

THE IMPACT OF ECONOMIC GROWTH ON INCOME INEQUALITY: UNVEILING THE ROLE OF INSTITUTIONAL QUALITY IN SELECTED AFRICAN COUNTRIES

A Thesis

**Submitted to the Master's Study Program of Economics at the Faculty of
Economics and Business in partial fulfillment of the requirements for the
degree of**

Master of Arts in Economics (M.A.)



by:

Riliwan Olalekan Olanrewaju

03212320016

UNIVERSITAS ISLAM INTERNASIONAL INDONESIA

DEPOK

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ABSTRACT

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In eleven carefully chosen African nations (Burkina Faso, Cameroon, Central African Republic, Cote d'Ivoire, Guinea-Bissau, Kenya, Mali, Niger, Senegal, Tunisia, and Zambia), this study examines the short-run and long-run effects of economic growth and institutional quality on income inequality over a balanced panel period from 2000 to 2021. The study adopts the Kuznets hypothesis in exploring the moderating role of institutional quality while incorporating important control factors such as unemployment rate and government's investment in education on the inequality-growth nexus. In accordance to the inverted U-shaped Kuznets curve, the panel Autoregressive Distributed Lag (ARDL) technique employed in the study shows that there is a long-run, statistically significant, and non-linear relationship between economic growth and income inequality. Additionally, it is found that while the relationship between economic growth and institutional quality showed varying short-run effects across nations, institutional quality has a negative but statistically insignificant effect on income inequality. Furthermore, a systematic structural imbalance in labour and education was shown by the long-run positive and significant effects of both the unemployment rate and the government's investment in education on income inequality. Country-specific results from the study showed heterogeneities in how economic and institutional factors influence inequality dynamics. The study findings underscore the significance of inclusive growth strategies, robust institutional quality reforms, and purposive investment in education and job creation as imperative to reducing Africa's growing income inequality.

Keywords: *Economic Growth, Income Inequality, Institutional Quality, Kuznets Hypothesis, Panel ARDL, Africa*

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The two primary components of economic development are income inequality and economic expansion. The relationship between these economic concepts have drawn attention more than five decades ago through the seminal work of Kuznets (1955). It has been argued in the Kuznets hypothesis that agrarian and developing economies experience higher rates of income inequality than industrialized and developed ones. The main argument of the hypothesis is that as economies witness increasing per capita income, there is a likelihood for income inequality to fall (Shahbaz, 2010). Hence, it can be deduced from Kuznets' hypothesis that income inequality is likely to be on the rise in developing economies which are primarily in the early stages of economic development. While trying to address the problems of poverty and income inequality, the economic growth of a nation has been considered as being essential in bringing improvement to the lives of the poor. It has been argued that growth in the economy, which is fueled by an increase in per capita income, can better poor people's lives (Perera & Lee, 2013). However, according to Aransiola et al. (2024), the societal benefit of economic growth can be limited when structural income inequality is present. This assertion follows economic theories that support conventional wisdom that economic growth can be affected negatively by rising income inequality (Kako Ouraga, 2022).

With 60% of the world's population living below the \$4.16 per day poverty threshold, absolute poverty and income inequality among nations have been increasing in many parts of the world (Smythe et al., 2024). The growing inequality has continued to destabilize the world's democracy and fuel societal dissatisfaction (United Nations, 2020). Notwithstanding, the global trend of inequality is not completely bad news, as there has been a steady decline in the global relative income inequality between countries for the past three decades. This is evidenced in the falling Gini coefficients of regions like Latin America, East Asia, and Sub-Saharan African countries (Smythe et al., 2024). In relation to this, Fosu (2017) identified that, of the three mentioned economies, the Sub-Saharan African income inequality remains the highest, limiting the region's ability to tackle the menace at first instance.

The central objective of the economic policies in Africa in the last few decades has focused on reducing sustainable poverty and making sure that the Sustainable Development

Goals are significantly closer to being achieved (Batuo et al., 2022). The sub-Saharan African region has an endowment that comprises 3 percent of global gas reserves, 25 percent bauxite reserves, 28 percent diamonds reserves, 23 percent uranium reserves, and 4 percent oil reserves. The aforementioned resources have not been able to shield the countries from different economic issues, like low human capital development, inequality, corruption, poverty, low public service quality, etc. (Addi & Abubakar, 2024). The sustainable development agenda, as captured in the recent *World Social Report 2020*, stressed the need to curtail inequality among countries (United Nations, 2020). This objective has called for concern on income inequality between countries (Batuo et al., 2022). The concern for income inequality is driven by its adverse effect of limiting the growth of mass demand and reducing the share of the poor from the benefits of economic growth (Perera & Lee, 2013). Consequently, studies like Alves and Coelho (2024) have identified the possibility of a double causality impact between economic growth and income inequality, stressing the importance of paying close attention to an economy's growth as it may contribute to rising income inequality.

According to the UNDP Report (2017), inspite of the declination of average unweighted Gini in sub-Saharan Africa by 3.4 percent between 1991 and 2011, the region persists to be one of the most unequal in the world. Furthermore, the report reveals that 10 out of the 19 countries with the most income inequality globally, of which 7 are outliers, inhabit in sub-Sahara Africa (Adeleye, 2024). Given this, studies like Jungo et al. (2024) have asserted that one of the most significant barriers to income inequality in African countries is their weak economic growth.

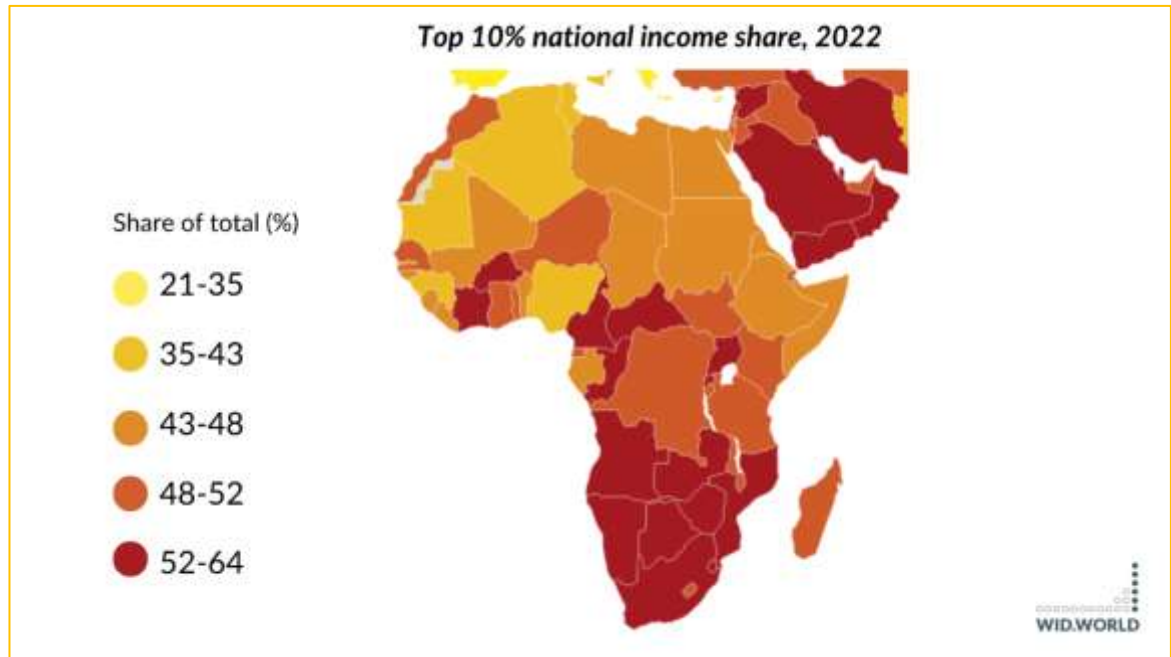


Figure 1.1 Top 10% National Income Share in African Countries
Source: World Inequality Database (2023)

The degree of income inequality that exists in sub-Saharan African nations is depicted in the map above. From the most unequal region, it shows that, on the average, about 56 percent of the total wealth of the country is controlled by the richest 10 percent of the country. Similarly, is the case of some parts of the North African countries, where half of the population earns only 9 percent of the national wealth. On the other hand, the wealthiest 10 percent of the population owns 57 percent of the region's total income. The inequality situation of the South African countries is quite disturbing, with the highest level of income concentration and also the most unequal in the region. Zungu et al. (2021), in their analysis, argued that most South African countries are characterized by severely skewed income inequality due to a number of reasons, including recession, unemployment rates, and geographic location. This was also the submission of Bernanke (2015), who argued that some South African countries have struggled with lower GDP per capita and a high Gini coefficient due to intense structural changes like globalization, technological advancement, institutional inconsistencies in the labor market, and demographic trends.

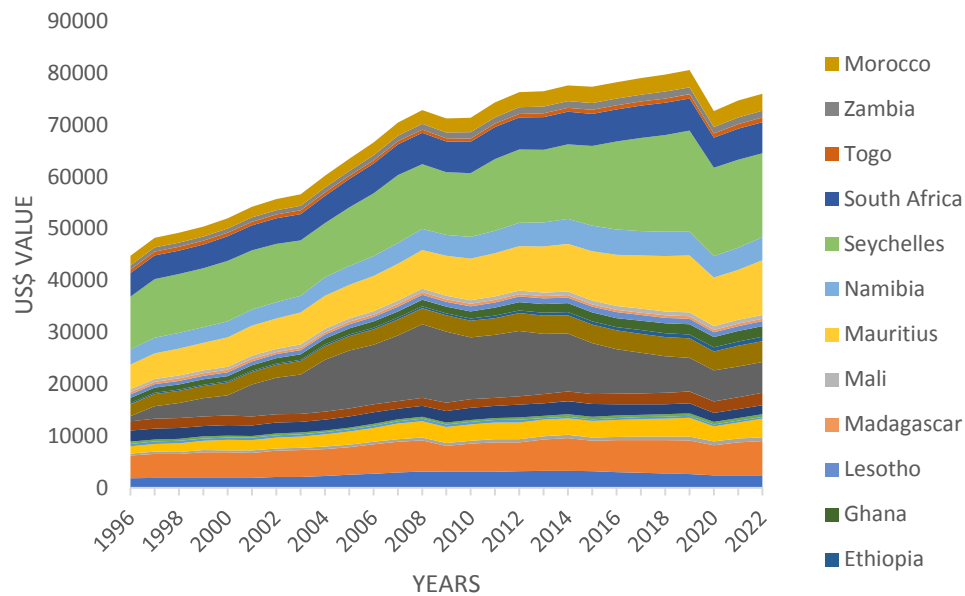


Figure1. 2 GDP Per Capita In Selected African Countries From 1996 – 2022

Source: Author's Computation

The GDP per capita of the African nations in our study from 1996 to 2022 is also displayed in figure 1.2. The graph makes it clear that throughout the given time frame, the majority of nations saw economic progress represented by increases in GDP per capita. Even though growth differs from nation to nation, we can observe a consistent rise in GDP per capita, except for the year 2020, when COVID-19 causes a steep drop in GDP per capita worldwide. It is therefore clear from both charts that while there has been a relatively stable economic growth across the African countries, income inequality has persisted. This calls for attention from academic researchers to investigate why economic growth has not been effective in addressing income inequality.

It has been widely agreed that economic performance across nations goes beyond technological advancement and factor accumulation. There is the existence of some underlying elements that propel technology and other factors in enhancing economic growth and development, such as the institutional quality (Madni, 2019). Recent growth theories have suggested that the varying rates of economic performance between countries and regions can be as a result of institutional quality (Hashim Osman et al., 2011). According to Madni (2019), the institutional building is an outcome of social, economic, political, and geographical factor interactions and interdependencies. It is a set of organizations or structures by which the values, rules, behavioral patterns, and norms of a society are governed. Also, there is an understanding that the institutional structures of

countries explain the differences in their levels of prosperity (Jungo, 2024). Hence, an effective and efficient institution is imperative in boosting investment levels, raising the society's stock of social capital, formulating relevant policies, and exerting authority over social violence, ethnic diversity, and conflicts (Madni, 2019). However, a society's prosperity can be hampered by institutional inefficiencies, such as a lack of accountable and transparent governance mechanisms, which can impede economic growth (Gebrue, 2024). As a matter of fact, the empirical approach employed by Ragmoun (2023) revealed that sustainable development is more highly determined by the quality of institutions in advanced economies than in developing ones. Therefore, Haini et al. (2023) noted that while institutional quality dictates the degree of income distribution and economic growth, income disparity can be a sign of subpar institutions. Examining the African instance on the relationship between income inequality and growth, as well as institutional quality function, is therefore essential.

1.2 Problem Statement

The growth of a state's economy is a clear indication of its economic stability. This is true because economic growth plays a significant role on the performance of each particular economic sector, the welfare of businesses and households, and the primary employment determinant of an economy (Jungo, 2024). Nonetheless, studies have shown that economic transformation “miracles” has occurred in countries with strong institutional quality, while those with weaker institutions have experienced years of poverty and stagnation (Acemoglu et al., 2005). Additionally, the economic development of many nations over the past few decades has resulted in a greater concentration of wealth and income, which has raised the income inequality level. Subsequently, the inequality in wealth and income has made poverty reduction more difficult within societies, and growth has become unsustainable (Haini et al., 2023). It is in this regard that Kunawotor et al. (2024) asserted that promoting quality institutions (in line with the Sustainable Development Goal 16), through institutional reforms, is the missing fundamental factor driving economic growth in Africa.

Within the last three decades, countries in sub-Saharan Africa have recorded a 5 percent average GDP growth and a 2 percent per capita GDP growth, while there has also been improvement in the quality of institutions (Hussen, 2023). For example, Seychelles, with a GNI per capita of \$14,540, remains Africa's richest nation, and closely behind them are Mauritius, Libya, and South Africa. Conversely, Burundi, Somalia, and the Central African Republic are the next poorest countries in Africa, with Western Sahara having the

lowest GNI per capita at \$56 (United Nations, 2021). Gebrue (2024) argued that in recent times, attention in African economies has shifted to the significance of institutions in economic expansion. In the words of Hashim Osman et al. (2011), institutions set a clear boundary defining “the rule of the game” and the conditions guiding economic agents’ operations in the economy. Such studies like that of Gebrue (2024) have asserted that institutions have a wide range of significant effects on economic growth in African nations.

Surprisingly, the inequality rate in majority of sub-Saharan African nations continues to widen. Although Hussen (2023) contested that differences in income level can be as a result of investment level and technological growth among countries. In the same vein, Jungo et al. (2024) posited that inequality in Africa is the result of a restricted financial system that unduly gives accessibility of finance to the wealthier population more than their poorer counterparts. Furthermore, Jungo et al. (2024) argued that poor governance can result in a country’s fragile institution. The product of these institutions such as weak rule of law, corruption, poor regulations, and political instability, becomes an impediment to whatever measure (like economic growth) aimed at reducing income inequality. For example, failure in administrative decision-making and institutional restrictions dampens the ability of foreign investors to predict government decisions on property and intellectual rights, which determines foreign direct investments. Economic growth and its capacity to lessen wealth disparity may suffer as a result (Perera & Lee, 2013). Another dimensional effect is systemic corruption, which leads to tax evasion and exemption by some relatively wealthy individuals, suggesting that the poor bear a larger burden of tax payment, thereby widening the income inequality gap (Perera & Lee, 2013). However, a sufficient control of institutional variables like government effectiveness can lead to an efficient limited resources distribution. This is very essential for reduction in poverty, income inequality, and job creation (Jungo et al., 2024). It is therefore imperative to identify measures that can

help reduce income inequality and distribute the benefits of economic growth evenly.

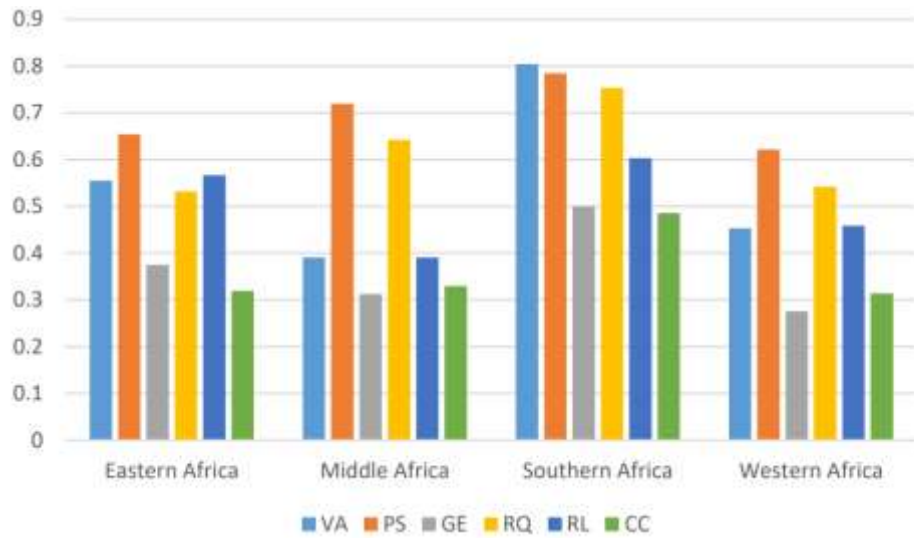


Figure1. 3 Governance Indicators of Sub-Saharan African Countries According to Region

Source: Addi and Abubakar (2024)

A glimpse into the ratings of the various institutional quality indices (as provided by the World Governance Indicators) in Sub-Saharan Africa was graphically explored by Addi and Abubakar (2024). Eastern Africa, Central Africa, Southern Africa, and Western Africa are the sub-regions that make up the sub-Saharan African region, as depicted in Figure 1.3. After that, the ratings for each sub-region's World Governance Indicators—voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and corruption control—were compared to those for all regions. As shown the figure 1.3, the whole of the regions, and more specifically the Eastern and Western regions struggle to combat corruption. Similarly, the rate of government effectiveness in virtually all regions is low. It is enough to say that these situations could be possible reasons for low investment, lower tax revenue to finance government expenditure, and possibly a wider income inequality gap. Based on this, the aim of this study is to identify the moderating role of institutional quality on the relationship between economic growth and income inequality in African nations.

Numerous studies have tried to look at how economic growth is affected by income inequality (Besarria et al., 2018; Silva, 2020; Yıldırım & Dibo, 2021; Smythe et al., 2024; Badur et al., 2024). Only a few studies (Alves & Coelho, 2024) have considered a possible dual causality effect or a reverse effect (Shahbaz, 2010; Perera & Lee, 2013; Zungu et al., 2021) of economic growth on income inequality. The result of existing studies on the relationship between income inequality and economic growth has been inconclusive.

Studies such as Alves and Coelho (2024), for instance, have found that some regions have a positive influence while others have a negative effect. However, Perera and Lee (2013) asserted that inequality is unaffected by economic growth, while Zungu et al. (2021) contended that there is a threshold level at which economic growth rises with income inequality. As a result, this study's research contribution will take the shape of responses to the research questions mentioned in the problem statement.

1.3 Research Questions

The following are the research questions that this study aims to address:

1. Does economic growth have a significant long and short run impact on income inequality in African countries?
2. Does institutional quality have a significant long and short run impact on income inequality in African countries?
3. Does institutional quality moderates the long-run and short-run effects of economic growth on income inequality in African nations?

1.4 Objectives of the Study

The following are the research objectives that this study aims to achieve:

1. To determine whether economic growth have a significant long and short run impact on income inequality in African countries
2. To determine whether institutional quality have a significant long and short run impact on income inequality in African countries.
3. To identify the role played by institutional quality in how economic growth impacts income inequality in African countries in the long and short run.

1.5 Research Hypothesis

The following are the research hypotheses that were established for the study in light of its goals and questions:

1. H1: Economic growth has a significant long and short run impact on income inequality in African countries.
2. H2: Institutional quality has a significant long and short run impact on income inequality in African countries.
3. H3: Economic growth lowers income inequality level in African countries with stronger institutions in the long and short run.

1.6 Significance and Contributions of the Study

The study's importance stems from its ability to contribute to both practical policymaking and academic knowledge, most especially as it deals with the rapidly developing economies of Africa. There have been debates about the connection between economic growth, income inequality, and institutional quality. This study intends to address existing gaps in literature, thereby providing stakeholders (researchers, policymakers, civil society, and international bodies) with valuable insights on the latest developments in the subject matter. Some of the specific significance of this study are:

1. **Advancement in Academic Understanding:** The scholarly grasp of the broad relationship between economic growth and income inequality in Africa will be strengthened by this study. The majority of the material currently in publication has isolated this link without giving enough consideration to the moderating influence of institutional quality. With an emphasis on indicators of institutional quality like governance, rule of law, and degree of corruption, this study offers a fresh perspective on how institutional quality affects how economic growth affects income disparity.
2. **African Development Context:** Numerous studies have focused on the influence of income inequality on economic growth. Fewer research investigated the economic growth impact on income disparity, particularly in the African context. The African economy is diverse and characterized by fragile and emerging economies with distinct and peculiar opportunities and challenges. The contribution of this study comes with a deeper understanding and comparative insights of the diverse economic development models and institutional frameworks inherent in African countries.
3. **Implications for Inclusive Growth Policies:** Another possible key contribution of this study is its ability to facilitate policies that can promote inclusive growth. A result supporting the idea that institutional quality significantly contributes to reducing income inequality will highlight the pertinence of achieving more equitable income distribution from economic growth through strengthening institutional quality.
4. **Implication for Sustainable Development Goals (SDGs) in Africa:** This study touches on several SDGs of the UN, including the 8th Goal (Decent Work and Economic Growth), the 10th Goal (Reduced Inequality), and the 16th Goal (Peace, Justice, and Strong Institutions). The objective of this research will serve as an evidence-based guide for African countries on their path to achieving the SDGs.

5. Contribution to African System of Governance: The study's findings can serve as a practical guide for African countries in enhancing effective institutional reforms. In more specific terms, it could put forward strategies for reducing corruption, improving public resource management, and fostering more transparent and accountable governance structures. This would serve as a valuable recommendation for governments, civil society groups, and international development organizations who advocate for economic justice and better governance in Africa.
6. Contribution to African Economic Strategy: This study can also provide a valuable insight for African policymakers, economic planners, and business leaders who craft strategies on development with an equitable and growth-oriented mindset. The understanding of the workings of institutions and how they influence income distribution helps in the formulation of policies that create growth, social cohesion, and long-term stability.

CHAPTER II

LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 The Kuznets Theory

Kuznets in 1955 postulated his theory, which proposes that there is a non-linear link between economic growth and income inequality. He posits that, income inequality tends to rise throughout an economy's early stages of development but falls as it matures into an emerging economy. With continuous levels of development, he argued that income inequality rises again, which results in his acclaimed inverted U-curve. The underlying assumption and argument are that at a low level of economic growth, fewer wealthy people are available, causing an extreme Gini coefficient. However, an increase in economic growth is accompanied by rising job opportunities and employment, causing the movement of people from lower-class earners to middle-class earners. This results in a higher Gini coefficient, which lowers income inequality (Zungu et al., 2021) and facilitates the existence of a more egalitarian society (Batuo et al., 2022).

In a more specific term, Kuznets' (1955) argument was based on the assumption that economic development shifts nations' production structure from agrarian to industrial. At the start, most economies are characterized majorly by agriculture, where inequality and per capita income are low. The industrial sector, on the other hand, occupies just a smaller part of the economy but with a higher inequality and per capita income. As development sets in, agricultural workers move to the industries, resulting to an increase in their income and a concomitant increase in inequality. This stage suggests that economic growth and income inequality are positively correlated. More workers are moving into the industrial sector in the following phase. Reduction of the agricultural sector labour supply also jacks up the sector's wage rate. This reduces the earlier inequality that was caused by the initial movement of workers, hence leading to a negative economic growth and income inequality relationship at the later developmental stage and a consequential inverted U-shape (Perera & Lee, 2013).

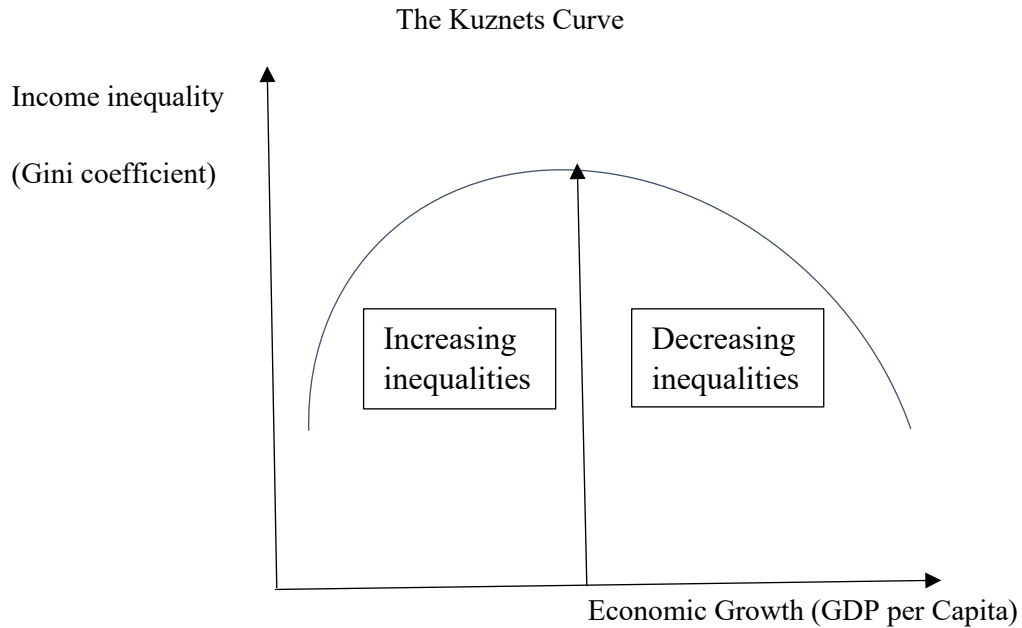


Figure 2. 1 The Kuznets Curve

This theoretical contribution by Kuznets is connected to population growth, productivity growth, and the distribution of labour by sector, which make it seem to focus on the relative shifts of traditional and modern sectors (Shahbaz, 2010). Perera and Lee (2013) posit that Kuznets' hypothesis implies that there can be a rise in inequality in developing countries at early stages of development. Similarly, it has explained the inequality experience of the majority of the Organization for Economic Cooperation and Development (OECD) member countries and the United States up to the 1970s. However, there has been a reversal of the downward trend of inequality (wage inequality in particular) in these countries during the 1980s (Yıldırım & Dibo, 2021). Nevertheless, several studies on inequality and economic growth, like that of Shahbaz (2010), Perera and Lee (2013), Zungu et al. (2021), Batuo et al. (2022), and Kassouri et al. (2025) have been conducted based on the Kuznets theory.

2.1.2 The New Institutional Economics

Institutions are the primary determinant of a country's political and economic development, according to the New Institutional Economics (NIE) theory. The theory stressed that factors attesting to institutional quality, such as corruption control, effectiveness of government, and political stability, are most important in driving economic growth. The central argument of this hypothesis is that the institutional framework that determines the interaction of economic agents in an economy affects economic development (Hashim Osman et al., 2011). North (1991) stated that institutions can be

formal in the form of law and constitution or informal in the form of tradition and taboo. The NIE approach brings to the limelight the understanding of how economic growth can be explained by non-purely economic factors (Addi & Abubakar, 2024). It provides solutions to the questions of how strong governance can spur economic growth and development and how different nations' growth rates can be explained (Olaoye & Aderajo, 2020).

According to Husnain et al. (2024), institutions can be broadly divided into three categories: economic, political, and legal. To reduce uncertainty, the political institutions prioritize the development of laws, the protection of property rights, the creation of rules and regulations, and the advancement of societal benefits. The legal institutions give approval of the rules, laws, and regulations put forward by the political institutions, while the economic institutions promote effective resource distribution through advancement in technology efficient human and physical capital (Husnain et al., 2024). It is widely agreed that weak institutions can serve as a setback on the ability of countries to acquire productive resources like physical and human capital and also the adoption of new technology. This is because countries with weaker institutions suffer from judicial manipulation, improper checks and balance mechanisms, inefficient bureaucracies, and corruption that inadequately support private economic activities (Olaoye & Aderajo, 2020). Besides, foreign investors can be discouraged from operating in a country with poor institutional factors like poor intellectual property rights and a high level of corruption (Addi & Abubakar, 2024).

The level of uncertainties and risks open to investment in an economy can be a function of the inherent institutional quality (Haini et al., 2023). Instilling confidence in investors is largely dependent on the institutional environment. This can be in the form of smooth information sharing, respect of property, ease with facilitation of transactions, contracts and property respect, and mitigation of negative externalities (Jungo, 2024). Smith (1776), who was the first to emphasize the importance of institutions in his work, mentioned that the prosperity of a nation lies in their ability to develop institutions that encourage savings and entrepreneurship. A responsive institution plays a significant function to influence how multinational firms affect their host economy (Husnain et al., 2024). Consequently, the presence of a strong institution in a country gives such a country the ability to lower the cost of transactions, actively participate in and benefit from international trade, attract investment and foster trust, and navigate easily through the process of long-run growth (Addi & Abubakar, 2024).

Institutions are crucial for advancing human development and economic growth at all economic levels (Kunawotor et al, 2024). Stable macroeconomic variables and effective economic sustainability are made possible by elements of high-quality institutions, like political stability, corruption control, regulatory quality, and rule of law. In addition, the differences of economic growth level across countries in terms of their efficiency are largely explained by their institutional framework. Jungo (2024) emphasizes that citizens involvement in governance, rule of law promotion, accountability, and oversight of institutions are measures to ensure economic growth in developing economies. For this reason, scholars such as Acemoglu et al. (2005) have come to the conclusion that the degree of institutional quality effectively accounts for the observed variations in cross-country income levels. While low-quality institutions exist in both developed and developing nations, research indicates that the subject matter has been recorded to be more popular in developing economies (Haini et al., 2023).

2.2 Empirical Review

2.2.1 Economic Growth and Income Inequality

Smythe et al. (2024) looked into how poverty and wealth inequality affect the frequency of economic contraction and why certain societies seem to be more resilient to it than others. The study estimated the 42-year longitudinal data of 23 developing nations using a quantitative methodology. The analysis's findings indicate that while inclusive societies appear more resilient to economic contraction, changes in poverty levels rather than income inequality are correlated with the frequency of contraction. The study comes to the conclusion that a fresh approach is needed to address the mechanism by which the catch-up process is associated with poverty and income inequality. In a similar vein, Alves and Coelho (2024) examined how fiscal policy affected the relationship between economic growth and income inequality in 31 European nations from 1995 to 2019. They found, using a simultaneous equation model, that market income inequality is positively impacted by all fiscal policy variables, whereas disposable income inequality is negatively impacted by all of them. Additionally, compared to countries in Western Europe, Eastern European nations benefit from both forms of inequality and economic growth simultaneously.

Aransiola et al. (2024) also investigated the impacts of the GDP growth and income inequality interaction on the relationship between crime rates and GDP. Using a dynamic panel GMM model to estimate the OECD data from 2000 to 2018, they found that the relationship between homicide rates and GDP is non-linear. In addition, the GDP effects on homicide rates are conditioned by income inequality, showing a significant influence.

This summarizes that crime rates reduce with GDP growth in situations where the income inequality level is high, as it provides a large room for improvement. Mustapha et al. (2024) examined how fiscal shocks affected Ghana's economic growth-income inequality relationship between 1996 and 2019. Using the structural VAR model's sacrifice ratio on the quarterly time series data, the study discovered that while shocks from government spending have a long-term positive impact on education, economic growth, and the exchange rate, shocks from tax revenue have a positive impact on economic growth and income inequality.

Shen and Zhao (2023) used a dynamic and comparable panel threshold model on a large dataset to examine how income inequality affects economic growth. One of the study's conclusions is that, while income inequality typically has a negative impact on growth, this effect may not be noticeable when fertility rates and country-specific variables are taken into account. Additional research reveals that, rather than mechanisms that impact investment, income disparity impacts economic growth in low-income nations by decreasing political stability, depleting human capital, and raising fertility. Li et al. (2023) used the difference-in-difference (DID) method to investigate how the sustainable development policies (SDP) affected income inequality in resource-based cities between 2013 and 2020. According to the study, SDP can reduce income disparity in resource-based cities by an average of 8.3 percent, which is statistically and economically significant. This conclusion, which was particularly noticeable in the western and central regions, offers emerging nations a foundation for lowering income disparity through sustainable development strategies.

Kako Ouraga (2022) looked at the connection between fiscal adjustments, income inequality, and economic growth. The study analyzed panel data from 47 Japanese prefectures between 1998 and 2017 using a simultaneous equation model that was generated using a three-stage least squares method. The results demonstrated that there is a trade-off between fiscal adjustment-induced economic growth and income inequality. They further discovered that while fiscal adjustment through a tax hike might reduce inequality for low-income households, a reduction in government expenditure tends to lead back to inequality. Therefore, the study proposes an apt consideration of the income inequality and economic growth tradeoff when designing the plans for fiscal adjustment, as this will enable a fair income distribution and a stable economy. Dorofeev (2022) carried out a panel research of 39 nations between 1980 and 2019 in an effort to reveal the dynamic nature of the relationship between economic growth and income inequality. The results of

the study support the theory that the degree of income inequality determines the direction of its effects on economic growth. Because of this, nations with low levels of inequality see an increase in economic growth when income disparity rises, while those with high levels of inequality see a decline in economic growth when income inequality declines.

Yıldırım and Dibo (2021) examined how income inequality affected GDP in emerging economies while taking direct taxation into account. The study's basic conclusions demonstrate that, in the majority of nations, the detrimental impact of taxes on economic growth is mitigated when income inequality is decreased. The importance of direct taxation as a fiscal policy tool to lower income inequality and increase GDP is emphasized in the study. Additionally, Zungu et al. (2021) used data from 13 Southern African Development Community (SADC) countries between 1990 and 2015 to similarly examine the relationship between inequality and growth. The study found that when economic growth is slower, income equality stays lower. However, the U-shaped relationship between inequality and growth is confirmed by the fact that an economic growth rate above US\$8,969 tends to increase income disparity in the SADC region.

In their investigation of the theoretical and empirical relationship between income inequality and economic growth, Balcilar et al. (2021) demonstrated that the two variables have an inverted U-shaped relationship. Their empirical assessment of 55 high-, upper-, middle-, and lower-income nations from 1980 to 2010 using a semi-parametric model supported this conclusion. The findings of their study demonstrated that, up to a certain threshold, income inequality initially has a beneficial impact on economic growth; after that, the impacts turn negative. Jianu et al. (2021) examined the relationship between economic growth and income inequality from the perspective of each country's economic development for the years 2010 to 2018 using a sample of two clusters of 14 EU member states each. The estimated generalized least squares with a fixed effect method revealed that, for developed EU member states, economic growth increases with income inequality, while for developing EU countries, income inequality has a negative impact on growth.

Adams and Akobeng (2021) investigated the role played by governance indicators on the relationship between ICT and inequality. The study analyzed the panel dataset, which included 46 African nations from 1984 to 2018, using the dynamic two-step system generalized technique of moment approach. The study found that whereas ICT metrics like internet, fixed broadband, and mobile cellular subscriptions directly reduce inequality, governance characteristics like political stability, rule of law, regulatory quality, and democracy strengthen the link between ICT and inequality in Africa. Silva (2020) used the

VAR approach to evaluate the dynamics of economic growth and income inequality because the research currently in publication lacks a clear consensus on the relationship between these two variables. According to the study, more income inequality in developing nations impedes economic progress, whereas greater economic growth results in a lower rate of income inequality. The results showed that greater income inequality does not always hinder economic growth. The dynamic relationship between income inequality and economic growth may provide a different picture in developing nations when there is a high level of income inequality and capital market imperfections.

A non-parametric method was used by Brida et al. (2020) to investigate the dynamic relationship between income inequality and economic growth. The study used two sample clusters of 38 nations from 1980 to 2015 and 23 countries from 1980 to 2010 to identify the presence of shared economic performance characterized by income inequality. The study result shows economic growth policies support income distribution in developed economies, while economic growth enhances income concentration in developing or poor economies. From 1990 to 2015, Younsi and Bechtini (2020) used a panel data analysis to examine the connection between income inequality, economic growth, and financial development in the five BRICS nations. The findings of their investigation confirmed the Kuznets inverted U-shaped relationship between economic growth and income inequality. Additionally, the study's Granger causality test revealed a unidirectional causal association between income inequality and economic growth, suggesting that income inequality has a detrimental impact on economic growth in the BRICS nations.

Sayed and Peng (2020) used a sample from four industrialized nations (the United States, the United Kingdom, France, and Germany) to illustrate the Kuznets curve's representation of the long-term relationship between income inequality and economic growth. According to the results of the panel data technique, the long-term curve is actually "N-shaped," meaning that inequality increases and decreases as economic growth increases, in contrast to Kuznets' inverted U-shaped curve. Factors such as globalization, economic and demographic factors, technological changes, economic policies, social transfers, etc. are identified as reasons for the inequality relationship. Hailemariam and Dzhumashev (2020) examined the nature of the link between economic growth and income inequality from 1965 to 2014 using an enhanced dataset made up of large panel data of nations. The study examined whether potential cross-country heterogeneity can lead to changes in the relationship between inequality and economic growth. The study's conclusions demonstrated that there is a threshold, which is larger for developing nations

than for industrialized ones, and that income disparity has a non-linear statistically significant impact on economic growth.

The nature of the connection between household income inequality and economic growth was investigated by Paleologou (2019). Through the use of the dynamic panel smooth transition regression model, the study aims to ascertain whether a threshold value exists. The study found that different countries have distinct threshold values; below certain thresholds, household income inequality boosts economic growth, whereas above them, inequality has no effect or a negative effect. Vo et al. (2019) used a dual sample of 158 nations and an additional 86 particular middle-income countries from 1960 to 2014 to investigate the dynamic and causal relationship between economic growth and income inequality. According to the study's Granger causality test, there is a reciprocal association between the two variables in the two country samples. Additionally, the study found that income inequality has a negative impact on economic growth in middle-income nations during the study period.

Besarria et al. (2018) used the transmission mechanism from Halter et al. (2014)'s model to investigate how income inequality affects economic growth in Brazil. The study's conclusions demonstrate that disparities in income and educational attainment are the main causes of the different growth rates among Brazilian states. In particular, they found that more years of education had a beneficial impact on economic growth while income inequality had a negative one.

2.2.2 Economic Growth and Institutional Quality

In order to determine the connection between institutional quality, government size, and economic welfare, Kunawotor et al. (2024) employed the System Generalized Method of Moments method in their analysis of 52 African economies. The findings indicate that economic welfare is positively impacted by institutional quality and negatively impacted by government size. However, when institutional quality is added, there is a positive correlation between government size and economic welfare. This suggests that any negative effects that the size of the government may have on economic well-being can be counteracted by a high-quality institution. Addi and Abubakar (2024) used panel fixed and random effects to examine data from 27 countries between 2005 and 2018 in order to examine the impact of institutions on investment levels and economic growth in Africa. The study found that increased economic freedom promotes economic growth, whereas an environment with strong institutions fosters investment. Their conclusions imply that in order to increase investment and spur economic growth in sub-Saharan African nations,

institutional quality and economic freedom must be enhanced concurrently. Less favorable investment and economic growth outcomes follow when one of the elements is prioritized over the other.

Gebrue (2024) estimated the random and fixed effects in upper-middle-income nations between 2002 and 2021 using the generalized least squares model in order to identify the most important institutional quality characteristics that influence a country's economic growth. The results demonstrate that the key institutional quality factors influencing economic growth in the chosen African nations are absence of violence, voice and accountability, political stability, and corruption control. Akinlo (2024) looked at how institutional quality mitigates the impact of capital flight on economic growth in Africa. The study analyzed panel data from 26 sub-Saharan African nations between 1998 and 2018 using a two-step generalized method of moments technique. The study found that the economic progress of SSA has been negatively impacted by capital flight. The findings also demonstrate that, aside from rule of law and corruption control, the institutional quality indices have not been able to lessen this negative impact.

The impact of inflation, domestic investment, institutional quality, and foreign direct investment (FDI) on economic growth was examined by Husnain et al. (2024). A panel autoregressive distributed lag (ARDL) analysis was one of several tests used in the study to gain insight into the economic dynamics of Latin American nations between 1996 and 2021. Results from the study showed that economic growth in Latin American countries has been significantly impacted by institutional quality, local investment, and FDI, while inflation has yielded a negative impact. The study suggests priority measures in improving quality institutions, promoting domestic investment, and encouraging FDI, without holding back on inflation control. Using the general method of moments technique, Jungo (2024) performed a dynamic panel analysis of 61 countries to examine the impact of financial inclusion, military spending, and education on the link between institutions and economic growth in emerging nations. Results indicate that growing military spending, limited financial inclusion, and weak institutions all have a negative impact on economic growth. On the other hand, rising gross capital formation and educational spending support developing nations' economic expansion.

A thorough literature analysis on the evaluation of the connections among institutional pillars, entrepreneurship, and economic growth was carried out by Raimi et al. in 2024. The study embarked on a comprehensive analysis using the PRISMA protocol to analyze 141 empirical publications from different databases such as Web of Science,

Scopus, and Google Scholar. The study discovered that institutional pillars influence entrepreneurship and economic growth at various levels. Also, the study discovered that different institutional quality proxies can have different influences on entrepreneurship, whether positive or negative. Efayena and Olele (2024) used panel data from 38 sub-Saharan African nations between 2006 and 2022 to investigate the impact of institutional quality on the relationship between fiscal policy and economic growth. According to the GMM model, the interplay between fiscal policy and institutional quality significantly hinders economic growth, suggesting that institutional quality lowers economic growth in SSA nations. The study recommends policies that promote improved institutions as well as fiscal viability, like government spending and resource mobilization.

The existence of a threshold effect on the connection between economic growth, foreign direct investment, and institutional quality was investigated by Guenichi and Omri (2024). The study found that there is a threshold level of institutional quality role on the FDI-growth nexus by using the panel smooth threshold regression technique on a sample of 160 countries between 2002 and 2021. The threshold is such that, above it, institutional quality positively impacts FDI marginal growth effect, and below it, the FDI marginal growth effect is negative and significant. Ragmoun (2023) attempted to analyze how entrepreneurial activities are being impacted by economic factors, institutional quality, and unemployment. Quantitatively, the study adopted a panel vector auto-regression analysis which takes into consideration, possible endogeneity issues between the variables. Three relative effects between the variables are revealed by the analysis's findings. First, there is a favorable and long-lasting relationship between self-employment and the industrial production index. Second, there is a little positive correlation between unemployment and institutional quality factors within a set time frame. Lastly, a negative effect exists between industrial production index and unemployment rate. The results provide an insight for policymakers in considering the unemployment rate on the best time to create firms given that there are provisions for quality institutions and economic support systems.

Hussen (2023) examined how several institutional quality indices affected the economic growth of sub-Saharan African nations between 1991 and 2015. The study's two-step Generalized Method of Moments (GMM) estimation technique revealed that, although investment-promoting, democratic, and regulatory institutions have a positive and significant impact on economic growth, the opposite is true for institutions that prevent conflict. The findings suggest that institutions that promote democracy and investment are vital for hastening the economic growth of regional countries. To show the relationship

between digital economy, institutional quality, and economic growth, Olofin (2023) employed the generalized least squares method to analyze the panel data consisting of Bangladesh, Ethiopia, Kenya, and Nigeria from 1985 to 2017. Among the discoveries of the study is that digital economy and democratic accountability enhance economic growth, while corruption and bureaucratic quality retard growth. Further findings prove that economic growth rises with interacting digital economy and corruption but falls with interacting digital economy and institutional quality.

Using a broad sample of nations from 1980 to 2015, Acquah et al. (2023) estimated the impact of institutions on the level of per capita GDP and its growth rate. The study's generalized propensity score method demonstrated a causal effect, demonstrating the importance of institutions in both middle- and low-income nations. Additionally, the study's findings indicate that the various aspects of institutions have varying effects on economic development, some of which may be non-linear due to the existence of a threshold effect. Wandeda et al. (2021) found that improvements in institutional quality have a significant and favorable impact on output in their investigation of the relationship between institutional quality and the economic growth of sub-Saharan African nations between 2006 and 2018. The two-step systems GMM technique's outcome further demonstrated that the nature of the relationship between institutional quality and economic growth in sub-Saharan African nations varies regionally from one nation to another. More precisely, the study found that West African nations' institutional quality has a greater impact on economic growth than that of Eastern, Southern, and Central African nations combined.

Barbier and Burgess (2021) compared estimates of net welfare changes that reflected progress toward the fulfillment of the 17 SDGs using two institutional quality and governance variables. The study looked at nine representative developing nations and a group of low-income nations between 2000 and 2018. In addition to finding a substantial association between SDG net welfare gains and lower country risk, the study also found a correlation between institutional quality and SDG net welfare gains. According to the report, long-term development and sustainable success depend on strong governance and institutional efficacy. Forson et al.'s (2021) study examines the connection between economic growth, innovation, and institutions in 25 sub-Saharan African nations. To determine how innovations and institutions contribute to economic growth, the study used a threshold regression with instrumental variable estimation. Findings from the study show

that institutional quality slows down the potency of innovation on economic growth in low-regime economies, and this result persists irrespective of the nature of institutional factors.

Omoke and Opuala-Charles (2021) examine the relationship between trade openness and economic growth in Nigeria between 1984 and 2017 by incorporating the influence of institutional quality using the ARDL bound testing approach. The results of the investigation showed that the factors had a long-term association. More precisely, the study demonstrated that robust institutions lessen the detrimental long-term consequences of importation on Nigeria's economic growth, highlighting the necessity of higher-quality institutions and governance in the nation. Between 2002 and 2018, Sari and Prastyani (2021) studied how institutional characteristics affected economic growth in ten ASEAN nations. Three institutional quality dimensions—voice and accountability, regulatory quality, and rule of law—have a significant impact on the per capita GDP of the chosen ASEAN nations, according to the study's panel fixed effect model results.

Additionally, Kim Thi Tran et al. (2021) looked at the connection between economic growth and institutional quality in 48 Asian nations between 2005 and 2008. According to the study, one of the main factors influencing economic development is institutional quality. Nonetheless, the study discovered that stronger institutions in lower-income Asian nations were more successful than those in higher-income nations at fostering economic growth. Olaoye and Aderajo (2020) examined the relationship between various aspects of institutions and economic growth with a focus on the 15 ECOWAS member countries. Using the spatial error model and Driscoll and Kraay's nonparametric covariance matrix estimator, they found that both political and economic institutions have a positive impact on economic growth. It was discovered further that a certain political institutional threshold exists beyond which economic institutions become effective for the desired growth of the economy.

Egbetokun et al. (2020) used the ARDL technique to examine the connection between economic growth, institutional quality, and environmental degradation in Nigeria between 1970 and 2017. According to a summary of the study's findings, Nigeria's institutional structure has faced difficulties in halting environmental degradation indicators and their impact on economic growth. According to the study, improving institutional quality may be a way to reduce environmental pollution, which may therefore accelerate economic growth. Epo and Nochi Faha (2020) examined the impact of institutional quality on the relationship between natural resources and economic growth using panel data from 46 African nations between 1996 and 2016. The study employed the cross-sectional

instrumental variable analysis, system dynamic panel data instrumental variable regression, and panel smooth regression to check for endogeneity, heterogeneity, and non-linearity of the variables, respectively. The study discovered that different institutional quality measures play different roles in how natural resources affect economic growth. For example, in the chosen African nations, a substantial non-linear link between natural resources and economic growth is facilitated by the rule of law and regulatory quality.

The moderating role of political stability on the democracy-growth nexus was examined by Baklouti and Boujelbene (2020), who used the generalized method of moment (GMM) to estimate panel data of 17 Middle Eastern and North African (MENA) countries from 1998 to 2011. The study's empirical findings demonstrated that there is a bidirectional causal relationship between democracy and growth, and that this relationship depends on the degree of political stability in the MENA regions. Economic growth is positively and significantly impacted by the relationship between political stability and democracy. Similarly, Abubakar's (2020) study on the directional effect of institutional quality on economic growth in Nigeria demonstrates that noneconomic growth is positively and significantly impacted by institutional quality. To provide empirical insight into the policy mechanisms for institutional quality, the study used the Ordinary Least Square (OLS) technique on Nigeria's annual time series data from 1979 to 2018. The study's recommendations support the creation of high-caliber organizations that enable both public and private businesses to operate efficiently and achieve sustainable growth.

Using panel data from 43 countries between 1991 and 2014, Seo et al. (2020) empirically investigated the effect of income inequality on economic development using the cumulative growth model. One of the study's conclusions is that, especially in developing nations, income inequality has a detrimental impact on investment and economic growth. The study suggests that a deliberate attempt by government to reduce inequality can help improve technological innovation, human capital accumulation, and accelerate investment, which can all be instrumental in mitigating growth gaps between countries. Pal et al. (2019) examined 13 developing market economies between 1980 and 2010 to see if trade, economic growth, income inequality, and fiscal policy were all simultaneously related. After taking into account the nonlinearity of the variables, the study's simultaneous panel model result indicates that there is an inverted U-shaped link between each and every variable.

Asghar et al. (n.d.) used ARDL on panel data spanning the years 1990–2013 to examine the impact of institutional quality on economic growth in 13 Asian developing

economies. According to the study's findings, the chosen countries' economic growth is positively impacted by institutional quality. Additionally, the study's causation test demonstrates that institutional quality Granger drives economic growth, highlighting the significance of creating high-quality institutions for the development of economic growth in the chosen Asian nations. In another study, Abuzayed and Al-Fayoumi (2016) examined the impact of institutional quality on the relationship between banking sector concentration and economic growth. They found a substantial and positive link between the variables by using a dynamic and static panel data analysis on data from 15 Middle Eastern and Northern African (MENA) nations. The results suggest that banking concentration and institutional quality are important factors for MENA nations' success.

2.2.3 Income Inequality and Institutional Quality

The ability of institutions to moderate the impact of economic growth on income inequality was examined by Halili and Rodriguez Gonzalez (2025). This was accomplished by using the systems generalized technique of moments, feasible generalized least squares, and correlated random effects to evaluate sample panel data of 43 OECD developing and developed nations between 1995 and 2019. The panel analysis's findings show that high-quality institutions, like more gender parity in schooling and more robust employment laws, lessen the positive effects of GDP growth on income inequality. Therefore, the report advocates for policies that emphasize inclusive growth and promote women's access to education and job protection through labor market reform. Similarly, Kassouri et al. (2025) explored the drivers of inequality in twenty sub-Saharan African countries, employing macroeconomic explanatory variables such as financial development, economic growth, and institutional performance. Their study confirmed that a non-linear relationship exists between economic growth and income inequality, while the impact of financial development differs between nations based on the quality of their political institutions, which include bureaucracy quality and government stability.

Badur et al. (2024) investigated the impact of income inequality and corruption on three-dimensional sustainable development in post-Soviet nations. The results of the dynamic panel regression's fixed-effect technique demonstrated that corruption and income inequality threaten sustainable development. The study suggests that policies in support of quality institutions and income redistributive mechanisms can make the bottom income groups benefit from the promotion of sustainable development. Jungo et al. (2024) argue that in a situation of political instability and high corruption, income inequality gets worse with economic growth. This was proven in their panel analysis of 30 African countries

from 2009 to 2020 using the instrumental variable technique for endogeneity control. They discover that inequality rises with military spending and weakening financial inclusion through financial regulations. The study suggests that the key to lowering income inequality through financial inclusion and economic growth is political stability and the prevention of corruption.

From 2010 to 2019, Adeleye (2024) examined the impact of institutional quality on the relationship between income inequality and human capital in 46 sub-Saharan African nations. The study's key findings, as determined by a number of econometric calculations, showed that while institutions and human capital exacerbate inequality, their interaction lowers inequality. To put it another way, there is a 95% chance that high-quality institutions will increase the impact of human capital on inequality. Haini et al. (2023) attempted to uncover whether institutional quality moderates the entrepreneurship and income inequality interplay. To assess the data sample of 100 industrialized and developing nations, the study used a dynamic panel estimator. The study found that income inequality and institutional quality have a favourable and significant impact on entrepreneurial activities, even after adjusting for simultaneity and endogeneity. However, for nations with poor institutions, the moderating effect of institutional quality indicates that the link is negative.

While focusing on the countries of the South Asian Association for Regional Cooperation (SAARC), Abbas et al. (2023) examined the interplay between corruption, institutional quality, and income inequality from the period 2000 to 2021. Using the FMOLS model, the study discovered that institutional quality exerts a favorable and massive impact in reducing income inequality, while corruption adversely affects income inequality. The study stresses the need to strengthen the quality of institutions and put up measures to combat corruption if income inequality is to be reduced significantly within the region. Ouechtati's (2023) study examined the moderating influence of economic and political institutions on the relationship between inequality and financial inclusion. By employing various panel data models to analyze the data from 110 countries between 2004 and 2018, the study documented that the interaction of political and economic institutions with financial access significantly and positively influences income inequality. It indicates that a healthy institutional framework and effective regulatory system are essential for the improvement of financial access to enhance economic development.

Additionally, Batuo et al. (2022) examined the impact of institutional and macroeconomic factors on income inequality using a panel model using data from 52

African nations between 1980 and 2017. The study's conclusions demonstrated the presence of four steady states that promote economic convergence. This multiple-state existence, when accounted for, leads to instability in the Kuznets curve relationship. This finding suggests that there is a possibility for inequality to increase in high-income countries and decrease in less developed or low-income countries. Therefore, macroeconomic and institutional roles in income inequality vary across different countries. Ongo Nkoa and Song (2022) examined the relationship between institutional quality and inequalities in Africa using a sample of 48 African countries from 1996 to 2016. The study focuses on environmental and housing inequalities to arrive at a robust analysis of income inequalities and their sources. The results of the maximum likelihood method (MLM) showed that income inequality reduces with governance indices, which adversely affects environmental and housing inequalities. Furthermore, the study found that the length of the heads of state's regimes and the amount of time spent in power by their political parties exacerbate all types of inequality.

Data from 126 industrial and developing economies between 1970 and 2023 were analyzed using the fixed panel effect by Bahamonde and Trasberg's (2021). The study investigated the impact of democratic governance and state capacity on income inequality. According to the study, greater inequality eventually results from a combination of democratic governance and a strong state. This high-capacity state and democratic rule, according to the study, form part of what is captured in inclusive institutions. Behnezhad et al. (2021) investigated institutional quality roles in the effect of economic growth on income inequality in higher-income and middle-income countries from 2004 to 2017. The study's panel threshold conclusion indicates that economic growth's capacity to lessen income inequality is driven by good governance over the threshold level.

Osode et al. (2020) looked into how institutions and globalization affected income inequality and whether institutional quality had an impact on the relationship between globalization and income inequality. The study, which used the instrumental variable quantile regression, discovered that in nations with low income inequality and better institutional quality, trade globalization considerably reduces income inequality. On the other hand, trade globalization exacerbates income disparity in nations with better institutions and an initial high level of inequality. Madni (2019) investigated how government spending, income inequality, and ethnic diversity affected the quality of institutions in Pakistan. Applying the ARDL technique to data from 1984 to 2015, the study found that while public spending can improve institutions, a deteriorating institution is

associated with income inequality and ethnic diversity. To lessen its negative impact on the caliber of institutions, the study recommended both an endogenous management of ethnic diversity and a decrease in wealth inequality.

According to Josifidis et al. (2017), unionization has more impact on income redistribution than elitization, although the effect of institutional changes on redistribution outweighs them both. This result was obtained from their study of the nature of the connection between institutional quality and income inequality in developed economies. They argue that high inequality in a global economy can be a result of institutional inertia impeding business and technological changes.

2.2.4 Past Studies on the Control Variables

There are numerous studies that have been conducted on how the control variables employed in this study (unemployment rate and government investment in education) have significantly impacted income inequality and other forms of inequalities. For example, studies like that of Ahmed and Shadmani (2024); Reveiu and Constantin (2023); Carranza et al. (2025); Gallo and Sconti (2024); Ahmed & Shadmani (2024); Munir and Kanwal (2020); Awasthi and Shrivastav (2017), etc., have all been conducted on how different dimensions of inequality are affected by either one or the combinations of the control variables employed in this study. The findings from these mentioned studies have emphasized the importance of the variables on subsequent studies on inequality. In this regard, studies like Shahbaz (2010), Osode et al. (2020), Zungu et al. (2021), etc. have also employed these variables i.e., unemployment rate and government investment in education, as control variables in their studies that are focused on how income inequality is affected by other independent variables.

2.3 Conceptual Framework

The existing theories and empirical literature serve as the foundation for this research study's conceptual framework. Income inequality is the study's dependent variable, and we are interested in knowing how it is affected by the independent variables. Economic growth, as indicated by GDP per capita, is the primary independent variable as defined by our study's goal. According to the acceptance of Kuznets' theoretical model, income inequality and economic growth have a non-linear relationship. The non-linearity of the relationship between the independent and dependent variables is thus indicated by GDP², another independent variable.

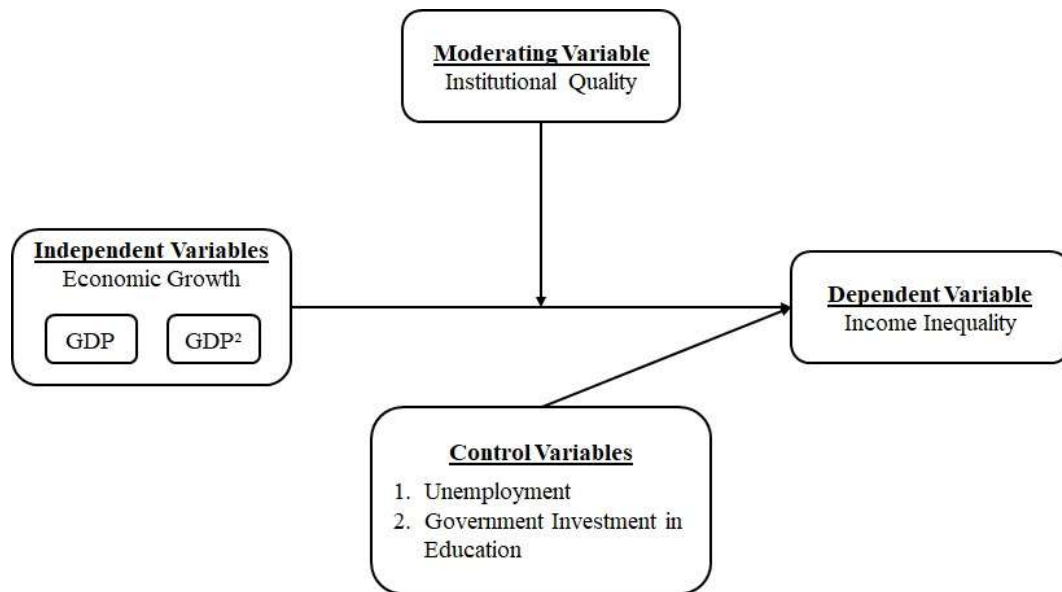


Figure 2. 2 Conceptual Framework

Source: Author's computation

In order to mediate the nature of the relationship between economic growth and income inequality, institutional quality acts as a moderating element. The six World Bank World Governance Indicators serve as the study's metrics for institutional quality and they are political stability, voice and accountability, regulatory quality, effective government, control of corruption, and rule of law. These proxies shall be harmonized using the Principal Component Analysis (PCA) to get a single variable representing institutional quality. Lastly, we have the control variables, which have been empirically proven to have an impact on income inequality. For example, unemployment rate and government investment in education are variables that have an impact on income inequality according to existing literature.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Type

This study uses the panel autoregressive distributed lag (ARDL) technique, which is an aspect of the panel quantitative research framework, to analyze the numerical data gathered for this research purpose. Quantitative analysis is very important and useful for the objectivity it provides in testing hypotheses, while ensuring that personal and external biases are reduced when evaluating economic theories. According to Ragmoun (2023), a process of quantitative methodology gives more interesting, precise, and specific results. This precision allows researchers to accurately provide predictions and quality policy recommendations based on estimated economic parameters.

3.2 Research Approaches

Given the objective of this study to identify the impact of economic growth on income inequality in African countries, while accounting for the role of institutions in the strength of this relationship, a quantitative panel approach becomes the most suitable for this study. Panel data, as being widely used by lots of economic literature, involves data containing several individual's time series observations. It incorporates a time series dimension (i) and a cross-sectional dimension (t) (Alfoul, n.d.).

The merits of panel data over time-series and cross-sectional data have been identified by Baltagi (2008) and Hsiao (2014). Firstly, panel data has the control ability for time and country variables, while this cannot be achieved in a cross-sectional or time series study. Secondly, in the control of heterogeneity, time series and cross-sectional analysis lead to biased results, while panel data analysis controls for it. Thirdly, researchers conducting panel studies come up with more informative data with a greater degree of freedom, more efficiency, less collinearity, and more variability among variables, leading to a more reliable parameter estimate. Fourthly, in the investigation of dynamic adjustment, the relative stability of cross-sectional distributions allows it to hide a lot of changing features. In the case of panel data, their speed of adjustment makes them better suited for economic policy changes. Lastly, researchers are easily able to test and build better complicated behavioral models using panel data than time series and cross-sectional data.

Panel data combines the attributes of a cross section (with a subscript i) and a time series (with a subscript t) on its variables at the same time, i.e.

$$Y_{it} = \alpha_i + X_{it}\beta + u_{it} \quad i = 1, \dots, N; t = 1, \dots, T \quad (3.1)$$

Where i represents countries i.e. cross-sectional dimension, t represents time i.e. time-series dimension, whereas $\beta = k \times 1$, and X_{it} is the it observation on k explanatory variables.

3.3 Data and Data Sources

This study employed panel data, which were extracted country by country, covering the period from 2000 to 2021. Based on data availability, the number of countries (N) considered for this study is 11 African countries within a period (T) of 22 years.

Table 3. 1 Variable Definitions and Data Sources

Variables	Definitions	Measurements	Sources
Income Inequality	Gini coefficient measuring disposable income (income after tax) among individuals.	Ranges from 0 to 100, where 0 signifies perfect equality and 100 signifies perfect inequality.	Standardized World Income Inequality Database (SWIID)
Gross Domestic Product per Capita (GDPpc)	Annual GDP per capita.	Measured in US\$.	World Development Indicators (WDI)
Institutional Quality	Author's computational derivation using PCA from voice and accountability, political stability, rule of law, government effectiveness, regulatory quality, and corruption control.	Measures range from -2.5 (for weak institutions) to +2.5 (for strong institutions).	World Governance Indicators (WGI)
Unemployment Rate	Percentage of unemployed labour from the total labour force.	Measured in percentage.	World Development Indicators (WDI)

Government Investment in Education	Government educational expenditure as a percentage of GNI	Measured in percentage.	World Development Indicators (WDI)
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Source: Author's Computation

3.4 Principal Component Analysis

As mentioned in table 3.1, the principal component analysis will be used as a tool to generate a composite index for the institutional quality variable. The PCA shall be conducted on the governance indicators, which will allow for an examination of the component with the minimum variance and high loading factor. Given that there could be possibly more than one variable describing the phenomenon, the interest here lies in reducing the indicators to a manageable set. The role played by PCA is to compute the eigenvalues for decomposing the variance that is observed.

3.5 Data Description

The study utilizes annual panel data of 11 African countries from the period of 2000 to 2021. These African countries are selected based on several factors, such as geopolitical diversity, economic growth and institutional quality variances, and most importantly, the data availability for all variables. The countries are Burkina Faso, Cameroon, Central African Republic, Cote d'Ivoire, Guinea-Bissau, Kenya, Mali, Niger, Senegal, Tunisia, and Zambia. The study uses balanced panel data, which were obtained from different sources, including the Standardized World Income Inequality Database (SWIID), World Bank World Governance Indicators (WGI), and the World Development Indicators (WDI) of the World Bank. An explanation of the data description and their associated interactions is given below.

3.5.1 Dependent Variable: Income Inequality

The interested explained variable in this study is income inequality. The gini coefficient shall be used as a measure of income inequality for this study. Gini coefficient remains the most popularly used proxy for income inequality and has been used by studies such as Shahbaz (2010), Perera and Lee (2013), Zungu et al. (2021), and Jungo et al. (2024). The data for gini coefficient as a proxy for income inequality is sourced from Standardized World Income Inequality Database (SWIID). The gini coefficient ranges from 0 to 100, where 0 indicates perfect equality and 100 indicates perfect inequality.

3.5.2 Independent Variable: Economic Growth

This study utilized GDP per capita as a proxy for economic growth. GDP per capita as a proxy for economic growth has been widely used by different literature, such as Silva (2020), Zungu et al. (2021), Smythe et al. (2024), Addi and Abubakar (2024), and others. The data for this variable is sourced from the World Development Indicators (WDI) of the World Bank. In order to establish the non-linearity argument of the Kuznets theory upon which this study is based, another variable $GDPC^2$ shall be generated through the GDP per capita.

3.5.3 Moderating Variable: Institutional Quality

One of the objectives of this research is to uncover the mediating role of institutional quality on the economic growth-income inequality relationship. Institutional quality is described by Gebrue (2024) as human-made constraints that affect societal interactions. It has been measured using varieties of parameters across different studies. One of the most popularly used parameters is Kaufman's six governance indicators, which include rule of law, government effectiveness, political stability and absence of violence, control of corruption, voice and accountability, and regulatory quality. This data as used for this study is sourced through the World Bank World Governance Indicators (WGI) with measures ranging from -2.5 (for weak institutions) to +2.5 (for strong institutions). This indicator of institutional quality has been used by studies like Haini et al. (2023), Ragmoun (2023), Kunawotor et al. (2024), and Akinlo (2024).

3.5.4 Control Variables

The control variables are other variables that have been empirically proven by other studies to have an impact on our dependent variable (income inequality). The first control variable that serves as a major determinant of income inequality to be considered by this study is unemployment rate as used by Shahbaz (2010). The unemployment rate is expected to be positive with income inequality, as a high rate of unemployment should naturally lead to a high level of income inequality. Lastly, the government investment in education has been identified to be a major determinant of income inequality by Shahbaz (2010). This is logical, as the level of government investment in education can determine the quality of such education and the kind of job that can be applied for by labour that has benefitted from the education investment. Hence, highly skilled workers with a high level of education get more income than their counterparts with a lower level of education and skill. The literacy rate is measured by government expenditure on education as a percentage of gross national income.

3.6 Data Analysis

This section discusses the general framework of panel data used in determining the relationship between the independent variable and income inequality. The data analysis steps to be carried out in this study will include the following: (1) Panel unit root to check the level of stationarity of the variables, (2) Panel co-integration test, (3) Lag length selection test, and (4) Estimation of panel ARDL.

3.6.1 The Panel Unit Root Test

The panel unit root test serves as a necessary preliminary test before estimating a panel ARDL. It relates to the process of stochastic trend of time series data to determine the stationarity fluctuation around the series' mean value, known as deterministic trend (Famoroti, n.d.-a). Panel ARDL estimation requires that variables be stationary either at first difference or level. There are many approaches to conducting a panel unit root test, but this study employs more than one approach to ensure a balanced and comparative analysis. Specifically, this study employed the Im Pesaran & Shin (IPS) and the Levin Lin & Chu (LLC) panel unit root tests. The IPS test is an alternative panel unit root technique that aligns with unit convergence at the same velocity towards the equilibrium. This flexible approach for t-bar statistics computation, simultaneously harmonizes non-stationary and stationary series. Also, unlike ADF, IPS accounts for all units of the cross-section, which accommodates autocorrelation and stochastic heterogeneous variables (Famoroti, n.d.-a). The LLC is an improvement over the Augmented Dickey Fuller (ADF) test. It is executed by having separate ADF regressions for all individuals, correcting serial correlation, and differentiating the lag order of the different terms. It can also be estimated by calculating the mean of the individual's observation and the lag length (Alfoul, n.d.).

3.6.2 Panel Co-integration Test

The panel co-integration test is meant to show whether a long-run relationship exists among the variables, following the confirmation of their stationarity. The test takes into account the variation of errors in panel data and the dynamic heterogeneity. This study follows that of Famoroti (n.d.) and Alfoul (n.d.), who employed the panel co-integration test proposed by Kao (1999). The test employs the assumption of convergence to normal distribution and achieving steady-state of the test statistics (Famoroti, n.d.). Also, it considers dynamic heterogeneity and error variation in panel data, employing non-parametric and parametric estimation of the long-run variance (Alfoul, n.d.). The decision rule in the KAO test is to reject the null hypothesis of "no co-integration" in a situation

where the probability value is less than 5 percent; otherwise we fail to reject the null hypothesis and conclude that no co-integration exists among the series.

3.6.3 Lag Length Selection Test

The optimum lag length selection is another fundamental requirement necessary for the estimation of a panel ARDL model. The econometrics approach to this estimation includes Akaike Info Criterion (AIC), Schwarz Info Criterion (SIC), Hannan-Quinn (HQ), Final Prediction Error Criterion (FBE), and Likelihood Ratio Test (LR). The selection of the lag length specifies the appropriate number of lags to be included in the ARDL model (Alfoul, n.d.). According to Ng and Perron (2001), to obtain the number of lags for each variable, the ARDL model estimates $(c + 1)n$ number of regressions, where the maximum number of lags to be used is denoted by c . However, the most used criteria are employed by this study, which is justified by the majority of results in the selected criteria.

3.6.4 Panel Auto-Regressive Distributive Lag Model (Panel ARDL)

The suitability of the panel ARDL method for this study is strengthened by the likelihood for the model to be dynamic. The study uses panel data comprising 11 countries from Africa over a period of 22 years. As suggested by Pesaran et al. (1999), the panel-ARDL permits cross-country short-term relationships, which allows for heterogeneity. Also, this approach examines the relationship between variables irrespective of whether they are combinations of $I(0)$ and $I(1)$ variables.

The ARDL model can be estimated as follows:

$$\Delta y_{it} = \sum_{j=1}^p a_{ij} \Delta y_{i,t-j} + \sum_{j=0}^q \lambda_{ij} \Delta X_{i,t-j} + u_{it} \quad (3.2)$$

Where Δy_{it} represents the dependent variable, X_i represents the independent variables which could be a combination of $I(0)$ and $I(1)$ of a unit root; scalars are represented by a_{ij} , λ_{ij} represents the coefficient vectors ($k \times 1$), i represents the number of samples (1 to N), t represents the study time period (1 to T), p and q represents the number of lags, and u_{it} represents the error term.

The ARDL estimate and the error correction term (ECT) can be expressed as follows:

$$\Delta y_{it} = \rho_i (y_{i,t-j} - \beta_i X_{it}) + \sum_{j=1}^p a_{ij} \Delta y_{i,t-j} + \sum_{j=0}^q \lambda_{ij} \Delta X_{i,t-j} + u_{it} \quad (3.3)$$

Where ρ_i represents the adjustment coefficient with value expected to be less than 0, β_i represents vectors indicating long-run relationships, $(y_{i,t-j} - \beta_i X_{it})$ represents the

error correction term (ECT), and a_{ij}, λ_{ij} are the parameters representing the dynamic coefficients in the short term.

The aim of this study is to examine the impact of economic growth on income inequality and to determine the role of institutional quality on this impact in African countries for the period 2000 to 2021. To achieve this objective, this study uses the Kuznets theory established on the tenet that the relationship between economic growth and income inequality is non-linear. The function specified by Kuznets can be expressed as follows:

$$GINI = \beta_0 + \beta_1 GDP + \beta_2 GDP^2 + u \quad (3.4)$$

Where GINI is the income inequality measured using the gini-coefficient, GDP is the gross domestic product representing economic growth. In testing for the Kuznets inverted curve, it is expected that β_1 is greater than 0 and β_2 is less than 0 i.e. $\beta_1 > \beta_2$.

In order to investigate the moderating role of institutional quality on the economic growth-income equality nexus, we introduce IQ into the Kuznets equation in 3.4. as well as the control variables such that we will have in ARDL form as thus:

$$\begin{aligned} \Delta GINI_DISP_{it} = & \rho_i \left(GINI_DISP_{i,t-j} - \theta_{i,1} LnGDPpc_{i,t-1} - \theta_{i,2} LnGDPpc^2_{i,t-1} - \right. \\ & \left. \theta_{i,3} IQ_{i,t-1} - \theta_{i,4} LnGDPpc_IQ_{i,t-1} - \theta_{i,5} UR_{i,t-1} - \theta_{i,6} GIE_{i,t-1} \right) + \\ & \sum_{j=1}^{p-1} a_{ij} \Delta GINI_DISP_{i,t-j} + \sum_{j=0}^{q-1} \lambda_{ij} \Delta LnGDPpc_{i,t-j} + \sum_{j=0}^{q-1} \gamma_{ij} \Delta LnGDPpc^2_{i,t-j} + \\ & \sum_{j=0}^{q-1} \mu_{ij} \Delta IQ_{i,t-j} + \sum_{j=0}^{q-1} \beta_{ij} \Delta LnGDPpc_IQ_{i,t-j} + \sum_{j=0}^{q-1} \sigma_{ij} \Delta UR_{i,t-j} + \\ & \sum_{j=0}^{q-1} \psi_{ij} \Delta GIE_{i,t-j} + u_{it} \end{aligned} \quad (3.5)$$

Where $i = 1, \dots, 11$ and $t = 2000, \dots, 2021$, the variable $GINI_DISP_{it}$ represents the income inequality as the dependent variable, $LnGDPpc_{i,t}$ and $LnGDPpc^2_{i,t}$ are the independent variables representing economic growth, $IQ_{i,t}$ is institutional quality which represents the moderating variables, $LnGDPpc_IQ_{i,t}$ is the interaction of gdp and institutional quality, $UR_{i,t}$ and $GIE_{i,t}$ are the control variables representing unemployment rate and government investment in education respectively. The $\theta_{i,1}, \theta_{i,2}, \theta_{i,3}, \theta_{i,4}, \theta_{i,5}$, and $\theta_{i,6}$ are the long-run coefficients; $a_{ij}, \lambda_{ij}, \gamma_{ij}, \mu_{ij}, \beta_{ij}, \sigma_{ij}$, and ψ_{ij} are the short-run coefficients.

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents empirical analysis of how economic growth affects income inequality in African countries. In addition, the chapter aims to examine how institutional quality influences the relationship between economic growth and income inequality in the selected African countries. It has been shown in previous chapters that economic growth significantly explains the level of income inequality within-country and between-country'. This is the argument made in the theoretical concept of Kuznets and has been investigated by past studies such as Shahbaz (2010); Perera and Lee (2013); and Zungu et al. (2021).

In light of the aforementioned, this study uses the Kuznets hypothesis, which is predicated on the idea that inequality first rises with economic growth but eventually falls as growth persists. Hence, the theory suggests a non-linear relationship between both variables. The contribution of this study to existing literature is testing the Kuznets theory using the data for African countries. Furthermore, the moderating influence of institutional quality on the association between economic growth and income inequality will also be investigated.

4.2 Descriptive Statistics and Correlation Matrix

Table 4.1 provides a summary of the descriptive statistics for each study variable. The distribution's mean, median, minimum, maximum, standard deviation, skewness, kurtosis, and probability in the chosen African nations are included in these statistics.

Table 4. 1 Summary of Statistics

	GINI_DISP	GDP_PC	IQ	UR	GIE
Mean	44.03297	1200.278	2.61E-09	5.15813	3.49551
Median	42.25000	1086.894	0.32974	3.62350	3.54000
Maximum	54.50000	4094.878	3.64757	18.33400	6.64000
Minimum	34.90000	338.1657	-4.76706	0.31700	1.06000
Std. Dev.	5.60357	891.5918	2.07319	4.08222	1.47402
Skewness	0.54767	1.82110	-0.35365	1.56733	0.05517
Kurtosis	1.99353	5.90796	2.20635	4.60599	2.08483
Probability	0.000014	0.00000	0.00335	0.00000	0.01379
Observations	242	242	242	242	242

Source: Author's computation from data, 2025

According to the table's results, the total number of observations for this study is 242. The mean values of GINI_DISP, GDP_PC, and GIE are closer to the median values. This implies that the mean values fall almost proportionately between the dataset's minimum and maximum values. In other words, it can be said that the distribution of data for these variables is symmetric and the availability of possible outliers has less impact on the distribution. Exceptionally, while the mean value of IQ is closer to the maximum value than the minimum, the reverse is the case for UR. These imply that whilst the latter is concentrated at the distribution's lower band, the former is concentrated in the distribution's higher band. We can determine that the distribution is normally distributed based on the probability of its values. Additionally, the skewness values are positive across all series except for IQ, which is negatively skewed. Finally, there is generally low standard deviation in the distribution, indicating that the series clusters around the mean.

Table 4. 2 Correlation Matrix

	GINI_DISP	LNGDP	IQ	UR	GIE
GINI_DISP	1				
LNGDP	0.01515	1			
IQ	-0.34342	0.46234	1		
UR	0.22935	0.58507	0.26887	1	
GIE	-0.33478	0.65788	0.65718	0.23418	1

Source: Author's computation from data, 2025

The study variables' matrix correlation is displayed in Table 4.2. The table indicates a positive correlation between the dependent variable (GINI_DISP) and LNGDP and UR, while IQ and GIE are negatively correlated with the dependent variable. LNGDP is equally positively correlated with IQ, UR, and GIE, just as IQ is positively correlated with UR and GIE. Lastly, UR and GIE are likewise positively correlated. Furthermore, there is a moderate correlation between all the independent variables, with the exception of UR, which is relatively weakly correlated with IQ and GIE at values of 0.26887 and 0.23418, respectively.

4.3 Principal Component Analysis

This study employed the principal component analysis (PCA) to come up with a single institutional quality variable from the six institutional quality dimensions, which are rule of law, government effectiveness, political stability and absence of violence, control of corruption, voice and accountability, and regulatory quality.

Table 4. 3 Principal Component Analysis for Governance Indicators

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp 1	4.2981	3.6196	0.7163	0.7163
Comp 2	0.6785	0.0907	0.1131	0.8294
Comp 3	0.5878	0.3537	0.0980	0.9274
Comp 4	0.2341	0.1022	0.0390	0.9664
Comp 5	0.1319	0.0623	0.0220	0.9884
Comp 6	0.0696	.	0.0116	1.000

Source: Author's computation from data, 2025

Table 4. 4 PCA Eigen Vectors

Variable	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	unexplained
pols	0.3143	0.7795	0.5234	-0.0014	0.1158	0.0795	0
rq	0.4373	-0.3020	0.0522	0.4550	0.7015	-0.1252	0
rol	0.4660	-0.0118	-0.0544	-0.0463	-0.4016	-0.7850	0
vac	0.3509	0.3689	-0.7864	0.1902	-0.0741	0.2840	0
geff	0.4275	-0.3556	0.3156	0.2661	-0.5279	0.4916	0
ccorr	0.4323	-0.1964	-0.0484	-0.8270	0.2213	0.1985	0

Source: Author's computation from data, 2025

Note: pols is political stability and absence of violence, rq is regulatory quality, rol is rule of law, vac is voice and accountability, geff is government effectiveness, and corr is control of corruption.

Table 4. 5 PCA Selected Components

Variable	Comp 1	Unexplained
Pols	0.3143	0.5754
Rq	0.4373	0.1779
Rol	0.4660	0.06653
Vac	0.3509	0.4707
Geff	0.4275	0.2145
Ccorr	0.4323	0.1968

Source: Author's computation from data, 2025

Note: pols is political stability and absence of violence, rq is regulatory quality, rol is rule of law, vac is voice and accountability, geff is government effectiveness, and corr is control of corruption.

From table 4.3, it is vivid that the highest eigenvalue is located under component 1, which also reflects its explanatory power as a better representation of all other

components. Table 4.4 presents the eigenvectors and the variance corresponding to each variable. According to the table, the component still remains the most representative, which explains the nature of variation in the dimensions better. Regulatory quality, rule of law, and control of corruption have the lowest unexplained components, as indicated in Table 4.5. This indicates that they possess more information about the institutional quality nature of the selected African nations than the other indicators. Notwithstanding, the contribution of other components has been captured in the estimation for a comprehensive and clear influence of the variable on the explained variable.

4.4 Panel Unit Root Test

From the preconditions for estimating a panel data analysis is determining the order of stationarity of the variables employed through conducting a panel unit root test. The test serves as guidance on whether a panel ARDL model is appropriate as an estimation technique for this study or not. In more technical language, series with unit roots are non-stationary, suggesting that they have shock-sustaining inclinations, while the reverse is the case for stationary series without unit roots (Famoroti, n.d.-b).

Table 4. 6 Panel Unit Root Test

Variables	Im, Pesaran and Shin W-Stat			Levin, Lin and Chu		
	p-value	Order of integration	of	p-value	Order of integration	of
GINI_DISP	0.0909	I(1)		0.0336	I(1)	
LNGDP	0.0000	I(1)		0.0116	I(1)	
LNGDP ²	0.0000	I(1)		0.0092	I(1)	
IQ	0.0000	I(1)		0.0000	I(1)	
LNGDP_IQ	0.0000	I(1)		0.0000	I(1)	
UR	0.0000	I(1)		0.0000	I(1)	
GIE	0.0047	I(0)		0.0001	I(0)	

Source: Author's computation from data, 2025

The Im, Pesaran, and Shin (IPS) and Levin, Lin, and Chu (LLC) unit root tests shown in table 4.6 present the stationarity order of the variables used in the study. The results of the tests show that all the variables (including GINI_DISP, LNGDP, LNGDP², IQ, LNGDP_IQ, and UR) are all stationary at first difference except for the stationarity of GIE, which is at level in both the panel unit root tests of IPS and LLC. This is because all the variables have probability values less than 5% at the first difference and at level for

only one variable. The panel ARDL model is therefore a very appropriate and suitable model for conducting the data analysis of the study, and it is reasonable to reject the null hypothesis of unit root existence and infer that the variables have a mixed order of stationarity.

4.5 Panel Co-integration Test

Given that we have earlier identified that six of the variables employed in this study (GINI_DISP, LNGDP, LNGDP2, IQ, LNGDP_IQ, UR) have stationarity at their first difference, it suffices that this study meets the requirements for a test of co-integration. The panel co-integration test determines whether there is a long-run equilibrium relationship between the variables that are understudied.

Table 4. 7 Kao Panel Co-integration Test

ADF	t-statistics	p-value
	-3.50765	0.0002
Residual variance	0.04967	
HAC variance	0.08823	

Source: Author's computation from data, 2025

The results of the Kao panel co-integration test used in this investigation are summarized in table 4.7. According to the conclusion, the null hypothesis—that there is no co-integration between the dependent variable, GINI_DISP, and the other independent variables that comprise the study's model—is rejected. A long-run co-integration relationship between the variables used in the model is thus supported by the outcome, which seems to support the alternative hypothesis. The specific statistics reported from the Kao co-integration test read as -3.50765 for the ADF t-statistic and 0.0002 for the probability value. These statistics establish a very strong evidence to support the existence of long-run equilibrium between the dependent and independent variables. Hence, it is safe to say that the existence of co-integration is confirmed in our sample data, which by implication inform the decision to employ the panel ARDL approach to examine the long-run effect of economic growth (LNGDP) and institutional quality (IQ) on income inequality (GINI_DISP).

4.6 Optimal Lag Length Selection Result

In order to choose the best lag for our regression model, this study investigated the five traditional optimal lag lengths regression techniques. These techniques include the Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information

Criterion (SIC), Hannan-Quinn Information Criterion, and Sequential Modified LR test statistics (LR). In a dynamic model analysis such as the panel ARDL, choosing the ideal lag is crucial to avoid mis-specification errors due to serial correlation in the model (Famoroti, n.d.)

Table 4. 8 Optimal Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1733.142	NA	15.39611	22.59925	22.73730	22.65533
1	300.8299	3856.623	9.82e-11	-3.179608	- 2.075262*	- 2.731026*
2	376.2509	136.1497*	6.99e-11*	- 3.522739*	-1.452090-	-2.681646
3	403.7023	47.05961	9.34e-11	--3.242888	-0.205935	-2.009285
4	440.6446	59.97123	1.11e-10	-3.086294	0.916962	-1.460181
5	475.2436	53.02187	1.38e-10	-2.899268	2.070291	-0.880646
6	513.3641	54.95284	1.66e-10	-2.757975	3.177887	-0.346843
7	542.1258	38.84705	2.31e-10	-2.495141	4.407024	0.308501
8	578.6701	46.03625	2.96e-10	-2.333377	5.535091	0.862774

Source: Author's computation from data, 2025

Note: * indicates the optimal lag selection criteria

Table 4.8 shows that most of the explored optimal lag selection methods, like LR, FPE, and AIC, suggested the use of 2 lags, while SC and HQ suggested the use of a single lag. Hence, this study combines all the information presented in the table to select 2 lags for the dependent variable based on AIC and a single lag for the independent variables.

4.7 Panel ARDL Long-Run Estimation Result

The next step in our series of analyses, which is the long-run panel ARDL (pooled mean group) estimation, is informed by the result of the panel co-integration test carried out on our variables. The aggregate short- and long-run effects of the independent variables on the dependent variable are displayed by the estimated PMG. In a dynamic model, it also

takes into consideration how quickly the short-term equilibrium adjusts to the long-term equilibrium after a disturbance. According to the Akaike Information Criteria (AIC), the proper lag for the estimation was determined. As a result, one lag was chosen for the independent variables (LNGDP, LNGDP2, IQ, LNGDP_IQ, UR, and GIE) and two lags were chosen for the dependent variable (GINI_DISP).

Table 4. 9 PMG Long-run Estimation Result

Dependent Variable: GINI_DISP

Variable	Co-efficient	Std. Error	t-statistic	Prob-value
Long Run Equation				
LNGDP	85.35931**	35.61936	2.39643	0.0179
LNGDP ²	-6.28026**	2.50335	-2.50875	0.0133
IQ	-4.03588	3.54055	-1.13990	0.2563
LNGDP_IQ	0.64254	0.49996	1.28519	0.2009
UR	0.31486**	0.15653	2.01152	0.0462
GIE	1.12324***	0.42454	2.64579	0.0091

Source: Author's computation from data, 2025

Note: *** signifies significant at 1%, ** signifies significant at 5%, and * signifies significant at 10%.

According to the long-run PMG test, which is displayed in table 4.9, economic growth (LNGDP) has a long-run positive and significant impact on income inequality (GINI_DISP) in the selected African countries. Given the non-linearity assumption in our model based on the Kuznets hypothesis, the result also shows that a rise in economic growth (LN_GDP²) lowers income inequality over the long run in the selected African countries. In contrast to the first finding, this shows a negative influence, and because the probability value (0.0133) is less than 0.05, it is significant at the 5 percent significance level. These dual results of economic growth on income inequality conform with the Kuznets theory that economic growth at first increases the level of income inequality, but as this growth keeps increasing, the level of inequality starts dropping, leading to the establishment of an inverted U-shaped curve. Given this analytical result, we can establish that this hypothesis also holds for the selected African countries in the long-run. Although this finding contradicts that of Zungu et al. (2021), who argued that the nature of the non-linearity relationship of economic growth and income inequality is a U-shaped curve, meaning that inequality falls with a fall in growth and then rises when growth increases to a given

threshold level. Nonetheless, the results of this study support those of Kassouri et al. (2025), who found an inverted U-shaped non-linear link between income inequality and economic growth in African nations. This finding partially addresses the study's first research question on whether economic growth have a significant long and short run impact on income inequality in African countries.

Furthermore, the table shows that the income inequality of the chosen African nations is negatively but insignificantly impacted over the long term by institutional quality (IQ). The probability value (0.2563), which is higher than 5 percent, establishes the insignificance of this outcome. This suggests that for the chosen African countries, a rise in IQ indicating a strong institution could eventually lower the level of income inequality by 4.03 percent, whereas a fall in IQ indicating a weak institution could eventually raise the level of income inequality by the same amount. Unfortunately, the null hypothesis that institutional quality has no long-run, significant impact on income inequality in the selected African nations cannot be rejected due to the insignificance of this outcome. As a result, this study does not support the claim made by new institutional economists such as Acemoglu et al. (2005) that institutions are the foundation of all economies. Additionally, this result partially addresses the study's second research question on whether institutional quality has a long and short run impact on income inequality in African countries.

The table also displays the estimated outcome for the long-run relationship between income inequality (GNI_DISP) and the interaction variable (LNGDP_IQ). The purpose of this estimation result is to determine whether the degree of institutional quality that exists in the chosen African nations moderates the effect of economic growth on income inequality. The result indicates that LNGDP_IQ and GINI_DISP have a positive but insignificant long-run relationship. The findings suggest that a percentage increase in LNGDP_IQ could increase GINI_DISP by 0.64 percent, indicating that as the economy grows and is accompanied by improving institutions in the selected African countries, the GINI_DISP, which measures the income inequality level, increases. The estimation output shows that this finding has a p-value of 0.2009, which is higher than the 5 percent significance criterion and suggests that the outcome is unreliable and insignificant. Similarly, this result runs counter to the findings of Jungo et al. (2024) and Perera and Lee (2013), who contended that economic growth in the presence of robust institutions results in an efficient distribution of limited resources, which is crucial for lowering poverty, income inequality, and job creation. The third research objective that this study attempts to demystify—that is, how institutional quality influences the short- and long-run effects of

economic growth on income inequality in African nations—is partially addressed by this conclusion.

Regarding the control variables taken into account in this study, the estimation findings, which are shown in table 4.9, indicate that in the selected African nations, the unemployment rate (UR) has a long-run, significant, and beneficial impact on the income inequality (GINI_DISP). This finding is reflected in the positive value of the UR coefficient, which shows that a percentage increase in the unemployment rate will result in a 0.31486 percent increase in income inequality. At the 5 percent significance level, the p-value of 0.0462 further indicates that this finding is significant. This result is consistent with the findings of Carranza et al. (2025) and partially with that of Ahmed and Shadmani (2024), who contended that the only factor contributing to rising inequality is an increase in male unemployment. Similarly, in the selected African nations, government investment in education (GIE) has a significant and positive long-run impact on income inequality. This conclusion is reflected in the positive GIE coefficient, which shows that a percentage increase in government spending on education will result in a 1.12324 percent increase in income inequality. At the 1 percent significance level, the p-value of 0.0091 further indicates that this finding is significant. This result partially supports the research findings of Munir and Kanwal (2020), who claimed that while secondary education increases income inequality, primary and postsecondary education decreases it.

4.8 Panel ARDL Aggregate Short-Run Estimation Result

It is necessary to provide an explanation of the short-run results of the study's analysis given that the research objectives of this study aim to provide the long-run and short-run influences of the independent variables on the dependent variable in the chosen African countries.

Table 4. 10 PMG Short-run Estimation Result

Dependent Variable: GINI_DISP

Variable	Co-efficient	Std. Error	t-statistic	Prob-value
Short Run Equation				
COINTEQ01	-0.06654***	0.02542	-2.61803	0.0098
D(GINI_DISP(-1))	0.34762**	0.13543	2.56675	0.0113
D(LNGDP)	-91.20724	105.7955	-0.86211	0.3901
D(LNGDP ²)	6.73363	8.08806	0.83254	0.4066
D(IQ)	-0.21895	2.50222	-0.08750	0.9304

D(LNGDP_IQ)	0.03349	0.37900	0.08835	0.9297
D(UR)	-0.03443	0.05440	-0.63292	0.5278
D(GIE)	-0.19997*	0.10284	-1.94440	0.0539
C	-16.3774***	6.11352	-2.67888	0.0083

Source: Author's computation from data, 2025

Note: *** signifies significant at 1%, ** signifies significant at 5%, and * signifies significant at 10%.

Based on the findings in table 4.10, the co-integration equation displays a probability value of 0.0098 and a negative coefficient of -0.06654. The short-run downward adjustment of our dependent variables towards the long-term equilibrium is indicated by this finding. It implies that the dependent variable mildly adjusts downward to correct the deviations from the long-run equilibrium. The coefficient value of -0.06654, which is statistically significant at the 1 percent significance level, represents the magnitude (speed) of this long-run adjustment. The co-integration equation's negative sign indicates the degree of correction and the existence of a causal long-run relationship (Alfoul, n.d.). This result supports the interpretation of the long-run PMG estimation results as well as the previously estimated Kao panel co-integration test result.

From the short-run estimation results, it is observed that the only statistically significant variables at the 5 percent significance level are the income inequality after a year lag (GINI_DISP(-1)) and the government investment in education (GIE) for the selected African countries. This is due to the fact that only these two variables have a probability value below 5 percent. The positive coefficient of GINI_DISP(-1), which stood at 0.34762, implies that a percentage increase in the income inequality in the current year will lead to an increase in income inequality in the succeeding year by 0.34762 percent. While the negative coefficient of GIE, which stood at -0.19997, implies that income inequality in the short run reduces by 0.19997 percent for the selected African countries as government investment in education increase by 1 percent.

The other independent variables in the study exhibit various signs that reveal the nature of their short-term relationship with the study's dependent variable. For instance, LNGDP, IQ, and UR all exhibited a negative sign, indicating that they affect GINI_DISP negatively. On the other hand, LNGDP2 and LNGDP_IQ showed a positive sign, implying that they positively affect the GINI_DISP in the short run. Unfortunately, because their probability values are above the 5 percent significance barrier, none of these outcomes are statistically significant. Instead, we are unable to reject the null hypothesis, which states

that the variables have no significant short-run effects on income inequality in the selected African nations. These findings round up the answers that this study aims to offer to the posed research questions. The short-run estimation indicates that none of the primary independent variables (LNGDP, LNGDP2, IQ, and LNGDP_IQ) have a short-run significant impact on income inequality in the chosen African countries, despite the long-run estimation results showing that some variables, such as economic growth, have long-run non-linear impacts on income inequality.

4.9 Cross-sectional Short-Run Estimation Result

The pool mean group estimation also provides the individual short-run results of the cross sections in the panel. These estimation results help a researcher to confirm if the cross-sectional results are similar to or differ from the aggregate short-run result.

Table 4. 11 PMG Short-run Estimation Result

Dependent Variable: GINI_DISP

Variable	Burkina Faso	Cameroon	CAR	Cote d'Ivoire	Guinea Bissau	Kenya
COINTEQ01	-0.035*** (0.0000)	-0.0719*** (0.0000)	-0.0682*** (0.0000)	-0.3052*** (0.0000)	-0.1027*** (0.0000)	-0.0538*** (0.0000)
D(GINI_DISP(-1))	0.4330*** (0.0008)	-0.1767** (0.0175)	0.4652*** (0.0002)	0.3029*** (0.0016)	0.6232*** (0.0004)	-0.1463** (0.0177)
D(LNGDP)	24.4821 (0.9944)	-284.476 (0.9805)	81.5595 (0.9553)	-127.778 (0.9940)	149.514 (0.9942)	-21.9578 (0.9985)
D(LNGDP ²)	-1.7514 (0.9331)	19.7797 (0.7289)	-6.6822 (0.5073)	8.6912 (0.9090)	-11.5701 (0.9227)	0.0603 (0.9905)
D(IQ)	3.04282 (0.9489)	1.3721 (0.9608)	-1.4667 (0.5332)	11.1938 (0.8035)	-7.7866 (0.9191)	-2.5583 (0.6483)
D(LNGDP_IQ)	-0.4358 (0.7072)	-0.1807 (0.7448)	0.2321** (0.0259)	-1.5179 (0.1354)	1.2129 (0.5274)	0.3545** (0.0365)
D(UR)	-0.1561*** (0.0010)	0.0257*** (0.0006)	-0.0472*** (0.0057)	-0.0543*** (0.0008)	-0.4785** (0.0161)	-0.0019 (0.2524)
D(GIE)	0.01126* (0.0555)	-0.0475*** (0.0015)	-0.8585*** (0.0002)	-0.4724*** (0.0002)	-0.7502** (0.0137)	0.0742*** (0.0000)
C	-9.0754 (0.6880)	-17.8125 (0.8639)	-16.3534 (0.8799)	-73.5836 (0.9680)	-25.7423 (0.9456)	-13.7199 (0.8881)

Source: Author's computation from data, 2025

Note: *** signifies significant at 1%, ** signifies significant at 5%, and * signifies significant at 10%. Probability values in parenthesis.

Dependent Variable: GINI_DISP

Variable	Mali	Niger	Senegal	Tunisia	Zambia
COINTEQ01	-0.0280*** (0.0000)	-0.0211*** (0.0000)	-0.0099*** (0.0000)	-0.0111*** (0.0000)	-0.0244*** (0.0000)
D(GINI_DISP(-1))	1.3428*** (0.0000)	0.6521*** (0.0000)	0.0071 (0.8765)	0.4154*** (0.0002)	-0.0950* (0.0534)
D(LNGDP)	-1080.600 (0.9888)	56.3513 (0.9897)	70.0675 (0.9720)	-29.0536 (0.9899)	138.6119 (0.9007)
D(LNGDP ²)	83.0950 (0.8539)	-4.6557 (0.8759)	-4.6807 (0.6374)	1.5547 (0.8528)	-9.7706 (0.1487)
D(IQ)	-16.1875 (0.9005)	11.6635 (0.6727)	5.6073 (0.5965)	-7.3460 (0.4498)	0.0571 (0.9761)
D(LNGDP_IQ)	2.5412 (0.4348)	-1.9340* (0.0666)	-0.7933** (0.0257)	0.8993*** (0.0058)	-0.0099 (0.8057)
D(UR)	0.2530*** (0.0001)	0.1184*** (0.0000)	0.0110*** (0.0000)	-0.0310*** (0.0000)	-0.0177*** (0.0000)
D(GIE)	-0.2115*** (0.0009)	-0.0113*** (0.0005)	-0.1067*** (0.0000)	0.0636*** (0.0023)	0.1094*** (0.0000)
C	-7.0718 (0.8379)	-5.3888 (0.4787)	-2.6246 (0.7696)	-2.8635 (0.8852)	-5.9155 (0.7407)

Source: Author's computation from data, 2025

Note: *** signifies significant at 1%, ** signifies significant at 5%, and * signifies significant at 10%. Probability values in parenthesis.

Table 4.11 shows the cross-sectional short-run estimation results across all countries selected for this study. Our first observation is that the coefficient of the cointegration equations across the 11 countries shows a significant and negative sign. This significance is evidenced in the probability value of the co-integration equations, which are all less than 1 percent. It is implied in this result that the individual cross-sections all have tendencies to adjust to long-run equilibrium at varying speeds defined by their coefficient. This has further strengthened the long-run estimation results as a true representation of the

long-run impacts of the independent variables on income inequality in the selected African countries.

Table 4.11 further demonstrates that the $GINI_DISP(-1)$ for seven of the nations has a significant and positive effect on the $GINI_DISP$. This suggests that a one percent increase in income inequality in these countries' current year will further increase the income inequality level within those countries in a year's time at varying rates of percentage. For example, the increase in income inequality after a year's time will increase by 0.4330 percent in Burkina Faso, 0.6232 percent in Guinea-Bissau, 1.3428 percent in Mali, etc. Additionally, $GINI_DISP(-1)$ significantly and negatively affects $GINI_DISP$ for three of the countries. This suggests that a 1% increase in income inequality in these nations this year will result in a varying percentage fall in income inequality within those nations in the following year. For example, the decrease in income inequality after a year's time will be 0.1767 percent in Cameroon, 0.1463 percent in Kenya, and 0.0950 percent in Zambia. All of these findings are significant at the 10 percent significance level or lesser. Of all the countries, only Senegal shows a positive but insignificant result with a probability value higher than the 5 percent significance limit.

According to the short-run cross-sectional estimation result, none of the three primary independent variables in this study—IQ, $LNGDP$, and $LNGDP2$ —have a substantial short-term effect on the dependent variable ($GINI_DISP$) across individual nations. This explains why the aggregate short-run estimation result for the mentioned variables was insignificant in the selected African countries. Additionally, the interaction variable ($LNGDP_IQ$) shows a significant and positive impact on $GINI_DISP$ in the Central African Republic, Kenya, and Tunisia. This implies that the growth of the economy and the improvement in the strength of institutions in these countries worsen income inequality level therein. On the other hand, it has been noted that in Niger and Senegal, $LNGDP_IQ$ significantly and negatively affects $GINI_DISP$. This suggests that the degree of income disparity in these two nations is reduced when economic expansion is accompanied by improvements in institutional quality. According to our study, the effect of $LNGDP_IQ$ on $GINI_DISP$ is insignificant for the six other countries, which is consistent with the long- and short-term aggregate results for all of the chosen African nations.

Lastly, the estimation result also demonstrates that the study's control variables (UR and GIE) significantly affect every cross section, with the exception of Kenya, where the unemployment rate is negative but not statistically significant. Both control variables

significantly and negatively affect income inequality in Guinea-Bissau, Cote d'Ivoire, and the Central African Republic (GINI_DISP). This suggests that the degree of income inequality in the three nations declines at different percentage rates for every 1% increase in both variables. Additionally, in Burkina Faso, Tunisia, and Zambia, UR significantly lowers GINI_DISP, but in the same countries, GIE significantly and positively affects GINI_DISP. However, in Cameroon, Mali, Niger, and Senegal, UR significantly and positively affects GINI_DISP, but GIE significantly and negatively affects GINI_DISP in all four of these nations.

4.10 Discussion of Results

In this section, this study attempts to provide a thorough explanation of the empirical findings that were discussed in the other sections. Here, we seek to draw inferences from our estimation results, mentioning peculiarities and within-country dynamics that could possibly account for the varying results in our estimation outputs. Also, this discussion shall be mirrored within the lens of the research questions and objectives earlier drawn for this study in order to enable us to reach a justifiable conclusion and policy implications.

4.10.1 Discussion of Long-run Findings

The goal of this study aligns well with the long-run non-linear effect of economic growth on income inequality in the chosen African nations, which supports the Kuznets hypothesis. As a matter of fact, studies like that of Kassouri et al. (2025) support that the effect of economic growth on income inequality in many African countries is non-linear and that the Kuznets inverted U-shaped curve holds for a lot of African countries. Also, it can be noted that countries like Burkina Faso, Mali, Niger, and Guinea-Bissau, though agrarian economies, will have the benefit of early development accrued by commercial farmers, which worsens income inequality, but with more economic expansion comes more inclusiveness in later periods. For countries like Cote d'Ivoire, Senegal, and Cameroon that are already more diversified economies, they could have possibly been at the declining right-hand side of the Kuznets curve. The same thing can be said about Tunisia being a middle-income country with stronger education and governance mechanisms. Though it has been argued by Batuo et al. (2022) that high-income countries in Africa might be facing rising inequality as against their low-income counterparts. This could be the reason why the positive economic growth coefficient is far larger than when it is negative. Nevertheless, this study finds evidence from the conducted analysis there is a non-linear long-term relationship between economic growth and income inequality in the chosen

African nations. It is however suggested that policies that can shorten the peak period of inequality be put in place, like promoting inclusive investment in rural infrastructure and implementing progressive taxation to ensure an even distribution of the benefits from economic growth.

On the negative but insignificant long-run effect of institutional quality on income inequality in the chosen African countries, Kunawotor et al. (2024) similarly discover a general non-significant influence of aggregated institutional quality on income inequality in Africa. According to Kunawotor et al. (2024), overall institutional indices may have a weak impact on inequality, even when certain institutional quality characteristics, such as corruption, may have a significant impact on income inequality. A possible explanation for this insignificant result could be that the aggregated institutional indices may obscure internal heterogeneity, where strong performances in some domains (e.g., rule of law) can be offset by weakness in others (e.g., government effectiveness, voice and accountability, regulatory quality, etc.). Countries like Cameroon, Kenya, Senegal, and Zambia with moderate rule of law but weak voice and accountability face challenges of narrow spread of institutional gains resulting in limited impact of overall inequality. Also, Tunisia, while possessing a strong governance, still faces enforcement gaps and corruption like Cote d'Ivoire, where persistent procurement and judiciary corruption undermines equality enhancement strategies. For countries with predatory bureaucracies like Burkina Faso, Guinea-Bissau, Mali, and Niger, as well as the Central African Republic, where persistent conflict limits institutional impact, there is bound to be fluctuation in aggregate metrics in these countries such that there seems to be an absence of a sustained institutional push strong enough to significantly impact inequality. In this sense, these economies require a stable political atmosphere that can ensure that institutional quality improves beyond a certain threshold where it can influence inequality; otherwise, operating below that level might be inconsequential.

The results of the long-run estimation also indicate that there is a positive but not statistically significant relationship between income inequality and the interaction variable (LNGDP_IQ), indicating that inequality tends to rise as institutional quality and GDP per capita both rises. An implicit interpretation of this data suggests that the institutions now in place in these African nations might not be robust enough to distribute the advantages of economic progress to the underprivileged. In line with Gagliardi's (2021) submission and Abbas et al.'s (2023) findings, they contended that the ability of institutional quality to address economic inequality may be negated by the way institutions interact with other

factors, such as corruption. For example, in countries like Tunisia, Senegal, Kenya, and Zambia with moderate and strong institutional quality, higher income in most cases disproportionately benefits skilled and urban elites at the expense of the rural and informal workers who get less benefit from the unequal income redistribution, leading to the misalignment in the face of strong institutions. Countries with weaker institutions like Mali, Niger, and Guinea-Bissau may also not be left out of this economic menace. The weakness of their institutions prevents the inclusive distribution of income, leading to a temporal inequality increase before reforms are put in place. In order to counterbalance this inequality, the overhauling of all aspects of the institution is required. The advantages of economic growth will be more widely distributed if more voice and accountability, high-quality regulations, and social inclusion are prioritized in addition to bolstering the rule of law.

The study's findings also take into consideration the control variables, which include the unemployment rate and government investment in education. These factors have been shown to have a long-term, positive, and significant impact on the income inequality of the chosen nations. Generally, high unemployment levels directly worsen income inequality as unemployed individuals usually fall behind, thereby widening the inequality gap. In Africa, youth unemployment is at the extreme and even much higher in the rural settlements. In countries like Kenya and Senegal, where unemployment is still generally low when compared to South Africa, there is still a prevalence of protests over limited jobs by unemployed youths (The Guardian, 2024). Although more government investment in education generally indicates better capabilities, inequalities can sometimes result from high level of education investment, particularly when it is unequally distributed and concentrated within the elite groups. In many African countries, high-paying formal jobs are usually undertaken by literate elites, while female literates or rural dwellers remain underutilized, thus widening the income disparities (UNESCO, 2016). In African countries with low-income like Burkina Faso and the Central African Republic, the rise of literacy among elites, while educated-related jobs remain scarce, makes such jobs available to a few, thereby worsening income inequality. Evidence of educational investment-driven inequality has been discovered in countries like Cameroon, Cote d'Ivoire, and Tunisia. Despite a high level of government education investment, the rural dwellers still face the challenge of securing formal jobs, and as such, they remain trapped in low-wage informal sectors. Mitigating this situation requires education initiatives that are paired with labour-market and institutional support, such as incentivizing firms that hire rural or semi-skilled graduates. In addition, investment in early childhood education to strengthen the literacy

foundation, as well as equipping rural settlements with quality teachers and infrastructure, are potential solutions to these problems.

4.10.2 Discussion of Aggregate and Cross-sectional Short-run Findings

The short-term findings of our panel ARDL analysis shows a negative and significant co-integration equation for the selected African countries in aggregate and as individual units. First of all, this finding confirms the presence of a long-term equilibrium that is stable and gradually corrects deviance. The magnitude of these cointegration equations' coefficients indicates how quickly the nations as a whole and as individual cross-sections adjust to equilibrium following a shock. Hence, it indicates that any short-run shock leading to the hike in income inequality will be reversed in the subsequent periods. The credibility of the long-run estimations' results is further reinforced by this short-run convergence behavior. Additionally, the results indicate that nations like Guinea-Bissau, Cameroon, Kenya, and Cote d'Ivoire are adjusting to long-term equilibrium at a higher rate than Zambia, Senegal, Niger, and Tunisia. This shows the level of institutional improvement and economic diversification that a country enjoys or the weak institution and high poverty that it suffers, leading to a dampened speed of adjustment. Purposeful government's fiscal policies (e.g., Kenya's unemployment benefit schemes during COVID-19) and labour market interventions can accelerate equilibrium restoration aftershocks, thereby limiting inequality divergence.

Additionally, we learned from the short-run estimate finding that inequality persists in the short term, which means that previous levels of inequality significantly predict the current level of inequality. This is because economic crises like inequality require sustained effort to reverse, but studies have shown that most African countries lack consistency in policy reforms. This result conforms with the situation in seven of the eleven African countries considered for this study. It goes a long way to justify that weak redistribution mechanisms, poor governance, and inequality shocks persist in these regions due to their weak social safety nets. Some other countries, like Zambia and Kenya, with a negative coefficient of $GINI_DISP(-1)$, suggest a tendency for inequality in those countries to bounce back from exceptional highs or lows. More structured redistributive tools like Zambia's mining revenue sharing or Kenya's fiscal transfers could be reasons why inequality is short-lived and self-corrects quickly in those countries. It therefore demands that long-term policy that widens access to education and robust safety nets be needed in African countries with strong income inequality persistence, while targeted fiscal and

monetary policy will hasten stabilization in countries with mean-reverting income inequality.

Similar to the long-run estimation result, the main variables (economic growth and institutional quality) and the interaction variable have been determined to be insignificant in the short term for the chosen African nations collectively. Plausible explanations that have been identified in earlier studies conducted in Africa, like Hussien (2023) are that the slow pace of economic growth in Africa may be unable to alter inequality in the short run, and institutions also require sustained periods to alter governance mechanisms and structural frameworks. As a matter of fact, the findings of Wang et al. (2021) further prove that economic development ought to reach a given threshold level before the effect on poverty eradication and inequality reduction can be felt. As for countries like Central African Republic, Tunisia, and Kenya, where the interaction of economic growth and institutional quality shows a positive and significant result, an earlier explanation has been given in this study about how improved institutions in these countries benefit the urban elites and private sector jobs first, before they are felt in rural regions. However, in Niger and Senegal, the reverse impact is observed, indicating that economic growth and high-quality institutions work together to temporarily lessen income inequality in these two nations. The recent decentralization in Niger as well as proven stable governance in Senegal are possible factors that ensure economic growth reaches a wider community. The resulting dynamics strengthen the belief that institutional outreach to rural and informal sectors can extend reforms beyond urban areas in avoidance of elite capture of national development. The identification of lagging institutional components and policy designs to align equity goals with growth, such as formalizing labour markets and targeting marginalized states, will no doubt amplify the positive effect of economic growth.

For the control variables, the unemployment rate, which deviates from the long-term results, is negative but not significant in the short term, while government investment in education, which deviates from the long-term results, is negative and significant in the short term for the chosen African nations as a whole. This suggests that there is a short-term reduction in income inequality as a result of government spending on education. While the overall results of this study support the short-term findings of Adeniyi et al. (2021), the government's investment in education may subsequently exacerbate inequality as urban literates benefit more from economic growth and national income than their rural counterparts. In the same vein, results for singular cross-sections show that unemployment rate and government investment in education are negative and significant in African

countries like the Central African Republic and Guinea-Bissau. Unemployment in these countries is largely within the unskilled workers; further rises in unemployment affect the skilled workers, thereby reducing the existing inequality gap. Concurrently, the rise in government investment in education provides access to new opportunities, which lift incomes at the bottom and compress inequality. Also, in countries like Tunisia and Zambia, the study finds unemployment to be negative and significant while government investment in education is significant and positive. A rise in government spending in education in these countries suggests more benefit to urban and skilled groups before driving it up to the rural regions. In the case of Mali, Niger, and Senegal, while the government investment in education is negative and significant, the unemployment rate is positive and also significant. Insights from these countries' show that unemployment increases inequality, likely because of urban job losses, while the informal safety nets buffer joblessness in the rural areas, which intensifies the income gap. However, government investment in education enables access to informal and community-based jobs such as empowering rural women with skills for small-scale businesses as is common in Mali and Niger, thereby narrowing the wage gap. This result suggests government investment in education, in order to be effective, must be supported with an economic structure that improves labour demand. The integration of vocations alongside literacy campaigns that target basic education are policies that can rapidly reduce inequality in most of these African countries.

CHAPTER V

SUMMARY AND POLICY RECOMMENDATIONS

5.1 Introduction

This study's final chapter contains the summary of the entire study as well as the conclusion and possible policy recommendation informed by the research discoveries. Also, this chapter identifies the limitations of this study, which further paves the way for suggested areas that can be explored by future studies. However, the study's contributions to knowledge are also carefully highlighted in order to establish the uniqueness of this research work.

5.2 Summary

Using empirical data from 2000 to 2021, this study examined how economic growth affected income inequality while revealing the significance of institutional quality in selected African nations. The study's goals were to: (i) ascertain whether economic growth has a significant short- and long-run impact on income inequality in African nations; (ii) ascertain whether institutional quality has a significant short- and long-run impact on income inequality in African nations; and (iii) ascertain the role that institutional quality plays in the short- and long-run effects of economic growth on income inequality in African nations.

In the first chapter of this study, an introduction was given about the background of issues surrounding economic growth's capacity to lessen income inequality within the framework of the Kuznets hypothesis. This issue narrowed down the African situation on how income inequality is still largely prevalent in many African countries despite a recorded aggregate and country-level economic growth. Under the problem statement, the study outlined the importance of high-quality institutions in enhancing the ability of economic growth to combat income inequality, as has been argued by earlier studies. In addition, the study's significance and contributions were described. The study's main goal is to close the knowledge gap by offering a sophisticated empirical analysis of the moderating role of institutional quality in the relationship between economic growth and income inequality in the African nations chosen for their geopolitical diversity, institutional quality and economic growth variances, and data availability for all variables.

In chapter two, the study commenced with an overview of the theoretical frameworks that inform the procedure of this research, which are the Kuznets hypothesis and the new institutional economics. These theories were the bedrock upon which the model analysis

of this study was built. The empirical literature review of the dynamic interaction between income inequality, economic growth, and institutional quality was then conducted. Several findings on our variables of interest have been discovered across different times and dimensions, which assisted in identifying the research gap and strengthens the efficacy of this research work in contributing to existing studies. Lastly, this chapter introduced the conceptual framework that emphasizes the diagrammatic perspective of the dynamic character of the relationship between our variables.

Chapter three of this study deals with the methodology, where the research type and research approaches were specified in the first parts of the section. The chapter then went on to describe our data, their sources, and all of the variables (dependent, independent, moderating, and controlled variables). It also went into detail about the analytical methods used to determine the impact of economic growth on income inequality in panel econometric analysis and the various levels of variable stationarity. These procedures were explained starting with the Im Pesaran & Shin (IPS) and Levin Lin & Chu (LLC) panel unit root tests, which were used to clarify these processes, were discussed first. Then the Kao panel co-integration test, which is followed by the optimal lag length selection test. The final section emphasizes the use of the panel ARDL model as a dynamic panel data analysis tool, which is crucial for resolving a number of panel data problems.

In chapter four of this study, the panel ARDL result was presented alongside other prerequisite test results. Following the summary statistics, which included the mean, median, minimum, maximum, standard deviation, probability, and so on, to characterize the nature of our data, the investigation moved on to the unit roots of the series, where it was found that the series are a combination of $I(0)$ and $I(1)$ variables. To determine whether there is a long-term equilibrium relationship between our variables, the Kao panel co-integration test was then performed, and the outcome was favorable. The optimal lag length selection test came next, in which we used the various criteria to choose the right number of lags for the variables in the research model. The PMG-ARDL was then used to examine how economic growth affected income inequality in the chosen African nations while taking institutional quality's moderating influence into consideration. The presentation of these test results started with the long-run dynamic relationship of the variables, where we discovered that there is a non-linear long-run impact of economic growth on income inequality, which conforms with the Kuznets inverted U-shaped curve. In addition, the moderating variable (institutional quality) and the interaction variables were discovered to be insignificant, while both the control variables (unemployment rate and government

investment in education) have a significant long-run positive impact on income inequality in the selected African countries.

The study established the error-correction propensity of the short-run estimation towards any divergence in the long-run equilibrium by finding that the co-integration equation for the short-run aggregate result is negative and significant. Additionally, after a year, there is a positive and significant impact on income inequality, indicating that the current level of inequality is a result of previous levels. With the exception of government investment in education, which was found to be both negative and significant, the other variables were found to be insignificant in the short term. This suggests that, in the short term, a higher level of government investment in education lowers income inequality in the chosen African nations. As regards the cross-sectional short-run estimation results, the study finds evidence that there is an existence of similarities and country-specific dynamics in the nature of the interplay of the variables. For example, while it was established that the co-integration equations across the 11 countries showed a significant and negative sign, implying that the individual cross-sections all have tendencies to adjust to long-run equilibrium, there is a varying effect of income inequality after a year period on income inequality at the current period. While this result is positive and significant for many countries, it is negative and significant for others. The same situation occurs for the moderating variables, where they were discovered to be positive and significant in some countries and, while in others, it is negative and significant. Similarly, the interaction variable was discovered to be insignificant in many countries but significant with varying signs in five other countries.

The study proceeded to give discussions on the findings of the analysis, covering both the long-term and the short-term findings. The study first identifies the non-linear long-term effects of economic growth on income inequality before demonstrating how the results are comparable to those of earlier research such as Kassouri et al. (2025). Some of the explanation given in relation to this result is that in most agrarian economies, early benefits of development are accrued by large-scale farmers, which aggravates income inequality, but more economic expansion comes with the spread of income distribution in later periods. For more diversified economies, income inequality could have already been at the decreasing right-hand side of the Kuznets curve. On the negative and insignificant effect of institutional quality, the result follows the explanation of Kunawotor et al. (2024). According to Kunawotor et al. (2024), the overall impact of institutional quality may be minimal or nonexistent if certain aspects, such as governance, voice and accountability,

and government effectiveness, are weak. This could lessen the influence of other aspects, such as political stability and corruption. Similar to this finding is that of the interaction, which is also insignificant. Accordingly, the institutions in the majority of African nations might not be robust enough to direct the positive effects of economic growth toward lowering wealth disparity. For the control variables that are both positive and significant, income inequality generally rises with unemployment due to the inability of the unemployed to earn a meaningful wage rate. As for the government investment in education, proof of rising inequality as government investment in education increases has been discovered in some countries. This has been attributed to a rise in government investment in education that is not followed by an increase in job availability. Most rural settlers find it difficult to secure formal jobs, and as such, they remain trapped in low-wage informal sectors.

Lastly, the study provided a detailed discussion on the short-run aggregate and cross-sectional findings. All of the study's countries have a propensity to return to long-run equilibrium when there are deviations, according to aggregate and cross-sectional short-run co-integrations, though the rate of adjustment varies by nation. These dynamics show the degree of strength or weakness of institutions in prevailing countries and their associated economic situation, leading to a sharp or dampened speed of adjustment. In addition, it was discovered that general and country-level inequality is affected by past inequality levels except for a few countries. The lack of consistency in policy reforms in many African countries makes it difficult to combat economic crises like inequality, which requires sustained effort to reverse. The study found that the interaction variable was significant in a few African nations, even if the results indicated that economic growth and institutional quality were not significant. According to studies such as Hussen (2023) and Wang et al. (2021), many African nations slowed economic growth and weak institutional quality may make it impossible to address inequality in the near future. The study's findings indicate that, with regard to the control variables, short-term, dynamic country-specific effects on income inequality result from changes in these variables. While it is positive in some countries, the reverse is the case in other countries, thus revealing the structural reforms and resilience that pre-exist in the different African countries.

5.3 Policy Implications of Findings

Inherent in the findings of this study is the significant implication for formulating policies that are aimed at addressing income inequality in the African countries. There is a need for policy responses that are multi-dimensional and in tandem with country-specific

realities given the complex interplay of the employed variables for this research study. Here, the study aims to synthesize the implications of the long-run and short-run findings in a way that they are translated into actionable policy considerations.

Economic growth first increases income inequality before decreasing it as growth matures, according to the study's long-term findings, which demonstrate that economic growth has a large and non-linear effect on income inequality (which is consistent with the Kuznets hypothesis). This situation highlights the importance of the formulation of policies that accelerate structural transformation, most especially in primary stage economies like the Central African Republic, Niger, and Guinea-Bissau. There is the need for government investment in value-added sectors such as manufacturing and service because of their capacity for absorbing employment, especially for unskilled and semi-skilled labour. In addition, channeling growth strategies to activities that are mostly participated in by the poor, like agriculture and informal trading, will facilitate inclusive growth and reduce the risk of augmenting existing income disparities.

The found negative but statistically insignificant relationship between income inequality and institutional quality suggests that these nations' institutions lack the wherewithal that can effectively reduce income inequality. In order to remedy this, important strategic sectors must undergo a thorough structural change that will improve accountability, openness, rule of law, and anti-corruption. Favorable institutional quality impacts that were discovered in countries like Senegal and Niger demonstrate the importance of participatory governance, public investment management, and effective decentralization. Attention must shift in other countries to prioritizing building institutions that protect property rights, enhance redistribution mechanisms, and facilitate equitable market access through public social spending and progressive tax systems.

The study observed the dualistic nature of the African labour market given the mixed result of the impact of unemployment on income inequality across countries in the short term. In economies like Mali, Senegal, and Cameroon, where inequality rises with unemployment, active labour market policies like youth development programs, skills development, and apprenticeships can be used as a cushion against the rising employment. While for economies like Zambia and Burkina Faso, where unemployment lowers income inequality, it follows that such economies reflect a highly informal compression effect. In this context, jobs in informal enterprises must be linked to productive-enhancing initiatives rather than just the number of employments offered.

The findings on the impact of government investment in education on income inequality present a very broad perspective. The long-run positive impact suggests that educational benefits are likely to be unevenly enjoyed by the already advantaged, while the short-run negative result in countries like Niger and Senegal implies that widespread and equitably distributed education can reduce income inequality. Priority must be given to high-quality educational access in rural and conflict-affected areas in order to optimize the egalitarian effects of government investment in education. This could include aligning curriculum with market needs, adult literacy programs, and gender-focused educational intervention.

The observation of country-level heterogeneities in both the long-term and short-term findings suggests that a universal policy prescription is likely to be ineffective. For example, countries like Kenya and Tunisia, where economic growth and institutional quality positively affect income inequality, require policies that curtail elite dominance and urban-centric development. Whereas in Senegal and Niger, where income inequality is negatively affected by these variables, it is encouraged to reinforce current policy pathways with regional expansion and scaled-up funding. The dynamics of the interaction variable showing insignificance in the long run but significance in the short run for some countries like Niger, Kenya, the Central African Republic, Tunisia, and Senegal highlights that even if the impact of institutional quality is insignificant in the long run, it can condition the short-run distributional effects of growth. This underscores that growth in the economy is a necessary but insufficient weapon to combat income inequality. It is critical that economic growth structure flows with quality institutions to ensure even distribution of economic growth benefits. Hence, policymakers must adopt a coordinated strategy that combines economic, institutional, and social development policies to suit the unique circumstances of each country.

5.4 Recommendations

It is clear from the empirical data presented in this study that reducing income disparity in African nations calls for context-sensitive policy approaches. Therefore, the recommendations given below are for the central government, regional bodies, development partners, and other noteworthy stakeholders committed to fostering inclusive economic growth and reducing inequality across the continent.

1. **Prioritizing equity and inclusion in growth design strategies:** Given that the study findings point to the fact that unmanaged economic growth can exacerbate income inequality in the early stages, it is imperative to divert investment to sectors with

large employment elasticity, such as manufacturing, microenterprises, and agriculture, especially in rural areas where unemployment is high. This will bridge the urban-rural income gap, which is the underlying cause of national income disparities.

2. Improvement in quality institutions to support even income redistribution: The study findings on institutional quality prove that institutions in many of the African countries are still weak and insufficient to positively transform the countries. In this regard, focus must be shifted to building institutions that promote equity, such as public service delivery agencies, land tenure systems, and judicial bodies responsible for upholding economic rights and social justice. This enhances quality of governance, accountability, transparency, and citizen participation in the policy-making process, which improves trust in the institutions.
3. Bridging literacy inequalities through an expanded access to quality education through government and private sector investment: The conflicting findings of the long-run and short-run impact of government investment in education signals a disconnect between equitable income and educational access. Policymakers must strengthen basic and adult literacy programs, especially in marginalized communities where the literacy rate is the lowest. This should be supported with developing a curriculum that aligns education to labour market needs through entrepreneurship skills, alongside technical and vocational training that improves employability.
4. Implementation of labour market policies to combat unemployment-driven inequality: Based on country context, unemployment affects income inequality in both ways, highlighting the need for labour policies that address it. Adequate support must be given to youth employment initiatives such as apprenticeships and start-ups. Then, the informal employment sector must be formalized through providing social protection coverage, legal recognition, and credit access.
5. Institutionalizing macroeconomic planning with equity impact assessments: The complex nature of the relationship between economic growth, institutional quality, and income inequality makes it imperative that national development planning must systematically embed equity considerations. There should be policy adjustments in the areas of fiscal, trade, and investment to incorporate disaggregated data by income group, gender, region, etc. to guarantee that growth is as equitable as it is robust.

6. Tailored country-specific strategies based on unique structural dynamics: The short-run dynamics observed across countries underscore the importance of context-specific policy designs. For instance, in countries like Kenya and Tunisia, where institutional strengths increase inequality in the short run, targeted interventions are imperative to widen the access to emerging growth opportunities in marginalized and poor areas. In Senegal and Niger, where institutional quality reduces inequality, intensive efforts should be made to replicate and scale successful governance models. In fragile states like Guinea-Bissau and the Central African Republic, foundational reforms such as basic service provision, capacity building, and conflict resolution must precede more advanced distributive policies.
7. Encouraging regional cooperation and knowledge exchange: Peer learning and cross-country collaboration can strengthen policy effectiveness across the continent. Therefore, there should be a constitution of bodies for policy dialogue among African countries to share best practices in managing inequality amidst economic growth and institutional reform. Also, support from regional and international bodies such as ECOWAS, the African Union, and UNECA can be leveraged to harmonize strategies to reduce inequality and mobilize developmental financing.

5.5 Limitations of the Study

Despite that this study provides a valuable insight into the interplay between economic growth, institutional quality, and income inequality in the selected African countries, it remains pertinent to acknowledge the several possible limitations that could have affected the interpretation, scope, and generalizability of the research findings.

1. Limited and unavailability of data: The basic constraint of this study is the data unavailability, particularly concerning income inequality in African countries. Some numbers of African countries were excluded because data is either missing or not up to date, which limited the panel size.
2. Limiting inequality to income inequality alone. The concept of inequality goes beyond that of income alone, as inequality cuts across different economic layers such as health inequality, gender inequality, education inequality, etc. The use of the gini disposable index may not fully capture the multi-dimensional nature of inequality.
3. Aggregation and measurement issues: This study measured institutional quality using a composite index generated by conducting a principal component analysis

on the six institutional dimensions of the World Development Indicators. Despite its comprehensiveness, there is a high possibility of hidden effects of individual institutional quality dimensions (e.g., rule of law, regulatory quality, political stability, etc.) on income inequality.

4. Generalization of findings: This study selected eleven African countries based on representation and data availability. These findings may not be generalizable to all African countries, especially those with different political histories, macroeconomic structures, and development levels. Hence, there should be caution in extrapolating the study results.
5. Limited consideration of social and structural factors: While this study focuses on economic growth and institutional quality, there are other structural factors such as gender inequality, health, disparities, conflicts etc., that are not included in the model. These factors can also play mediating roles on the impacts of economic growth on income inequality, and their omission serves as a limitation in capturing the determinants of income distribution holistically.
6. Constraints in time period: The findings of this study may not have fully accounted for long-term structural changes or recent economic shocks (like the COVID-19 pandemic or the global world tension) that could have influenced the growth-inequality nexus in Africa. In this regards, recent inequality dynamics or macroeconomic disruptions could have been misrepresented or underestimated in the model.

It is important to mention that these limitations do not invalidate the findings of this study but highlight key areas of caution in interpretation and point out avenues for future research. By addressing these challenges, especially through a wider data collection, incorporation of more structural variables, and the use of alternative model techniques, future researchers can further strengthen the empirical understanding of Africa's inequality and support the formulation of more effective policy responses.

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