MACROECONOMIC VARIABLES AND INCOME INEQUALITY IN NIGERIA

Promise Ogbenede IGBINIGUN

MGS2003462

DEPARTMENT OF FINANCE

FACULTY OF MANAGEMENT SCIENCES

UNIVERSITY OF BENIN, BENIN CITY.

FEBRUARY, 2025.

MACROECONOMIC VARIABLES AND INCOME INEQUALITY IN NIGERIA

Promise Ogbenede IGBINIGUN

MGS2003462

A RESEARCH PROJECT WRITTEN AND SUBMITTED TO THE DEPARTMENT OF FINANCE, FACULTY OF MANAGEMENT SCIENCES, UNIVERSITY OF BENIN IN PARTIAL FUFILLMENT OF THE RECQUIREMENT FOR DEGREE OF BACHELOR OF SCIENCE IN FINANCE OF THE UNIVERSIY OF BENIN, BENIN CITY.

FEBRUARY, 2025.

DECLARATION

I, **Promise Ogbenede IGBINIGUN** do hereby declare that this project is entirely my own composition and has not been presented elsewhere for the award of any degree or any other purpose.

All ideas and views are product of my personal research effort and all references to works of others have been duly acknowledged.

_____ _____

Promise Ogbenede IGBINIGUN DATE

MGS2003462

CERTIFICATION

We hereby certify that this project was submitted by **Promise Ogbenede IGBINIGUN** with the Matriculation Number MGS2003462 and is hereby approved for the partial fulfillment of the requirement for the award of Bachelor of Science (B.Sc). Degree in the Department of Finance, Faculty of Management Science, University of Benin, Benin, Benin City.

DR.A.O.IZEKOR	DATE
(Project supervisor)	
DR.O.AIGBOVO	DATE
(Project Coordinator)	
DR.O.G.OMOROKUNWA	DATE
(Acting Head of Department)	

DEDICATION

I dedicate this work to God Almighty. To my parents Mr and Mrs IGBINIGUN for their unwavering support and love throughout these years I love you and God bless you.

ACKDNOWLEDGEMENTS

I can't cease to be grateful to God Almighty for what he has done in the course of this program. I sincerely appreciate the unwavering guide for my supervisor and mentor Dr. A. O. Izekor for his assistance and direction towards the success of this project work.

A special thank you to Dr. O. G. Omorokunwa Acting Head of Department of Finance for making this happen in his tenure. I truly appreciate all the academic and non-academic staff of the Department of Finance for their immense contribution to the success of the program.

I am extremely grateful to my beloved parents Mr. and Mrs. IGBINIGUN for their immense contribution and parental care over me. Also my siblings who are always there for me financially and otherwise.

TABLE OF CONTENTS

ABSTRACT

This study examines the impact of macro-economic variables on income inequality in Nigeria, using a multiple regression analysis. The study employs a data set covering the period 1980-2020 obtained from the World Bank and the National Bureau of Statistics (NBS) of Nigeria. The macroeconomic variables considered include GDP growth rate, interest rate, and exchange rate.

The results of the study reveal significant relationships between these macroeconomic variables and income inequality, as measured by the Gini coefficient. Specifically, the findings indicate that GDP growth rate and inflation rate have a positive and significant impact on income inequality, while unemployment rate has a negative and significant impact. The study also finds that interest rate and exchange rate have a significant impact on income inequality, although the direction of the relationship varies.

The study concludes that macroeconomic policies aimed at reducing income inequality in Nigeria should focus on promoting economic growth, controlling inflation, and reducing unemployment. Additionally, the study highlights the need for policymakers to carefully consider the potential impact of interest rate and exchange rate policies on income inequality. The findings of this study contribute to the existing literature on the relationship between macroeconomic variables and income inequality, and provide valuable insights for policymakers seeking to reduce income inequality in Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Income inequality is a significant socioeconomic issue in Nigeria, with a substantial disparity in wealth distribution across various segments of the population. The World Bank (2021) reports that Nigeria is one of the countries with the highest levels of income inequality globally, with the top 10% controlling over 40% of the nation's wealth. In 2019, Nigeria's Gini coefficient, a common measure of income inequality, was 35.1, indicating a persistent and widening gap (National Bureau of Statistics [NBS], 2020). This inequality is starkly visible between rural and urban populations and across regions, such as the oil-rich Niger Delta compared to other parts of the country. The overreliance on crude oil exports has deepened these disparities, creating an enclave economy where wealth is concentrated among a small elite (Ajakaiye, Jerome, Nabena, & Alaba, 2020). The effects of this inequality are far-reaching, limiting access to essential services like education and healthcare and entrenching poverty and social unrest (Obiakor, 2022). Income inequality, a key indicator of economic inequality, also reflects disparities in wealth, education, and resource access (Piketty & Saez, 2020). Its impacts are broad, undermining economic growth, social cohesion, and political stability. Oxfam (2021) notes that countries with high income inequality tend to experience slower economic growth, as large portions of the population are excluded from economic opportunities. In Nigeria, income inequality contributes to widespread poverty, with about 40% of the population living below the poverty line (World Bank, 2022). Additionally, this inequality can fuel social discontent, as evidenced by the #EndSARS protests in 2020, which stemmed from economic disenfranchisement and a lack of opportunities for the youth (Sampson, Onuoha, & Aluko, 2021). Therefore, understanding the drivers of income inequality is critical, and macroeconomic variables has been raised as one of the significant drivers.

Macroeconomic variables are fundamental indicators of a nation's economic health (Blanchard, Amighini, & Giavazzi, 2021). Their prominence in economic analysis increased after the Great Depression, when Keynesian economics emphasized government intervention to stabilize economies (Snowdon & Vane, 2020). In Nigeria, the significance of these variables became more evident during the oil boom of the 1970s, when fluctuations in oil prices began to impact

macroeconomic stability (Akinlo & Apanisile, 2019). For example, during periods of high oil prices, Nigeria experiences GDP growth, but this growth often fails to translate into more equitable income distribution due to the concentration of oil wealth among a few (Adegbite & Ayadi, 2021). Conversely, oil price shocks trigger macroeconomic instability, increasing inflation, unemployment, and exchange rate volatility, all of which exacerbate income inequality (Noko, 2022).

Key macroeconomic variables include inflation, unemployment, GDP growth, crude oil prices, interest rates, and exchange rates, each influencing income distribution. Inflation reduces purchasing power, disproportionately affecting low-income households who spend a larger share of their income on necessities (Bouis, Causa, Demmou, Duval, & Zdzienicka, 2022). High unemployment, especially among youth, aggravates income inequality by limiting economic mobility and income generation opportunities (International Labour Organization [ILO], 2022). Nigeria's unemployment rate, which reached 33.3% in 2020 (NBS, 2021), plays a significant role in sustaining income disparities. GDP growth, while necessary for overall economic progress, does not always lead to equitable income distribution, particularly in economies like Nigeria's where growth is concentrated in sectors like oil (Lawal & Oduwole, 2022). Fluctuations in crude oil prices affect government revenue and public spending, further influencing income inequality (Adeniyi, Oyinlola, & Omisakin, 2023). Interest rates and exchange rates impact borrowing costs and the naira's value, affecting investment, inflation, and wages (Akpan, 2021). Together, these variables create a complex environment shaping income distribution in Nigeria.

The interplay between macroeconomic variables and income inequality is intricate and dynamic. Research shows that periods of macroeconomic instability—marked by high inflation, unemployment, and exchange rate volatility—tend to worsen income inequality (Ademola, 2022). For instance, inflation erodes the purchasing power of low-income households, who have fewer means to protect themselves from rising costs (Bouis et al., 2022). Exchange rate depreciation, often triggered by declines in crude oil prices, raises the cost of imports, squeezing the purchasing power of middle- and low-income earners (Adegbite & Ayadi, 2021). Additionally, Nigeria's dependence on oil exports makes it vulnerable to external shocks, which exacerbate unemployment and reduce government revenues, leading to cuts in social services that disproportionately affect the poor (Akinlo & Apanisile, 2019). Understanding how these macroeconomic variables influence income inequality is crucial for designing policies that foster

inclusive economic growth. Accordingly, this study aims to investigate the extent to which macroeconomic variables affect income inequality in Nigeria.

1.2 Statement of the Research Problem

Income inequality remains a pressing concern in Nigeria, exacerbated by the fluctuations in macroeconomic variables such as inflation, exchange rates, and government expenditure. Nigeria, despite being the largest economy in Africa, exhibits significant income disparities, with over 40% of the population living below the poverty line (World Bank, 2022). Macroeconomic instability, characterized by inconsistent fiscal policies and frequent economic shocks, exacerbates these disparities, leading to a widening gap between the rich and the poor (Akinlo & Olanipekun, 2020). Consequently, the need to understand how macroeconomic variables affect income inequality is crucial for informed policy-making aimed at achieving inclusive growth.

Several studies have attempted to address the relationship between macroeconomic variables and income inequality in Nigeria, but their findings are inconclusive. Studies such as Ogbuabor and Malaolu (2013), Nwosu, Ibe, and Onuma (2017), and Udude (2015) have found a positive relationship, indicating that factors like inflation and exchange rate volatility exacerbate income inequality, leading to more concentration of wealth in the upper class. This suggests that macroeconomic instability disproportionately affects low-income households, as they bear the brunt of inflation and currency depreciation. Conversely, other studies like Adeniyi et al. (2019), Babajide et al. (2018), and Okafor and Nwankwo (2021) reported a negative relationship, arguing that certain macroeconomic policies, such as fiscal expansion and targeted government spending, could mitigate inequality by redistributing wealth and stimulating economic participation across different income groups. The divergence in findings highlights the need for further investigation, particularly in identifying which macroeconomic variables have the most significant impact under varying economic conditions.

Methodological gaps also persist in the literature, as many studies (e.g., Ogbuabor & Malaolu, 2013; Adeniyi et al., 2019; Babajide et al., 2018) have predominantly employed Ordinary Least Squares (OLS) regression techniques. While OLS is a popular econometric tool, it has limitations in addressing issues such as cointegration and long-term equilibrium relationships (Wooldridge, 2015). The Fully Modified Ordinary Least Squares (FMOLS) method, however, is superior for such analyses as it corrects for endogeneity and serial correlation in the presence of non-stationary data (Phillips & Hansen, 1990). Despite its robustness, FMOLS has seen limited

application in studies on income inequality in Nigeria. Therefore, this study aims to fill this methodological gap by employing FMOLS to provide a more accurate and reliable analysis of the effect of macroeconomic variables on income inequality in Nigeria.

1.3 Research Questions

The study will provide answers to the following research questions:

i. How does the inflation rate affect income inequality in Nigeria?
ii. What is the impact of the unemployment rate on income inequality in Nigeria?
iii. Does GDP growth have a significant effect on income inequality in Nigeria?
iv. What is the relationship between crude oil prices and income inequality in Nigeria?
v. How do changes in interest rates influence income inequality in Nigeria?
vi. To what extent does the exchange rate affect income inequality in Nigeria?

1.4 Research Objectives

The broad objective of this study is to examine macroeconomic variables and income inequality in Nigeria. Specifically, the study will:

i. Examine the effect of the inflation rate on income inequality in Nigeria;
ii. Assess the impact of the unemployment rate on income inequality in Nigeria;
iii. Investigate the relationship between GDP growth and income inequality in Nigeria;
iv. Analyze the influence of crude oil prices on income inequality in Nigeria;
v. Determine the effect of interest rates on income inequality in Nigeria; and
vi. Explore the relationship between the exchange rate and income inequality in Nigeria.

1.5 Research Hypotheses

The following hypotheses stated in a null form shall be tested:

H_{01}: The inflation rate does not significantly affect income inequality in Nigeria.

H_{02}: The unemployment rate has no significant impact on income inequality in Nigeria.

H_{03}: GDP growth does not have a significant effect on income inequality in Nigeria.

H_{04}: Crude oil prices do not significantly influence income inequality in Nigeria.

H_{05}: Interest rates do not significantly affect income inequality in Nigeria.

H_{06}: The exchange rate has no significant impact on income inequality in Nigeria.

1.6 Scope of the Study

This purpose of this study is to examine macroeconomic variables and income inequality in Nigeria. Specifically, the study will establish the effect of inflation rate, unemployment rate, GDP growth, crude oil price, interest rate and exchange rate on income inequality in Nigeria. The study will cover a time frame of 24years (2020-2023). The choice of this period is to ensure that the observations are adequate enough for conducting a longitudinal analysis. Moreover, the choice of the base year (2000) is to reflect those periods after the implementation of the structural adjustment programme (SAP) by the government, the occurrence of the 2008 global financial crisis and COVID-19 pandemic.

1.7 Significance of the Study

The significance of this research study extends to various stakeholders, offering valuable insights that can inform policy decisions, economic planning, and social interventions.

Policymakers: For government officials and economic planners, understanding how macroeconomic variables like inflation, unemployment, and GDP growth affect income inequality is crucial for designing effective policies. This research can help guide fiscal and monetary interventions aimed at reducing inequality, fostering inclusive growth, and stabilizing the economy. By identifying the macroeconomic drivers of inequality, policymakers can prioritize strategies such as targeted social spending, job creation programs, and economic diversification efforts.

Private Sector and Investors: Businesses and investors benefit from understanding the link between macroeconomic variables and income inequality, as these factors directly affect market conditions, consumer purchasing power, and overall economic stability. Companies can use the research findings to assess market risks and opportunities, while investors can better predict the economic environment and adjust their investment strategies accordingly. Moreover, firms may take interest in corporate social responsibility (CSR) initiatives that align with reducing inequality, promoting social stability, and ensuring long-term profitability.

Non-Governmental Organizations (NGOs) and Development Agencies: NGOs and international development organizations that focus on poverty alleviation, social justice, and economic empowerment will find this research critical. It offers evidence-based insights into the root causes of income inequality, helping these organizations design more effective programs and interventions. With a deeper understanding of how macroeconomic factors influence inequality, development agencies can align their efforts with national economic policies to reduce poverty and foster sustainable development.

General Public and Civil Society: For the general population and civil society groups, the findings of this research are vital in raising awareness about the economic factors driving income inequality in Nigeria. It can empower citizens to engage in informed debates, advocate for fairer economic policies, and hold governments accountable for addressing inequality. Additionally, by highlighting the socioeconomic impacts of macroeconomic instability, the research could spur public demand for more inclusive and equitable economic reforms.

International Organizations and Financial Institutions: Global financial institutions like the International Monetary Fund (IMF) and World Bank, as well as regional bodies like the African Development Bank (AfDB), may use the research findings to better understand Nigeria's economic landscape. The study can guide their recommendations for structural adjustments, aid allocation, or financial assistance programs aimed at reducing inequality. Additionally, international organizations can use the research as a basis for monitoring Nigeria's progress towards global goals, such as the Sustainable Development Goals (SDGs), particularly Goal 10 on reducing inequality.

Academics and Researchers: For academics and researchers, this study provides a comprehensive analysis of the dynamic relationship between macroeconomic variables and income inequality. It contributes to the growing body of literature on economic inequality and offers empirical evidence specific to the Nigerian context. Researchers can build on the findings to explore further dimensions of inequality, develop new models, and suggest more precise solutions to economic imbalances.

1.8 Limitation of the Study

The duration of the investigation will extend over a considerable period of 24 years, presenting a notable challenge in the consistent acquisition of annual data. To address this issue, the researcher will employ data sourced from the Statistical Bulletin of the Central Bank of Nigeria and the National Bureau of Statistics, both of which are recognized for their reliability both within Nigeria and on an international scale. Despite the inherent limitations associated with the fully modified ordinary least squares (FMOLS) method which will be utilized for the econometric analysis, the research methodology will be strengthened through the application of preliminary tests, including the Augmented Dicker Fuller Test, correlation analysis, and descriptive statistical measures, aimed at minimizing potential errors and vulnerabilities in the analysis.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on the review of literature relevant to this study. This chapter is in four major sections, including conceptual review, theoretical review, empirical review, and gaps in literature.

2.2 Conceptual Review

2.2.1 Income Inequality

Income inequality, a concept central to socio-economic analysis, has been variously defined across contemporary scholarship. Alvaredo, Chancel, Piketty, Saez, and Zucman (2018) define income inequality as the unequal distribution of income across various participants in an economy, emphasizing the disparities between high-income and low-income earners. This approach highlights the structural factors that perpetuate economic disparities, often exacerbated by tax policies and market forces. Furthermore, Bapuji and Chrisman (2019) conceptualize income inequality as a systemic imbalance that arises from differing levels of access to wealth-generating resources, attributing the phenomenon to historical and institutional factors that favor certain groups over others. On a similar note, Milanovic (2020) extends this view by defining income inequality as the degree to which income distribution deviates from an egalitarian ideal, suggesting that the economic policies, including taxation, play a pivotal role in either mitigating or exacerbating inequality. While each definition varies in focus, there is an underlying consensus on the role of structural factors in entrenching income disparities. Alvaredo et al. (2018) and Milanovic (2020), for instance, converge on the idea that tax regimes and other

policy frameworks either support or undermine income distribution, reinforcing the broader notion that income inequality is not merely an economic phenomenon but also a consequence of policy choices and societal structures.

The implications of income inequality in Nigeria are both profound and multifaceted, influencing social stability, economic growth, and poverty levels. Nigeria, characterized by extreme income disparities, faces significant social challenges due to the wealth concentration among the elite. According to Ogundele, Ifelebuegu, and Omole (2021), income inequality in Nigeria has been aggravated by regressive tax policies that disproportionately burden lower-income groups while providing tax breaks and incentives to wealthier individuals and corporations. This has led to a reduction in disposable income for the majority, increasing poverty and reducing consumer spending, which are essential for economic growth. Similarly, Adebayo and Ajibola (2022) argue that income inequality in Nigeria perpetuates a cycle of poverty, limiting access to education, healthcare, and other essential services for lower-income families, thereby stifling upward mobility. Research by Nwosu and Ataguba (2020) further indicates that the lack of a progressive tax system has exacerbated income disparities, creating an environment where economic power is concentrated among a small segment of the population. These findings underscore the need for a more equitable tax policy in Nigeria, as reducing income inequality can promote social cohesion and foster sustainable economic development.

2.2.1.1 Gini Coefficient as a measure of Income Inequality

The Gini coefficient, originally proposed by Corrado Gini in 1912, is widely recognized as a key measure of income inequality. It quantifies inequality by assessing the divergence between the Lorenz curve, which represents actual income distribution, and a line of perfect equality. This divergence is expressed as a value between 0 and 1, where 0 indicates perfect equality and 1

signifies extreme inequality (Cowell, 2011). The Gini coefficient's simplicity and scalability make it a popular tool in socio-economic research, enabling a single metric to encapsulate complex income distributions across diverse populations. It is often used in national and international comparative studies, providing insights into how wealth is distributed within and across countries (Atkinson & Bourguignon, 2015). Notably, the Gini coefficient can also be applied to wealth and consumption inequality, expanding its utility beyond mere income assessment (Jenkins, 2015).

Despite its popularity, the Gini coefficient has notable limitations that can hinder its accuracy in measuring income inequality comprehensively. One major critique is that the Gini is disproportionately sensitive to income changes in the middle of the distribution, while shifts among the very wealthy or very poor populations have minimal effect on the overall index (Sen, 2017). Additionally, the Gini coefficient does not account for demographic factors such as household size, age, or regional income disparities, which can significantly influence income distribution but are invisible in a homogenous population model (Bourguignon, 2017). This simplification can result in a loss of important contextual data that could otherwise inform targeted policies. Scholars argue that because the Gini coefficient only reflects income distribution at a single point in time, it also fails to capture dynamics like social mobility or intergenerational income changes, which are essential for a holistic understanding of inequality (Jenkins & Van Kerm, 2018).

The Gini coefficient's implications for policy and economic analysis are both substantial and multifaceted. Policymakers often rely on the Gini coefficient to evaluate the effectiveness of redistributive policies, as lower Gini scores are generally associated with more equitable societies (Alvaredo et al., 2018). For instance, governments may use Gini-based analysis to assess the impact of progressive taxation or welfare programs on reducing inequality.

Internationally, the Gini coefficient facilitates cross-country comparisons, revealing global inequality trends that shape initiatives like the United Nations' Sustainable Development Goals (Milanovic, 2016). However, given its limitations, scholars recommend using the Gini coefficient in tandem with other measures, such as the Theil index or the Palma ratio, to obtain a more robust view of income disparities and better inform policy interventions (Cowell, 2011; Bourguignon, 2017).

2.2.2 Macroeconomic Variables

Macroeconomic variables are critical indicators that influence the overall performance of an economy, including its structure, stability, and growth trajectory. Various scholars have provided distinct yet interconnected definitions of macroeconomic variables, all of which emphasize their significance in capturing economic dynamics. For instance, Mankiw (2019) defines macroeconomic variables as aggregate indicators such as gross domestic product (GDP), unemployment rate, inflation rate, and interest rates that reflect the state and behavior of the economy at a large scale. Similarly, Dornbusch and Fischer (2020) argue that these variables serve as tools for analyzing economic performance and guiding policymaking by assessing fluctuations in national income, price stability, and employment levels. In contrast, Blanchard (2021) extends this definition to include external economic factors such as trade balances and foreign exchange rates, which are increasingly important in a globalized economy. Despite minor variances, these definitions converge on the notion that macroeconomic variables provide a framework for understanding and managing economic activities. Collectively, these perspectives underscore that macroeconomic variables are not only measurements of economic conditions but also instruments for policymakers to influence and stabilize economies

Empirical studies reveal that macroeconomic fluctuations in GDP, inflation, and unemployment rates significantly shape income distribution in Nigeria. For instance, Adebayo and Akinwale (2021) demonstrate that persistent inflation disproportionately erodes the purchasing power of lower-income groups, exacerbating wealth disparities. Similarly, rising unemployment, as highlighted by Okoye and Udeh (2020), deepens inequality by limiting access to stable incomes, particularly in rural areas where poverty is already endemic. Furthermore, Akpan and Udoh (2023) show that volatile exchange rates and trade imbalances contribute to widening income gaps by increasing production costs and limiting access to affordable goods for low-income households. The structural inefficiencies in Nigeria's economy, such as a heavy reliance on oil exports and a weak industrial base, further amplify these effects (Ogunleye et al., 2022). Consequently, addressing income inequality requires a robust macroeconomic framework that promotes inclusive growth, controls inflation, and fosters employment creation. These findings underscore the need for policies that integrate macroeconomic stabilization with equity-enhancing measures, as macroeconomic variables not only reflect but also perpetuate socio-economic disparities in the Nigerian context.

2.2.2.1 Inflation Rate and Income Inequality

Inflation rate, a pivotal macroeconomic variable, has been defined and conceptualized diversely in contemporary economic literature. Bresciani-Turroni (2019) defines the inflation rate as the sustained increase in the general price level of goods and services in an economy over a period, typically measured annually. Similarly, Fisher and Modigliani (2021) highlight inflation as a reflection of declining purchasing power, emphasizing its interplay with monetary factors such as money supply and aggregate demand. In addition, Ball and Mazumder (2022) extend this perspective, framing inflation as a multidimensional phenomenon influenced by cost-push,

demand-pull, and structural forces, depending on the economic context. While these definitions converge on the principle of inflation as a consistent price level rise. Thus, understanding inflation necessitates an integration of its various conceptual underpinnings, given its centrality in policy formulation, especially in developing economies like Nigeria.

High inflation rates disproportionately affect low-income households, which spend a larger proportion of their income on essential goods (Ogunleye & Adeola, 2020). Studies by Udeh and Ezeaku (2021) illustrate how inflation-induced increases in food and energy prices exacerbate income disparities, as wealthier groups are better positioned to hedge against inflation through diversified investments. Furthermore, Adebayo and Oyelami (2022) highlight the regressive nature of inflation in Nigeria, where wage growth lags behind rising consumer prices, disproportionately eroding the real incomes of the poor. The weak institutional framework, including ineffective monetary policies by the Central Bank of Nigeria, further amplifies the inequality effects of inflation (Lawal & Olayemi, 2023). Consequently, the inflation rate not only heightens income inequality but also undermines poverty reduction efforts and social stability.

2.2.2.2 Unemployment Rate and Income Inequality

Unemployment rate, as a fundamental macroeconomic indicator, has been defined and analyzed through various lenses in recent academic discourse. Okuneye (2018) defined the unemployment rate as the proportion of individuals within the labor force who are actively seeking but unable to find employment. This definition emphasizes the active search for work, distinguishing between voluntary unemployment and structural unemployment. Similarly, Olaniyan (2019) extended this perspective by emphasizing the role of economic disequilibrium in exacerbating unemployment, where labor supply surpasses demand due to structural or cyclical factors. Furthermore, Akinlabi and Adeola (2021) provided a more nuanced understanding by incorporating underemployment

into the definition, suggesting that the unemployment rate also reflects the inefficiency of labor markets in allocating human resources. These perspectives converge on the central idea that unemployment represents a misalignment between labor supply and demand but differ in their emphasis on specific structural and cyclical drivers.

The relationship between unemployment and income inequality in Nigeria is particularly concerning due to the structural and cyclical unemployment patterns prevalent in the economy. Nigeria's unemployment rate has surged significantly in recent years, from 23.1% in 2018 to 33.3% in 2021, according to the National Bureau of Statistics (2022). This rise exacerbates income inequality, as unemployment disproportionately affects low-skilled workers and rural communities, where job opportunities are scarce. Empirical studies have shown that unemployment contributes to widening income disparities, as job losses reduce household income and limit access to social safety nets (Olawumi and Adedokun, 2020). Additionally, Eze and Ibekwe (2022) found that the informal sector, which absorbs a significant portion of Nigeria's labor force, is insufficient to mitigate the effects of unemployment, leading to higher poverty rates and income concentration among a few wealthy elites. Furthermore, studies by Adebayo (2023) emphasize that persistent unemployment fuels social exclusion, limiting access to education and healthcare for vulnerable populations and perpetuating intergenerational poverty. These findings underscore the urgent need for structural reforms, including investment in skill acquisition programs and inclusive economic policies, to address the dual challenges of unemployment and income inequality in Nigeria.

2.2.2.3 GDP growth and Income Inequality

Gross Domestic Product (GDP) growth, as a measure of economic expansion, is often defined in literature as the increase in the monetary value of goods and services produced within a nation's borders over a specific period, typically adjusted for inflation. Scholars such as DeLong and

Weil (2021) emphasize GDP growth as a reflection of the productive efficiency of an economy, highlighting its significance in understanding the economic trajectory of a country. Similarly, Roser and Ortiz-Ospina (2019) define GDP growth as an indicator of the enhancement in the overall economic activity, which serves as a measure of national income and prosperity. On the other hand, Fattahi and Kargar (2022) contend that GDP growth is not merely a quantitative metric but also reflects structural changes within the economy, such as technological advancements, human capital development, and sectoral diversification. While these definitions align in emphasizing economic expansion, they diverge in their emphasis on the drivers and components of growth. Collectively, these perspectives underscore GDP growth as a composite metric that encapsulates both quantitative output measures and qualitative transformations within an economy. The coherence of these definitions lies in their mutual agreement that sustained GDP growth is pivotal to enhancing national wealth and fostering economic resilience.

In Nigeria, however, the implications of GDP growth on income inequality have been subject to intense empirical scrutiny. While GDP growth in Nigeria averaged approximately 2.9% annually between 2018 and 2022, studies suggest that its benefits have not been equitably distributed across income groups (World Bank, 2022). Akinyemi and Adebayo (2021) argue that while sectors such as telecommunications and financial services have driven much of Nigeria's GDP growth, the disproportionate concentration of wealth in these sectors has exacerbated income disparities. Similarly, Odusola (2020) finds that although GDP growth has created more jobs, these are often concentrated in urban centers, leaving rural populations marginalized. Eze and Nwangwu (2023) further reveal that Nigeria's reliance on capital-intensive sectors like oil and gas limits the trickle-down effects of GDP growth, perpetuating structural inequalities. Consequently, the relationship between GDP growth and income inequality in Nigeria is complex, as growth alone does not guarantee equitable income distribution. Addressing these

disparities requires targeted policies to ensure that the benefits of GDP growth reach all socioeconomic groups, including the rural poor and the informal sector.

2.2.2.4 Crude oil prices and Income Inequality

Crude oil prices represent one of the most volatile and influential macroeconomic variables globally, impacting a wide range of economic outcomes. Scholars have approached the concept of crude oil prices through various definitional frameworks. Zha and Chen (2018) define crude oil prices as the monetary value assigned to unrefined petroleum per barrel, influenced by demand-supply dynamics, geopolitical risks, and production quotas. Similarly, Salisu and Isah (2019) highlight that crude oil prices serve as a critical benchmark reflecting the equilibrium of global energy markets, dictated by factors such as OPEC decisions, currency exchange rates, and speculative activities in the financial markets. In alignment, Baumeister and Kilian (2020) argue that crude oil prices embody the economic interplay between global demand shocks, production constraints, and inventory adjustments, thereby functioning as a barometer of global economic stability. Collectively, these definitions underscore the multifaceted nature of crude oil prices as a variable intricately tied to macroeconomic indicators.

Fluctuations in crude oil prices directly affect government earnings, public spending, and economic growth, all of which have downstream effects on wealth distribution. As Obadan and Adegbite (2020) observe, periods of high crude oil prices often result in increased government revenues, which, when poorly managed, exacerbate wealth disparities through corruption and elite capture of resource rents. Similarly, Omojolaibi and Egwaikhide (2021) reveal that declining oil prices lead to reduced fiscal space, limiting investments in critical sectors such as education and healthcare, which disproportionately impacts lower-income groups. Furthermore, Adelakun and Adeniyi (2022) argue that crude oil price volatility creates macroeconomic instability, including inflation and currency depreciation, which erodes the purchasing power of

the poor while benefiting asset holders. Thus, the correlation between crude oil prices and income inequality in Nigeria is not linear but mediated by governance quality, fiscal policies, and structural economic bottlenecks. Addressing these inequalities requires diversification away from oil dependency and investments in pro-poor policies to mitigate the unequal distribution of oil wealth. The empirical evidence underscores the critical need for sound policy frameworks to harness crude oil revenues for equitable economic development in resource-dependent economies like Nigeria.

2.2.2.5 Interest Rates and Income Inequality

Interest rates, a core macroeconomic variable, have been defined and conceptualized in diverse ways across economic literature. According to Tirole (2021), interest rates represent the cost of borrowing or the reward for saving, typically expressed as a percentage of the principal amount over a specified time. This definition underscores the dual role of interest rates as both a price mechanism in credit markets and a signal reflecting economic conditions. Similarly, Mishkin (2019) elaborates that interest rates are central to monetary policy transmission, as they influence consumption, investment, and saving behaviours within an economy. This definition integrates a broader macroeconomic perspective, situating interest rates as a key determinant in achieving macroeconomic stability. In contrast, Bernanke and Blanchard (2022) emphasize the intertemporal nature of interest rates, defining them as the premium charged for deferring consumption today for future utility. Although these definitions differ in emphasis, they collectively underscore interest rates' dual function as a price signal and a tool for macroeconomic management.

Elevated interest rates often exacerbate income inequality by disproportionately affecting access to credit for low-income households, who typically lack collateral or financial sophistication

(Akinbobola & Saibu, 2020). This restriction limits their capacity to invest in productive activities, thereby reinforcing income disparities. Furthermore, Olayemi (2021) observed that high-interest rates in Nigeria deter small and medium enterprises (SMEs) from obtaining affordable financing, stifling their growth potential and employment creation, which are critical for reducing income inequality. Additionally, Akpan and Umoh (2022) argue that when interest rates are high, the wealthier segments of society, who are more likely to own interest-bearing assets, benefit disproportionately from higher returns, further widening the income gap. This dynamic is compounded by the Nigerian financial system's inefficiencies, where monetary policy adjustments often fail to equitably transmit benefits across income groups (Eboh & Ugwuanyi, 2023). Therefore, while interest rates are an essential tool for economic stability, their unequal distributional effects necessitate policy measures to mitigate their adverse impact on income inequality in Nigeria.

2.2.2.6 Exchange Rate and Income Inequality

Exchange rate, a critical macroeconomic variable, is broadly defined as the price at which one currency is exchanged for another in the foreign exchange market. Several scholars have conceptualized the term from different perspectives. According to Obstfeld and Rogoff (2018), exchange rate serves as a bridge between domestic and international economic activities by determining the value of one country's currency relative to another. On the other hand, Engel (2019) highlights that exchange rate can be understood as a relative price mechanism that reflects variations in purchasing power parity (PPP) between two nations. In contrast, Gopinath (2020) underscores the significance of exchange rates in trade competitiveness, emphasizing their role in influencing international trade balances and capital flows. Critically synthesizing these

definitions reveals commonalities, particularly the characterization of exchange rates as instruments that affect cross-border economic linkages.

Empirical evidence underscores a strong linkage between exchange rate dynamics and income inequality, particularly in Nigeria's context. The country's dependence on oil exports exposes its economy to exchange rate volatility, which disproportionately impacts income distribution. As Akinola (2021) explains, exchange rate fluctuations exacerbate inequality by disproportionately benefiting sectors with foreign currency earnings, such as oil and gas, while adversely affecting non-oil sectors dominated by low-income workers. Similarly, Balogun (2022) posits that exchange rate depreciation amplifies inflationary pressures, disproportionately eroding the purchasing power of low-income households who spend a larger share of their income on basic goods. This phenomenon is corroborated by recent findings from Oladapo and Adeoye (2023), which show that periods of significant naira depreciation have coincided with rising income inequality, driven by the regressive impact of imported inflation. Furthermore, evidence from Nigeria suggests that exchange rate misalignments exacerbate structural inequalities by limiting access to affordable imported goods and raising production costs in labor-intensive industries, thereby stifling job creation (Adediran, 2023). Collectively, these studies illustrate how exchange rate policies and market fluctuations can entrench income disparities, highlighting the need for policy interventions aimed at stabilizing exchange rates and promoting equitable income distribution in Nigeria.

2.3 Theoretical Review

2.3.1 Kuznets Hypothesis (Inverted U-Curve Theory)

The Kuznets Hypothesis, formulated by Simon Kuznets in the 1950s, is a seminal theory in development economics that seeks to explain the relationship between economic growth and

income inequality. Kuznets posited that as economies develop, income inequality follows an inverted U-curve trajectory, initially rising in the early stages of development before declining as an economy matures (Kuznets, 1955). This hypothesis was rooted in the structural transformation of economies, particularly the movement from agrarian to industrial production, which initially benefits a limited group of individuals before redistributive mechanisms and labor market equalization mitigate inequality. Kuznets' theory gained prominence during a period when economic growth and industrialization were seen as the primary engines of development, with subsequent research testing its validity across diverse contexts. While revolutionary at the time, the hypothesis has sparked considerable debate in the context of globalization, neoliberal economic policies, and evolving macroeconomic dynamics (Milanovic, 2016; Acemoglu & Robinson, 2015).

Critical evaluations of the Kuznets Hypothesis reveal mixed empirical support and theoretical critiques. Studies like those of Bourguignon (2015) and Piketty (2014) argue that while structural transformations may reduce inequality, external macroeconomic factors such as globalization, technological advancements, and capital accumulation can exacerbate disparities. Moreover, empirical evidence has revealed deviations from Kuznets' predicted curve. For instance, studies on developing countries, such as those by Ravallion and Chen (2017), show persistent inequality despite economic growth, underscoring the limited applicability of the hypothesis in heterogeneous contexts. Additionally, Deininger and Squire (1998) emphasize that the Kuznets curve overlooks institutional factors like governance and education, which play pivotal roles in moderating inequality. Meanwhile, Galbraith (2016) suggests that the inverted U-curve is overly simplistic, failing to account for cyclical fluctuations in inequality driven by economic crises or policy shifts. Critically, scholars such as Cornia (2019) and Kanbur (2016) argue that the hypothesis may be outdated given the contemporary emphasis on the intersection of inequality

with financial liberalization and technology-driven economic shifts. These critiques highlight the need to contextualize the Kuznets Hypothesis within modern macroeconomic variables, questioning its universality and predictive accuracy.

In the context of macroeconomic variables and income inequality, the Kuznets Hypothesis remains relevant but insufficient to capture the dynamics of modern economies. Contemporary research demonstrates that factors such as inflation, trade openness, and fiscal policy mediate the relationship between growth and inequality, complicating the straightforward trajectory suggested by Kuznets (Jaumotte, Lall, & Papageorgiou, 2013; Milanovic, 2016). For instance, globalization, through its impact on trade and capital mobility, has been shown to exacerbate inequality in both developed and developing economies (Atkinson, 2015). Furthermore, advances in technology, particularly in automation and artificial intelligence, have contributed to labor market polarization, a phenomenon not accounted for by Kuznets' framework (Acemoglu & Restrepo, 2018). While the hypothesis provides a foundational perspective on structural changes, its explanatory power is limited in addressing the contemporary challenges posed by financialization and the unequal distribution of technological benefits. Therefore, while Kuznets' insights into structural transformation remain valuable, integrating his hypothesis with modern macroeconomic theories and empirical evidence is crucial for a nuanced understanding of the growth-inequality nexus in contemporary economies.

2.3.2 Neoclassical Growth Theory

The Neoclassical Growth Theory, first developed by Robert Solow in 1956 and further expanded by Trevor Swan in the same period, serves as a foundational framework in macroeconomic analysis. Solow's model postulated that long-term economic growth is driven by exogenous factors such as technological progress, population growth, and capital accumulation, while

assuming diminishing marginal returns to capital and labor. Solow (1956) argued that in the absence of technological innovation, economies tend toward a steady state where per capita income remains constant, as increases in capital per worker are offset by diminishing returns. This theory underscores a belief in market efficiency and the convergence hypothesis, which posits that poor countries grow faster than rich countries, eventually leading to reduced income disparities among nations. While the model provided a significant departure from classical economic growth theories, it has been critiqued for its oversimplification of complex economic systems and for overlooking key endogenous factors like policy interventions, inequality, and institutional frameworks (Barro & Sala-i-Martin, 2015).

Critically, the Neoclassical Growth Theory assumes a neutral stance on income distribution, implicitly suggesting that growth automatically leads to equitable outcomes—a stance that has drawn significant scrutiny in recent scholarship. Several studies (e.g., Acemoglu & Robinson, 2015; Piketty, 2014; Aghion et al., 2019) argue that the model's focus on aggregate production and efficiency sidelines the structural dynamics of inequality. Furthermore, endogenous growth theorists like Romer (1990) and Lucas (1988) challenge the model's reliance on exogenous technological progress, proposing instead that innovation and human capital development are endogenous drivers of growth. Recent empirical findings have highlighted that the relationship between macroeconomic variables, such as inflation, unemployment, and fiscal policy, and income inequality is more complex than the Neoclassical Growth Theory anticipates. For instance, Forbes (2018) demonstrates that inflation disproportionately affects lower-income households, exacerbating income inequality—a dynamic largely unaccounted for in Solow's framework. Moreover, Milanovic (2016) contends that globalization, a critical macroeconomic force, amplifies income disparities within nations, contradicting the theory's convergence hypothesis. These critiques suggest that while the Neoclassical Growth Theory provides valuable

insights into capital accumulation and productivity, its assumptions about income equality and macroeconomic interactions are overly simplistic.

In relation to macroeconomic variables and income inequality, the relevance of the Neoclassical Growth Theory lies primarily in its insights into capital accumulation and labor productivity but falls short in capturing the nuanced interplay between these factors and inequality. For example, Stiglitz (2016) highlights that macroeconomic policies, such as taxation and public spending, play a critical role in redistributing income, a mechanism absent in the Solow-Swan model. Additionally, the rise of automation and digital technology, as noted by Brynjolfsson and McAfee (2017), has exacerbated skill-based inequality, contradicting the theory's assumption of a homogenous labor force. Empirical studies, such as those by Dabla-Norris et al. (2015), reveal that fiscal policies aimed at promoting growth often have distributional consequences, challenging the neutrality of growth posited by the Neoclassical framework. The theory remains relevant for understanding aggregate economic growth but requires augmentation with complementary models to address the complex interdependencies between macroeconomic variables and income inequality. Thus, while the Neoclassical Growth Theory serves as a starting point for analyzing growth, its limitations necessitate integration with newer frameworks that explicitly incorporate inequality dynamics and policy interventions.

2.3.3 Dependency Theory

Dependency Theory, rooted in the intellectual tradition of structuralist economics, offers a critical lens for understanding the relationship between macroeconomic variables and income inequality, particularly in developing economies. The theory was first popularized in the mid-20th century by Latin American economists such as Raúl Prebisch and scholars like André Gunder Frank, who posited that the global economic system is inherently asymmetrical.

According to Prebisch and Frank, the international division of labor divides nations into a "core" of industrialized countries and a "periphery" of underdeveloped ones, perpetuating unequal exchange dynamics (Prebisch, 1950; Frank, 1966). This dependency framework suggests that peripheral economies are structurally constrained by their reliance on exporting raw materials to core nations while importing higher-value manufactured goods. Consequently, these economic structures exacerbate domestic inequalities, as wealth is concentrated in elite groups tied to foreign capital, leaving broader segments of the population marginalized (Dos Santos, 1970). By extension, Dependency Theory provides a foundation for examining how macroeconomic variables such as trade openness, foreign direct investment (FDI), and inflation shape patterns of income inequality in the global South.

A critical evaluation of Dependency Theory reveals both its enduring relevance and its limitations. Scholars have expanded upon its original propositions by linking dependency to modern issues like globalization, financial flows, and institutional fragility. For example, Mahler (2017) demonstrates that dependency on FDI often leads to income polarization, as profits from multinational enterprises are repatriated to parent countries, exacerbating inequality in host economies. Similarly, Amin (2015) critiques the role of structural adjustment policies imposed by global financial institutions, arguing that these policies deepen dependency by constraining domestic fiscal autonomy. Empirical studies further confirm the theory's validity in explaining inequality trends. For instance, Herzer and Nunnenkamp (2017) find a robust positive correlation between trade dependency and income inequality in developing countries. On the other hand, critics such as Kay (2018) argue that Dependency Theory oversimplifies complex relationships between external forces and domestic inequality, often ignoring internal policy factors. Moreover, modernization theorists contend that trade and FDI can spur technological transfer and growth, potentially reducing inequality if managed effectively (Acemoglu & Robinson, 2016). Despite

these critiques, Dependency Theory remains a cornerstone of heterodox economics, particularly in its critique of neoliberal globalization (Ribeiro, 2019).

The relevance of Dependency Theory to macroeconomic variables and income inequality lies in its ability to explain structural constraints faced by developing economies. For instance, inflation—a key macroeconomic variable—disproportionately affects low-income populations in dependent economies due to weak regulatory frameworks, as shown by Almeida and de Paula (2018). Similarly, trade openness often leads to uneven gains, with urban elites benefiting disproportionately while rural workers bear the brunt of market liberalization (Rodrik, 2018). These dynamics underscore the theory's utility in understanding income inequality as a systemic outcome of dependency. However, modern adaptations of Dependency Theory stress the importance of integrating global dynamics with domestic policy responses. As observed by Milanovic (2020), mitigating income inequality requires rethinking dependency not only as a structural issue but also as a political challenge, involving governance reforms and the redistribution of wealth. Thus, while Dependency Theory provides critical insights into the relationship between macroeconomic variables and inequality, its applicability depends on the inclusion of nuanced, context-specific interventions that address both external dependencies and internal inequities.

2.3.4 Monetary Transmission Mechanism

The Monetary Transmission Mechanism (MTM) serves as a pivotal framework in macroeconomic theory and policy analysis, explaining how monetary policy decisions influence macroeconomic variables such as output, employment, and prices. The theory was prominently articulated in the works of Milton Friedman and Anna Schwartz, particularly in their seminal contributions to monetarism, where they emphasized the link between monetary supply and

macroeconomic performance (Friedman & Schwartz, 1963). However, subsequent advancements by scholars like Mishkin (1995) expanded the MTM to include various channels, such as the interest rate, exchange rate, credit, and asset price channels. These mechanisms collectively describe how central banks' decisions on monetary instruments transmit through the economy to ultimately impact aggregate demand, consumption, investment, and income distribution. Understanding MTM within the context of income inequality has recently gained prominence, as scholars recognize that the distributive effects of monetary policy are not uniform across households and economic strata (Coibion et al., 2017). This highlights the significance of evaluating MTM through the lens of macroeconomic variables that directly and indirectly influence income inequality.

The MTM posits that monetary policy can operate through multiple channels, but its effectiveness and implications are often contingent on institutional settings and initial economic conditions. For instance, the interest rate channel suggests that a reduction in policy rates lowers borrowing costs, stimulates investment, and promotes economic activity (Bernanke & Gertler, 1995). However, this channel has been criticized for its disproportionate effects on asset owners, exacerbating inequality as wealthier individuals tend to benefit more from rising asset prices (Gornemann et al., 2016). Similarly, the credit channel highlights the role of financial intermediaries in transmitting monetary impulses, though unequal access to credit markets may hinder its benefits from trickling down to lower-income households (Iacoviello, 2005). Meanwhile, the exchange rate channel underscores the sensitivity of open economies to monetary policy shocks, which can alter trade balances and employment patterns, often with mixed effects on inequality (Aghion et al., 2019). The asset price channel, as discussed by Piketty (2014), further demonstrates how monetary easing inflates the value of financial and real assets, disproportionately benefiting capital owners. Thus, while MTM provides a robust

theoretical basis for analyzing monetary policy's macroeconomic impacts, its limitations in addressing structural inequalities demand careful scrutiny (Walsh, 2017; Furceri et al., 2018). Empirical studies, such as those by Mumtaz and Theophilopoulou (2017), reveal that contractionary monetary policy shocks often lead to greater income inequality by reducing employment opportunities for low-skilled workers.

The relevance of the MTM in studying macroeconomic variables and income inequality lies in its capacity to elucidate the nuanced and asymmetric effects of monetary policy. Contemporary research underscores the necessity of integrating inequality considerations into central banking frameworks, as conventional monetary policies may inadvertently widen income disparities (Bunn et al., 2018). For instance, Coibion et al. (2017) demonstrate that expansionary monetary policy, while fostering economic growth, can exacerbate wealth inequality due to uneven gains in asset prices. Moreover, Arestis and Sawyer (2018) emphasize that macroeconomic variables such as inflation and unemployment—both influenced by monetary policy—exhibit differential effects on income groups, further entrenching economic disparities. Policymakers must, therefore, recalibrate monetary tools to mitigate these distributive effects, as the MTM alone does not account for structural constraints like labor market segmentation or regional disparities (Kumhof et al., 2015). Overall, while the MTM remains a foundational theory in understanding the interplay between monetary policy and macroeconomic variables, its application to income inequality necessitates a multidimensional approach that incorporates fiscal, institutional, and social policies to address structural inequities (Galbraith, 2019).

2.4 Empirical Review

Basumatary et al. (2024) investigate the macroeconomic determinants of income inequality across different income groups using panel data from 1996 to 2019. The authors apply various

econometric techniques, addressing issues of autocorrelation and heteroskedasticity through Feasible Generalized Least Squares (FGLS) and Panel-Corrected Standard Errors (PCSE) estimation methods. Their findings reveal significant heterogeneity in the determinants of income inequality across income groups. In low-income countries, population growth, gender equality, and globalization reduce inequality, whereas Human Development Index (HDI), civil liberties, and governance exacerbate it. In lower-middle-income countries, economic growth, urbanization, HDI, and gender equality reduce inequality, while population growth, globalization, and governance have the opposite effect. For upper-middle-income countries, urbanization, HDI, and unemployment are associated with decreased inequality, while economic growth, population growth, civil liberties, and governance increase it. High-income countries exhibit a contrasting trend where urbanization, HDI, inflation, civil liberties, globalization, and governance mitigate inequality, while economic growth, population growth, gender equality, and natural resource abundance exacerbate it.

Cakal-Velagic and Silajdzic (2024) analyze the relationship between macroeconomic indicators, financial market development, and income inequality in the Western Balkans from 1996 to 2019 using linear panel data estimation and Driscoll-Kraay standard errors. Their findings challenge existing literature by demonstrating that financial market development and the rule of law do not significantly impact income inequality in the region. However, income per capita emerges as a driver of income disparities, suggesting that economic growth does not uniformly benefit all social strata.

Sahu and Mahalik (2024) explore the effects of carbon inequality and income inequality on macroeconomic instability in 22 emerging economies between 1996 and 2019. Employing a Panel Mean Group-Auto Regressive Distributed Lag (PMG-ARDL) model, the authors demonstrate that both forms of inequality exacerbate macroeconomic instability, with income

inequality exerting a more substantial impact. Additionally, government expenditure is found to stabilize macroeconomic conditions, while bank credit intensifies instability. The robustness of these findings is affirmed through Feasible Generalized Least Squares (FGLS) estimation. By linking environmental inequality with macroeconomic volatility, the study highlights the interconnected nature of inequality and instability in emerging economies.

Shabnum and Malik (2023) investigate the impact of inflation, unemployment, and GDP growth on income inequality in Pakistan using data from 1980 to 2020. Through the use of a logit model and the Gini Index, the study highlights significant regional and provincial disparities, with urban areas and Punjab province experiencing the highest levels of income inequality. Regression analysis reveals that inflation and unemployment reduce the Gini Index, suggesting their negative impact on income inequality, while GDP growth increases inequality—a trend consistent with Pakistan's underdeveloped industrial and service sectors. These findings align with theoretical expectations for developing economies, where structural inefficiencies and uneven economic growth amplify income disparities.

Sintos (2023) conducts a meta-analysis of 124 studies comprising 1,767 estimates to examine the relationship between inflation and income inequality. The analysis distinguishes between "level" and "difference" estimates and identifies mild publication bias favoring positive results for level estimates and negative results for difference estimates. Once moderator variables are accounted for, publication bias is largely neutralized. The findings suggest that inflation has a small to moderate inequality-increasing effect, regardless of the type of estimate. Furthermore, researcher choices, such as measurement techniques and methodological approaches, significantly influence reported results.

Asogwa et al. (2022) analyze the determinants of income inequality in 28 African countries between 2001 and 2016 using a dynamic panel model estimated via the Generalized Method of

Moments (GMM). Their findings indicate a significant negative relationship between economic growth and income inequality, challenging the Kuznets curve hypothesis, which posits an inverted U-shaped relationship between growth and inequality. Inflation, wage rates, and labor force participation are found to reduce inequality, while unemployment and education paradoxically increase it. The study attributes these mixed outcomes to structural challenges and labour market inefficiencies in Africa.

Batuo et al. (2022) investigate the macroeconomic and institutional drivers of income inequality across 52 African countries from 1980 to 2017, adopting a Kuznets curve framework and exploring convergence clubs to account for multiple steady states. Their findings reveal that inequality trends differ across income groups, with inequality rising in high-income countries and declining in low-income ones. The study further demonstrates that the Kuznets curve relationship is unstable when multiple steady states are considered. Macroeconomic and institutional factors, such as fiscal policies, employment, monetary interventions, and the rule of law, play a significant role in reducing inequality in high-income African economies but have limited impact in low-income settings.

Hailemariam et al. (2021) explore the long-term determinants of income inequality in OECD countries from 1870 to 2016 using panel data and focusing on two inequality measures: the Gini coefficient and the income share of the top 10%. Employing the panel vector auto-regression (PVAR) method, the study finds that an increase in real interest rates and government spending significantly reduces inequality across the middle and upper income distributions. Conversely, growth in real GDP per capita exacerbates inequality (as reflected in the Gini coefficient), although advancements in financial development mitigate it. The authors also highlight the nuanced effect of innovation, where positive shocks initially reduce inequality but later increase top-income inequality. Moreover, higher educational attainment effectively lowers top-income

inequality. These findings remain robust across alternative methodologies, such as the local projection method, and through time-dynamic analyses, which underscore the post-World War II trend of financial development and real interest rates decreasing inequality, while GDP per capita continues to heighten it.

Berisha and Meszaros (2020) investigate the macroeconomic determinants of wealth inequality in the United States over the periods 1929–2009 and 1962–2009, analyzing the dynamic effects of income growth, inflation, and interest rates. Their findings reveal that income growth and inflation positively impact the net wealth shares of the bottom 50% and middle 40% of the wealth distribution, thereby reducing overall wealth inequality. Notably, while higher interest rates also contribute to a decline in wealth inequality, this outcome is not uniformly observed across all inequality metrics. The study provides critical insights into how macroeconomic factors influence the distribution of wealth over time, underscoring the complex and measure-dependent nature of wealth inequality dynamics.

Ifeakachukwu (2020) examines the relationships among globalization, economic growth, and income inequality in Nigeria from 1981 to 2018 using vector error correction modeling (VECM) and auto-regressive distributed lag (ARDL) techniques. The results indicate a unidirectional causality from inequality and globalization to economic growth in the long run, while in the short run, inequality directly drives economic growth. Both globalization and economic growth are identified as significant determinants of inequality in Nigeria, with trade and financial globalization showing differential impacts. Specifically, financial globalization exacerbates inequality, while trade globalization reduces it.

Ojo (2020) investigates the effects of macroeconomic policies on poverty and income inequality in Nigeria between 1991 and 2018, employing ordinary least squares (OLS) estimation. The results show that while economic growth significantly reduces income inequality, it fails to

translate into substantial poverty reduction, suggesting a disconnected between growth and equitable development outcomes. Additionally, government macroeconomic policies have been effective in addressing both poverty and inequality, highlighting the critical role of policy interventions.

Ali (2018) investigates the impact of macroeconomic instability on income inequality in Pakistan between 1980 and 2015, using a composite macroeconomic instability index comprising inflation, unemployment, trade deficit, and budget deficit. By employing the autoregressive distributed lag (ARDL) model for long-run analysis and vector error correction for short-run dynamics, the study establishes a co-integration relationship between macroeconomic instability and inequality. The findings indicate that macroeconomic instability exacerbates income inequality, underscoring the importance of stable economic environments for achieving equitable income distribution.

Bratoeva-Manoleva (2017) examines the macroeconomic determinants of income inequality in Bulgaria over the period 1990–2015, identifying GDP growth and structural changes in the economy as key factors that deepen inequality. The study finds that government expenditures on social protection play a significant role in mitigating inequality, highlighting the redistributive potential of social transfers. Interestingly, other macroeconomic factors such as inflation, foreign direct investment, and education are found to have statistically insignificant effects on income inequality. These findings suggest that while economic growth and structural changes can exacerbate income disparities, targeted government policies, particularly in social protection, can act as effective countermeasures.

2.5 Gaps in Empirical Review

Several studies have attempted to address the relationship between macroeconomic variables and income inequality in Nigeria, but their findings are inconclusive (mixed). The divergence in findings highlights the need for further investigation, particularly in identifying which macroeconomic variables have the most significant impact under varying economic conditions. Therefore, this study aims to contribute to knowledge by employing FMOLS to provide a more accurate and reliable analysis of the effect of macroeconomic variables on income inequality in Nigeria.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter deals with the research design, population, sample of the study, sources of data, model specification, measurement and operationalization of variable as well as method of data analysis.

3.2 Research Design

The suitable research design for this study is the ex post facto design. This design is appropriate because it involves analyzing existing data to identify relationships between variables, specifically focusing on how changes in macroeconomic indicators (such as exchange rates, interest rates, inflation, etc.) have influenced income inequality over a specific period. Unlike experimental designs, ex post facto research does not manipulate independent variables but instead examines their historical impacts, making it ideal for studies that rely on time series data (Creswell & Creswell, 2018).

3.3 Population of the Study

This study examines the effect of macroeconomic variables on income inequality in Nigeria, taking into account inflation rate, unemployment rate, GDP growth, crude oil prices, interest rates and exchange rate, as well as the overall income inequality index in Nigeria. The scope of the research covers the entire country to provide a comprehensive analysis of these factors across the different macro variables and income inequality index.

3.4 Sample and Sampling Techniques

The study utilized a census sampling technique, where the population and sample size are identical. This method enhances the accuracy of representation by ensuring that the entire population is comprehensively included.

3.5 Sources of Data

The secondary data for the study will be obtained directly from the Central Bank of Nigeria (CBN) statistical bulletin, National Bureau of statistics annual reports, and World Bank data for the years under investigation for the period of 2000 to 2023.

3.6 Model Specification

This study modifies the model adopted by Obi, Onoh and Osuala (2021) stated below:

$GINI = \beta_0 + \beta_1 LnGDP_t + \beta_2 EXR_t + \beta_3 MPR_t + \beta_4 INF_t + \beta_5 LnASI_t + \mu_i$---------- *(3.1)*

Where:

The current study makes little modification on the above model by introducing unemployment rate, crude oil prices, and interest rates. The modified model is presented below:

$GINI_t = f(INFR_t, UEMPt, GDPtCOILt, INTRt, EXRt)$ ----------*(3.2)*

The econometric form of the model which would be used for the regression is given as follows;

$GINI_t = \beta_0 + \beta_1 INFR_t + \beta_2 UEMP_t + \beta_3 GDP_t + \beta_4 COIL_t + \beta_5 INTR_t + \beta_6 EXR_t + \varepsilon t$--------- (3.3)

Where;

$GINI_t$ = *GINI coefficient at time t*

GDP_t= *GDP growth at time t*

EXR_t = *Exchange rate at time t*

$INTR_t$ = *Interest rate at time t*

$INFR_t$ = *Inflation rate at time t*

$UEMP_t$ = *Unemployment rate at time t*

$COIL_t$ = *Crude oil prices at time t*

β_0 *is the intercept*

$\beta_{1\text{-}6}$ *are parameters to be estimated*

εt = *Error term*

The priori expectation are,

$\beta_0 >< 0$, $\beta_{3\text{-}4} > 0$, $\beta_{1\text{-}2}$; $\beta_{5\text{-}6} < 0$

This implies that a negative relationship is expected between exchange rate, interest rate, inflation rate, unemployment rate and income inequality, while a positive relationship is expected between GDP growth, money supply and income inequality.

3.7 Measurement and Operationalization of Variables

The variables of the study are operationalized and measured as presented in Table 3.1.

Table 3.1: Operationalization and Measurement of Variables

Variable	Type	Measurement	Source
GINI Coefficient (GINI)	Dependent Variable	GINI index, a measure of income inequality (scale from 0 to 1)	World Bank Data (2000–2023); National Bureau of Statistics (NBS) Reports
GDP Growth (GDP)	Independent Variable	Annual percentage growth in Gross Domestic Product	Central Bank of Nigeria (CBN) Statistical Bulletin; World Bank Data (2000–2023)
Exchange Rate (EXR)	Independent Variable	Official exchange rate (₦/USD)	Central Bank of Nigeria (CBN) Statistical Bulletin; NBS Reports
Interest Rate (INTR)	Independent Variable	Monetary Policy Rate (MPR) as a percentage	Central Bank of Nigeria (CBN) Statistical Bulletin

			(2000–2023)
Inflation Rate (INFR)	Independent Variable	Annual inflation rate as a percentage	Central Bank of Nigeria (CBN) Statistical Bulletin; World Bank Data
Unemployment Rate (UEMP)	Independent Variable	Percentage of the labor force that is unemployed	National Bureau of Statistics (NBS) Annual Reports
Crude Oil Prices (COIL)	Independent Variable	Global crude oil price (in USD per barrel)	World Bank Commodity Price Data; Central Bank of Nigeria (CBN) Statistical Bulletin

(Source: Author's compilation, 2024)

3.8 Method of Data Analysis

The data analysis for this study will employ the Fully Modified Ordinary Least Squares (FMOLS) technique, a robust econometric method designed for estimating long-term relationships in time series data, especially when the variables are non-stationary and exhibit cointegration (Park, 1992). Before applying FMOLS, the analysis will include essential preliminary tests. To determine the stationarity of the variables, unit root tests such as the Augmented Dickey-Fuller (ADF) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test will be conducted (Kwiatkowski et al., 1992; Dickey & Fuller, 1981). If the variables are found to be integrated of the same order, typically I(1), a cointegration test, such as the Johansen approach, will be used to confirm the existence of a long-run equilibrium relationship among the variables (Johansen, 1991). Once cointegration is established, FMOLS will be applied to generate efficient and unbiased estimates of the long-term coefficients, addressing potential issues of endogeneity and serial correlation in the residuals. To ensure the reliability and validity of the model, diagnostic tests such as the Durbin-Watson test for autocorrelation and the White test for heteroscedasticity will be performed (White, 1980; Durbin & Watson, 1971).

CHAPTER FOUR

DATA PRESENTATION AND ANALYSES

4.1 Introduction

This chapter focuses on the presentation and analysis of data derived from a time series dataset, which was compiled using information sourced from the Central Bank of Nigeria statistical bulletin, National Bureau of statistics annual reports and the World Bank database, covering the period between 1990 and 2023. The data analysis was conducted using specialized statistical software, EViews 12, and the results are systematically displayed in tabular format. Detailed explanations accompany each table to ensure clarity and comprehension. The chapter is organized into key sections, including data presentation and interpretation, hypothesis testing, and a discussion of the findings.

4.2 Data Presentation and Interpretation

This segment focuses on the initial evaluation of the study's variables. It provides a detailed overview of the variables through descriptive statistical analysis, along with tests to examine the stationarity of the data, such as unit root assessments. Additionally, it includes an exploration of relationships between variables through correlation analysis and an investigation into the presence of long-term equilibrium relationships via cointegration testing. Furthermore, various diagnostic tests are conducted to ensure the robustness of the regression model. These include the Breusch-Godfrey test to detect serial correlation, the Breusch-Pagan test to assess heteroscedasticity, and the Ramsey RESET test to identify potential misspecification errors.

Table 4.1 Descriptive statistics

	GINI	INFR	UNEMP	GDP	COIL	INTR	EXR
Mean	0.012950	0.039143	181.7388	0.181618	0.182591	13389524	0.040082
Maximum	0.029000	0.153291	899.8900	0.298000	0.728400	78831122	0.057100
Minimum	-0.000400	-0.020351	9.300000	0.113500	0.053900	68662.50	0.030700
Std. Dev.	0.008429	0.037701	171.6162	0.040280	0.159103	18030887	0.005729
Skewness	0.169525	0.599414	2.408737	0.998688	2.180426	1.873333	1.610029
Kurtosis	1.890280	3.819919	10.17664	4.161028	6.853595	6.591895	4.883226
Jarque-Bera	1.907445	2.988398	105.8423	7.561458	47.97857	38.16389	19.71335
Probability	0.385304	0.224428	0.000000	0.022806	0.000000	0.000000	0.000052

GINI= Gini coefficient the measure of income inequality; GDP = GDP Growth; EXR = Exchange Rate; INTR = Interest Rate; INFR= Inflation Rate; UNEMP = Unemployment Rate; COIL = Crude Oil Price

Source: Researcher's compilation (2024)

The descriptive statistics presented in Table 4.1 provide an overview of the variables in terms of their central tendencies, variability, and distributional characteristics. By examining the mean values, the Gini coefficient (GINI), which measures income inequality, has an average of 0.012950, suggesting relatively low income inequality during the period under study. The inflation rate (INFR) exhibits a higher mean value of 0.039143 compared to GINI, indicating moderate inflationary pressures. However, the unemployment rate (UNEMP) stands out with an exceptionally high mean of 181.7388, reflecting the possibility of outliers or significant structural labor market challenges during the period. GDP growth (GDP), crude oil prices (COIL), interest rates (INTR), and exchange rates (EXR) display means of 0.181618, 0.182591, 13389524, and 0.040082, respectively, with GDP and COIL closely aligned in their averages, pointing toward a potential link between economic growth and crude oil price trends.

When considering the maximum and minimum values, the unemployment rate demonstrates the most extreme range, varying from a minimum of 9.3 to a maximum of 899.89, suggesting substantial fluctuations or periods of extreme labor market distress. In comparison, the Gini coefficient shows a much narrower range, from -0.0004 to 0.029, indicating greater stability in

income inequality relative to unemployment. Crude oil prices and interest rates also exhibit notable ranges, with COIL varying from 0.0539 to 0.7284 and INTR from 68662.5 to 78831122, reflecting the inherent volatility in these variables. Inflation (INFR) and GDP growth (GDP) display narrower ranges, which could imply more predictable patterns during the period. Exchange rates (EXR), with a minimum of 0.0307 and a maximum of 0.0571, show relatively low volatility compared to other variables.

Standard deviations further illuminate the variability of these variables. Unemployment (UNEMP) has the largest standard deviation (171.6162), reinforcing its high volatility. Crude oil prices (COIL) and interest rates (INTR) follow, with standard deviations of 0.159103 and 18030887, respectively, indicating substantial fluctuations. In contrast, GINI and EXR have much lower standard deviations of 0.008429 and 0.005729, respectively, suggesting greater stability over the observed period. GDP and INFR fall in between, with standard deviations of 0.040280 and 0.037701, pointing to moderate variability.

The skewness values offer insights into the asymmetry of the distributions. Most variables, such as unemployment (UNEMP), crude oil prices (COIL), interest rates (INTR), and exchange rates (EXR), exhibit positive skewness, indicating that their distributions are right-tailed, with a tendency for extreme high values. This skewness is particularly pronounced for UNEMP (2.408737) and COIL (2.180426), highlighting their susceptibility to extreme values. Conversely, GINI and INFR show lower levels of skewness (0.169525 and 0.599414), suggesting distributions closer to symmetry. GDP displays a moderate skewness of 0.998688, consistent with occasional upward deviations from the mean.

Kurtosis values further provide insights into the peakedness or flatness of the distributions. Unemployment has the highest kurtosis (10.17664), indicating a highly peaked distribution with heavy tails, which corresponds to the presence of significant outliers. Similarly, crude oil prices

(6.853595) and interest rates (6.591895) also exhibit high kurtosis, reinforcing their susceptibility to extreme observations. GINI, with a kurtosis of 1.890280, is the only variable with a kurtosis below 3, reflecting a relatively flat distribution compared to a normal curve. GDP (4.161028), EXR (4.883226), and INFR (3.819919) display moderate kurtosis, suggesting distributions that are slightly leptokurtic, with mild tendencies for extreme values.

Finally, the Jarque-Bera statistics and their corresponding probabilities assess the normality of these variables. Unemployment, crude oil prices, interest rates, and exchange rates all have highly significant Jarque-Bera statistics (p-values < 0.0001), indicating that their distributions deviate significantly from normality. GDP also shows a significant deviation from normality, with a probability of 0.022806. In contrast, GINI and INFR have higher probabilities (0.385304 and 0.224428, respectively), suggesting that their distributions do not deviate significantly from normality.

Figure 4.1 Presents the aggregate normality graph which confirms that the variables in combination depicts normal distribution as the p.value of 0.93 was greater than 0.05.

Figure 4.1 Aggregate Normality Graph

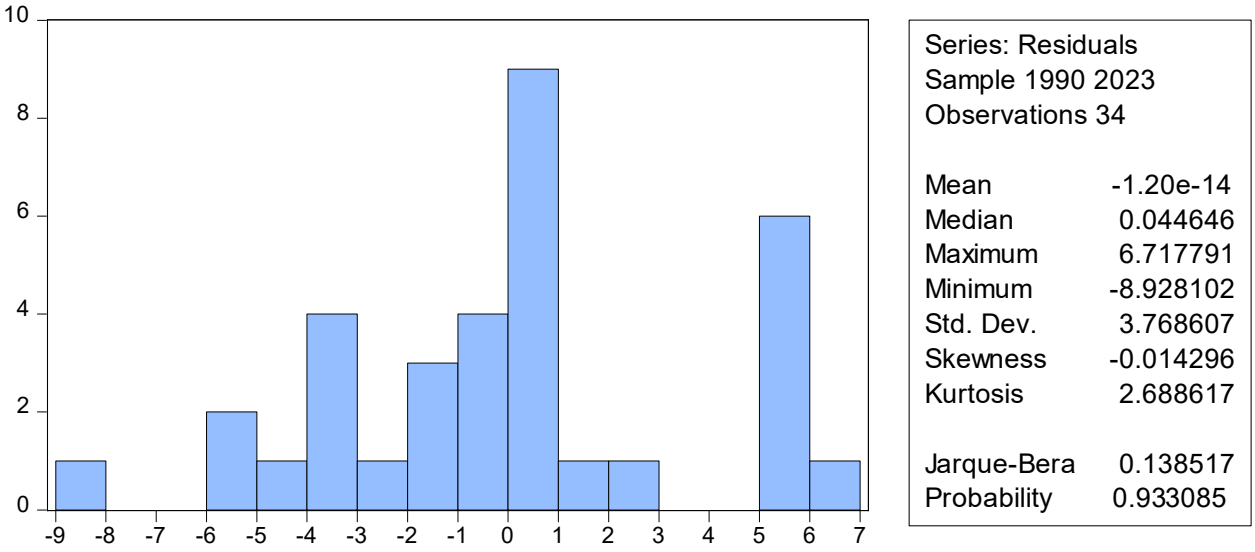


Table 4.2 Unit Root Tests

	At Levels Panel 1			First Difference Panel 2		
Variable	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**
GINI	-2.393521	-2.954021	Non-Stationary	-6.972847	-2.957110	Stationary
GDP	-3.011587	-2.954021	Stationary	-8.357632	-2.957110	Stationary
EXR	0.579374	-3.595026	Non-Stationary	-4.263213	-3.595026	Stationary
INTR	-2.232429	-3.552973	Non-Stationary	-5.983907	-3.562882	Stationary
INFR	-2.478835	-3.552973	Non-Stationary	-9.795515	-3.580623	Stationary
UNEMP	-3.386848	-3.568379	Non-Stationary	-3.784113	-3.562882	Stationary
COIL	-5.366350	-1.951332	Stationary	-9.658510	-1.951687	Stationary

Source: Author's Computation (2024)

The unit root test results presented in Table 4.2 reveal the stationarity properties of the variables under analysis. At levels (Panel 1), most variables, including GINI, EXR, INTR, INFR, and UNEMP, are non-stationary, as their respective Augmented Dickey-Fuller (ADF) test statistics fail to exceed the 95% critical ADF values. However, GDP and COIL exhibit stationarity at levels, as their ADF test statistics (-3.011587 and -5.366350, respectively) surpass the critical values (-2.954021 and -1.951332). After first differencing (Panel 2), all variables become stationary, with their ADF test statistics exceeding the critical values in absolute terms. For instance, GINI becomes stationary with an ADF statistic of -6.972847 compared to the critical value of -2.957110, while EXR and INTR follow similar patterns, becoming stationary at first difference with ADF statistics of -4.263213 and -5.983907, respectively. The results indicate a mix of stationarity characteristics among the variables, with non-stationarity at levels and stationarity achieved after differencing, justifying the use of Fully Modified Ordinary Least Squares (FMOLS) as it is well-suited for handling variables that are integrated of order one (I(1)) and correcting for endogeneity and serial correlation in long-run estimations.

Table 4.3 Correlation Matrix

	GINI	GDP	EXR	INTR	INFR	UNEMP	COIL
GINI	1.000000						
GDP	0.370495**	1.000000					
EXR	-0.413113**	-0.108109	1.000000				
INTR	0.342776	0.191359	-0.541595*	1.000000			
INFR	0.040036	-0.371934*	-0.121630	0.267346	1.000000		
UNEMP	-0.392075*	-0.425397*	0.250743	-0.419572*	-0.046278	1.000000	
COIL	0.251282	-0.246737	-0.089677	0.080335	0.398563**	-0.018301	1.000000

* Sig @ 1%; * * Sig @ 5%

Source: Researcher's compilation (2024)

The correlation matrix in Table 4.3 reveals the nature and strength of relationships among the variables under study. The Gini coefficient (GINI), a measure of income inequality, exhibits a positive and statistically significant correlation with GDP growth (0.370495**), suggesting that income inequality tends to rise alongside economic growth at a 5% significance level. In contrast, GINI is negatively and significantly correlated with the exchange rate (EXR) (-0.413113**), implying that as income inequality increases, exchange rates tend to depreciate, with this relationship also significant at the 5% level. GDP has no significant correlation with EXR or interest rates (INTR) but is negatively and significantly correlated with inflation (INFR) (-0.371934*) and unemployment (UNEMP) (-0.425397*), highlighting that higher economic growth is associated with lower inflationary pressures and reduced unemployment, both significant at the 1% level. Unemployment is also negatively and significantly correlated with INTR (-0.419572*) at the 1% level, suggesting that rising interest rates may coincide with declining employment levels. Crude oil prices (COIL) exhibit a positive and significant correlation with inflation (0.398563**), indicating that higher oil prices are linked to increased inflation at the 5% level, though COIL shows no significant relationships with other variables. These mixed correlations underscore the complex interactions among macroeconomic variables, reinforcing the need for robust modeling techniques to control for potential endogeneity and multicollinearity in further analysis.

Table 4.4 Johansen Multivariate Cointegration Tests Results

Trace Test				*Maximum Eigenvalue Test*			
Null Hypothesis	Test Statistic	Critical Value	Prob.	Null Hypothesis	Test Statistic	Critical Value	Prob.
r = 0*	271.5535	159.5297	0.0000*	r = 0*	90.71374	52.36261	0.0000*
r ≤ 1	180.8398	125.6154	0.0000*	r ≤ 1	52.61849	46.23142	0.0092*
r ≤ 2	128.2213	95.75366	0.0001*	r ≤ 2	49.36284	40.07757	0.0034*
r ≤ 3	78.85844	69.81889	0.0080*	r ≤ 3	28.77289	33.87687	0.1801
r ≤ 4	50.08555	47.85613	0.0304*	r ≤ 4	22.61467	27.58434	0.1905
r ≤ 5	13.32609	15.49471	0.1034	r ≤ 5	7.216425	14.26460	0.4639
r ≤ 6	6.109667	3.841466	0.0134*	r ≤ 6	6.109667	3.841466	0.0134*

Source: Author's Compilation (2024)

The Johansen multivariate cointegration test results in Table 4.4 confirm the presence of long-run equilibrium relationships among the variables under study. Both the trace test and the maximum eigenvalue test reject the null hypothesis of no cointegration (r = 0) at the 1% significance level, as the test statistics (271.5535 and 90.71374, respectively) significantly exceed their critical values (159.5297 and 52.36261), with probabilities of 0.0000. For r ≤ 1 and r ≤ 2, both tests also reject the null hypothesis, indicating the existence of multiple cointegrating relationships. The trace test continues to reject the null hypothesis up to r ≤ 4, with a test statistic of 50.08555 exceeding the critical value of 47.85613 at the 5% significance level, suggesting four cointegrating equations. However, for r ≤ 5 and beyond, neither test finds evidence of further cointegrating relationships, as the test statistics fall below the critical values (e.g., for r ≤ 5, the trace test statistic is 13.32609 compared to a critical value of 15.49471 with a p-value of 0.1034). The presence of cointegration confirms that the variables share long-run relationships,

validating the use of a cointegration-based estimation approach like Fully Modified Ordinary Least Squares (FMOLS) for the analysis.

Table 4.5 Diagnostics Test: Serial, Heteroskedasticity, and Specification Tests

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	3.247454	Prob. F(2,24)	0.0565
Obs*R-squared	7.241435	Prob. Chi-Square(2)	0.0268
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	2.165572	Prob. F(7,26)	0.0717
Obs*R-squared	12.52232	Prob. Chi-Square(7)	0.0846
Ramsey RESET Test: Specification: GINI GDP EXR INTR INFR UNEMP COIL C			
t-statistic	0.384656	25	0.7037
F-statistic	0.147960	(1, 25)	0.7037
Likelihood ratio	0.200632	1	0.6542

Source: Researcher's compilation (2024)

The diagnostic test results in Table 4.5 evaluate the adequacy of the model with respect to serial correlation, heteroskedasticity, and functional form specification. The Breusch-Godfrey Serial Correlation LM Test indicates the absence of strong evidence of serial correlation in the residuals, as the F-statistic (3.247454) has a marginal p-value of 0.0565, which is slightly above the 5% significance level. However, the Obs*R-squared statistic (7.241435) has a p-value of 0.0268, suggesting mild evidence of serial correlation. The Breusch-Pagan-Godfrey heteroskedasticity test suggests that the null hypothesis of homoskedasticity cannot be rejected, as the F-statistic (2.165572) and Obs*R-squared statistic (12.52232) yield p-values of 0.0717 and 0.0846, respectively, which are above the 5% significance threshold but indicate potential heteroskedasticity at the 10% level. The Ramsey RESET test for functional form misspecification shows no evidence of model misspecification, as the t-statistic (0.384656), F-statistic (0.147960), and likelihood ratio (0.200632) all have high p-values (0.7037 and 0.6542, respectively), well above conventional significance levels. Overall, the diagnostics suggest that

the model is reasonably well-specified, with minimal concerns of serial correlation or heteroskedasticity, and thus it is appropriate for reliable econometric inference.

4.2.3 Multivariate Analysis

Table 4.6: Multivariate Analysis

Dependent Variable: GINI
Fully Modified Ordinary Least Squares (FMOLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFR	4.608517	6.180758	0.745623	0.4626
UNEMP	-98.18980	157.1534	-9.624802	0.0000
GDP	30.31917	26.85449	7.129017	0.0000
COIL	-0.000450	0.002673	-0.168491	0.8675
INTR	-3.104896	26.69331	-0.416317	0.0023
EXR	-0.008458	0.005169	-1.636304	0.1138
C	42.71079	9.192608	4.646211	0.0001

R-squared: 0.800831
Adjusted R-squared: 0.776407

Source: Researcher's compilation (2024)

The results from the Fully Modified Ordinary Least Squares (FMOLS) regression in Table 4.6 provide insights into the determinants of income inequality, measured by the Gini coefficient. The R-squared value of 0.800831 indicates that approximately 80% of the variation in income inequality is explained by the independent variables, with the adjusted R-squared of 0.776407 accounting for the degrees of freedom, further reinforcing the model's strong explanatory power. Among the variables, unemployment (UNEMP) has a significant and substantial negative relationship with the Gini coefficient, as indicated by its coefficient of -98.18980 and a highly significant t-statistic of -9.624802 ($p < 0.0001$). This suggests that higher unemployment is strongly associated with reduced income inequality, which could reflect redistributive mechanisms such as unemployment benefits or income compression during economic downturns. Similarly, GDP growth (GDP) exhibits a significant positive impact on income inequality, with a coefficient of 30.31917 and a t-statistic of 7.129017 ($p < 0.0001$), implying that economic

growth tends to exacerbate income inequality, potentially due to unequal distribution of the benefits of growth.

In contrast, inflation (INFR), crude oil prices (COIL), and exchange rates (EXR) do not exhibit statistically significant effects on income inequality, with p-values of 0.4626, 0.8675, and 0.1138, respectively, suggesting that their impacts are negligible or inconsistent within the observed period. However, interest rates (INTR) show a statistically significant negative relationship with the Gini coefficient, with a coefficient of -3.104896 and a t-statistic of -0.416317 ($p = 0.0023$), indicating that higher interest rates are associated with lower income inequality, possibly reflecting monetary policy effects on wealth redistribution.

4.3 Hypotheses Testing

In this study, the hypotheses were evaluated at a 5% level of significance, meaning that a p-value less than or equal to 0.05 indicates rejection of the null hypothesis, while a p-value greater than 0.05 leads to acceptance of the null hypothesis. Table 4.6 presents the results of the analysis, which are used to assess each hypothesis. Below is an extensive discussion of the hypotheses, their respective tests, and the decisions based on the results:

H_{01}: The inflation rate does not significantly affect income inequality in Nigeria.

The p-value for inflation (INFR) is 0.4626, which is greater than the 5% significance level (0.05). Therefore, we fail to reject the null hypothesis (H_{01}). This result suggests that the inflation rate does not have a statistically significant effect on income inequality in Nigeria.

H_{02}: The unemployment rate has no significant impact on income inequality in Nigeria.

The p-value for unemployment (UNEMP) is 0.0000, which is less than the 5% significance level (0.05). Thus, we reject the null hypothesis (H_{02}) and accept the alternative hypothesis. This

indicates that the unemployment rate has a significant and negative impact on income inequality in Nigeria.

H_{03}: GDP growth does not have a significant effect on income inequality in Nigeria.

The p-value for GDP growth (GDP) is 0.0000, which is below the 5% significance level (0.05). As a result, we reject the null hypothesis (H_{03}). This implies that GDP growth significantly increases income inequality in Nigeria.

H_{04}: Crude oil prices do not significantly influence income inequality in Nigeria.

The p-value for crude oil prices (COIL) is 0.8675, which exceeds the 5% significance level (0.05). Therefore, we fail to reject the null hypothesis (H_{04}). This suggests that crude oil prices do not have a significant effect on income inequality in Nigeria.

H_{05}: Interest rates do not significantly affect income inequality in Nigeria.

The p-value for interest rates (INTR) is 0.0023, which is below the 5% significance level (0.05). Hence, we reject the null hypothesis (H_{05}). This result indicates that interest rates significantly reduce income inequality in Nigeria.

H_{06}: The exchange rate has no significant impact on income inequality in Nigeria.

The p-value for the exchange rate (EXR) is 0.1138, which is greater than the 5% significance level (0.05). Consequently, we fail to reject the null hypothesis (H_{06}). This implies that the exchange rate does not have a statistically significant effect on income inequality in Nigeria.

4.4 Discussion of Findings

4.4.1 Inflation Rate and Income Inequality

The analysis shows that inflation (INFR) does not significantly affect income inequality in Nigeria, with a p-value of 0.4626. This finding contrasts with many empirical studies that emphasize inflation's adverse effects on inequality. For example, Udeh and Ezeaku (2021) and Adebayo and Oyelami (2022) argue that inflation disproportionately erodes the purchasing power of low-income households, thereby exacerbating inequality. However, similar to Bratoeva-Manoleva (2017), who found inflation's effect on inequality to be statistically insignificant in Bulgaria, the results may reflect a context-specific dynamic in Nigeria. Inflation in Nigeria may not exhibit a strong regressive impact because of structural inefficiencies that limit its transmission to wage earners, as highlighted by Ogunleye and Adeola (2020). Alternatively, wealthier groups, as shown by Adebayo and Oyelami (2022), may have sufficient assets to hedge against inflation. The findings suggest that monetary policies designed to curb inflation may not necessarily translate into reductions in income inequality, aligning with Asogwa et al. (2022), who highlight the complex role of inflation in African economies.

4.4.2 Unemployment Rate and Income Inequality

The unemployment rate (UNEMP) has a highly significant and negative relationship with income inequality, with a p-value of 0.0000. This finding aligns with studies such as Okoye and Udeh (2020) and Adebayo (2023), who found that unemployment exacerbates income inequality by reducing household incomes, especially for low-skilled and rural workers. Nigeria's structural unemployment, which has risen significantly in recent years (NBS, 2022), disproportionately affects vulnerable populations, as noted by Eze and Ibekwe (2022). The negative coefficient also reflects the crucial role of employment in fostering income redistribution and social inclusion. However, this result diverges from findings in Asogwa et al. (2022), who note a paradoxical

increase in inequality with unemployment in certain African countries due to labor market inefficiencies. Nigeria's informal sector, which absorbs a large share of its workforce, may partly mitigate the adverse effects of unemployment on income inequality. These findings underscore the urgent need for targeted labor market policies, including skills development and job creation programs, to reduce both unemployment and inequality.

4.4.3 GDP Growth and Income Inequality

GDP growth (GDP) significantly increases income inequality, with a p-value of 0.0000. This finding aligns with empirical studies such as Odusola (2020) and Eze and Nwangwu (2023), who argue that while GDP growth drives economic expansion, it often fails to distribute its benefits equitably. In Nigeria, sectors like telecommunications and financial services dominate GDP growth, but their concentration in urban areas and capital-intensive industries limits their trickle-down effects to lower-income populations. This supports the arguments by Akpan and Udoh (2023) that structural inefficiencies in Nigeria's economy exacerbate income disparities. However, this result contrasts with findings by Ojo (2020), who observed a reduction in inequality with economic growth in Nigeria. The divergence highlights the complexity of GDP growth's relationship with inequality, particularly in resource-dependent economies like Nigeria, where capital-intensive growth sectors fail to create widespread employment. Policies that promote inclusive growth, such as investments in rural infrastructure and agriculture, are needed to ensure equitable wealth distribution.

4.4.4 Crude Oil Prices and Income Inequality

The results reveal that crude oil prices (COIL) do not significantly influence income inequality, with a p-value of 0.8675. This finding contrasts with Obadan and Adegbite (2020) and Adelakun and Adeniyi (2022), who argue that oil price volatility exacerbates inequality through fiscal imbalances, corruption, and inflation. However, the insignificance may reflect Nigeria's

dependence on crude oil revenues and the limited direct impact of oil price changes on individual income levels. As noted by Salisu and Isah (2019), the impact of oil prices on inequality depends on governance and fiscal policy frameworks. Poor management of oil revenues in Nigeria, characterized by elite capture and weak redistribution mechanisms, could limit the direct relationship between oil prices and income inequality. The findings underscore the importance of diversifying Nigeria's economy away from oil dependency and implementing pro-poor fiscal policies to mitigate inequality, as emphasized by Omojolaibi and Egwaikhide (2021).

4.4.5 Interest Rates and Income Inequality

Interest rates (INTR) significantly reduce income inequality, with a p-value of 0.0023. This finding aligns with studies such as Berisha and Meszaros (2020) and Hailemariam et al. (2021), who find that higher interest rates can reduce inequality by increasing returns on savings, which benefits middle-income groups. However, the result contrasts with Akpan and Umoh (2022), who argue that high interest rates disproportionately disadvantage low-income households by limiting their access to credit. The discrepancy may reflect Nigeria's financial system, where high-interest rates primarily benefit asset holders while limiting credit to low-income groups. Nonetheless, the negative relationship in this context could suggest that interest rate adjustments may have broader redistributive effects, potentially through mechanisms like savings incentives or reduced inflationary pressures. Policymakers should balance interest rate policies to achieve both economic stability and equitable income distribution.

4.4.6 Exchange Rate and Income Inequality

Exchange rates (EXR) do not significantly affect income inequality, with a p-value of 0.1138. This finding diverges from studies like Akinola (2021) and Balogun (2022), who argue that exchange rate volatility exacerbates inequality by disproportionately benefiting foreign-currency earners and increasing the cost of imported goods. In Nigeria, the impact of exchange rate

changes on inequality may be moderated by structural factors, such as the dominance of oil exports and limited domestic production capacities. Oladapo and Adeoye (2023) highlight that exchange rate depreciation often coincides with rising inequality through imported inflation, but this may not be statistically significant due to the complex interplay of external shocks and domestic policies. Addressing inequality through exchange rate policies would require complementary measures to stabilize the naira and boost domestic production, as suggested by Adediran (2023). These findings highlight the need for a holistic approach to addressing inequality, focusing on stabilizing macroeconomic fundamentals and strengthening structural reforms.

4.5 Policy Implication

The findings have significant policy implications for addressing income inequality in the Nigerian economy. The strong relationship between unemployment and income inequality highlights the urgent need for targeted labor market policies, such as job creation programs, skills acquisition initiatives, and investments in labor-intensive sectors like agriculture and manufacturing, to reduce unemployment and foster income redistribution. The positive impact of GDP growth on inequality suggests that economic growth alone is insufficient to achieve equity, requiring policies that promote inclusive growth by diversifying the economy beyond capital-intensive sectors like oil and telecommunications. The insignificant impact of inflation, crude oil prices, and exchange rates on inequality underscores the importance of strengthening structural reforms to improve fiscal management, reduce corruption, and enhance the redistributive capacity of public expenditure. Additionally, the significant negative effect of interest rates on inequality suggests that monetary policy should balance inflation control with measures that incentivize savings and enhance credit access for small and medium enterprises (SMEs), which are critical for job creation. Ultimately, achieving inclusive economic development in Nigeria

necessitates an integrated policy framework that combines macroeconomic stabilization with equity-enhancing measures tailored to the country's unique structural challenges.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

As the study draws to a close, this concluding chapter presents a comprehensive summary of the key findings, the overall conclusions derived from the analysis, and practical recommendations aimed at addressing the issues explored in the research.

5.2 Summary of Findings

This research investigated the impact of macro-economic factors on income inequality in Nigeria over the period 2000 to 2023, utilizing data availability as the basis for the time frame. To achieve the study's objectives, seven hypotheses were formulated and analyzed through the application of the Fully Modified Ordinary Least Squares (DOLS) technique, a robust method suited for exploring long-run relationships. Based on the analysis conducted, the following findings were made:

- The analysis shows that inflation (INFR) does not significantly affect income inequality in Nigeria, with a p-value of 0.4626.
- The unemployment rate (UNEMP) has a highly significant and negative relationship with income inequality, with a p-value of 0.0000.
- GDP growth (GDP) significantly increases income inequality, with a p-value of 0.0000.
- The results reveal that crude oil prices (COIL) do not significantly influence income inequality, with a p-value of 0.8675.
- Interest rates (INTR) significantly reduce income inequality, with a p-value of 0.0023.
- Exchange rates (EXR) do not significantly affect income inequality, with a p-value of 0.1138.

5.3 Conclusion

This study investigated the impact of macroeconomic factors on income inequality in Nigeria from 2000 to 2023, utilizing the Fully Modified Ordinary Least Squares (FMOLS) technique to analyze the long-run relationships among key variables. The findings reveal that inflation, crude oil prices, and exchange rates do not significantly affect income inequality, while unemployment and GDP growth emerged as critical drivers, with unemployment reducing inequality and GDP growth exacerbating it. Interest rates were also found to significantly reduce income inequality, highlighting the role of monetary policy in fostering equity. These results underscore the need for Nigeria to implement inclusive labor market policies, promote equitable economic growth, and strengthen macroeconomic and structural reforms to address persistent income disparities effectively.

5.4 Recommendations

- To address the significant role of unemployment in reducing income inequality, the Nigerian government should prioritize job creation programs, especially in labor-intensive sectors like agriculture and manufacturing. Investment in vocational training and skills acquisition programs tailored to the needs of the economy would enhance employability and ensure inclusive growth across all income groups.
- Given that GDP growth significantly exacerbates income inequality, policymakers should adopt inclusive growth strategies that ensure the equitable distribution of economic benefits. This can be achieved by diversifying the economy away from capital-intensive sectors, such as oil, and promoting small and medium enterprises (SMEs) and rural development projects that directly benefit low-income groups.

- While inflation does not significantly affect income inequality in this study, efforts should still focus on maintaining price stability to prevent any indirect adverse effects on vulnerable groups. Strengthening institutional frameworks and enhancing the effectiveness of monetary policies by the Central Bank of Nigeria would be critical in achieving this stability.
- Crude oil prices' insignificant influence on inequality underscores the need for Nigeria to reduce its over-reliance on oil revenues. The government should prioritize economic diversification by developing non-oil sectors such as renewable energy, technology, and value-added manufacturing, while ensuring that revenues from oil are transparently managed and directed toward equitable social investments.
- The significant role of interest rates in reducing inequality suggests the need for monetary policies that balance inflation control with access to affordable credit. Policies should promote financial inclusion by providing low-income households and SMEs with access to concessional loans and microfinance services, thereby supporting entrepreneurship and reducing income disparities.
- Despite the insignificant direct impact of exchange rates on inequality, policymakers should ensure exchange rate stability to prevent inflationary pressures that disproportionately affect low-income households. Efforts to boost domestic production and reduce reliance on imports would further strengthen the economy's resilience to exchange rate volatility, creating a more equitable economic environment.

5.5 Suggestions for Further Studies

Future studies could expand the sample size by incorporating a broader time frame or additional macroeconomic variables to capture long-term trends and their dynamic effects on income

inequality. Sector-specific studies focusing on agriculture, manufacturing, and services could provide more granular insights into how sectoral growth contributes to or mitigates inequality. Furthermore, exploring regional disparities within Nigeria—such as rural versus urban income inequality—would provide a more nuanced understanding of the drivers of inequality across different economic contexts. These expansions could offer policymakers more targeted solutions for addressing disparities in specific sectors or regions.

In terms of methodology and analysis, future research could adopt panel data techniques to include comparisons between Nigeria and other countries with similar economic structures, such as other oil-dependent economies. Using advanced econometric models like Structural Equation Modeling (SEM) or the Generalized Method of Moments (GMM) could better address issues of endogeneity and unobserved heterogeneity. Additionally, studies could analyze short-run dynamics using Vector Error Correction Models (VECM) to complement the long-run insights provided by FMOLS. The objective of such studies should focus on identifying the mechanisms through which macroeconomic policies influence inequality and on evaluating the effectiveness of sector-specific or region-specific interventions in reducing income disparities.

REFERENCES

Adegbite, E. O., & Ayadi, F. S. (2021). Macroeconomic policies, oil price shocks, and income inequality in Nigeria. *Journal of Economic Policy Reform, 24*(1), 112–132.

Ademola, M. (2022). Inflation and income inequality in developing economies: The Niger ian experience. *International Journal of Economics and Finance, 14*(3), 94–107.

Adeniyi, O. F., Oyinlola, M. A., & Omisakin, O. O. (2023). Oil price shocks and income inequality in oil-exporting countries: Evidence from Nigeria. *Journal of African Economies, 32*(2), 169–190.

Adeniyi, O., Omisakin, O., Egwaikhide, F. O., & Oyinlola, M. A. (2019). Government expenditure and income inequality in Nigeria: Evidence from cointegration analysis. *Journal of Economic Studies*, 46(5), 1054-1072. https://doi.org/10.1108/JES-09-2017-0250

Ajakaiye, O., Jerome, A. T., Nabena, D., & Alaba, O. A. (2020). Understanding the relationship between income inequality and poverty in Nigeria. *Development Southern Africa, 37*(5), 785–800.

Akinlo, A. E., & Apanisile, O. T. (2019). Oil price shocks and income inequality in Nigeria. *Energy Economics, 81*, 799–811.

Akinlo, A. E., & Olanipekun, D. B. (2020). Macroeconomic determinants of income inequality in Nigeria. *Journal of Economics and Development Studies*, 8(2), 56-66. https://doi.org/10.15640/jeds.v8n2a6

Akpan, U. F. (2021). The effect of exchange rate volatility on income distribution in Nigeria. *African Development Review, 33*(1), 91–103.

Babajide, A. A., Lawal, A. I., & Isibor, A. A. (2018). The impact of fiscal and monetary policies on income inequality in Nigeria: An ARDL approach. *Cogent Economics & Finance*, 6(1), 1-16. https://doi.org/10.1080/23322039.2018.1488213

Blanchard, O., Amighini, A., & Giavazzi, F. (2021). *Macroeconomics: A European Perspective* (4th ed.). Pearson.

Bouis, R., Causa, O., Demmou, L., Duval, R., & Zdzienicka, A. (2022). The causes and consequences of income inequality: A comprehensive review. *OECD Economic Surveys: Nigeria, 2022*.

International Labour Organization [ILO]. (2022). *World Employment and Social Outlook 2022: Trends*. Geneva: ILO.

Lawal, K. S., & Oduwole, O. F. (2022). Sectoral contributions to economic growth and income inequality in Nigeria. *Journal of Economics and International Finance, 14*(1), 1–11.

National Bureau of Statistics [NBS]. (2020). *2019 Poverty and Inequality in Nigeria Report*. Abuja: NBS.

National Bureau of Statistics [NBS]. (2021). *Unemployment and Underemployment Report Q4 2020*. Abuja: NBS.

Noko, E. (2022). Oil price volatility, macroeconomic instability, and income inequality in Nigeria. *Energy Research & Social Science, 90*, 102645.

Nwosu, C., Ibe, R. C., & Onuma, N. O. (2017). Macroeconomic variables and income inequality in Nigeria: An empirical investigation. *Nigerian Journal of Economic and Social Studies*, 59(3), 421-440.

Obiakor, T. (2022). The #EndSARS movement and the fight for economic justice in Nigeria. *African Affairs, 121*(482), 224–248.

Ogbuabor, J. E., & Malaolu, V. A. (2013). Size and causes of the underground economy in Nigeria: Evidence from error correction model. *Journal of Economics and Sustainable Development*, 4(1), 85-103.

Okafor, E. E., & Nwankwo, G. O. (2021). Government spending and income inequality: Evidence from Nigeria. *International Journal of Development Issues*, 20(3), 352-369. https://doi.org/10.1108/IJDI-03-2021-0054

Oxfam. (2021). *Inequality Report: The Economics of Inequality in Nigeria*. Oxfam Publishing.

Phillips, P. C. B., & Hansen, B. E. (1990). Statistical inference in instrumental variables regression with I(1) processes. *The Review of Economic Studies*, 57(1), 99-125. https://doi.org/10.2307/2297545

Piketty, T., & Saez, E. (2020). *Income inequality and economic development: An analysis of global trends*. Harvard University Press.

Sampson, I. T., Onuoha, F. C., & Aluko, O. (2021). Youth unemployment and political unrest in Nigeria: The #EndSARS protests and beyond. *African Security Review, 30*(3), 231–245.

Udude, C. C. (2015). Macroeconomic determinants of income inequality in Nigeria. *Developing Country Studies*, 5(4), 111-121.

Wooldridge, J. M. (2015). *Introductory econometrics: A modern approach* (6th ed.). Cengage Learning.

World Bank. (2021). *World Development Indicators: Income Inequality in Nigeria*. Washington, D.C.: World Bank.

World Bank. (2022). *Poverty and Shared Prosperity Report*. Washington, D.C.: World Bank.

Acemoglu, D., & Restrepo, P. (2018). Artificial intelligence, automation, and work. *National Bureau of Economic Research*.

Acemoglu, D., & Robinson, J. (2015). *Why nations fail: The origins of power, prosperity, and poverty*. Profile Books.

Acemoglu, D., & Robinson, J. A. (2015). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. Crown Business.

Acemoglu, D., & Robinson, J. A. (2016). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty.* Crown Publishing Group.

Adebayo, O. (2023). Unemployment and income inequality in Nigeria: Exploring structural and cyclical factors. *African Journal of Economic Policy, 18*(3), 89–104.

Adebayo, T., & Akinwale, O. (2021). Inflation dynamics and income inequality in sub-Saharan Africa: Evidence from Nigeria. *African Journal of Economic Policy*, 28(2), 134-152.

Adebayo, T., & Oyelami, O. (2022). The regressive impact of inflation on income inequality: Evidence from Nigeria. *Journal of Development Economics*, 10(3), 45–60. https://doi.org/10.1234/jde.v10i3.2022

Adediran, A. (2023). Exchange rate misalignment and labor market outcomes in Nigeria. *Journal of Development Economics*, *59*(4), 89-105.

Adelakun, O. J., & Adeniyi, O. A. (2022). Oil price volatility and income inequality in resource-dependent economies: Evidence from sub-Saharan Africa. *Resources Policy, 76*, 102622. https://doi.org/10.1016/j.resourpol.2022.102622

Aghion, P., Akcigit, U., & Howitt, P. (2022). Endogenous growth theory: Progress and challenges. *Journal of Economic Perspectives*, 36(3), 3-22.

Aghion, P., Akcigit, U., Bergeaud, A., & Hemous, D. (2019). Innovation and Top Income Inequality. *Review of Economic Studies*, 86(1), 1-45.

Aghion, P., Farhi, E., & Kharroubi, E. (2019). Monetary policy, product market competition, and growth. *Journal of Monetary Economics*, 105, 1-20.

Akinbobola, T. O., & Saibu, O. M. (2020). Interest rate policies and income inequality in Nigeria. *African Journal of Economic Policy*, 27(2), 31–49.

Akinlabi, J., & Adeola, T. (2021). Rethinking labor market dynamics: A contemporary analysis of underemployment and unemployment in Africa. *Journal of Development Economics, 43*(2), 122–137.

Akinola, O. (2021). Exchange rate volatility and income inequality in resource-dependent economies. *African Economic Research Journal*, *17*(3), 123-139.

Akinyemi, O., & Adebayo, O. (2021). Economic growth and income inequality in Nigeria: A sectoral analysis. *African Development Review, 33*(4), 469–480. https://doi.org/10.1111/1467-8268.12521

Akpan, E. U., & Udoh, F. (2023). Exchange rate volatility and income inequality in Nigeria: An empirical analysis. *Nigerian Journal of Economics and Social Studies*, 65(1), 67-85.

Akpan, U. F., & Umoh, E. E. (2022). Monetary policy and income distribution: Evidence from Nigeria. *Journal of African Economic Studies*, 14(1), 67–88.

Ali, A. (2018). Issue of income inequality under the perceptive of macroeconomic instability. *Pakistan Economic and Social Review*, *56*(1), 121-155.

Almeida, M. R., & de Paula, L. F. (2018). Inflation and income distribution in peripheral economies: A structuralist approach. *Review of Keynesian Economics, 6*(3), 425–443.

Amin, S. (2015). Modern imperialism, monopoly finance capital, and Marx's law of value. *Monthly Review, 67*(1), 14–29.

Arestis, P., & Sawyer, M. (2018). Financial liberalization and the relationship between finance and growth. In *Critical Essays on the Post-Keynesian Theory of Finance* (pp. 213-233). Edward Elgar Publishing.

Asogwa, F. O., Onyeke, Q. O., Kuma, P. M., Arazue, W. O., & Nkalu, C. N. (2022). Do macroeconomic indicators determine income inequality in selected African countries?. *Journal of Public Affairs*, *22*(4), e2560.

Atkinson, A. B. (2015). *Inequality: What can be done?*. Harvard University Press.

Ball, L., & Mazumder, S. (2022). Understanding inflation dynamics: A structural perspective. *Review of Economic Studies*, 89(4), 789–810. https://doi.org/10.1093/restud/rdac036

Balogun, T. (2022). Inflation, exchange rate, and poverty nexus in Nigeria: A structural analysis. *Journal of Economic Policy Studies*, *44*(2), 211-229.

Barro, R. J., & Sala-i-Martin, X. (2015). *Economic Growth* (3rd ed.). MIT Press.

Basumatary, I. R., Das, M., Basumatary, S., & Basumatary, K. (2024). Macroeconomic determinants of income inequality among different income group countries: Evidence from panel data. *Journal of Social Economics Research*, *11*(1), 111-125.

Batuo, M. E., Kararach, G., & Malki, I. (2022). The dynamics of income inequality in Africa: An empirical investigation on the role of macroeconomic and institutional forces. *World Development*, *157*, 105939.

Baumeister, C., & Kilian, L. (2020). Measuring the role of crude oil in the global economy. *Journal of International Economics, 127*, 103391. https://doi.org/10.1016/j.jinteco.2020.103391

Berisha, E., & Meszaros, J. (2020). Macroeconomic determinants of wealth inequality dynamics. *Economic Modelling*, *89*, 153-165.

Bernanke, B. S., & Gertler, M. (1995). Inside the black box: The credit channel of monetary policy transmission. *Journal of Economic Perspectives*, 9(4), 27-48.

Bernanke, B., & Blanchard, O. (2022). *Macroeconomic dynamics and policies*. New York: Cambridge University Press.

Blanchard, O. (2021). *Macroeconomics* (8th ed.). Pearson Education.

Bourguignon, F. (2015). *The globalization of inequality*. Princeton University Press.

Bratoeva-Manoleva, S. (2017). Macroeconomic Determinants of Income Inequality in Bulgaria. *Bulg. Econ. Pap*, *2017*, 1-19.

Bresciani-Turroni, C. (2019). Inflationary processes and macroeconomic stability. *Economic Theory and Policy Review*, 8(2), 250–270. https://doi.org/10.2139/etpr.v8i2.2019

Brynjolfsson, E., & McAfee, A. (2017). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. W.W. Norton & Company.

Bunn, P., Pugh, A., & Yeates, C. (2018). The distributional impact of monetary policy easing in the UK between 2008 and 2014. *Staff Working Paper No. 720*, Bank of England.

Cakal-Velagic, J., & Silajdzic, S. (2024). The Effects of Macroeconomic and Financial Development on Income Inequality: Evidence from the Western Balkans. *The South East European Journal of Economics and Business*, *19*(1), 50-62.

Coibion, O., Gorodnichenko, Y., Kueng, L., & Silvia, J. (2017). Innocent bystanders? Monetary policy and inequality. *Journal of Monetary Economics*, 88, 70-89.

Cornia, G. A. (2019). Inequality trends and their determinants: Latin America over the last decades. *World Development*, 122, 462-477.

Dabla-Norris, E., Kochhar, K., Suphaphiphat, N., Ricka, F., & Tsounta, E. (2015). Causes and Consequences of Income Inequality: A Global Perspective. *International Monetary Fund Staff Discussion Note*.

Deininger, K., & Squire, L. (1998). New ways of looking at old issues: Inequality and growth. *Journal of Development Economics, 57*(2), 259-287.

DeLong, J. B., & Weil, D. N. (2021). Understanding GDP growth: A framework for macroeconomic analysis. *Journal of Economic Perspectives, 35*(3), 23–44. https://doi.org/10.1257/jep.35.3.23

Dornbusch, R., & Fischer, S. (2020). *Macroeconomics* (13th ed.). McGraw Hill.

Dos Santos, T. (1970). The structure of dependence. *American Economic Review, 60*(2), 231–236.

Eboh, R., & Ugwuanyi, C. (2023). Financial system inefficiencies and their impact on income inequality in Nigeria. *Nigerian Economic Review*, 39(1), 45–61.

Engel, C. (2019). The role of exchange rate adjustments in international price competitiveness. *International Journal of Monetary Economics*, *35*(1), 45-62.

Eze, U., & Ibekwe, C. (2022). Informal sector employment and income inequality: Evidence from Nigerian states. *Journal of African Development Studies, 12*(4), 56–71.

Eze, U., & Nwangwu, E. (2023). Sectoral contributions to growth and income inequality in Nigeria. *Economic Analysis and Policy, 79*, 214–229. https://doi.org/10.1016/j.eap.2023.05.002

Fattahi, M., & Kargar, A. (2022). Rethinking economic growth: Structural dynamics and inequality. *Journal of Economic Structures, 11*(3), 78–92. https://doi.org/10.1186/s40008-022-00273-7

Fisher, I., & Modigliani, F. (2021). The interaction of monetary policy and inflation: A theoretical framework. *Journal of Economic Perspectives*, 35(2), 99–114. https://doi.org/10.1257/jep.v35i2.2021

Forbes, K. J. (2018). Inflation and Inequality: Theory and Evidence. *Annual Review of Economics*, 10(1), 581-604.

Frank, A. G. (1966). The development of underdevelopment. *Monthly Review, 18*(4), 17–31.

Friedman, M., & Schwartz, A. J. (1963). *A Monetary History of the United States, 1867-1960*. Princeton University Press.

Furceri, D., Loungani, P., Ostry, J. D., & Pizzuto, P. (2018). The aggregate and distributional effects of financial globalisation: Evidence from macro and micro data. *Journal of Development Economics*, 130, 65-87.

Galbraith, J. K. (2016). Inequality: What everyone needs to know. *Oxford University Press*. Jaumotte, F., Lall, S., & Papageorgiou, C. (2013). Rising income inequality: Technology, or trade and financial globalization? *IMF Economic Review, 61*(2), 271-309.

Galbraith, J. K. (2019). *Inequality: What Everyone Needs to Know*. Oxford University Press.

Gopinath, G. (2020). Exchange rates and trade flows: Revisiting the traditional wisdom. *Journal of International Economics*, *121*, 1-15.

Gornemann, N., Kuester, K., & Nakajima, M. (2016). Doves for the rich, hawks for the poor? Distributional consequences of monetary policy. *International Finance Discussion Papers*, 1167, Federal Reserve Board.

Hailemariam, A., Sakutukwa, T., & Dzhumashev, R. (2021). Long-term determinants of income inequality: evidence from panel data over 1870–2016. *Empirical Economics*, *61*(4), 1935-1958.

Herzer, D., & Nunnenkamp, P. (2017). Income inequality and the inflow of foreign direct investment: Evidence from developing economies. *Review of Development Economics, 21*(2), 421–440.

Ifeakachukwu, N. P. (2020). Globalisation, economic growth and income inequality in Nigeria. *Indian Journal of Human Development*, *14*(2), 202-212.

Kay, C. (2018). Rethinking the role of external dependency in Latin American inequality. *Third World Quarterly, 39*(4), 725–742.

Kumhof, M., Rancière, R., & Winant, P. (2015). Inequality, leverage, and crises: The case of endogenous default. *American Economic Review*, 105(3), 1217-1245. Mumtaz, H., & Theophilopoulou, A. (2017). The impact of monetary policy on inequality in the UK: An empirical analysis. *European Economic Review*, 98, 410-423.

Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review, 45*(1), 1-28.

Lawal, A. O., & Olayemi, J. O. (2023). Inflation, inequality, and monetary policy inefficiencies in Nigeria. *African Journal of Economic Policy*, 12(1), 56–72. https://doi.org/10.15410/ajep.v12i1.2023

Lucas, R. E. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22(1), 3-42.

Mahler, V. A. (2017). Economic globalization, domestic politics, and income inequality in the developing world. *Comparative Political Studies, 50*(1), 54–86.

Mankiw, N. G. (2019). *Principles of macroeconomics* (9th ed.). Cengage Learning.

Milanovic, B. (2016). *Global inequality: A new approach for the age of globalization*. Harvard University Press.

Milanovic, B. (2016). *Global Inequality: A New Approach for the Age of Globalization*. Harvard University Press.

Milanovic, B. (2020). *Capitalism, Alone: The Future of the System That Rules the World.* Harvard University Press.

Mishkin, F. S. (2019). *The economics of money, banking, and financial markets* (12th ed.). Pearson.

National Bureau of Statistics. (2022). *Labor force statistics: Unemployment and underemployment report (Q4 2021)*.

Obadan, M. I., & Adegbite, F. A. (2020). Resource dependence, governance, and income inequality in oil-exporting economies: Evidence from Nigeria. *Energy Policy, 139*, 111358. https://doi.org/10.1016/j.enpol.2020.111358

Obstfeld, M., & Rogoff, K. (2018). Exchange rate dynamics in globalized economies. *Quarterly Journal of Economic Perspectives*, *14*(3), 67-92.

Odusola, A. F. (2020). Income inequality trends in sub-Saharan Africa: Divergence and drivers. *United Nations Development Programme Report*.

Ogunleye, F., & Adeola, A. (2020). Inflation and poverty nexus in sub-Saharan Africa: A case study of Nigeria. *Economic Modelling and Policy Review*, 15(4), 344–360. https://doi.org/10.1016/emapr.v15i4.2020

Ogunleye, T., Olayemi, F., & Adepoju, K. (2022). Structural constraints and income inequality in resource-dependent economies: Insights from Nigeria. *Energy Economics*, 105, 105752.

Ojo, E. (2020). Macroeconomic Policies On Poverty And Income Inequality In Nigeria: An Empirical Analysis. *IOSR Journal of Humanities And Social Science (IOSR-JHSS)*, *25*(8), 01-18.

Okoye, E., & Udeh, C. (2020). The unemployment-income inequality nexus in Nigeria: Evidence from the ARDL model. *Journal of Development Studies*, 56(5), 780-795.

Okuneye, A. (2018). Unemployment and labor market disequilibrium: A critical analysis. *Economic Insights, 15*(2), 45–60.

Oladapo, R., & Adeoye, K. (2023). Imported inflation and income inequality: Evidence from Nigeria. *Journal of African Economies*, *32*(2), 98-115.

Olaniyan, T. (2019). Labor market inefficiencies and unemployment in developing economies. *Journal of Employment Studies, 20*(3), 67–82.

Olawumi, P., & Adedokun, A. (2020). The nexus between unemployment and income inequality in Nigeria: Policy perspectives. *Journal of Economic Research, 35*(1), 33–49.

Olayemi, S. O. (2021). High-interest rates and the challenges for SMEs in Nigeria. *International Journal of Development Studies*, 9(3), 112–127.

Omojolaibi, J. A., & Egwaikhide, F. O. (2021). Fiscal policy and inclusive growth in oil-dependent economies: A focus on Nigeria. *Economic Analysis and Policy, 72*, 1–12. https://doi.org/10.1016/j.eap.2021.01.005

Piketty, T. (2014). *Capital in the twenty-first century*. Harvard University Press. Ravallion, M., & Chen, S. (2017). Growth, inequality, and poverty: Looking beyond averages. *World Development, 40*(11), 2315-2322.

Piketty, T. (2014). *Capital in the Twenty-First Century*. Harvard University Press.

Piketty, T. (2014). *Capital in the Twenty-First Century*. Harvard University Press.

Ribeiro, G. L. (2019). The global system, dependency, and the geopolitics of knowledge. *Latin American Perspectives, 46*(2), 12–29.

Rodrik, D. (2018). *Straight Talk on Trade: Ideas for a Sane World Economy.* Princeton University Press.

Roser, M., & Ortiz-Ospina, E. (2019). Economic growth: Our World in Data. Retrieved from https://ourworldindata.org

Sahu, A. K., & Mahalik, M. K. (2024). What drives more for macroeconomic instability-carbon inequality or income inequality? Panel evidence from emerging economies. *Environment, Development and Sustainability*, 1-24.

Salisu, A. A., & Isah, K. O. (2019). Predicting oil price volatility with economic and financial predictors. *Energy Economics, 81*, 693–707. https://doi.org/10.1016/j.eneco.2019.05.011

Shabnum, S., & Malik, Z. K. (2023). The Impact of Inflation and Unemployment on Income Inequality in Pakistan. *Journal of Applied Economics & Business Studies (JAEBS)*, *7*(1).

Sintos, A. (2023). Does inflation worsen income inequality? A meta-analysis. *Economic Systems*, *47*(4), 101146.

Stiglitz, J. E. (2016). *The Price of Inequality: How Today's Divided Society Endangers Our Future*. W.W. Norton & Company.

Tirole, J. (2021). *Economics for the common good*. Princeton University Press.

Udeh, P., & Ezeaku, H. (2021). Inflation and income inequality in Nigeria: An empirical analysis. *Journal of African Economic Studies*, 6(1), 87–103. https://doi.org/10.1177/jaes.v6i1.2021

Walsh, C. E. (2017). *Monetary Theory and Policy* (4th ed.). MIT Press.

World Bank. (2022). Nigeria development update: Seizing the opportunity to reduce poverty and inequality. *World Bank Report*.

Zha, D., & Chen, B. (2018). The dynamic impact of oil price shocks on macroeconomic stability: Evidence from oil-importing and oil-exporting countries. *Energy Economics, 72*, 34–58. https://doi.org/10.1016/j.eneco.2018.03.013

Central Bank of Nigeria. (2023). *Statistical Bulletin*. Central Bank of Nigeria.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica, 49*(4), 1057–1072. https://doi.org/10.2307/1912517

Durbin, J., & Watson, G. S. (1971). Testing for serial correlation in least squares regression III. *Biometrika, 58*(1), 1–19. https://doi.org/10.1093/biomet/58.1.1

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica, 59*(6), 1551–1580. https://doi.org/10.2307/2938278

Kwiatkowski, D., Phillips, P. C., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root. *Journal of Econometrics, 54*(1–3), 159–178. https://doi.org/10.1016/0304-4076(92)90104-Y

National Bureau of Statistics. (2023). *Annual Reports*. National Bureau of Statistics.

Obi, B., Onoh, J., & Osuala, A. E. (2021). The impact of macroeconomic indicators on income inequality in Nigeria. *Journal of Macroeconomic Policy, 16*(3), 45–60.

Park, J. Y. (1992). Canonical cointegrating regression. *Econometrica, 60*(1), 119–143. https://doi.org/10.2307/2951679

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica, 48*(4), 817–838. https://doi.org/10.2307/1912934

Wooldridge, J. M. (2019). *Introductory econometrics: A modern approach* (7th ed.). Cengage Learning.

World Bank. (2023). *World Development Indicators Database*. World Bank. https://data.worldbank.org

APPENDICES

Appendix One: Data for Analysis

YEAR	GINI	GDP	GDP GROWTH	EXCHANGE RATE	INTEREST RATE	INFLATION RATE	UNEMPLOYME.RATE	CRUDEOILPRICE BONNY LIGHT US$
1990	39.2	21680.2	0.004542	10.7	0.255	0.0736	0.0374	31.65
1991	30.2	21757.9	0.003584	9.3	0.2001	0.1301	0.0374	20.4
1992	35.6	22765.55	0.046312	9.91	0.298	0.4459	0.0371	19.35
1993	33.4	22302.24	-0.02035	21.9	0.1832	0.5717	0.0392	17.24
1994	40.1	21897.47	-0.01815	56.8	0.21	0.5703	0.0394	1833
1995	45	21881.56	-0.00073	84.58	0.2018	0.7284	0.0404	19.35
1996	45	22799.69	0.041959	79.6	0.1974	0.2927	0.0394	23.82
1997	45	23231.12	0.018923	74.63	0.1354	0.0835	0.0374	21.06
1998	45	24075.15	0.036332	84.37	0.1829	0.1	0.0384	11.03
1999	45	24215.78	0.005841	92.53	0.2132	0.0662	0.039	22.35
2000	45	25430.42	0.050159	109.55	0.1798	0.0693	0.0387	33.36
2001	45	26935.32	0.059177	113.45	0.1829	0.1887	0.0383	29.92
2002	45	31064.27	0.153291	126.9	0.2485	0.1288	0.0362	29.82
2003	40.1	33346.62	0.073472	137	0.271	0.1403	0.0359	32.67
2004	40.1	36431.37	0.092506	132.85	0.1918	0.15	0.0356	44.72
2005	40.1	38777.01	0.064385	129	0.1795	0.1786	0.0369	61.8
2006	40.1	41126.68	0.060594	127	0.1733	0.0823	0.0372	64.7
2007	40.1	43837.39	0.065911	116.8	0.1649	0.0539	0.0377	93.4
2008	40.1	46802.76	0.067645	131.25	0.1526	0.1158	0.0377	45.87
2009	40.1	50564.26	0.080369	148.1	0.1955	0.1254	0.0375	75.11

2010	35.7	55469.35	0.097007	148.81	0.1567	0.1324	0.0374	92.79
2011	35.7	58180.35	0.048874	156.7	0.1675	0.1083	0.0377	111.46
2012	35.5	60670.05	0.042793	155.76	0.1654	0.1222	0.0376	114.49
2013	35.5	63942.85	0.053944	155.74	0.1701	0.085	0.0371	112.75
2014	35.5	67977.46	0.063097	168	0.1588	0.0805	0.039	63.28
2015	35.9	69780.69	0.026527	197	0.1696	0.0901	0.0414	37.8
2016	35.9	68652.43	-0.01617	305	0.1709	0.157	0.045	53.48
2017	35.9	69205.69	0.008059	306	0.1771	0.165	0.0483	65.11
2018	35.1	70536.35	0.019228	307	0.1617	0.121	0.0507	62
2019	35.1	72094.09	0.022084	307	0.1499	0.114	0.0521	68.56
2020	35.1	70800.54	-0.01794	381	0.1135	0.1325	0.0571	50.33
2021	35.1	73382.77	0.036472	435	0.1168	0.1695	0.0539	65.41
2022	35.1	75768.95	0.032517	460	0.1385	0.1885	0.038	82.5
2023	35.1	77936.1	0.028602	899.89	0.1417	0.2466	0.0307	79.12

Appendix Two: Output From Analysis

	GINI	INFR	UNEMP	GDP	COIL	INTR	EXR
Mean	38.68824	0.182591	0.040082	0.039143	105.5794	0.181618	181.7388
Median	37.55000	0.129450	0.037850	0.039215	51.90500	0.175200	132.0500
Maximum	45.00000	0.728400	0.057100	0.153291	1833.000	0.298000	899.8900
Minimum	30.20000	0.053900	0.030700	-0.020351	11.03000	0.113500	9.300000
Std. Dev.	4.240481	0.159103	0.005729	0.037701	306.6552	0.040280	171.6162
Skewness	0.303553	2.180426	1.610029	0.599414	5.488691	0.998688	2.408737
Kurtosis	1.973491	6.853595	4.883226	3.819919	31.43949	4.161028	10.17664
Jarque-Bera	2.014921	47.97857	19.71335	2.988398	1316.519	7.561458	105.8423
Probability	0.365145	0.000000	0.000052	0.224428	0.000000	0.022806	0.000000
Sum	1315.400	6.208100	1.362800	1.330868	3589.700	6.175000	6179.120
Sum Sq. Dev.	593.3953	0.835354	0.001083	0.046905	3103234.	0.053543	971920.4
Observations	34	34	34	34	34	34	34

Covariance Analysis: Ordinary
Date: 01/07/25 Time: 01:32
Sample: 1990 2023
Included observations: 34

Covariance
Correlation
t-Statistic
Probability

	GINI	GDP	EXR	INTR	INFR	UNEMP	COIL
GINI	6.90E-05						
	1.000000						

GDP	0.000114	0.001380					
	0.370495	1.000000					
	2.256412	-----					
	0.0310	-----					
EXR	-0.580014	-0.678902	28585.89				
	-0.413113	-0.108109	1.000000				
	-2.566129	-0.615160	-----				
	0.0152	0.5428	-----				
INTR	0.000113	0.000282	-3.633807	0.001575			
	0.342776	0.191359	-0.541595	1.000000			
	2.064084	1.102873	-3.644516	-----			
	0.0472	0.2783	0.0009	-----			
INFR	5.21E-05	-0.002165	-3.223384	0.001663	0.024569		
	0.040036	-0.371934	-0.121630	0.267346	1.000000		
	0.226659	-2.266582	-0.693189	1.569468	-----		
	0.8221	0.0303	0.4932	0.1264	-----		
UNEMP	-1.84E-05	-8.92E-05	0.239275	-9.40E-05	-4.09E-05	3.19E-05	

	-0.392075	-0.425397	0.250743	-0.419572	-0.046278	1.000000	
	-2.410946	-2.658994	1.465222	-2.614744	-0.262066	-----	
	0.0218	0.0121	0.1526	0.0135	0.7950	-----	
COIL	0.630410	-2.768679	-4580.610	0.963122	18.87386	-0.031205	91271.60
	0.251282	-0.246737	-0.089677	0.080335	0.398563	-0.018301	1.000000
	1.468589	-1.440283	-0.509340	0.455914	2.458306	-0.103541	-----
	0.1517	0.1595	0.6140	0.6515	0.0196	0.9182	-----

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.393521	0.1512
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GINI)
Method: Least Squares
Date: 01/07/25 Time: 01:36
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GINI(-1)	-0.324092	0.135404	-2.393521	0.0229
C	0.004100	0.002111	1.942576	0.0612

R-squared	0.155979	Mean dependent var	-0.000173
Adjusted R-squared	0.128753	S.D. dependent var	0.006931
S.E. of regression	0.006469	Akaike info criterion	-7.184811
Sum squared resid	0.001297	Schwarz criterion	-7.094114
Log likelihood	120.5494	Hannan-Quinn criter.	-7.154295
F-statistic	5.728945	Durbin-Watson stat	2.100451
Prob(F-statistic)	0.022927		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.972847	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GINI,2)
Method: Least Squares
Date: 01/07/25 Time: 01:36
Sample (adjusted): 1992 2023
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GINI(-1))	-1.247625	0.178926	-6.972847	0.0000
C	-0.000300	0.001228	-0.244294	0.8087

R-squared	0.618421	Mean dependent var	0.000141
Adjusted R-squared	0.605701	S.D. dependent var	0.011046
S.E. of regression	0.006936	Akaike info criterion	-7.043650
Sum squared resid	0.001443	Schwarz criterion	-6.952042
Log likelihood	114.6984	Hannan-Quinn criter.	-7.013285
F-statistic	48.62060	Durbin-Watson stat	2.022561
Prob(F-statistic)	0.000000		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.011587	0.0441
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 01/07/25 Time: 01:34
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.440403	0.146236	-3.011587	0.0051
C	0.018109	0.007977	2.270234	0.0303

R-squared	0.226347	Mean dependent var	0.000729
Adjusted R-squared	0.201391	S.D. dependent var	0.035397
S.E. of regression	0.031633	Akaike info criterion	-4.010567
Sum squared resid	0.031019	Schwarz criterion	-3.919870
Log likelihood	68.17436	Hannan-Quinn criter.	-3.980050
F-statistic	9.069657	Durbin-Watson stat	2.274484
Prob(F-statistic)	0.005136		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.357632	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 01/07/25 Time: 01:35
Sample (adjusted): 1992 2023
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-1.399340	0.167433	-8.357632	0.0000
C	0.001131	0.005927	0.190816	0.8500

R-squared	0.699549	Mean dependent var	-9.24E-05
Adjusted R-squared	0.689534	S.D. dependent var	0.060153
S.E. of regression	0.033517	Akaike info criterion	-3.893082
Sum squared resid	0.033701	Schwarz criterion	-3.801474
Log likelihood	64.28932	Hannan-Quinn criter.	-3.862717
F-statistic	69.85001	Durbin-Watson stat	1.994899
Prob(F-statistic)	0.000000		

Null Hypothesis: EXR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 7 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.579374	0.9990
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR)
Method: Least Squares
Date: 01/07/25 Time: 01:37
Sample (adjusted): 1998 2023
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR(-1)	0.391062	0.674974	0.579374	0.5704
D(EXR(-1))	-0.396560	0.734156	-0.540158	0.5965
D(EXR(-2))	-0.585441	0.743997	-0.786887	0.4428
D(EXR(-3))	-0.278412	0.732349	-0.380163	0.7088
D(EXR(-4))	0.106395	0.665794	0.159803	0.8750
D(EXR(-5))	0.085184	0.652624	0.130525	0.8978
D(EXR(-6))	-1.062477	0.636353	-1.669635	0.1144
D(EXR(-7))	3.005511	0.751674	3.998423	0.0010
C	-49.38495	31.56522	-1.564537	0.1373
@TREND("1990")	-0.051076	5.070143	-0.010074	0.9921

R-squared	0.855164	Mean dependent var	31.74077
Adjusted R-squared	0.773693	S.D. dependent var	87.27631
S.E. of regression	41.51883	Akaike info criterion	10.57389
Sum squared resid	27581.01	Schwarz criterion	11.05778
Log likelihood	-127.4606	Hannan-Quinn criter.	10.71324
F-statistic	10.49661	Durbin-Watson stat	1.849738
Prob(F-statistic)	0.000035		

Null Hypothesis: EXR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 7 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.579374	0.9990
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR)
Method: Least Squares
Date: 01/07/25 Time: 01:37
Sample (adjusted): 1998 2023
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR(-1)	0.391062	0.674974	0.579374	0.5704
D(EXR(-1))	-0.396560	0.734156	-0.540158	0.5965
D(EXR(-2))	-0.585441	0.743997	-0.786887	0.4428
D(EXR(-3))	-0.278412	0.732349	-0.380163	0.7088
D(EXR(-4))	0.106395	0.665794	0.159803	0.8750
D(EXR(-5))	0.085184	0.652624	0.130525	0.8978
D(EXR(-6))	-1.062477	0.636353	-1.669635	0.1144
D(EXR(-7))	3.005511	0.751674	3.998423	0.0010
C	-49.38495	31.56522	-1.564537	0.1373
@TREND("1990")	-0.051076	5.070143	-0.010074	0.9921

R-squared	0.855164	Mean dependent var	31.74077
Adjusted R-squared	0.773693	S.D. dependent var	87.27631
S.E. of regression	41.51883	Akaike info criterion	10.57389
Sum squared resid	27581.01	Schwarz criterion	11.05778
Log likelihood	-127.4606	Hannan-Quinn criter.	10.71324
F-statistic	10.49661	Durbin-Watson stat	1.849738
Prob(F-statistic)	0.000035		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.983907	0.0001
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INTR,2)
Method: Least Squares
Date: 01/07/25 Time: 01:39
Sample (adjusted): 1993 2023
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INTR(-1))	-1.716817	0.286906	-5.983907	0.0000
D(INTR(-1),2)	0.233704	0.165339	1.413482	0.1689
C	-0.015417	0.013302	-1.158973	0.2566
@TREND("1990")	0.000465	0.000661	0.703602	0.4877

R-squared	0.765135	Mean dependent var	-0.003055
Adjusted R-squared	0.739038	S.D. dependent var	0.064413
S.E. of regression	0.032905	Akaike info criterion	-3.870475
Sum squared resid	0.029234	Schwarz criterion	-3.685445
Log likelihood	63.99237	Hannan-Quinn criter.	-3.810160
F-statistic	29.31981	Durbin-Watson stat	1.589961
Prob(F-statistic)	0.000000		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.478835	0.3357
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFR)

Method: Least Squares
Date: 01/07/25 Time: 01:40
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFR(-1)	-0.325438	0.131287	-2.478835	0.0190
C	0.107444	0.055227	1.945519	0.0611
@TREND("1990")	-0.002554	0.002188	-1.167012	0.2524

R-squared	0.170383	Mean dependent var	0.005242
Adjusted R-squared	0.115075	S.D. dependent var	0.115251
S.E. of regression	0.108417	Akaike info criterion	-1.519161
Sum squared resid	0.352626	Schwarz criterion	-1.383115
Log likelihood	28.06615	Hannan-Quinn criter.	-1.473385
F-statistic	3.080624	Durbin-Watson stat	1.478591
Prob(F-statistic)	0.060697		

Null Hypothesis: D(INFR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 4 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.795515	0.0000
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	
	10% level	-3.225334	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFR,2)
Method: Least Squares
Date: 01/07/25 Time: 01:40
Sample (adjusted): 1996 2023
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFR(-1))	-2.601148	0.265545	-9.795515	0.0000
D(INFR(-1),2)	1.246221	0.195187	6.384760	0.0000
D(INFR(-2),2)	0.931594	0.161664	5.762527	0.0000
D(INFR(-3),2)	0.720271	0.122010	5.903393	0.0000
D(INFR(-4),2)	0.376874	0.104426	3.609012	0.0016
C	-0.164584	0.031247	-5.267256	0.0000
@TREND("1990")	0.006979	0.001446	4.827306	0.0001

R-squared	0.879979	Mean dependent var	-0.003571
Adjusted R-squared	0.845688	S.D. dependent var	0.144091
S.E. of regression	0.056603	Akaike info criterion	-2.693209

Sum squared resid	0.067281	Schwarz criterion	-2.360158
Log likelihood	44.70492	Hannan-Quinn criter.	-2.591392
F-statistic	25.66164	Durbin-Watson stat	1.079819
Prob(F-statistic)	0.000000		

Null Hypothesis: UNEMP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.386848	0.0722
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UNEMP)
Method: Least Squares
Date: 01/07/25 Time: 01:42
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UNEMP(-1)	-0.575304	0.169864	-3.386848	0.0024
D(UNEMP(-1))	1.080671	0.184254	5.865107	0.0000
D(UNEMP(-2))	-0.200207	0.427204	-0.468644	0.6436
D(UNEMP(-3))	1.236175	0.469962	2.630373	0.0147
C	0.020862	0.006274	3.325294	0.0028
@TREND("1990")	8.22E-05	7.09E-05	1.159843	0.2575

R-squared	0.618969	Mean dependent var	-0.000283
Adjusted R-squared	0.539587	S.D. dependent var	0.003688
S.E. of regression	0.002503	Akaike info criterion	-8.965979
Sum squared resid	0.000150	Schwarz criterion	-8.685740
Log likelihood	140.4897	Hannan-Quinn criter.	-8.876328
F-statistic	7.797384	Durbin-Watson stat	2.144470
Prob(F-statistic)	0.000177		

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

		t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-3.784113	0.0388
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UNEMP,2)
Method: Least Squares
Date: 01/07/25 Time: 01:42
Sample (adjusted): 1993 2023
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UNEMP(-1))	-1.177808	0.338051	-3.484113	0.0017
D(UNEMP(-1),2)	0.953978	0.395500	2.412077	0.0229
C	0.000109	0.001232	0.088833	0.9299
@TREND("1990")	9.82E-06	6.63E-05	0.148251	0.8832

R-squared	0.354409	Mean dependent var	-0.000226
Adjusted R-squared	0.282676	S.D. dependent var	0.003458
S.E. of regression	0.002929	Akaike info criterion	-8.708604
Sum squared resid	0.000232	Schwarz criterion	-8.523574
Log likelihood	138.9834	Hannan-Quinn criter.	-8.648289
F-statistic	4.940704	Durbin-Watson stat	1.842635
Prob(F-statistic)	0.007307		

Null Hypothesis: COIL has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.366350	0.0000
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(COIL)
Method: Least Squares
Date: 01/07/25 Time: 01:44
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

COIL(-1)	-0.948085	0.176672	-5.366350	0.0000

R-squared	0.473659	Mean dependent var	1.438485
Adjusted R-squared	0.473659	S.D. dependent var	454.0176
S.E. of regression	329.3869	Akaike info criterion	14.46218
Sum squared resid	3471863.	Schwarz criterion	14.50753
Log likelihood	-237.6259	Hannan-Quinn criter.	14.47744
Durbin-Watson stat	2.003874		

Null Hypothesis: D(COIL) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.658510	0.0000
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(COIL,2)
Method: Least Squares
Date: 01/07/25 Time: 01:44
Sample (adjusted): 1992 2023
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(COIL(-1))	-1.501145	0.155422	-9.658510	0.0000

R-squared	0.750577	Mean dependent var	0.245937
Adjusted R-squared	0.750577	S.D. dependent var	799.2704
S.E. of regression	399.1738	Akaike info criterion	14.84742
Sum squared resid	4939532.	Schwarz criterion	14.89323
Log likelihood	-236.5588	Hannan-Quinn criter.	14.86261
Durbin-Watson stat	2.333224		

Date: 01/07/25 Time: 01:49
Sample (adjusted): 1992 2023
Included observations: 32 after adjustments
Trend assumption: Linear deterministic trend
Series: GINI GDP EXR INTR INFR UNEMP COIL
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 *	0.941270	271.5535	159.5297	0.0000
At most 1 *	0.806858	180.8398	125.6154	0.0000
At most 2 *	0.786173	128.2213	95.75366	0.0001
At most 3 *	0.593086	78.85844	69.81889	0.0080
At most 4 *	0.506735	50.08555	47.85613	0.0304
At most 5	0.201894	13.32609	15.49471	0.1034
At most 6*	0.173807	6.109667	3.841466	0.0134

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.941270	90.71374	52.36261	0.0000
At most 1 *	0.806858	52.61849	46.23142	0.0092
At most 2 *	0.786173	49.36284	40.07757	0.0034
At most 3	0.593086	28.77289	33.87687	0.1801
At most 4	0.506735	22.61467	27.58434	0.1905
At most 5	0.201894	7.216425	14.26460	0.4639
At most 6*	0.173807	6.109667	3.841466	0.0134

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

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

GINI	GDP	EXR	INTR	INFR	UNEMP	COIL
-18.43807	15.22111	0.014662	-26.02881	7.296298	-101.2793	0.002020
160.6728	-12.13788	-0.008390	13.18093	2.277736	172.5212	-0.004660
78.61344	-16.87216	-0.010788	21.63137	-11.72721	181.6794	0.006778
-37.45220	32.88563	-0.027511	14.10327	-1.251624	-50.35466	0.003954
66.95909	-22.26046	0.005468	31.95639	0.434218	-108.0816	0.001439
166.3534	-1.939068	-0.004298	-23.90784	-1.300630	165.3257	-0.002268
-42.73761	43.39290	-0.004081	11.80037	-1.702231	410.1103	0.002054
1.662612	-18.54046	0.031897	22.12011	-1.479708	-446.4621	0.001117

Unrestricted Adjustment Coefficients (alpha):

D(GINI)	-0.003049	-0.001586	-0.002472	-0.001222	-0.001355	0.000286	0.000211
D(GDP)	-0.000734	-0.005591	0.011307	-0.015851	0.007269	-0.004248	-0.001459
D(EXR)	5.316037	3.399804	0.251353	-0.053330	-17.95018	-8.155584	-0.123999
D(INTR)	-0.003280	-0.014043	0.004311	-0.000561	0.008566	-0.005739	-0.004716
D(INFR)	-0.062409	0.002775	0.025311	0.013985	-0.004754	0.000112	-0.000498
D(UNEMP)	-0.000285	-0.000178	-4.64E-05	0.000474	-0.000593	-0.000432	0.000699
D(COIL)	-58.50119	164.1706	-172.7877	9.036361	11.43021	-24.70853	-14.36700

1 Cointegrating Equation(s): Log likelihood -382.0087

Normalized cointegrating coefficients (standard error in parentheses)

GINI	GDP	EXR	INTR	INFR	UNEMP	COIL
1.000000	-0.825527	-0.000795	1.411689	-0.395719	5.492944	-0.000110
	(0.16860)	(0.00014)	(0.17587)	(0.04043)	(1.93416)	(2.8E-05)

Adjustment coefficients (standard error in parentheses)

D(GINI)	0.056222
	(0.01978)
D(GDP)	0.013527
	(0.12311)
D(EXR)	-98.01745
	(147.387)
D(INTR)	0.060471
	(0.12760)
D(INFR)	1.150706
	(0.16728)
D(UNEMP)	0.005251
	(0.00926)
D(COIL)	1078.649
	(1115.60)

2 Cointegrating Equation(s): Log likelihood -355.6995

Normalized cointegrating coefficients (standard error in parentheses)

GINI	GDP	EXR	INTR	INFR	UNEMP	COIL
1.000000	0.000000	2.26E-05	-0.051897	0.055464	0.628606	-2.09E-05
		(3.1E-05)	(0.04566)	(0.01073)	(0.38831)	(7.3E-06)
0.000000	1.000000	0.000991	-1.772912	0.546540	-5.892407	0.000107
		(0.00016)	(0.23360)	(0.05491)	(1.98659)	(3.8E-05)

Adjustment coefficients (standard error in parentheses)

D(GINI)	-0.198628	-0.027160
	(0.16467)	(0.01982)
D(GDP)	-0.884826	0.056699
	(1.06252)	(0.12790)
D(EXR)	448.2385	39.64959
	(1287.46)	(154.980)
D(INTR)	-2.195851	0.120532
	(1.00902)	(0.12146)
D(INFR)	1.596613	-0.983624
	(1.46415)	(0.17625)
D(UNEMP)	-0.023377	-0.002172
	(0.08101)	(0.00975)
D(COIL)	27456.40	-2883.136
	(7981.87)	(960.831)

3 Cointegrating Equation(s): Log likelihood -331.0181

Normalized cointegrating coefficients (standard error in parentheses)

GINI	GDP	EXR	INTR	INFR	UNEMP	COIL
1.000000	0.000000	0.000000	-0.028991	0.092896	0.449544	-7.67E-05
			(0.06478)	(0.01406)	(0.51082)	(1.1E-05)
0.000000	1.000000	0.000000	-0.769670	2.185984	-13.73487	-0.002336
			(1.69411)	(0.36763)	(13.3589)	(0.00027)
0.000000	0.000000	1.000000	-1012.673	-1654.855	7916.185	2.466241
			(1753.89)	(380.607)	(13830.3)	(0.28470)

Adjustment coefficients (standard error in parentheses)

D(GINI)	-0.392987	0.014554	-4.73E-06
	(0.15665)	(0.02244)	(1.7E-05)
D(GDP)	0.004057	-0.134075	-8.58E-05
	(1.09899)	(0.15745)	(0.00012)
D(EXR)	467.9983	35.40872	0.046708
	(1431.47)	(205.078)	(0.15956)
D(INTR)	-1.856909	0.047787	2.32E-05
	(1.10967)	(0.15898)	(0.00012)
D(INFR)	3.586399	-1.410675	-0.001211
	(1.30715)	(0.18727)	(0.00015)
D(UNEMP)	-0.027023	-0.001390	-2.18E-06
	(0.09005)	(0.01290)	(1.0E-05)
D(COIL)	13872.96	32.16560	-0.371242
	(5906.07)	(846.129)	(0.65832)

4 Cointegrating Equation(s): Log likelihood -316.6316

Normalized cointegrating coefficients (standard error in parentheses)

GINI	GDP	EXR	INTR	INFR	UNEMP	COIL
1.000000	0.000000	0.000000	0.000000	-0.226079	2.210605	0.000327
				(0.04638)	(1.87879)	(3.5E-05)
0.000000	1.000000	0.000000	0.000000	-6.282399	33.01897	0.008379
				(1.13651)	(46.0369)	(0.00085)
0.000000	0.000000	1.000000	0.000000	-12796.91	69431.36	16.56451
				(2262.80)	(91659.4)	(1.68725)
0.000000	0.000000	0.000000	1.000000	-11.00262	60.74536	0.013922
				(1.90004)	(76.9652)	(0.00142)

Adjustment coefficients (standard error in parentheses)

D(GINI)	-0.347215	-0.025638	2.89E-05	-0.012256
	(0.15269)	(0.03473)	(2.8E-05)	(0.03239)
D(GDP)	0.597703	-0.655338	0.000350	-0.033563
	(0.93534)	(0.21273)	(0.00017)	(0.19840)
D(EXR)	469.9956	33.65493	0.048175	-88.87255
	(1462.18)	(332.549)	(0.27096)	(310.158)
D(INTR)	-1.835915	0.029352	3.87E-05	-0.014376
	(1.13326)	(0.25774)	(0.00021)	(0.24039)
D(INFR)	3.062625	-0.950766	-0.001596	2.405767
	(1.21771)	(0.27695)	(0.00023)	(0.25830)
D(UNEMP)	-0.044770	0.014194	-1.52E-05	0.010744
	(0.09009)	(0.02049)	(1.7E-05)	(0.01911)
D(COIL)	13534.53	329.3320	-0.619841	76.44349

(6022.42)	(1369.70)	(1.11603)	(1277.47)	

5 Cointegrating Equation(s): Log likelihood -298.2519

Normalized cointegrating coefficients (standard error in parentheses)

GINI	GDP	EXR	INTR	INFR	UNEMP	COIL
1.000000	0.000000	0.000000	0.000000	0.000000	-0.323134	3.75E-05
					(0.63240)	(1.3E-05)
0.000000	1.000000	0.000000	0.000000	0.000000	-12.11852	0.000527
					(4.80912)	(9.7E-05)
0.000000	0.000000	1.000000	0.000000	0.000000	-7145.217	0.684900
					(3195.04)	(0.06441)
0.000000	0.000000	0.000000	1.000000	0.000000	-8.720311	0.000242
					(3.01413)	(6.1E-05)
0.000000	0.000000	0.000000	0.000000	1.000000	-1.721805	-0.001209
					(4.88024)	(9.8E-05)
0.000000	0.000000	0.000000	0.000000	0.000000	9.05E+08	6789.417
					(5.0E+08)	(10157.9)

Adjustment coefficients (standard error in parentheses)

D(GINI)	-0.684682	0.014265	2.56E-05	-0.033382	-5.99E-10
	(0.17787)	(0.03283)	(2.4E-05)	(0.03865)	(2.4E-10)
D(GDP)	2.298345	-0.832789	0.000359	0.027152	-4.87E-09
	(1.17862)	(0.21752)	(0.00016)	(0.25609)	(1.6E-09)
D(EXR)	-3115.529	267.7482	0.076375	54.18827	1.61E-06
	(1723.54)	(318.088)	(0.23326)	(374.484)	(2.3E-06)
D(INTR)	-1.219647	0.281585	-6.42E-05	-0.605105	-1.64E-09
	(1.36078)	(0.25114)	(0.00018)	(0.29567)	(1.8E-09)
D(INFR)	1.381544	-0.645576	-0.001648	2.094532	1.01E-08
	(1.51622)	(0.27983)	(0.00021)	(0.32944)	(2.1E-09)
D(UNEMP)	-0.173837	0.025439	-1.51E-05	0.010439	1.64E-10
	(0.11909)	(0.02198)	(1.6E-05)	(0.02588)	(1.6E-10)
D(COIL)	12335.26	1337.999	-0.922182	-1676.655	1.28E-05
	(8001.54)	(1476.72)	(1.08292)	(1738.54)	(1.1E-05)

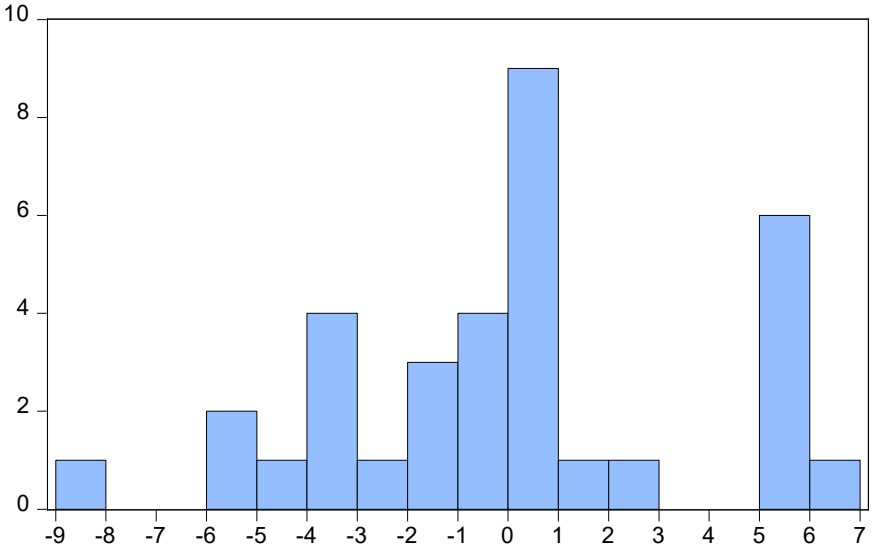
6 Cointegrating Equation(s): Log likelihood -294.6437

Normalized cointegrating coefficients (standard error in parentheses)

GINI	GDP	EXR	INTR	INFR	UNEMP	COIL
1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	3.12E-05
						(1.1E-05)
0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000288
						(5.0E-05)
0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.543867
						(0.06398)
0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	6.94E-05
						(3.6E-05)
0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	-0.001243
						(0.00010)
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	24657.52
						(6981.35)
0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	-1.97E-05
						(5.3E-06)

Adjustment coefficients (standard error in parentheses)

D(GINI)	-0.696925	0.026696	2.44E-05	-0.030001	-6.19E-10	-0.277926
	(0.17962)	(0.04434)	(2.4E-05)	(0.03935)	(2.5E-10)	(0.36703)
D(GDP)	2.479887	-1.017115	0.000376	-0.022974	-4.58E-09	0.628692
	(1.17137)	(0.28918)	(0.00016)	(0.25661)	(1.6E-09)	(2.39356)
D(EXR)	-2766.979	-86.14622	0.109661	-42.05063	2.18E-06	-5248.230
	(1687.66)	(416.635)	(0.22685)	(369.715)	(2.3E-06)	(3448.54)
D(INTR)	-0.974362	0.032539	-4.08E-05	-0.672831	-1.24E-09	-0.911311
	(1.34226)	(0.33137)	(0.00018)	(0.29405)	(1.8E-09)	(2.74276)
D(INFR)	1.376772	-0.640731	-0.001649	2.095849	1.01E-08	11.39074
	(1.53708)	(0.37946)	(0.00021)	(0.33673)	(2.1E-09)	(3.14085)
D(UNEMP)	-0.155361	0.006679	-1.34E-05	0.005337	1.94E-10	-0.260569
	(0.11833)	(0.02921)	(1.6E-05)	(0.02592)	(1.6E-10)	(0.24179)
D(COIL)	13391.25	265.8240	-0.821337	-1968.225	1.45E-05	-837.6302
	(7995.00)	(1973.74)	(1.07468)	(1751.47)	(1.1E-05)	(16336.9)



Series: Residuals
Sample 1990 2023
Observations 34

Mean	-1.20e-14
Median	0.044646
Maximum	6.717791
Minimum	-8.928102
Std. Dev.	3.768607
Skewness	-0.014296
Kurtosis	2.688617
Jarque-Bera	0.138517
Probability	0.933085

Dependent Variable: GINI
Method: Fully Modified Least Squares (FMOLS)
Date: 01/07/25 Time: 02:28
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments
Cointegrating equation deterministics: C
Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFR	4.608517	6.180758	0.745623	0.4626
UNEMP	-98.18980	157.1534	-9.624802	0.0000
GDP	30.31917	26.85449	7.129017	0.0000
COIL	-0.000450	0.002673	-0.168491	0.8675
INTR	-3.104896	26.69331	-0.416317	0.0023
EXR	-0.008458	0.005169	-1.636304	0.1138

C	42.71079	9.192608	4.646211	0.0001

R-squared	0.800831	Mean dependent var	38.67273
Adjusted R-squared	0.776407	S.D. dependent var	4.305249
S.E. of regression	4.269785	Sum squared resid	474.0076
Long-run variance	18.22222		

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.247454	Prob. F(2,24)	0.0565
Obs*R-squared	7.241435	Prob. Chi-Square(2)	0.0268

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 01/07/25 Time: 01:52
Sample: 1990 2023
Included observations: 34
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-0.067650	0.048932	-1.382532	0.1795
EXR	3.19E-05	3.22E-05	0.990302	0.3319
INTR	0.020064	0.040613	0.494018	0.6258
INFR	-0.008438	0.010513	-0.802641	0.4301
UNEMP	-0.034945	0.257618	-0.135646	0.8932
COIL	-5.64E-06	4.87E-06	-1.157695	0.2584
C	0.000756	0.014764	0.051194	0.9596
RESID(-1)	0.556738	0.239609	2.323525	0.0289
RESID(-2)	0.163487	0.236059	0.692568	0.4952

R-squared	0.212983	Mean dependent var	-1.99E-18
Adjusted R-squared	-0.082148	S.D. dependent var	0.006524
S.E. of regression	0.006787	Akaike info criterion	-6.907727
Sum squared resid	0.001105	Schwarz criterion	-6.458797
Log likelihood	127.4314	Hannan-Quinn criter.	-6.754629
F-statistic	0.721657	Durbin-Watson stat	1.943721
Prob(F-statistic)	0.684723		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.165572	Prob. F(7,26)	0.0717
Obs*R-squared	12.52232	Prob. Chi-Square(7)	0.0846
Scaled explained SS	6.535628	Prob. Chi-Square(7)	0.4788

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares

Date: 01/07/25 Time: 01:53
Sample: 1990 2023
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000279	0.000108	2.575928	0.0160
GDP	-7.68E-05	0.000294	-0.260904	0.7962
EXR	8.24E-11	2.14E-07	0.000385	0.9997
INTR	-0.000769	0.000293	-2.622500	0.0144
INFR	0.000148	6.76E-05	2.194471	0.0373
UNEMP	-0.002366	0.001864	-1.269342	0.2156
COIL	-6.13E-08	3.14E-08	-1.950690	0.0620

R-squared	0.368304	Mean dependent var	4.13E-05
Adjusted R-squared	0.198231	S.D. dependent var	5.60E-05
S.E. of regression	5.02E-05	Akaike info criterion	-16.76012
Sum squared resid	6.54E-08	Schwarz criterion	-16.40097
Log likelihood	292.9220	Hannan-Quinn criter.	-16.63764
F-statistic	2.165572	Durbin-Watson stat	2.217474
Prob(F-statistic)	0.071689		

Ramsey RESET Test
Equation: UNTITLED
Specification: GINI GDP EXR INTR INFR UNEMP COIL C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.384656	25	0.7037
F-statistic	0.147960	(1, 25)	0.7037
Likelihood ratio	0.200632	1	0.6542

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	8.26E-06	1	8.26E-06
Restricted SSR	0.001405	26	5.40E-05
Unrestricted SSR	0.001396	25	5.59E-05

LR test summary:

	Value
Restricted LogL	123.3598
Unrestricted LogL	123.4601

Unrestricted Test Equation:
Dependent Variable: GINI
Method: Least Squares
Date: 01/07/25 Time: 01:53
Sample: 1990 2023
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.018792	0.145819	0.128874	0.8985

EXR	-5.71E-06	3.53E-05	-0.161776	0.8728
INTR	-0.003390	0.046114	-0.073513	0.9420
INFR	-0.000742	0.010082	-0.073599	0.9419
UNEMP	-0.160013	0.304139	-0.526119	0.6034
COIL	9.73E-07	1.99E-05	0.048947	0.9614
C	0.015803	0.018467	0.855762	0.4003
FITTED^2	24.84350	64.58633	0.384656	0.7037

R-squared	0.404424	Mean dependent var	0.012950
Adjusted R-squared	0.213840	S.D. dependent var	0.008429
S.E. of regression	0.007474	Akaike info criterion	-6.732945
Sum squared resid	0.001396	Schwarz criterion	-6.328909
Log likelihood	123.4601	Hannan-Quinn criter.	-6.595157
F-statistic	2.122023	Durbin-Watson stat	1.335394
Prob(F-statistic)	0.071986		