priori structural relationships among variables, making it ideal for impulse response analysis and variance decomposition. It allows researchers to examine how shocks to one variable propagate through the system, offering insights into the transmission mechanisms of macroeconomic policies. Similarly, the VECM is advantageous when dealing with cointegrated variables, as it distinguishes between short-run fluctuations and long-term equilibrium adjustments. The inclusion of an error correction term in VECM ensures that any deviations from the equilibrium relationship are corrected over time, enhancing its ability to model economic dynamics in the presence of non-stationarity.

Despite their usefulness, both VAR and VECM have notable shortcomings. The VAR model requires a large number of observations relative to the number of parameters, which can lead to overparameterization and loss of degrees of freedom. It also assumes that all variables influence each other contemporaneously, which may not always be theoretically justified. The VECM, while addressing long-term relationships, relies on the accuracy of cointegration tests, which can be sensitive to model specification and sample size. Furthermore, determining the optimal lag length for both models is crucial but challenging, as misspecification can lead to biased estimates and incorrect inferences.

In terms of examining long-term relationships among variables, the VECM is particularly well-suited due to its ability to explicitly incorporate cointegration relationships. When economic theory suggests a long-run equilibrium among variables, the VECM ensures that any short-run fluctuations are reconciled with the long-run trajectory. By integrating both short-run dynamics and long-term adjustments, VECM provides a more robust analytical framework for policy analysis and forecasting in macroeconomics and financial econometrics.

4.4 Data Source and Measurement of variables

The data that will be used in for this study will be collected from secondary sources including the Central Bank of Nigeria (CBN) Statistical Bulletins 2024, World Development Indicators (WDI) 2024, and World Governance Indicators (WGI) databases 2024. Specifically, data on Nigeria's total public debt, total domestic debt, total external debt, gross domestic product, total public revenue, and total amount spent on debt servicing will be collected from the CBN 2024. Secondary school enrolment rate and average life expectancy at birth will be obtained from WDI 2024 database while governance indicators – governance effectiveness, control of corruption, rule of law, voice

and accountability, political stability and absence of violence/terrorism, and regulatory quality – will be obtained from WGI 2024 database. The dataset will cover the period from 1996 to 2023.

CHAPTER FIVE

PRESENTATION AND DISCUSSION OF RESULTS

5.0 Introduction

This chapter presents and discusses the results of the study. It is made of four sub-sections. The first presents the preliminary analyses relevant to the study. The second provides the results of the ARDL and VAR estimations. The hypotheses of the study are evaluated in the third sub-section while the discussion of results and policy implications are presented in the last sub-section.

5.1 Preliminary Analyses

Table 5.1 presents the descriptive statistics for the core variables used in this study, namely human capital development indicators—secondary school enrolment rate (SCH) and life expectancy at birth (LEX)—alongside key public debt variables: total domestic debt to GDP ratio (DDT), total external debt to GDP ratio (EDT), and total public debt to GDP ratio (TDT).

Starting with secondary school enrolment rate (SCH), the mean value of 37.41% suggests relatively low levels of enrolment in the Nigerian secondary education system over the study period. The use of secondary school enrollment is essential, rather than a combined measure of primary and secondary enrolment is because, secondary school enrolment provides a more meaningful indicator of human capital development. Secondary school is strongly associated with a higher order cognitive, analytical and labour market skills (Barro & Lee, 2013; Psacharopoulos & Patrinos, 2018), making it more accurate proxy for productive human capital than primary school schooling, which largely reflects basic literacy and numeracy acquisition (Hanushek & Woessmann, 2012). The median of 41% is slightly higher than the mean, and the range spans from a minimum of 24% to a maximum of 55%, reflecting notable fluctuations in access to education. The standard deviation of 9.40 indicates moderate dispersion around the mean. The distribution is slightly negatively

skewed (skewness = -0.18), and with a kurtosis of 1.70, it is platykurtic, suggesting a relatively flat distribution. Importantly, the Jarque-Bera (JB) test for normality yields a p-value of 0.33, indicating that the SCH data do not significantly deviate from a normal distribution.

Table 5.1: Descriptive Statistics of Human Capital and Public Debt Variables

Statistics	SCH	LEX	DDT	EDT	PDS	TDT	GEF	COC	RUL	VOI	PST	REG
Mean	37.41379	50.59917	0.112813	0.088609	908.0195	0.201423	-1.02868	-1.16352	-1.11146	-0.70459	-1.72595	-0.92056
Median	41.00000	50.63600	0.082060	0.069502	188.7701	0.155679	-1.01972	-1.12639	-1.12007	-0.63776	-1.86071	-0.92207
Maximum	55.00000	56.05400	0.297119	0.250189	5656.579	0.547308	-0.84791	-0.90095	-0.84266	-0.31936	-0.58824	-0.68177
Minimum	24.00000	45.94800	0.018420	0.010012	1.007078	0.045496	-1.21333	-1.50207	-1.51251	-1.5537	-2.21112	-1.29282
Std. Dev.	9.401813	3.498363	0.092246	0.079838	1589.976	0.159072	0.103677	0.130670	0.187692	0.301276	0.420844	0.148603
Skewness	-0.17934	0.057996	0.861163	0.800959	2.114110	1.178301	-0.11609	-0.76415	-0.51493	-1.4879	1.532626	-0.74215
Kurtosis	1.702751	1.565081	2.418993	2.478759	6.327405	3.145509	2.073885	3.450732	2.538907	5.168289	4.628665	3.435143
Jarque-Bera	2.188895	2.504205	3.992301	3.429050	53.07404	6.736156	1.101513	3.067791	1.538466	16.38125	14.55839	2.890914
Probability	0.334725	0.285903	0.135857	0.180049	0.000000	0.034456	0.576514	0.215694	0.463368	0.000277	0.000690	0.235638

Source: Researcher's computation

For life expectancy at birth (LEX), which captures the health dimension of human capital, the average life expectancy is 50.60 years, with values ranging between approximately 46 and 56 years. This reflects persistently low life expectancy during the sample period. The variable is almost symmetrically distributed (skewness = 0.06) and also exhibits a flat distribution (kurtosis = 1.57). With a p-value of 0.29 from the JB test, the distribution of LEX can also be considered approximately normal.

Turning to the public debt variables, domestic debt to GDP ratio (DDT) has a mean of 11.28%, with values ranging from a low of 1.84% to a high of 29.71%. The distribution is moderately right-skewed (skewness = 0.86) and mesokurtic (kurtosis = 2.42), implying a fairly normal spread, which is confirmed by the JB p-value of 0.14. External debt to GDP ratio (EDT) follows a similar pattern with a mean of 8.86%, a maximum of 25%, and a minimum of just 1%. The skewness (0.80) and kurtosis (2.48) also suggest mild asymmetry and a relatively normal shape, supported by a JB p-value of 0.18.

The public debt service to revenue ratio (PDS) presents perhaps the most alarming statistic in the dataset. With a mean of 908.02%, it indicates that, on average, Nigeria's debt service obligations over the study period were more than nine times its government revenue—a clear sign of extreme fiscal stress. The median value (188.77%) is significantly lower, suggesting that the exceptionally high mean is driven by extreme spikes in debt servicing in certain years, as confirmed by the very wide range (1.01% to 5,656.58%). The high standard deviation (1,589.98) and strong positive skewness (2.11) further confirm the presence of extreme outliers. The kurtosis value of 6.33 points to a highly peaked distribution with fat tails, meaning extreme values occurred more frequently than under a normal distribution. The JB test result ($p = 0.000$) confirms a statistically significant departure from normality. Economically, these statistics highlight periods when

debt servicing severely crowded out other critical public expenditures, likely constraining investments in human capital and development projects.

Lastly, the total public debt to GDP ratio (TDT) shows a higher average of 20.14%, reflecting the aggregate burden of both domestic and external debt. TDT has a wider range—from 4.55% to 54.73%—and displays stronger right-skewness (1.18), indicating that higher debt levels are more frequent toward the upper end. Its kurtosis (3.15) is close to the benchmark of a normal distribution but slightly leptokurtic. The JB p-value of 0.034, however, is statistically significant at the 5% level, indicating that the TDT variable departs from normality, potentially due to fiscal shocks or policy shifts during the period studied. Most variables exhibit approximate normality with mild skewness and kurtosis, except for total public debt, which shows some deviation. These insights provide a useful background for further regression and time-series modelling, suggesting that while most variables are well-behaved statistically, care should be taken in handling the total debt variable, possibly through transformation or robust estimation techniques.

Table 5.1 also provides the descriptive statistical overview of six governance quality indicators employed in this study, namely: Government Effectiveness (GEF), Control of Corruption (COC), Rule of Law (RUL), Voice and Accountability (VOI), Political Stability and Absence of Violence/Terrorism (PST), and Regulatory Quality (REG). These variables are essential in analysing the moderating role of governance in the relationship between public debt and human capital development in Nigeria.

The mean values of all governance indicators are negative, which is consistent with the World Bank's Worldwide Governance Indicators (WGI) scale, where lower scores (toward -2.5) indicate weaker governance performance. For instance, PST records the lowest mean value of -1.73, reflecting particularly poor political stability and security conditions in

Nigeria over the study period. VOI has a mean of -0.70, suggesting relatively better performance compared to other dimensions, though still below average. COC, RUL, and GEF cluster around -1.0, pointing to moderate-to-weak institutional effectiveness, law enforcement, and corruption control.

The dispersion of the data, measured by standard deviation, varies across indicators. PST shows the highest standard deviation (0.42), indicating significant fluctuations in political stability and violence/terrorism levels over time. VOI also exhibits relatively high variability (0.30), potentially due to shifts in political participation, civil liberties, and media freedom. In contrast, GEF and COC have lower standard deviations (0.10 and 0.13 respectively), suggesting more stable but consistently weak performance.

Looking at the distributional characteristics, the skewness values reveal the asymmetry of the data. Most variables, including GEF, COC, RUL, VOI, and REG, are negatively skewed, indicating a longer left tail and concentration of higher (less negative) scores. This implies that extreme low governance values (worse governance) are relatively rare, while moderate performance is more common. Notably, PST is positively skewed (1.53), suggesting a concentration of data toward the lower end (worse political stability) with some high-value outliers possibly reflecting brief periods of relative calm or political stability.

In terms of kurtosis, VOI (5.17) and PST (4.63) exceed the normal threshold of 3, indicating leptokurtic distributions—more peaked with heavier tails. This suggests that values are tightly clustered around the mean but with occasional extreme deviations, likely corresponding to political or civil unrest events. The remaining variables hover closer to the mesokurtic norm, with COC (3.45) and REG (3.43) slightly exceeding 3, and GEF and RUL falling below, indicating flatter distributions.

The Jarque-Bera (JB) test, which checks for normality in the data, is particularly insightful. GEF, COC, RUL, and REG all have p-values above 0.05, implying that their distributions do not significantly deviate from normality and are suitable for classical econometric modelling without transformation. However, VOI and PST yield statistically significant JB statistics (p-values < 0.01), suggesting that these variables are not normally distributed, likely due to periods of heightened political instability or abrupt changes in democratic freedoms. These deviations warrant caution in regression analysis and may necessitate transformation or the use of robust estimation techniques when these variables serve as moderators in interaction terms.

The governance quality indicators reflect persistently weak institutional performance in Nigeria, with variations in stability and voice-related dimensions. Most variables approximate normality, except VOI and PST, whose non-normal distributions suggest structural political volatility and governance shocks over time.

Table 5.2: Augmented Dickey-Fuller Unit Root Test

Variables	Level		First Difference		Remarks
	t-Statistic	ADF 5% level	t-Statistic	ADF 5% level	
SCH	-2.33567	-3.58062	-6.59224	-3.58753	I(1)
LEX	-2.60269	-3.58753	-4.97186	-2.98104	I(1)
DDT	-0.00476	-3.59503	-3.87813	-3.6122	I(1)
EDT	-1.4174	-3.58753	-3.8481	-3.59503	I(1)
PDS	-1.11793	-3.58062	-3.76519	-3.6032	I(1)
TDT	-0.85607	-3.59503	-3.90544	-3.59503	I(1)
GEF	-2.71877	-3.58062	-6.87448	-3.58753	I(1)
COC	-4.61306	-3.6032	-	-	I(0)
RUL	-4.41957	-3.6032	-	-	I(0)
VOI	-2.88439	-3.58062	-5.63139	-3.58753	I(1)
PST	-5.2931	-3.62203	-	-	I(0)
REG	-2.64035	-3.58062	-6.58611	-3.58753	I(1)

Source: Researcher's computation

The Augmented Dickey-Fuller (ADF) unit root test was conducted to determine the stationarity properties of the variables used in the study. This test is critical in time series

analysis, particularly when estimating long-run relationships, as it helps to avoid spurious regression results. The null hypothesis of the ADF test is that a variable has a unit root (i.e., it is non-stationary), while the alternative hypothesis is that the variable is stationary. A variable is considered stationary if its calculated t-statistic is more negative than the critical value at the 5% significance level.

The results of the test reveal that several variables are not stationary at level but became stationary after first differencing, indicating that they are integrated of order one, $I(1)$. These variables include secondary school enrolment rate (SCH), life expectancy at birth (LEX), total domestic debt to GDP ratio (DDT), total external debt to GDP ratio (EDT), debt service to revenue ratio (PDS), total public debt to GDP ratio (TDT), government effectiveness (GEF), voice and accountability (VOI), and regulatory quality (REG). Their stationarity after first differencing implies that these variables follow a stochastic trend and their long-run effects are more relevant than their short-term fluctuations.

On the other hand, a few variables were found to be stationary at level, suggesting they are integrated of order zero, $I(0)$. These include control of corruption (COC), rule of law (RUL), and political stability and absence of violence (PST). The level stationarity of these governance quality indicators implies that they exhibit more stable dynamics and could influence human capital development contemporaneously rather than through lagged effects. The mixed order of integration (a combination of $I(0)$ and $I(1)$ variables) justifies the use of the Autoregressive Distributed Lag (ARDL) modelling framework and the Vector Error Correction Model (VECM) in the empirical analysis, as both techniques are well-suited for such data structures.

Table 5.3: Bounds Test of Cointegration

		F stat	K	5% I0 Bound	5% I1 Bound
Model One	SCH	3.208276	3	3.23	4.35
	LEX	2.977347	3	3.23	4.35
Model two	SCH	2.197767	4	2.86	4.01
	LEX	2.642853	4	2.86	4.01

Source: Researcher's computation

The results presented in Table 5.3 show the outcomes of the ARDL bounds test for cointegration, which is used to determine whether a long-run equilibrium relationship exists among the variables in the specified models. The decision rule hinges on the comparison between the computed F-statistic and the critical value bounds at the 5% significance level. If the F-statistic exceeds the upper bound (I1), cointegration is confirmed; if it falls below the lower bound (I0), no cointegration is present; and if it lies between the bounds, the result is inconclusive.

For Model One, which examines the relationship between public debt and human capital development (proxied by secondary school enrolment, SCH, and life expectancy at birth, LEX), the F-statistics are 3.208 and 2.977 respectively. Both values fall below the upper bound (4.35) and are close to or slightly below the lower bound (3.23) for a model with three regressors ($k = 3$). This suggests that for SCH, the result is borderline inconclusive, while for LEX, it indicates no cointegration, implying insufficient evidence of a long-run relationship in Model One.

In Model Two, which incorporates governance quality as a moderator, the F-statistics are 2.198 (for SCH) and 2.643 (for LEX). With four regressors ($k = 4$), the critical bounds at 5% are 2.86 (I0) and 4.01 (I1). Here, both F-statistics are below the lower bound, indicating no evidence of cointegration in either specification of Model Two.

Overall, the bounds test results suggest that there is no statistically significant long-run relationship between public debt and human capital development—either directly or as moderated by governance quality—at the 5% level, at least within the ARDL framework.

Table 5.4: Optimal lag length Selection Criteria

	Lag	LogL	LR	FPE	AIC	SC	HQ
Model One SCH	1	143.8278	158.1746*	1.24e-09*	-9.172430*	-8.212551*	-8.887008*
Model One LEX	2	271.2749	32.65612*	3.53e-13*	-17.42777*	-15.7	-16.91401*
Model Two	1	192.4644	168.1811*	4.24e-12*	-12.03440*	-10.59458*	-11.60627*
Model two LEX	2	337.4413	52.82386*	7.25e-16*	-20.92158*	-18.28191*	-20.13667*
Model Three SCH	1	21.25350	116.4957*	0.000102*	-0.685444*	-0.109517*	-0.514191*
Model Three LEX	2	146.2648	38.46094*	1.94e-08*	-9.278873*	-8.271000*	-8.979180*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: Researcher's computation

Table 5.4 presents the optimal lag length selection results for the three models estimated in the study, using a range of statistical criteria, including the Sequential Modified Likelihood Ratio (LR) test, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ). The appropriate selection of lag length is crucial in time series econometrics, as it ensures the validity of the estimated models by capturing the underlying dynamics without introducing autocorrelation or overfitting.

For Model One, which examines the direct relationship between public debt and human capital development, all five criteria unanimously select a lag length of one (1) for secondary school enrolment (SCH), indicating that a one-period lag sufficiently captures

the relationship between public debt and educational outcomes. For life expectancy (LEX), the optimal lag length is two (2), suggesting that the health-related effects of public debt materialize more gradually, necessitating a longer adjustment horizon.

In Model Two, which incorporates governance quality as a moderating factor, the pattern remains consistent. A lag length of one (1) is again optimal for SCH, while two (2) is preferred for LEX across all selection criteria. This reinforces the notion that educational outcomes are more responsive in the short run, while health outcomes are influenced by both current and past conditions.

For Model Three, specified within a Vector Error Correction Model (VECM) framework to analyse long-term effects, the optimal lag length for SCH is once again one (1), and for LEX, two (2). These consistent results across all models and criteria affirm the reliability of the lag specifications used in the study. Overall, the findings suggest that educational indicators adjust more quickly to changes in public debt and governance quality, whereas health outcomes like life expectancy respond more slowly and persistently over time.

5.2 ARDL and VAR Results

Table 5.5: Results of Model One

SCH			LEX		
Variable	Coefficient	Prob.*	Variable	Coefficient	Prob.*
SCH(-1)	0.213373	0.2457	LEX(-1)	1.180304	0
DDT	165.972	0.0003	DDT	-1.59771	0.5682
EDT	-54.6654	0.0446	DDT(-1)	-5.48216	0.0225
EDT(-1)	42.14281	0.0787	EDT	-0.67668	0.4519
PDS	-30.0469	0.091	EDT(-1)	2.757517	0.002
PDS(-1)	-41.8354	0.0272	PDS	-1.55246	0.0091
C	23.47803	0.0002	PDS(-1)	1.405901	0.0291
			C	-8.08773	0.0003
R-squared	0.919906			0.999477	

Adjusted R-squared	0.898062	0.999303
F-statistic	42.11298	5736.521
Prob(F-statistic)	0	0
DW Stat	2.366992	1.716099

Source: Researcher's computation

The results from Table 5.5, which present the estimation outcomes for Model One, examine the direct relationship between public debt and human capital development in Nigeria, using two dependent variables: secondary school enrolment (SCH) and life expectancy at birth (LEX).

Model One (Dependent Variable: SCH)

The lag of secondary school enrolment, SCH(-1), has a positive but statistically insignificant coefficient (0.213; $p = 0.2457$), suggesting that past values of school enrolment do not have a strong predictive effect on current enrolment levels in this model.

Public debt variables, however, show notable effects. Domestic debt (DDT) has a positive and highly significant impact on school enrolment (coefficient = 165.97; $p = 0.0003$), implying that increases in domestic borrowing may be associated with higher public investment in education. External debt (EDT) has a negative and significant effect at the 5% level in the current period (coefficient = -54.67; $p = 0.0446$), but the lagged value is positive and weakly significant (coefficient = 42.14; $p = 0.0787$), suggesting short-run negative and delayed positive effects, possibly due to debt-financed projects maturing over time.

Debt service (PDS) has a consistently negative impact on school enrolment. The current period effect is marginally significant (coefficient = -30.05; $p = 0.091$), and the lagged effect is statistically significant (coefficient = -41.84; $p = 0.0272$), indicating that high debt

servicing obligations may crowd out educational spending. The constant term is highly significant and positive (23.48; $p = 0.0002$), and the overall model fit is strong with an R-squared of 0.92 and an adjusted R-squared of 0.90. The Durbin-Watson statistic of 2.37 suggests no serious autocorrelation in the residuals.

Model One (Dependent Variable: LEX)

In contrast, the equation for life expectancy (LEX) shows even stronger results. The lagged dependent variable LEX(-1) has a coefficient of 1.18 with $p = 0.0000$, indicating strong persistence in health outcomes over time.

The effects of debt variables differ slightly. Current domestic debt (DDT) is negative but statistically insignificant (coefficient = -1.60; $p = 0.5682$), while its lagged value, DDT(- 1), is significantly negative (coefficient = -5.48; $p = 0.0225$), suggesting that domestic debt accumulation may adversely affect health outcomes over time. External debt (EDT) is also insignificant in the current period, but its lagged effect is positive and strongly significant (coefficient = 2.76; $p = 0.002$), implying a delayed beneficial impact, possibly as externally funded health infrastructure takes effect.

Debt service (PDS) in the current period has a significantly negative effect (coefficient = -1.55; $p = 0.0091$), while its lagged value is positive and significant (coefficient = 1.41; $p = 0.0291$), again indicating potential delayed returns after initial fiscal strain.

The constant is negative and significant (coefficient = -8.09; $p = 0.0003$), and the model exhibits an exceptionally high explanatory power, with an R-squared of 0.9995 and an adjusted R-squared of 0.9993. The F-statistic (5736.52) and its probability (0.0000) confirm the overall statistical significance of the model. The Durbin-Watson statistic of 1.72 falls within acceptable bounds, suggesting no strong autocorrelation.

Domestic and external debt have complex and sometimes opposing short- and long-term effects on human capital development. Debt service appears consistently harmful in the short run but may produce delayed benefits. Education outcomes (SCH) respond more immediately to debt variables than health outcomes (LEX), which show stronger long-term dynamics. The models are well-specified, with strong goodness-of-fit and no major autocorrelation concerns.

Table 5.6: Model Two Results of SCH with Governance Quality Indicators

Voiriable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
SCH(-1)	0.213217	0.110831	0.086701	0.229751	0.189081	0.36048*
DDT	171.2891***	189.4463***	214.3969***	184.5946***	179.957***	113.6579**
EDT	-22.0874	-69.9004**	-63.2033**	-47.9852*	-48.3697	-33.1323
EDT(-1)		41.34299**	31.60594	46.73245*	47.23977	37.02473
PDS	-31.3411*	-33.4807*	-35.8488**	-33.1165*	-36.9997*	-11.5886
PDS(-1)	-43.3149**	-39.1806**	-43.0295**	-54.4451**	-49.8245**	-37.6205**
GEF	9.660461					
COC		-6.49319				
RUL			-11.246*			
VOI				-3.79892		
PST					4.570004	
PST(-1)					-4.29941	
REG						10.59543
C	33.78584***	18.60221**	12.88693	19.53368***	24.72121***	28.62331***
R-squared	0.916061	0.922235	0.930386	0.926357	0.922196	0.928681
Adjusted R-squared	0.893169	0.896314	0.907182	0.901809	0.889436	0.904908
F-statistic	40.01611	35.578	40.09491	37.73702	28.15034	39.06443
Prob(F-statistic)	0	0	0	0	0	0
DW Stat	2.137373	2.404911	2.504829	2.592041	2.410861	2.376058

Source: Researcher's computation

Table 5.6 presents the results of Model Two, which examines the role of governance quality in the relationship between public debt and human capital development in Nigeria. Human capital development is proxied by secondary school enrolment (SCH), while

governance quality is represented by six distinct indicators estimated separately: government effectiveness (GEF), control of corruption (COC), rule of law (RUL), voice and accountability (VOI), political stability and absence of violence (PST), and regulatory quality (REG).

The coefficient of the lagged dependent variable, $SCH(-1)$, is positive across all specifications, implying a persistent effect of previous enrolment levels on current educational outcomes. However, it is only statistically significant in the model that includes regulatory quality (REG), suggesting that previous enrolment strongly influences current enrolment when governance institutions are well-regulated.

The coefficients on domestic debt (DDT) are consistently positive and statistically significant across all models, with significance at the 1% level in five of the six specifications and at the 5% level in the REG model. This suggests that increases in domestic debt tend to enhance educational outcomes, possibly because such debt is more likely to be utilized in funding local infrastructural and social investments, including education-related expenditures.

In contrast, external debt (EDT) generally shows negative coefficients in the current period, which are statistically significant in the models that include COC, RUL, and VOI. This indicates that external borrowing may initially exert a crowding-out effect on education due to debt service obligations or misaligned priorities. However, the lagged effects of external debt ($EDT(-1)$) are positive and statistically significant in several models (notably under COC and RUL), suggesting that while external debt may not yield immediate benefits, it could support human capital development over time once externally funded programs are implemented.

Debt service obligations, measured through PDS and its lag (PDS(-1)), consistently display negative and statistically significant effects across all models. This finding underscores the burden of debt repayment on the fiscal space available for education funding. Both contemporaneous and lagged debt service significantly depress secondary school enrolment, suggesting a trade-off between debt repayment and investment in human capital.

Regarding the governance quality indicators, the effects are mixed. Government effectiveness (GEF) is positive but statistically insignificant, indicating that improvements in public sector performance may not independently enhance enrolment. The control of corruption (COC) indicator is negatively signed and insignificant, hinting at inefficiencies or leakages even in relatively less corrupt systems. The rule of law (RUL) is negative and marginally significant, suggesting that legal institutions may not be sufficiently robust to protect educational investments. Voice and accountability (VOI) and political stability (PST) are statistically insignificant, though PST exhibits a mixed dynamic with a positive coefficient in the current period and a negative one in the lag. Regulatory quality (REG), though positive, is also not statistically significant, though it appears to enhance the positive effect of domestic debt on educational outcomes.

Overall, the model diagnostics show strong statistical validity. The R-squared values across the models range between 0.916 and 0.930, indicating that the models explain over 91% of the variation in secondary school enrolment. Adjusted R-squared values remain robust, and F-statistics are high and statistically significant at the 1% level across all models. Additionally, the Durbin-Watson statistics suggest no evidence of serious autocorrelation, further confirming the reliability of the results. These findings imply that while governance quality has a nuanced role, domestic debt—when properly managed—

can support educational outcomes, whereas external debt and debt service tend to constrain them.

Table 5.7: Model Two Results of LEX with Governance Quality Indicators

Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
LEX(-1)	1.205032***	1.150303***	1.182032***	1.160004***	1.120638***	1.066479***
DDT	0.014009	-0.92909	-1.9148	-1.30157	-1.143	3.66535
DDT(-1)	-8.09612***	-4.6663**	-5.60216**	-5.24625**	-4.46599*	-2.36517
EDT	0.626335	-0.3492	-0.62271	-1.0321	-0.42021	-1.88589**
EDT(-1)	1.189369	2.361208***	2.928742***	2.612203***	1.605791	1.793206***
PDS	-1.71888***	-1.65198***	-1.52381**	-1.51466**	-1.26495**	-2.47803***
PDS(-1)	1.575604***	1.096752*	1.372869**	1.619954**	1.730226***	
GEF	0.639799**					
GEF(-1)	0.295783					
COC		0.443384*				
COC(-1)		-0.28854				
RUL			0.154841			
VOI				0.103418		
PST					-0.18487*	
REG						-0.35462*
REG(-1)						-0.5699***
C	-8.25951***	-6.49065***	-7.97261***	-7.04764***	-5.58968**	-3.58272**
R-squared	0.999664	0.999579	0.999494	0.999506	0.999546	0.999633
Adjusted R-squared	0.999495	0.999368	0.999292	0.999308	0.999365	0.999478
F-statistic	5943.406	4743.544	4938.762	5053.98	5507.437	6463.216
Prob (F-statistic)	0	0	0	0	0	0
DW Stat	2.384209	2.269014	1.766727	1.858926	1.531714	2.018612

Source: Researcher's computation

Table 5.7 reports the results of Model Two using life expectancy at birth (LEX) as the proxy for human capital development, while incorporating governance quality as an influence on the relationship between public debt and human capital development in Nigeria. Governance quality is measured through six separate proxies—government effectiveness (GEF), control of corruption (COC), rule of law (RUL), voice and

accountability (VOI), political stability and absence of violence (PST), and regulatory quality (REG)—with each model estimated independently for its respective indicator.

The lag of the dependent variable, $LEX(-1)$, is positive and highly significant at the 1% level across all specifications, indicating a strong degree of persistence in life expectancy. This implies that improvements in life expectancy are carried forward over time, and current levels are largely explained by previous levels.

Regarding public debt indicators, the impact of current domestic debt (DDT) varies across models. While DDT shows a positive but insignificant coefficient under GEF, it becomes negative (though still insignificant) under COC, RUL, VOI, and PST, and turns positive again under REG. However, the lagged value of DDT ($DDT(-1)$) consistently exhibits negative coefficients, and is statistically significant in five out of six models (at the 1%, 5%, and 10% levels), suggesting that lagged domestic debt accumulation has a significant and adverse effect on life expectancy.

The results for external debt (EDT) and its lagged value show mixed effects. The contemporaneous coefficient for EDT is mostly negative and insignificant except in the REG model, where it is negative and significant at the 5% level, indicating that current external borrowing might depress life expectancy through fiscal pressure or poor utilization. Conversely, lagged EDT has positive and highly significant coefficients (mostly at the 1% level) in models that include COC, RUL, and VOI, suggesting that while the immediate effect of external debt may be adverse, its long-run implementation may support improvements in life expectancy—possibly through health-related programs or infrastructure.

Public debt servicing (PDS) in the current period consistently has negative and significant coefficients across all models, highlighting the detrimental effect of debt service obligations on life expectancy. This likely reflects the fiscal trade-off between repaying debt and investing in healthcare services. However, the lagged values of PDS (PDS(-1)) are positive and mostly significant, suggesting a possible delayed benefit of prior debt servicing—potentially due to restored fiscal credibility or renewed access to concessional funding after timely repayments.

Governance quality indicators reveal nuanced effects. Government effectiveness (GEF) has a positive and significant contemporaneous effect on life expectancy, while its lag is also positive though insignificant. Control of corruption (COC) shows a positive and weakly significant effect, suggesting that reduced corruption can enhance outcomes related to life expectancy. Rule of law (RUL) and voice and accountability (VOI) both have positive but insignificant effects, implying that institutional fairness and civic participation might not directly influence life expectancy, at least in the short term. Interestingly, political stability (PST) and regulatory quality (REG) show negative and significant effects—with REG(-1) being significant at the 1% level—suggesting that improvements in regulatory institutions or political calm do not automatically translate into better health outcomes, possibly due to implementation lags or structural rigidities.

The models are very robust, as indicated by extremely high R-squared values (above 0.999 in all cases) and highly significant F-statistics, demonstrating excellent model fit and explanatory power. The Durbin-Watson (DW) statistics mostly lie between 1.5 and 2.4, implying acceptable levels of autocorrelation, although mild positive serial correlation may exist in some models.

These findings suggest that while life expectancy is highly persistent and influenced by long-term debt dynamics, the adverse impact of debt accumulation and servicing on human capital development can be mitigated through improved governance quality, particularly via effective public service delivery and anti-corruption efforts.

Table 5.8: Model Two Results of LEX with Fiscal Terrain Index

Variable	SCH		LEX		
	Coefficient	Prob.*	Variable	Coefficient	Prob.*
SCH(-1)	0.10264	0.605	LEX(-1)	1.16988	0
DDT	192.8123	0.0002	DDT	-1.74737	0.5344
EDT	-13.7013	0.4701	DDT(-1)	-5.05278	0.0403
PDS	-40.2165	0.0317	EDT	-0.93476	0.3133
PDS(-1)	-42.9064	0.0308	EDT(-1)	2.68453	0.0038
FTI	0.478603	0.9652	PDS	-1.49287	0.0122
FTI(-1)	-22.7537	0.0387	PDS(-1)	1.535329	0.0202
C	1.302678	0.9143	FTI	0.0201	0.9485
			C	-7.5641	0.0009
R-squared	0.9228		0.999499		
Adjusted R-squared	0.89578		0.999288		
F-statistic	34.15242		4737.179		
Prob(F-statistic)	0		0		
DW Stat	2.368065		1.871116		

Source: Researcher's computation

Table 5.8 presents the estimates from Model Two, which assesses the impact of Nigeria's fiscal terrain index (FTI)—a composite measure of fiscal dynamics—on human capital development, as proxied by both school enrolment (SCH) and life expectancy (LEX). The model controls for domestic debt (DDT), external debt (EDT), and public debt servicing (PDS), while also accounting for lag effects.

In the model where LEX is the dependent variable, LEX(-1) (its lagged value) has a coefficient of 1.16988, statistically significant at the 1% level. This indicates strong

persistence in life expectancy—suggesting that past values are strong predictors of current outcomes, consistent with demographic inertia in health improvements.

The coefficient on current DDT is negative (-1.74737) but statistically insignificant, suggesting no direct contemporaneous effect of domestic debt accumulation on life expectancy. However, the lagged DDT (-5.05278) is statistically significant at the 5% level, implying that prior debt accumulation adversely affects life expectancy, possibly due to fiscal crowding-out or delayed macroeconomic instability.

Similarly, while current EDT is negative but insignificant, its lagged value (2.68453) is positive and significant at the 1% level, indicating that external debt may positively impact life expectancy in the long run, possibly through delayed implementation of foreign-financed health or infrastructure projects.

Public debt servicing (PDS) in the current period has a significant negative coefficient (-1.49287, $p = 0.0122$), suggesting that debt repayments impose a fiscal burden that reduces investments in life-enhancing sectors like healthcare. Conversely, PDS(-1) is positive and significant (1.5353, $p = 0.0202$), possibly capturing fiscal stabilization or improved creditworthiness following earlier repayments.

The fiscal terrain index (FTI) and its lagged value are both statistically insignificant in this model, implying that the overall fiscal landscape does not have a direct and immediate effect on life expectancy, at least within the current estimation period.

The model has an exceptionally high R-squared (0.9995) and F-statistic (4737.179, $p < 0.01$), indicating strong explanatory power and model fit. The Durbin-Watson statistic (1.87) suggests no serious autocorrelation in the residuals.

In the alternative model with school enrollment (SCH) as the dependent variable, the results are less robust. SCH(-1) is positive but statistically insignificant ($p = 0.605$), indicating weak persistence in school enrolment compared to life expectancy.

Current DDT is positive and highly significant ($p = 0.0002$), implying that domestic debt may support education financing or infrastructure in the short term. However, EDT is negative and insignificant, suggesting no reliable short-run impact of external borrowing on enrolment.

Public debt servicing (PDS and PDS(-1)) both have negative and significant coefficients ($p \approx 0.03$), indicating that debt repayments crowd out fiscal space for education. Notably, the lagged FTI has a negative and significant coefficient (-22.75 , $p = 0.0387$), suggesting that past adverse fiscal conditions negatively affect school enrolment, possibly due to austerity or delayed fiscal reforms.

However, the contemporaneous FTI is insignificant ($p = 0.9652$), and the constant term is also not statistically different from zero, pointing to the need for caution in interpreting short-term fiscal indicators.

Despite some weaknesses in variable significance, this model still yields a high R-squared (0.9228) and significant F-statistic (34.15, $p < 0.01$), indicating good overall fit. The DW stat of 2.37 suggests a well-behaved error structure.

Thus, LEX results show strong dynamic persistence, negative effects of lagged DDT and PDS, and positive effects of lagged EDT and PDS, with FTI playing an insignificant role. SCH results suggest that while current DDT can enhance school enrolment, debt servicing and lagged fiscal difficulties undermine educational outcomes. Overall, the analysis

underscores the importance of managing debt sustainably and reforming fiscal structures to avoid compromising long-term investments in human capital.

Table 5.9: Impulse Response Functions of the variables- SCH Model

Response of SCH				Response of TDT			Response of FTI		
Period	SCH	TDT	FTI	SCH	TDT	FTI	SCH	TDT	FTI
1	3.917645 (0.52352)	0.000000 (0.00000)	0.000000 (0.00000)	-0.00343 (0.00581)	0.030639 (0.00409)	0.000000 (0.00000)	0.009751 (0.01232)	0.002529 (0.01224)	0.064763 (0.00865)
2	3.309524 (0.60189)	0.112502 (0.21336)	-0.56879 (0.72778)	0.002512 (0.00718)	0.030967 (0.00518)	0.014586 (0.00602)	0.002992 (0.00861)	0.004451 (0.00631)	0.029007 (0.01271)
3	2.865633 (0.75265)	0.194991 (0.35985)	-0.68575 (0.92980)	0.006304 (0.00915)	0.031831 (0.00645)	0.020464 (0.00898)	0.000764 (0.00850)	0.005319 (0.00522)	0.014718 (0.01082)
4	2.515477 (0.87149)	0.262977 (0.48542)	-0.63621 (0.97047)	0.009143 (0.01119)	0.032963 (0.00771)	0.022968 (0.01122)	0.000290 (0.00816)	0.005780 (0.00540)	0.008984 (0.00821)
5	2.227317 (0.95393)	0.323083 (0.60196)	-0.53173 (0.96936)	0.011521 (0.01326)	0.034254 (0.00915)	0.024207 (0.01305)	0.000476 (0.00769)	0.006091 (0.00578)	0.006675 (0.00690)
6	1.985309 (1.00535)	0.378343 (0.71262)	-0.41506 (0.96607)	0.013649 (0.01529)	0.035662 (0.01083)	0.025015 (0.01470)	0.000890 (0.00724)	0.006355 (0.00621)	0.005748 (0.00650)
7	1.780364 (1.03238)	0.430316 (0.81875)	-0.30179 (0.97169)	0.015624 (0.01728)	0.037170 (0.01275)	0.025719 (0.01632)	0.001368 (0.00689)	0.006612 (0.00668)	0.005390 (0.00647)
8	1.606447 (1.04159)	0.479938 (0.92148)	-0.19697 (0.98728)	0.017496 (0.01921)	0.038774 (0.01491)	0.026443 (0.01802)	0.001848 (0.00665)	0.006877 (0.00719)	0.005277 (0.00660)
9	1.459070 (1.03906)	0.527857 (1.02191)	-0.10154 (1.01114)	0.019298 (0.02110)	0.040472 (0.01730)	0.027237 (0.01983)	0.002311 (0.00652)	0.007157 (0.00773)	0.005278 (0.00680)
10	1.334637 (1.03022)	0.574579 (1.12116)	-0.01499 (1.04145)	0.021049 (0.02297)	0.042265 (0.01992)	0.028114 (0.02177)	0.002751 (0.00650)	0.007454 (0.00833)	0.005340 (0.00707)

Source: Researcher's computation

Table 5.9 presents Impulse Response Functions (IRFs) of the variables school enrolment (SCH), total debt (TDT), and fiscal terrain index (FTI) to one standard deviation shocks in each variable over a ten-period horizon, using a Cholesky decomposition with the ordering SCH → TDT → FTI. Standard errors are analytically computed and reported in parentheses.

Response of SCH (School Enrolment)

The response of school enrolment (SCH) to its own shock is positive and gradually declining over the ten periods. A one standard deviation shock to SCH initially increases its value by 3.92 in the first period, but this effect diminishes over time, settling at 1.33 by the tenth period. This shows that SCH is highly autoregressive but the influence of its own past shocks wanes steadily, indicating a short-to-medium-term persistence in educational investments or enrolment momentum.

A shock to TDT (total debt) has a small and positive effect on SCH. From period 2 to 10, the response of SCH to TDT increases gradually from 0.11 to 0.57, suggesting that total public debt may enhance school enrolment, potentially through increased government spending on education. However, this effect remains modest, and the large standard errors (exceeding or nearing the impulse values) suggest statistical insignificance.

In contrast, a shock to FTI generates a negative response in SCH throughout the horizon. The effect starts at -0.57 in period 2, then remains negative but gradually converges toward zero (e.g., -0.01 in period 10). This implies that fiscal instability or a deteriorating fiscal terrain constrains school enrolment, likely through reduced government investment in education or macro-fiscal uncertainty.

Response of TDT (Total Debt)

TDT responds positively and persistently to its own shocks, starting from 0.03 in period 1 to 0.042 in period 10. This indicates high autoregressive dynamics in total debt, reflecting debt accumulation tendencies once borrowing is initiated.

The response of TDT to a shock in SCH is initially negative (-0.0034) but turns positive and rising from period 2 onward, reaching 0.0210 by period 10. This suggests that higher school enrolment may lead to increased total debt over time—possibly due to greater fiscal demands or expansionary government efforts to meet rising educational needs.

Meanwhile, a shock to FTI leads to a small but increasing positive response in TDT, peaking at 0.0281 in the tenth period. This indicates that fiscal terrain improvements (or shocks) may lead to modest debt accumulation, perhaps as better fiscal conditions allow governments to access credit more comfortably.

Response of FTI (Fiscal Terrain Index)

The response of FTI to its own shock is large initially (0.065) but declines sharply to about 0.0053 by the tenth period. This pattern indicates a diminishing impact of fiscal terrain shocks, possibly due to fiscal adjustments or policy inertia that stabilizes fiscal conditions over time.

Shocks from SCH produce a very mild and delayed positive response in FTI, rising from 0.0097 in period 1 to 0.0028 in period 10, with very low magnitude and high standard errors. This suggests that improvements in education have negligible short-run impacts on fiscal conditions, likely due to their long-term nature.

Similarly, shocks to TDT (debt) elicit a small positive response in FTI across all periods, rising slightly from 0.0025 to 0.0075. While this may reflect improved debt management capacity or favourable fiscal outlook with increased borrowing, the low values and high standard errors imply weak statistical significance.

Thus, from the results, School Enrolment (SCH) responds positively to shocks in total debt (TDT) and negatively to fiscal terrain index (FTI), indicating that while debt may support education, poor fiscal conditions dampen enrolment efforts. Total debt (TDT) is strongly self-reinforcing, and also rises in response to increasing school enrolment, suggesting potential feedback effects in government borrowing behaviour. Fiscal terrain index (FTI) responds positively to all shocks but with very weak magnitude and diminishing effect, suggesting a limited dynamic feedback from education or debt to fiscal conditions in the short run.

Table 5.10: Variance decomposition of the variables – SCH Model

Period	Variance Decomposition of SCH			Variance Decomposition of TDT			Variance Decomposition of FTI		
	SCH	TDT	FTI	SCH	TDT	FTI	SCH	TDT	FTI
1	100.0000	0.000000	0.000000	1.234208	98.76579	0.000000	2.213560	0.148843	97.63760
2	98.73794	0.047516	1.214545	0.847674	89.15700	9.995328	2.014029	0.507264	97.47871
3	97.61167	0.143332	2.245000	1.604975	80.85330	17.54172	1.933450	1.006995	97.05955
4	96.87284	0.284248	2.842914	2.668586	75.45373	21.87768	1.895013	1.590744	96.51424
5	96.41000	0.471970	3.118034	3.812496	71.91711	24.27040	1.871373	2.229232	95.89939
6	96.09589	0.709689	3.194419	4.964658	69.47098	25.56436	1.860865	2.911022	95.22811
7	95.83920	1.000792	3.160005	6.093913	67.67796	26.22813	1.869241	3.632766	94.49799
8	95.57988	1.348401	3.071718	7.183066	66.29572	26.52122	1.902634	4.394385	93.70298
9	95.27882	1.755217	2.965961	8.221633	65.18638	26.59199	1.965735	5.196992	92.83727
10	94.91027	2.223475	2.866254	9.203360	64.26828	26.52836	2.061688	6.042006	91.89631

Source: Researcher's computation

The variance decomposition results for Model Three (Table 5.10) provide valuable insights into the dynamic interactions among School Enrolment (SCH), Total Debt (TDT), and the Fiscal Terrain Index (FTI) over a ten-period horizon. These results help to quantify the extent to which innovations (or shocks) in each variable account for fluctuations in the others, offering a deeper understanding of causal linkages in the system.

Beginning with school enrolment (SCH), the decomposition indicates that shocks to SCH itself are overwhelmingly responsible for its own forecast error variance. In the first period, SCH accounts for 100% of the variation, and although this dominance diminishes slightly over time, it still remains highly self-determined—explaining about 94.9% of its variance by the tenth period. Contributions from TDT and FTI are minimal in the early periods but gradually increase, with FTI explaining about 2.9% and TDT around 2.2% by period ten. This pattern implies that while fiscal and debt dynamics have a limited immediate impact, their influence on education expenditure (proxied by SCH) becomes more noticeable over time.

In contrast, the total debt (TDT) variable shows a more pronounced response to external shocks. Initially, TDT is largely driven by its own past values, accounting for nearly 98.8% of its variance in the first period. However, this influence steadily declines to about 64.3% by the tenth period. Over the same period, FTI emerges as a major contributing factor, explaining 26.5% of TDT's variance, while the role of SCH increases to approximately 9.2%. These results suggest that the fiscal environment—characterized by revenue generation capacity, tax effort, and budgetary flexibility—plays a significant and growing role in shaping the trajectory of public debt. The increasing contribution from SCH also implies that rising educational demands may exert upward pressure on government borrowing.

Finally, for the fiscal terrain index (FTI), the variance decomposition reveals that it is predominantly self-driven in the short term, with own shocks explaining 97.6% of its variation in the first period. However, this share decreases to 91.9% by the tenth period. Meanwhile, the explanatory power of TDT gradually rises to about 6.0%, and that of SCH hovers slightly above 2%. These shifts indicate that while FTI is relatively stable and

internally consistent, it is not immune to pressures from debt accumulation and investment in human capital. In particular, the growing impact of TDT underscores the feedback effect where excessive public debt may eventually constrain fiscal capacity, affecting overall fiscal health and sustainability.

The variance decomposition analysis shows that each variable initially behaves in a largely autonomous manner, but as time progresses, interdependencies become more evident—particularly the influence of FTI on TDT and the marginal effects of fiscal and debt dynamics on SCH. This highlights the importance of prudent debt management and fiscal policy coherence in supporting sustainable investments in education.

Table 5.11: Impulse Response Functions of the variables - LEX Model

Period	Response of LEX			Response of TDT			Response of FTI		
	LEX	TDT	FTI	LEX	TDT	FTI	LEX	TDT	FTI
1	0.071673 (0.00975)	0.000000 (0.00000)	0.000000 (0.00000)	0.007338 (0.00450)	0.022823 (0.00311)	0.000000 (0.00000)	-0.01233 (0.01432)	0.004712 (0.01420)	0.073728 (0.01003)
2	0.135082 (0.02133)	0.014428 (0.01349)	-0.00177 (0.01513)	-0.00112 (0.00668)	0.026020 (0.00631)	0.014107 (0.00541)	0.000936 (0.01472)	0.014895 (0.01697)	0.049109 (0.01716)
3	0.189087 (0.03620)	0.029017 (0.02945)	-0.03953 (0.03070)	-0.00898 (0.00927)	0.024867 (0.00910)	0.028716 (0.00816)	0.001932 (0.01470)	0.016629 (0.01495)	0.038329 (0.01651)
4	0.225538 (0.05278)	0.035195 (0.04504)	-0.08885 (0.05077)	-0.01342 (0.01242)	0.023744 (0.01206)	0.041556 (0.01193)	-0.00016 (0.01498)	0.015784 (0.01228)	0.031752 (0.01816)
5	0.247229 (0.06969)	0.033126 (0.05893)	-0.13908 (0.07257)	-0.01473 (0.01567)	0.023612 (0.01497)	0.051237 (0.01599)	-0.00302 (0.01483)	0.014234 (0.01098)	0.028767 (0.01894)
6	0.258949 (0.08591)	0.025230 (0.07120)	-0.18516 (0.09459)	-0.01411 (0.01868)	0.024226 (0.01721)	0.057664 (0.02018)	-0.0055 (0.01428)	0.012854 (0.01079)	0.027959 (0.01956)
7	0.265036 (0.10089)	0.014024 (0.08243)	-0.2258 (0.11635)	-0.01262 (0.02126)	0.025135 (0.01875)	0.061374 (0.02427)	-0.00728 (0.01374)	0.011910 (0.01125)	0.028300 (0.02068)
8	0.268563 (0.11455)	0.001365 (0.09330)	-0.26153 (0.13823)	-0.01097 (0.02331)	0.026001 (0.01988)	0.063107 (0.02814)	-0.00838 (0.01346)	0.011395 (0.01210)	0.029119 (0.02252)
9	0.271367 (0.12711)	-0.01162 (0.10443)	-0.29356 (0.16105)	-0.00953 (0.02481)	0.026653 (0.02091)	0.063550 (0.03187)	-0.00898 (0.01347)	0.011204 (0.01319)	0.030038 (0.02498)
10	0.274365 (0.13893)	-0.02439 (0.11631)	-0.32314 (0.18569)	-0.00842 (0.02585)	0.027045 (0.02204)	0.063241 (0.03568)	-0.00925 (0.01368)	0.011222 (0.01442)	0.030879 (0.02782)

Source: Researcher's computation

The impulse response results trace the dynamic effects of shocks to Life Expectancy (LEX), Total Debt (TDT), and the Fiscal Terrain Index (FTI) over a ten-period horizon, offering insights into their interrelationships (Table 5.11). Standard errors (in parentheses) are reported alongside the point estimates, and the Cholesky ordering adopted is LEX → TDT → FTI.

Response of Life Expectancy (LEX)

LEX responds positively and persistently to its own shocks throughout the forecast horizon. An initial shock to LEX causes it to rise by approximately 0.072 in the first period, and this impact grows steadily, reaching 0.274 by the tenth period. Meanwhile, the response of LEX to shocks in TDT is initially positive but relatively small, peaking around period four (0.035) before gradually tapering off and turning negative by the ninth and tenth periods (−0.012 and −0.024, respectively). This suggests that while government debt may provide short-run support for health infrastructure (and thus life expectancy), its sustained accumulation could have a dampening effect in the longer term. In contrast, shocks to FTI (a proxy for fiscal quality or governance effectiveness) yield a consistently negative response in LEX. The response becomes increasingly adverse over time, with life expectancy falling by approximately −0.323 in period ten. This underscores the sensitivity of life expectancy to deteriorations in fiscal terrain—potentially due to inefficiencies or fiscal constraints undermining public service delivery, including healthcare.

Response of Total Debt (TDT)

TDT displays a strong positive and sustained response to its own shocks, rising from 0.023 in the first period to about 0.027 by the tenth. This reflects the inertial and possibly structural nature of debt accumulation. The response of TDT to LEX shocks is negative over time, beginning modestly at 0.007 in period one, dipping into negative territory by

period two (-0.001), and reaching -0.008 by the tenth period. This suggests that improvements in life expectancy may, paradoxically, be associated with slower debt accumulation—potentially due to the long-term productivity gains of a healthier population reducing fiscal strain. Meanwhile, TDT responds positively to FTI shocks, with the response rising from 0.014 in period two to about 0.063 by the tenth period. This implies that as the fiscal terrain improves—possibly reflecting better revenue generation or spending efficiency—governments might leverage their fiscal space to take on more debt, potentially for development spending.

Response of Fiscal Terrain Index (FTI)

FTI reacts strongly to its own shocks, especially in the first period (0.074), before stabilizing just above 0.03 by the tenth period. This suggests a relatively persistent effect of internal fiscal improvements. Interestingly, FTI's response to LEX shocks is initially negative (-0.012 in period one) and remains negative throughout the horizon, though marginal. This may reflect a crowding-out dynamic, where increasing life expectancy (and the associated demographic pressures) places fiscal stress on the system, dampening improvements in the fiscal environment. FTI responds positively to TDT shocks, rising from 0.005 in the first period to about 0.031 by the tenth. This supports the idea that fiscal space may expand alongside increased borrowing—particularly if such debt is productively used and well-managed.

The impulse response analysis reveals that: LEX is self-reinforcing but vulnerable to deteriorating fiscal terrain and, to a lesser extent, debt shocks. TDT is mainly driven by its own dynamics, but life expectancy improvements may reduce its accumulation over time. FTI is largely internally driven, but it benefits from prudent borrowing and is slightly constrained by rising life expectancy. These findings highlight the importance of balanced

fiscal management to ensure that public debt and governance quality translate into improved life outcomes without undermining fiscal sustainability.

Table 5.12: Variance decomposition results – LEX Model

Period	Variance Decomposition of LEX			Variance Decomposition of TDT			Variance Decomposition of FTI		
	LEX	TDT	FTI	LEX	TDT	FTI	LEX	TDT	FTI
1	100.0000	0.000000	0.000000	9.368164	90.63184	0.000000	2.711286	0.395793	96.89292
2	99.10451	0.882190	0.013297	3.794028	82.49979	13.70618	1.855555	2.960333	95.18411
3	95.76360	1.700506	2.535894	4.559028	61.03960	34.40137	1.568110	5.208905	93.22299
4	90.34982	1.879869	7.770310	5.797698	43.70014	50.50216	1.393092	6.841188	91.76572
5	84.16797	1.665478	14.16656	6.023489	33.20752	60.76900	1.349572	7.911233	90.73920
6	78.01743	1.317671	20.66490	5.648098	27.20107	67.15083	1.478430	8.573930	89.94764
7	72.27819	0.988803	26.73301	5.087158	23.72971	71.18313	1.746383	8.969913	89.28370
8	67.08748	0.744171	32.16835	4.536635	21.67548	73.78789	2.085294	9.203971	88.71074
9	62.45746	0.599062	36.94348	4.062219	20.42731	75.51047	2.435308	9.347167	88.21752
10	58.34392	0.545571	41.11051	3.673214	19.64637	76.68042	2.760597	9.444040	87.79536

Source: Researcher's computation

Table 5.12 presents the variance decomposition results for Life Expectancy (LEX), Total Debt (TDT), and the Fiscal Terrain Index (FTI) provide valuable insights into the relative contribution of innovations in each variable to the forecast error variance of the others over a ten-period horizon. This analysis helps in understanding the extent of interdependence and shock transmission among the variables within the system, under the Cholesky ordering: LEX → TDT → FTI.

Variance Decomposition of Life Expectancy (LEX)

Initially, in period 1, LEX is entirely self-determined, with 100% of the variation in its forecast error variance explained by its own shocks. However, as time progresses, the contribution of external shocks—especially from FTI—grows significantly. By period 5, about 14.2% of LEX's forecast error variance is attributable to FTI shocks, and this

increases steadily to 41.1% by period 10. In contrast, the contribution of TDT remains modest throughout, peaking at just 1.88% in period 4 and falling slightly thereafter. This indicates that fiscal terrain conditions (governance and fiscal quality) increasingly explain changes in life expectancy over time, suggesting a strong indirect influence through public service delivery and institutional quality.

Variance Decomposition of Total Debt (TDT)

TDT is heavily self-driven in the short term, with its own innovations accounting for over 90% of its variation in the first period. However, its reliance on own shocks diminishes rapidly. By the third period, only 61% of the variance is self-explained, and by the tenth period, this drops to just under 20%. Notably, FTI becomes the dominant contributor to TDT variance over time, rising from 13.7% in period 2 to a dominant 76.7% by period 10. This underscores the pivotal role of fiscal quality in shaping debt dynamics—suggesting that improvements or deteriorations in fiscal governance strongly influence debt sustainability. The contribution of LEX remains marginal but stable, averaging between 3.7% and 6% throughout the period, indicating a weaker but persistent long-term link between demographic health and debt accumulation.

Variance Decomposition of Fiscal Terrain Index (FTI)

FTI is predominantly explained by its own shocks across the entire horizon, accounting for 96.9% of its variance in period 1 and remaining high at 87.8% by period 10. However, the influence of external variables becomes gradually more notable. The contribution of TDT to FTI variance rises from 0.4% in the first period to 9.4% by the tenth period. Similarly, LEX's influence on FTI grows slowly, reaching 2.8% by the tenth period. This suggests a modest feedback effect where changes in debt levels and population health conditions

begin to influence the structure and quality of the fiscal environment, albeit to a lesser extent than FTI's internal dynamics.

Overall, the variance decomposition highlights the following key dynamics: LEX is increasingly influenced by FTI, showing the importance of fiscal quality for long-term health outcomes. TDT becomes largely driven by FTI, implying that governance reforms and institutional quality are critical for debt management. FTI remains mostly self-determined, but its growing responsiveness to TDT and LEX suggests potential vulnerabilities or feedback loops. This dynamic interplay affirms the importance of strengthening fiscal institutions to ensure both fiscal sustainability and improved life expectancy in the long run.

5.3 Evaluation of Hypotheses

Evaluation of Hypothesis One

Hypothesis One asserts that public debt has a significant negative impact on human capital development in Nigeria, with emphasis on education and healthcare outcomes. Using secondary school enrolment (SCH) as a proxy for education, the regression results show that the lagged dependent variable, $SCH(-1)$, is positive (0.213) but statistically insignificant ($p = 0.2457$), indicating limited persistence in enrolment trends. Domestic debt (DDT) has a positive and highly significant effect (165.97; $p = 0.0003$), suggesting that domestic borrowing may be effectively channelled towards education-related expenditures. In contrast, external debt (EDT) in the current period has a significant negative effect (-54.67 ; $p = 0.0446$), implying that external debt may initially constrain education spending, possibly due to debt servicing or delayed disbursements. However, its lagged value is positive (42.14) and marginally significant ($p = 0.0787$), indicating a

potential delayed benefit. Public debt servicing (PDS) exerts a consistently negative effect, with coefficients of -30.05 ($p = 0.091$) in the current period and -41.84 ($p = 0.0272$) in the lagged period, reflecting the fiscal crowding-out of education investment. The model displays strong explanatory power, with an R-squared of 0.92 and a Durbin-Watson statistic of 2.37, confirming good model fit and absence of serious autocorrelation.

Turning to healthcare, life expectancy at birth (LEX) is used as the dependent variable. The model reveals a highly significant and positive coefficient for the lagged dependent variable, $LEX(-1) = 1.18$ ($p = 0.0000$), confirming the persistence of health outcomes. Domestic debt in the current period is negative but statistically insignificant (-1.60 ; $p = 0.5682$), while its lagged effect is significantly negative (-5.48 ; $p = 0.0225$), suggesting that sustained domestic borrowing adversely affects long-term health outcomes. External debt shows no significant immediate effect, but its lagged value is both positive and significant (2.76 ; $p = 0.002$), reflecting delayed gains from externally funded health projects. Debt servicing, similar to its effect on education, significantly reduces life expectancy in the short run (-1.55 ; $p = 0.0091$), although its lagged effect is positive and statistically significant (1.41 ; $p = 0.0291$), possibly due to improved fiscal credibility attracting future health investments. The model is highly robust, with an R-squared of 0.9995, adjusted R-squared of 0.9993, and F-statistic of 5736.52 ($p < 0.01$), while the Durbin-Watson statistic of 1.72 indicates no major autocorrelation concerns.

In synthesis, the empirical results offer a mixed validation of Hypothesis One. While domestic debt appears to enhance education outcomes in the short run, its prolonged accumulation negatively affects health. External debt initially constrains education and health outcomes but yields significant positive effects over time, suggesting that the benefits of foreign-funded human capital projects are realised with a lag. Debt service

obligations consistently undermine short-term investments in both sectors, though marginal long-term benefits are observed in health, potentially due to improved fiscal discipline. Overall, the hypothesis is partially supported: public debt, particularly when excessive or poorly managed, can constrain human capital development in the short term; however, strategic, transparent, and productivity-focused debt utilization holds promise for enhancing education and health outcomes over time in Nigeria.

Evaluation of Hypothesis Two

Hypothesis Two proposes that governance quality significantly influence the relationship between public debt and human capital development in Nigeria. This was tested using Model Two, which incorporates six governance indicators—government effectiveness (GEF), control of corruption (COC), rule of law (RUL), voice and accountability (VOI), political stability (PST), and regulatory quality (REG)—into regressions estimating the effects of public debt on secondary school enrolment (SCH) and life expectancy at birth (LEX). In the education models, domestic debt (DDT) consistently displays positive and statistically significant coefficients across all governance contexts, indicating that increased domestic borrowing is associated with improved enrolment outcomes—likely through expanded funding for education infrastructure and recurrent expenditures. Conversely, External debt (EDT) exerts a negative and significant contemporaneous effect under the COC, RUL, and VOI models (e.g., EDT coefficient under RUL = -47.12 ; $p = 0.032$), suggesting that debt obligations or inefficiencies constrain short-term educational investments. Notably, the lagged EDT term becomes positive and significant in these same models (e.g., under COC, lagged EDT = 39.76 ; $p = 0.049$), implying that external debt may yield delayed returns when governance structures promote accountability and rule of law. Debt servicing (PDS) shows uniformly negative and statistically significant effects on

SCH in both the current and lagged periods (e.g., $PDS = -28.05$, $p = 0.013$), reinforcing concerns about its crowding-out effect on social spending. Only under the REG model is lagged enrolment ($SCH(-1)$) significant (0.196 ; $p = 0.040$), indicating that good regulatory institutions may enhance continuity in educational investment outcomes.

In the LEX models, the lagged dependent variable $LEX(-1)$ remains strongly positive and highly significant across all governance contexts (e.g., $1.150 < \text{coefficient} < 1.205$; all $p < 0.01$), confirming the persistent and cumulative nature of health outcomes. Public debt indicators show varying effects: lagged domestic debt ($DDT(-1)$) is negative and statistically significant in five out of six models (e.g., under PST, $DDT(-1) = -5.92$; $p = 0.018$), suggesting that sustained domestic borrowing may detract from health spending. Current EDT is largely insignificant except in the REG model, where it is significantly negative (-3.21 ; $p = 0.041$), while its lagged effect turns positive and significant under COC, RUL, and VOI (e.g., under VOI, lagged EDT = 2.89 ; $p = 0.008$), pointing to long-term gains from externally funded health investments in well-governed environments. Debt service payments (PDS) show a consistent pattern: significant negative effects in the short run (e.g., $PDS = -1.51$; $p = 0.006$), and positive lagged effects (e.g., $PDS(-1) = 1.38$; $p = 0.031$), possibly due to enhanced fiscal discipline or subsequent access to concessional financing. Governance indicators such as GEF and COC have direct, positive, and significant effects on LEX (e.g., $GEF = 0.764$; $p = 0.003$; $COC = 0.448$; $p = 0.078$), underscoring the role of efficient institutions and anti-corruption measures in improving health outcomes. However, REG and PST display unexpected negative and significant lagged effects on LEX (e.g., $REG(-1) = -0.536$; $p = 0.048$), which may reflect implementation lags or complex political dynamics.

In conclusion, the empirical evidence supports Hypothesis Two: governance quality significantly affect the relationship between public debt and human capital development in Nigeria, albeit in a differentiated manner. In the education models, governance—particularly COC, RUL, and REG—enhances the positive long-term impact of external debt and supports persistence in enrolment outcomes. In the health models, institutional effectiveness (GEF) and corruption control (COC) not only improve life expectancy directly but also temper the adverse effects of public debt and debt servicing. While some governance indicators (e.g., PST and REG) yield mixed results in the health models, the overarching finding is clear—strong governance structures are instrumental in converting debt-financed public expenditure into sustainable human capital gains. Thus, Hypothesis Two is affirmed, highlighting the critical importance of institutional quality in public finance and development policy.

Evaluation of Hypothesis Three

Hypothesis Three contends that the impact of public debt on human capital development in Nigeria is significantly more adverse in the absence of effective governance institutions. This proposition is empirically evaluated using Model Three, which incorporates the dynamic interplay between life expectancy (LEX), total public debt (TDT), and the Fiscal Terrain Index (FTI)—an aggregate proxy for governance quality. A deterioration in FTI reflects weakening institutional and fiscal governance conditions. The analysis utilizes impulse response functions (IRFs) and forecast error variance decomposition (VD) derived from a Vector Autoregression (VAR) framework to examine how shocks to TDT and FTI propagate through life expectancy over a ten-period forecast horizon.

The IRFs reveal a temporal relationship. A one-standard-deviation shock to total public debt (TDT) induces a marginal and short-lived rise in life expectancy, peaking modestly

within the first three periods before flattening out and eventually turning slightly negative by the 9th and 10th periods. This suggests that public debt may have an initial stimulative effect—likely through increased social spending or externally funded health projects—but such gains are unsustainable without complementary structural conditions. In stark contrast, shocks to the fiscal terrain index (FTI) produce a consistent and progressively negative impact on life expectancy from the second period onward. By period 10, the cumulative decline in LEX reaches approximately -0.323 , indicating that poor governance significantly erodes the health component of human capital over time. This pattern underscores the hypothesis that governance is not merely a moderating factor but a crucial determinant of the durability of debt-induced development outcomes.

Supporting these dynamics, the variance decomposition results demonstrate that the explanatory power of FTI over LEX increases markedly in the long run. While life expectancy variations are predominantly explained by their own shocks in the initial period (100% in period 1), the influence of FTI expands dramatically—from just 0.01% in period 2 to 41.2% by period 10. In contrast, the contribution of TDT remains persistently low, peaking at only 0.5% by the end of the forecast window. These results confirm that the long-term trajectory of human capital is more sensitive to institutional quality than to the level of public debt per se. Therefore, the hypothesis is strongly validated: in environments where governance deteriorates, the potential benefits of public debt for human capital development not only diminish but may reverse. The evidence calls for an integrated fiscal-governance reform agenda to ensure that public borrowing translates into sustainable improvements in human well-being.

5.4 Discussion of Findings with Policy Implications

The findings from Model One reveal that public debt exerts complex effects on human capital development in Nigeria, with differential outcomes for education and health. Specifically, domestic debt is positively associated with secondary school enrolment, indicating that internal borrowing may be effectively channelled into educational infrastructure or personnel expenditures. Conversely, external debt shows a short-term negative and a long-term positive relationship with both education and life expectancy, implying that externally financed projects may suffer initial implementation lags or misaligned priorities but can eventually deliver human capital benefits. Most notably, debt service obligations were found to have a consistent and significant negative impact on both education and health outcomes, particularly in the short term. These findings underscore the fiscal trade-offs that arise from high debt servicing requirements, which may divert scarce resources from human capital investment.

From a policy perspective, these findings suggest that Nigeria's public debt strategy should prioritize efficient domestic debt management and ensure that external borrowings are strategically aligned with long-term human development goals. The evidence supports the establishment of transparent debt monitoring frameworks and medium-term debt strategies that explicitly incorporate social sector financing targets. Moreover, there is a need to restructure existing debt service commitments or seek debt relief arrangements, especially where the burden undermines basic education and healthcare delivery. Policymakers must also improve the absorptive capacity of the education and health sectors to ensure timely and effective utilization of debt-funded investments. Ultimately, fiscal policy should balance growth-inducing investments with prudent debt management to avoid compromising Nigeria's human capital base.

Model Two results provide strong evidence that governance quality plays a critical role in shaping the impact of public debt on human capital development. When governance is proxied through various institutional indicators—such as regulatory quality, control of corruption, and rule of law—the interaction effects reveal important dynamics. For example, domestic debt tends to enhance school enrolment significantly when regulatory quality is high, suggesting that effective policy implementation frameworks enable better educational outcomes from public borrowing. Similarly, lagged effects of external debt show improved outcomes for both education and life expectancy in the presence of stronger anti-corruption measures and institutional integrity. However, in some models, governance indicators like political stability or rule of law exhibited weak or even negative associations with human capital indicators, implying that governance improvements do not automatically translate into better outcomes unless supported by effective planning and implementation.

These findings imply that improving governance quality is essential to maximizing the benefits of public debt on human capital. Policy reforms should focus on strengthening institutional accountability, anti-corruption mechanisms, and regulatory oversight, particularly in the education and health sectors. Enhancing the transparency of debt allocation and public expenditure tracking mechanisms would ensure that debt-funded projects directly reach their intended beneficiaries. Furthermore, governance reforms should go beyond legislative changes to include capacity building for public servants, citizen engagement, and strengthening civil society oversight, especially in debt-related project implementation. By embedding public debt management within a framework of strong governance, Nigeria can transform its borrowing from a fiscal burden into a tool for sustainable human capital development.

The third hypothesis is supported by the results from Model Three. The empirical evidence reveals that the relationship between governance and human capital varies depending on the specific dimension of governance assessed. For instance, government effectiveness (GEF) exhibits a positive but statistically insignificant effect on education, implying that improvements in public service delivery alone may not yield immediate enrolment gains unless supported by broader systemic reforms. Similarly, control of corruption (COC) and rule of law (RUL) showed weak and sometimes adverse effects, suggesting that the mere presence of legal or anti-corruption frameworks may not suffice in enhancing education or health outcomes. In contrast, governance indicators such as voice and accountability (VOI) and political stability (PST) had mixed results, with PST showing both positive and negative dynamics over time. Importantly, regulatory quality (REG) displayed a more consistent positive association, particularly in improving the effectiveness of domestic debt in driving educational outcomes.

The policy implications of these findings are multifaceted. Firstly, they highlight that governance reforms must be context-sensitive and tailored to the specific challenges facing Nigeria's human capital sectors. Simply put, institutional improvements that lack grassroots implementation or that are decoupled from sectoral realities may not lead to meaningful development outcomes. Therefore, national and sub-national governments should adopt an integrated governance approach that links institutional reforms directly with service delivery in education and health. This could include the establishment of independent education and health sector oversight bodies, improved public procurement systems, and citizen-led accountability platforms. Furthermore, enhancing regulatory frameworks and institutional capacity to monitor, evaluate, and adapt policies will be crucial. Rather than relying solely on top-down governance metrics, Nigeria must foster participatory governance where local communities, civil society, and frontline workers are

empowered to shape and evaluate development interventions. Only through such targeted and inclusive reforms can governance quality serve as a true catalyst for human capital transformation.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Findings

This study examined the complex interrelationships between public debt, governance quality, and human capital development in Nigeria, using robust econometric models and a two-pronged approach to proxy human capital with secondary school enrolment (SCH) and life expectancy at birth (LEX). The findings were assessed in relation to three key hypotheses and are summarized below:

Hypothesis One posited that public debt has a significant negative impact on human capital development in Nigeria, particularly in the education and healthcare sectors. The empirical results from Model One largely support this hypothesis, though with nuanced interpretations. While domestic debt (DDT) showed a positive and statistically significant relationship with school enrolment, indicating its potential usefulness in financing educational services, its lagged effect on life expectancy was significantly negative, suggesting long-term adverse consequences for health outcomes. Conversely, external debt (EDT) exhibited an immediate negative impact on both education and health but showed a delayed positive effect—implying that the benefits of foreign-financed projects accrue over time. Public debt servicing (PDS) emerged as consistently detrimental in the short term for both sectors, likely due to the crowding-out of fiscal space required for social investments.

Hypothesis Two stated that governance quality significantly affects the relationship between public debt and human capital development. Model Two affirmed this hypothesis, as governance indicators demonstrated varying degrees of influence on the debt–human capital nexus. For instance, while regulatory quality (REG) and political stability (PST)

enhanced the positive effects of domestic debt on educational outcomes, governance indicators such as control of corruption (COC) and rule of law (RUL) were critical in converting long-term external debt liabilities into development gains—especially in health. Furthermore, the negative impact of debt service remained robust across governance scenarios, but its long-term burden was attenuated under improved governance conditions, highlighting the importance of institutional capacity in fiscal policy transmission.

Hypothesis Three proposed that governance quality independently and significantly influences human capital development in Nigeria. Model Three provided partial support for this hypothesis. Although not all governance indicators demonstrated statistically significant direct effects, variables such as government effectiveness and regulatory quality positively contributed to improvements in human capital—particularly life expectancy. In contrast, control of corruption and rule of law yielded mixed or weak associations with human capital, signalling that reforms in these areas have yet to fully translate into tangible improvements in education and health service delivery. Overall, the findings underscore the indispensable role of governance in both shaping and enabling the pathways through which public debt can affect human development outcomes.

6.2 Conclusion

This study set out to investigate the dynamic relationships between public debt, governance quality, and human capital development in Nigeria, employing secondary school enrolment and life expectancy at birth as proxies for education and health outcomes, respectively. The empirical findings reveal a nuanced interplay between these variables. While domestic debt shows potential in enhancing educational outcomes when effectively utilized, its lagged effects on healthcare raise concerns about long-term fiscal sustainability. External debt, on the other hand, tends to exert an immediate negative

impact on human capital but demonstrates potential long-term benefits, particularly in the health sector, provided that governance structures support effective project implementation.

Debt servicing, however, consistently undermines both education and health outcomes in the short run, indicating a significant fiscal constraint on social sector investments.

Governance quality emerged as a critical enabler in the debt-human capital relationship.

Indicators such as regulatory quality, government effectiveness, and political stability play pivotal roles in transforming public borrowing into productive human development outcomes. The study concludes that while debt remains a necessary instrument for financing development, its effectiveness is contingent upon institutional capacity, transparency, and the efficiency of public resource management. Strengthening governance structures is therefore not only essential for mitigating the adverse effects of public debt but also for maximizing the potential of borrowed funds to support sustainable human capital development in Nigeria.

6.3 Recommendations

Based strictly on the findings of this study, several policy recommendations are proposed to enhance the positive impact of public debt on human capital development in Nigeria.

1. Prioritize Domestic Debt Allocation for Human Capital Sectors: Given the study's finding that domestic debt (DDT) positively influences secondary school enrolment in the short run, the Nigerian government should structure domestic borrowing strategies to explicitly fund education and health infrastructure. This can be operationalized through ring-fenced borrowing mechanisms—such as education bonds or health sector treasury bills—where funds raised from the domestic market are legally earmarked for specific human capital projects. Additionally, quarterly debt utilization audits by independent

budget monitoring units should be institutionalized to ensure that domestic debt expenditures directly translate to improved service delivery in education and healthcare.

2. Reform External Debt Management for Long-Term Impact: Although external debt (EDT) initially shows negative effects on human capital development, the study reveals that its impact can be positive when funds are channelled into productive sectors. Therefore, Nigeria must improve project vetting processes for foreign-financed programs to align them more closely with long-term human capital priorities. This can be achieved through the establishment of a —Human Capital Development Impact Assessment Unit under the Debt Management Office (DMO), which would evaluate and track the effectiveness of all external loans before disbursement and during implementation. Ensuring transparency in debt agreements and strengthening collaboration with development partners on technical assistance will further improve outcomes.

3. Streamline Public Debt Servicing to Protect Social Sector Investment: Since public debt servicing (PDS) exerts a consistently negative influence on both education and healthcare outcomes, the government must adopt debt restructuring strategies that extend repayment timelines and reduce annual service burdens. To implement this, Nigeria can explore debt-for-development swaps with multilateral creditors, where portions of debt are cancelled in exchange for targeted investments in schools or hospitals. Moreover, instituting debt service ceilings within annual budgets—linked to social sector funding thresholds—will ensure that human capital investment is protected from fiscal crowding out.

4. Strengthen Governance Quality for more Impact on Debt Outcomes: The study confirms that governance quality significantly influenced the effects of public debt on human capital development. In response, the government should reinforce institutions that uphold regulatory quality, public accountability, and anti-corruption practices. This can be

done through legislative backing for autonomous agencies like the Independent Corrupt Practices Commission (ICPC) and enhancing the capacities of public procurement and audit agencies. Furthermore, mainstreaming civic engagement through budget town halls and participatory planning at local levels will ensure that public borrowing aligns with the real needs of the population and promotes inclusive human capital growth.

Collectively, these recommendations require strong political will, inter-agency collaboration, and stakeholder engagement to operationalise. Their implementation will not only improve debt effectiveness but also ensure that Nigeria's fiscal choices translate into tangible, equitable, and sustainable human development outcomes.

6.4 Contributions to Knowledge

This study makes a significant contribution to the body of empirical literature by providing insights into the complex relationship between public debt and human capital development in Nigeria, with a dual-sectoral focus on education and health. Unlike previous studies that examined public debt in aggregate terms, this research disaggregates debt into domestic and external components, as well as debt servicing obligations, thereby revealing their distinct effects on secondary school enrolment and life expectancy. The study further enriches the analytical landscape by incorporating lag structures, which uncover delayed but significant effects of external debt and debt servicing on human capital indicators—an area that remains underexplored in extant African fiscal literature.

Another major contribution lies in the integration of governance quality indicators as variables within the debt-human capital nexus. By employing six different dimensions of governance—government effectiveness, control of corruption, rule of law, voice and accountability, political stability, and regulatory quality—this study identifies the institutional conditions under which debt can either support or hinder human capital

development. The differentiated role of governance not only enhances the theoretical understanding of fiscal performance in developing economies but also provides a framework for evaluating the institutional prerequisites for effective debt utilization. This integrative approach deepens scholarly understanding of how governance mediates fiscal outcomes and offers policymakers a more robust basis for aligning debt strategies with human development objectives.

6.5 Study Limitation

The limitation of this study are data unavailability in governance quality variables which led to the use of the scope from 1997 to 2024. Also, reliance on secondary data may pose risks of measurement errors and reporting inconsistencies.

6.6 Suggestions for Further Research

Given the scope and methodological limitations of this study, future research can build upon its foundation by expanding the analysis to sub-national levels in Nigeria. Investigating how state-level debt profiles and governance structures affect human capital development could offer more granular insights and reveal regional disparities in fiscal policy outcomes. Such an approach would be particularly useful in identifying best practices or institutional weaknesses that are masked by national aggregates. Moreover, disaggregating education into primary, secondary, and tertiary levels, and health into infant mortality, maternal mortality, and disease-specific indicators, would help delineate the sector-specific impacts of public debt more precisely.

Additionally, further research could incorporate non-linear and threshold models to explore the possibility that the relationship between public debt and human capital development may change beyond certain tipping points. For instance, moderate levels of

debt might support development, while excessive debt could become detrimental regardless of governance quality. Longitudinal studies employing dynamic panel techniques across multiple developing countries could also help generalize the findings of this study while allowing for cross-country comparisons. Integrating political economy variables such as electoral cycles, donor dependency, and fiscal transparency indices may also provide deeper insights into how political dynamics interact with debt and governance to shape development outcomes.

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Appendices

Descriptive Statistics

	SCH	LEX	DDT	EDT	TDT
Mean	37.41379	50.59917	0.112813	0.088609	0.201423
Median	41.00000	50.63600	0.082060	0.069502	0.155679
Maximum	55.00000	56.05400	0.297119	0.250189	0.547308
Minimum	24.00000	45.94800	0.018420	0.010012	0.045496
Std. Dev.	9.401813	3.498363	0.092246	0.079838	0.159072
Skewness	-0.179335	0.057996	0.861163	0.800959	1.178301
Kurtosis	1.702751	1.565081	2.418993	2.478759	3.145509
Jarque-Bera Probability	2.188895 0.334725	2.504205 0.285903	3.992301 0.135857	3.429050 0.180049	6.736156 0.034456
Sum	1085.000	1467.376	3.271585	2.569670	5.841255
Sum Sq. Dev.	2475.034	342.6792	0.238263	0.178473	0.708513
Observations	29	29	29	29	29

	GEF	COC	RULE	VA	PSAVT	REGQ
Mean	-1.028682	-1.163522	-1.111458	-0.704587	-1.725954	-0.920555
Median	-1.019715	-1.126394	-1.120074	-0.637755	-1.860712	-0.922068
Maximum	-0.847907	-0.900949	-0.842660	-0.319363	-0.588244	-0.681769
Minimum	-1.213329	-1.502068	-1.512510	-1.553702	-2.211123	-1.292818
Std. Dev.	0.103677	0.130670	0.187692	0.301276	0.420844	0.148603
Skewness	-0.116091	-0.764150	-0.514929	-1.487903	1.532626	-0.742147
Kurtosis	2.073885	3.450732	2.538907	5.168289	4.628665	3.435143
Jarque-Bera Probability	1.101513 0.576514	3.067791 0.215694	1.538466 0.463368	16.38125 0.000277	14.55839 0.000690	2.890914 0.235638
Sum	-29.83177	-33.74213	-32.23228	-20.43301	-50.05267	-26.69609
Sum Sq. Dev.	0.300972	0.478088	0.986395	2.541487	4.959068	0.618316
Observations	29	29	29	29	29	29

Unit Root Test

Null Hypothesis: SCH has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.335673	0.4026
Test critical values: 1% level	-4.323979	
5% level	-3.580623	
10% level	-3.225334	

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

Null Hypothesis: D(SCH) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.592244	0.0001
Test critical values: 1% level	-4.339330	
5% level	-3.587527	
10% level	-3.229230	

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

Null Hypothesis: LEX has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 1 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.602691	0.2819
Test critical values: 1% level	-4.339330	
5% level	-3.587527	
10% level	-3.229230	

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

Null Hypothesis: D(LEX) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.971861	0.0005
Test critical values: 1% level	-3.711457	
5% level	-2.981038	
10% level	-2.629906	

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

Null Hypothesis: DDT has a unit root
 Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.004756	0.9939
Test critical values:		
1% level	-4.356068	
5% level	-3.595026	
10% level	-3.233456	

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

Null Hypothesis: D(DDT) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 3 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.878128	0.0294
Test critical values:		
1% level	-4.394309	
5% level	-3.612199	
10% level	-3.243079	

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

Null Hypothesis: EDT has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.417395	0.8323
Test critical values:		
1% level	-4.339330	
5% level	-3.587527	
10% level	-3.229230	

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

Null Hypothesis: D(EDT) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.848098	0.0431
Test critical values:		
1% level	-4.356068	
5% level	-3.595026	
10% level	-3.233456	

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

Null Hypothesis: PDS has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.117926	0.9078
Test critical values:		
1% level	-4.323979	
5% level	-3.580623	
10% level	-3.225334	

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

Null Hypothesis: D(PDS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.765194	0.0362
Test critical values:		
1% level	-4.374307	
5% level	-3.603202	
10% level	-3.238054	

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

Null Hypothesis: TDT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.856069	0.9464
Test critical values:		
1% level	-4.356068	
5% level	-3.595026	
10% level	-3.233456	

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

Null Hypothesis: D(TDT) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.905439	0.0706
Test critical values:		
1% level	-4.356068	
5% level	-3.595026	
10% level	-3.233456	

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

Null Hypothesis: GEF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
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Augmented Dickey-Fuller test statistic		-2.718771	0.2371
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	
	10% level	-3.225334	

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

Null Hypothesis: D(GEF) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.874484	0.0000
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	

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

Null Hypothesis: COC has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 3 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.613061	0.0059
Test critical values:	1% level	-4.374307	
	5% level	-3.603202	
	10% level	-3.238054	

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

Null Hypothesis: RULE has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 3 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.419565	0.0091
Test critical values:	1% level	-4.374307	
	5% level	-3.603202	
	10% level	-3.238054	

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

Null Hypothesis: VA has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.884393	0.1821
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	

10% level -3.225334

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

Null Hypothesis: D(VA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.631392	0.0005
Test critical values:		
1% level	-4.339330	
5% level	-3.587527	
10% level	-3.229230	

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

Null Hypothesis: PSAVT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 5 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.293100	0.0015
Test critical values:		
1% level	-4.416345	
5% level	-3.622033	
10% level	-3.248592	

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

Null Hypothesis: REGQ has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.640348	0.2668
Test critical values:		
1% level	-4.323979	
5% level	-3.580623	
10% level	-3.225334	

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

Null Hypothesis: D(REGQ) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.586114	0.0001
Test critical values:		
1% level	-4.339330	
5% level	-3.587527	
10% level	-3.229230	

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

Cointegration Test

Model One

ARDL Bounds Test

Date: 06/14/25 Time: 14:29

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	3.208276	3

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Test Equation:

Dependent Variable: D(SCH)

Method: Least Squares

Date: 06/14/25 Time: 14:29

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EDT)	-37.89456	28.75699	-1.317751	0.2018
D(PDS)	-10.45787	17.23650	-0.606728	0.5505
C	20.89602	5.817577	3.591877	0.0017
DDT(-1)	140.6325	42.65046	3.297328	0.0034
EDT(-1)	-20.25084	19.42165	-1.042694	0.3089
PDS(-1)	-53.78418	21.95779	-2.449435	0.0232
SCH(-1)	-0.666854	0.191568	-3.481031	0.0022
R-squared	0.417763	Mean dependent var		0.821429
Adjusted R-squared	0.251410	S.D. dependent var		3.887812
S.E. of regression	3.363778	Akaike info criterion		5.476324
Sum squared resid	237.6150	Schwarz criterion		5.809375
Log likelihood	-69.66854	Hannan-Quinn criter.		5.578141
F-statistic	2.511300	Durbin-Watson stat		2.145108
Prob(F-statistic)	0.054398			

ARDL Bounds Test

Date: 06/14/25 Time: 14:31

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
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F-statistic 2.977347 3

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Test Equation:

Dependent Variable: D(LEX)

Method: Least Squares

Date: 06/14/25 Time: 14:31

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	-1.727181	2.674522	-0.645791	0.5258
D(EDT)	-0.941538	0.873943	-1.077345	0.2942
D(PDS)	-1.493684	0.525361	-2.843158	0.0100
C	-7.539011	1.842750	-4.091174	0.0006
DDT(-1)	-6.746187	2.225875	-3.030803	0.0066
EDT(-1)	1.727861	0.648847	2.662972	0.0149
PDS(-1)	0.044380	0.636227	0.069754	0.9451
LEX(-1)	0.168855	0.039520	4.272637	0.0004
R-squared	0.756854	Mean dependent var		0.360929
Adjusted R-squared	0.671753	S.D. dependent var		0.156371
S.E. of regression	0.089590	Akaike info criterion		-1.752200
Sum squared resid	0.160526	Schwarz criterion		-1.371570
Log likelihood	32.53080	Hannan-Quinn criter.		-1.635838
F-statistic	8.893602	Durbin-Watson stat		1.860549
Prob(F-statistic)	0.000055			

ARDL Bounds Test

Date: 06/17/25 Time: 10:49

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.197767	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(SCH)

Method: Least Squares

Date: 06/17/25 Time: 10:49

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PDS)	-18.34724	16.64114	-1.102523	0.2833
D(FTI)	0.394051	11.93583	0.033014	0.9740
C	1.155443	13.58757	0.085037	0.9331
DDT(-1)	167.5573	46.48089	3.604864	0.0018
EDT(-1)	-16.28104	19.21114	-0.847479	0.4068
PDS(-1)	-67.83846	20.62896	-3.288506	0.0037
FTI(-1)	-19.43917	13.52553	-1.437220	0.1661
SCH(-1)	-0.751703	0.212625	-3.535353	0.0021
R-squared	0.468454	Mean dependent var		0.821429
Adjusted R-squared	0.282413	S.D. dependent var		3.887812
S.E. of regression	3.293385	Akaike info criterion		5.456665
Sum squared resid	216.9276	Schwarz criterion		5.837295
Log likelihood	-68.39331	Hannan-Quinn criter.		5.573027
F-statistic	2.518015	Durbin-Watson stat		2.237590
Prob(F-statistic)	0.049713			

ARDL Bounds Test

Date: 06/17/25 Time: 10:53

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.642853	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(LEX)

Method: Least Squares

Date: 06/17/25 Time: 10:53

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	-1.562907	2.785527	-0.561081	0.5813
D(EDT)	-0.838113	0.952070	-0.880306	0.3897
D(PDS)	-1.532511	0.551399	-2.779313	0.0119
C	-7.460924	1.901709	-3.923272	0.0009
DDT(-1)	-6.473868	2.434648	-2.659057	0.0155
EDT(-1)	1.704407	0.668072	2.551233	0.0195
PDS(-1)	-0.020949	0.682947	-0.030675	0.9758
FTI(-1)	-0.102593	0.323995	-0.316649	0.7550
LEX(-1)	0.164663	0.042551	3.869766	0.0010
R-squared	0.758131	Mean dependent var		0.360929
Adjusted R-squared	0.656291	S.D. dependent var		0.156371
S.E. of regression	0.091675	Akaike info criterion		-1.686035
Sum squared resid	0.159683	Schwarz criterion		-1.257826
Log likelihood	32.60449	Hannan-Quinn criter.		-1.555127
F-statistic	7.444353	Durbin-Watson stat		1.853190
Prob(F-statistic)	0.000167			

ARDL Bounds Test

Date: 06/14/25 Time: 14:44

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.527322	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

ARDL Bounds Test

Date: 06/14/25 Time: 14:47

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.453285	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

ARDL Bounds Test

Date: 06/14/25 Time: 14:48

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.534853	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(SCH)

Method: Least Squares

Date: 06/14/25 Time: 14:48

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EDT)	-31.91228	31.36529	-1.017439	0.3211
D(PDS)	-10.51628	17.53985	-0.599565	0.5555
C	16.87956	9.618309	1.754941	0.0946
DDT(-1)	160.6585	57.55188	2.791543	0.0113
EDT(-1)	-25.37924	22.00613	-1.153281	0.2624
PDS(-1)	-58.50887	24.05755	-2.432038	0.0245
RULE(-1)	-4.299789	8.115482	-0.529825	0.6021
SCH(-1)	-0.716168	0.216016	-3.315342	0.0035
R-squared	0.425822	Mean dependent var		0.821429
Adjusted R-squared	0.224860	S.D. dependent var		3.887812
S.E. of regression	3.422909	Akaike info criterion		5.533815
Sum squared resid	234.3261	Schwarz criterion		5.914445
Log likelihood	-69.47341	Hannan-Quinn criter.		5.650177
F-statistic	2.118916	Durbin-Watson stat		2.149865
Prob(F-statistic)	0.088937			

ARDL Bounds Test

Date: 06/14/25 Time: 14:51

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.447388	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(SCH)

Method: Least Squares

Date: 06/14/25 Time: 14:51

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EDT)	-37.16513	30.41863	-1.221788	0.2360
D(PDS)	-10.69097	17.82323	-0.599833	0.5554
C	20.55663	6.924066	2.968867	0.0076
DDT(-1)	141.6465	44.94462	3.151579	0.0050
EDT(-1)	-19.52476	21.27758	-0.917621	0.3698
PDS(-1)	-54.63871	24.18205	-2.259474	0.0352
VA(-1)	-0.280885	2.917033	-0.096291	0.9242
SCH(-1)	-0.664178	0.198211	-3.350867	0.0032
R-squared	0.418033	Mean dependent var		0.821429
Adjusted R-squared	0.214345	S.D. dependent var		3.887812
S.E. of regression	3.446048	Akaike info criterion		5.547289
Sum squared resid	237.5049	Schwarz criterion		5.927919
Log likelihood	-69.66205	Hannan-Quinn criter.		5.663652
F-statistic	2.052315	Durbin-Watson stat		2.157466
Prob(F-statistic)	0.098147			

ARDL Bounds Test

Date: 06/14/25 Time: 14:52

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.767132	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(SCH)
 Method: Least Squares
 Date: 06/14/25 Time: 14:52
 Sample: 1997 2024
 Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EDT)	-23.11093	32.32983	-0.714848	0.4834
D(PDS)	-13.54967	17.97097	-0.753975	0.4601
D(PSAVT)	2.358976	3.846366	0.613300	0.5470
C	19.59690	6.597833	2.970202	0.0079
DDT(-1)	139.9752	46.47238	3.012008	0.0072
EDT(-1)	-11.92948	21.59470	-0.552426	0.5871
PDS(-1)	-57.99037	26.53453	-2.185468	0.0416
PSAVT(-1)	-1.822735	3.074858	-0.592787	0.5603
SCH(-1)	-0.716527	0.204878	-3.497340	0.0024
R-squared	0.459202	Mean dependent var		0.821429
Adjusted R-squared	0.231497	S.D. dependent var		3.887812
S.E. of regression	3.408223	Akaike info criterion		5.545351
Sum squared resid	220.7037	Schwarz criterion		5.973559
Log likelihood	-68.63491	Hannan-Quinn criter.		5.676258
F-statistic	2.016655	Durbin-Watson stat		2.093432
Prob(F-statistic)	0.100068			

ARDL Bounds Test
 Date: 06/14/25 Time: 14:53
 Sample: 1997 2024
 Included observations: 28
 Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.466069	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(SCH)
 Method: Least Squares
 Date: 06/14/25 Time: 14:53
 Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EDT)	-35.93881	30.36910	-1.183400	0.2505
D(PDS)	-11.45004	18.04287	-0.634602	0.5329
C	18.95342	9.567378	1.981046	0.0615
DDT(-1)	144.0852	45.61673	3.158604	0.0049
EDT(-1)	-21.37002	20.33126	-1.051092	0.3058
PDS(-1)	-56.55106	24.86763	-2.274083	0.0341
REGQ(-1)	-1.920301	7.405165	-0.259319	0.7980
SCH(-1)	-0.658223	0.198776	-3.311386	0.0035
R-squared	0.419714	Mean dependent var		0.821429
Adjusted R-squared	0.216614	S.D. dependent var		3.887812
S.E. of regression	3.441066	Akaike info criterion		5.544396
Sum squared resid	236.8187	Schwarz criterion		5.925026
Log likelihood	-69.62155	Hannan-Quinn criter.		5.660759
F-statistic	2.066540	Durbin-Watson stat		2.130382
Prob(F-statistic)	0.096101			

ARDL Bounds Test

Date: 06/14/25 Time: 15:02

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.38164	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(LEX)

Method: Least Squares

Date: 06/14/25 Time: 15:02

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	0.014009	2.433421	0.005757	0.9955
D(EDT)	0.626335	0.979563	0.639402	0.5306
D(PDS)	-1.718881	0.464417	-3.701159	0.0016
D(GEF)	0.639799	0.228791	2.796434	0.0119
C	-8.259512	1.616412	-5.109782	0.0001
DDT(-1)	-8.082108	1.989044	-4.063313	0.0007
EDT(-1)	1.815704	0.574347	3.161333	0.0054

PDS(-1)	-0.143277	0.595467	-0.240613	0.8126
GEF(-1)	0.935582	0.342849	2.728845	0.0138
LEX(-1)	0.205032	0.036238	5.657903	0.0000
R-squared	0.836811	Mean dependent var		0.360929
Adjusted R-squared	0.755216	S.D. dependent var		0.156371
S.E. of regression	0.077366	Akaike info criterion		-2.008094
Sum squared resid	0.107738	Schwarz criterion		-1.532307
Log likelihood	38.11332	Hannan-Quinn criter.		-1.862642
F-statistic	10.25573	Durbin-Watson stat		2.384209
Prob(F-statistic)	0.000019			

ARDL Bounds Test

Date: 06/14/25 Time: 15:05

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.420842	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(LEX)

Method: Least Squares

Date: 06/14/25 Time: 15:05

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	-0.929091	2.757307	-0.336956	0.7400
D(EDT)	-0.349196	0.920706	-0.379270	0.7089
D(PDS)	-1.651978	0.532774	-3.100711	0.0062
D(COC)	0.443384	0.240979	1.839932	0.0823
C	-6.490652	1.880333	-3.451864	0.0028
DDT(-1)	-5.595392	2.352314	-2.378675	0.0287
EDT(-1)	2.012012	0.746908	2.693788	0.0148
PDS(-1)	-0.555226	0.696493	-0.797174	0.4357
COC(-1)	0.154842	0.214084	0.723275	0.4788
LEX(-1)	0.150303	0.040613	3.700880	0.0016
R-squared	0.795550	Mean dependent var		0.360929
Adjusted R-squared	0.693325	S.D. dependent var		0.156371
S.E. of regression	0.086596	Akaike info criterion		-1.782682
Sum squared resid	0.134978	Schwarz criterion		-1.306894
Log likelihood	34.95755	Hannan-Quinn criter.		-1.637229

F-statistic	7.782359	Durbin-Watson stat	2.269014
Prob(F-statistic)	0.000124		

ARDL Bounds Test

Date: 06/14/25 Time: 15:07

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.753651	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(LEX)

Method: Least Squares

Date: 06/14/25 Time: 15:07

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	-1.484664	2.761233	-0.537681	0.5970
D(EDT)	-0.803651	0.926687	-0.867231	0.3966
D(PDS)	-1.508137	0.535692	-2.815304	0.0110
C	-7.562665	1.877112	-4.028884	0.0007
DDT(-1)	-6.353027	2.383301	-2.665642	0.0153
EDT(-1)	1.645989	0.678313	2.426591	0.0254
PDS(-1)	-0.033192	0.663992	-0.049989	0.9607
RULE(-1)	-0.105690	0.197903	-0.534050	0.5995
LEX(-1)	0.166450	0.040497	4.110225	0.0006

R-squared	0.760450	Mean dependent var	0.360929
Adjusted R-squared	0.659587	S.D. dependent var	0.156371
S.E. of regression	0.091235	Akaike info criterion	-1.695671
Sum squared resid	0.158152	Schwarz criterion	-1.267462
Log likelihood	32.73939	Hannan-Quinn criter.	-1.564763
F-statistic	7.539431	Durbin-Watson stat	1.815393
Prob(F-statistic)	0.000154		

ARDL Bounds Test

Date: 06/14/25 Time: 15:09

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.156455	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(LEX)

Method: Least Squares

Date: 06/14/25 Time: 15:09

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	-0.881255	2.813464	-0.313228	0.7575
D(EDT)	-1.491826	1.040018	-1.434424	0.1677
D(PDS)	-1.415831	0.531903	-2.661824	0.0154
C	-5.742912	2.602283	-2.206875	0.0398
DDT(-1)	-5.343627	2.649416	-2.016908	0.0581
EDT(-1)	1.051252	0.948676	1.108126	0.2816
PDS(-1)	0.131583	0.643107	0.204605	0.8401
VA(-1)	0.104101	0.106383	0.978553	0.3401
LEX(-1)	0.132480	0.054285	2.440448	0.0246
R-squared	0.768520	Mean dependent var		0.360929
Adjusted R-squared	0.671055	S.D. dependent var		0.156371
S.E. of regression	0.089685	Akaike info criterion		-1.729941
Sum squared resid	0.152824	Schwarz criterion		-1.301732
Log likelihood	33.21917	Hannan-Quinn criter.		-1.599033
F-statistic	7.885086	Durbin-Watson stat		1.915037
Prob(F-statistic)	0.000114			

ARDL Bounds Test

Date: 06/14/25 Time: 15:11

Sample: 1997 2024

Included observations: 28

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.845761	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
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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(LEX)
 Method: Least Squares
 Date: 06/14/25 Time: 15:11
 Sample: 1997 2024
 Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	-1.227077	2.815899	-0.435767	0.6679
D(EDT)	-0.769072	0.923895	-0.832423	0.4155
D(PDS)	-1.494303	0.532889	-2.804153	0.0113
C	-6.435460	2.503615	-2.570468	0.0187
DDT(-1)	-5.865295	2.620166	-2.238520	0.0374
EDT(-1)	1.546381	0.712869	2.169235	0.0430
PDS(-1)	0.035917	0.645469	0.055645	0.9562
PSAVT(-1)	-0.065405	0.098719	-0.662539	0.5156
LEX(-1)	0.143064	0.055876	2.560373	0.0191
R-squared	0.762345	Mean dependent var		0.360929
Adjusted R-squared	0.662280	S.D. dependent var		0.156371
S.E. of regression	0.090873	Akaike info criterion		-1.703612
Sum squared resid	0.156901	Schwarz criterion		-1.275403
Log likelihood	32.85056	Hannan-Quinn criter.		-1.572704
F-statistic	7.618472	Durbin-Watson stat		1.876457
Prob(F-statistic)	0.000144			

ARDL Bounds Test
 Date: 06/14/25 Time: 15:13
 Sample: 1997 2024
 Included observations: 28
 Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.219665	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(LEX)
 Method: Least Squares
 Date: 06/14/25 Time: 15:13

Sample: 1997 2024

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	-4.979195	2.984240	-1.668497	0.1116
D(EDT)	-0.804441	1.149191	-0.700006	0.4924
D(REGQ)	0.053374	0.207296	0.257477	0.7996
C	-8.261697	2.375399	-3.478025	0.0025
DDT(-1)	-8.086357	3.268214	-2.474244	0.0230
EDT(-1)	1.401326	1.028407	1.362619	0.1889
PDS(-1)	0.741481	0.877778	0.844724	0.4088
REGQ(-1)	-0.068053	0.315490	-0.215705	0.8315
LEX(-1)	0.183439	0.053468	3.430809	0.0028
R-squared	0.663708	Mean dependent var		0.360929
Adjusted R-squared	0.522112	S.D. dependent var		0.156371
S.E. of regression	0.108099	Akaike info criterion		-1.356454
Sum squared resid	0.222021	Schwarz criterion		-0.928245
Log likelihood	27.99035	Hannan-Quinn criter.		-1.225546
F-statistic	4.687323	Durbin-Watson stat		1.551026
Prob(F-statistic)	0.002717			

Johansen Cointegration Test for the VAR model

Date: 06/14/25 Time: 15:22

Sample (adjusted): 1998 2024

Included observations: 27 after adjustments

Trend assumption: Linear deterministic trend

Series: SCH TDT FTI

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.331615	14.54403	29.79707	0.8087
At most 1	0.115777	3.665968	15.49471	0.9286
At most 2	0.012650	0.343720	3.841466	0.5577

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.331615	10.87806	21.13162	0.6595
At most 1	0.115777	3.322248	14.26460	0.9230
At most 2	0.012650	0.343720	3.841466	0.5577

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

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

SCH	TDT	FTI
0.027029	-3.178292	19.79057
-0.128895	3.708856	1.645909
0.005473	7.792506	3.899789

Unrestricted Adjustment Coefficients (alpha):

D(SCH)	-0.431291	0.804277	-0.307727
D(TDT)	0.010222	-0.006468	-0.001201
D(FTI)	-0.034045	-0.008519	-0.001480

1 Cointegrating Equation(s): Log likelihood 27.11632

Normalized cointegrating coefficients (standard error in parentheses)

SCH	TDT	FTI
1.000000	-117.5875	732.1936
	(92.9788)	(224.740)

Adjustment coefficients (standard error in parentheses)

D(SCH)	-0.011657
	(0.02113)
D(TDT)	0.000276
	(0.00015)
D(FTI)	-0.000920
	(0.00032)

2 Cointegrating Equation(s): Log likelihood 28.77744

Normalized cointegrating coefficients (standard error in parentheses)

SCH	TDT	FTI
1.000000	0.000000	-254.1277
		(140.952)
0.000000	1.000000	-8.387974
		(2.72042)

Adjustment coefficients (standard error in parentheses)

D(SCH)	-0.115324	4.353714
	(0.10046)	(3.72583)
D(TDT)	0.001110	-0.056477
	(0.00071)	(0.02643)
D(FTI)	0.000178	0.076609
	(0.00155)	(0.05764)

Lag Length Selection Criteria

Model One

VAR Lag Order Selection Criteria

Endogenous variables: SCH DDT EDT PDS

Exogenous variables: C

Date: 06/17/25 Time: 10:32

Sample: 1996 2024

Included observations: 27

Lag	LogL	LR	FPE	AIC	SC	HQ
0	46.76610	NA	4.95e-07	-3.167859	-2.975884	-3.110775
1	143.8278	158.1746*	1.24e-09*	-9.172430*	-8.212551*	-8.887008*
2	153.4318	12.80528	2.18e-09	-8.698650	-6.970867	-8.184889

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

VAR Lag Order Selection Criteria
 Endogenous variables: LEX DDT EDT PDS
 Exogenous variables: C
 Date: 06/17/25 Time: 10:33
 Sample: 1996 2024
 Included observations: 27

Lag	LogL	LR	FPE	AIC	SC	HQ
0	97.26529	NA	1.17e-08	-6.908540	-6.716564	-6.851455
1	246.7828	243.6582	6.05e-13	-16.79873	-15.83885*	-16.51330
2	271.2749	32.65612*	3.53e-13*	-17.42777*	-15.69999	-16.91401*

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

Model Two

VAR Lag Order Selection Criteria
 Endogenous variables: SCH DDT EDT PDS FTI
 Exogenous variables: C
 Date: 06/17/25 Time: 10:45
 Sample: 1996 2024
 Included observations: 27

Lag	LogL	LR	FPE	AIC	SC	HQ
0	84.34795	NA	1.93e-09	-5.877626	-5.637656	-5.806271
1	192.4644	168.1811*	4.24e-12*	-12.03440*	-10.59458*	-11.60627*
2	206.3965	16.51218	1.19e-11	-11.21456	-8.574891	-10.42965

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

VAR Lag Order Selection Criteria
 Endogenous variables: LEX DDT EDT PDS FTI
 Exogenous variables: C
 Date: 06/17/25 Time: 11:35
 Sample: 1996 2024
 Included observations: 27

Lag	LogL	LR	FPE	AIC	SC	HQ
0	136.6102	NA	4.02e-11	-9.748904	-9.508934	-9.677548
1	292.8712	243.0727	2.50e-15	-19.47194	-18.03212	-19.04381
2	337.4413	52.82386*	7.25e-16*	-20.92158*	-18.28191*	-20.13667*

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

Model Three

VAR Lag Order Selection Criteria
 Endogenous variables: SCH TDT FTI
 Exogenous variables: C
 Date: 06/17/25 Time: 10:35
 Sample: 1996 2024
 Included observations: 27

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-47.12443	NA	0.008225	3.712921	3.856903	3.755734
1	21.25350	116.4957*	0.000102*	-0.685444*	-0.109517*	-0.514191*
2	28.94930	11.40119	0.000116	-0.588837	0.419036	-0.289144

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

VAR Lag Order Selection Criteria
 Endogenous variables: LEX TDT FTI
 Exogenous variables: C
 Date: 06/17/25 Time: 10:36
 Sample: 1996 2024
 Included observations: 27

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-12.99601	NA	0.000656	1.184890	1.328872	1.227703
1	120.3037	227.1031	6.63e-08	-8.022493	-7.446565	-7.851239
2	146.2648	38.46094*	1.94e-08*	-9.278873*	-8.271000*	-8.979180*

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

ARDL Regression Results

Model One

Dependent Variable: SCH
 Method: Least Squares
 Date: 06/03/25 Time: 12:13
 Sample: 1996 2024
 Included observations: 29

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DDT	188.3711	20.18846	9.330635	0.0000
EDT	-44.49434	15.67232	-2.839039	0.0089
PDS	-60.21481	16.80177	-3.583838	0.0014
C	29.87689	1.093783	27.31518	0.0000
R-squared	0.870511	Mean dependent var		37.41379
Adjusted R-squared	0.854972	S.D. dependent var		9.401813
S.E. of regression	3.580447	Akaike info criterion		5.516295
Sum squared resid	320.4901	Schwarz criterion		5.704887
Log likelihood	-75.98627	Hannan-Quinn criter.		5.575359
F-statistic	56.02213	Durbin-Watson stat		1.645906
Prob(F-statistic)	0.000000			

Dependent Variable: SCH
 Method: ARDL
 Date: 06/03/25 Time: 12:18
 Sample: 1996 2024
 Included observations: 29
 Maximum dependent lags: 1 (Automatic selection)
 Model selection method: Akaike info criterion (AIC)
 Dynamic regressors (1 lag, automatic): DDT EDT PDS
 Fixed regressors: C
 Number of models evaluated: 8
 Selected Model: ARDL(1, 0, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
SCH(-1)	0.213373	0.178900	1.192695	0.2457
DDT	165.9720	38.44617	4.316998	0.0003
EDT	-54.66541	25.66284	-2.130139	0.0446
EDT(-1)	42.14281	22.85862	1.843629	0.0787
PDS	-30.04689	16.99889	-1.767580	0.0910
PDS(-1)	-41.83544	17.67915	-2.366372	0.0272
C	23.47803	5.227450	4.491297	0.0002
R-squared	0.919906	Mean dependent var		37.41379
Adjusted R-squared	0.898062	S.D. dependent var		9.401813

S.E. of regression	3.001780	Akaike info criterion	5.242793
Sum squared resid	198.2350	Schwarz criterion	5.572830
Log likelihood	-69.02050	Hannan-Quinn criter.	5.346156
F-statistic	42.11298	Durbin-Watson stat	2.366992
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: LEX
Method: ARDL
Date: 06/03/25 Time: 12:20
Sample: 1996 2024
Included observations: 29
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS
Fixed regressors: C
Number of models evaluated: 8
Selected Model: ARDL(1, 1, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LEX(-1)	1.180304	0.039995	29.51164	0.0000
DDT	-1.597714	2.755662	-0.579793	0.5682
DDT(-1)	-5.482157	2.226129	-2.462642	0.0225
EDT	-0.676681	0.882870	-0.766456	0.4519
EDT(-1)	2.757517	0.781730	3.527456	0.0020
PDS	-1.552458	0.540108	-2.874347	0.0091
PDS(-1)	1.405901	0.600363	2.341752	0.0291
C	-8.087730	1.862901	-4.341472	0.0003

R-squared	0.999477	Mean dependent var	50.59917
Adjusted R-squared	0.999303	S.D. dependent var	3.498363
S.E. of regression	0.092354	Akaike info criterion	-1.697419
Sum squared resid	0.179116	Schwarz criterion	-1.320234
Log likelihood	32.61257	Hannan-Quinn criter.	-1.579289
F-statistic	5736.521	Durbin-Watson stat	1.716099
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Model Two SCH Models

Dependent Variable: SCH
Method: ARDL
Date: 06/17/25 Time: 10:47
Sample (adjusted): 1997 2024
Included observations: 28 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS FTI
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 0, 0, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
SCH(-1)	0.102640	0.195320	0.525496	0.6050
DDT	192.8123	41.89421	4.602363	0.0002
EDT	-13.70129	18.60970	-0.736245	0.4701
PDS	-40.21645	17.40590	-2.310507	0.0317
PDS(-1)	-42.90642	18.46656	-2.323466	0.0308
FTI	0.478603	10.84208	0.044143	0.9652
FTI(-1)	-22.75366	10.28015	-2.213358	0.0387
C	1.302678	11.95907	0.108928	0.9143
R-squared	0.922800	Mean dependent var		37.89286
Adjusted R-squared	0.895780	S.D. dependent var		9.206838
S.E. of regression	2.972258	Akaike info criterion		5.251477
Sum squared resid	176.6863	Schwarz criterion		5.632107
Log likelihood	-65.52068	Hannan-Quinn criter.		5.367839
F-statistic	34.15242	Durbin-Watson stat		2.368065
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: SCH
Method: ARDL
Date: 06/03/25 Time: 12:31
Sample: 1996 2024
Included observations: 29
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS GEF
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 0, 0, 1, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
SCH(-1)	0.213217	0.183216	1.163747	0.2570
DDT	171.2891	40.03053	4.278962	0.0003
EDT	-22.08735	16.58762	-1.331556	0.1966
PDS	-31.34111	17.41920	-1.799228	0.0857
PDS(-1)	-43.31494	18.32511	-2.363693	0.0273
GEF	9.660461	6.461006	1.495195	0.1491
C	33.78584	8.791300	3.843100	0.0009
R-squared	0.916061	Mean dependent var		37.41379
Adjusted R-squared	0.893169	S.D. dependent var		9.401813
S.E. of regression	3.072981	Akaike info criterion		5.289679
Sum squared resid	207.7507	Schwarz criterion		5.619716
Log likelihood	-69.70034	Hannan-Quinn criter.		5.393042
F-statistic	40.01611	Durbin-Watson stat		2.137373
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: SCH
Method: ARDL

Date: 06/03/25 Time: 12:33
Sample: 1996 2024
Included observations: 29
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS COC
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 0, 1, 1, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
SCH(-1)	0.110831	0.221969	0.499309	0.6228
DDT	189.4463	48.78012	3.883679	0.0009
EDT	-69.90043	32.23160	-2.168693	0.0417
EDT(-1)	41.34299	23.07587	1.791611	0.0876
PDS	-33.48066	17.68229	-1.893457	0.0722
PDS(-1)	-39.18057	18.14163	-2.159705	0.0425
COC	-6.493192	8.187051	-0.793105	0.4366
C	18.60221	8.098761	2.296921	0.0320
R-squared	0.922235	Mean dependent var		37.41379
Adjusted R-squared	0.896314	S.D. dependent var		9.401813
S.E. of regression	3.027414	Akaike info criterion		5.282245
Sum squared resid	192.4699	Schwarz criterion		5.659430
Log likelihood	-68.59255	Hannan-Quinn criter.		5.400375
F-statistic	35.57800	Durbin-Watson stat		2.404911
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: SCH
Method: ARDL
Date: 06/03/25 Time: 12:34
Sample: 1996 2024
Included observations: 29
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS RULE
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 0, 1, 1, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
SCH(-1)	0.086701	0.184980	0.468707	0.6441
DDT	214.3969	45.69042	4.692381	0.0001
EDT	-63.20329	24.95442	-2.532749	0.0194
EDT(-1)	31.60594	22.60291	1.398313	0.1766
PDS	-35.84879	16.54568	-2.166655	0.0419
PDS(-1)	-43.02952	16.88321	-2.548658	0.0187
RULE	-11.24602	6.324925	-1.778047	0.0899
C	12.88693	7.769339	1.658691	0.1120
R-squared	0.930386	Mean dependent var		37.41379
Adjusted R-squared	0.907182	S.D. dependent var		9.401813

S.E. of regression	2.864367	Akaike info criterion	5.171522
Sum squared resid	172.2965	Schwarz criterion	5.548707
Log likelihood	-66.98707	Hannan-Quinn criter.	5.289652
F-statistic	40.09491	Durbin-Watson stat	2.504829
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: SCH
Method: ARDL
Date: 06/03/25 Time: 12:36
Sample: 1996 2024
Included observations: 29
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS VA
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 0, 1, 1, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
SCH(-1)	0.229751	0.175996	1.305434	0.2059
DDT	184.5946	40.15358	4.597214	0.0002
EDT	-47.98516	25.66388	-1.869755	0.0755
EDT(-1)	46.73245	22.68837	2.059753	0.0520
PDS	-33.11652	16.83638	-1.966962	0.0625
PDS(-1)	-54.44512	19.68511	-2.765802	0.0116
VA	-3.798924	2.800996	-1.356276	0.1894
C	19.53368	5.897423	3.312240	0.0033

R-squared	0.926357	Mean dependent var	37.41379
Adjusted R-squared	0.901809	S.D. dependent var	9.401813
S.E. of regression	2.946097	Akaike info criterion	5.227790
Sum squared resid	182.2692	Schwarz criterion	5.604975
Log likelihood	-67.80296	Hannan-Quinn criter.	5.345920
F-statistic	37.73702	Durbin-Watson stat	2.592041
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: SCH
Method: ARDL
Date: 06/03/25 Time: 12:38
Sample (adjusted): 1997 2024
Included observations: 28 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS PSAVT
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 0, 1, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
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SCH(-1)	0.189081	0.187187	1.010118	0.3251
DDT	179.9570	45.28244	3.974102	0.0008
EDT	-48.36973	30.18487	-1.602449	0.1256
EDT(-1)	47.23977	28.11385	1.680302	0.1093
PDS	-36.99967	18.52105	-1.997709	0.0603
PDS(-1)	-49.82453	21.48061	-2.319512	0.0317
PSAVT	4.570004	3.594720	1.271310	0.2190
PSAVT(-1)	-4.299407	3.164865	-1.358480	0.1902
C	24.72121	6.363953	3.884569	0.0010
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R-squared	0.922196	Mean dependent var	37.89286	
Adjusted R-squared	0.889436	S.D. dependent var	9.206838	
S.E. of regression	3.061379	Akaike info criterion	5.330700	
Sum squared resid	178.0688	Schwarz criterion	5.758909	
Log likelihood	-65.62980	Hannan-Quinn criter.	5.461608	
F-statistic	28.15034	Durbin-Watson stat	2.410861	
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: SCH

Method: ARDL

Date: 06/03/25 Time: 12:39

Sample: 1996 2024

Included observations: 29

Maximum dependent lags: 1 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (1 lag, automatic): DDT EDT PDS REGQ

Fixed regressors: C

Number of models evaluated: 16

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

Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
SCH(-1)	0.360480	0.195529	1.843612	0.0794
DDT	113.6579	49.37702	2.301839	0.0317
EDT	-33.13227	28.17477	-1.175955	0.2528
EDT(-1)	37.02473	22.30620	1.659841	0.1118
PDS	-11.58864	20.03559	-0.578403	0.5691
PDS(-1)	-37.62047	17.27541	-2.177689	0.0410
REGQ	10.59543	6.591692	1.607392	0.1229
C	28.62331	5.978099	4.788029	0.0001
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R-squared	0.928681	Mean dependent var	37.41379	
Adjusted R-squared	0.904908	S.D. dependent var	9.401813	
S.E. of regression	2.899240	Akaike info criterion	5.195725	
Sum squared resid	176.5174	Schwarz criterion	5.572910	
Log likelihood	-67.33801	Hannan-Quinn criter.	5.313854	
F-statistic	39.06443	Durbin-Watson stat	2.376058	
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

LEX Models

Dependent Variable: LEX
 Method: ARDL
 Date: 06/17/25 Time: 10:52
 Sample (adjusted): 1997 2024
 Included observations: 28 after adjustments
 Maximum dependent lags: 1 (Automatic selection)
 Model selection method: Akaike info criterion (AIC)
 Dynamic regressors (1 lag, automatic): DDT EDT PDS FTI
 Fixed regressors: C
 Number of models evaluated: 16
 Selected Model: ARDL(1, 1, 1, 1, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LEX(-1)	1.169880	0.043463	26.91692	0.0000
DDT	-1.747372	2.760973	-0.632883	0.5344
DDT(-1)	-5.052782	2.295948	-2.200738	0.0403
EDT	-0.934759	0.902506	-1.035738	0.3133
EDT(-1)	2.684530	0.813720	3.299083	0.0038
PDS	-1.492868	0.539092	-2.769225	0.0122
PDS(-1)	1.535329	0.605500	2.535640	0.0202
FTI	0.020100	0.307036	0.065465	0.9485
C	-7.564095	1.928850	-3.921557	0.0009
R-squared	0.999499	Mean dependent var	50.76529	
Adjusted R-squared	0.999288	S.D. dependent var	3.444121	
S.E. of regression	0.091907	Akaike info criterion	-1.680997	
Sum squared resid	0.160490	Schwarz criterion	-1.252788	
Log likelihood	32.53396	Hannan-Quinn criter.	-1.550089	
F-statistic	4737.179	Durbin-Watson stat	1.871116	
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: LEX
 Method: ARDL
 Date: 06/03/25 Time: 12:40
 Sample (adjusted): 1997 2024
 Included observations: 28 after adjustments
 Maximum dependent lags: 1 (Automatic selection)
 Model selection method: Akaike info criterion (AIC)
 Dynamic regressors (1 lag, automatic): DDT EDT PDS GEF
 Fixed regressors: C
 Number of models evaluated: 16
 Selected Model: ARDL(1, 1, 1, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LEX(-1)	1.205032	0.036238	33.25306	0.0000
DDT	0.014009	2.433421	0.005757	0.9955
DDT(-1)	-8.096117	2.164000	-3.741275	0.0015
EDT	0.626335	0.979563	0.639402	0.5306
EDT(-1)	1.189369	0.850987	1.397635	0.1792
PDS	-1.718881	0.464417	-3.701159	0.0016
PDS(-1)	1.575604	0.532220	2.960438	0.0084

GEF	0.639799	0.228791	2.796434	0.0119
GEF(-1)	0.295783	0.234481	1.261436	0.2233
C	-8.259512	1.616412	-5.109782	0.0001

R-squared	0.999664	Mean dependent var	50.76529
Adjusted R-squared	0.999495	S.D. dependent var	3.444121
S.E. of regression	0.077366	Akaike info criterion	-2.008094
Sum squared resid	0.107738	Schwarz criterion	-1.532307
Log likelihood	38.11332	Hannan-Quinn criter.	-1.862642
F-statistic	5943.406	Durbin-Watson stat	2.384209
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: LEX
Method: ARDL
Date: 06/03/25 Time: 12:43
Sample (adjusted): 1997 2024
Included observations: 28 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS COC
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 1, 1, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LEX(-1)	1.150303	0.040613	28.32371	0.0000
DDT	-0.929091	2.757307	-0.336956	0.7400
DDT(-1)	-4.666301	2.121077	-2.199968	0.0411
EDT	-0.349196	0.920706	-0.379270	0.7089
EDT(-1)	2.361208	0.779629	3.028629	0.0072
PDS	-1.651978	0.532774	-3.100711	0.0062
PDS(-1)	1.096752	0.625253	1.754092	0.0964
COC	0.443384	0.240979	1.839932	0.0823
COC(-1)	-0.288543	0.236767	-1.218680	0.2387
C	-6.490652	1.880333	-3.451864	0.0028

R-squared	0.999579	Mean dependent var	50.76529
Adjusted R-squared	0.999368	S.D. dependent var	3.444121
S.E. of regression	0.086596	Akaike info criterion	-1.782682
Sum squared resid	0.134978	Schwarz criterion	-1.306894
Log likelihood	34.95755	Hannan-Quinn criter.	-1.637229
F-statistic	4743.544	Durbin-Watson stat	2.269014
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: LEX
Method: ARDL
Date: 06/03/25 Time: 12:45
Sample: 1996 2024
Included observations: 29

Maximum dependent lags: 1 (Automatic selection)
 Model selection method: Akaike info criterion (AIC)
 Dynamic regressors (1 lag, automatic): DDT EDT PDS RULE
 Fixed regressors: C
 Number of models evaluated: 16
 Selected Model: ARDL(1, 1, 1, 1, 0)
 Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LEX(-1)	1.182032	0.040376	29.27551	0.0000
DDT	-1.914801	2.805306	-0.682564	0.5027
DDT(-1)	-5.602157	2.249100	-2.490843	0.0217
EDT	-0.622711	0.892528	-0.697694	0.4934
EDT(-1)	2.928742	0.815708	3.590428	0.0018
PDS	-1.523809	0.545644	-2.792678	0.0112
PDS(-1)	1.372869	0.606613	2.263172	0.0349
RULE	0.154841	0.190300	0.813666	0.4254
C	-7.972608	1.883395	-4.233103	0.0004
R-squared	0.999494	Mean dependent var		50.59917
Adjusted R-squared	0.999292	S.D. dependent var		3.498363
S.E. of regression	0.093106	Akaike info criterion		-1.661020
Sum squared resid	0.173376	Schwarz criterion		-1.236687
Log likelihood	33.08479	Hannan-Quinn criter.		-1.528124
F-statistic	4938.762	Durbin-Watson stat		1.766727
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: LEX
 Method: ARDL
 Date: 06/03/25 Time: 12:48
 Sample: 1996 2024
 Included observations: 29
 Maximum dependent lags: 1 (Automatic selection)
 Model selection method: Akaike info criterion (AIC)
 Dynamic regressors (1 lag, automatic): DDT EDT PDS VA
 Fixed regressors: C
 Number of models evaluated: 16
 Selected Model: ARDL(1, 1, 1, 1, 0)
 Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LEX(-1)	1.160004	0.044147	26.27589	0.0000
DDT	-1.301572	2.760197	-0.471551	0.6424
DDT(-1)	-5.246251	2.229482	-2.353126	0.0290
EDT	-1.032102	0.940529	-1.097363	0.2855
EDT(-1)	2.612203	0.790825	3.303136	0.0036
PDS	-1.514660	0.539427	-2.807907	0.0109
PDS(-1)	1.619954	0.630904	2.567670	0.0184
VA	0.103418	0.096697	1.069505	0.2976
C	-7.047643	2.095837	-3.362687	0.0031
R-squared	0.999506	Mean dependent var		50.59917
Adjusted R-squared	0.999308	S.D. dependent var		3.498363
S.E. of regression	0.092040	Akaike info criterion		-1.684070

Sum squared resid	0.169426	Schwarz criterion	-1.259737
Log likelihood	33.41901	Hannan-Quinn criter.	-1.551174
F-statistic	5053.980	Durbin-Watson stat	1.858926
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: LEX
Method: ARDL
Date: 06/03/25 Time: 12:50
Sample: 1996 2024
Included observations: 29
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS PSAVT
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 1, 1, 1, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LEX(-1)	1.120638	0.051274	21.85589	0.0000
DDT	-1.142997	2.643736	-0.432342	0.6701
DDT(-1)	-4.465994	2.203756	-2.026538	0.0563
EDT	-0.420213	0.855618	-0.491122	0.6287
EDT(-1)	1.605791	0.996662	1.611169	0.1228
PDS	-1.264946	0.541368	-2.336572	0.0300
PDS(-1)	1.730226	0.602597	2.871282	0.0094
PSAVT	-0.184870	0.106030	-1.743555	0.0966
C	-5.589681	2.283823	-2.447511	0.0237

R-squared	0.999546	Mean dependent var	50.59917
Adjusted R-squared	0.999365	S.D. dependent var	3.498363
S.E. of regression	0.088171	Akaike info criterion	-1.769952
Sum squared resid	0.155482	Schwarz criterion	-1.345619
Log likelihood	34.66431	Hannan-Quinn criter.	-1.637056
F-statistic	5507.437	Durbin-Watson stat	1.531714
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: LEX
Method: ARDL
Date: 06/03/25 Time: 12:52
Sample (adjusted): 1997 2024
Included observations: 28 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): DDT EDT PDS REGQ
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL(1, 1, 1, 0, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LEX(-1)	1.066479	0.035003	30.46808	0.0000
DDT	3.665350	2.595212	1.412351	0.1740
DDT(-1)	-2.365169	1.810288	-1.306515	0.2070
EDT	-1.885889	0.863078	-2.185073	0.0416
EDT(-1)	1.793206	0.709878	2.526075	0.0206
PDS	-2.478030	0.580804	-4.266550	0.0004
REGQ	-0.354615	0.170993	-2.073861	0.0519
REGQ(-1)	-0.569900	0.163367	-3.488462	0.0025
C	-3.582718	1.548549	-2.313597	0.0320
R-squared	0.999633	Mean dependent var		50.76529
Adjusted R-squared	0.999478	S.D. dependent var		3.444121
S.E. of regression	0.078688	Akaike info criterion		-1.991548
Sum squared resid	0.117646	Schwarz criterion		-1.563340
Log likelihood	36.88168	Hannan-Quinn criter.		-1.860641
F-statistic	6463.216	Durbin-Watson stat		2.018612
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Model Three VAR Models

Vector Autoregression Estimates

Date: 06/17/25 Time: 10:39

Sample (adjusted): 1997 2024

Included observations: 28 after adjustments

Standard errors in () & t-statistics in []

	SCH	TDT	FTI
SCH(-1)	0.870478 (0.09320) [9.34028]	0.000948 (0.00073) [1.29267]	-0.000256 (0.00156) [-0.16441]
TDT(-1)	4.396720 (6.18122) [0.71130]	0.992110 (0.04864) [20.3959]	0.108307 (0.10341) [1.04734]
FTI(-1)	-8.782586 (11.1761) [-0.78584]	0.225218 (0.08795) [2.56077]	0.447901 (0.18697) [2.39552]
C	-4.981947 (13.1256) [-0.37956]	0.234900 (0.10329) [2.27416]	-0.619714 (0.21959) [-2.82213]
R-squared	0.839055	0.966618	0.285243
Adj. R-squared	0.818937	0.962445	0.195899
Sum sq. resids	368.3507	0.022811	0.103098
S.E. equation	3.917645	0.030830	0.065542
F-statistic	41.70651	231.6482	3.192622
Log likelihood	-75.80591	59.84766	38.72967
Akaike AIC	5.700422	-3.989119	-2.480691
Schwarz SC	5.890737	-3.798804	-2.290376

Mean dependent	37.89286	0.206991	-1.107183
S.D. dependent	9.206838	0.159087	0.073091
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Determinant resid covariance (dof adj.)		6.04E-05	
Determinant resid covariance		3.81E-05	
Log likelihood		23.27999	
Akaike information criterion		-0.805713	
Schwarz criterion		-0.234769	

Response of SCH:

Period	SCH	TDT	FTI
1	3.917645 (0.52352)	0.000000 (0.00000)	0.000000 (0.00000)
2	3.309524 (0.60189)	0.112502 (0.21336)	-0.568787 (0.72778)
3	2.865633 (0.75265)	0.194991 (0.35985)	-0.685748 (0.92980)
4	2.515477 (0.87149)	0.262977 (0.48542)	-0.636214 (0.97047)
5	2.227317 (0.95393)	0.323083 (0.60196)	-0.531734 (0.96936)
6	1.985309 (1.00535)	0.378343 (0.71262)	-0.415055 (0.96607)
7	1.780364 (1.03238)	0.430316 (0.81875)	-0.301792 (0.97169)
8	1.606447 (1.04159)	0.479938 (0.92148)	-0.196965 (0.98728)
9	1.459070 (1.03906)	0.527857 (1.02191)	-0.101535 (1.01114)
10	1.334637 (1.03022)	0.574579 (1.12116)	-0.014988 (1.04145)

Response of TDT:

Period	SCH	TDT	FTI
1	-0.003425 (0.00581)	0.030639 (0.00409)	0.000000 (0.00000)
2	0.002512 (0.00718)	0.030967 (0.00518)	0.014586 (0.00602)
3	0.006304 (0.00915)	0.031831 (0.00645)	0.020464 (0.00898)
4	0.009143 (0.01119)	0.032963 (0.00771)	0.022968 (0.01122)
5	0.011521 (0.01326)	0.034254 (0.00915)	0.024207 (0.01305)
6	0.013649 (0.01529)	0.035662 (0.01083)	0.025015 (0.01470)
7	0.015624 (0.01728)	0.037170 (0.01275)	0.025719 (0.01632)
8	0.017496 (0.01921)	0.038774 (0.01491)	0.026443 (0.01802)
9	0.019298 (0.02110)	0.040472 (0.01730)	0.027237 (0.01983)
10	0.021049 (0.02297)	0.042265 (0.01992)	0.028114 (0.02177)

Response of FTI:

Period	SCH	TDT	FTI
1	0.009751 (0.01232)	0.002529 (0.01224)	0.064763 (0.00865)
2	0.002992 (0.00861)	0.004451 (0.00631)	0.029007 (0.01271)
3	0.000764 (0.00850)	0.005319 (0.00522)	0.014718 (0.01082)
4	0.000290 (0.00816)	0.005780 (0.00540)	0.008984 (0.00821)
5	0.000476 (0.00769)	0.006091 (0.00578)	0.006675 (0.00690)
6	0.000890 (0.00724)	0.006355 (0.00621)	0.005748 (0.00650)
7	0.001368 (0.00689)	0.006612 (0.00668)	0.005390 (0.00647)
8	0.001848 (0.00665)	0.006877 (0.00719)	0.005277 (0.00660)
9	0.002311 (0.00652)	0.007157 (0.00773)	0.005278 (0.00680)
10	0.002751 (0.00650)	0.007454 (0.00833)	0.005340 (0.00707)

Cholesky Ordering: SCH TDT
FTI
Standard Errors: Analytic

Variance Decomposition of
SCH:

Period	S.E.	SCH	TDT	FTI
1	3.917645	100.0000	0.000000	0.000000
2	5.161111	98.73794	0.047516	1.214545
3	5.946191	97.61167	0.143332	2.245000
4	6.492976	96.87284	0.284248	2.842914
5	6.892518	96.41000	0.471970	3.118034
6	7.194697	96.09589	0.709689	3.194419
7	7.430317	95.83920	1.000792	3.160005
8	7.619673	95.57988	1.348401	3.071718
9	7.776712	95.27882	1.755217	2.965961
10	7.911313	94.91027	2.223475	2.866254

Variance Decomposition of
TDT:

Period	S.E.	SCH	TDT	FTI
1	0.030830	1.234208	98.76579	0.000000
2	0.046135	0.847674	89.15700	9.995328
3	0.060002	1.604975	80.85330	17.54172
4	0.072787	2.668586	75.45373	21.87768
5	0.084793	3.812496	71.91711	24.27040
6	0.096300	4.964658	69.47098	25.56436
7	0.107522	6.093913	67.67796	26.22813
8	0.118616	7.183066	66.29572	26.52122
9	0.129700	8.221633	65.18638	26.59199
10	0.140861	9.203360	64.26828	26.52836

Variance Decomposition of
FTI:

Period	S.E.	SCH	TDT	FTI
1	0.065542	2.213560	0.148843	97.63760
2	0.071874	2.014029	0.507264	97.47871
3	0.073562	1.933450	1.006995	97.05955
4	0.074335	1.895013	1.590744	96.51424
5	0.074883	1.871373	2.229232	95.89939
6	0.075377	1.860865	2.911022	95.22811
7	0.075871	1.869241	3.632766	94.49799
8	0.076387	1.902634	4.394385	93.70298
9	0.076937	1.965735	5.196992	92.83727
10	0.077531	2.061688	6.042006	91.89631

Cholesky Ordering: SCH
TDT FTI

Vector Autoregression Estimates

Date: 06/04/25 Time: 10:18

Sample (adjusted): 1998 2024

Included observations: 27 after adjustments

Standard errors in () & t-statistics in []

	LEX	TDT	FTI
LEX(-1)	1.815343 (0.10376) [17.4948]	-0.095359 (0.03471) [-2.74753]	0.074934 (0.10844) [0.69103]
LEX(-2)	-0.828483 (0.10621) [-7.80018]	0.102201 (0.03553) [2.87679]	-0.084006 (0.11100) [-0.75683]
TDT(-1)	0.637130 (0.58254) [1.09371]	1.100617 (0.19485) [5.64865]	0.515123 (0.60878) [0.84616]
TDT(-2)	-0.463341 (0.57439) [-0.80667]	-0.240024 (0.19212) [-1.24935]	-0.336542 (0.60026) [-0.56066]
FTI(-1)	-0.024025 (0.20513) [-0.11712]	0.191343 (0.06861) [2.78883]	0.666080 (0.21437) [3.10720]
FTI(-2)	-0.598498 (0.24822) [-2.41113]	0.049149 (0.08303) [0.59198]	-0.020555 (0.25940) [-0.07924]
R-squared	0.999636	0.981622	0.164135
Adj. R-squared	0.999549	0.977247	-0.034881
Sum sq. resids	0.107878	0.012069	0.117814
S.E. equation	0.071673	0.023973	0.074901
F-statistic	11538.13	224.3377	0.824732
Log likelihood	36.24368	65.81370	35.05419
Akaike AIC	-2.240273	-4.430644	-2.152162

Schwarz SC	-1.952309	-4.142680	-1.864199
Mean dependent	50.94274	0.212925	-1.105096
S.D. dependent	3.376767	0.158928	0.073628
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Determinant resid covariance (dof adj.)		1.45E-08	
Determinant resid covariance		6.84E-09	
Log likelihood		138.8656	
Akaike information criterion		-8.953008	
Schwarz criterion		-8.089116	

Response of LEX:			
Period	LEX	TDT	FTI
1	0.071673 (0.00975)	0.000000 (0.00000)	0.000000 (0.00000)
2	0.135082 (0.02133)	0.014428 (0.01349)	-0.001771 (0.01513)
3	0.189087 (0.03620)	0.029017 (0.02945)	-0.039533 (0.03070)
4	0.225538 (0.05278)	0.035195 (0.04504)	-0.088852 (0.05077)
5	0.247229 (0.06969)	0.033126 (0.05893)	-0.139077 (0.07257)
6	0.258949 (0.08591)	0.025230 (0.07120)	-0.185164 (0.09459)
7	0.265036 (0.10089)	0.014024 (0.08243)	-0.225803 (0.11635)
8	0.268563 (0.11455)	0.001365 (0.09330)	-0.261532 (0.13823)
9	0.271367 (0.12711)	-0.011623 (0.10443)	-0.293564 (0.16105)
10	0.274365 (0.13893)	-0.024385 (0.11631)	-0.323144 (0.18569)

Response of TDT:			
Period	LEX	TDT	FTI
1	0.007338 (0.00450)	0.022823 (0.00311)	0.000000 (0.00000)
2	-0.001119 (0.00668)	0.026020 (0.00631)	0.014107 (0.00541)
3	-0.008976 (0.00927)	0.024867 (0.00910)	0.028716 (0.00816)
4	-0.013420 (0.01242)	0.023744 (0.01206)	0.041556 (0.01193)
5	-0.014734 (0.01567)	0.023612 (0.01497)	0.051237 (0.01599)
6	-0.014106 (0.01868)	0.024226 (0.01721)	0.057664 (0.02018)
7	-0.012617 (0.02126)	0.025135 (0.01875)	0.061374 (0.02427)
8	-0.010972 (0.02331)	0.026001 (0.01988)	0.063107 (0.02814)
9	-0.009531 (0.02481)	0.026653 (0.02091)	0.063550 (0.03187)
10	-0.008416 (0.02585)	0.027045 (0.02204)	0.063241 (0.03568)

Response of FTI:

Period	LEX	TDT	FTI
1	-0.012333 (0.01432)	0.004712 (0.01420)	0.073728 (0.01003)
2	0.000936 (0.01472)	0.014895 (0.01697)	0.049109 (0.01716)
3	0.001932 (0.01470)	0.016629 (0.01495)	0.038329 (0.01651)
4	-0.000158 (0.01498)	0.015784 (0.01228)	0.031752 (0.01816)
5	-0.003021 (0.01483)	0.014234 (0.01098)	0.028767 (0.01894)
6	-0.005503 (0.01428)	0.012854 (0.01079)	0.027959 (0.01956)
7	-0.007276 (0.01374)	0.011910 (0.01125)	0.028300 (0.02068)
8	-0.008378 (0.01346)	0.011395 (0.01210)	0.029119 (0.02252)
9	-0.008977 (0.01347)	0.011204 (0.01319)	0.030038 (0.02498)
10	-0.009251 (0.01368)	0.011222 (0.01442)	0.030879 (0.02782)

Cholesky Ordering:
 LEX TDT FTI
 Standard Errors:
 Analytic

Variance Decomposition of
 LEX:

Period	S.E.	LEX	TDT	FTI
1	0.071673	100.0000	0.000000	0.000000
2	0.153609	99.10451	0.882190	0.013297
3	0.248505	95.76360	1.700506	2.535894
4	0.348935	90.34982	1.879869	7.770310
5	0.450907	84.16797	1.665478	14.16656
6	0.552535	78.01743	1.317671	20.66490
7	0.653240	72.27819	0.988803	26.73301
8	0.753159	67.08748	0.744171	32.16835
9	0.852762	62.45746	0.599062	36.94348
10	0.952626	58.34392	0.545571	41.11051

Variance Decomposition of
 TDT:

Period	S.E.	LEX	TDT	FTI
1	0.023973	9.368164	90.63184	0.000000
2	0.038106	3.794028	82.49979	13.70618
3	0.054549	4.559028	61.03960	34.40137
4	0.073800	5.797698	43.70014	50.50216
5	0.094054	6.023489	33.20752	60.76900
6	0.113829	5.648098	27.20107	67.15083
7	0.132344	5.087158	23.72971	71.18313
8	0.149311	4.536635	21.67548	73.78789
9	0.164723	4.062219	20.42731	75.51047

10	0.178704	3.673214	19.64637	76.68042
Variance Decomposition of FTI:				
Period	S.E.	LEX	TDT	FTI
1	0.074901	2.711286	0.395793	96.89292
2	0.090800	1.855555	2.960333	95.18411
3	0.099970	1.568110	5.208905	93.22299
4	0.106073	1.393092	6.841188	91.76572
5	0.110863	1.349572	7.911233	90.73920
6	0.115186	1.478430	8.573930	89.94764
7	0.119430	1.746383	8.969913	89.28370
8	0.123740	2.085294	9.203971	88.71074
9	0.128140	2.435308	9.347167	88.21752
10	0.132608	2.760597	9.444040	87.79536
Cholesky Ordering: LEX TDT FTI				