



SEEK WISDOM, ELEVATE YOUR INTELLECT AND SERVE HUMANITY!



**ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ECONOMICS**

**DOES FEMALE LABOUR FORCE PARTICIPATION AFFECT
INCOME INEQUALITY IN SUB-SHARAN AFRICAN
COUNTRIES: EMPIRICAL ANALYSIS**

BY MASTEWAL MULUGETA

**THESIS PROPOSAL SUBMITTED TO THE DEPARTMENT OF
ECONOMICS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR DEGREE OF MASTERS OF SCIENCE IN ECONOMICS**

ADVISOR: TEWODROS NEGASH KAHSAY (PHD)

JUNE 2023

ADDIS ABABA, ETHIOPIA

This is to certify that the thesis prepared by Mastewal Mulugeta entitled: “**DOES FEMALE LABOUR FORCE PARTICIPATION AFFECT INCOME INEQUALITY IN SUB-SHARAN AFRICAN COUNTRIES: EMPIRICAL ANALYSIS**” submitted in partial fulfillment of the requirements for the degree Masters of Science in Economics: Specialization in Development Economics complies with the regulations of the University and meets the accepted standards concerning originality and quality.

Signed by the Examining Committee:

External Examiner _____ Signature _____ Date _____

Examiner _____ Signature _____ Date _____

Advisor: Dr. Tewodros Negash Kahsay _____ Date _____

Declaration

I, Mastewal Mulugeta, declare that this thesis entitled “**DOES FEMALE LABOUR FORCE PARTICIPATION AFFECT INCOME INEQUALITY IN SUB-SHARAN AFRICAN COUNTRIES: EMPIRICAL ANALYSIS**” is an outcome of my effort except those which are duly cited and quoted. This study has not been submitted for any degree in this University or any other University. It is offered for the partial fulfillment of the degree of Masters of Science in Economics: Specialization in Development Economics.

Declared by:

Name: Mastewal Mulugeta

Signature -----

Date -----

Confirmed by Advisor:

Name: Dr. Tewodros Negash Kahsay

Signature -----

Date -----

Place and date of submission: Addis Ababa University June 2023

LIST OF TABLE

<u>Table 4.1 summary statistics of the variables.....</u>	<u>28</u>
<u>Table 4.3.2 STATA result of the pooled regression model.....</u>	<u>33</u>
<u>Table 4.3.3 STATA result of the Fixed (Within Group) estimator.....</u>	<u>35</u>
<u>Fig 4.3.4 STATA result of the Random Effect GLS estimator.....</u>	<u>37</u>

Acronyms

FLFP = Female Labor Force Participation

FLFPR_ILO =Female Labor Force Participation Rate, International Labor Organization Estimate

GDPpc = Gross Domestic Product Per Capita

GNI = Gini-Coefficient

HDI = Human Development Index

IMF = International Monetary Fund

Inf = Inflation Rate

POPg = Population Growth Rate

WB = The World Bank

LIST OF FIGURE

Figure 2.3A: Conceptual framework (Determinants of household income inequality).....	17
Figure 2.3B: Conceptual Framework (the transmission channel of the Female labor force participation rate with income inequality).....	18
Figure 4. A: Trend of Income Equality (Gini-Coefficient) Throughout the Years.....	22
Figure 4. B: Trend of Income Equality (Gini-Coefficient) Across Countries.....	23
Figure 4. C: GDP Per Capita and Income Inequality (Gini-Coefficient).....	24
Figure 4. D: Inflation Rate and Income Inequality (Gini-Coefficient).....	25
Figure 4. E: Human Development Index and Income Inequality Gini-Coefficient.....	26
Figure 4. F: Population Growth Rate and Income Inequality (Gini-Coefficient).....	27

Contents

LIST OF TABLE	I
ACRONYMS	I
LIST OF FIGURE	III
ABSTRACT	V
CHAPTER ONE	1
1. INTRODUCTION	1
1.1. Background of the Study.....	1
1.2. Statement of the Problem	2
1.3. Questions to be Addressed	3
1.4. Objectives of the study.....	4
1.4.1. General objective.....	4
1.4.2. Specific objectives.....	4
1.5. Significance of the study.....	4
1.6. Scope of the study.....	4
1.7. Organizations of the Study.....	5
1.8. Operational Definition of the Important Terms.....	5
CHAPTER TWO	6
2. LITERATURE REVIEW	6
2.1. Theoretical Literature Review	6
2.1.1. Income inequality in Africa	6
2.1.2. Income Inequality Determinants in Africa.....	6
2.1.3. Significance of the Female Labour Participation.....	8
2.1.4. Female labor force participation/engagement effects on income inequality	8
2.1.5. Income inequality and Female Labour Participation	9
2.2. Empirical Literature Review	10
2.3. Summary of the Literature Review.....	11
2.4. Conceptual Framework	17
2.5. Expected sign of Variables.....	18
CHAPTER THREE	19
3. RESEARCH DESIGN AND METHODOLOGY	19
3.1. Research method	19
3.1.1. Variables Definition and Measurement.....	19
3.2. Source and data type	20
3.3. Model Specification.....	20

3.4. Diagnostic Tests	20
CHAPTER FOUR	22
4. DATA ANALYSIS AND DISCUSSION	22
4.1. Descriptive Analysis	Error! Bookmark not defined.
4.1.1. Trend of Income Equality (Gini-Coefficient) Throughout the Years	22
4.1.2. Trend of Income Equality (Gini-Coefficient) Across Countries	23
4.1.3. GDP Per Capita and Income Inequality (Gini-Coefficient)	24
4.1.4. Inflation Rate and Income Inequality (Gini-Coefficient).....	25
4.2. Summary statistics of variables.....	27
4.3. Empirical Econometric Analysis	29
4.3.1. Diagnostic tests	29
A. Hausman Test.....	29
B. Unit Root Test	30
C. Multicollinearity Test.....	32
4.3.2. The Pooled OLS Regression	33
4.3.3. The Fixed (Within Group) Regression	35
4.3.4. Random Effect GLS Regression	37
CHAPTER FIVE	39
5. CONCLUSIONS AND RECOMMENDATIONS	39
5.2. Recommendations	39
REFERENCES	41

Abstract

This paper examines the impact of female labor force participation on income inequality using a random effect panel data model. The study uses data from selected 12 sub-Saharan countries and employs descriptive and econometric methods to investigate the relationship between income inequality and Female Labor Force Participation Rate alongside with potential variables that affect income inequality and assessing the relationship with GDP per capita, Inflation, Human Development Index, and Population Growth Rate. The results of the study indicate that there is a negative relationship between female labor force participation and income inequality. Additionally, there is a negative relationship between population growth rate and income inequality, and a negative relationship between human development index and income inequality. However, there is a positive but statistically insignificant relationship between GDP per capita and income inequality, as well as a positive but statistically insignificant relationship between inflation and income inequality. Based on these findings, the study recommends policies that promote female labor force participation to reduce income inequality.

Key words: Female Labor Force Participation, Income Inequality, women's labor force involvement, income distribution

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

According to Psacharopoulos and Tzannatos (1989), while contributing about 50% of the population, women remain underrepresented in the workforce. The research of Turanli et al. (2015), nations that have active female participation in the political, social, and economic sectors grow faster. Contrarily, nations with adverse mindset towards women incur greater impoverishment. Increasing FLFPR is essential for reducing income disparity and promoting growth in the economy. (Verick, 2014).

The topic of FLFP and income disparity is complex and reflects shifts in a nation's social standards, job patterns, fertility rates, educational attainment, and economic growth patterns. Although women make up half of the world's population, their contributions to economic activity, growth, and well-being do not correspond to their proportion in the economy. Women constitute approximately 40% of the global labor force, and at a country level, they make up around half of the human resources available. However, in most countries, women's labor force participation is lower than that of men. While the average gender participation gap has been decreasing since 1990, according to the IMF (2018), this may be due to the global decline in male labor force participation rates rather than an increase in women labor force involvement rates. Therefore, significant differences between male and women labor force involvement rates still exist. (Kesuh, et al., 2021). ILO research (2018) claims that rather than demographic changes, the reduction in worldwide male engagement between 1990 and 2018 was mostly caused by falls in participation rates, educational achievement, and job polarization. Every demographic in emerging and developing nations had a decline (of varied magnitudes) over the time.

If the issue of low women labor force involvement is not resolved, achieving food security, poverty alleviation, gender parity, full employment, and economic progress for all in Africa will be challenging. The United Nations (2018) emphasizes the importance of narrowing the wage gap between men and women to achieve the Sustainable Development Goals (SDGs) by 2030, highlighting why researchers are now focusing on female labor force participation. The World Development Indicators (WDI) 2020 report shows that in several advanced countries, women make up almost fifty percent of the labor force, suggesting that women can significantly contribute to economic development when their potential is fully utilized (Chimere et al., 2020). This could explain why these economies are developing rapidly.

In the past, women in sub-Saharan Africa were primarily expected to focus on domestic work and child-rearing, but as human rights have advanced and family living standards have declined, this traditional notion has become outdated. Women are now able to fully participate in the labor force. However, due to the challenges they face in finding paid employment in the commercial and public sectors, many women (as well as men) are starting their own businesses. According to the United Nations (2000), the percentage of self-employed women among employed women

increased from 44% in 1970 to 90% in 1990 in sub-Saharan Africa (excluding Southern Africa). Similarly, the percentage also rose in Northern Africa (Ahinkorah et al., 2020).

1.2. Statement of the Problem

Africa saw significant economic progress in the 2000s, with many countries achieving double-digit growth rates. Good macroeconomic performance can lead to the development of a prosperous middle class and help to reduce poverty and income disparities. However, wealth and income distribution disparities remain problematic in Africa, even in countries with abundant resources such as the Democratic Republic of the Congo, Nigeria, Angola, and South Africa. These countries have not been successful in reducing inequality despite their resources (AEO, 2011).

The average income disparity in sub-Saharan Africa is relatively high compared to other regions of the world. According to the World Bank, the Gini coefficient, which is a commonly used measure of income inequality, for sub-Saharan Africa was 0.43 in 2018, which is higher than the global average of 0.38. The average Female Labor Force Participation Rate (FLFPR) in sub-Saharan Africa is 24.5%.

Gender inequality in economic opportunities is linked to higher overall income inequality. If a country transitions from complete gender inequality, as measured by the United Nations Gender Inequality Index, to perfect gender equality, the net income inequality, as measured by the Gini coefficient, could decrease by about 10 points (Gonzalez et al., 2019). In the first decade of the 2000s, the growth in women's labor market earnings and higher participation rates, along with the introduction of non-contributory pension programs for women, contributed significantly to poverty reduction (The World Bank, 2015).

Low women labor force involvement remains a significant challenge in the job market, resulting in underutilization of a nation's human potential and affecting resource distribution. It also has an impact on social norms and expands gender-based economic disparities. Despite recent attention on the relationship between women labor force involvement and prosperity, little is known about how it affects family inequality levels (Arzu Akkoyunlu Wigley and Selim Cagatay, 2019).

Recent increases in women labor force involvement rates have been driven by changes in developed economies and emerging markets. Advanced nations had the highest women labor force involvement rate in 2018, at 70%, which is an increase of 12 percentage points over the previous two decades. In low-income nations, rates remained stable at around 63%. Although the average rate in developing markets increased by 5 percentage points, it still remains significantly lower than in developed countries and low-income nations. Improvements in education, structural change, labor market reforms, and changes in societal norms have all contributed to higher women labor force involvement rates (Grigoli, Koczan, and Topalova, 2018; Klasen, 2019).

Although there has been an increase in women's labor force participation over the past 30 years, women still experience unequal opportunities compared to men in most countries. The average

women's labor force participation rate is 20 percentage points lower than the male rate across countries, and gender gaps in wages and education access remain. Achieving greater gender equality can contribute to economic growth and lead to better development and social outcomes. Gender equality is also one of the United Nations Sustainable Development Goals that 193 countries have committed to achieving by 2030 (Stefania et al., IMF-2020).

It is important to analyze changes in women's employment to understand how income distribution may be affected. Research has shown that income disparity tends to be greater in areas with low rates of female labor force participation. However, in many cases, the increase in women labor force involvement has had an equalizing effect on the distribution of household income over time. This effect can vary depending on which women join the workforce. It tends to be equalizing for women in low-income households but can also be dis-equalizing (Segato, 2021).

Several studies have established a relationship between income inequality and women's participation in the labor force. Researchers such as Gronau (1982), Nelissen (1990), Björklund (1992), Del Boca and Pasqua (2003), Amin and DaVanzo (2004), Western, Bloome and Percheski (2008), and Harkness (2010) have found a strong correlation between income inequality and female employment. These studies suggest that while female employment may reduce income inequality, income inequality can also have a negative impact on female labor force participation.

There is a lack of research on the relationship between income inequality and women's economic participation in Africa, with most studies focused on West Africa. Given the importance of this issue, it is crucial to assess the current state of women labor force involvement and its implications for income inequality in Africa. This research topic is highly relevant for policymakers to consider.

The main objective of this research is to explore how the women labor force involvement rate affects income distribution equality in selected sub-Saharan African countries. Additionally, this study aims to investigate the relationship between income inequality and women labor force involvement to determine if there is a long-term causal connection between the two in sub-Saharan Africa. Using current data, descriptive and econometric methods will be employed to examine the relationship between women labor force involvement and income distribution inequality.

1.3. Questions to be Addressed

The research is addressing the below Questions

1. What is the state of the Female labour force participation in Sub-Sharan African countries?
2. What is the Effect of the Female labour force participation on Income Inequality in Sub-Sharan African countries ?

3. How are Female labour force participation and Income Inequality Related?
4. Is there long-term relationship between Income Inequality and Female labour force participation?

1.4. Objectives of the study

1.4.1. General objective

The primary objective of the research is to investigate the effect of Women labour force involvement on income inequality in Sub-Saharan African economies.

1.4.2. Specific objectives

The specific objective of this study is:-

- To assess the state of the Female labour force participation in Sub-Saharan African countries
- To investigate the effect of Women labour force involvement on income inequality in Sub-Saharan African economies
- To assess the relationship between income inequality and Female labour participation.
- To examine whether there is long run relationship between income inequality and Female labour participation in developing countries.
- To examine the relationship in between income inequality and its determinant variables

1.5. Significance of the study

The conducted research is significant to a number of parties. First, this study serves to enlighten governments and decision-makers in Sub-Saharan African nations about the primary causes that affect income inequalities. Additionally, the results of this research prove a long-run connection between income inequality and women labor force involvement. As a result, they were able to develop and put into practice policies that improved women's employment opportunities and decreased income disparity by taking into account both supply and demand-side factors. The study's other significance comes from its attempt to empirically identify the key factors that influence income inequality in a subset of countries. This information will be used as a basis for those nations' subsequent development policies. Finally, the research enhances the body of knowledge on the topic, and its conclusions will be critical in that they will serve as a significant body of literature and a point of reference for researchers, learners, and other organisations or individuals.

1.6. Scope of the study

Using panel data collected for 21 years, spanning 2000-2020, this study is limited to examining the impact of female labour force participation on income inequality/disparity in 12 selected Sub-Saharan African nations. Based on current data, the researchers used both descriptive and econometric analysis to delve further into female labour force engagement and income inequality/disparity. While income inequality/disparity is a complex issue with socio-economic, political, and cultural dimensions, this study will focus solely on the economic aspects

of the issue. The research will examine how lower FLFPR in Sub-Saharan African countries contribute to income inequality/disparity.

1.7. Organizations of the Study

The paper consists of five main chapters. The first chapter serves as an introduction and includes the background of the study, statement of the problem, research questions, significance, scope, and operational definitions of key terms. The second chapter is a literature review that covers both theoretical and empirical literature related to the research topic. The third chapter focuses on the methodology of the study, specifically model specification and research methods. The fourth chapter presents the data and findings, with a discussion and explanation of the results. Finally, the fifth chapter summarizes the main findings, draws conclusions, and provides recommendations based on those conclusions.

1.8. Operational Definition of the Important Terms

Some ideas will be defined in context under this section. To clear up any misunderstandings and offer a clear foundation for the interpretation of the findings subsequently, the descriptions of the terms below are supplied in the context of this study.

- **Income Inequality/Disparity:** Income inequality/disparity is used to describe how unevenly income is allocated among the population. For this study the researcher is use Gini Index as the measure Income inequality for empirical assessment.
- **FLFPRate (FLFPR):** In this research, the percentage of economically active women who work to create products and services over a given time period described as the female labour force participation rate. The Data is gathered in the The World Bank 's World Development Indicator database.
- **The effect of FLFPR on Income Inequality:** The contribution that the FLFPR makes to an improvement or deterioration in the way that income is distributed throughout a population depends on the conceptual relationship between these two macro variables. This study is specifically evaluating the overall impact of the low FLFPR on the growing income disparity/ inequality among the population in Sub-Sharan countries.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1. Income inequality in Africa

In order to achieve sustainable poverty reduction and make progress towards the Sustainable Development Goals (SDGs) in Africa, economic policy has prioritized poverty reduction over the past few decades (UNDP, 2017). However, wealth inequality has been the biggest obstacle to achieving this goal across nations (Bicaba, Brixiova, & Ncube, 2017). Despite rapid economic growth in many African countries over the past decade, indicators of human development and poverty reduction have not progressed as expected (Anyanwu et al., 2016; Asongu et al., 2019; Shimeles and Nabassaga, 2018).

Income disparities result in unequal access to essential services and less opportunity to break the cycle of poverty. In most African countries, there is a significant disparity between the rich and the poor in terms of access to healthcare and education. Malnourished children are more likely to be in poverty, less likely to seek medical attention, and less likely to complete five years of primary education. Children from the lowest income bracket are 1.6 times less likely to receive a measles vaccination and 2.1 times more likely to be underweight than their wealthier counterparts. By 2020, the number of underweight children in Africa is projected to increase to 30 million, up from 24 million in 1990. Stunted children experience impaired brain development, which can lead to poor academic performance and learning difficulties (AfDB, 2021).

In Africa, extreme poverty is increasing while the wealthiest Africans continue to get richer. Seven of the world's most unequal nations are in Africa, making it the second-most unequal continent globally. The top 0.0001% of Africans own 40% of the continent's wealth, while the poorest 50% of Africans, about 650 million individuals, are collectively wealthier than the three richest male billionaires in the continent. Africa is on track to become the global center of extreme poverty, with 87% of the world's extremely poor people projected to reside there by 2030, according to the World Bank. Despite significant GDP growth in many sub-Saharan African countries over the past three decades, human development and poverty indices have not progressed as expected, sparking renewed interest in studying inequality in Africa as a barrier to poverty reduction (IMF, Regional Economic Outlook 2022).

2.1.2. Income Inequality Determinants in Africa

The Kuznets' curve, which depicts the association b/n economic progress and income disparity, is a well-known paradigm for analysing the factors that contribute to income inequality. According to this relationship, there are three stages at which income inequality emerges: The first is that income disparity is minimal during the minimum income period, increases to its maximum with a specific amount of income, and then declines as income per capita rises further. According to this link, the quadratic shape of income and income disparity are related. The main

factor causing income inequality is income. Kuznets (1955) proposed that there could be a curvilinear quadratic relationship between income inequality and economic development.

The Kuznets framework, which suggests a curvilinear quadratic relationship between income inequality and economic development, has gained popularity, but some empirical studies have produced conflicting results on the causes and extent of income inequality (Boushey & Price, 2014). While some researchers have found a negative relationship between income inequality and economic growth, others have found a positive relationship (Alesina & Perotti, 1994, 1996; Persson & Tabellini, 1994; Li & Zou, 1998; Forbes, 2000; Frank, 2009; Muinelo-Gallo & Roca-Sagalés, 2013; Cingano, 2014; Nahum, 2005; Rubin & Segal, 2015; Saari et al., 2015). However, some studies have found no discernible relationship between income and inequality (Bruno et al., 1996; Fishlow, 1995; Ravallion, 1995; Huang et al., 2015; Deininger & Squire, 1998).

According to Boushey (2020, 2015), Alesina and Perotti (1996), and Persson and Tabellini (1994), income inequality significantly slows down overall economic growth by restricting the efficient and equitable use of available resources. Income inequality also slows down poverty reduction, meaning that African countries would have made more progress in economic growth and poverty reduction if income inequality levels were lower (Enowbi Batuo et al., 2021).

According to Persson and Tabellini (1994), Alesina and Perotti (1996), Alesina and Rodrik (1994), Keefer and Knack (2002), and Baumol (2007), inequalities persist in nations with unfavourable local conditions such as political instability, greater gender disparities in the labour market, an absence of investment, inadequate levels of human capital and health care, macroeconomic instability, an unskilled labour force, and weak financial institutions. According to the literature, investment in human capital stays low in areas with substantial income inequality because the poor lack sufficient collateral to finance such investments (Galor and Zeira, 1993; Fishman and Simhon, 2002). Similar to this, Barro (2000) demonstrates in his study that investment is "the primary engine for growth" using a panel of 70 different countries. Investment is hampered by income disparity since just a few wealthy individuals control how money is distributed. Alesina and Perotti (1996) found a negative relationship between investment and income inequality. An economy's growth, whether it is developed or growing, could be catastrophic as a result of this (Ibid!).

Government spending is seen as a significant factor that could impact inequality, although the literature has produced conflicting results. Calderon and Servén (2004) found that government spending on infrastructure can promote economic growth and reduce inequality, based on a panel of Latin American countries with high levels of inequality. However, other studies, such as those by Maestri and Roventini (2012), have found that higher levels of government expenditure are associated with higher income inequality, particularly in some European countries. Inflation has generally been viewed as contributing negatively to income inequality, although some studies, such as those by Ademan and Fuwa (1992), Sarel (1997), and Blinder and Esaki (1978), have not found a significant relationship between the two.

The effect of African growth patterns on income inequality has also been studied, with Gini coefficients decreasing in countries where contemporary agriculture, labor-intensive manufacturing, and contemporary services accounted for a greater share of value added. Extractive industries have been found to contribute to inequality through institutional and economic means, as they are characterized by high capital intensity and limited job growth mostly for skilled labor (Bhorat et al., 2017). Colonial legacies, where a small number of colonial settlers controlled a disproportionately large portion of the nation's wealth and occupied the highest income tiers, are also seen as a major problem (Walle & van de Walle, 2009).

2.1.3. Significance of the Female Labour Participation

Closing the gender gap in labor participation is crucial for achieving many of the Sustainable Development Goals, such as ending poverty, promoting gender equality, ensuring food security, and providing universal and affordable health services, among others, according to the United Nations (2018).

The International Monetary Fund (2018) also highlights the positive impact of increasing women's participation in the labor force on economic growth and productivity. Female employment has been found to lower baby and child mortality rates (Akinyemi, Solanke, and Odimegwu, 2018). However, despite these benefits, data from WDI (2020) show that FLFP in West African countries remains low. Fewer women are working in the formal economy, which is detrimental to both economic and human welfare as it prevents the positive spillover effects of female labor force engagement on other socioeconomic indicators (Abney and Laya, 2018).

Increasing women's economic engagement can have a positive impact on productivity, income equality, and overall development, according to the International Monetary Fund (2018), and gender gaps can have negative effects on the economy. Despite a rise in FLFP over the past three decades, gender disparities in earnings and access to education persist, and the average female labor market participation rate across all countries is still lower than the male rate. However, women's labor force participation rates have been increasing in advanced economies and emerging markets due to labor market policies, structural transformation, gains in educational attainment, and shifts in social norms (Grigoli, Koczan, and Topalova 2018; Klasen 2019). Achieving gender equality is one of the United Nations' Sustainable Development Goals, and African women can play a crucial role in promoting growth and development in their nations. To increase FLFP in Africa, Idowu and Owoeye (2019) suggest conducting an empirical analysis of the supply and demand for female labor force participation.

2.1.4. Female labor force participation/engagement effects on income inequality

Classical labor theory (CLT) forms the basis for theories on women's participation in the labor force, including the work-leisure hypothesis of Mincer (1962), the human capital theory of Becker (1964), and the time allocation hypothesis of Becker (1965). Income inequality can limit women's opportunities and negatively affect other socio-economic factors, according to Asongu

and Odhiambo (2019) and Klasen and Lamanna (2009). As a country transitions from an informal to a formal economy, FLFP changes due to reorganization of economic activities and the production system, which can affect women's position in the economy (Gaddis & Klassen, 2012; Robinson, 2005). The U-shaped hypothesis by Claudin Goldin suggests that as a country becomes more industrialized, FLFP drops at the bottom of the U shape due to low educational attainment, lack of skills, technical know-how, and fertility, but starts increasing again due to higher female educational attainment and completion of the fertility period. Assortative marriage can increase household income inequality when accompanied by similarities in the labor supply and earning capacity of women, but women's labor force participation can have an equalizing effect when the labor supply of women with lower education rapidly increases, according to Esping-Andersen (2007, 2009). Women's engagement in the labor force can have both positive and negative effects on income inequality, with research suggesting that women's income can buffer household income inequality and that their involvement can have an equalizing effect in several countries (Naoki Sudo, 2017). Bloome and Percheski 2008; Harkness 2010) (Naoki Sudo, 2017).

2.1.5. Income inequality and Female Labour Participation

The International Monetary Fund (IMF, 2018) claims that increasing the participation of women in the labour force has a beneficial effect on economic growth and productivity. Additionally, Akinyemi, Solanke, and Odimegwu (2018) note that female work lowers baby and child death rates. Although it had a favourable effect, data from WDI (2020) continuously showed that the involvement of women in the labour market in West African nations remained appalling. According to Abney and Laya (2018), there are fewer women working in the formal economy, which is particularly detrimental to both economic and human welfare since it prevents economies from benefiting from the positive spillovers of female labour force participation on other socioeconomic indicators.

Several studies have established links between income inequality and women participation in the labour force. Studies such as (Gronau, 1982; Nelissen, 1990; Björklund, 1992; Del Boca & Pasqua 2003; Amin & DaVanzo 2004; Western, Bloome & Percheski 2008; Harkness, 2010) found a strong link between income inequality and female employment. These studies reflect that while female employment may reduce income inequality, income inequality can also act as a determining factor which could deteriorate female labour participation (Iheonu et, al. 2020).

A consistent theory on the effect of gender inequality on employment by Klasen and Lamanna (2009) is that income inequality changes economic realities negatively and motivates externalities that limit opportunities for women, leading to increase in female unemployment and participation in the labour market. This belief pushed further by Asongu and Odhiambo (2019) are broadly consistent with literature on relationships between unemployment, income inequality and economic prosperity (Witte & Witt, 2001; Brush, 2007; Odedokun & Round, 2001; PeruGinii & Martino, 2008; Van der Hoeven, 2010). Furthermore, income inequality also drives poverty which remains a determining factor for not just the participation of women in the labour

market but also the participation of men in the labour market. Hence, to improve female labour force participation rate.

2.2. Empirical Literature Review

Kuhn and Ravazzini (2017) identified factors related to FLFP that can impact household income disparity, based on Jenkins (1995). Empirical research on FLFP and income inequality has been primarily focused on the US, with fewer studies on European and African economies. While some studies have shown that women's labor force participation can reduce income inequality, the effect varies depending on different socioeconomic contexts. Assortative marriage can also influence the expanding or contracting effect of women's labor market involvement. In Africa, studies on income inequality and FLFP are limited, with most studies focused on West Africa. For instance, Asongu and Odhiambo (2019) found that inequality lowers female employment in regression analyses based on the Gini coefficient and Palma ratio. Idowu and Owoeye (2019) investigated the determinants of FLFP in 20 African economies and found that GDP growth rate and inequality are positive determinants of female labor participation, while wages, GDP per capita growth, and poverty are negative determinants. They also found an inverted U-shaped relationship between female labor supply and economic development in Africa, with education, fertility, GDP per capita growth, manufacturing growth rate, and culture contributing factors to this relationship. However, some studies failed to account for cross-sectional dependence, which could lead to estimation bias, such as in Iheonu et al. (2020).

2.3. Summary of the Literature Review

Titles	Authors and Year	Objective	Data and Methodology	Major Findings
Inequality and FLFP in West Africa	Iheonu, Chimere Okechukwu; Nwodo, Ozoemena S.; Anaduaka, Uchechi S.; Ekpo, Ugochinyere (2020)	The objective study looked at the effects of income disparity on women's involvement in the labour force in West Africa from 2004 to 2016.	In order to account for simultaneity/reverse causation, serial correlation, groupwise heteroskedasticity, and cross-sectional dependence, the study used the instrumental variable fixed effects model with Driscoll and Kraay standard errors.	<ul style="list-style-type: none"> • The three income inequality variables considerably lower women's involvement in the labour force in West Africa. • Domestic credit, remittances, and female education are all connected favourably with women's engagement in the labour force in the subregion. • The U-shaped feminization theory is invalid for the West African region, because economic progress lowers the participation of women in the labour force.
The Effects of WLFP: An Explanation of Changes in Household Income Inequality in Japan	Naoki Sudo (2017)	Using mathematical and statistical methods, this study seeks to explain how the interplay between household income and marriage results in societal inequality. simulation-based	Mathematical and simulation-based approaches.	The results shown here imply that increasing women's labour force participation has a short-term expanding effect on household income inequality but a long-term attenuating effect. Additionally, they claim that assortative marriage itself has an acceleration rather than a widening influence on household income disparity.

		approaches.		
FLFP in African Countries: An Empirical Analysis	Omowumi O. Idowu and Taiwo Owoeye (2019)	Analysing the factors that influence FLFP supply and demand will add to the continuing discussion on women's labour participation in African nations.	20 specifically chosen African nations were included in a panel data set that covered five sub-regional groups from 1990 to 2018. After validating the stationarity of the time series features of all variables and the static analysis of the models, it uses regression that appears to be unrelated as an estimation technique.	According to the analysis, wages, GDP per capita growth, and poverty are negative predictors of female labour demand, while the GDP growth rate and inequality are positive determinants. It also provides evidence for an inverted U-shaped relationship between the availability of female labour and economic growth in Africa, with factors such as education, fertility, GDP per capita growth, manufacturing growth rate, and culture playing a role.
African Economic Outlook : Human Capital development Nexus in Africa	AFRICAN DEVELOPME NT BANK GROUP(2021) and other recent publications			
The dynamics of income inequality in Africa: An empirical investigation on the role of macroeconomic and institutional forces	Michael E. Batuo, George Kararach, and Issam Malki (2022)	to empirically evaluate the institutional and macroeconomic factors that influence income disparity in Africa.	panel data models and a data set covering 52 African nations from 1980 to 2017.	According to the research, inequality may be rising in high-income African nations while falling in low-income or least developed nations. Additionally, the contribution of institutional and macroeconomic factors to the explanation of income disparity is meagre and varies across convergence groups. Evidence supports the need for fiscal, employment, and monetary policies as well as the rule of law to combat inequality

				in high-income economies, but not in low-income economies, where they are statistically insignificant.
IMF Regional Economic Outlook : Regional Inequalities in Sub-Saharan Africa	Habtamu Fuje, Rasmane Ouedraogo, Jiaxiong Yao, Mohamed Diaby, and Franck Ouattara (2022)		This study examines differences in economic activity, welfare, and social indices among areas of sub-Saharan African nations using a variety of datasets.	The findings show that regional disparity significantly decreased in the 1990s and 2000s, primarily as a result of increases in economic activity in lagging regions. However, development has slowed over the last ten years, and it's possible that during the COVID-19 epidemic, it partially reversed. In addition, sub-Saharan African nations with high regional inequality typically have high household consumption inequality..
Income Inequality Trends in sub-Saharan Africa: Divergence, determinants and consequences	giovanni andrea cornia (2011)		This study aims to map regional patterns of inequality and identify the root causes of changes in inequality from the early to mid-1990s to 2011.	
The Impact of FLFP on Household Income Inequality in	Ursina Kuhn and Laura Ravazzini (2017)		Using data from the Swiss Household Panel (2000-2014), this article examines the relationship between female labour force participation and	It was discovered that throughout time, the presence of women in the labour force has slightly lessened the disparity in household income. This effect has been influenced by women's admission into the workforce,

Switzerland			household income inequality.	increasing work percentages in part-time work (but not the transition from part-time to full-time work), and the weak correlation between partners' wages.
The Changing Importance of Household Structure and Male and Female Labor Earnings Inequality	Jeff Larrimore (2014)		This study analyses the proportion of changes in labour earnings, employment, and marriage patterns that explain for the rise in household income inequality in the United States since 1979 using a shift-share analysis using March CPS data.	The rise in female earnings inequality and losses in both male and female employment were the main factors contributing to the ongoing growth in income inequality in the 2000s.
Inequality and the Economic Participation of Women in Sub-Saharan Africa: An Empirical Investigation	Asongu, Simplice and Odhiambo, Nicholas (2019)	For the years 2004 to 2014, this study examines the impact of inequality on female employment in 42 sub-Saharan African nations.	The Gini coefficient, Atkinson index, and Palma ratio are the three indices of inequality that are employed. Additionally, the rates of female employment and female unemployment are used as two indices of gender inclusion. Based on the Generalised Method of Moments (GMM), the empirical analysis.	The key findings listed below are confirmed. First, in regressions based on the Palma ratio, inequality makes women more unemployed. Second, according to the robustness tests, both the Gini coefficient and the Palma ratio show that inequality lowers female employment.
Female participation in African labor markets: The role of	Gaston Brice Nkoumou Ngoa, J. Song (2021)	In a sample of 48 African countries, this paper examines the impact of	For the years 2001–2017, it describes and calculates linear regression, dynamic panel data models with fixed effects (FE), and system-generalized method	The use of ICT (mobile phones and the internet) has been found to greatly increase the labour force participation of women in Africa; this effect is strengthened by financial growth and female education; and

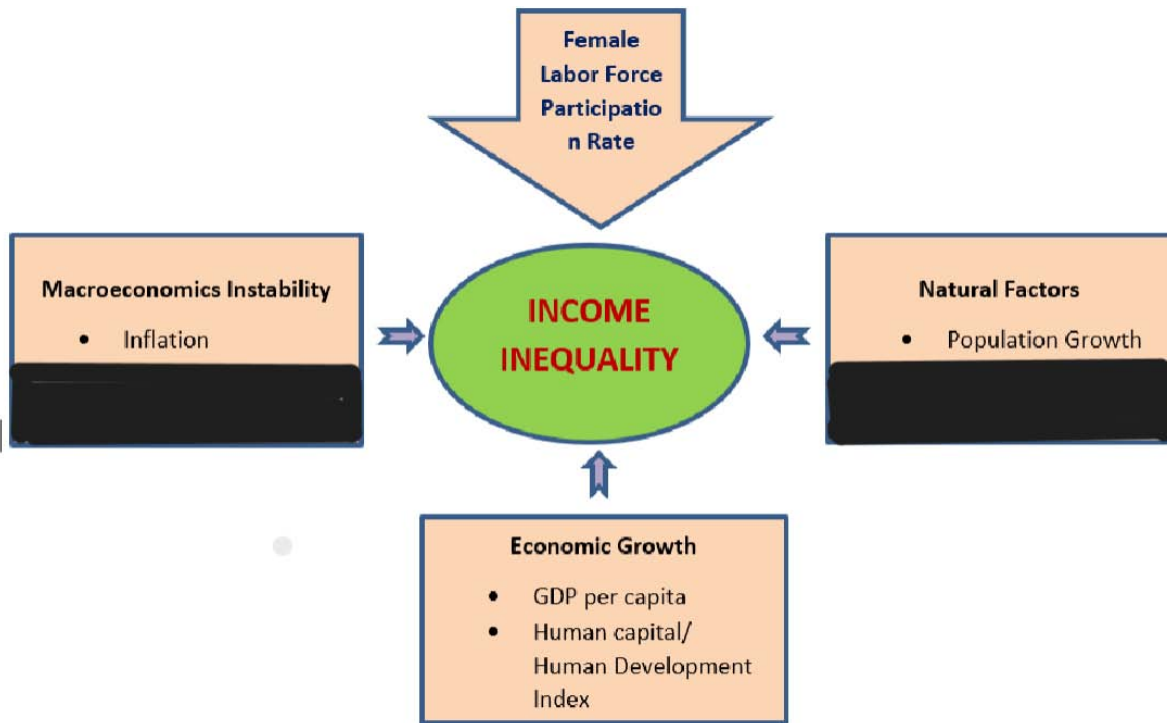
information and communication technologies		information and communication technologies (ICT) on female labour force participation.	of moments (SYS-GMM) estimation.	the industrial sector is where ICT has the greatest impact on women's employment in Africa.
FLFP in African Countries: An Empirical Analysis	<i>Omowumi O. Idowu and Taiwo Owoeye(2019)</i>	The use of ICT (mobile phones and the internet) has been found to greatly increase the labour force participation of women in Africa; this effect is strengthened by financial growth and female education; and the industrial sector is where ICT has the greatest impact on women's employment in Africa..	It looks at female labour force participation (FLFP) in a panel of 20 carefully chosen African nations spread over five sub-regional groups between 1990 and 2018.	According to the empirical findings, women's participation in the labour force in West Africa is dramatically decreased by the three indicators of income inequality. The research also showed a positive correlation between domestic credit, remittances, and female education.

<p>Inequality and FLFP in West Africa</p>	<p>Chimere Okechukwu Iheonu, Ozoemena Stanley Nwodo, Uchechi Anaduaka, and Ugochinyere Ekpo (2020)</p>	<p>This study examined the impact of income inequality on female labour force participation in West Africa for the period 2004 to 2016.</p>	<p>To account for simultaneity/reverse causation, serial correlation, groupwise heteroskedasticity, and cross-sectional dependence, the study used the instrumental variable fixed effects model with Driscoll and Kraay standard errors.</p>	<p>According to the analysis, wages, GDP per capita growth, and poverty are negative predictors of female labour demand, while the GDP growth rate and inequality are positive determinants. It also provides evidence for an inverted U-shaped relationship between the availability of female labour and economic growth in Africa, with factors such as education, fertility, GDP per capita growth, manufacturing growth rate, and culture playing a role. Therefore, it is recommended that African governments speed up the formalisation of their economies in order to promote a rise in female labour participation.</p>
---	--	---	---	---

2.4. Conceptual Framework

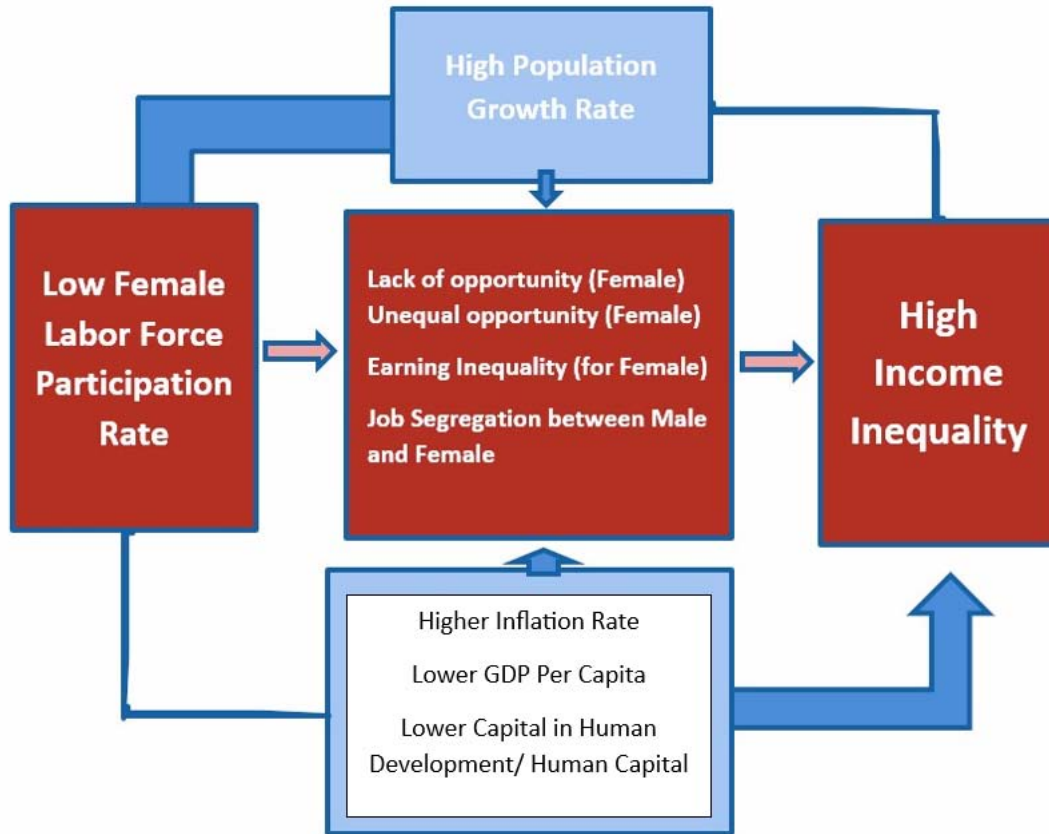
It is a collection of overarching concepts used to organise subsequent studies. As a result, a conceptual framework is a research instrument created to help an investigator gain knowledge and comprehension of the topic being investigated and to interact with a study (Upton, 2011). Thus, from the literature review, researcher have developed conceptual framework, which shows the determinants of the Income inequality as illustrated below figures

Figure 2.4 A: Conceptual framework (factors that contribute to household income disparity)



Source: Own computation from Literature review

It is important to contextualize the link between FLFPR and income inequality, given that the primary objective of the study is to examine the effect of FLFP on income inequality. Therefore, Figure 2B presents a framework that illustrates how a low female participation rate can impact income disparity.



Source: Own computation from Literature review

2.5 Expected sign of Variables

Based on literature review and the researcher own conceptual framework the following are the expected sign that the variables might be in Relation to Income Inequality (Gini-Coefficient)

Variables	Positive Sign	Negative Sign
Female Labor Force Participation/Engagement Rate		✓
GDP Per Capita		✓
Inflation Rate	✓	
Human Development Index (Capital)		✓
Population Growth Rate		✓

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1. Research method

This investigation utilized both descriptive and econometric data analysis techniques. The study took into account other factors that may affect income inequality and examined the impact of female labor participation on income inequality through empirical research. In order to assess the relationship between women labour force involvement and income inequality/ disparity, the study employed descriptive statistics tool and a panel data approach(Econometrics) from a variety of nations spanning from 2000 to 2020. The model used in this study draws on various economic indicators and considers their relevance and reliability.

3.1.1. Variables Definition and Measurement

The descriptions and measurements of the dependent and the explanatory variables that the model included in this paper are explained as follows:

- **Income Inequality:** This serves as the study's independent variable. It gauges how equally income is dispersed among a population. Numerous indices are used to quantify it, but in this study the researcher will utilise the Gini Index to measure income inequality and make an empirical assessment. The The World Bank Development Indicator, the GINI Index, and other pertinent sources were used to get the data.
- **Female Labour force Participation (FLFP):** The proportion of the labour force that is made up of women reveals how involved women are in the workforce. People who are at least 15 years old who provide labour to create goods and services for a set amount of time are considered to be part of the labour force.
- **GDP Per Capita:** It is a financial indicator that quantifies the economic production per person of a nation and is computed by dividing GDP by population. The information for this variable was gathered from appropriate sources, including The World Bank development indicators.
- **Inflation Rate:** The pace of price growth over a specific time period is known as inflation. Inflation is often measured in broad terms, such as the general rise in prices or the rise in a nation's cost of living.
- **Human Capital Index:** It is quantified in terms of production compared to a benchmark of total health and education. A human capital indicator that combines health and education. Based on years spent in school and returns to education, it is computed.
- **Population growth rate:** The percentage change in the population over time is known as the population growth rate. It is calculated by dividing the total population at the beginning of the period by the number of persons who were already there.

3.2. Source and data type

The research utilized secondary data. In order to accomplish the study's goals, time series data from the employee panel for 12 chosen Sub-Saharan African nations from 2000 to 2020 was used in this study. All necessary information was gathered from many national and international organisations, as well as from books, documents, annual reports, and other written sources in various and related fields. Particularly, the The World Bank (WB), the International Monetary Fund (IMF), and other relevant organizations provided the data for this study.

3.3. Model Specification

The empirical framework of this study concerned about modeling of the relationship between the Female Labour Force Participation/ Engagement rate with Income Inequality and its determinant factors. Therefore, this section contains model specifying for the analysis of the study.

$$InI = f(FLFPr, GDPpc, INF, HCI, PoPg)$$

Therefore, the model is written as:

$$InI = \beta_0 + \beta_1 FLFPr_{it} + \beta_2 GDPpc_{it} + \beta_3 INF_{it} + \beta_4 HCI_{it} + \beta_5 PoPg_{it} + \varepsilon_{it}$$

Where:

InI-Income Inequality measured by Gini-Coefficient Index (**GIN**)

FLFPr ; - Female Labour force participation Rate

GDPpc : Per Capita Gross Domestic Product

INF : Inflation Rate

HDI: Human Capital Index

PPg: Population Growth Rate

3.4. Diagnostic Tests

A. Tests for Appropriate Model Selection

Panel data models examine the effects of time and/or groups on a given phenomenon. These effects can either be random or fixed. Random effects assume that each individual group and time period have a different disturbance, while fixed effects assume that each group and time period have a different intercept in the regression equation. There are various models that can be created depending on the combination of these effects, including the fixed group effect model

(one-way), fixed time effect model (one-way), fixed group and time effect model (two-way), random group effect model (one-way), and random group and time effect model (two-way).

To determine the appropriate model, the researcher conducts necessary tests, such as the F-test for the fixed effect model and the Breusch-Pagan Lagrange Multiplier (LM) test. If both fixed and random effects are present, the Hausman test is also conducted to compare the two models and select the most suitable one. Therefore, the F test (Wald Test) for fixed effects and the Breusch-Pagan LM test for random effects are conducted to choose relevant and appropriate models for data analysis. Finally, if both fixed and random effects are significant, the Hausman test provides insight into selecting one between the two.

B. Panel unit root test

Unit root tests can be employed to determine whether trending data should be stabilized by initially differencing it or regressing it on deterministic functions of time. The key benefit of utilising panel unit root tests is that they have substantially higher power than the common time-series unit root tests for testing alternative hypotheses with very persistent departures from equilibrium in finite samples. For this investigation, the researcher conducted xtunitroot tests using Stata, which offers various tests for assessing unit roots or stationarity in panel datasets.

C. Multicollinearity Test

The variance inflation factor (VIF) is a measure of multicollinearity, which occurs when two or more independent variables have a high correlation with each other. Multicollinearity can lead to problems in regression analysis such as biased coefficient estimates and poor significance levels.

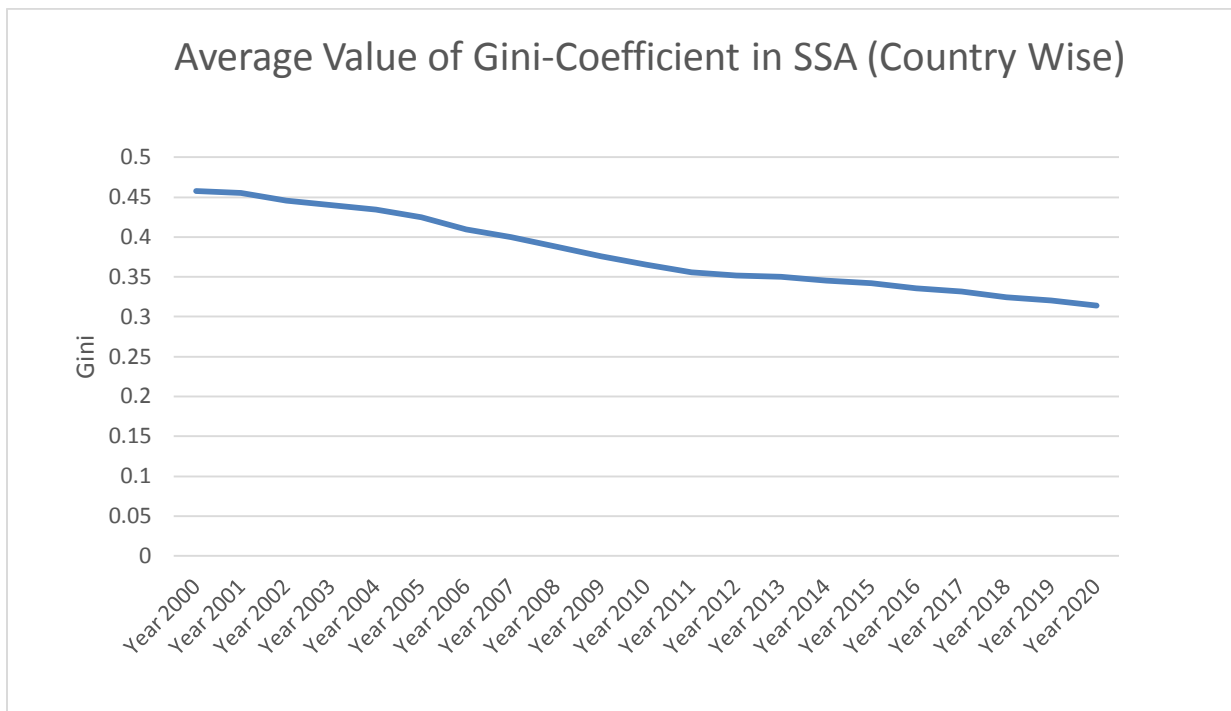
CHAPTER FOUR

4. DATA ANALYSIS AND DISCUSSION

Introduction

within this section, the data gathered from different secondary sources was presented and analyzed in line with the specific objectives that the researcher has aroused. The chapter contains two parts: the first part deals with the descriptive issues like Trends of Income Inequality in selected Sub-Sharan Countries from 2000 – 2020, and the trends of explanatory variables in relation with the Income Inequality in selected Sub-Sharan counties . The second part contains Econometric parts of the study that assess variables that affect the Income Inequality in the selected Sub-Sharan counties from year 2000 – 2020. The data was gathered from The World Bank and national bank of the respective countries.

4.1.1. Trend of Income Equality (Gini-Coefficient) Throughout the Years

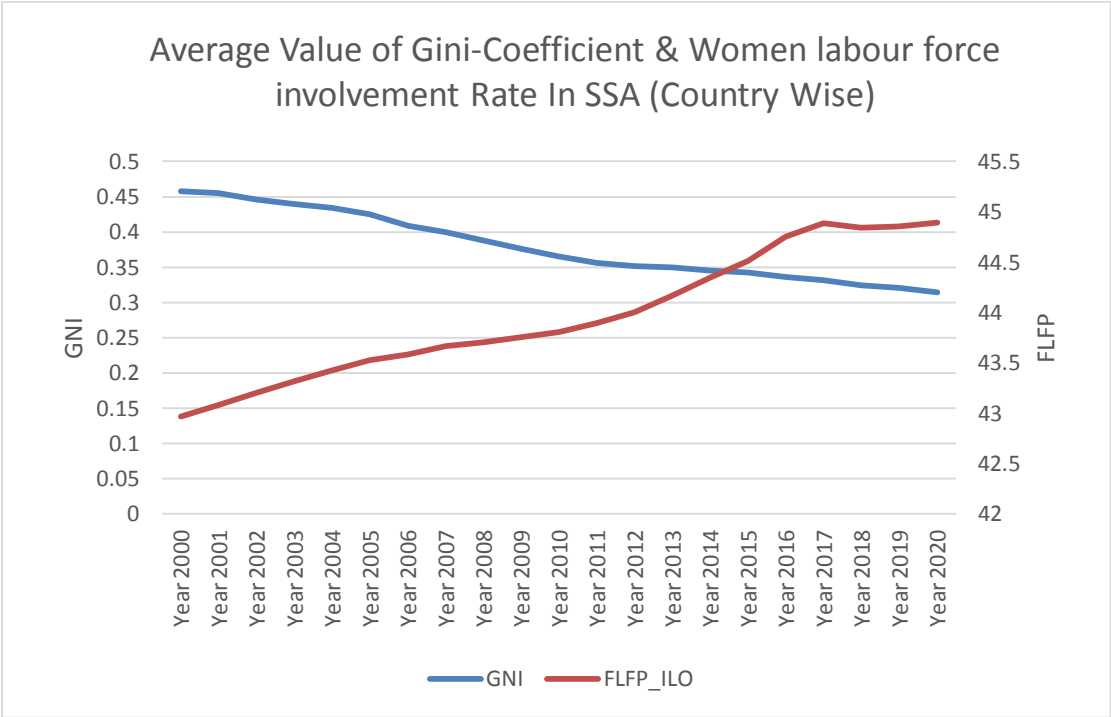


Source: The World Bank Database

Figure 4. A: own computation.

The trend of declining income inequality, which is calculated by averaging the performance of each country over the years, is evident. This trend can be attributed to several factors, such as the economic growth experienced by Sub-Saharan Africa, which has led to a reduction in poverty and an improvement in living conditions. This growth is due to various factors, including increased investment, improved infrastructure, and higher commodity prices. Policies aimed at redistributing wealth, such as tax breaks for the poor and subsidies for essential goods, have also contributed to the decline in income inequality. Additionally, globalization has led to increased trade and investment in Sub-Saharan Africa, creating new job opportunities for people of all income levels. These trends have been observed and reported by The World Bank, as of 2021.

4.1.2. Trend of Income Equality (Gini-Coefficient) Across Countries



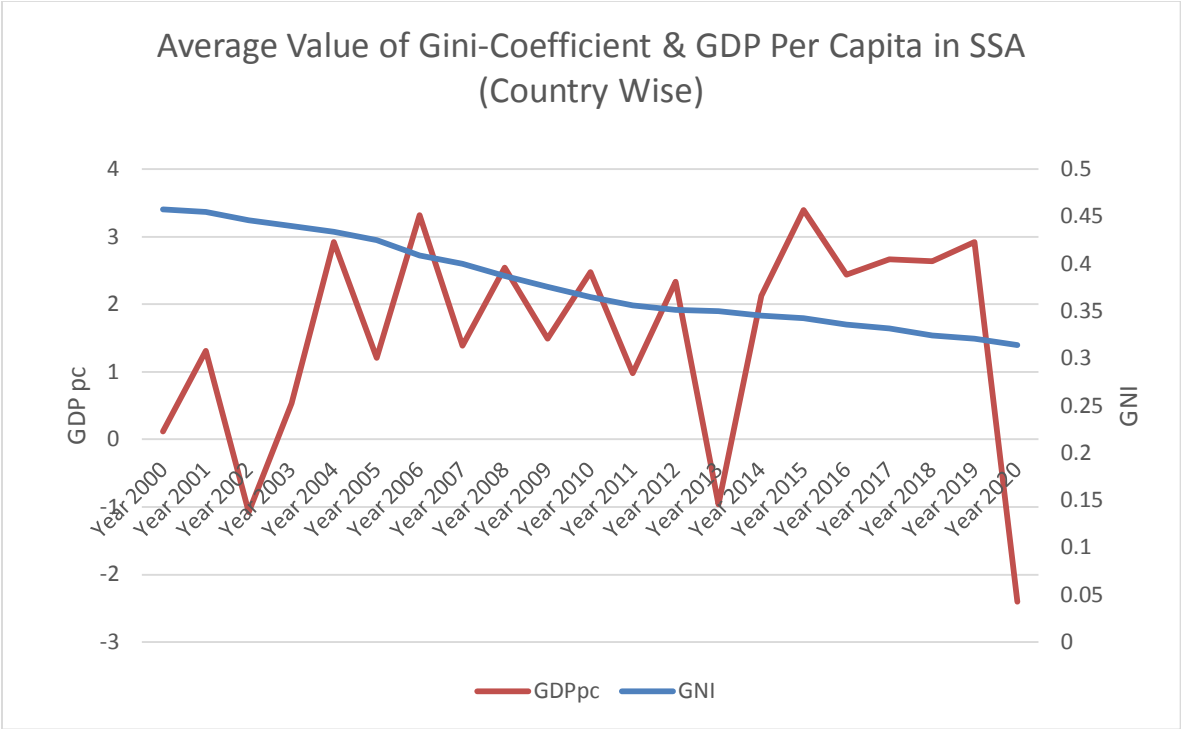
Source: The World Bank Database

Figure 4. B: own computation.

The trend analysis reveals an inverse relationship between the involvement of women in the labor force and income inequality, as measured by the Gini coefficient. Empirical evidence supports this hypothesis, as demonstrated in a study by The World Bank, which found that for every 10% increase in female labor force participation, the Gini coefficient can decrease by 0.5%. This relationship is significant because women's earnings can help lift families out of poverty, particularly in countries where women are more likely to be impoverished than men. Additionally, a more diverse workforce can promote innovation and productivity, benefiting the

economy as a whole, while reducing economic inequality among women. Therefore, encouraging greater women's participation in the labor force can contribute to reducing income disparity in the sub-Saharan countries studied.

4.1.3. GDP Per Capita and Income Inequality (Gini-Coefficient)

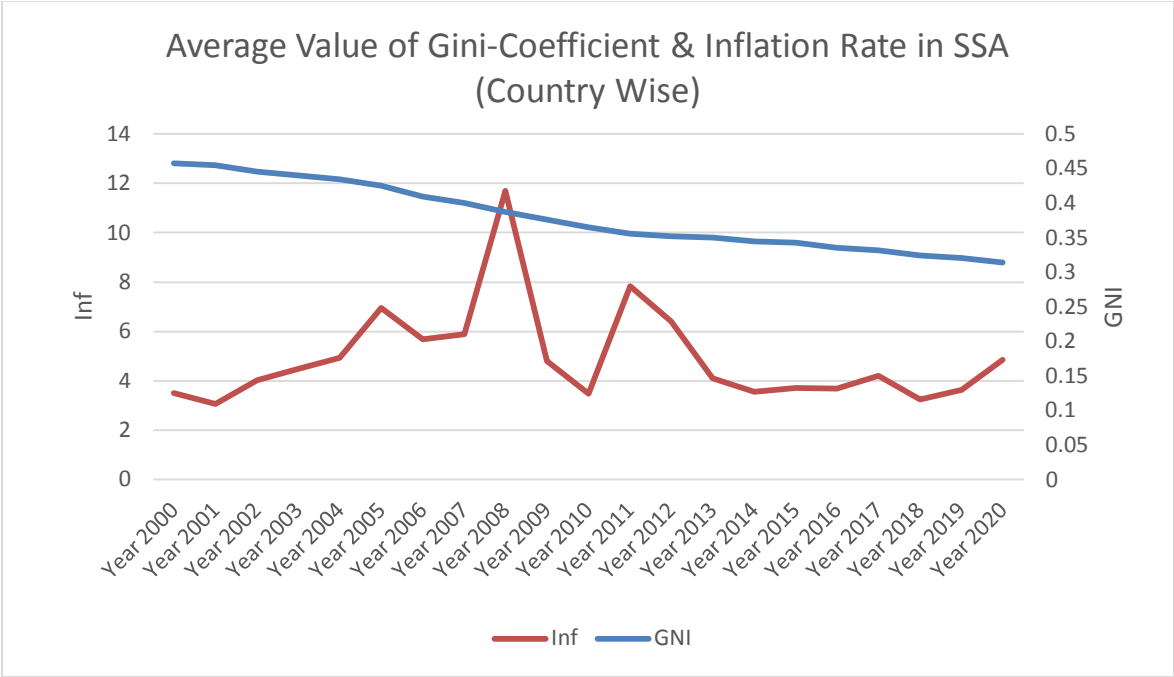


Source: The World Bank Database
 Figure 4. C: own computation.

The trend analysis reveals that there may be either a positive or negative relationship between GDP per capita and income inequality, as measured by the Gini coefficient, in sub-Saharan African countries. The positive relationship can be attributed to technological changes that require higher skills and education, creating new jobs and displacing lower-skilled workers, resulting in a widening income gap. In addition, changes in government policies, such as tax cuts for the wealthy or cuts to social programs, may also contribute to higher income inequality. Conversely, a higher GDP per capita can lead to a reduction in income inequality by creating more job opportunities and improving the standard of living for everyone. Investment in education and healthcare can also enhance the skills and productivity of the workforce, resulting in higher wages and a more equitable distribution of income. Redistribution policies, such as tax breaks for the poor or subsidies for essential goods, have been implemented in many sub-

Saharan African countries, including Cameroon, Ghana, and Rwanda, to help reduce income inequality.

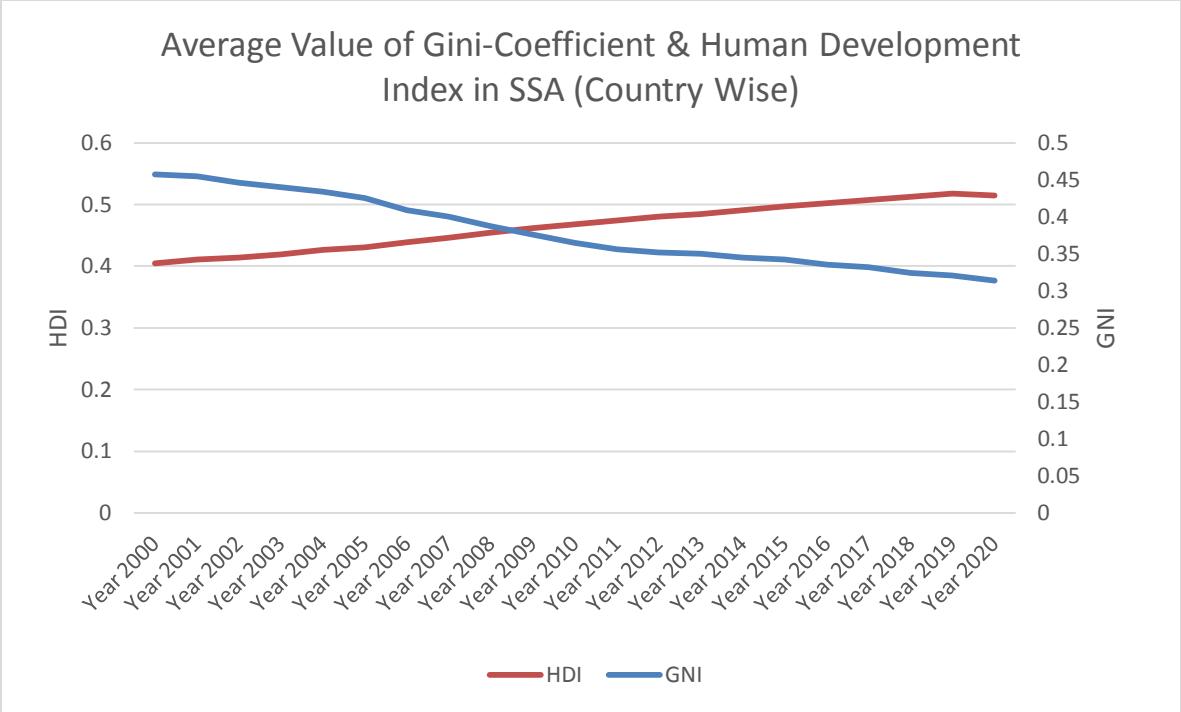
4.1.4. Inflation Rate and Income Inequality (Gini-Coefficient)



Source: The World Bank Database
 Figure 4. D: own computation.

The trend analysis suggests that inflation and income inequality have a negative relationship for the average computed sub-Saharan countries from the year 2000 up to 2008. However, the relationship between inflation and income inequality is complex and can be influenced by various factors. From 2011 to 2020, there appears to be a positive relationship, which can be attributed to governments in sub-Saharan African countries responding to inflation by raising interest rates. This can lead to economic recession and joblessness, which can disproportionately affect the poor, who are more likely to be employed in informal sectors of the economy. As the poor tend to spend a larger portion of their income on necessities like food and housing, they are more susceptible to the effects of inflation, which can have a significant impact on their purchasing power. In contrast, the wealthy have capital invested in assets that tend to increase in value as inflation rises.

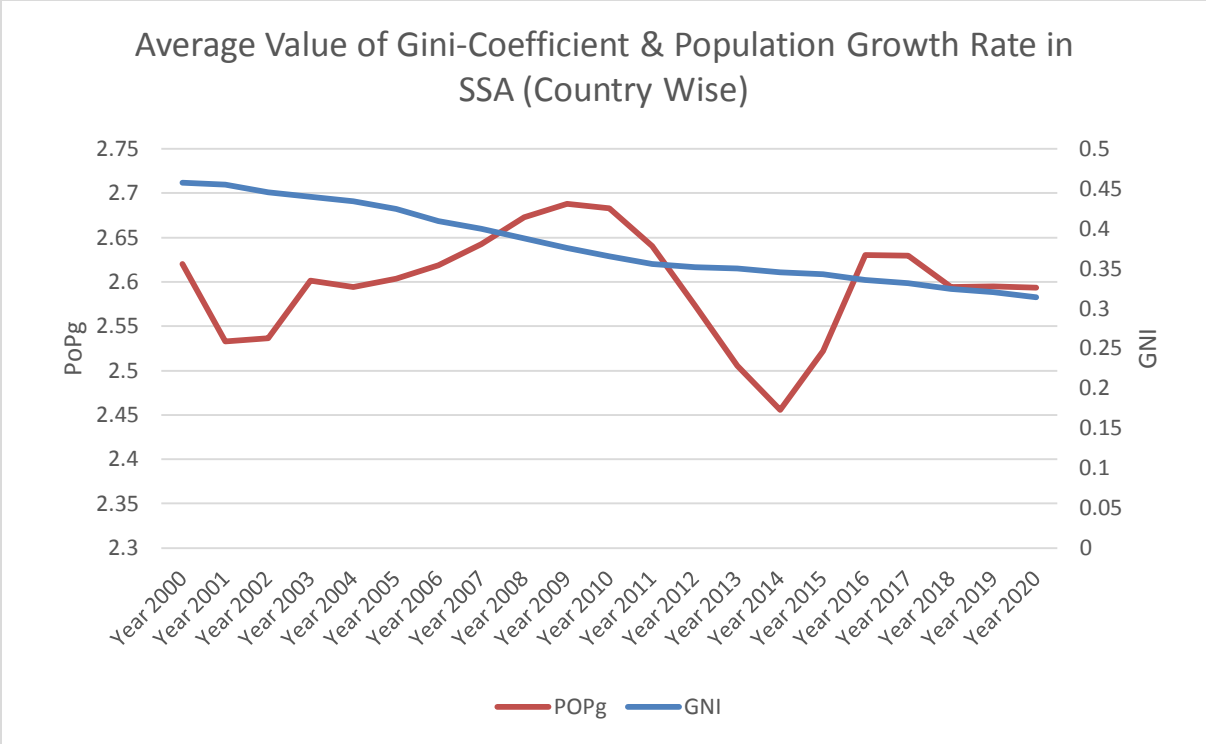
4.1.5. Human Development Index and Income Inequality Gini-Coefficient



Source: The World Bank Database
 Figure 4. E: own computation.

Based on the graphical representation of the Human Development Index/Human Capital and Income Inequality (Gini-Coefficient), it can be observed that there is a negative/inverse relationship between them, except for the average sub-Saharan countries. As the Human Development Index increases, access to healthcare and education also increases, which may explain the negative relationship. This can result in a more qualified and healthy workforce, which can lead to economic growth and increased opportunities for all. Improved governance can also lead to a more equitable distribution of opportunities and resources, which can reduce income inequality. A higher Human Development Index can lower poverty and improve the standard of living for everyone, resulting in a more equitable distribution of income as everyone in society has more disposable income. These findings have been supported by research conducted by Asongu, S. A., & Asongu, S. A. (2018).

4.1.6. Population Growth Rate and Income Inequality (Gini-Coefficient)



Source: The World Bank Database

Figure 4. F: own computation.

The trend analysis of the relationship between Population Growth Rate and Income Inequality suggests both positive and negative relationships for different time periods. From 2000-2002, 2011-2014, and 2018-2020, there appears to be a positive relationship, while from 2002-2010 and 2014-2018, there is a negative relationship. Increased population growth can have both positive and negative effects on income inequality. On the one hand, it can lead to a larger workforce, which can boost economic growth and create more opportunities for everyone. On the other hand, population growth can strain resources such as land and water, and lead to a decrease in the quality of education and healthcare. Ultimately, the impact of population growth on income inequality depends on various factors such as the level of development of the country and its ability to manage population growth. The World Bank (2019) has also highlighted the complex relationship between population growth and income inequality.

4.2. Summary statistics of variables

In This section the researcher is going to present statistics summary of the variables considered in the model.

Table 4.2 summary statistics of the variables

Variable	Observation	Mean	Std. Dev.	Min	Max
GNI	252	.3793651	.0926007	.21	.66
FLFP_ILO	252	43.96127	4.969786	30.91514	49.43054
GDPpc	252	1.542057	4.51876	-36.7777	15.68832
Inf	252	4.943718	5.40717	-8.237845	44.35669
HDI	252	.4644008	.0578263	.287	.583
POPg	252	2.59676	.4287038	-.076949	3.496468

Source: Own Computation using data from The World Bank Database

The table shows the summary statistics for a set of variables, including GNI, FLFP_ILO, GDPpc, Inf, HDI and POPg

GNI: The mean GNI is 0.379, with a standard deviation of 0.093. This suggests that the GNI values are relatively evenly distributed. The mean GNI is relatively low, suggesting that the countries in the dataset are low-income countries.

FLFP_ILO: The mean FLFP_ILO is 43.96, with a standard deviation of 4.97. This suggests that the FLFP_ILO values are relatively evenly distributed. The mean FLFP_ILO is relatively high, suggesting that women in the countries in the dataset are relatively well-integrated into the workforce.

GDPpc: The mean GDPpc is 1.54, with a standard deviation of 4.52. This suggests that the GDPpc values are relatively evenly distributed. The mean GDPpc is relatively low, suggesting that the countries in the dataset have relatively low levels of economic development.

Inf: The mean Inf is 4.94, with a standard deviation of 5.41. This suggests that the Inf values are relatively evenly distributed. The mean Inf is relatively high, suggesting that the countries in the dataset have relatively high rates of inflation.

HDI: The mean HDI is 0.46, with a standard deviation of 0.06. This suggests that the HDI values are relatively evenly distributed. The mean HDI is relatively low, suggesting that the countries in the dataset have relatively low levels of human development.

POPg: The mean POPg is 2.59, with a standard deviation of 0.43. This suggests that the POPg values are relatively evenly distributed. The mean POPg is relatively high, suggesting that the countries in the dataset have relatively high population growth rates.

These observations suggest that the countries in the dataset are facing a number of challenges, including low levels of economic development, high rates of inflation, and low levels of human development. Overall, the data in the table appears to be relatively evenly distributed. This suggests that the data is reliable and can be used for analysis.

4.3. Empirical Econometric Analysis

4.3.1. Diagnostic tests

A. Hausman Test

A statistical test called the Hausman test can be used to compare models with random effects and models with fixed effects. The Hausman test is predicated on the idea that the model's error terms are unrelated to the regressors. Use the fixed effects model if the Hausman test indicates significance. The random effects model can be utilised if the Hausman test returns no significant result.

Random effects model is a type of panel data analysis that allows for the possibility that the relationships between the variables may be different across units. This flexibility can lead to more accurate estimates of the relationships between variables.

Fixed effects model is a type of panel data analysis that assumes that the relationships between the variables are the same across units. This assumption can lead to biased estimates of the relationships between variables if the relationships are actually different across units.

Coefficients	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
FLFP_ILO	-.0075724	-.0053343	-.0022381	.0010215
GDPpc	.0003364	.0003491	-.0000127	.
Inf	.0004411	.000575	-.0001339	.
HDI	-1.135206	-1.161864	.0266579	.0119125
POPg	-.0252976	-.0240883	-.0012093	.

Test: Ho: difference in coefficients not systematic

chi2(5)	1.62
Prob>chi2	0.8992

The Hausman test is designed to determine whether the error terms in a model are correlated with the regressors. If the test is significant, it suggests that the fixed effects model should be used, while a non-significant result indicates that the random effects model is appropriate. In this case, the p-value of the Hausman test is 0.8992, which indicates that the null hypothesis cannot be rejected. Therefore, the test suggests that the random effects model is appropriate for the analysis.

B. Unit Root Test

A unit root test is a statistical test that can be used to determine whether a time series has a unit root. A unit root is a special type of value that causes the time series to trend upwards or downwards over time. Levin, A., C.-F. Lin, and C.-S. J. Chu. (2002)

xtunitroot llc GNI, lags(1)

	Statistic	p-value
Unadjusted t	-4.0802	
Adjusted t*	-2.5256	0.0058

The Levin-Lin-Chu unit-root test assesses whether the panels in a dataset contain unit roots, with the null hypothesis stating that they do and the alternative hypothesis stating that they are stationary. In this case, the adjusted t-statistic's p-value is 0.0058, which is less than the significance level of 0.05. This indicates that we can reject the null hypothesis and conclude that the panels are stationary, meaning that the GNI series is not exhibiting any upward or downward trend over time. However, it is important to note that this test is just one of many possible tests, and the results may differ if other variables were included or alternative methods were used.

xtunitroot llc FLFP_ILO , lags(1)

	Statistic	p-value
Unadjusted t	-4.7677	
Adjusted t*	-3.3483	0.0004

The Levin-Lin-Chu unit-root test assesses whether the panels in a dataset contain unit roots, with the null hypothesis stating that they do and the alternative hypothesis stating that they are

stationary. In this case, the adjusted t-statistic's p-value is 0.0004, which is much less than the significance level of 0.05. This indicates that we can reject the null hypothesis and conclude that the panels are stationary. Based on this test, it can be concluded that the FLFP_ILO series is stationary, meaning that it does not exhibit any upward or downward trend over time and is not subject to random fluctuations.

xtunitroot llc GDPpc , lags(1)

	Statistic	p-value
Unadjusted t	-9.4857	
Adjusted t*	-3.3291	0.0004

The adjusted t-statistic's p-value for the Levin-Lin-Chu unit-root test in this case is 0.0004, which is significantly lower than the significance level of 0.05. This indicates that the null hypothesis of the presence of unit roots in the panels can be rejected, and it can be concluded that the panels are stationary. As a result, it can be inferred that the GDPpc series is not exhibiting any trend, either upwards or downwards, over time. Furthermore, the series' values are not impacted by random fluctuations, highlighting its stability over time.

xtunitroot llc Inf , lags(1)

	Statistic	p-value
Unadjusted t	-11.1773	
Adjusted t*	-6.0956	0.0000

The Levin-Lin-Chu unit-root test in this case has an adjusted t-statistic's p-value of 0.0000, very close to zero. This indicates that the null hypothesis of the presence of unit roots in the panels can be strongly rejected, and it can be concluded that the panels are stationary. Therefore, it can be inferred that the Inf series is not showing any trend, either upwards or downwards, over time. Additionally, the series' values are not affected by random fluctuations, indicating its stability over time.

xtunitroot llc HDI , lags(1)

	Statistic	p-value
Unadjusted t	-5.7956	
Adjusted t*	-4.6680	0.0000

The adjusted t-statistic's p-value for the Levin-Lin-Chu unit-root test in this case is 0.0000, which is very close to zero. This indicates that the null hypothesis of the presence of unit roots in the panels can be strongly rejected, and it can be concluded that the panels are stationary. As a result, it can be inferred that the HDI series is stationary, meaning that it does not exhibit any

trend, either upwards or downwards, over time. Additionally, the series' values are not subject to random fluctuations, emphasizing its stability over time. `xtunitroot llc POPg , lags(1)`

	Statistic	p-value
Unadjusted t	-6.8814	
Adjusted t*	-3.4480	0.0003

The Levin-Lin-Chu unit-root test in this case yields an adjusted t-statistic's p-value of 0.0003, which is significantly lower than 0.05. This implies that the null hypothesis of unit roots' presence in the panels can be rejected, and it can be concluded that the panels are stationary. Therefore, it can be inferred that the POPg series is stationary, indicating that it does not exhibit any trend, either upwards or downwards, over time. Additionally, the series' values are not influenced by random fluctuations, highlighting its stability over time.

C. Multicollinearity Test

The Variance Inflation Factor (VIF) is a metric that measures the degree of multicollinearity, which is a situation where several independent variables are strongly correlated. Multicollinearity can lead to problems in regression analysis, such as biased coefficient estimates and low levels of statistical significance.

Variance Inflation Factors			
Sample: 2000 2020			
Included observations: 252			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
FLFP_ILO	3.90E-06	2641.313	1.053875
GDPPC	1.74E-07	1.167796	1.023235
HDI	0.002487	189.1669	1.029289
INF	1.50E-07	2.304083	1.019190
POPG	3.55E-05	84.73256	1.020821
C	0.005981	2093.362	NA

Based on the above Eview result, the VIFs for the variables in your model are all below 10, which is considered to be a good threshold for multicollinearity.

FLFP_ILO: The VIF for FLFP_ILO is 1.05, which is below the threshold of 10. This suggests that FLFP_ILO is not collinear with one or more of the other variables in the model.

GDPPC: The VIF for GDPPC is 1.02, which is below the threshold of 10. This suggests that GDPPC is not collinear with any of the other variables in the model.

HDI: The VIF for HDI is 1.03, which is below the threshold of 10. This suggests that HDI is not collinear with one or more of the other variables in the model.

INF: The VIF for INF is 1.02, which is below the threshold of 10. This suggests that INF is not collinear with any of the other variables in the model.

POPG: The VIF for POPG is 1.02, which is below the threshold of 10. This suggests that POPG is not collinear with any of the other variables in the model.

C: The VIF for C is not applicable, as it is a constant term.

4.3.2. The Pooled OLS Regression

Sample: 2000 – 2020		*** = 1% significance level	
Number of observations = 252		** = 5% significance level	
R-squared	=0.9214		
Adj R-squared	=0.9160	F (16, 235)	=172.13
Root MSE	= 0.02683	Prob>F	=0.0000

GNI	Coef.	Std.Err.	t	P> t	[95% Conf. Interval]
FLFP_ILO	-.0075724***	.0019756	-3.83	0.000***	-.0114646 -.0036802
GDPpc	.0003364	.0004168	0.81	0.420	-.0004847 .0011575
Inf	.0004411	.0003876	1.14	0.256	-.0003224 .0012047
HDI	-1.135206***	.0498728	-22.76	0.000***	-1.233461 -1.036951
PoPg	-.0252976***	.0059558	-4.25	0.000***	-.0370312 -.013564
Constant	1.392222	.0836061	16.65	0.000	1.227509 1.556936

Table 4.3.2 STATA result of the pooled regression model

The Pooled Panel Data regression model was utilized to investigate the correlation between GNI (Gin-Coefficient) and several other variables, including FLFP_ILO (Female Labor Force Participation), GDPpc (Gross Domestic Product per capita), Inf (Inflation), HDI (Human Development Index), POPg (Population Growth). The results of the regression show that Gin-Coefficient (GNI) is inversely associated with Female Labor Force Participation, Population Growth rate, and Human Development Index, with a statistical significance of 1%. Conversely, it is positively related to inflation, and Gross Domestic Product Per-Capita has no significant effect. Essentially, countries with higher Female Labor Force Participation, Population Growth rate, and Human Development indices have a lower Gin-Coefficient (Income Inequality).

The regression results indicate that various factors such as female labour force participation, GDP per capita, human development index, inflation rate, population growth, and year are linked to GNI.

- FLFP_ILO: The coefficient for Female Labor Force Participation/ Engagement is negative, which suggests that an increase in female labour force participation is associated with a decrease in Gin-Coefficient (Income Inequality). This may be due to the recent increase in women entering the labour force, which lowers the overall Gin-Coefficient (Income Inequality).
- GDPpc: The coefficient for GDP Per Capita is positive and statistically insignificant effect.
- Inf: The coefficient for Inflation rate is positive and statistically insignificant effect.
- HDI: The coefficient for Human Development Index is Negative, which suggests that an increase in the human development index is associated with a decrease in Gin-Coefficient (Income Inequality). This is likely because the human development index is a measure of a country's social and economic well-being, and countries with higher levels of well-being tend to have lower Gin-Coefficient (Income Inequality).
- POPg: The coefficient for Population Growth Rate is negative, which suggests that an increase in population growth is associated with a decrease in Gin-Coefficient (Income Inequality). This is likely because population growth can strain a country's resources, making it more suitable for the labour force market to get a potential labour force supply which might lead to a lower amount of Gin-Coefficient (Income Inequality).

It's important to keep in mind that the findings are supported by a panel dataset, which means that the same countries are followed throughout time. This can assist in adjusting for unobserved factors that might affect both the independent variables and the Gini score. However, if any unobserved influences remain, the results may still be skewed.

Data from numerous nations are examined using a sort of regression analysis called a pooled effect regression. It presumes that all countries share the same relationships between the variables.

The `testparm` command in Stata is used to test the significance of the coefficients for a set of group effect. In this case, the researcher is testing the significance of the coefficients for the group effect for each year from 2001 to 2020.

testparm count2-count12

F(11, 235)	118.93
Prob > F	0.0000

The testparm command results reveal that all coefficients for the grouped variables are significant at the 0.0000 level, indicating that there is a group (country) effect in the data. This implies that there are certain country-specific factors that influence the Gini index, and the relationships between variables may not be consistent across all countries.

Various historical, cultural, political, and economic factors could be contributing to this country-specific effect. It is crucial to take into account the group effect since policies that work in one country may not be effective in another due to these unique factors.

4.3.3. The Fixed (Within Group) Regression

Sample: 2000 – 2020		Number of Group = 12				
Number of observations = 252		Group Variable = Country				
R-squared :				*** = 1% significance level		
Within = 0.7994		F (5, 235) =187.25		** = 5% significance level		
Between = 0.0893		Prob>F =0.0000				
Overall = 0.2952		corr (u_i,xb) =0.2952				
GNI	Coef.	Std.Err.	t	P> t 	[95% Conf. Interval]	
FLFP_ILO	-.0075724***	.0019756	-3.83	0.000***	-.0114646	-.0036802
GDPpc	.0003364	.0004168	0.81	0.420	-.0004847	.0011575
Inf	.0004411	.0003876	1.14	0.256	-.0003224	.0012047
HDI	-1.135206***	.0498728	-22.76	0.000***	-1.233461	-1.036951
PoPg	-.0252976***	.0059558	-4.25	0.000***	-.0370312	-.013564
Constant	1.302441	.0773398	16.84	0.000	1.150073	1.454809

Table 4.3.3 STATA result of the Fixed (Within Group) estimator

The pooled OLS estimator does not utilize the panel variance, rendering panel data ineffective. However, the fixed effect or within-group (WG) estimator is superior to the pooled OLS estimator because it relies on within-group variation. The among-groups estimator also eliminates the country-specific effect.

The fixed-effects model is a regression model that controls for time-invariant factors that may be correlated with the independent variables. In this context, the country-level variables represent the time-invariant factors. Number of observations: This is the total number of observations in your dataset. In this case, there are 252 observations.

Group variable: This is the variable that is used to group the observations into different groups. In this case, the group variable is country. There are 12 groups in your dataset, each representing a different country.

Coefficients: These are the estimated coefficients for the independent variables. The coefficients for FLFP_ILO, HDI and PoPg are negative, which suggests that these variables are inversely related to GNI. The coefficient for GDPpc and Inf is positive, which suggests that this variable is directly related to GNI. The coefficient for Inf is positive, which suggests that this variable is inversely related to GNI.

- Female labor force participation/ Engagement (FLFP_ILO): A one-percentage-point increase in FLFP_ILO is associated with a 0.75-percentage-point decrease in GNI. This suggests that countries with higher Women labour force involvement rates tend to have lower income inequality, GNIs.
- Gross domestic product per capita (GDPpc) has a Statistically Insignificant Effect.
- Inflation (Inf) has a Statistically Insignificant Effect.
- Human development index (HDI): A one-point increase in HDI is associated with a 113-percentage-point decrease in GNI. This suggests that countries with higher HDIs tend to have lower income inequality, GNIs.
- Population Growth Rate (PoPg): A one-point increase in PoPg is associated with a 2.52-percentage-point decrease in GNI. This suggests that countries with higher PoPs tend to have lower income inequality, GNIs.

The results of the fixed-effects (within) regression reveal a significant relationship between the independent variables FLFP_ILO, HDI, and POPg and the dependent variable. The model fits the data well, and the residual standard error is relatively low. However, the fixed-effects model can only control for time-invariant factors, not time-varying factors like economic growth, technological advancements, and globalization, which may influence the model's predictions. The fixed-effects model assumes that the unobserved effect remains constant over time, which may not always be accurate and could lead to unreliable coefficient estimates. Moreover, the fixed-effects model may not capture the complex interactions between Gini-Coefficient and these other variables fully. More sophisticated models, such as random-effect models, may produce more precise coefficient estimates.

4.3.4. Random Effect GLS Regression

Sample: 2000 – 2020		Number of Group = 12				
Number of observations = 252		Wald chi2 (5) =876.85				
Group Variable = Country		Prob>F =0.0000				
R-squared :		Corr (u_i,xb) = 0 (assumed)				
Within = 0.7982		*** = 1% significance level				
Between = 0.1274		** = 5% significance level				
Overall = 0.3411						
GNI	Coef.	Std.Err.	z	P> z 	[95% Interval]	Conf.
FLFP_ILO	-.0053343 ***	.001691	-3.15	0.002***	-.0086486	-.00202
GDPpc	.0003491	.0004286	0.81	0.415	-.000491	.0011892
Inf	.000575	.0003976	1.45	0.148	-.0002043	.0013543
HDI	-1.161864 ***	.0484292	-23.99	0.000***	-1.256783	-1.066944
PoPg	-.0240883 ***	.0060976	-3.95	0.000***	-.0360394	-.0121371
Constant	1.21261	.0693262	17.49	0.000	1.076734	1.348487

Table 4.3.4 STATA result of the Random Effect GLS estimator

$$\begin{aligned}
 \ln(GNI) = & 1.21261 + -.0053343FLFP_{it} + .0003491 GDPpc_{it} + .000575 INF_{it} \\
 & + -1.161864 HCI_{it} + -.0240883PoPg_{it} + \varepsilon_{it}
 \end{aligned}$$

The random effects regression model is useful in accounting for the possibility that different countries may have unique relationships between variables. This flexibility is beneficial as it can result in more precise coefficient estimates. This model allows for accounting for the variation in the data, leading to more accurate estimations of the relationship between variables. Overall, the random effects regression model is more flexible and accurate than the fixed effects regression model, particularly in panel data models where the relationships between variables vary across countries. Hsiao, C. (2003).

The random-effects model is a type of regression model that considers time-invariant variables that are related to the independent variables while also allowing for the possibility that coefficients can differ between groups. In this context, the country-level variables represent the time-invariant factors.

R-sq: the R-squared for the within model is 0.7982, which means that 79.82% of the variation in GNI is explained by the independent variables.

F-statistic: This is a test statistic that is used to test the overall significance of the model. In this case, the F-statistic is highly significant (p-value < 0.0000). This suggests that the model is a good fit for the data and that the independent variables are significantly related to the dependent variable.

- Women labour force involvement (FLFP_ILO): A one-percentage-point increase in FLFP_ILO is associated with a 0.53-percentage-point decrease in income inequality, GNI. This suggests that countries with higher Women labour force involvement rates has Increased household income, Reduced gender wage gap, Diverse workforce and Increased social mobility can be evidence of lower income inequality, GNI.
- Gross domestic product per capita (GDPpc) has statically insignificant effect on Income Inequality, GNI.
- Inflation Rate (Inf) has a statistically insignificant effect on Income Inequality, GNI.
- Human development index (HDI): A one-point increase in HDI is associated with a 116-percentage-point decrease in Income Inequality, GNI. This suggests that countries with higher HDIs tend to have lower Income Inequality GNI as HDI rises, so does accessibility to healthcare and education, better qualified and healthy workforce may result from this, which may spur economic growth and increase possibilities for all.
- Population Growth Rate (PoPg): Population Growth Rate (PoPg): A one-point increase in PoPg is associated with a 2.4-percentage-point decrease in GNI. This suggests that countries with higher PoPg tend to have lower income inequality, GNIs as higher PoPg can lead to a larger workforce, which can boost economic growth and create more opportunities for everyone.

Test: Ho: difference in coefficients not systematic

chi2(5)	1.62
Prob>chi2	0.8992

The Hausman test is based on the assumption that the error terms in the model are not correlated with the regressors. If the Hausman test is significant, then the fixed effects model should be used. If the Hausman test is not significant, then the random effects model can be used.

Hausman, J. A. (1978)

In this case, the p-value of the Hausman test is 0.8992. This means that we fail to reject the null hypothesis, there for the test suggest that the random effect model to be used.

The researcher chose the Random Effect Panel Data model for its variable based on the ability of Random Effect to account for the variation in the data as well as its nature of flexibility relative to Fixed Effect, and particularly based on the Hausman test.

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

Africa saw significant economic progress in the 2000s, with many countries achieving double-digit growth rates. However, wealth and income distribution disparities remain problematic in Africa, even in countries with abundant resources and these countries have not been successful in reducing inequality. Gender inequality in economic opportunities is linked to higher overall income inequality. Low women labor force involvement remains a significant challenge in the job market, resulting in underutilization of a nation's human potential and affecting income distribution.

A study conducted in 12 selected sub-Saharan countries revealed that Women's labor force participation has a negative impact on income inequality. This implies that when the rate of Women's participation in the labor force increases income inequality decreases. Additionally, the study found a negative correlation between human development index and population growth rate with income inequality, while GDP per capita and inflation rate have a positive but statistically insignificant effect on income inequality.

The researcher utilized both descriptive and econometric frameworks to evaluate the relationship between the variables. The descriptive analysis was conducted to observe the trend of the independent variable over time and its association with the dependent variable. To ensure the accuracy and efficiency of the econometric estimation, diagnostic tests were performed on the variables to confirm their suitability for analysis and to ascertain that the model was appropriately specified. The stationarity test was used to determine that all variables were stationary at the level, and the residual stationarity indicated that the variables were co-integrated, indicating the existence of a long-run relationship among the variables.

To estimate the relationship between women labor force involvement rate and income inequality, the study employed a random effects panel data model. The random effects panel data model was selected due to its ability to consider the possibility that different countries could have distinct associations between the variables, resulting in a more flexible model and more accurate estimations.

5.2. Recommendations

It is widely acknowledged that increasing women labor force involvement can play a significant role in reducing income inequality.

Evidence suggests that when women join the labor force, they contribute to household income, which can help families escape poverty. This is particularly important in countries like sub-Saharan Africa, where women are more likely to be poor than men.

The gender pay gap can be reduced by promoting women's participation in the labor force, which can lead to better salaries as they acquire knowledge and skills. This, in turn, can help to reduce one of the main causes of economic inequality: the gender wage gap. Women who work become more financially independent, which can increase their level of control over their lives and promote social mobility, ultimately aiding in the reduction of income disparity.

5.3. Policy Recommendation

Based on the evidence, there are a number of policy interventions that can be implemented to increase FLFP and reduce income inequality/disparity in Sub-Saharan Africa. These include:

- Investing in women's education and training will help to improve their abilities and increase their likelihood of participating in the workforce.
- Offering childcare assistance: This will assist in lowering the obstacles that prohibit women from working.
- Passing legislation to uphold women's rights: This will aid in ensuring that women are treated properly at work.
- Modifying societal norms: This will aid in dispelling the preconceptions that keep women from entering the workforce.
- Offer inducements, like tax exemptions or subsidies, to develop programmes to encourage the hiring of women, level the playing field for women in employment, and lessen wage inequality while also assisting women in starting their own enterprises.

Sub-Saharan African countries can promote Women Labor Force Participation/Involvement and decrease income inequality/disparity by enacting these policies. This will result in a more equitable and prosperous society for everyone.

REFERENCES

- Abebe Shimeles & Tiguene Nabassaga, 2018. "Why Is Inequality High in Africa?," *Journal of African Economies*, Centre for the Study of African Economies (CSAE), vol. 27(1), pages 108-126.
- African Development Bank, *African Economic Outlook (AEO) 2021*
- Ahinkorah, B.O., Seidu, A.A., Armah-Ansah, E.K., Budu, E., Ameyaw, E.K., Agbaglo, E. and Yaya, S. (2020), "Drivers of desire for more children among childbearing women in sub-Saharan Africa: implications for fertility control", *BMC Pregnancy Childbirth*, Vol. 20, p. 778, doi: 10.1186/s12884-020-03470-1.
- Akinyemi, Joshua & Solanke, Bola Lukman & Odimegwu, Clifford. (2018). *Maternal Employment and Child Survival During the Era of Sustainable Development Goals: Insights from Proportional Hazards Modelling of Nigeria Birth History Data*. *Annals of Global Health*. 84. 15-30. 10.29024/aogh.11.
- Akkoyunlu Wigley, A., & Çağatay, S. (Eds.). (2019) *The Dynamics of Growth in Emerging Economies: The Case of Turkey* (1st ed.). Routledge. <https://doi.org/10.4324/9780429436369>
- Alesina, A., & Perotti, R. (1996, June). Income distribution, political instability, and investment. *European Economic Review*, 40(6), 1203–1228. [https://doi.org/10.1016/0014-2921\(95\)00030-5](https://doi.org/10.1016/0014-2921(95)00030-5)
- Altuzarra, A., Galvez-Galvez, C., & Gonzalez-Flores, A. (2019). Economic Development and Female Labour Force Participation: The case of European Union Countries. *Sustainability*, 11.
- Amin, S., and J. DaVanzo. 2004. "The Impact of Wives' Earnings on Earnings Inequality among Married Couple Households in Malaysia." *Journal of Asian Economics* 15:49-70
- Anyanwu, John & Erhijakpor, Andrew & Obi, Emeka. (2016). Empirical Analysis of the Key Drivers of Income Inequality in West Africa. *African Development Review*. Vol. 28. Pages 18-38. 10.1111/1467-8268.12164.
- Arzu Akkoyunlu Wigley and Selim Çağatay, (2019). "The Dynamics of Growth in Emerging Economies: In case of turkey." *Women–Employment–Turkey*. | Information technology–Economic aspects. Available at <https://lccn.loc.gov/2018043357>
- Asongu, S. A., Nnanna, J., & Acha-Anyi, P. N. (2020, September). Finance, inequality and inclusive education in Sub-Saharan Africa. *Economic Analysis and Policy*, 67, 162–177. <https://doi.org/10.1016/j.eap.2020.07.006>
- Asongu, Simplice and Odhiambo, Nicholas (2019): *Inequality and the Economic Participation of Women in Sub-Saharan Africa: An Empirical Investigation*. Published in: *African Journal of Economic and Management Studies* , Vol. 11, No. 2 (June 2020): pp. 193-206.

- Asongu, S. A., & Asongu, S. A. (2018). Human development index and income inequality in Sub-Saharan Africa. *Journal of Human Development and Capabilities*, 19(3), 327-344.
- Batuo, M. E., Kararach, G., & Malki, I. (2022, September). The dynamics of income inequality in Africa: An empirical investigation on the role of macroeconomic and institutional forces. *World Development*, 157, 105939. <https://doi.org/10.1016/j.worlddev.2022.105939>
- Bhorat H., and M. Oosthuizen (2020), Jobs, Economic Growth, and Capacity Development for Youth in Africa, Working Paper Series N° 336, African Development Bank, Abidjan, Côte d'Ivoire.
- Björklund, A. 1992. "Rising Female Labour Force Participation and the Distribution of Family Income— The Swedish Experience. *Acta Sociologica*, 35:299.
- Blau, Francine D., and Lawrence M. Kahn. "The Gender Pay Gap: Evidence from the 1950s to the 1990s." *The Journal of Economic Perspectives*, vol. 14, no. 4, 2000, pp. 79-95., doi:10.1257/jep.14.4.79.
- Bourguignon, Francois. (2004). The Poverty-Growth-Inequality Triangle, Available at: https://www.researchgate.net/publication/5127146_The_Poverty-Growth-Inequality_Triangle
- Boushey, H. (2020). Unbound: Releasing Inequality's Grip on Our Economy. *Review of Radical Political Economics*, 52(4), 597–609. <https://doi.org/10.1177/0486613420938187>
- Budig, Michelle J., and Paula England. "The Gender Gap in Pay: The Role of Occupations, Work Schedules, and Credentials." *Social Forces*, vol. 88, no. 2, 2010, pp. 659-682., doi:10.1353/sof.0.0182.
- Chancel, L., Cogneau, D., Gethin, A., Myczkowski, A., & Robilliard, A. S. (2023, March). Income inequality in Africa, 1990–2019: Measurement, patterns, determinants. *World Development*, 163, 106162. <https://doi.org/10.1016/j.worlddev.2022.106162>
- Cuberes, David & Teignier, Marc. (2012). Gender Gaps in the Labor Market and Aggregate Productivity.
- David, et al. "The Polarization of the U.S. Labor Market." *The Journal of Economic Perspectives*, vol. 29, no. 3, 2015, pp. 31-48., doi:10.1257/jep.29.3.31
- Del Boca, D., and S. Pasqua. 2003. "Employment Patterns of Husbands and Wives and Family Income Distribution in Italy (1977-98)." *Review of income and wealth* 49:221-45.
- Enowbi Batuo, M., Kararach, G., & Malki, I. (2021). The Macroeconomic and Institutional Effects on Income Inequality in Africa. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3855517>
- Fruttero, Anna & Gurara, Daniel & Kolovich, Lisa & Malta, Vivian & Tavares, Marina & Tchelishvili, Nino & Fabrizio, Stefania. (2020). Women in the Labor Force: The Role of Fiscal Policies. 10.5089/9781513529134.006

- Fruttero, Anna & Gurara, Daniel & Kolovich, Lisa & Malta, Vivian & Tavares, Marina & Tchelishvili, Nino & Fabrizio, Stefania. (2020). Women in the Labor Force: The Role of Fiscal Policies. Staff Discussion Notes. 20. 10.5089/9781513529134.006.
- Gronau, R. (1982). Inequality of Family Income: Do Wives' Earnings Matter? *Population and Development Review*, 8, 119-136.
- Habtamu Fuje, Rasmane Ouedraogo, Jiaxiong Yao, Mohamed Diaby, and Franck Ouattara (2022), IMF World Economic and Financial Surveys Regional Economic Outlook for Sub-Saharan Africa
- Harkness, Susan. 2010. "The Contribution of Women's Employment and Earnings to Household Income Inequality: A Cross-Country Analysis." LIS Working Paper Series
- Hsiao, C. (2003). *Analysis of panel data*. Cambridge, UK: Cambridge University Press.
- Iadow, O. O., & Owoeye, T. (2019). Female Labour Force Participation in African Countries: An Empirical Analysis. *Indian Journal of Human Development*, 13(3), 278–293. <https://doi.org/10.1177/0973703019895234>
- Iheonu, C. O., Nwodo, O., Anaduaka, U., & Ekpo, U. (2020, December 18). Inequality and female labour force participation in West Africa. *European Journal of Government and Economics*, 9(3), 252–264. <https://doi.org/10.17979/ejge.2020.9.3.6717>
- Katharine Bradbury, & Robert K. Triest. (2016). Inequality of Opportunity and Aggregate Economic Performance. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 2(2), 178–201. <https://doi.org/10.7758/rsf.2016.2.2.08>
- Kesuh Jude Thaddeus, Dimna Bih and Njimukala Moses Nebong, Chi Aloysius Ngong, Eric Achiri Mongo, Akume Daniel Akume, Josaphat Uchechukwu Joe Onwumere (2021): Female labour force participation rate and economic growth in sub-Saharan Africa: “a liability or an asset” *Journal of Business and Socioeconomic Development Emerald Publishing Limited e-ISSN: 2635-1692 p-ISSN: 2635-1374 DOI 10.1108/JBSED-09-2021-0118, Vol. 2 No. 1, 2022 pp. 34-48*
- Krugman, Paul. "Technological Change and the Inequality of Nations." *The Quarterly Journal of Economics*, vol. 111, no. 4, 1996, pp. 1073-1104., doi:10.1162/0033553965555518.
- Kuhn, Ursina, and Laura Ravazzini. 2015. "High Female Labour Force Participation and Income Inequality." <http://www.researchgate>.
- Kuznets, S. (1955). Economic Growth and Income Inequality. *The American Economic Review*, 45(1), 1–28. <http://www.jstor.org/stable/1811581>
- Naoki Sudo, *The Effects of Women's Labor Force Participation: An Explanation of Changes in Household Income Inequality, Social Forces*, Volume 95, Issue 4, June 2017, Pages 1427–1450, <https://doi.org/10.1093/sf/sox011>

Nelissen, J. (1990). The Effect of Increased Labour Force Participation of Married Women on the Distribution of Family Income in the Netherlands. *De Economist*, 138, 47-62.

Nkoumou Ngoa, G. B., & Song, J. S. (2021, October). Female participation in African labor markets: The role of information and communication technologies. *Telecommunications Policy*, 45(9), 102174. <https://doi.org/10.1016/j.telpol.2021.102174>

Pasqua, S. 2008. "Wives' Work and Income Distribution in European Countries." *The European Journal of Comparative Economics* 5(2): 197-226.

Perotti, R. (1996). Growth, Income Distribution, and Democracy: What the Data Say. *Journal of Economic Growth*, 1(2), 149–187. <http://www.jstor.org/stable/40215914>

Persson, T., & Tabellini, G. (1994). Is Inequality Harmful for Growth? *The American Economic Review*, 84(3), 600–621. <http://www.jstor.org/stable/2118070>

Psacharopoulos, G., & Tzannatos, Z. (1989). Female Labor Force Participation: An International Perspective. *The World Bank Research Observer*, 4(2), 187–201. <http://www.jstor.org/stable/3986509>

Schivardi, F. (2003, February). Reallocation and learning over the business cycle. *European Economic Review*, 47(1), 95–111. [https://doi.org/10.1016/s0014-2921\(02\)00210-6](https://doi.org/10.1016/s0014-2921(02)00210-6)

Segato, Federico, 2021. "[Female labour force participation and household income inequality in Italy](#)," [MPRA Paper](#) 108280, University Library of Munich, Germany.

Sudo, N. (2017). The Effects of Women's Labor Force Participation: The Effects of Women's Labor Force Participation: An Explanation of Changes in Household Income Inequality. *Social Forces*, 95(4), 1427–1449. <http://www.jstor.org/stable/26166880>

[Thaddeus, K.J.](#), [Bih, D.](#), Nebong, N.M., [Ngong, C.A.](#), [Mongo, E.A.](#), [Akume, A.D.](#) and [Onwumere, J.U.J.](#) (2022), "Female labour force participation rate and economic growth in sub-Saharan Africa: “a liability or an asset”", *Journal of Business and Socio-economic Development*, Vol. 2 No. 1, pp. 34-48. <https://doi.org/10.1108/JBSED-09-2021-0118>

Van de Walle, N. (2009, June 1). The Institutional Origins of Inequality in Sub-Saharan Africa. *Annual Review of Political Science*, 12(1), 307–327. <https://doi.org/10.1146/annurev.polisci.11.063006.092318>

Verick, S. (2014) Women labour force involvement in Developing Countries. *IZA World of Labor*, 2014, 87. <https://doi.org/10.15185/izawol.87>

Western, B., D. Bloome, and C. Percheski. 2008. "Inequality among American Families with Children, 1975 to 2005." *American Sociological Review* (6):903.

Whalley, J., & Curwen, P. (2020, June 26). A tale of two continents: the internationalisation of Millicom in Africa and Latin America. *Digital Policy, Regulation and Governance*, 22(3), 177–199. <https://doi.org/10.1108/dprg-08-2019-0065>

World Bank . 2012. *World Development Report 2012: Gender Equality and Development*

World Bank . (2019). Inflation in Sub-Saharan Africa: Causes and Policy Responses. The World Bank Policy Research Working Paper, No. 8894. Washington, DC: The World Bank .

World Bank . (2019). Population growth and inequality. Washington, DC: The World Bank .

World Bank . (2021). World Development Report 2021: The Changing Nature of Work. Washington, DC: The World Bank .

Appendix 1. List of Countries

1. CMR = Cameroon
2. CVI = Central African Republic
3. CAF = Cote d'Ivoire
4. ETH = Ethiopia
5. GMB = Gambia
6. GNB = Guinea-Bissau
7. MDG = Madagascar
8. MRT = Mauritania
9. RWA = Rwanda
10. SEN = Senegal
11. TGO = Togo
12. UGA = Uganda

Appendix 2. STATA Result

```

. import excel "C:\Users\mastewal.hailemaryam\OneDrive - \Documents\Masti\Thesis\Defe
> nce Materials\Book_12_R.xlsx", sheet("Sheet1") firstrow clear

. egen country=group( Country)

. egen year=group(Year)

. xtset country year,yearly
      panel variable:  country (strongly balanced)
      time variable:  year, 1 to 21
                   delta: 1 year

```

```
. sum
```

Variable	Obs	Mean	Std. Dev.	Min	Max
Country	0				
Year	252	2010	6.067351	2000	2020
GNI	252	.3793651	.0926007	.21	.66
FLFP_ILO	252	43.96127	4.969786	30.91514	49.43054
GDPpc	252	1.542057	4.51876	-36.7777	15.68832
Inf	252	4.943718	5.40717	-8.237845	44.35669
HDI	252	.4644008	.0578263	.287	.583
POPg	252	2.59676	.4287038	-.076949	3.496468
country	252	6.5	3.458922	1	12
year	252	11	6.067351	1	21

```
. tab country, gen(count)
```

```
group(Count |  
      ry) |      Freq.      Percent      Cum.  
-----+-----  
      1 |          21          8.33          8.33  
      2 |          21          8.33         16.67  
      3 |          21          8.33         25.00  
      4 |          21          8.33         33.33  
      5 |          21          8.33         41.67  
      6 |          21          8.33         50.00  
      7 |          21          8.33         58.33  
      8 |          21          8.33         66.67  
      9 |          21          8.33         75.00  
     10 |          21          8.33         83.33  
     11 |          21          8.33         91.67  
     12 |          21          8.33        100.00  
-----+-----  
     Total |         252        100.00
```

```
. reg GNI FLFP_ILO Uemp_ILO GDPpc Inf HDI POPg count2-count12  
variable Uemp_ILO not found  
r(111);
```

```
. reg GNI FLFP_ILO GDPpc Inf HDI POPg count2-count12
```

```
Source |      SS      df      MS      Number of obs =      252  
-----+-----  
      Model |  1.98308661      16  .123942913  F(16, 235) =      172.13  
      Residual |  .169211804     235  .00072005  Prob > F =      0.0000  
-----+-----  
      Total |  2.15229841     251  .008574894  R-squared =      0.9214  
                               Adj R-squared =      0.9160  
                               Root MSE =      .02683
```

	GNI	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
FLFP_ILO		-.0075724	.0019756	-3.83	0.000	-.0114646 -.0036802
GDPpc		.0003364	.0004168	0.81	0.420	-.0004847 .0011575
Inf		.0004411	.0003876	1.14	0.256	-.0003224 .0012047
HDI		-1.135206	.0498728	-22.76	0.000	-1.233461 -1.036951
EQG		-.0252976	.0059558	-4.25	0.000	-.0370312 -.013564
count2		-.1652351	.0117149	-14.10	0.000	-.1883148 -.1421554
count3		-.1657062	.0163385	-10.14	0.000	-.1978949 -.1335175
count4		.0372407	.0106986	3.48	0.001	.0161634 .0583181
count5		-.1961976	.010421	-18.83	0.000	-.2167281 -.1756671
count6		-.136918	.009607	-14.25	0.000	-.1558449 -.1179911
count7		-.0364842	.0092905	-3.93	0.000	-.0547875 -.0181809
count8		-.0883395	.0310785	-2.84	0.005	-.1495675 -.0271114
count9		-.0171069	.0091769	-1.86	0.064	-.0351863 .0009726
count10		-.1983576	.0216975	-9.14	0.000	-.2411041 -.1556111
count11		-.090077	.0085094	-10.59	0.000	-.1068415 -.0733125
count12		-.0201987	.0091093	-2.22	0.028	-.0381449 -.0022524
_cons		1.392222	.0836061	16.65	0.000	1.227509 1.556936

. testparm count2-count12

- (1) count2 = 0
- (2) count3 = 0
- (3) count4 = 0
- (4) count5 = 0
- (5) count6 = 0
- (6) count7 = 0
- (7) count8 = 0
- (8) count9 = 0
- (9) count10 = 0
- (10) count11 = 0
- (11) count12 = 0

F(11, 235) = 118.93
 Prob > F = 0.0000

```
. xtreg GNI FLFP_ILO GDPpc Inf HDI POrg , re
```

```
Random-effects GLS regression           Number of obs   =       252
Group variable: country                 Number of groups =       12
```

```
R-sq:                                Obs per group:
    within = 0.7982                    min =          21
    between = 0.1274                   avg =         21.0
    overall = 0.3411                    max =          21
```

```
Wald chi2(5) = 876.85
Prob > chi2 = 0.0000
COR(u_i, X) = 0 (assumed)
```

```
-----+-----
```

	GNI	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
	FLFP_ILO	-.0053343	.001691	-3.15	0.002	-.0086486 - .00202
	GDPpc	.0003491	.0004286	0.81	0.415	-.000491 .0011892
	Inf	.000575	.0003976	1.45	0.148	-.0002043 .0013543
	HDI	-1.161864	.0484292	-23.99	0.000	-1.256783 -1.066944
	POrg	-.0240883	.0060976	-3.95	0.000	-.0360394 -.0121371
	_cons	1.21261	.0693262	17.49	0.000	1.076734 1.348487

```
-----+-----
```

	sigma_u	.05013228
	sigma_e	.02683375
	rho	.77730146 (fraction of variance due to u_i)

```
-----+-----
```

```
. estimates store re
```

```
. xtreg GNI FLFP_ILO GDPpc Inf HDI POrg , fe
```

```
Fixed-effects (within) regression       Number of obs   =       252
Group variable: country                 Number of groups =       12
```

```
R-sq:                                Obs per group:
    within = 0.7994                    min =          21
    between = 0.0893                   avg =         21.0
    overall = 0.2952                    max =          21
```

```
F(5,235) = 187.25
Prob > F = 0.0000
COR(u_i, Xk) = -0.3636
```

```

-----
      GNI |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----+-----
      FLFP_ILO |   -0.0075724   .0019756    -3.83   0.000   -0.0114646   -0.0036802
      GDPpc |   .0003364   .0004168     0.81   0.420   -0.0004847   .0011575
      Inf |   .0004411   .0003876     1.14   0.256   -0.0003224   .0012047
      HDI |  -1.135206   .0498728   -22.76   0.000   -1.233461   -1.036951
      EQPg |  -0.0252976   .0059558    -4.25   0.000   -0.0370312   -0.013564
      _cons |   1.302441   .0773398    16.84   0.000    1.150073    1.454809
-----+-----
      sigma_u |   .08199463
      sigma_e |   .02683375
      rho |   .90326027   (fraction of variance due to u_i)
-----
F test that all u_i=0: F(11, 235) = 118.93          Prob > F = 0.0000

```

```
. estimates store fe
```

```
. hausman fe re
```

```

----- Coefficients -----
      |      (b)      (B)      (b-B)      sqrt(diag(V_u_b-V_u_B))
      |      fe      re      Difference      S.E.
-----+-----
      FLFP_ILO |  -0.0075724  -0.0053343  -0.0022381  .0010215
      GDPpc |   .0003364   .0003491  -0.0000127  .
      Inf |   .0004411   .000575  -0.0001339  .
      HDI |  -1.135206  -1.161864   .0266579  .0119125
      EQPg |  -0.0252976  -0.0240883  -0.0012093  .
-----+-----

```

```

      b = consistent under Ho and Ha; obtained from xtreg
      B = inconsistent under Ha, efficient under Ho; obtained from xtreg

```

```
Test: Ho: difference in coefficients not systematic
```

```

      chi2(5) = (b-B)'[(V_u_b-V_u_B)^(-1)](b-B)
              =      1.62
      Prob>chi2 =      0.8992
      (V_u_b-V_u_B is not positive definite)

```

```
. reg GNI FLFP_ILO GDPpc Inf HDI ROEg count2-count12
```

Source	SS	df	MS	Number of obs	=	252
-----+-----						
				F(16, 235)	=	172.13
Model	1.98308661	16	.123942913	Prob > F	=	0.0000
Residual	.169211804	235	.00072005	R-squared	=	0.9214
-----+-----						
				Adj R-squared	=	0.9160
Total	2.15229841	251	.008574894	Root MSE	=	.02683

GNI	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
GNI	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
-----+-----						
FLFP_ILO	-.0075724	.0019756	-3.83	0.000	-.0114646	-.0036802
GDPpc	.0003364	.0004168	0.81	0.420	-.0004847	.0011575
Inf	.0004411	.0003876	1.14	0.256	-.0003224	.0012047
HDI	-1.135206	.0498728	-22.76	0.000	-1.233461	-1.036951
ROEg	-.0252976	.0059558	-4.25	0.000	-.0370312	-.013564
count2	-.1652351	.0117149	-14.10	0.000	-.1883148	-.1421554
count3	-.1657062	.0163385	-10.14	0.000	-.1978949	-.1335175
count4	.0372407	.0106986	3.48	0.001	.0161634	.0583181
count5	-.1961976	.010421	-18.83	0.000	-.2167281	-.1756671
count6	-.136918	.009607	-14.25	0.000	-.1558449	-.1179911
count7	-.0364842	.0092905	-3.93	0.000	-.0547875	-.0181809
count8	-.0883395	.0310785	-2.84	0.005	-.1495675	-.0271114
count9	-.0171069	.0091769	-1.86	0.064	-.0351863	.0009726
count10	-.1983576	.0216975	-9.14	0.000	-.2411041	-.1556111
count11	-.090077	.0085094	-10.59	0.000	-.1068415	-.0733125
count12	-.0201987	.0091093	-2.22	0.028	-.0381449	-.0022524
_cons	1.392222	.0836061	16.65	0.000	1.227509	1.556936

```
. xtunitroot llc GNI, lags(1)
```

```
Levin-Lin-Chu unit-root test for GNI
```

```
-----  
Ho: Panels contain unit roots      Number of panels =    12  
Ha: Panels are stationary          Number of periods =   21
```

```
AR parameter: Common                Asymptotics: N/T -> 0  
Panel means:  Included  
Time trend:  Not included
```

```
ADF regressions: 1 lag
```

```
LR variance:  Bartlett kernel, 8.00 lags average (chosen by LLC)
```

```
-----  
Statistic      p-value  
-----  
Unadjusted t   -4.0802  
Adjusted t*    -2.5256      0.0058  
-----
```

```
. xtunitroot llc FLFP_ILO , lags(1)
```

```
Levin-Lin-Chu unit-root test for FLFP_ILO
```

```
-----  
Ho: Panels contain unit roots      Number of panels =    12  
Ha: Panels are stationary          Number of periods =   21
```

```
AR parameter: Common                Asymptotics: N/T -> 0  
Panel means:  Included  
Time trend:  Not included
```

```
ADF regressions: 1 lag
```

```
LR variance:  Bartlett kernel, 8.00 lags average (chosen by LLC)
```

```
-----  
Statistic      p-value  
-----  
Unadjusted t   -4.7677  
Adjusted t*    -3.3483      0.0004  
-----
```

```
. xtunitroot llc GDPpc , lags(1)
```

```
Levin-Lin-Chu unit-root test for GDPpc
```

```
-----  
Ho: Panels contain unit roots          Number of panels =    12  
Ha: Panels are stationary              Number of periods =   21
```

```
AR parameter: Common                  Asymptotics: N/T -> 0  
Panel means: Included  
Time trend: Not included
```

```
ADF regressions: 1 lag
```

```
LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)
```

```
-----  
Statistic      p-value  
-----  
Unadjusted t   -9.4857  
Adjusted t*    -3.3291      0.0004  
-----
```

```
. xtunitroot llc Inf , lags(1)
```

```
Levin-Lin-Chu unit-root test for Inf
```

```
-----  
Ho: Panels contain unit roots          Number of panels =    12  
Ha: Panels are stationary              Number of periods =   21
```

```
AR parameter: Common                  Asymptotics: N/T -> 0  
Panel means: Included  
Time trend: Not included
```

```
ADF regressions: 1 lag
```

```
LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)
```

```
-----  
Statistic      p-value  
-----  
Unadjusted t   -11.1773  
Adjusted t*    -6.0956      0.0000  
-----|
```

```
. xtunitroot llc HDI , lags(1)
```

```
Levin-Lin-Chu unit-root test for HDI
```

```
-----
```

```
Ho: Panels contain unit roots          Number of panels =    12
```

```
Ha: Panels are stationary              Number of periods =   21
```

```
AR parameter: Common                  Asymptotics: N/T -> 0
```

```
Panel means: Included
```

```
Time trend: Not included
```

```
ADF regressions: 1 lag
```

```
LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)
```

```
-----
```

	Statistic	p-value
Unadjusted t	-5.7956	
Adjusted t*	-4.6680	0.0000

```
-----
```

```
. xtunitroot llc FOPg , lags(1)
```

```
Levin-Lin-Chu unit-root test for FOPg
```

```
-----
```

```
Ho: Panels contain unit roots          Number of panels =    12
```

```
Ha: Panels are stationary              Number of periods =   21
```

```
AR parameter: Common                  Asymptotics: N/T -> 0
```

```
Panel means: Included
```

```
Time trend: Not included
```

```
ADF regressions: 1 lag
```

```
LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)
```

```
-----
```

	Statistic	p-value
Unadjusted t	-6.8814	
Adjusted t*	-3.4480	0.0003

```
-----
```

```

. reg GNI FLFP_ILO GDPpc Inf HDI POPg count2-count12
-----+-----
Source |      SS          df           MS       Number of obs   =      252
-----+-----+-----+-----+-----+-----
Model |  1.98308661         16   .123942913   F(16, 235)       =     172.13
Residual | .169211804        235   .00072005   Prob > F         =     0.0000
-----+-----+-----+-----+-----+-----
Total |  2.15229841        251   .008574894   R-squared        =     0.9214
                                           Adj R-squared   =     0.9160
                                           Root MSE      =     .02683
-----+-----
GNI |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----+-----
FLFP_ILO | -.0075724   .0019756    -3.83   0.000   -.0114646   -.0036802
GDPpc |  .0003364   .0004168     0.81   0.420   -.0004847   .0011575
  Inf |  .0004411   .0003876     1.14   0.256   -.0003224   .0012047
  HDI | -1.135206   .0498728   -22.76   0.000   -1.233461   -1.036951
POPg | -.0252976   .0059558    -4.25   0.000   -.0370312   -.013564
count2 | -.1652351   .0117149   -14.10   0.000   -.1883148   -.1421554
count3 | -.1657062   .0163385   -10.14   0.000   -.1978949   -.1335175
count4 |  .0372407   .0106986     3.48   0.001   .0161634   .0583181
count5 | -.1961976   .010421   -18.83   0.000   -.2167281   -.1756671
count6 | -.136918   .009607   -14.25   0.000   -.1558449   -.1179911
count7 | -.0364842   .0092905    -3.93   0.000   -.0547875   -.0181809
count8 | -.0883395   .0310785    -2.84   0.005   -.1495675   -.0271114
count9 | -.0171069   .0091769    -1.86   0.064   -.0351863   .0009726
count10 | -.1983576   .0216975   -9.14   0.000   -.2411041   -.1556111
count11 | -.090077   .0085094   -10.59   0.000   -.1068415   -.0733125
count12 | -.0201987   .0091093    -2.22   0.028   -.0381449   -.0022524
  _cons |  1.392222   .0836061    16.65   0.000   1.227509   1.556936

```