Public Expenditure, Agricultural Productivity, and Income Inequality in ECOWAS

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Being a MSc Thesis Submitted to the Department of Economics, Faculty of Social Sciences, Lead City University, Ibadan Oyo State, Nigeria

In Partial Fulfillment of the Requirement for the Award of Masters Degree (MSc) in Economics

2023

Certification

This is to certify that Abimbola Elizabeth Adetunji with Matriculation Number LCU/PG/002673 carried out this research work titled "Public Expenditure, Agricultural Productivity and Income Inequality in ECOWAS" in the Department of Economics, Faculty of Management and Social Sciences, Lead City University, Ibadan, Oyo State Nigeria, for the award of Masters Degree (MSc) in Economics and that this has not been previously submitted.

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Dedication

This thesis is dedicated to the Almighty God and my lovely husband, Mr Johnson Adebayo Adetunji.

Acknowledgement

I am grateful to God for the successful completion of this thesis and my Masters degree programme in economics at Lead City University, Ibadan.

I wish to appreciate the management of Lead City University for the opportunity afforded me to pursue my postgraduate studies with the laudable university. My profound gratitude goes to the Vice-chancellor of the institution, Professor K.A. Adeyemo and the Provost of Postgraduate School, Professor AfolakemiOredein.

My special appreciation goes to my supervisor Prof. W.O Akerele for the encouragements, useful comments, and valuable suggestions which contributed immensely to the Successful completion of this projects, I am highly grateful. My gratitude also goes to Prof. O.A Campbell (Dean, Faculty of Social Science), Dr. O.O Ogunjinmi (H.O.D, Economic), Dr. O.O Adesina, Dr. O.Y Alimi, Dr. T.T Ogunro, Dr. E. Aderinto and all other lecturers whose impactful tutelage contributed to the success of my quest for knowledge with the University.

My appreciation also goes to my course mates: Mr Kezeem, Mr Olajide, Mr Bethel and all others for their support and encouragement to all Academic and Non-academic Staff of Lead City University Postgraduate School, I am grateful.

I deeply appreciate my brothers and Sisters, Kayode Ologuntere, May the grace of God Almighty continue to abide with you guys in all your endeavours. Thank you all for your supports. I am grateful.

In conclusion, I acknowledge that even though the above-mentioned institution and persons have assisted in the process of this research work, I alone stand responsible for the errors, if any, found in this work.

Abstract

High disparities in the distribution of public expenditure across the agricultural sector in ECOWAS have exacerbated economic inequalities among its residents, as large individuals or groups receive disproportionate attention. Moreover, the effectiveness of public spending in enhancing agricultural productivity has faced severe problems in the region, thereby posing substantial challenges to the goal of reducing income inequality in the ECOWAS region. This study investigates the interactive effects of agriculture productivity and public expenditure on income inequality in ECOWAS from 2000 to 2021. Using the panel ARDL approach, the study found that agriculture productivity and public expenditure positively and significantly influence income in ECOWAS. It implies that increased productivity primarily benefits large-scale commercial farmers or those with access to modern agricultural technologies which therefore exacerbate existing income disparities. Thus, agriculture productivity widen gap between the wealthier agricultural producers and smallholder farmers, contributing to overall income inequality. The positive and significant impact of public expenditure on income inequality in ECOWAS suggests that public spending primarily benefits higher-income groups or is directed toward projects that do not address the needs of the poor, it can contribute to increased income inequality.The negative and insignificant impact of public expenditure and agriculture productivity on income inequality suggests that the joint effect of agriculture productivity and public expenditure does not significantly alter the existing income distribution patterns in ECOWAS. In economic terms, this could imply that despite efforts to enhance productivity in the agricultural sector and increase public spending, the outcomes do not translate into a substantial change in the distribution of income among different segments of the population.Government should increase public expenditures on social programs that directly benefit the poor and vulnerable populations. Investments in education, healthcare, and social safety nets can improve human capital development and reduce income inequality.

Keywords: Government spending, agriculture output growth, GINI index, ECOWAS.

Word Counts: 296

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Chapter One

Introduction

1.1 Background to the Study

The fast and growing economic share in the West African region accounts for unequal distribution of wealth and income, which pushes the rate of poverty upwards, instigates violation of fundamental human rights, and underscores the performance of West African governments in fulfilling their expected obligations to their citizens. However, millions of people's lives are short-lived or truncated due to limited and lack of good health care.

However, Inequalities beyond a certain threshold has been revealed to undermine and impede the level of growth[1], as well as making growth experienced become highly ineffective in fighting against poverty in the Economic of West African States (ECOWAS)[2]. Despite the fact that, Africa is one of the largest economies among the continents in the world, over 50% of its citizens are still living on less than $1.90 per day which indicates the limit of extreme poverty.

It has been revealed by many scholars that high degree of income disparity has a positive correlation with rise in the level of crime[3,4], thus negatively affects African region, as many suffer the pains of economic imbalance due to lack of employment opportunities or inadequate access to resources which results in higher degree of criminal activities in the region. Increased income inequality leading to limited access to good health services and good nutrition have caused many vulnerable in West African to be exposed to serious illnesses, chronic diseases and sudden deaths[5].

The adverse effect of income disparity in ECOWAS has led to unequal education level of many low-income earners, which has resulted to decrease in the regional average level of education in West Africa. Political inequality is one of the socio-economic phenomena instigated by income

disparity as the share of national income or wealth that should have provided great opportunity to improve the lives of people is unfortunately concentrated only in the hands of selected the few rich[6].

The divergence in the levels and trends of disparity in West African region, has led to some of the 15 members of the economic Community of West African States such as Benin, Cote d' Ivorie, Ghana, Togo and Nigeria to simultaneously experience a rise in income inequalities between 2000 and 2011,while Senegal, Mali and Niger witnessed a decline between 2000-2011.The 10% richest in Ghana and Nigeria experienced increase in the consumption share, while 40% of the poorest in the two economies witnessed decrease in share of consumption. Inversely, most vulnerable in Senegal, Mali and Nigeria experienced increase in the share of consumption, compared to the share of the richest in the region[7].

The relationship between agricultural productivity and income inequality as noticed by the economists has been a matter of concern to policy makers of both the advanced and less developed economies over the years especially in ECOWAS. Even though, the agriculture sector serves as the largest employer of labour[8,9]. Agriculture system practiced in West African Economies is still confronted with problems of limited agricultural land, unfavorable climatic condition[10], decline in agricultural public spending, inadequate funding, inadequate manpower, lack of adequate research and machinery.

Therefore, it is however relevant to observe that the rate of change that occurs in agricultural productivity affects income distribution. And this is noticed to have a negative or indirect relationship (that is, high agricultural productivity in the long run reduces income inequality level). In the past years, agricultural productivity - income inequality relationship and the role of public expenditure has consistently triggered a debate among various international institutions

policy makers and educationists due to the coincidence of high-income inequality and low agricultural productivity in ECOWAS. This is in contrast to the belief that high inequality may increase growth, provided it promotes incentives for people to work harder, invest and innovate. However, improvements have been recorded in some parts of the region, as it is revealed that the agricultural contributions to economic growth in Sub-Saharan Africa is still high at 17.5%, compared with 5.3% in Latin America and 1.6% in Caribbean[10].It is also revealed that agricultural sector contributes 43% of GDP in Ivory Coast and 77% in Niger[11].

The roles of public expenditure have been argued to include economic welfare maximization, promotion of full employment, and equal distribution of income, poverty alleviation and economic stability. These objectives are relevant for the accomplishment and promotion of sustainable economic growth and stability. Although the effectiveness of public expenditure varies and depends on each country's policy makers, the institutional mechanisms employed and the areas of concern.

The mandates of the policy makers include promoting the welfare of the citizens, provision and promotion of economic activities, provision of social amenities, maintenance of law and order, provision of security, protection of fundamental human rights, redistribution of income and economic stability[18]. And for these objectives to be fulfilled, institutional authority needs to adopt public expenditure frameworks to stabilize or influence the economy. Public expenditure services directed to education, health, agriculture, and social protection has been revealed to have a positive effect on lowering inequality in West Africa[12, 13]. The level of commitment and seriousness shown by the ECOWAS governments, especially Nigeria, Sierra Leone and Guinea Bissau revealed their ineffectiveness in fulfillment of their duties to their citizens, while Burkina Faso, Senegal and Mali are regarded as the most committed so far. African Agricultural

Development program (CAAPD) was purposely initiated for West African governments to improve their budgetary allocations to at least 10% in the agricultural sector on a yearly basis[14]. And also to invest in public goods, Economic of West African Agricultural Programme (ECOWAP) was adopted, as well as agricultural tariffs were raised from 20% to 30% to provide protection for farmers. The efficacy of this public expenditure framework is proven by its potency to attain the final objectives of income redistribution and agricultural productivity to eradicate povertyand income disparity[15,16]. Moreover, even though, various fiscal policies and mechanisms have been employed over the years by ECOWAS governments, the region has persistently witnessed increased income inequality in which its effects are unfavorably affecting the ECOWAS region.

1.2 Statement of Problem

Over the years, many institutional policies have been established to stimulate growth in ECOWAS region, but these policies have not achieved meaningful success. However, Income inequality becomes one of the critical challenges affecting the West African from attaining long-term economic growth and development[17]. According to the Goal 10 of the SDGs which was planned to abate inequality within and among economies of the world, coupled with its significant target that states that by 2030, the world will progressively achieve sustainable income growth of the bottom 40% of the population at a level greater than the average national income. The aftermath of increase in income disparity between the rich and poor, enables Economists both globally and nationally to study about this fast-growing phenomenon, and how it can be tackled to allow meaningful economic growth records. The results revealed that, public spending adopted by West African region has not and stimulated effective and long-term agricultural productivity that will help in abating unequal distribution of income, such as

adoption of regressive taxation system by policy makers which imposes heavy burden on the poor group in the economy [18,]

Further, most economists and policy makers are still divided on their conclusions about how the most appropriate, targeted, and directional fiscal expenditures tools can be employed to curb the level of Income disparity affecting the West African Countries. This is because the trends of disparity differ across both the developed and developing economies, so the distributional policies measure heterogeneously should be adopted by each region.

Researchers have empirically revealed whether equal distribution of income or wealth is attributed to effective public expenditure mechanisms and agricultural productivity or whether income disparity level is traced to other factors. However, the trends of income disparity in ECOWAS region had instigated numerous economic crises in Countries like, Nigeria, Mali, Carbo Verde, at different periods. Various level of income disparity occurred in each Country at different times in ECOWAS region. In general ECOWAS region recorded some socio-economic variables determinants of income inequality which are tax policy, political interest and choices, public policies and national resources. Some economic theorists have stated that fiscal expenditure framework and agricultural modernization narrow the rate of income disparity. But available empirical studies present controversial proofs.

Some have examined empirically that the efficacy of public expenditure policies and agricultural modernization are significant in abating income disparity in the ECOWAS region, others have examined whether these fiscal spending mechanisms truly had effect as specified in a priori expectation when tested empirically[20,21]. In order to correct this macro-economic issue, this study attempt to examine the public expenditure instruments and agricultural mechanisms, adopted by the ECOWAS policy makers to stimulate agricultural productivity, abate the level of

income disparity, analyse the impact of public expenditure on income disparity and also to investigate which fiscal expenditure tool and agricultural practices are potent and effective in abating income disparity and stimulating Agricultural productivity in ECOWAS region. Moreover, this study will also attempt to determine the interaction of public expenditure and agricultural productivity on income inequality.

1.3 Aim and Objectives of the Study

The aim of this study is to examine the relationship between public expenditure and agricultural productivity in ECOWAS. The specific objectives are to:

a) Examine the effect of public expenditure on income inequality in ECOWAS.
b) Investigate the effect of agricultural productivity on income inequality in ECOWAS.
c) To analyse the effect of the interaction of the public expenditure and agricultural productivity on income inequality in ECOWAS.

1.4 Research Questions

This seeks to address the following questions:

a) How does public expenditure affect income inequality in ECOWAS?
b) To what extent does agricultural productivity affect income inequality in ECOWAS?
c) Is the interaction of public expenditure and agricultural productivity affecting income inequality in ECOWAS?

1.5 Hypotheses

The study seeks to test the following hypotheses:

H_{01}: Public expenditure has no effect on income inequality rate in ECOWAS.

H_{02}: Agricultural productivity has no effect on income inequality rate in ECOWAS.

H_{03}: Interaction of public expenditure and agricultural productivity has no effect on income inequality in ECOWAS.

1.6 Scope of the Study

This study seeks to add to the existing body of literature by examining the effects of both public expenditure and agricultural productivity on income inequality in ECOWAS using annual data from 2000 to 2021. These are the periods following the millennium development summit in 2000, and it's aimed at combating extreme poverty and income inequality (hunger, disease, gender inequality, lack of education etc) by improved agricultural productivity and government expenditure. Also, during these periods, profound achievements were recorded, as the rate of extreme poverty, gender inequality, and child mortality reduced, and universal primary education level and maternal health increased. Hence an estimate of effective government expenditure instruments adopted, and potent agricultural productivity growth recorded within that interval will serve as basis for evaluation.

1.7 Significance of the Study

This study aims at contributing to the existing body of knowledge on the effects of government expenditure and agricultural productivity on income inequality in ECOWAS. The findings of this study will provide relevant information for the West African policy makers to identify public expenditure tools that are targeted and effective in boosting agricultural productivity and abating income inequality. Moreover, it will provide relevant insight on agricultural productivity and income inequality relationship. The findings of this study will also provide information on the significance of agricultural productivity in reducing income disparity in ECOWAS. The study will also contribute to the present public expenditure policy debate on the suitability and effectiveness of public expenditure tools and mechanisms in controlling income inequality in

ECOWAS. The study is also important to the local and international investors who want to make better decisions on investment plans and to take into consideration the effects of income inequality on their profit margin. As well as academics and researchers who want to understand the effect of public expenditure policy and agricultural productivity on income inequality, to improve their knowledge base and identity gaps that require further research and instruments that can be adopted to offer quality research.

1.8 Operational Definitions of Terms

Agricultural Productivity Growth: It measures the increase in agricultural outputs per given quantity of inputs or the reduction in inputs per a given level of output. In other words, it measures the efficiency with which inputs are used to produce agricultural output.

Public Expenditure: it is the spending incurred by the government of a country on collective or individual needs and wants of public goods and public services such as pension, healthcare, security, education, subsidies, emergency services, infrastructures. It is also known as government spending or government expenses. It means the expenditure on the development and non-development activity such as construction of roadways and dams, and other activity.

Progressive Tax: it is a system of tax adopted in which the average tax burden increases with income. High-income families pay a disproportionate share of the tax burden, while low- and middle-income tax increases as taxable income increases. It imposes a lower tax rate on low income earners and a higher tax rate on those earning more income.

Income Inequality: it is the significant disparity in the distribution of income between individuals, groups, populations, social classes or countries. It refers to how unevenly income is distributed throughout a population.

The Gini Co-efficient: Also known as the Gini index or Gini ratio. It is a measure of statistical dispersion intended to represent the income inequality, the wealth inequality or the consumption inequality within a nation or a social group. It measures income distribution across a population.

Endnotes

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Chapter Two

Literature Review

This section presents a review of related concepts, theories, and empirical studies on the effects of public expenditure and agricultural productivity on income Inequality in ECOWAS.Particularly, this section conceptualizes public expenditure, agricultural productivity, and income Inequality. Further, theories and empirics related to the topic of this study were extensively discussed.Lastly, the gaps in literature were identified.

2.1 Conceptual Review

2.1.1 Public Expenditure

Public expenditure cannot be fully discussed without looking at Fiscal Policy. Fiscal Policy has been defined by scholars from many areas of study. Some define fiscal policies as policies that are designed by the public authorities to regulate or stabilize the Economic activities and growth through various spending and taxes. Fiscal policies are also known as the policies under which the government uses the instrument of taxation, public expenditureand public borrowing to achieve sustainable growth.These definitions of Fiscal Policy reveals that, it is used to adjusting growth level in the economy,In order to achieve some Macroeconomic objectives, especially to promote productivity, income distribution and growth stabilization.

Therefore,the fiscal policies are categorized as public expenditure (fiscal expansionary measure) and Taxation (fiscal contractionary measure). The objectives of fiscal policies are to achieve full employment, price and economic stability, economic growth, optimum allocation of resources, capital formation and growth, and equitable distribution of income and wealth[1].

However, Public expenditure is refered to as expenses or spending incurred by public authorities such as federal, state, and local governments for the provision of goods and services, to satisfy

the wants of the society in areas such as education, health, employment, infrastructures, subsidies, roads, security, research and development and pension programs. It is a segment of Fiscal policies that is strategically designed and adopted to regulate or stabilize the economy.

Scholars have described public expenditure as fiscal expansionary mechanisms strategically designed and adopted by government of a particular economy for the purpose of regulating, stabilizing and stimulating aggregate demand, macroeconomic activities and level of income distribution in an economy [2]. It is revealed that public expenditure is applied when government wants to stimulate aggregate demand. And this is often visible when government increased expenditure on projects in the various sectors of the economy or when tax burdens are reduced while ensuring higher disposable income for the people in the economy.

It is observed that higher government spending resulting from the desire of government to expand public spending through deficit financing or increased public debt may not have the desired favourable impact on productivity and growth. but rather leads to a negative effect on the economy. which is often referred to as the crowding out effect. For example, the expansion of public spending through deficit public financing could reduce private sector investment which in turn increases the tax burden on the households and firms, and also lead to a detrimental implication on the growth and productivity in the long run [3].

The impact of public expenditure may either have a significant or adverse effect on the economy. Therefore, when government increases its expenditure for the purpose of being channeled productively, its marginal impact on productivity and growth will increase in the long run.

Scholars have observed that productive public expenditure has contributed to theshort- and long-termgrowth of most developed countries. Therefore, increased public expenditure is considerably encouraged if it is regulatory, stimulating, favourable and productive.

2.1.1.1Types of Public Expenditure

There are different forms of public expenditure in the economy. Studies have therefore identified two main types of public expenditure, namely capital and recurrent expenditure. These are:

Capital expenditure: capital expenditure refers to expenses on capital goods or projects like roads, airports, education, telecommunication, electricity generation, hospitals, public transportation, research and development. It is the spending on the creation of national assets and infrastructures for the purpose of promoting the welfare of the citizens and improving the level of productivity and growth.that is, when government embarks on capital and developmental spending, the purpose is to enhance further production of goods and services, in order toimprove employment, income distribution, living standard and overall Macroeconomic growth.

Recurrent expenditure: recurrent expenditure is a form of expenditure incurred by government on administrative purposes such as wages and salaries, interest on loans and maintenance. It is refered to as the day-to-day operational expenses of government.This type of expenditure is regular and recurring in nature. Publicauthorities expend moneyon a daily basis to ensure that all sectoral and departmental activities are properly run and maintained.

Taxation: is referred to as fiscal Policy tools or mechanisms through which government generates revenue by imposing financial obligation or levy on its Citizens, to finance its expenditure to stimulate and stabilize the economy.

However, taxes can be direct or indirect. Direct taxes are taxes paid directly to the government, which are levied on profits and Income. These are income taxes, transfer taxes, entitlement taxes, property taxes and capital gain taxes. While indirect taxes are taxes charged indirectly on goods and services[4].

The fundamental purpose for imposing tax has always been to finance government budget or activities, redistribute income, stimulate economic activities and influence the level of aggregate demand[5].

Meanwhile, it has been observed that indirect taxes are ignored, not because they do not have effect, but rather they cannot be connected to income, as they are based on choices of consumption that are different among individuals or households with the same income.

Scholars have defined tax as a levy compulsorily charged on goods and services, income, profits and capital gains of individuals and organizations.It is a compulsory transfer or payment from individuals, organizations or groups to the authorities.

System of Taxation

However, taxation system can be progressive, regressive and proportional in nature. In order to achieve growth in the economy the government provides certain goods and services to the member of the society, and the people in return contribute in form of taxes according to their earnings to offset the cost of these supplies, for the benefits they received.

It has been argued that tax should be charged in relation to the individual's income or ability to pay. This is actually achieved on the basis of progressive tax system,which is a system that increases tax rate as the taxable income increases.

However, progressive tax system is known as the most equitable tax system, because it is widely applied in the industrialized economies and also because it is affordable for every section of the economy. Government adopts progressive tax system to reduce Inequality in the economy as more revenue generated from higher income earners are used as transfer payments,and a means to provide social benefits to the poor or low income groups. Such as infrastructure, quality

education, health, subsidies, electricity and good roads.Therefore tax is proportional when income, wealth and transaction are taxed at a fixed percentage. This means that people who earn more would have to pay more taxes[6].

Regressive tax is a tax system that government uses to impose higher rate of tax on lower income earners than those with higher income. For example, indirect taxes are regressive in nature, because low income groups spend a larger share of their income on necessities. This involves almost any tax on necessities like food purchased at a grocery store.

Other fiscal measures are tax incentives, transfer payments, deficit spending and tax cuts.

Tax incentive: is an aspect of a government's taxation policy designed to encourage a particular economic activity by reducing tax payments, it is revealed that this form of expansionary tax mechanisms can have both favourable and negative effects on the economy. Which means if it is properly designed and adopted, it will attract investors, which in turn will raise employment, increase the number of capital transfers and improve research and development[7, 8].

Tax cuts:Tax cuts is an example of Fiscal expansionary policies because It reduces the percentage of tax payments on income, goods and services by increasing consumers disposable income which leads to overall increased consumption and growth in the economy[9].

Deficit spending: deficit spending or budget deficit is the amount by which spending (government expenses) exceeds revenue over a particular period of time. This approach is used by government when taking on debt to boost its spending power in order to create aggregate demand and stimulate the economy.It is observed that deficit spending can lead to increased borrowing, higher interest payment, low investment rate, and decrease in revenue during the following year.

Transfer payment: is a fiscal redistribution of income and wealth by means of the government making a payment, without goods or services being received in return. Example of transfer payments include; welfare, financial aid, social security,government subsidies, unemployment benefits and civil pensions. It is revealed that government uses the tax income to reallocate resources from certain sections of the society and redistribute them as a payment to other sections usually in form of subsidies, education, social security or welfare benefits and unemployment benefits. This policy is crucial in addressing income Inequality and supporting the vulnerable within the society[10].

Canon of Public Expenditure

This principlewhich was propelled by Professor Findlay, stated the essential qualities that government expenditure should possess.These are Canon of benefit, Canon of economy,Canon of sanction, and Canon of surplus[11].

Canon of Benefit:Canon of benefit implies that every government spending must be optimally used for social spending purposes, which are for the general well-being of the people in the society. This states that government expenses must be spent generally to pursue common interest and promote the welfare of the citizens.

Canon of Economy:This signifies that government spending should be spent in an economical and prudent manner. Economy in this sense means to avoid wasteful and extravagant public spending so as to promote productivity and efficiency.

Canon of Sanction: This principle also suggests that before any public spending is incurred, there must be authorization and approval of it by the appropriate authority. This means that money must be spent on the purpose for which it was approved by the government.

Canon of Surplus: This canon states that the government should adopt the habit of saving in its budget system. This means that the government should avoid deficit spending in the interest of its economic stability. Some other scholars have suggested more characteristics that public expenditure should exhibit. These are canon of elasticity, canon of productivity, and canon of equality.

Canon of Elasticity: This impliesthat government expenditure should be flexible and easy to adjust according to economic situation and requirements.In case of emergency, such as time of war,natural disaster, and pandemic.

Canon of Productivity: This signifies that government expenditure should be encouraged for productive purposes in the economy. Which means the larger fraction of government expenditure should be allotted for capital or developmental purposes.

Canon of Equitable distribution or equality: This implies that public expenditure should promote or support equitable distribution of income or wealth between the rich and the poor.This will enable low-income earners to receive benefits,as economic resources or income is being redistributed and reallocated to everyone in the society.

Canon of Taxation

This principle was first introduced by Adam Smith.andhe states the features of an ideal taxation system as Canon of equality, canon of certainty, canon of economy, canon of convenience,canon of productivity, canon of elasticity, canon of simplicity and canon of diversity[12].

Canon of Equality: it suggests that the tax burden must be equally or equitably distributed among the taxpayers in such a way that people who have greater ability or earn more income must pay

more taxes than the lower income earners. This implies that taxes are to be imposed in compliance with the ability to pay.

Canon of Certainty: Thisimplies that tax paid by taxpayers should be certain and not arbitrary. That is the time of payment, the manner of payment, and the quantity to be paid should be clearand plain to both the taxpayers and the tax levying officials.Therefore, a lack of certainty in the tax administrative system can lead to corruption and misappropriation of public funds.

Canon of Economy: This states that the cost of collecting taxes should be as minimal as possible. This implies that any tax collection associated with high administrative costs and unusual delay in assessment should be avoided.

Canon of Convenience:This signifies that taxes should be levied and collected in such a way that it will create a high level of convenience to both the taxpayers and government officials. That means that taxes should be deducted only when the income is earned.

Canon of Productivity: Tax levied must not go against the principle of productivity. Thisimplies that tax amounts should not be arbitrarily fixed or levied on the individual, in such a manner that it will be productive.

Canon of Simplicity: Tax structure should be simple and easy to understand because when it is complex,it may lead to abstinence of taxpayers. This principle plays a positive role in the effective and efficient operation of the tax system.

Canon of Elasticity: This also suggests that tax structure should be flexible in such a way that it goes along with economic growth. This means that when income earned by people in the economy increases, the government revenue shouldas well increase. For example, higher taxes

are levied on luxury goods and services. Similarly,when there is a reduction on the income of people, the tax levy should also be decreased accordingly.

Canon of Diversity:This implies that there should not be a single tax that would becharged too high because whentax levy is highly imposed on the taxpayers it may lead to tax evasion. This principle also promotes investments and leads to economic growth.

Principle of Maximum Social Advantage

This is a fundamental principle that determines the fiscal operations of the government. This principle also known as social benefit was formulated by Prof Pigou and Dr Dalton. It provides the government with guidance regarding public revenue and public expenditureso as tomaximize social advantage or welfare. According to this principle, optimum financial operations of government should therefore be determined, astaxation does not satisfy the people when part of income is deducted,so is public expenditure a gain of utility to the economy. This implies that when the government imposes taxes on people, some disutility or dissatisfaction is experienced in the economy.

Therefore, the principle of maximum social advantage implies that, public expenditure is subject to diminishing marginal social benefits while taxes are subject to increasing social costs.It is necessary to achieve an equilibrium position where marginal social benefits of public expenditure are equal to the maximum social cost of taxation in order tomaximize social advantage[13, 14].

Marginal Social Sacrifice (MSS): Marginal social sacrifice refers to that amount of social cost or sacrifice borne by society due to the additional unit of tax imposed. The additional tax burden resulting from the additional units of tax will increase the more. This implies that the total

sacrifice increases at an increasing rate.This is because as taxes are imposed, the income (stock of money) with people decreases. Therefore, every additional unit of taxation brfrom about greater impact to the economy.

Marginal Social Sacrifice is graphically depicted in figure 2.1 below.

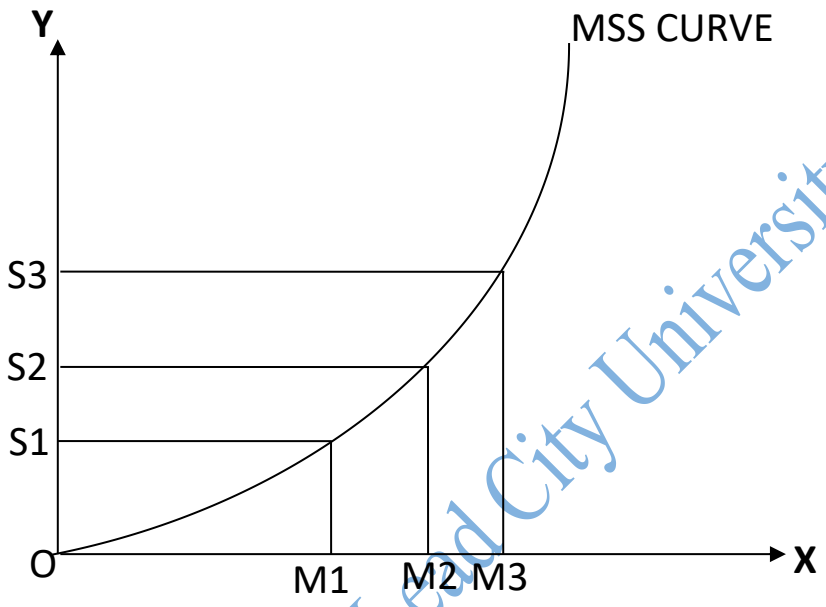

Figure 2.1 Illustration of Marginal Social Sacrifice

Unit of Tax (Rupee)

Increasing marginal social sacrifice (MSS) curve increases upwards from left to right. This indicates that with each additional unit of taxation, the level of sacrifice also increases. When the unit of taxation is at OM_1, the sacrifice is at OS_1, and with the rise in taxation at OM_2 and OM_3, the marginal social sacrifice rises to OS_2 and OS3.

Marginal social benefit (MSB): it is observed that taxes imposed on the people, generate revenue, which produces benefits. The additional unit of public expenditure is known as marginal social benefits (MSB). The social benefit derived from each additional unit of government spending

will decrease, as more and more unit of public expenditure is incurred. Initially, the units of government expenditure incurred on the most pressing social services, will be subsequently spent on less and less essential services, which will therefore results in the dnward sloping of the marginal curve of social benefits from left to right as depicted below

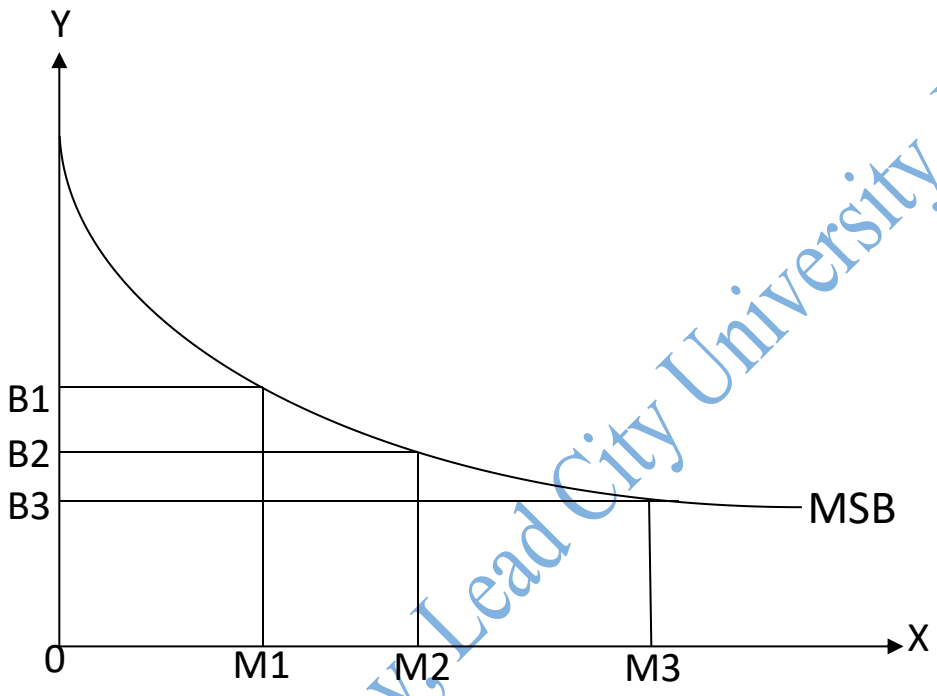

Figure 2.2 The Marginal Social Benefit

It is revealed in the diagram that the marginal social benefit derived from public expenditure is decreasing at a diminishing rate. When the public expenditure is at OM_1, the marginal social benefit is at OB_1, and when public expenditure is at OM_2 and OM_3, the marginal social benefit is decreased to OB_2 and OB_3.

The Point of Maximum Social Advantage.

Dalton's Principles of Maximum Social Advantage

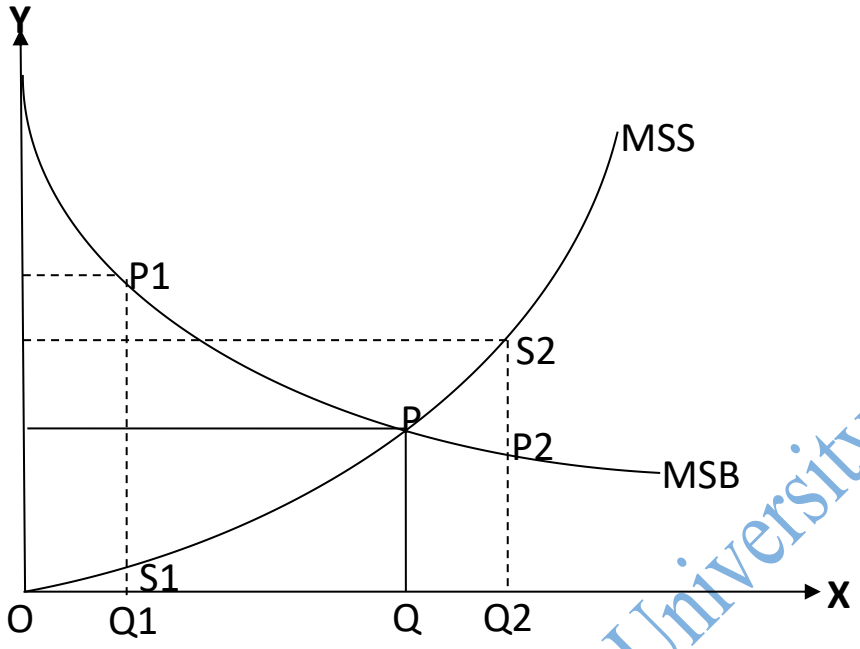

Figure 2.3 Illustrates the Point of Maximum Social Advantage

It is revealed that social advantage is maximized at the point where marginal social sacrifice intersects the marginal social benefit curve.In the diagram, the marginal disutility or social sacrifice is equal to the marginal utility or social benefit.It is also shown that maximum social advantage is obtained at the point of intersection of MSS and MSB curves where P_1Q_1 represents marginal social benefit, which is observed to be higher than the marginal social sacrifice S_1Q_1.since the marginal social sacrifice is lower than the marginal social benefit, it is more sensible, to raise the level of taxation and public expenditure. Because when the additional unit of revenu generated is spent by the government, it will lead to increased net social advantage. This situation of raising taxation and public expenditure goes on,as the levels of taxation and public expenditure move towards the leftof the point p. where at point p,the taxation and public expenditure shifts to OQ, The marginal utility or social benefit equals to marginal disutility or

social sacrifice at this point, which implies that at this point p,the maximum social advantage is attained. It is also shown that the marginal social sacrifice S_2Q_2 is greater than marginal social benefit P_2Q_2. This signifies that any further rise in the level of taxation and public expenditure above the point p may result in social disadvantage. This isbecause each additional unit of taxation increases marginal disutility or social sacrifice, and which is more than marginal utility or social benefit.

The principle of maximum social advantage was translated by economist Richard Musgrave as maximum welfare principle of budget determination.

2.1.2 Income Inequality

Income inequality in economics has been defined as a significant imbalance or difference in the distribution of income between individuals, group, populations, social groups, or economies.It has been referred to as how income is unevenly distributed within a population. The less income is distributed the more income is unequal.Income inequality is also described as a major dimension of social stratification and social groups. It affects other forms of inequality, and it is also influenced by them.The effect of income inequality on any economy can be either positive and /or negative, which may be controlled or abated through potent government expenditure. Scholars have described income inequality as the state of not being equal especially in status,right and opportunities. Therefore, income inequality is the disproportionate distribution of income which could be between or within an economy. It is however observed that the gap between the few"haves"(the rich) and the majority "have not"(the poor) broadens with regards to access to quality education, good health service, income or wealth and good nutrition.It was revealed through the global statistics that inequality is still rising, which allows the rich to be getting richer, and the poor to be getting poorer. Forexample the top 10% of the rich hold more

than 75% of all income or wealth. While the 90% of the poor hold less than 25% of income or wealth[15].The augmented level of income inequality has been traced to structural or institutional factors. These factors responsible for increased income inequality have been revealed by scholars as the level of globalization and technological improvement. But Recently, the researchers have extended their views by regarding privatization, deregulation, tax policy and decrease in welfare benefits as factors influencing the rising Income disparity[16].

2.1.2.1 Effects of Income Inequality

Globalization: One of the most popular factors causing increased income inequality can be traced to the impact played by globalization. The effect of globalization, which brought about the adoption of labour saving technologies such as automated machines and artificial intelligence, has led to job displacement and decrease in demand for a certain number of low and middle workers. as a result, highly skilled workers are greatly demanded and highly remunerated, thereby leaving the larger section of the population jobless with little or no income.

it was revealed that globalization has a "small -to-moderate inequality. While rising effect caused by Financialglobalization exhibits the major effect[17]. For example, it was scholarly observed that globalization has marginally contributed to 10-20% rise in the United States wage inequality.

Technology: It was revealed that over the years, the rapid improvement in the utilisation of advanced machineries, computers, and artificial intelligence has caused a large proportion of skilled workers to lose their jobs. Because advanced technologies are now utilised in replacement of labour productivity in terms of task performance,which are seen to be more efficient, effective, and faster. The effect of this factor has created high unemployment or low wages for most workers as the supply of labour becomes higher with a decrease in demand for labour. Therefore, due to the effect of technological factors, few sections of the society, especially owners of

resources (capital), are able to manipulate the larger fraction of the economy. As a result, the income gap between employees who earn based on their productivity, and employers who earn by investing in capital through wealth accumulation has become broadened.

However, unskilled workers are more affected than skilled workers in terms of technological advance due to the fact that, skilled worker adopt computers and machines. The effect will result in the rightward push in demand for skilled workers, as their wages become higher than the wages of the unskilled workers.

Tax policy: Over the years, taxation mechanisms have become fiscal instruments adopted by policymakers for income redistribution and income inequality alleviation. The benefits derived from tax cuts of the higher income earners are transferred to everyone in society. Although some researchers have established that, tax cuts do not necessarily boost economic growth, but its effect is revealed by scholars as being very significant and potent in tackling and abating the problemof income disparity in the developed economies.

Therefore, the tax progressive system practiced, especially in Africa, has been considered very low and inefficient. The problem surrounding the tax system is seen to have instigated the fast growing issue of income disparity in the region. It has also been observed that the excessive decline in income tax progressivity has contributed to the massive growth of the income of wealthy individuals around the globe.

Education: The level of education is seen to be proportionate to the level of skill as well as the level of wage or income. Education has been an instrument of investment and a key to human and economic development. as a result, workers are required to attain a level of educational qualification that will stimulate higher wages for those with this level of education. Also,those that do not have access to the required levels of education earn lower wages. This justifies that

lack of education, which results in lack of productivity can attract lower earnings. and access to quality education, attracts higher wages,and can lead to increased productivity, efficiency improvement, and economic growth. Therefore, educational differences that determine the wage rate of workers can widen the income gap in the economy.

Economic situation: macroeconomic distortions and instabilities have been seen as the major determinants that have contributed to the problem of income inequality,unemployment, inflation, poverty rate,financial instability,low business investment, and other economic breakdown affect the well-being of the people due to low performance of economic activities,which leads to low productivity and inefficiency will result in low income earnings of many as well as high income inequality.

Sex and Race Differences: Sex and racial problems have been revealed as factors contributing to income disparities around the globe. In many countries of the world, gender discrimination practices have led to gender pay differences in favour of male againsttheir female counterparts in the LabourMarket.and it has been observed that there are over 50% gender pay differences in Armenia, Georgia, and Azerbaijan post soviet nations as a result of the fact that women are not allowed to get employed due to maternity leave during child birth. other reasons for gender pay differences in the region are low earned positions and sectors occupied by women such as social services and education.

Racism: this is also widely recognised inequality ofwealth, income, and economic well-being of people of various races. In many countries, it has been shown that people of certain racial settings encounter lower earnings, fewer opportunities for career development, and less access to educational improvement and inheritable wealth differences. for example, black races are especially faced with the racial issues which was traced from the colonial historical background,

and that has led to a lack of universal education,poverty, limited resources and opportunities, financial instabilities, and political backwardness. Compared to the white race, that are considered highly developed in terms of technology, finances, education, politics, and economics[17].

Favourable Impacts of Income Inequality are as follows:

Moderate inequality provides an incentive to work harder and efficiently,as people work generally, for greater reward. This will lead to higher economic growth, increased national income,and an increase in the overall wellbeing of both high- and low-income earners.

Income inequality allows for higher savings as rich income earners save greater than people with low-income earnings. It is revealed that higher savings encourage investment,while investment leads to improvement in technology and capital expansion,which in turn will lead to higher productivity and efficiency. It is also argued that income inequality creates greater room for quality and innovation. It is emphasised that an economy with a greater quality of life has greater access to enhance production in terms of high standards and innovation. Initially, goods that are newly produced always attract higher prices,but price reduces as improvement in technology and increase in production leads to a reduction in the cost of production. This implies that low income earners will be able to afford to buy those commodities.

Furthermore, it encourages more opportunity for allocation and distribution of resources inform of governmentspending. as the government generates more income from tax revenue received from wealthy individuals in the economy, which is later transferred to the poor section of the society in form of social programs and benefits like education, health,infrastructure and defense.

Income Inequality means there is a gap between the highest income earners and the lowest income earners. Likewise, income inequality is seen to be advantageous as it provides incentives in a free market economy.Income inequality has many negative effects as its impact is very noticeable.

Unfavourable Impact of Income Inequality

Income inequality has been revealed as a type of market failure which occurswhen there is an inefficient allocation of resources in a free market. It can occur as a result of inequality arising from monopoly power, which means when firms have monopoly power,they are in positions to place higher prices on goods. This leads to income redistribution from consumers to the monopolists. Inequality is centred on an unequal distribution of power inthe society.According to Adam Smith,the government needs to regulate monopolyin order to avoid power being concentrated in the hands of few people. Inequality arising from Monopsony power:A monopsony means when a firm has market power in employing workers at a wage rate below the competitive equilibrium. It means workers are paid wages below the marginal revenue product (MRP) of labour. This leads to an unfair distribution of income between the employers of labour to the employee.In addition, inequality is caused as a result of some firms being authorised the power to set wage rates.

Diminishing marginal utility of income: Income has been noticed to have a diminishing marginal utility. For example, the first $1,000 an individual earns as income gives the highest benefits. With this first $1,000, such a person can afford to fulfil his basic necessities such as food,clothing,and shelter. Which implies that the first $ 1000, has the highest utility because of its importance to life maintenance.Also, If he earns another $1,000 the utility derives increases because he can now afford improved basic necessities of life. But the increase in utility is less

than the first $1,000.Moreover, if he earns an additional $1,000 theadditional (marginal) utility will be limited as he probably buys an expensive car and other luxury that gives comfort and improves quality of life.

Social Problems: income inequality has been revealed to be responsible for the rampant social vice over the years. Income inequality, which is a factor that has led to social friction, such as robbery,assassination,suicide,kidnapping,insurgency, and other higher crime activities has become socio-economic problems which has been responsible for the macroeconomic imbalance in the economy. In this case, all members of society are badly affected.

Unemployment: Unemployment has been identified as the greatest cause of abject poverty.Unemployment is considered a type of market failure because it represents an inefficient allocation of resources in a free market. Lack of employment, which is synonymous to poverty rate has become a major economic problem in the society. When a larger section of the economy is faced with poor or lack of employment, this will lead low income of greater part of the economy, making the few ones who are investors to have greater wealth or income.

Inequality Decreases Health:the vulnerable members of society are subject to various kinds of illnesses and diseases. Due to inadequate or low income earnings of the poor individuals, access to good health care and healthy nutrition has become sometimes unaffordable and unavailable. as a result in order to halt unhealthy living and sudden death arising from lack of access to medical facilities, it is advisable for the policymakers to address this issue by embarking on health program that will encourage and enhance creations of more medical facilities so as to reduce health inequality in the economy.

Income Inequality Increases Political Inequality:This happens when wealth or power distribution becomes more concentrated in the hands of few sections of the society. Political power has been

noticed to become skewed in favor of that small rich class. High-income earners are able to manipulate government in their favor through both legal and corrupt means. While disadvantaged groups are equally unable to become educated or participate in the political activity as economic means become increasingly scarce.

Inequality Lowers Education Quality:Many empirical researches have revealed correlation between education and poverty. Countries with a high degree of income equality and a relatively small low-income population tend to have a substantially higher level of education. In a society that is economically unequal, the society-wide average level of education declines, while the number of educational rich elites increases.One causal relationship between education and inequality is unequal societies tend to reduce investment in education. Lack of private or public scholarship programs, has led inability of the poor to afford to pay for education or spend the time in school that could have otherwise been spent working. In unequal societies, it is revealed that government policy that encourages public education programs decreases,as the rich get more access to good quality education, it also revealed that Public education programs are primarily established from taxes imposed on the rich, and redistributing those resources to the poor.In addition, the unfavourable impacts of income inequality are more significant and greater than its benefits. Countries with augmented income inequality suffer from lower economic growth rates, higher crime rates, unemployment, poor public health, poor nutrition, lack of good education and political inequality.

Education: The level of education is seen to be proportionate to the level of skill as well as the level of wage or income. Education has been an instrument of investment and a key to human and economic development. As a result, workers are required to attain a level of educational qualification that will stimulate higher wages for those with this level of education. while those

who do not have access to the required level of education earn lower wages. This justifies that lack of education, which results in lack of productivity can attract lower earnings. while access to quality education, which attracts higher wages, can lead to increased productivity, efficiency improvement, and economic growth. Therefore, educational differences that determine the wage rate of workers can widen the income gap in the economy.

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Sex and Race Differences: sex and racial problems have been revealed as factors contributing to income disparities around the globe. In many countries of the world, gender discrimination practices have led to gender pay differences in favour of male against their female counterparts in the Labour Market. It has been observed that there are over 50% gender pay differences in Armenia, Georgia, and Azerbaijan post soviet nations as a result of the fact that women are not allowed to get employed due to maternity leave during child birth. Other reasons for gender pay differences in the region are low earned positions and sectors occupied by women such as social services and education.

Racism is also widely recognised inequality such as wealth, income, and economic well-being of people of various races. In developeed countries, it has been shown that people of certain racial settings encounter lower earnings, fewer opportunities for career development, and less access to educational improvement and inheritable wealth differences. For example, black races are

especially faced with the racial issues that have been traced to the colonial system historical background, and this has led to lack of universal education, poverty, limited resources and opportunities, financial instabilities, and political backwardness. While the white raceare highly developed in terms of technology, finances,education, politics, and economics[18].

Measurement of Income Inequality

Different instruments have been created to measure inequality these are Gini coefficient, Theil's index,The Atkinson index, and the Palma index[19] and The Lorenz curve.

The Gini coefficient, derived from the Lorenz curve, is the most widely used measure of income inequality in a society. Its value varies between 0 and 1. Which means 0is corresponding to a perfectly egalitarian distribution of total income, i.e. each individual has the same income. While, 1is corresponding to a perfectly unequal distribution of total income, i.e. only one individual would have all the income. Which means that the higher the index, the greater the income inequality.

The Lorenz curve is a graphical representation of wealth distribution in a society.Lorenz curve shows the percentage of total income earned by Cumulative percentage of the population. In a perfectly equal society, The Poorest 25% of the population earns 25% of the Total Income, While, The Poorest 50% of the population earns 50% of the Total Income. The Lorenz curve also follows the path of the 45° line of equality. As inequality increases, the Lorenz curve deviates from the line of equality. Which implies that, The poorest 25% of the population may earn 10% of the total income. This means that, The poorest 50% of the population may earn 20% of the total income.One of the properties of this framework is that, it can be used to generate a single summary statistic of the income distribution.

Theil's index: The Theil index measures the difference between the weight of an individual (or group) in the population, and the weight of his income from the total income. For example, An index of 0 shows equality, an index of 0.5 shows inequality represented by a society where 74% of individuals have 26% of resources and 26% of individuals have 74% of resources. An index of 1 indicates that, Inequality represented by a society where 82.4% of individuals have 17.6% of resources, and 17.6% of individuals have 82.4% of resources.

Theil index is less commonly used than the Gini index, despite the fact that, it has undeniable practical benefits.

The Atkinson Index: This index is similar to Gini index, the Atkinson index varies between 0 and 1, with 0 representing perfect equality, and 1 representing perfect inequality. The Atkinson index answers the following question: "If society could move towards a perfectly egalitarian distribution of income, what fraction of income would it be willing to give up doing so? This fraction is the Atkinson index. In other words, an Atkinson index of x% means that people would be willing to give up x% of their current income to make the distribution more proportionate.

The Palma Index: The Palma Index is a member of the family of inter-deciles ratios, which is best known as D90/D10 ratio. The Palma index is the sum of the income earned by households in the top decile (the top 10%) divided by the sum of the income earned by the most 40% disadvantaged households. This indicator is centredon the assumption that the“tails” of the distribution, provides a clear and synthetic measure, which shows the extent to which higher tax rates paid by the rich, and transfer payments received by the poor, actually reduce income inequality in societies with the adoption of progressive tax systems.

2.1.3 Agricultural Productivity

Agricultural productivity can be defined as the quantity of agricultural output produced on the agricultural land with a given quantity of agricultural inputs such as agricultural equipment, fertilisers, pesticides, seeds, agricultural machines, labor productivity, and water supply equipment. However, Agricultural productivity can be improved or reduced, depending on the effective and efficient utilisation of the ratio of agricultural outputs to agricultural inputs employed. Agricultural productivity can estimate the efficiency with which farmers adopt inputs such as land, labour, and capital to produce outputs such as crops, livestock, and wool. However, Agricultural productivity is estimated as the market value of the end-product (final output). it can be compared to various types of production factors or inputs, which is known as partial measure of productivity. Agricultural productivity is also estimated by total factor productivity (TFP). This compares the ratio of Agricultural inputs (factors) to the ratio of outputs (production).Agricultural productivity is measured by comparing the index of Agricultural inputs to an index of Agricultural outputs. However, the agricultural productivity measure was set up to remove the weaknesses associated with the partial measures of productivity.Changes in total factor productivity are usually characterised by technological improvements.

Also, Agricultural productivity has been seen as an integral element of food security. This is because the food productive capacity of a Nation is determined by increasing agricultural productivity, through sustainable practices. Productivity is triggered by changes in either agricultural methods or improvements in agricultural technology[20].

Components of Agricultural Productivity

Components or elements of agricultural productivity are factors that enhance agricultural productivity.These components are:

Agricultural mechanization: agricultural mechanization is the use of machinery and equipment, ranging from simple manual or traditional hand implements such as: hoe,cutlass,axe,rake, fork,hand trowel, spanner, bolt and nut sickle and wheelbarrow to more sophisticated equipment and machinery, such as:tractor,truck combined harvesters,and other machineries to perform agricultural activities.

Contemporarily, sophisticatedmachineries are now handling numerous agricultural tasks, which were formerly carried out by manual labour or by working animals such as oxen, horses, and mules.The history of agriculture was characterisedby the use of tools, such as cutlass, plough ,and hoe.The extinction of the adoption of these tools began during the Industrial Revolution as the integration of machines were newly introduced to enable farming activities to become much less labour-intensive.

Agricultural mechanization, which is part of technological improvement of agriculture, can be summarized as a progressive transfer of Agricultural implements from the manual and animal traction method, to motorized mechanization, adoption of digital equipment and utilization of the artificial intelligence.This agricultural evolution has contributed to the imporovement in productivity such as: Production of Crops and Livestocks, Aquaculture and Forestry Management.It also enhances better working conditions,improves income,reduces the workload of farming operationsand generates rural employment opportunities.The Modern agricultural systems also involve the adoption of other types of agricultural implements, such as aeroplanes and helicopters (for aerial application), the use of computers with satellite imagery and satellite navigation (GPS guidance) to increase crop yields.

New digital equipment is increasingly contributing to agricultural productivity by using these machines to diagnose and facilitate agricultural decisions. However, mechanisation is one of the significant factors responsible for urbanisation and industrialization.

Apart from enhancing production efficiency, Agricultural mechanisation encourages large-scale production and also can promote the quality of farm produce[21]. It is therefore revealed that, despite the fact that, many benefits are derived from the utilisation of agricultural mechanization, still it causes environmental degradation such as pollution, deforestation, and soil erosion, especially, when adopted shortsightedly rather than holistically.

Application of fertilisers such as nitrogen, phosphorus,sulphur, zinc, copper,and magnesium are components that also help agricultural productivity to improve.Fertilizer, which refers to any material of natural or synthetic origin is applied to soil or to plant tissues to supply plant nutrients.For most modern agricultural practices, fertilization focuses on three main macro nutrients: Nitrogen (N), phosphorus (P), and potassium (K) with occasional addition of supplements like rock flour for micronutrients.

Fertilization applications emerged from natural or organic sources such as compost, animal manure, human manure, harvested minerals, crop rotations and byproducts of human-nature industries. That is, Fish processing waste, or blood meal from animal slaughter.

However, it is also revealed that the use of artificial and industrially-applied fertilizers can lead to environmental consequences such as water pollution, eutrophication, carbon and other emissions from fertilizer production and mining.

Education and training: Education and training are also vital components that promote agricultural productivity. They are required for managerial and entrepreneurial skills, which

helps in minimizing both fixed and variable costs, which in turn leads to efficient utilization of limited available resources.

Irrigation:irrigation which also refers to as watering, is the practice of applying controlled amounts of water to landin order to help grow crops, landscape plants, and lawns.

Irrigation helps to grow crops, maintain landscapes, and revegetate disturbed soils in dry areas and during times of below-average rainfall. It is also employed to protect crops from frost, control weed growth in grain fields, and eliminate soil consolidation. It is also used in cooling livestock, reduce dust, dispose of sewage, and support mining activities.

Irrigation can come from underground water (extracted from springs or by using wells), surface water (withdrawn from rivers, lakes or reservoirs) or non-conventional sources like treated wastewater, desalinated water or fog collection.Irrigation which is supplementary to rainfall, are commonly adopted in many parts of the world as rainfed agriculture. Full irrigation is less common and only occurs in arid landscapes with very low rainfall or when crops are grown in semi-arid areas outside of rainy seasons. However, the implication of applying irrigation depends on the changes in quantity and quality of soil and water.The effects arise from the altered hydrological conditions caused by the installation and operation of the irrigation scheme.Also, one of the problems caused by this is depletion of underground aquifers through overdrafting. It is also revealed that Soil can be over-irrigated due to poor distribution ormanagement wastes.

Herbicides: which is commonly known as weed killers, are substances used to control undesired plants, also known as weeds.Selective herbicides control specific weed species, while leaving the desired crop relatively unharmed.

Pesticides:pesticides are substances that are used incontrolling pests.This includes herbicides, insecticides, nematicide, molluscicide, piscicide, avicide, rodenticide, bactericidal, insect repellent, animal repellent, microfiche, fungicide, and lampricide.The most common of these are herbicides, which account for approximately 50% of all pesticide adopted worldwide. Most pesticides serve as plant protection products also known as crop protection products, which in general, protect plants from weeds, fungi, or insects.

AnimalFeeds: These are food given to domestic animals, especially livestock. Animal feed is divided into two types. These are fodder and forage. Animal feed which is an important input to animal agriculture,is often the major cost required in raising or keeping animals.The Animals wellbeing are highly dependent on feed that reflects a well balanced nutrition. Some modern agricultural practices, such as fattening cows on grains, have detrimental effects on the environment and animals. For example, increased corn or other grain for cows, causestheir microbiomes to be more acidic, weakening their immune systems and making cows a more likely vector for E.coli.

Importance of Agricultural Productivity

Agricultural productivity is very essential for various reasons apart from enhancing food production; agricultural productivity stimulates economic growth and market competition in an economy. Agricultural productivity encourages labour Mobility and promote job opportunities: This renders opportunity to people who are living in rural areas to secure agricultural jobs,as they migrate from one place to secure opportunity, as a result, rural income increases,and this will lead to improvement in rural income distribution.

Increased agricultural productivity encourages international trade. This is due to increase in efficient utilisation of limited resources. Therfore, an economy becomes more productive when it

has a comparative agricultural advantage over others. i.e., It can produce agricultural outputs at a lowe opportunity cost than other economies. Therefore, increase in agricultural productivity brings about decrease in prices of food, which in turn leads to increase in real income.

Agricultural productivity also increases agricultural output growth, and reduction of poverty rate in the economy. This happens when the prices of food fall, as a result of increase in the food production.

2.2 Theoretical Review

Some of the major theories explaining the behaviour of income inequality and its determinants include Capital Accumulation Theory, Redistribution Theory, Marginal Productivity Theory, and Human Capital Theory. All of these theories in their individual piece made effort to expose the distinct element of income inequality, which has been seen to be an uneven or unequal distribution of income between individuals, groups, populations, social groups or countries, based on the principles of their schools of thought.

Capital Accumulation Theory

This theory which was developed by Thomas Piketty (2014) asserts that an increase in assets from investment or profit is one of the means to accumulate wealth through capital accumulation. The theory assumes that increase in the existing investment value as a return on investment either by rent, profit or interest. However, accumulation of capital is measured by the increased value of store of assets by investments and saving

The theory also assumes that the investment in capital will create a building block of wealth which then continue to recycle until it controls the economy as a whole, Piketty emphasized that capital accumulation can only be controlled through state intervention.[22]

However, he centers his assumption on a formula that relates the rate of return on capital (r) to economic growth (g). Where (r) involves gains, dividends, rents and earnings from capital. (g) is measured as growth of the economy's income or output. Further assumes that when economic growth rate is declined, wealth will accumulate more faster from (r) than labour wage, and in turn increases the level of inequality. Piketty also establishes in his book that wars, depression and recessionary situation instigated by public debt will destroy wealth specifically owned by the rich elites.[23] He asserts that, the event can only be corrected by redistribution of income.

The theory further proposes that a progressive yearly global wealth tax up to 2%, combined with a progressive income tax up to 80%, would abate inequality.[23] but he affirms that such tax could be impossible to achieve.

Therefore he also assumes that without progressive tax adjustment system, to correct the trend of income inequality, economic growth would be very low globally. The theory refutes that the notion that flows of productivity resulting from technological improvements can be relied on to revamp sustained economic growth.[24]

However, Piketty theory has been criticized by the remedy of income redistribution through progressive tax system initiated by the world governments after the world war. Another criticisms is that inequality is generally decreasing, because of the opportunity to quality of life, social benefits and access to public goods, as a result income redistributed among the sections of the society.

The Theory of Redistribution

The theory of Redistribution emphasized that government uses public spending as an instrument for redistributing income and reducing income inequality by adopting tax progressivity system and effective social welfare services.The theory assumes that public authorities redistribute income through collection and transfer of benefits from higher income groups to lower income groups. The theory also asserts that redistribution of resources or income is aimed at abating the level of income disparity and enhancing equality of wealth distribution through embarking on social welfare services such as health program, education, construction of roads and railways, electricity, subsidy, pension and other publics benefits in the economy. It is also revealed that the theory of distribution entails: (1) How income is distributed among the people in the economy, (2) The determinants of the factors of production, i.e. Factors determining the wage rate for a particular type of labour, Interest rate, Rent and Profits. (3) How national income is distributed equally among the factors of production[25].

The theory of redistribution can be personal and functional; Personal redistribution theory states that income is shared according to the classes of people in a society. For example the top 20% of income earners receive between 35 and 40% of the national income, while the lowest 40% of the income earners receive about 10% of the national income. This means income inequality tends to be higher in less developed economies and declines in the process of economic development[26]. However, the theory of functional redistribution emphasized that prices of land, labour and capital are very Significant as their demands are derived demand, because they emerged from the demand for final goods. This implies that a producer requires factors of land, labour, and capital, due to the fact that he needs them in the production of commodity that he sells. It is revealed that the objectives of income redistribution are to stabilize the economic growth, create opportunity for the disadvantaged in the economy, as well as promoting social services[27].

Income redistribution is based on the concept of equal distribution of income in such a manner that income and resources distributed will lead to a social equality most especially in the area of distribution of income or wealth. It is argued that a larger portion of the society benefit from the economy as they are given the equal opportunities to earn better living standard. It is also revealed that other wealthy section of the society will also benefit in the economy as they produce and create enabling environment for consumption, and also promote equal redistribution of income, thereby reducing income disparity in the economy.

However, Income redistribution is criticised by some socialist economists as it benefits those that hold political power more than the less advantaged in the economy.The theory was criticised because of its failure in improving equal access to economic resources.it also criticised that social democracy needs an effective labour union to establish a sustainable redistribution of income because it is impossible for an economy with ineffective labour union to maintain equal distribution of income.

Marginal Productivity Theory:

The marginal productivity theory of distribution was popularized by Mankiw N.G in 2015.The theory of marginal distribution explains how prices of different factors of production are determined under conditions of perfect competition. The theory suggests that any factor input must receive a reward equal to its marginal product.[28]

Also, according to the theory, there is no difference between the method of determining factor price, as well as commodities price. However, Mankiw suggests that, factor prices are determined under the influence of the forces of demand and supply.

However, the theory also establishes that there is a difference between the demand for commodities which is direct demand, while demand for factors of production is a derived demand. For example there will be demand for labour to build a dam, only if there is demand for water supply.

Also, based on the assumption of Piketty marginal productivity theory of distribution, in a perfectly competitive market each factor input will receive a price equal to the value of its physical product.[29] This signifies that an employer will employ additional unit of factor of production until the price of that factor equals the value of marginal product.

Further, the theory reveals that, the aim of an employer is profit maximization.this signifies that he will employ a factor, if total revenue earned is more than the total cost. Hence, an employer will hire a factor up to a certain level at which the marginal revenue adds more to total Cost as to total revenue.

However, the condition of equilibrium in the labour market is MCL = VMPL

Where MCL = Marginal cost of labour, VMPL = Value of marginal product of labour. Or W = VMPLWhere W = wages of labour.

VMPL = MPPL.PX (VMPL = Marginal physical product of labour multiplied by price of the commodity)

Hence, the theory also suggests that, an employer should adopt the principle of substitution and combine land, labour and capital in a way that the cost of production will be minimal.

The Mankiw theory is based on the following assumptions which are

(1) There is presence of perfect competition

(2) All units of factors of production are homogeneous in nature.i.e one units of a factor is the same as the other.

(3) Factors can be replaced for each other. I.e all factors can be used interchangeably.

The theory is also based on the law of diminishing returns.which implies that when additional units of a factor is employed, its marginal return diminishes.[30]

Therefore, when a firm discovers that there is an increase in a certain factor as a result of diminishing returns, the firm replaces it with other factor. Hence, it helps in reducing the cost of production.

Moreover, the following criticisms are levelled against the marginal productivity theory.

(1) The theory has been opposed based on the assumption that, every product is a joint product and its product value cannot be substituted for each other i.e either labour or capital. Also, it is rather impossible to estimate the 'productivity' of certain skilled labour like doctors, lawyers

(2) The theory only specifically takes into consideration the factors on the side of demand while, leaving the supply side.

(3)The theory based its assumption on perfect market competition and full employment which can not be applied in the real world situation as we only operate imperfect market competition.

The human capital theory:

The human capital theory was propounded by G .Becker 1964. This theory assumes that through education and training, workers Productivity and efficiency can be increased, which will in turn increase income distribution within the economy. Therefore, the more educated the labour population, the more the economy grows. That is, when workers become more and more educated, their productivity increases as well as their earnings[31]which will in turn narrow income gap and stimulate the economy.

Becker expresses human capital as the result of an investment process. Due to the fact that productive knowledge acquired through education is very expensive.

Becker also asserts that a rational thinker will invest in education only if its future benefit is greater than the short term costs associated with education acquired. And as a result of the assumption, the theory emphasizes that leaving school early will attract low earnings compared to those who earn higher wages as a result of their ability to advance more educationally.

According to the theory, human capital occurs through formal education, on job training and off-the-job training[32]. Becker also made a clear emphasis on specific and general training.As he states that both have distinct capacity to improve marginal productivity of labour, as well as, increase the future earnings of the workers.

However, Becker's theory emerged due to increasing interest which affected the growth of the United States economy during that time, as physical capital growth and labour productivity was considered as human investment. The theory also suggests that human capital is a factor determining the qualities of human resources such as health, knowledge, skill and other attributes that influence human abilities to undertake productive task.[33]

The views of these theorists do not only center on the labour productivity, but also education and training which are very significant to the growth and development of any economy. This theory also indicates that there is a close link between the number of years of schooling and income level of a person. Which means improvements in the level of schooling would lead to greater earnings. Other relevance of human capital theory is that, it provides a means of evaluating the cost of production which are direct cost such as school fees, school uniforms, cost of books and opportunity cost which is the amount forgone while schooling.[34]

And the benefits of schooling which is the difference between the life time earnings of a person and the lifetime earnings obtained, if he had not attained education.

However, one of the criticisms levelled against the theory is that, it seems very impossible to estimate the link between education and increase in earnings because, an increase in personal income can be determined by many other factors apart from education.

Another criticism is that human capital should not be regarded as factor of production as individuals productivity differences can not be estimated objectively.

2.3 Empirical Review

The research findings of the past studies have not attained agreement on measures of abating income Inequality, showing the necessity for further studies. The macroeconomic structures of each country of the world are diverse. Therefore, each economy must be able to identify and utilise their specific measures in combating with income Inequality. The Findings of these past studies are discussed in this section.

2.3.1 Public Expenditure and Income Inequality

As a result of the failure of the existing literature, to investigate the impact of the various fiscal policy measures on income redistribution in ECOWAS. Some Scholars have made enormous efforts to improve on the past studies as regards the distributional effect of Fiscal measures in abating the level of poverty and income Inequality in 29 African Countries for a period between 1990 and 2015. The study examines the importance of fiscal strategic measures such as government expenditures, education expenses, health, social benefit transfers and taxes significantly adopted in abating the level of poverty and income inequality.

Using different panel data estimators, poverty and unequal distribution of income in the chosen countries was instigated by lack of effective human capital and development, and low level of capital formation and investment. It was also discovered that poverty level reduced by 8% from

1990 - 2010, while unequal distribution of income reduced by 4.3% from 1990 to 2009. During the findings it was discovered that, the Economies that have large fiscal tax structure are likely to experience a decline in poverty level more than their counterparts that have small Fiscal tax structure to GDP growth ratios. It was also shown that, a fiscal revenue structure may only record up to 16.5% decrease in marginal rate of poverty. As a result of the significant contributions played by African governments on Fiscal revenue structure, the study observed that Economies that are highly active, and open in the area of budgetary system accountability are likely to have significant influence on fiscal structure, which will help in narrowing poverty rate and redistributing income.

However, it was revealed some years back that 29 Economies experienced a fall in the effective redistribution of the fiscal measures adopted,and also the redistributive effect of Fiscal policies increased more than 35% in countries like Angola, Mozambique, South Africa and Togo. The study recommended that,effective progressive tax system as well as diversification of income generated from the extractive sources should be used in the countries that are experiencing increased income disparity due to large fiscal structure, in building industries and infrastructure, which are very essential in abating poverty and income Inequality. It was also suggested in the study that, high level of investment in standard education, quality health programs and social security services should be encouraged and promoted by African policy makers[35].

Institutional factors responsible for the trend of Income Inequality have made some Scholars to analyze the impact of Institutional quality performances on the drivers of income disparity in 40 Sub-Saharan African Economies, for a period of 27 years. A two-step dynamic generalized method of moments with standard errors was employed to evaluate the parameters. The study revealed that, there is no statistically positive impact of Institutions on Income Inequality in the

region.It was also revealed that, there is no statistically positive impact of other factors indicating Institutional quality performances like Institutional efficiency, Institutional responsibility, Standard regulatory system and political balance on Income disparity in the study Therefore,it was recommended that, Institutional quality performance should be encouraged and enhanced as well as adoption of more policy measures that will curb corruption level and promote strict performance of law and order, inorder to equalize income distribution in African region[36].

Similarly, resulting to the need for abating income inequality in Ecowas region, Other Scholars have examined the redistributive and interactive roles played by both fiscal and monetary measures in African continent for a period above 27 years. In this study, different estimators were applied to evaluate the parameter such as a Two-Step Generalised Method of Moments (GMM), Quantile Regression Model (QR) and Fiscal and Monetary Indicator Tools (FMI). However, the findings was evidenced that redistributive effect of fiscal policy tools had been really impactful in the continent of Africa by revealing the impact contributed by direct progressive income taxes, social benefits transfer, and other productive fiscal measures. It was also discovered that indirect taxation system is regressive in nature and does not have equalizing effect on income distribution. In the same vein, taxes levied on properties have no equalizing effect on distribution of income in African Continent. The findings also showed that basic primary education policy sponsored by public expenditure abates unequal distribution of income. While, economic inequality is broadened when government spends more on secondary and undergraduate education programs. It was also observed that, Tight monetary measures adopted has no intention to stimulate income distribution in African region. However, to promote redistributive role of fiscal measures in African region, recommendation had been made that institutional authority should encourage fiscal space in form of efficient progressive tax policies,

(direct income tax, taxes levied on properties) and increased public expenses on basic primary education programs[37].

Leading to the problem of disparity in West African Economies, some Scholars have seen the needs to investigate the correlating impacts of both institutional system and financial development on distribution of income in 42 Sub-Saharan African Economies for a period of 19 years. In this study the System Generalised Method of Moments Instrument was applied to evaluate the parameters by accounting for the possible endogeneity issue. It was evidenced that in the 42 Sub-Saharan African Countries there is a wide spread of income inequality, financial mechanisms do not influence income distribution in the region,and also there is an inverse relationship between corruption control, domestic credit facility and economic inequality. Therefore, result showed that a productive institutional system coupled with an effective, structural financial framework, will reduce income inequality by establishing effective and supportive legal and political framework that will help in curbing corruption and also enhance domestic credit facilities in African region[38].

Dynamics of income inequality in Africa have also examined the interactive effect of both fiscal and monetary mechanisms on income distribution in 52 African Countries for a period of 37 years. To account for the possible endogenous problem encountered, panel data techniques estimator and Kuznets Curve mechanisms were applied in the study. However, Kuznets Curve Technique was adopted to evaluate the effect of average income, in order to illustrate the time range of income differences across the African States which emphatically established the likelihood of the presence of convergence in terms of income level. It was also revealed that there is an economic convergence that exist among the African Economies, and that has led to the identification of four stable economies, which is high income groups to low income groups.

Therefore, by applying the mechanisms of Kuznets Curve, the result showed that there is an overall divergence of per capital income level across the African Countries, which brought about instability in the relationship that exist in the selected 52 African Countriesi.e. the impact of income on income distribution may be different across the African Countries. Therefore, it was also revealed in the study that economies with high-income, experienced greateincome differences while low-income or developing economies witnessed low income inequalities. Also the effects of fiscal and monetary framework on income distribution are restricted and vary across the lowered groups of African Economies. Then, it was evidenced that institutional macro-economic frameworks, job creation and effective law and order should be adopted to abate unequal distribution of income in high income classes. It was also revealed that, the impact of these frameworks do not have a statistical significant relationship on income differences of low-income Countries[39].

As a result of the level of disparity In West African Countries, some Scholars have examined the major driver of income disparity,in both Macroeconomic and Institutional levels of 52 African Economies for a period of 37 years, Inorder to account for the possible endogeneity problem, panel data instrmentand kuznets curve mechanisms were employed, to emphasize the impact of Income per head so as to express the disparity time path. The study expressly investigates the probability of the presence of multiple balanced states of income which contradict most literature review, by adopting the concept of convergence club to indicate the Divergence of income per head, and to reveal the convergence of four stable states of different economies. Which means high income to low income groups, It was revealed that there will be unsteady kuznets curve correlation as a result of multiple balanced income states. The study also emphasized that, African Economies with high income earnings may experience increased disparity, where as

Economies with low income earnings may witness low income disparity. It was also expressed further in the study that, to examine income disparity, there will be restriction and divergent effect of Macroeconomic and Institutional framework across the clubs of convergence. It was stressed in the study that fiscal measures, monetary frameworks, employment services and the Institutional law and order are very significant in combating Inequality in countries with high income earnings, while, countries which earn low income have no statistically positive impact in controlling income Inequality[40].

One of the scholars has seen the need to investigate the impact of micro finances, financial improvement and foreign assistance on Economic Inequality in 43 Sub-Saharan African Economies for a period of 20 years. Inorder to check the Macroeconomic distortion, panel data, and fixed effects, pooled ordinary least square and generalized method of moments (GMM) instruments were employed. It was proven however that,in sub-Saharan Africa, foreign aid acts as a significant Determinant which is used to express the state of disparity but does not serve as factor that ease the poor groups. It was empirically shown that both development in financial banks and micro banks help in reducing income disparity level between the high income and low-income earners in the economy. Which means that provision of credit facilities given to the low-incomegroup through the financial institutions either Micro finances or commercial banks serve as means of increasing Economic activities that will generate more income for the poor class. It is further revealed that, economic growthper head and public spending are found to reduce poverty rate. Where increased population growth rate, high rate of Inflation, foreign direct investment and free trade are positively and significantly related with high level of income disparity. It was suggested in the study that, Sub-Saharan governments should embark on policy

that will improve the effectiveness of social security, enhance tax progressive system and promote potent Fiscal distribution which are significant in abating income disparity[41].

Being one of the ECOWAS members state, some Scholars have evaluated the distributional effect of fiscal policy instruments on income distribution in Nigeria for a period of 38 years. To evaluate both the long and short run impact of fiscal expenditure on economic inequality, affecting economic, social, environmental and institutional factors. The autoregressive distributive lag (ARDC) technique estimator and Gint index were adopted.It was shown in the study that the unit root test conducted on the data showed mixed integration result of the variables, and also, long-term correlation among the macro-economic variables areshown by the estimated cointegration test and model estimator conducted. It was also shown that there is short and long-term negative relationship that exists between Social, and Environmental capital expenditure and economic inequality. Which means that, improvement in health and education program, will reduce income difference.

Concurrently, there is also a negative relationship between capital spending on growth, and income disparity. Which signifies that, development in farming, infrastructures and telecommunications, will promote avenue for equitable income distribution in the country. Therefore, there is no statistically significant relationship between public spending on administration and economic inequality, both in the long and short-term. And it is suggested in the study that, all level of government institutions should develop in the areas of social and economic investment,in order to enhance distributinal effect by reducing the level of economic inequality[42].

Resulting to the trends and high level of income disparity in West African Region, some Scholars have examined the interactive effect of both fiscal policy tools and institutional setting

on economic inequality among 35 developed and 33 developing nations over the period of 2000 - 2019. To account for the possible endogeneity problem, the study used the panel system generalised method of moments (GMM) estimator, to evaluate the parameters. The findings showed that income inequality is persistent across the selected developed and developing countries because of the positive and significant estimate of income inequality at first lag. It was also discovered that, income tax is more progressive and its mitigating effect on income inequality is statistically evidenced in developing economies and not in the developed nations. Globally, taxes levied on goods and services do not statistically have impact on income equality over the periods understudy. Further, the results show that government spending, education expenses, and health spending are indirectly related with income inequality in developed nations only. Meanwhile, government debt does not impact on income equality in both regions. As for the institutional variables government effectiveness and corruption do not influence income distribution in developed and developing countries. Concerning the interaction of institutions and fiscal policy, the parameter estimates are in line with a prior expectation but not significant statistically. It means that institutional capacity failed to instigate fiscal policy instrument towards ensuring equal distribution of income globally[43].

Similarly, due to the negative effects of income inequality, study has evaluated the impact of both foreign direct investment and institutional quality on economic inequality in 51 economies, (24 developed Countries and 37 developing Countries), for a period of 13 years. To examine the possible endogeneity problem, Two-Step System Generalised Method of Moments was adopted to estimate the parameters. This study showed how foreign direct investment inflows contribute immensely in combating economic inequality and poverty rate in nations globally. It is also revealed that effective institutional framework and condition plays a significant factor in linking

the foreign direct investment and unequal distribution of income in developed and developing economies. The results was evidenced that the level of unequal distribution of income is exacerbated by foreign direct investment in the advanced economies, while it (FDI), abates the level of income inequality in the less developed nations. Further, it is also indicated that in both advanced and less developed economies, institutional quality coupled with effective public spending on education program reduce economic inequality. However, economic activity and integration broadened the level of disparity of income.Therefore, it was recommended that, institutions in advanced economies should formulate and implement strict and effective policies, laws and regulations that will stimulate economic progress and narrow income inequality rate[44].

As a result of the unfavorable impacts of disparity in ECOWAS Region, studies have seen the need to investigate the interactive effect of effective governance and inflationary situation on distribution of income. To evaluate for the endogeneity problem encountered, the Two-Step System Generalised Method of Moment Instrument was utilized, to estimate the parameters for 65 advanced and less developed economies over a period of 27 years in the study.

It was observed empirically that, when inflation rate is high it will exacerbate economic inequality, but unequal distribution of income is abated when there is effective governmental system put in place. However, it was proven that with the support received from effective governance through the use of potent and efficient fiscal policy measures, such as direct progressive tax system (income tax, property tax, company tax), well-targeted expansionary monetary measures, (such as reduction in interest rate, availability of credit facilities) and well-planned, and judious public spending on areas like education, healthcare, employment etc). The impact of inflationary pressure will be abated on income gap, thereby reducing the effect of income inequality.

Therefore, it is recommended in the study that institutions should be effective in their governmental performance and responsibility, because of the direct and indiret implications it has on distribution of income.[45].

Similarly, other Scholars have investigated the impact of fiscal policy tools on income inequality in 47 economies, (30 advanced countries and 17 less developed economies) for a period of 24 years.

In the study, linear panel data Instrument estimator was applied to evaluate the parameters. During the discovery, it is evidenced that income generated by progressive tax system was used to abate economic inequality in the less developed economies, but in the case of advanced countries, public expenditures spent on social benefits transfer such as education, health care etc were used to promote or enhance distribution of income. It was also proven in the study that the economic progress experienced so far in the less developed nations has undesirable influence on income inequality level due to economic imbalances or distortions necessitated by inflation and unemployment rate, witnessed in the region. Meanwhile, both economic progress and inflationary situation in advanced economies plays a favourable role on distributive level of income,as a result of the strict and potent public instrument or social policy measures stimulated to improve the living standard of the populace in the economies[46].

The problem of income inequality has also led other researchers to investigate the redistributive role of fiscal policy tools on the distribution of income in 22 OECD Countries for a period of 40 years. The study captures fiscal policy by using several fiscal instruments such as public consumption spending, government debt, government expenses on education and social security, taxes, covering income, property, and goods and services, (value added). Using different panel data estimators, unequal income distribution in the selected countries was attributed to increase

in government debts and spending. However, the direct impact of government expenditure and debt on income inequality is not significant statistically at 5% significance level. Thus, public spending and debt do not ensure a distributive effect in the countries understudy. However, government expenditure on education, social works and consumption supports, have distributive effects as these spending were able to curtail unequal income distribution. Besides, property and income taxes have an equalizing effect on income distribution[47].

One of the Scholars has also examined the interdependent effect of fiscal measures on disparity of income and issues associated with banking system in 21 OECD Countries for a period of 46 years. To account for the macro-economic problem, the study used Probit Least Squares Estimate Parameters and Panel Instrument to examine 81 banking crises. The study also shows that unequal distribution of income affects likely issues associated with banking system by means of government debts, taxation, and public expenditures alongside with increasing interest rates. And as a result of these macro economicfactors, economic growth, and banking activity are drastically affected. However, the Parameter Estimates indicate that there is a negative relationship between fiscal policy and economic inequality i.e. a substantial and effective public expenditure reduces unequal distribution of income.

It was also revealed that, there is a positive relationship between fiscal policy measures and financial crisesi.e. effective fiscal system sponsored by government debt or surplus revenue increases the level of economic inequality and the likelihood of problems associated with financial system.Also,trade openness (exports and imports) and share of prices have negative implications on banking crisis. While consumer price index, real interest rate and money supply are not significant statistically at 5% level of significance[48].

Similarly, amidst the controversial evidences with regards to whether fiscal policy abates income disparity, Some Scholars have investigated the redistributive effect of fiscal instruments on economic inequality in 17 European Countries for a period of 24 years. The study captures nine fiscal policy tools on economic inequality such as public expenses on health, social benefits transfer, housing programs, direct income tax, tax levied on properties, exports duties, import duties and taxes imposed on business transactions. To estimate for the likely endogeneity problem, (LSDVC) Least-Squares Dummy Variable, (GMM) Generalised Method of Moments and (FE) Fixed Effect panel regression were applied to evaluate the parameters. In this study, Latin America was regarded as one of the countries that has experienceddecrease in economic inequality recently. This achievement was realised because the fiscal policy instruments adopted played a significant role in abating the level of unequal distribution of income i.e. fiscal policy has a negative relationship with income inequality.

It was also discovered that the distributional effect of the fiscal policy instruments adopted by the use of strict progressive taxation system brought about the reduction in the level of economic inequality[49].

Some researchers have also analyzed the interactive relationship between economic growth, poverty rate and income distribution in 28 European Union Economies for a period of 11 years. To assess the endogenous problem, descriptive statistics techniques and economic models were employed to evaluate the parameters. It was empirically expressed that the relationship that is established between economic growth and poverty level is statistically significant at 5% in the selected economies. Further, it was revealed that poverty is a factor that determines the level of economic growth in most of these economies. It was also observed that when the economies experienced increased in the level of real GDP per capital,It will definitely reduce the proportion

of people living under the poverty limits. It was also revealed that there is a direct relationship between income inequality and economic growth of the selected economies, because the greater the level of growth experienced in some countries, the greater the level of income disparity recorded. and the lower the level of growth achieved, the smaller the level of economic imbalance witnessed by other economies. Therefore, it was also shown that economic inequality is directly related to poverty level because, increase in one leads to increase in the other, while decrease in one leads to reduction in the other. In addition, decision makers were advised to organise and stimulate macro-economic mechanisms and reforms that will create enabling environment, for a sustainable economic development that will help in alleviating poverty and promoting equitable distribution of income[50].

Moreover, one of the researchers have also examined the effectiveness of public transfer, expenditure programs on poverty alleviation and income distribution in 27 European Union (EU) economies for a period of 9 years. To check for the probable endogenous problem, Data Envelopment Analysis (DEA) and Constant Return to Scale (CRS) mechanisms were applied to account and check for effectiveness in government spending by comparing the performance of the selected 27 European economies in terms of reduction in poverty and income inequality. In the study, the estimated outcome showed diversities in the efficacy of public social expenditure, across selected 27 European economies. It was revealed that economies with highest scale of social spending habit, are less efficient in reducing income inequality, while economies with lowest level of social spending are more efficient in alleviating inequality. Because, spending that are highly socially targetted and directional,are not pro-poor and inequality reducing. and also, their effects are equally felt, and distributed in the society by the rich, and poor classes. Therefore, it was recommended that, public spending that are more efficient, such as health and

education expenditure should be adopted, because of their long-term benefits and investment in human development and well being. This study also showed diversities in social spending habit that exist between the European economies, the Southern part directed their social mechanisms on alleviation of income inequality, whereas the Northern economies and other developed states directed their social expenditure on reduction in poverty level.

It was also revealed that during the economic conflict, the social expenditure program adopted were less efficient, and thepoor groups were at the losing end because, the social mechanisms adopted were not targeted and directional in reducing poverty level, and only the middle groups were beneficiaries of the social strategic mechanism put in place by the government. It was recommended that, government should adopt social programs that are effective in stimulating poverty and inequality alleviation[51].

The negative influence of income disparity have called for the need of some Scholars to assess the interactive role of fiscal policy tools on economic inequality in 34 economies in which (Brazil, Russia, India and China were among), for a period of 33 years. To estimate for the endogeneity problem, Two-Stage Least Square, Instrument Variable (IV) the Generalised Method of Moments (GMM) and panel instrument were utilised. The study showed that, when Expansionary and Contractonary fiscal mechanisms such as government expenditure and taxation, are adopted in China at the same time, they will have negative impact on income distribution.

The evidence revealed that when each fiscal policy measures is used, each has different impact on income distribution. I.e public expenditure will have negative impact on income inequality. Whilst taxation mechanism when only adopted, it will reduce unequal distribution of income. However it is proven that, despite the distributional effect of fiscal measures adopted in China

was very strict and effective, the fiscal benefit was not sufficient to produce benefits that will abate income inequality and other macro-economic imbalances. It was recommended in the study that taxation space mechanism must be encouraged, by adopting potent progressive taxation policy, which will allow for direct income tax policy that will help in abating the level of economic inequality. And government should also encourage and provide public programs that are well-planned and directed to support the less privileged on education, health and other social benefits programs, especially, the 95% of people living in poverty within the rural settlement[52].

Similarly, other researchers have also sought to investigate the interaction of fiscal policy measures and economic growth on poverty income inequality and level of crime using 16 different economies for a period of 24 years. To account for the possible endogeneity discrepancy, panel Generalised method of moments (GMM) instrument was adopted to evaluate the parameters. During the findings, it is revealed that there is no significant relationship between crime level and average income.But there is inverse relationship between poverty line and average income.

Also it is shown that, there is an indirect correlationaninversersersen unequal distribution of income and growth rate. However, study has proven so far that the interaction existing between both economic inequality and unemployment level, exacerbates the level of criminal activities. Where as, a decline in the level of crime will promote free trade and distribution of income. The evidence showed that fiscal expenses directed to health programs coupled with free trade policy will have positive influence on poverty level and income inequality, since average income has a direct impact on poverty rate.

It was also revealed in the pro-poor results that, between 2000 and 2004, and from 2010 to 2014, the level of criminal activitieshave greatly reduced. but the economic growth rate had a negative effect on distribution of income. Therefore, poverty alleviation program stimulated by fiscal expenditure policy which provided education and health care programs for low income earners abated the level of crime in the year specified in the study[53].

Due to the augmented the level of disparity in ECOWAS, some Scholars seek to evaluate the implication of fiscal policy tools such as direct income tax, taxes levied on goods and services received, and public expenditure on economic growth and income distribution, for a period of 49 years in Australia. To check for the likely endogeneity problem, structural vector autoregressive (SVAR) techniques estimator was shortly adopted to account for currentproblem identified in the study. Also, structural vector error correction (SVEC) tools were applied for long term purpose. It was shown that, taxes imposed directly on income property, company, goods and services alongside the public expenses employed, were acknowledged as long - lasting fiscal mechanism framworks.

The reliability of the outcome was supported and revealed by combining the application of the Two Statistical Estimated Techniques (SVAR & SVEC). Therefore, the estimated results have shown the effects of fiscal policy instruments adopted, on the level of growthand income distribution in Australia as (A) Decrease in direct income tax increases economic growth, while income distribution level remains the same. (B) The level of unequal distribution of income rises when there is a decrease in government spending.(C) The negative implication of taxes levied on goods and services is higher on income inequality and growth level, than the distributional impact received from public spending. and as a result of this, indirect fiscal strategic mechanisms

werenot generally acceptable in funding public expenses that will encourage income redistribution[54].

2.3.2 Public Expenditure Effects on Agricultural Productivity

Researchers have observed that, despite the various public expenditure policy adopted in African Countries, low agricultural productivity is still prevalent in the region, as a result, some Scholars have examined the effect of institutional strategic tools on agricultural output in 49 African Economies for the period of 16 years. In this study. Fare-Premont index and panel data analysis estimator with 833 samples received from the department of Agriculture Economic Research Service data base of the United State were employed, to evaluate the overall growth experienced in the agricultural sector of the selected African nations.

However, the estimated outcome showed that, the growth rate per capita for Agriculture in African Countries is 0.73% per year. It was discovered that, Agricultural segment witnessed increase in growth, following the agricultural programme termed "Maputo Declaration" established, which was helpful in the world economic crisis. The study also revealed that the growth rate experienced by each economy differs due to different Agricultural policies and programmesorganisedin both national and regional levels, which help in stimulating agricultural output in the economy. And as a result of this, West African Economies were able to record increase in agricultural growth, where as, the Southern African Economies witnessed great deterioration in the agricultural growth.

Therefore, it was also revealed that technological progress contributes immensely in promoting agricultural growth rate such as investment in research and development, improvement in fertiliser Application and mechanised practices. Meanwhile, technical efficiency change, limited agricultural progress. In addition, institutions were recommended to improve in the area of

research and development in order to encourage agricultural innovations and quality and also invest in education, workshops, training,In order to improve the management skills, knowledge and productivity of agricultural workers, for the purpose of increasing food capacity, reducing poverty level and promoting agricultural output and progress in African region[55].

Due to low agricultural output growth recorded in African Region, one of the researchers has investigated the role of both institutional and private policy instrument on agricultural total factor productivity growth in 23 Sub-Saharan African Economies, for a period of 24 years. To account for the possible heteroscedashcity problem, a Stochastic Frontier Analysis estimator was utilised. The estimated evidence revealed that, there is positive and statistically significant relationship that exists between increased agricultural productivity and investment in human capital ,machinery and fertiliser in Sub-Saharan African region. While the relationship between increased agricultural productivity and agricultural labour is positively insignificant.

Therefore it was evidenced in the recent years that, the growth experienced in agricultural sector of the Sub-Saharan African region was not instigated by the productive capacity of labour, but was achievable by improvement in technical progress, as total factor productivity of agricultural growth was recorded in the average year as 1.96%. However, it was recorded that, improvement in technology realized 14.5% estimated average growth rate per year. Therefore, it was shown that in Sub-Saharan African agricultural sector, scale efficiency change was seen as the great impediment to agricultural total factor productivity growth, and as a result of this, institutions and private organisations should emphasise on optimal utilisation and development of human capital, research and development and also effective land maintainance, for increased agricultural cultivation and practices[56].

Other researchers have also analyzed the relationship between agricultural public spending and agricultural output in 33 Sub-Saharan African Economies for a period of 17 years. For empirical analysis, data were collected from FAOSTAT, ASTI and IFPRI sources,in order to account for the possible heterogeneity and endogeneity problem associated with the variables used, a system generalised method of moments (Blundell and Bond version) instrument was employed. It was empirically indicated that there is a positively long and short-run significant correlation between agricultural output and farm land, labour, capital and public agricultural spending. It was revealed that many researchers have presented a negatively significant long and short run relationship between public agricultural spending and agricultural output.

It was revealed that government agricultural spending without other independent variables such as land, labour, and capital being inclusively used, showed a negatively long and short run correlation with agricultural output. However it was suggested in the study that, institutions across the Sub-Saharan region should adopt effective use of MAPUTO Declaration policy, by ensuring that not less than 10% of other estimated budgets should be apportioned to the agricultural segment of the economy, so as to encourage production of more agricultural output as well as increase the use and practice of infrastructural facilities in the economy, by encouraging the system of ascribing land ownership to farmers at local level and stimulating agricultural workers to produce more agricultural output[57].

Moreover, as a result of low agricultural productivity growth experienced in ECOWAS, some Scholars have evaluated the effects of public spending on food supply in 9 ECOWAS region for a period of 16 years. However, a fixed effect generalized least square instrument was employed. The study revealed four food security indixes, such as availability, accessibility, utilization and sustainability that were adopted in the study. It was proven that food supply has not experienced

improvement despite development in agricultural spending. It was also recorded that, the 9 ECOWAS regionexamined, were still experiencing increased rate of malnutrition, and scarcity of food.

The study also indicate that a one unit rise in government agricultural spending, led to a ⅕ decline in malnutrition and improvement in the available per balance diet energy production. It was empirically revealed in the study that, the 9 selected ECOWAS states in the study, have recorded success moderately in the improvement of adequate food supply, as a result of increased agricultural spending allocated to the region.Through the establishment of CAADP fiscal policy, which enabled most of the African governments to meet up with 10% agricultural spending requirements for some years.

It was also revealed that agricultural expenditure has a significant effect onthe access to food and adequate food supply. Therefore, the study recommended that physical expenditure programs should be repeatedly adopted when drawing plans for national food supply investment, as it helps in recognising targeted and speedy mechanisms for food supply and nourishment enhancement in West African Economies[58].

Poverty rate being associated with increased income disparity have made some Scholars to evaluate the benefits derived by West Africans from agricultural productivity in the area of employment generation as the rate of poverty is abated in the region for the period of 16 years (2000-2016). The study utilised the method of moments (GMM) to evaluate the variables. It was empirically indicated that agricultural activities serves as means of improvement on the low income earners,as it is seen as a means of escaping from poverty, by improving agricultural productivity through investment in human capital.

It was however recommended that, potent fiscal agricultural policy should be drawn up so as to ensure land sustainability, water supply management service, market accessibility and food security supply are prioritised. It was also suggested that in order to fulfill the above mentioned benefit, modernised techniques for agricultural practices should be promoted by encouraging farmers with agricultural support so as to stimulate the agricultural productivity as well as raising agricultural earnings, by selling the agricultural products and thereby promoting the Country's income, and also abating the rate of poverty in the long run[59].

Nigerian being one of the ECOWAS Region, some Scholars have investigated the impact of public spending on agricultural output and growth level in Nigeria for a period 30 years. To account for the problem, multiple regressive model and Johansen cointegration test were employed. During the study, it was evidenced that the agricultural sector of the Nigerian economy has been poorly financed more than 20 years,as a result of the Country's over-reliance on crude oil that represented more than 90% of the export products of Nigerian economy. However, estimated results showed that public spending has a positive and great effect on agriculture and real GDP per capita in Nigeria economy.Also, the co-integration test conducted, showed 5% significant level constructed in the co-integration analysis. It was also estimated that, public spending has a long-run effect on the level of growth and agriculture.

And there is no statistically significant relationship between household savings habit and economic growth. which means that the household saving habit in the economy was not a factor that encourage or promote real GDP per capita, so agricultural workers should be enlightened to promote saving habit, so as to remove the barriers of not getting easy loan facilities that will help them in accessing,and procuring farming equipment and machineries. It was suggested that the

institution should establish framework that would help in stimulating public spending and saving habits,in order to increase the living standard of people as well as the economy[60].

Due to the limited productivity level recorded in the agricultural sector of Nigeria, some Scholars have examined the role of public expenditure on agricultural productivity in Nigerian Economy for a period of 37 years. In the study, the data used were obtained from the statistical bulletin of the CBN which shows the gross domestic product, government recurrent expenditure on agricultural output, and government capital spending on agricultural output and agricultural productivity.

To estimate the long run relationship between the independent and dependent variables, Augmented Dickey - Fuller Test, The Johanson Co-integration Test and the ordinary least square (OLS) were employed in the study. However, in the study, the estimated result showed that there is a positive relationship that exists between the fiscal capital and recurrent spending on agricultural output, and agricultural productivity growth.

Therefore, it was suggested in the study that federal institution of Nigeria should maintain standard, effective and stable fiscal agricultural spending so as to succeed in actualizing the desired effectual agricultural output and growth in the Nigerian economy[61].

Similarly, due to the low output growth of the agricultural sector of Nigeria, some Scholars have investigated the effect of government spending on agricultural development in Nigeria for a period of 31 years. Ordinarily Least Square and Co-integration Techniques coupled with E-views Software Statistical tools which include the following : standard error, T-test, R-square, F-test and Durbin Watson Statistics, were usedto evaluate the parameters, and also, to check for a long-run correlation that exist among the economic variables.

In the study, it is shown that public spending on development in Agriculture has a positive effect on the sustainability of employment opportunities in Nigeria. This revealed that public spending and agricultural development on Agricultural productivity has a great significance in reducing unemployment rate in Nigeria. And as a result of this, decision makers were advised to stimulate effective government policy tools on the Nigeria agricultural development in both national and regional levels, so as to promote employment opportunities in Nigeria, and also induce agricultural growth by removing, ineffectiveness, poor formulation and implementation of agricultural government policies, and also by eliminating impotency in the government frameworks which are directed towards policy activation[62].

Resulting to the problem of low agricultural productivity, one of the researchers has assessed the effect of government policy framework on agricultural output in Nigeria for a period of 33 years. The data used in the time series were gotten from the secondary source. Co-integration test, error-correction analysis and equations approach model were employed, to estimate the parameters obtained from agricultural productivity and public spending variables.

In the study, different roles played by the elements representing public expenditure on agricultural output were also evaluated. Therefore, it was shown that repeated and overall government spending on agriculture has no relevance to the growth of agricultural output, except if the government spending is capitally driven. That is, when agricultural output growth can be positively achieved within an interval of time. The study also revealed how private investment on agriculture receive fulfillment in government capital spending, directed to agricultural output. It was also stated that after MAPUTO declaration of 2003, private investment on agriculture has not achieved a great improvement on agricultural growth.

However it is revealed that, Nigerian budgetary system directed towards government capital spending on agricultural growth was rejected, as a result of its insignificant exorbitant cost incurred on irrigation purpose, which only encouraged private investment on agriculture, and ignored investment on research and development of rural areas, and policy on agricultural subsidy.

In addition, suggestion was made in the study that, decision makers should improve on quick and effective execution and implementation of budget directed towards agricultural growth and also they should adjust their budgetary system in a way to support investment in Research and development, irrigation development and rural improvement.in order to review the impact of government expenditure in agriculture, and other relevant factors promoting the value of agricultural productivity[63].

Similarly, other Scholars have evaluated the interactive role of both public spending and agricultural sector on agricultural productivity in Nigeria for 33 years. The study employed Granget Causality Tests Estimator to evaluate the parameters. It was revealed in the study that there is no significant relationship that exists between public agricultural spending, agricultural productivity and agricultural exports. Whereas it was public spending directed towards agricultural productivity that brought about the need for employment opportunity in the agricultural sector. However, it was also shown that agricultural exports have no causal correlation with employment level in the agricultural sector.

And as a result of this, it was suggested that, decision makers should make it very important to formulate effective policy, that is highly supportive and motivational in the area of job creation for young people who are job seekers from rural and partly-urban regions in the agricultural

sector, so as to be fully granted job opportunities that will abate socio-vices and illegitimate acts in the society, which will in turn stimulate effective agricultural productivity and growth[64].

Similarly, leading to the low level of agricultural output growth in Nigerian Economy, some Scholars have analyzed the effect of agriculture public expenditure on agricultural productivity in Nigerian economy for a period of 38 years. The study employed Description Statistics, Augment Dickey-Fuller Tests, Vec Granger Causality and Block Exogeneity Wald Test, Johansen Co-integration test, vector error correlation test to evaluate parameters. In the study, it was revealed that all the variables estimated were fixed at first, while they remained unstable at each level of estimation.

However, the estimated results revealed that public expenditure has a positively long-run significant relationship with agricultural productivity in Nigerian Economy. It was also shown that there is a two way relationship that exists between agricultural public expenditure and agricultural growth, which is at 10% statistically significant level. During the estimated period it was revealed that, agricultural productivity showedsudden positive impact of public agricultural expenditure. As a result of this evidence, it was suggested in this study that, Nigerian government should ensure that more budgeted allocation should be allotted for the agricultural workers, so that they can improve in the use of fertilizers, better seedlings application. Also, they should be given access to grants and credit from banks, in order for them to have easy access to agricultural mechanized tools as well as to improve on their usage.

In addition, it was also recommended that Nigerian decision makers should improve in the aspect of funding, allocated to the agricultural sector,in order to increase food security that will reduce poverty level as well as to compete with other countries around the globe[65].

As a result of low agricultural output growth recorded in Nigeria, other researchers have examined the effect of both the short run and long run correlation between agricultural productivity, public spending and level of growth in the economy of Nigeria, for a period 34 years. TheZivot-Andrew Unit root Test, the Gregory - Hansen Test and Auto-regressive distributed Lag (ARDL) analysis estimator were employed.

The Zivot Andrew unit root test revealed that agricultural productivity rate of exchange and gross domestic output are fixed at the first lag, whereas public spending is fixed at each level. The Gregory - Hansen test established the presence of a co-integrated correlation that exist among the sample variables adopted, and the autoregressive distributive lag (ARDL) analysis showed that agricultural productivity has a negatively statistical and non-significant impact on real gross domestic product in the Nigerian economy.

It was shown in the study that, public spending and the rate of exchange have positively long-run significant impact on the real gross domestic output in Nigerian Economy. Therefore, the study suggested that Nigerian institution should provide more credit facilities to the farmers in order for them to have access to credit borrowing that will increase agricultural productivity. It was also suggested that they should stimulate more spending, that will improve agricultural sector of the economy so as to induce increase in level of growth economically[66].

Leading to the poorly financed in the aspect of agricultural research and development in Russia, some Scholars have seen the need to examine the impact of government expenditure on agriculture and growth in Russian economy for a period of 11 years. Fixed effects technique estimator was utilised. In the study, it is revealed that there is a positive relationship between public expenditure and agricultural growth, and that government budgetary support has not

helped in providing agricultural development in the areas of subsidising agricultural raw materials, research and development due to poor financing.

Also, it was shown that Russian government shifted support in the arrea of subsidy from the public service, which individual producers should also be benefiting from, to only larger and most successful ones. In order to promote and encourage export, import substitution and market competition around the globe. As a result, the agricultural output of the remaining Russian producers, were drastically reduced. And it was also revealed that the Russian institution created budgetary support between the national and regional government, which resulted to distortion of market system and reduction in efficiency of government spending.

Therefore, it was recommended that the budgeting support policy should be mostly directed and transferred to the regional producers with the most favorable climatic conditions,so as to encourage and promote market harmonization, which will result in long-lasting agricultural growth[67].

Resulting to the decline in the level of agricultural growth in Asian Countries, some Scholars have evaluated the effect of institution development framework on improvement in agricultural output in 15 Asian Economies, covering South and Southeast region for a period of 14 years. To account for the possible economic problem, Stochastic Frontier Analysis (SFA) and dynamic panel data technique estimator were employed to analyse the parameters.

In the study undergone, total factor of agricultural productivity was analysed in three segments; Technological Change, Technical Efficiency Change and Scale Change. And it was shown that, both South and Southeast Asia region experienced a total fall in agricultural output, despite the fact that, the total factor of agricultural productivity is triggered by technological change.it is alsorevealed recently that, its impact resulted to decrease in agricultural growth rate, while

decrease in technical scale Change,and technological efficiency caused agricultural output capacity to be decreasing over the years. Therefore, technological change is seen as a major contributor, considering the agricultural output capacity level revealed for each economy.

It was also shown that, the Southeast Asian economies witnessed more balanced and consistent growth in agriculture.Also, human capital investment inurbanisation development and inflow of agricultural investmenthave beengreatly considered as factors determining growth due to its impact on the total factor of agricultural output growth. Meanwhile, the development recorded in the level of growth, due to reliance on agricultural importation, has a negative relationship with total factor of agricultural productivity growth. In addition, it was suggested that the South and Southeast Asian Institutions should stimulate agricultural framework that will promote human capital development, investment in research and development, inducement of financial aid and inflow of agricultural investment for promotion and maintenance of agricultural output.

Also, India and Indonesia should make use of sub-national agricultural development mechanisms, through supportive efforts received from other neighbouring counterparts on areas like development in technology, in the same vein, economies like Afghanistan and Iran who are affected, as result of economic deterioration experienced from diseconomies of scale should embark on the use of importation of agricultural materials and equipments[68].

Similarly, other researchers have seen the need to assess the effect of fiscal or institutional policy instruments through the use of technical Change and efficiency on Agricultural world productivity growth in 104 economies for a period of 45 years. To account for the agricultural total factor productivity growth, primont index approach analysis was employed to evaluate the parameters.

It is revealed that, the world total factor productivity agricultural growth level was 0.44% yearly, and technical Change and mix efficiency Changes were recorded as factors responsible for the agricultural growth witnessed in the countries estimated.Where as, the technological efficiency and scale efficiency changes contributed little to the growth level. Therefore, it was revealed that the agricultural total factor productivity growth rate differs around the globe, by enlisting the South Asia economies as the first on the list that are experiencing agricultural growth with 1.05% yearly, followed by East Asia and the Pacific regions which yearly recorded 0.18% growth rate. In addition it was shown that,the total variable factor of productivity of Agricultural growth produced different effect on each economy across the world. However, African continent employed mix efficiency (TFP) to improve agricultural output growth, while European regions adopted technological efficiency TFP to stimulate their agricultural productivity.

Due to the low rate of TFP growth recorded in agricultural sector, recommendation was made that global institutions should majorly attend to how the world agricultural growth rate will be stimulated, through effective and appropriate institutional policy tools designed and employed, in order to achieve basic necessities of life such as food, shelter and clothing for the less developed economies. Also, targeted agricultural mechanisms should be adopted, and effectively utilised so as to derive maximum economies of scale through investment in human capital, research and development, as well as, procurement of agricultural equipments and machineries.

And government should also employ price and non-price mechanisms (such as taxation, subsidy, tax-holiday, agricultural workshop, training and other extentions), so that input and output resources can be maximally utilised[69].

Leading to the decline in allocation budgeted to South African agricultural Sector; some Scholars have investigated the impacts of public spending on agricultural output, Yearly average rainfall,

and quality of food import, price index of consumer and population growth on the quality of agricultural produce in South African Economy for a period of 36 years. Johansen Co-integration test was employed in the study. It was revealed that despite the fact that, the enormous contribution received from the South Africa agricultural output, and other aspects of economy over the years, the agricultural sector is still suffering from the measures put forward by the South African government, by allocating low estimated amount to take care of the agricltural sector, and other aspects of the economy, contributing to the South African agriculturalgrowth. In addition, it was indicated in the estimated resultthat, the impacts of government spending has a long-term correlation with other variables. The Granger Causality test was carried out stated that, agriculture public expenditure has no Granger influence on the quality of agricultural produce, as other estimated variables are correlated with the two variables such as (agriculture public expenditure, and quality of agricultural produce) in the model analysed.

Meanwhile, Vector autoregressive (VAR) Model revealed that, public spending directed to agriculture, population growth, and annual average rainfall stimulated maximally the value of agricultural produce. Adversely, the value of agricultural productivity deteriorated, when the price index of consumer is highly exorbitant, and when the value of importation of food is extremely low.

However, based on the estimated results revealed, it was recommended South African government should allocate more government spending on agriculture, so that the agricultural aspect of the economy will be able to invest on research and development, climate-friendly agricultural practices to promote sufficient rainfall for agricultural uses, and for better agricultural production. It was also recommended that, inflationary pressure in South Africa

should be curbed by reviewing the monetary framework, so that agricultural products prices can be regulated during economic ups and downs[70].

As a result of the significant effect of fiscal public spending,some researchers have investigated the role of agricultural public expenditure on agricultural output in South African Economy for a period of 33 years to establish the long run relationship between the sample variables, Autoregressive distributed lag (ARDL) Model was employed to estimate the parameters. It was discovered in the study that agricultural public expenditure has a positively long run correlation with agricultural sector productivity and growth. However, the study emphasised the inestimable impact of the South African institution on fiscal expenditure of agricultural sector growth, by adopting agricultural practices in a highly productive manner regardless of any climate conditionAnd also in order to stimulate and increase agricultural output in the Short-run, South African government should increase more allocation to the agricultural sector of the economy[71].

Some Scholars have examined the impacts of public spending on agricultural productivity and sector in China Economy for a period of 30 years. To examine the correlation between the long-run and short-run variables, time series and Auto-regressive distribution lag model instrument were applied to estimate the parameters. In the study, agricultural public spending,total number of state farms cultivated were used as independent parameters, while agricultural productivity and agricultural sector of the economy were use as dependent variables. The data sample used in the study, were obtained from the Office of China's National Statistics. It was also revealed in the study that, there is positively significant correlation that exists between agricultural productivity sector (dependent variables) and agricultural public expenditure total number of state farms and area cultivated for state farming practices (independent variables). It was revealed that more than 5% estimated results of public expenditure was shown in the short-run,

while positively direct correlation exist between the agricultural productivity sector and public expenditure and area cultivated for state farming showed more than 5% estimated results in the long-run, apart from the total number of state Farm variables. However, the study showed how the Chinese institution has been making effort tirelessly to stimulate the agricultural aspect of the economy by establishing effective policies that will encourage more targeted expenditure in the area of agriculture both in the long-term and short-term period so as to positively contribute to the Chinese nation's economic and agricultural growth. and also to be able to provide independently and sufficiently for the needs of the region at large[72].

Other researchers have analyzed the impact of agricultural fiscal spending on agricultural total factor productivity in 30 Regions of China for a period of 12 years. In order to check for the possible heterogeneity problem, the random effects and spatial Durbin analysis estimators were adopted. It was also revealed that, time-series analysis was also used to check the effect of the fiscal policy adopted foragricultural fiscal spending on agricultural total factor productivity. Therefore, during the study, it was estimated that; (1) There is positively and spatially significant spillover impact between total factor productivity of agriculture and agricultural fiscal spending. (2) Agricultural total factor productivity can be maximally abated by agricultural public expenditure in the local region. This means reduction in agricultural total factor productivity by 0.037%, would totally raise agricultural fiscal spending by 1%. It was recently discovered that massive improvement of agricultural productivity, as a result ofincrease in agricultural spending, led to high rate of pollution emitted in the local region. (3) There is negative and spatially significant spillover relationship between agricultural fiscal spending and agricultural total factor productivity, which means that in the similar geographical region, the ATFP reduce by 0.123% as AFS rose by 1%. Whereas, in the same geographical and economic regions ATFP reduced by

0.116%. It was also revealed that agricultural output requirements in the region will be maximally increased by AFS alongside with the impact being actively working in the geographical region. Therefore, there will be increase in the amount of pollution emitted in the region as a result of the expansion of agricultural output. (4) It was revealed during the period examined that, there is a negatively significant relationship between ATFP and AFS, prior to the time the fiscal policy review was suggested in the year 2015, which showed that potent fiscal programmes have a positively great effect on sustaining agricultural growth[73].

Leading to the limited agricultural growth in Tanzanian region, some Scholars have also investigated the impact of persistence fiscal budget spending on the growth of agricultural sector in Tanzanian economy for a period of 14 years. The Sample data used in the study were collected from secondary sources, Unit Root Test, the Augmented Dickey-Fuller Test, co-integration error correction test, and autoregressive distributed lag analysis tools were applied to establish both long and short run correlation between the independent (fiscal recurrent expenditure) variables and dependent (agricultural sector growth) variables.

It was revealed in the study that, there is long-run positively significant correlation between the fiscal recurrent budget spending and growth of agricultural sector. However, it was indicated that 0.3326% rate of agricultural sector growth was achieved as a result of 1% rise in fiscal recurrent spending on agriculture. It was also revealed that fiscal spending on the agricultural sector had a negative multiplier effect on other aspects that could improve the growth of other sector of the economy such as industry, commerce, transport, infrastructure, by causing a fall in economic growth of Tanzania between46.4% in 2004, and 28.8% to 2018, due to raw materials used in the industries which are produced through agricultural sector. Also, the creation of job opportunities, for both rural and urban dwellers, and rendering help in the area of reducing over-reliance of

importation of sugar, wheat and oil, had really affected the Tanzania gross domestic product till 2018. Therefore, it was suggested in the study that Tanzania policy makers should embark on effective fiscal policies reforms and also encourage allotment of more fiscal expenditure on agriculture in order to achieve increase in agricultural sector growth[74].

2.3.3 Agricultural Output Effects on Income Inequality

Several studies on the effect onagricultural output growth on income inequality have been carried out and different evidencehas been analyzed. This has been characterized by different microeconomics situation of each Country. Different Data Sets and the Scope of years investigated, and diverse techniques employed, and Models specified. Unfortunately, despite the several studies aimed at providing a solution to income inequality, the growth is still persistent. As a result, some Scholars haveexamined both the effect of factors of production on agricultural output and how agricultural productivity is used as instrument to reduce poverty and stimulate economic growth in 13 ECOWAS economies for a period of 25 years. Linear Cobb-Douglas production function, fixed effects, two-stage least Squares and Generalized Method of Moments tools were adopted to estimate the parameters.

However, it was revealed that Cobb-Douglas production function and fixed effects tools employed showed that there is a positively significant correlation between lands and tangible and intangible capitals, while conversely, the more agricultural workers are employed, the more the level of agricultural productivity reduced. However, it was also indicated in the study that, two-stage least squares and generalized method of movements instruments revealed that agricultural output serves as a tool to stimulate growth and alleviate poverty. In addition, it was shown that non-agricultural output has a significant relationship with agricultural output, and that poverty level would be reducedbecause of agricultural output gap. Therefore, due to the positive and

significant impact of tangible capitals on agricultural output, it was recommended that institutions should encourage and support farmers on how to be well-trained and adopt mechanized farming practices that will promote agricultural productivity. In the study however, it was also recommended that the government should also provide financial assistance to the farmers by giving them easyacess to credit, and also reduce the rates of interest so as to boost agricultural productivity[75].

Similarly, other researchers have analyzed the relationship between agricultural productivity, agricultural job opportunities and poverty alleviation in 15 ECOWAS Economic Community of West African States over the period of 17 years. In this study, the Generalized Method of Moments (GMM) approach was adopted to estimate the parameters.

It was however revealed that, above 40% of the world population which are accounted as poor and are majorly agricultural rural workers who totally relied on farming activities for survival. It was also revealed that, the main source of Job creation which covered above 60% population of West African Nations are from agricultural source. Therefore, in the study, it was indicated that, with the help of improving and investing in human capital, agricultural activities will enable the rural farmers to improve the level of their income, which helps them from their poor state.

It was also suggested in the study thatpotent fiscal programmes should be put in place to improve agricultural activities, such as: land management, water sustainability, market accessibility and food production. And it was also recommended that, the adoption of mechanized agricultural practices should be promoted by providing agricultural fiscal assistance that will stimulate agricultural productivity and promote the earnings of the farmers by means of selling agricultural produce, as well as increasing income generated by the government which in turn abate poverty level[76].

Resulting to the low agricultural productive performance which has brought about the augmented level of income disparity in African, Latin American and Asians Economies, instigated several researchers to examine the role of agricultural output growth on income distribution in 27 developing economies (11 Sub - Saharanpur African, 9 Latin American and 7 Asian Countries) economies for a period of 50 years. Ordinary Least Square Regression Analysis Tool was employed.

It was revealed in the study that inspite of the fact that, agriculture is considered as one of the sectors of the economy that provides massive employment opportunity for rural dwellers still it is associated with high level of poverty and income inequality. However, the study focuses on long-term structural transformation of overall sectors in terms of productivity and creation of employment in the economy, by segregating the economies into tradition and advanced economies. The average labour agricultural productivity was considered, as well as the non-agricultural sector, so as to examine the impact of structural transformation on income disparity.

It was discovered that, there is positively significant relationship between income disparity and inter sectoral difference. It is also revealed in the study that, the impact of structural transformation has been neglected in agricultural and developed economies as the impact was effectively felt in the early labour capital economies, but totally ended in labour - capital developed economies. It was conclusively evidenced that to extend benefits to the poor income group, especially non-agricultural group, income should be effectively distributed to reduce the impact of income disparity[77].

Due to the decline in the performanceof the agricultural sector, the high trend of unequal distribution of income has been the order of the day especially, in the less developed economies.

This has triggered one of the Scholars to investigate the role of agricultural, non-agricultural output growth and inflationary effect on income distribution in 26 developed and 66 developing economies for a period of 24 years. To evaluate the correlation between agricultural and non-agricultural output growth and inflationary impact on income disparity, Kuzenets hypothesis analysis, and the multivariate panel data unit root instrument were employed. The study also made use of the Hodrick - Prescott (HP) tool. The study showed negative non-linear significant correlation between income disparity, and the Hodrick - Prescott (HP) tool showing inflationary situation sign twice in the developed economies.

However, it was empirically discovered in the study, that there is a positive significant linear correlation between income disparity and the HP inflationary rate tool. And it also revealed that, in less-developed economies, a negative significant linear link between income disparity and HP inflation rate tool was established. During the study Kuznets U-shaped curve analysis was adopted to indicate the link between income disparity and agricultural growth and between income disparity and non-agricultural output growth in the advanced and less developed economies[78].

Due to low performance of the agricultural sector, the region has been seriously facing the high rate of income inequality, and as a result, some Scholars have investigated the effect of agricultural productivity on economic growth in Nigeria for a period of 30 years. However, different statistical instruments such as ordinary least squares, cointegration, granger causality test were employed, to estimate the parameters. During the study, the result estimated from cointegration test showed that there is along-term correlation between the agricultural output and the level of growth. While the repression analysis that was shortly run showed that there is a significant correlation between financial credit directed to agriculture, and the rate of interest on

the level of growthin Nigeria,whilethere is no significant correlation between agricultural productivity and growth level.However, it was recommended that, government should adopt effective fiscal mechanisms that would stimulate stability in the economy, and promote growth through suitable interest rate mechanisms, which will stimulate agriculture, by having effective impact on people generally and economy. It was also suggested that effective and potent actions should be strictly taken by the financial institutions in the aspect of financing agricultural sector,so as to stimulate growth in the economy, by taking decisions on diversifying the econom and aslo taking prudent actions in the management of public funds[79].

Similarly, some scholars have assessed the relationship between agricultural output, food availability and poverty alleviation in Nigeria economy over a period of 29 years. Co-integration and Grange Causality instruments were used to estimate the parameters. Further, the study revealed study that, data was gathered and obtained from the central bank of Nigeria statistical bulletin, as well as the world development indicators. The study empirically showed that there is a long-run correlation between agricultural output, food availability and economic growth. In the same vein, the study also indicated a one-way relationship between food security and poverty alleviation in Nigeria.

It was shown that there is a one-way correlation between poverty alleviation and agricultural growth. Therefore, because of the empirical evidence, suggestion was made in the study that, Nigerian government and other African region should place great importance on agricultural growth, by adopting effective fiscal mechanisms that will help in stimulating increase in availability of food and agricultural growth. Which help in abating poverty in African countries[80].

Further, this study has seen the need to analyze the impact of rainfall on agricultural output, income disparity and consumption of household in Nigeria and Uganda economies for a period

of 6 years. In the study, a panel data approach was adopted to evaluate the parameters. However, the study indicates the effect of rainfall on various agricultural output, as it affects both household income, and consumption behaviour in the rural regions.

Also, the impact of climatic changes was shown in the study, how household consumption behaviour and income disparity rose because of the various implications of the climatic changes on agricultural output growth, which also reduced the agricultural productive capacity of the poor farmers.

Therefore, it was stated that, if the fiscal agricultural inducement is not in alignment with the present style of technological improvement, that will mitigate the implication of climatic changes, this will lead to differences in agricultural production, and it may also result similarly to rise in the disparity of income and consumption level of rural households. However, it was recommended in the study that, fiscal potent mechanisms such as subsidies that will improve agricultural productive capacity of the farmers, solid fertility and irrigation management, as well as other socio - agricultural benefits like safety nets should be provided for low-income farmers in order to abate the level of income disparity in the area[81].

Resulting to the limited agricultural output growth recorded in Asian which led to the problem of income disparity. Some Scholars have investigated the role of macroeconomic and non-macroeconomic variables on income disparity in ASIAN economies (Indonesia, Malaysia, Thailand, Vietnam and the Philippines) for a period of 4 years. Panel Data Instrument was employed to evaluate the macroeconomic variables while non macroeconomic factors were measured by democratic behaviour and corruption analysis indices. Therefore, it was empirically shown in the study that the role played by the agricultural sectors, triggered income disparity in ASIAN economies. According to the empirically evidence, it is suggested in the study that

ASIAN economies institutions should embark on effective fiscal development mechanisms to establish industries, create job opportunities and provide improved financial institution services for people living in the rural regions, so as to abate income disparity among the rural farmers. It was also advised that institutions should help the rural dwellers to have easy access to Bank loans to improve their living standard and earnings[82].

Some researchers have analyzed the effect and the correlation between agricultural output and income inequality in Iran economy for a period of 8 years. To examine the relationship between agricultural output growth and economic inequality, Panel data simultaneous regression approach was employed to estimate the parameters. However, in the study, it was revealed that the earnings realised from agricultural productivity determined the growth and income distributed in the rural areas of the Iran economy. While other studies recently revealed that increase or decrease in social infrastructural amenity has impact on the relationship between economic growth and income inequality.

As a result of the fact established empirically, income inequality and economic growth has interactive impact played on each other and the relationship that exist between them is marked by the areas with increased social infrastructure, and those regions with little or no amenity. In addition, two approaches were used in the study to analyse the correlation between income inequality and growth experienced in the agricultural sector. The first approach explained the potent elements used for the growth of agricultural sector, and the second approach investigated the variables that influence rural income distribution. It was revealed in the estimated result that there is no significant correlation that exists between the agricultural sector growth and income inequality in the regions with high social amenities.Whereas, agricultural sector output increases as income distribution improves greatly in the poor arreas that were marked bya low level of

social infrastructures. In the study, it was also revealed that high income inequality instigated increase in the growth of economy of the poor regions while there is no significant impact of income inequality on economic growth of provinces with high social amenity.

Moreover, the estimated result showed that public spending led to high economic inequality in the rural regions and increase in public spending will reduce income inequality in the poor and low-infrastructured regions. As a result of this, it was recommended in the study that, Iran government should provide social infrastructures and amenities to promote agricultural sector growth and equal income distribution in the poor provinces characterized by low social infrastructures[83].

Due to the unfriendly climatic condition experienced by Malaysians populace, agricultural productivity has been minimal, and this has really affected income distribution in the region. For this reason, some Scholars have evaluated the negative effect of climate conditions on agricultural output, income distribution, agricultural gain, Job opportunity, health condition of farmers and institutional policy on subsidy in Malaysia for a period of a year (2009). In the study investigated, A questionnaire approach was used to carry out 198 Sample of farmers in the Agricultural Sector of North - West Malaysia region to analyse the variables. The descriptive statics, ordinal scale and percentile instrument were employed.

Therefore, in the study, it was shown that agricultural production, agricultural gain, distribution of income, agricultural Job opportunity, health condition of farmers and institutional subsidy policy were affected by the unfavourable climatic condition of the region. It was also empirically revealed that there is income disparity among agricultural workers, and thatunfavourable climate conditionsincrease income disparity. i.e the poor farmers are mostly affected by the negative impact of climate conditions. However, it was suggested in the study that government should

formulateprogrammes that would support friendly climatic conditions, to stop the negative impact of climate conditions on income distribution of agricultural workers in Malaysia region[84].

Some researchers have analyezed the impacts of agricultural output growth on poverty, unemployment and income inequality in Pakistan Economy for the period of 37 years. In the study, data on agricultural output growth and poverty per head ratio are collected from various reliable data sources like Pakistan economy survey (PES), international financial statistics (IFS) and world development indicators (WDI). To evaluate the endogenous variables, ordinary least square instruments were employed. However, it was revealed in the study thatagricultural productivity growth has been identified as one of the key factors used in the developed and growing countries to reduce poverty. Further, it was empirically indicated in the study that agricultural output growth and other key factors estimated in the study like cash crops, farm animals, fish farming and forest cultivation, greatly influenced the number of people living below the poverty line in Pakistan.

Therefore, it was recommended in the study that, agricultural long term fiscal measures, alongside with the total country's planned economy progressive policy should be strictly executed,to improve agricultural output growth that will help in reducing poverty, income disparity and promote employment opportunities which in turn will lead to maximum economic progress in Pakistan. It was also recommended further that, other operational arreas of the Pakistan agricultural sector should be strictly monitored and investigated,inorder to know the key areas where revenue can be realised to solve important economic related challenges facing Pakistan, as well as fulfilling the requirements of United nations sustainable development goals[85].

Some Scholars have also seen the need to examine the distributional impact of agricultural programme on significance of income disparities among farmers for agricultural sustainability

and output growth in Polish economy for a period of 14 years. In the study, the GMM coefficient, concentration index and multivariate regression analysis instrument were employed. It was empirically discovered in the study that, the intense and increasing issue of agricultural income disparities has been identified as major impediment to the sustainability of polish agricultural productivity and growth.

Therefore, the correlation between agricultural income inequalities and agricultural factors of production was established in the study, However, agricultural factor of production such as agricultural land and capital were seen as variables that triggered the problem of agricultural income inequalities in Poland, and fiscal spending like agricultural subsidies allocated for polish agricultural sector, in order to help farmers generate more income could not stop the level income disparity, but only reduced the increasing income gap among farmers in Poland[86].

Several studies have evaluated the impact of income disparity and poverty related factors on agricultural production in Kosovo for a period of 1 year (2017). Data were obtained from 203 households in Kosovo randomly by using a questionnaire to estimate the parameters. The study adopted linear regression analysis, ANOVA version and other poverty indexes. It was revealed in the study that, despite the implementation of different fiscal measures on poverty reduction, Kosovostill remains as one of the poorest economies in the European region.

However, it was also revealed that ¼ of the households' earnings were obtained from non-agricultural activities, while the average income earners were opportuned to secure jobs in other sector of the economy as alternative. During the study, schooling years, family size, total number of households above age 18, and total amount of earnings were indicated to havefavourable effects on income generated from other sectors of the economy. It was also revealed that, the low income household earnings obtained 77.52% largest earnings from agricultural services, Mean

while, the earnings generated from other sectors of the economy played significant role in reducing poverty rate in Kosovo.

Therefore, it was recommended in the study that effective fiscal policy measures should be implemented to increase job opportunities in non-agricultural sectors for the low income earners in the rural region. It was also recommended that Kosovo government should look intoagro-tourism sector of the economy that will help in providing social economic and educational advantages to agricultural producers and economy at large, as well as focusing on recycling agricultural services by re-using agricultural wastes economically, which could serve as income generation for low-income rural dwellers, in order to alleviate poverty consistently[87].

Due to the level of development in this part of the world, many workers have migrated from the agricultural sectors to the non agricultural sectors, and this resulted in declined agricultural output growth. However, one of the researchers has analyzed impact of agricultural productivity on both employment development, and farming income in 28 European Union Economies for a period of 9 years, Analysis Excel Program and GRETI software instruments were employed to estimate the parameters. It was revealed in the study that the more economies are advancing globally, the more the workers in the agricultural sectors are reducing below 14%, while the numbers of working population in European Union Countries reduced below 19%.

However, the agricultural output growth increased globally above 21%. Where as, the agricultural productivity increased more than 22% in the European economies. The study accounts for the growth of agricultural productivity, by using the three-group indexes of agricultural income, and numbers of workers in the agricultural sector of European Union economies. It was revealed in 2017 that group A Indicator showed 25.56% rise in farmers income, group B indicated 39.11% rise, and group C showed 20.39% compared to what was

recorded in 2010. It was also shown that in 2019, 4 members of the European Union (Germany, Spain, France, and Italy) recorded 42% as the greatest growth experienced in agricultural sectors. Similarly, in 2019, it was revealed that income of farmers recorded in the indexes, showed the greatest positive transformation experienced by Bulgaria, Denmark and Romania.While, Poland and Romania were rated as the greatest employers of labour in the same year.

Moreover, the study reveals reasons whydevelopment experienced in the agricultural sectors of the 28 European Union states varies from each other. Which are Location differences, variations in climatic conditions, natural resources and ecological phenomenon of each state.Also,the variation in the structural and organisationallevel of the economy, and differences in the levels of growth of the economy were among the factors that marked difference in the agricultural productive capacity of the 28 European Union States[88].

This study has evaluated the impact of change in various source of living on income disparity and poverty in the rural region of Bangladesh for a period of (1988, 2000 and 2008) 3 interrupted years. Data was obtained from 153 households randomly from regions Bangladesh, 62 villages of 57 regions of Bangladesh were also visited for data collection. Different instruments were employed in the study such as multidimensional poverty index, GMM coefficient and decomposition of GMM coefficient to estimate the variables.

However, it was empirically shown that, diversities in the sources of living by changes in the source of earnings, affected the level of households income disparity and poverty in the rural region. As a result of the modification in livelihood, income improvement in the total level of poverty was recovered, while income disparity level increased in the recent years. It was revealed that, rural household dwellers changed their source of living from farming activities to other non-agricultural activities.

The study established that, some rural farmers who were self-engaged in non-farming activities for years, contributed greatly in alleviating income disparity in Bangladesh. It was also revealed that income generated from wage paid jobs broadened the gap of income level of rural households in Bangladesh. However, it was suggested that, policy makers should embark on fiscal policy mechanisms that will help in creating more industries, as well as supporting rural households to be self-engaged in other non-agricultural activities, so as to stimulate improved agricultural output growth in Bangladesh economy[89].

Leading to the over reliance importation of food in Mozambians region, agricultural productivity growth was minimally declined, which influenced the problem of increased income disparity in the region. As a result, some researchers have examined the effect of agricultural growth and foreign trade development on Monzambian economy for a period of 2 years. To evaluate the variables in the study, a social accounting decomposition matrix multiplier instrument was adopted specifically and other tool was used to compute income distribution in the mozambian economy. In the study, the effect of the independent variables (agricultural growth and foreign trade development) on income disparity of rural households was examined, by majorly focusing on the aspects of the economy that specialises on production and processing of food.

However, it was revealed in the study that, low-income rural households received little advantage from a rise in agricultural production as a result of low-income earnings and poverty level. While the rich rural and urban income earners were benefiting more than the poor rural and urban income groups. Due to the level of affluence and high income they enjoyed from their earnings. It was also revealed empirically that the rich income earners were not contributing to the growth of the economy. As a result of the over-reliance on more importation of agricultural food production, and food processing, majorly from South African,rather than the locally made

ones. While, Rural dwellers with low-income earnings, were only the ones that were consuming locally made and processed-food crops[90].

Some Scholars have seen the need to analyze the impact of agricultural human capital development and agricultural output growth in China for a period of 14 years. To account for the income disparity in China, Quantile Regression Model analysis was employed. Therefore, in the study, it was empirically evidenced that; (1) The Total factor of agricultural productivity of China Economy started improving,because of the technological change without any effect of change in the technical efficiency (TEC) or stable scale change (sc).

It was however stated that, investment in human capital has directly helped in reducing income disparity between the rural - urban farmers, as well as increasing agricultural output indirectly. It was also revealed that, as a result of income disparity among the farmers, the role of agricultural human capital development, and agricultural output growth have various effects on income differences of the rural - urban farmers.

Therefore, it was suggested in the study that, there should be improvement in agricultural human capital development such as Training and Education. Farmers should also be encouraged to adopt mechanised farming practices,so as to stimulate increased agricultural output growth[91].

Similarly, the study also investigated the factors and effects of different utilization of agricultural technological inventions on household agricultural income in China Economy for a period of 2 years. The study obtained data from 847 China households farms. To evaluate the likely problem associated with the impacts of agricultural invention on households' agricultural income, regression model analysis was used. Moreover, it was revealed that, the utilisation of agricultural technological invention was influenced by farmers natural knowledge, and the household agricultural qualiies.

Therefore, the study showed that there is a positive, high relationship between agricultural technological inventions and agricultural households income. The study also showed that household farmers that made use of more land for cultivation benefited from the inventions of agricultural technology, more than farmers that had acess to limited space of land for agricultural practices. The study alsorevealed the effect of adopting new pest management and application of chemical fertilisers is significantto household agricultural income. Where as, the invention of mechanised practices has insignificant effect on agricultural household income.

However, the invention of agricultural technology employed by household farmers was seen as more significant in the enhancement of agricultural science development and technological application. It was therefore suggested in the study that, Chinese institution should carry out potent actions towards removing hindrances to the application of agricultural inventions so as to effectively utilise them in order to enhance effective agricultural output growth[92].

Some Scholars have examined the roles of farming inputs and urban development on income inequality of farmers in the urban - rural region of 30 provinces in China for a period of 18 years. To analyse the variables in the study, The Generalised Method of Moments Instrument was employed to estimate the parameters. Therefore, it was empirically revealed that improvement in urban development has a great impact in alleviating the unequal distribution of income of urban - rural farmers. It was also established in the study that the effective utilisation of fertiliser has a great effect on income gap of the farmers, while the development of the urban - rural province will be determined by the effective utilization offertilisers.

Moreover, it was also discovered in the study that the improvement in the efficient application of fertilisers could reduce unequal distribution of farmer's income even in the regions that are experiencing little or no development. Meanwhile, decrease in the effective use of fertilisers in

the region that are more developed could also lead reduction in income inequality among farmers in those regions. Similarly, it was shown that, the level of regional development determines the extent to which chemical fertiliser can be applied. However, China regional development has presently called for modification in the use of fertilizers, which result in, decrease in the use of fertiliser on agricultural practices[93].

2.4 Gaps in the Literature

There are several literature existing that have examinedthe effects of public expenditure in controlling income inequality rate in ECOWAS and the effect of agricultural productivity on income inequality.As a result of relationship between income inequality and agricultural productivity such that,an attempt to control inflation and alsohave an effect on agricultural productivity is an issue that needs extensive studies. While in ECOWAS, only very few researchers have examined this.The major focus of these studies has been on individual effects of different public expenditure tools employing various methodologies to determine the effects of these tools on income inequality and agricultural productivity. Therefore, a comparative analysis of these public expenditure tools might give a clearer knowledge to determine which tools is more appropriate and potent in controlling income inequality as well as promoting agricultural productivity. Also, an understanding of the public expenditure threshold for Income inequality and agricultural productivity calls for a study in order to determine the rate at which each tools should be employed to impact before it leads to income inequality problem or impact agricultural negatively. Also, an examination of all the public expenditure tools that affect all sectors in the economy should be conducted with the aim of Identifying public expenditure tools that required to be ignored or modified and also taking into account the significance of creating new and

effective public expenditure tools designed for agricultural productivity of the ECOWAS region as a whole.

2.5 Theoretical Framework

The Marginal Productivity Theory of income distribution suggests that in a competitive labor market, individuals are paid according to their marginal productivity—the additional output they contribute to the production process. The mathematical framework of the theory can be represented using a simple labor market model based on the idea that the wage rate is determined by the marginal productivity of labor. Along the process agricultural productivity and public expenditure as factors influencing this relationship are introduced.

Y is the Total output or income generated in the economy, Lis the Quantity of labor input, and MPL is the Marginal Product of Labor, representing the additional output produced by an additional unit of labor.The basic equation for the Marginal Productivity Theory can be expressed as:

$$Y=MPL \cdot L \quad (2.1)$$

Equation (1) states that total output or income (Y) is equal to the marginal product of labor (MPL) multiplied by the quantity of labor input (L). According to the Marginal Productivity Theory, in a competitive labor market, the wage rate is equal to the marginal product of labor:

$$W=MPL \quad (2.2)$$

This equation expresses the idea that in equilibrium, the wage rate is equal to the marginal productivity of labor.

Incorporate agricultural productivity and public expenditure into the model:

$$Y = MPL.L + AP.Land + PE \quad (2.3)$$

Equation reflects that total income (Y) is a function of the marginal productivity of labor (MPL) times the quantity of labor (L), agricultural productivity (AP) times the amount of land used, and public expenditure (PE).

Thus, the model for Income Distribution as proxy by Gini Coefficient (G) is given as:

$$G = 1 - \frac{1}{Y^2}\sum_{i=1}^{n}(Y_i - \overline{Y})^2 \quad (2.4)$$

Here, G represents the Gini coefficient, which measures income inequality. Y_i is the income of individual i, $\overline{Y}$ is the mean income, and n is the number of individuals.

Equations (3) and (4) are combined to obtain the baseline equation for this study;

$$G = f(MPL, L, AP, Land, PE) \quad (2.5)$$

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Chapter Three

Methodology

In this section, the study presents the methodology that will be used to achieve the objectives of this study alongside the research design, model specification, theoretical expectation, data collection, and data analysis.

3.1 Research Design

The research design adopted for this study is the *ex-post facto* research design. Secondary data will be extracted from the database of international institutions such as the World Bank, International Monetary Fund, for the 31-year period which the study looks at.

3.2 Model Specification

3.2.1 Model for Estimating the Effects of Public Expenditure on Income Inequality

Following the theoretical model developed in the previous chapter, the empirical model that establishes the effect of public expenditure on income inequality in ECOWAS is based on previous works[1,2,3,4,5]. Thus, this study expresses public expenditure as a determinant of income inequality. It is argued that an increase in public expenditure on social programs (e.g., education, healthcare, social welfare) is expected to reduce income inequality. This is based on the idea that targeted public spending can provide opportunities and support for disadvantaged individuals, narrowing the income gap. Meanwhile, this study incorporates other factors like GDP per capita (*gdppc*), primary school enrollment (*pse*), inflation (*inf*), interest rate (*int*), and foreign direct investment (*fdi*). Thus, the empirical model is specified as follows:

$$ineq_{it} = \phi_0 + \phi_1 p\exp_{it} + \phi_2 gdppc_{it} + \phi_3 pse_{it} + \phi_4 \inf_{it} + \phi_5 \text{int}_{it} + \phi_6 fdi_{it} + e_{it} \quad (3.1)$$

Where: *ineq* represents income inequality, typically measured by Gini coefficient; *pexp* stands for public expenditure as a percentage of GDP; *gdppc* is the GDP per capita; *pse* represents primary school enrollment rate;*inf* is the inflation rate;*int* is the interest rate; *fdi* denotes foreign direct investment as a percentage of GDP; ϕ_0, ϕ_{1-6} are parameters; *i* is country; *t* is time; *e* represents the error term capturing unexplained variations in income inequality.

3.2.2 Model for Estimating the Effects of Agricultural Productivity on Income Inequality

The theoretical model solved in the last section of chapter two is employed for analysing the effect of agricultural productivity on income inequality in ECOWAS. Also, previous studies give credence to agricultural productivity on its role towards reducing income inequality[6,7,8,9,10].These studies consider income inequality as a function ofagricultural productivity while incorporating some other economic variables. In addition, to control the fact that agricultural productivity (*agrp*) has great effect on income inequality (*ineq*), exogenous factors [GDP per capita (*gdppc*), primary school enrollment (*pse*), inflation (*inf*), interest rate (*int*), and foreign direct investment (*fdi*)] are incorporated in the model as:

$$ineq_{it} = \gamma_0 + \gamma_1 agrp_{it} + \gamma_2 gdppc_{it} + \gamma_3 pse_{it} + \gamma_4 \inf_{it} + \gamma_5 \text{int}_{it} + \gamma_6 fdi_{it} + \mu_{it} \quad (3.2)$$

Where: *ineq* represents income inequality, typically measured by Gini coefficient; *agrp* denotes agricultural productivity measured by agriculture output as a percentage of GDP;*gdppc* is the GDP per capita; *pse* represents primary school enrollment rate; *inf* is the inflation rate; *int* is the interest rate; *fdi* denotes foreign direct investment as a percentage of GDP; γ_0, γ_{1-6} are parameter estimates; *i* is country; *t* is time; μ represents the error term capturing unexplained variations in income inequality.

3.2.3 Model for Estimating the Interactive Effects of Public Expenditure and Agricultural Productivity on Income Inequality

Following the theoretical model in the last section of chapter two, it is used for stating the links among public expenditure, agricultural productivity, interaction of public expenditure, agricultural productivity, and income inequality in ECOWAS. Also, previous studies give credence to the role of public expenditure and agricultural productivity in the reduction of income inequality. This study considers income inequality as a function of public expenditure and agricultural productivity while incorporating some economic variables. Exogenous factors like GDP per capita (*gdppc*), primary school enrollment (*pse*), inflation (*inf*), interest rate (*int*), and foreign direct investment (*fdi*) are incorporated in the model. Thus, this model is specified as follows:

$$ineq_{it} = \pi_0 + \pi_1 p\exp_{it} + \pi_2 agrp_{it} + \pi_3 (p\exp \times agrp)_{it} + \pi_4 gdppc_{it} + \pi_5 pse_{it} + \pi_6 \inf_{it} + \pi_7 \text{int}_{it} + \pi_8 fdi_{it} + \nu_{it} \quad (3.3)$$

Where: *ineq* represents income inequality, typically measured by Gini coefficient; *pexp* stands for public expenditure as a percentage of GDP; *agrp* denotes agricultural productivity measured by agriculture output as a percentage of GDP; *pexp*×*agrp* is the interaction of public expenditure and agricultural productivity; *gdppc* is the GDP per capita; *pse* represents primary school enrollment rate; *inf* is the inflation rate; *int* is the interest rate; *fdi* denotes foreign direct investment as a percentage of GDP; π_0, π_{1-8} are parameter estimates; *i* is country; *t* is time; ν represents the error term capturing unexplained variations in income inequality.

3.3 Theoretical Expectation

Concerning the theoretical expectation, an increase in public expenditure as a percentage of GDP is expected to have a mitigating effect on income inequality. Higher public spending, especially on social programs and infrastructure, can lead to improved access to education, healthcare, and employment opportunities, reducing income disparities. As to agricultural productivity, it is a crucial determinant of income distribution in ECOWAS, as a significant portion of the population relies on agriculture for their livelihoods. Higher agricultural productivity resulting from improved technology, access to credit, and better farming practices can positively affect income distribution by increasing rural incomes and reducing poverty among small-scale farmers. Concerning the interaction of public expenditure and agricultural productivity, when public expenditure is directed towards agriculture, such as through investments in rural infrastructure, agricultural research, and extension services, it can enhance the positive impact of agricultural productivity on income distribution. Effective public expenditure in the agricultural sector can lead to inclusive growth, reducing income disparities and poverty among rural communities.

For the control variables, higher GDP per capita tends to be associated with lower income inequality. A wealthier economy often provides more resources and opportunities for its citizens, potentially reducing income gaps. For primary school enrollment, increased primary school enrollment rates are expected to correlate with lower income inequality. Improved access to education can enhance human capital and economic mobility, potentially reducing income disparities. As regards the inflation rate, the impact of inflation on income inequality is context specific. Moderate inflation may not have a significant effect, but high inflation can erode the real income of the poor, potentially exacerbating income inequality.

Regarding interest rates, it has mixed effects on income inequality. Higher interest rates may benefit the wealthy by increasing returns on savings but can also promote entrepreneurship and investment, potentially benefiting a broader segment of the population. As to foreign direct investment (FDI), the impact of FDI on income inequality depends on factors such as the sector targeted and its impact on job creation. FDI can contribute to economic growth and job opportunities, potentially reducing income inequality.

3.4 Estimation Methods

3.4.1 Panel Fixed Effects

A panel fixed effects regression is an estimation technique, engaged in a panel data situation that permits one to control for time-invariant. Its analysis assumes that the samples where measurements are drawn, are fixed and that the differences between them are therefore, not of interest. In a fixed effects model, random variables are treated as though they were nonrandom or fixed. In this study, the panel fixed effects models were also used as it removes all endogeneity associated with the higher-level entity and time. The fixed effects models enable the study to account for country time invariant characteristics in ECOWAS. For instance, ECOWAS have differences in their geographical location, colonial heritage, religious ideologies and affiliations, political regimes, climate condition etc.; these factors do not necessary change with time.

Panel fixed effects models control for, or partial out, the effects of time-invariant variables with time-invariant effects. This is true whether the variable is explicitly measured or not. When using the fixed effects, it is assumed that something within the individual may impact or bias the predictor or outcome variables and it is imperative that this is controlled. Another assumption is that time invariant characteristics are unique to the individual and should not be correlated with

other individual characteristics. Each entity is different therefore the entity's error term and the constant shouldn't be correlated with the others. The fixed effects model therefore is stated as:

$$Y_{it} = \Psi X_{it} + v_i + u_{it} \quad (3.4)$$

Where: Y_{it} is the dependent variable observed for individual country *i*at time *t*; $X_{it}$is the time-variant (the number of independent variables) regressor vector; Ψ is the slope vector of independent variables; v_i is the unobserved time-invariant individual effect; and u is the error term.

3.4.2 Panel Random Effects

In simple term a random effects model in statistics, is a statistical model where the model parameters are random. It is also referred to as variance component model. The assumption of random effects is that the individual-specific effects are uncorrelated with the independent variables, as opposed to the assumption of fixed effects, which states that the individual-specific effects are correlated with the independent variables. In econometrics, random effects models are used in the analysis of hierarchical or panel data when one assumes no fixed effects (it allows for individual effects). In panel random effects model, the unobserved variables are assumed to be uncorrelated with (or, more strongly, statistically independent of) all the observed variables.

The panel random effect analysis assumes that measurements are some kind of random sample, drawn from a larger population, and therefore the variance between them is interesting and reveal information about the larger population. It infersinformation about the population from which the sample was drawn.

3.5 Data Source and Description

The study employs both the quantitative and descriptive analyses in its empirical investigation. Basically, the nature of this study requires secondary data obtained from different institutions regionally and continentally. The secondary data was sourced from the World Bank (World Development Indicators, 2023). The cross-sectional data across different time periods of variables was used to analyze the relationship among public expenditure, agricultural productivity and income inequality in ECOWAS which span between 1990 and 2020. The list of member countries includes Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

The series include public expenditure variable (government spending as a percentage of GDP), agricultural productivity (agriculture output as a percentage of GDP), Gini coefficient, income per capita, inflation rate, interest rate, foreign direct investment, and primary school enrollment rate. The secondary source of data was used in this study. The internationally accredited institutions from which the data are sourced show the validity and reliability of the data used. The data is publicly available and is seen to represent the actual environmental, economic and political situation of the region.

Endnotes

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Chapter Four

4.0 Results and Discussion of Findings

This Chapter discusses the presentation of data and the analysis of result after applying the expected technique in estimating the objectives of the study. The preliminary graphical analysis of variables was presented, followed by the summary statistics, unit root test, cointegration test, panel fixed and random test and discussion of findings.

4.1 Graphical Analysis

This section describes the various variables employed for this study using graphical analysis, by using graphs, which plot time on a yearly basis from 2000 to 2021 (on the X Axis) against variables (on the y Axis), the trend of agricultural productivity, public expenditure, income inequality, and other factors are described. Also, this section presents descriptive statistic (such as mean, median, maximum, minimum, standard deviation, and so on) of the variables included in the study. However, further statistics (such as correlation, covariance) were presented to estimate the bi relationship between the variables.

The graph in Figure 4.1 depicts the level of trend of Agricultural productivity (AGRIVA) in the nine selected countries out 15 ECOWAS region. In Benin, Agricultural productivity dropped between 2002 and 2003, and drastically fluctuated from 2005 to 2012, which may be as a result of global financial crisis in 2008. These fluctuations declined, as agricultural productivity rose from 2013 to 2017, but latter dropped from 2018 to 2019. In Burkina Faso, Agricultural productivity increasingly rose from 2000 to 2003, but drastically fluctuated from 2004 until it completely declined in 2020. In Cabo Verde, Agricultural productivity completely reduced between 2000 and 2020. Between 2000 and 2005, Agricultural productivity increased in Gambia, while there was a reduction within 2006, and later rose from 2007 to 2010. From 2011, Gambia

recorded drastic reduction till 2020. Mali recorded fluctuations in Agricultural productivity from 2000 to 2009, but increased greatly in 2010 to 2012, and the growth started reducing from 2014 to 2020. From the year 2000 to 2003 Niger also experienced increase between 26.2 and 41, and began to fluctuate between 2004 and 2014, Agricultural productivity started increasing from 2015 to 2018, and started declining till 2020. Nigeria recorded growth in agricultural productivity between 2001 and 2003, but drastically declined between 2003 and 2008, while little growth was recorded between 2009 and 2010, However, Agricultural productivity dropped at a steady pace until 2019. Senegal experienced high fluctuations in agricultural productivity form 2001 to 2018, but from 2007 to 2009 a little growth was recorded. In Togo agricultural productivity became unstable between 2000 and 2014, but later dropped from 2015 till 2020.

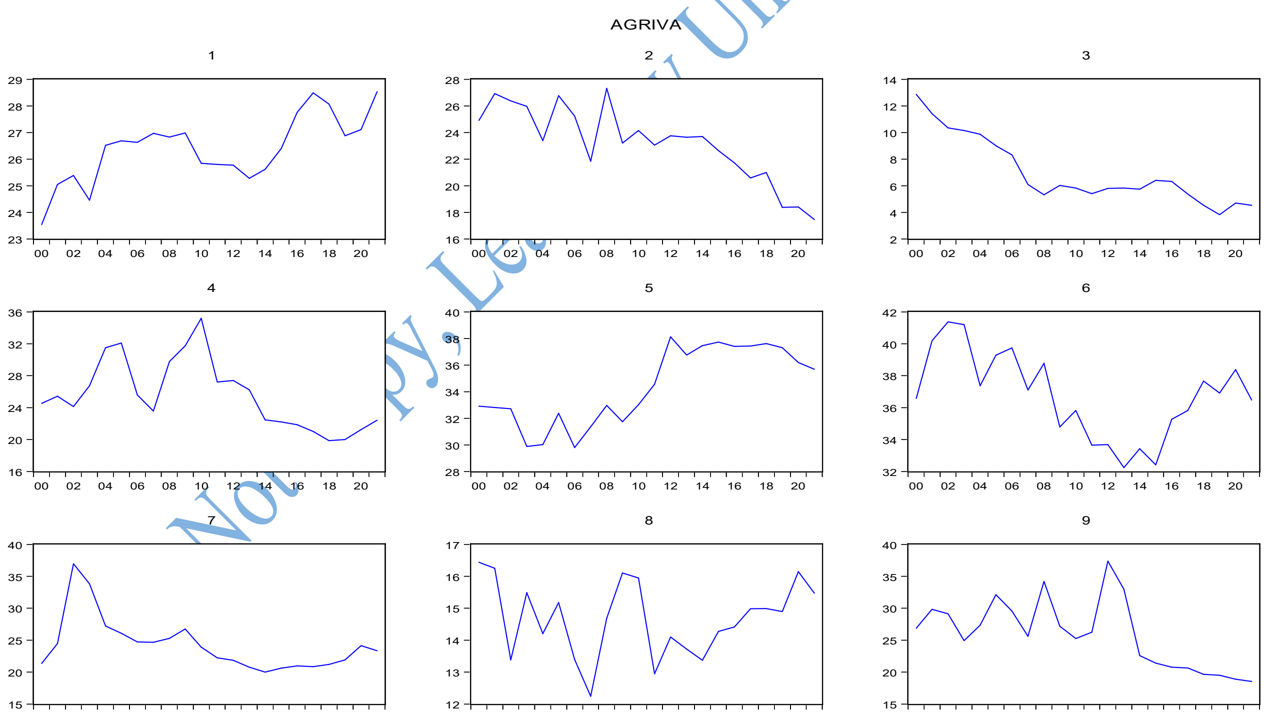

Figure 4.1: Agricultural productivity in ECOWAS

Source: WDI (2023)

The graph in the Figure 4.2 shows how the governments in the nine selected economies of ECOWAS were able to employ public expenditure in their different countries.In Benin, it was recorded that the level of Public expenditure increased from 2002 to 2019 and slightly declined in 2020. In Burkina Faso, the level of Public expenditure slightly increased between 2002 and 2006, from 2008 to 2012, a decline was experienced, but later increased between 2014 and 2020. In Cabo Verde, a decline in Public spending was recorded between 2000 and 2008, but between 2010 and 2017, Cabo verde experienced fluctuations in Public expenditure, but started increasing from 2018 to 2020. Gambia also recorded a gradual decline in Public expenditure from 2000 to 2006, but slight increase was recorded between 2007 and 2010. While there was a decline experienced between 2012 and 2014, Mali also recorded high fluctuation between 2000 and 2014, but, there was a steady decline, from 2018 to 2020. Niger also experienced high instability in Public expenditure from 2000 to 2020. In Nigeria, from 2000 to 2009, Public spending greatly increased, while there was a decline between 2010 and 2016, and slightly rose between 2018 and 2020. Senegal recorded fluctuations between 2000 and 2008, while there was an increase recorded from 2010 to 2020. In Togo, Public spending fluctuated between 2000 and 2016, but steadily increased between 2018 and 2020.

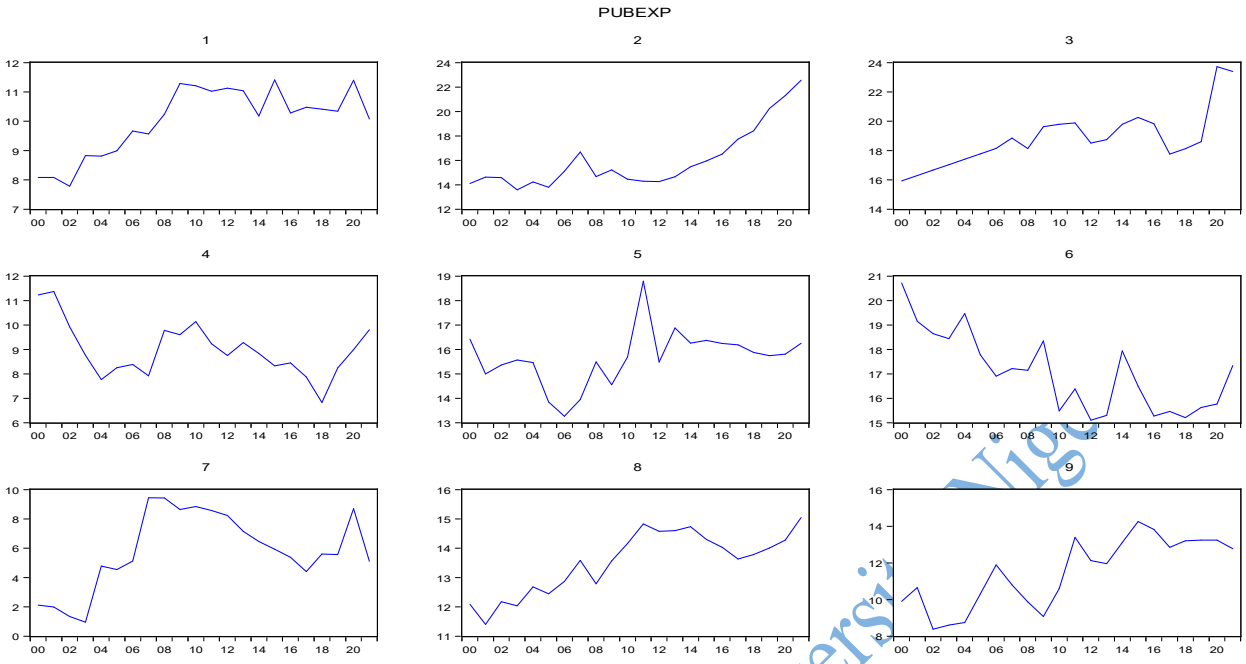

Figure 4.2: Public Expenditure in ECOWAS

Source: WDI (2023)

The graphs in Figure 4.3 shows the trend of income inequality in the nine selected countries of ECOWAS accounted for. In Benin, the level of income disparity was high between 2000 and 2002, while the country experienced reduction from 2004 to 2020. In Burkina Faso,the level of income inequality increased from 2000 to 2020. Carbo Verde also experienced a high trend in income inequality, from 2000 to 2020. In Gambia, the level of income disparity was very low between 2000 and 2004, but gradually increased from 2008 to 2016. But, later experienced a persistent rise in income inequality between 2018 and 2020. Also, Mali recorded a decline in the trend of INI between 2000 and 2004, and started experiencing steady rise of INI from 2006 to 2010. But the trend increased steadily, between 2011 and 2020. In Niger, The level of INI reduced, from 2000 to 2005. While the trend increased at a steady pace, from 2006 to 2020. In Nigeria, INI level steadily dropped between 2000 and 2008, but rose from 2010 to 2020. However, Senegal experienced a continual rise in the level of INI from 2000 to 2006, while the

level of INI slightly reduced, but at increasing rate between 2008 and 2020. In Togo, INI level rose between 2000 and 2005, but started declining from 2006 to 2010. Moreover, the level of trend of INI rose from 2011 to 2020.

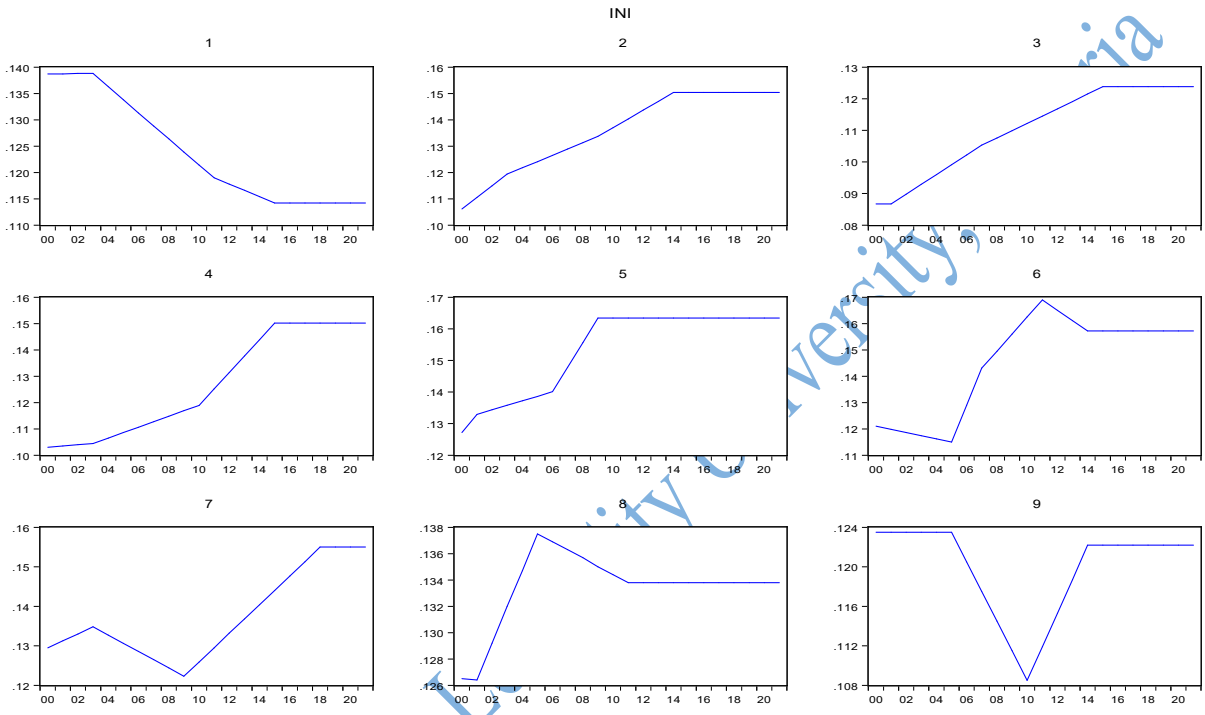

Figure 4.3: Income inequality in ECOWAS

Source: WDI (2023)

The graph in Figure 4.4 portrays the rate of inflation in the nine selected West African countries of ECOWAS. In Benin, the rate of LCPI increased from the year 2000 to 2020, at 4.3 to 4.75. In Burkina Faso, the level of LCPI also increased between 2000 and 2020 at 4.3 to 4.7. While in Cabo Verde the rate of LCPI rose from 4.38 to 4.75 between 2000 and 2020. Also, Gambia experienced a steady increase in the rate of LCPI between 2000 and 2020 at 4.0 to 5.2. Mali recorded a rise in the level of LCPI at 4.3 to 4.7 between 2000 and 2020. However, Niger recorded a rise in the rate of LCPI between 2000 and 2020. In Nigeria between 2000 and 2020,

the rate of LCPI increased at a steady pace from 3.4 to 5.9. In Senegal, the level of LCPI started rising from 4.4 to 4.75, between 2000 and 2020. In Togo however, the rate of LCPI increased at 4.3 to 4.78, from 2000 to 2020.

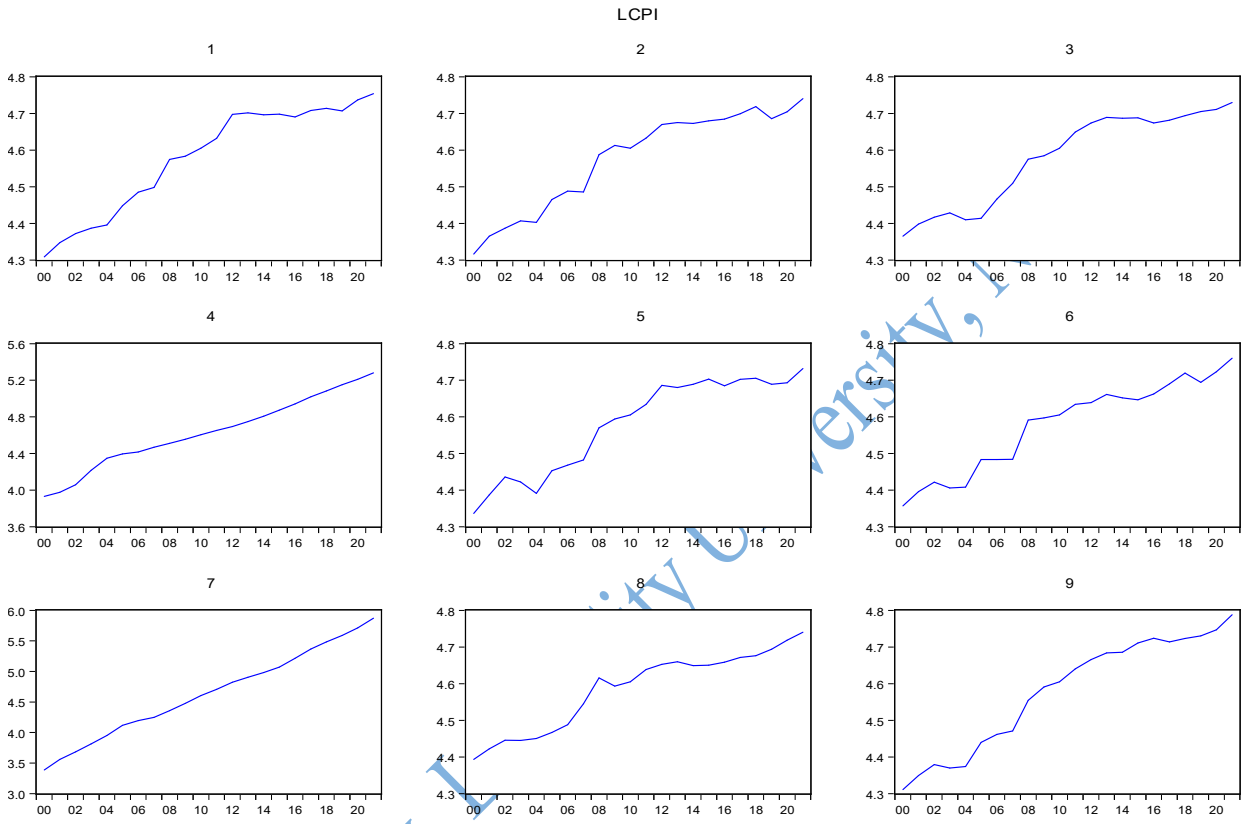

Figure 4.4: Inflation rate in ECOWAS

Source: WDI (2023)

The graph in |Figure 4.5 shows the trend of Foreign Direct Investment in the nine West African Economies accounted for. In Benin, the trend of FDI has been drastically fluctuating between 2000 and 2020. In Burkina Faso, FDI declined unsteadily between 2000 and 2009, but FDI increased slightly between 2010 and 2014, However, FDI fluctuated from 2015 to 2020. In Cabo Verde, FDI rose from the year 2000 to 2006, and fluctuated drastically between 2008 and 2020 at 12 to 4. Also, Gambia recorded drastic fluctuation from 2000 to 2020. In Mali the level of FDI was drastically unstable, between 2000 and 2020. Moreover, Niger recorded a decline in FDI

from 2000 to 2005, While FDI increased between 2007 and 2011, and FDI started declining from 2012 to 2020. In Nigeria, FDI increased unsteadily from 2000 to 2010, and drastically reduced between 2012 and 2020. In Senegal, FDI drastically declined between 2000 and 2012, but started increasing from 2014 to 2020. In Togo, FDI slightly increased from 2000 to 2010, but between 2012 and 2020, FDI drastically declined.

Figure 4.5:Foreign Direct Investment in ECOWAS

Source: WDI (2023)

The graph in Figure 4.6 depicts the growth of Gross Domestic Product Per Capita in the nine selected countries of ECOWAS. The growth of GDPPC in Benin rose, between 2000 and 2020 at 500 to 1400. Burkina Faso, also recorded an increase in the growth of GDPPC from 2000 to 2020. In Cabo Verde the growth of GDDPC started increasing between 2000 and 2008. But the growth of GDPPC began to fluctuate between 2010 and 2020. In Gambia, GDPPC growth started reducing from 2000 to 2003, While, GDDPC growth unsteadily rose between 2004 and

2020. In Mali GDDPC steadily grew between 2000 and 2010, while GDPPC growth slightly fluctuated, from 2012 to 2020. In Niger, the growth of GDPPC increased between 2000 and 2020 at 100 to 600. While in Nigeria, the GDPPC growth steadily rose between 2000 and 2014. Also, from 2016 to 2020, GDPPC growth slightly dropped. In Senegal, the GDPPC growth unsteadily rose between 2000 and 2020. However, Togo experienced a slight fluctuation between 2000 and 2020.

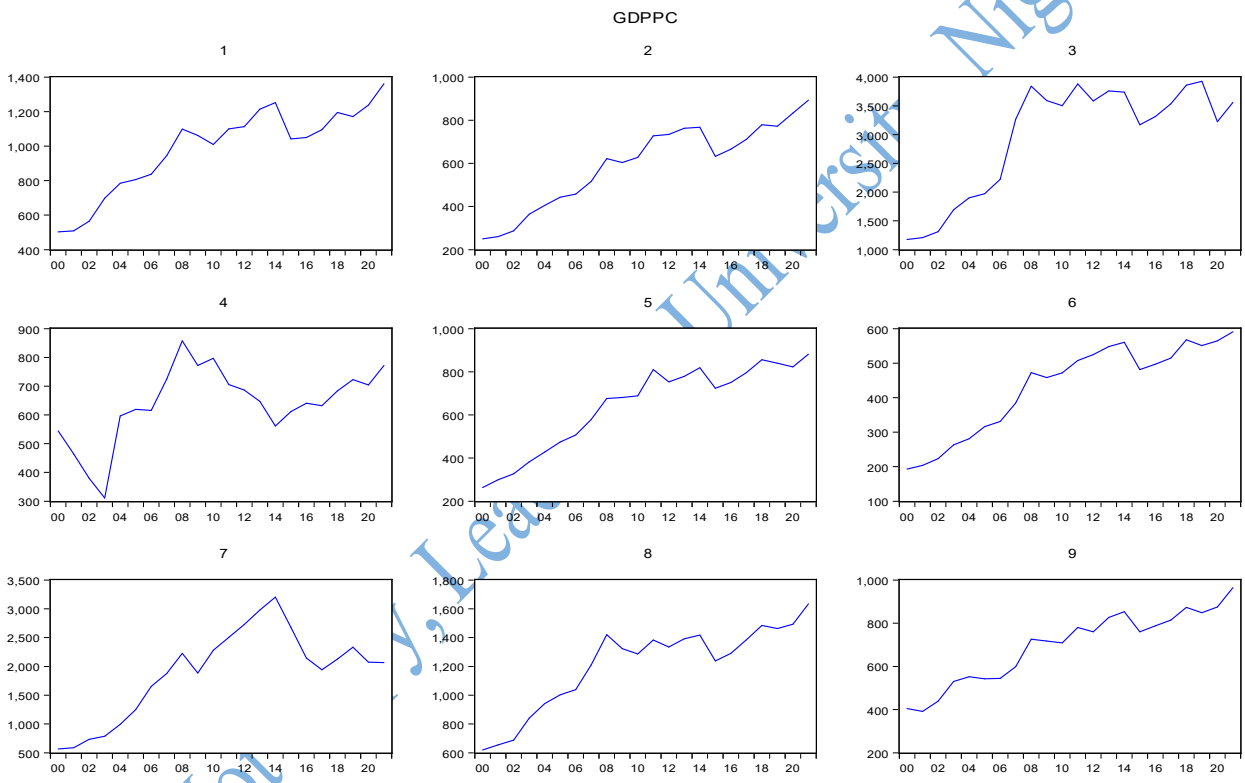

Figure 4.6:Gross Domestic Product Per Capita in ECOWAS

Source: WDI (2023)

The graph in Figure 4.7 portrays the level of Human Capital in the nine selected countries of ECOWAS. In Benin, the level of HUMCAP rose at a steady pace between 2000 and 2020. In Burkina Faso, HUMCAP also increased steadily between 2000 and 2020. In Cabo Verde, HUMCAP declined drastically from 2000 to 2020. Moreover, In Gambia, the level of HUMCAP

drastically reduced between 2000 2011, while Gambia recorded a steady rise in the trend of HUMCAP from 2012 to 2020. In Mali, the trend of HUMCAP increased between 2000 and 2012, but started fluctuating from 2014 to 2020. Likewise, Niger recoded a steady rise between 2000 and 2020. In Nigeria the trend of HUMCAP drastically recorded a decline between 2000 and 2008, by 2010 and 2016, the level of HUMCAP dropped, but between 2016 and 2020 the level of HUMCAP slightly increased. In Senegal, HUMCAP level unsteadily rose from 2000 to 2020. In Togo the level of HUMCAP dropped between 2000 and 2007, while HUMCAP rose from 2008 to 2010. But between 2012 and 2020 the level of HUMCAP fluctuated drastically.

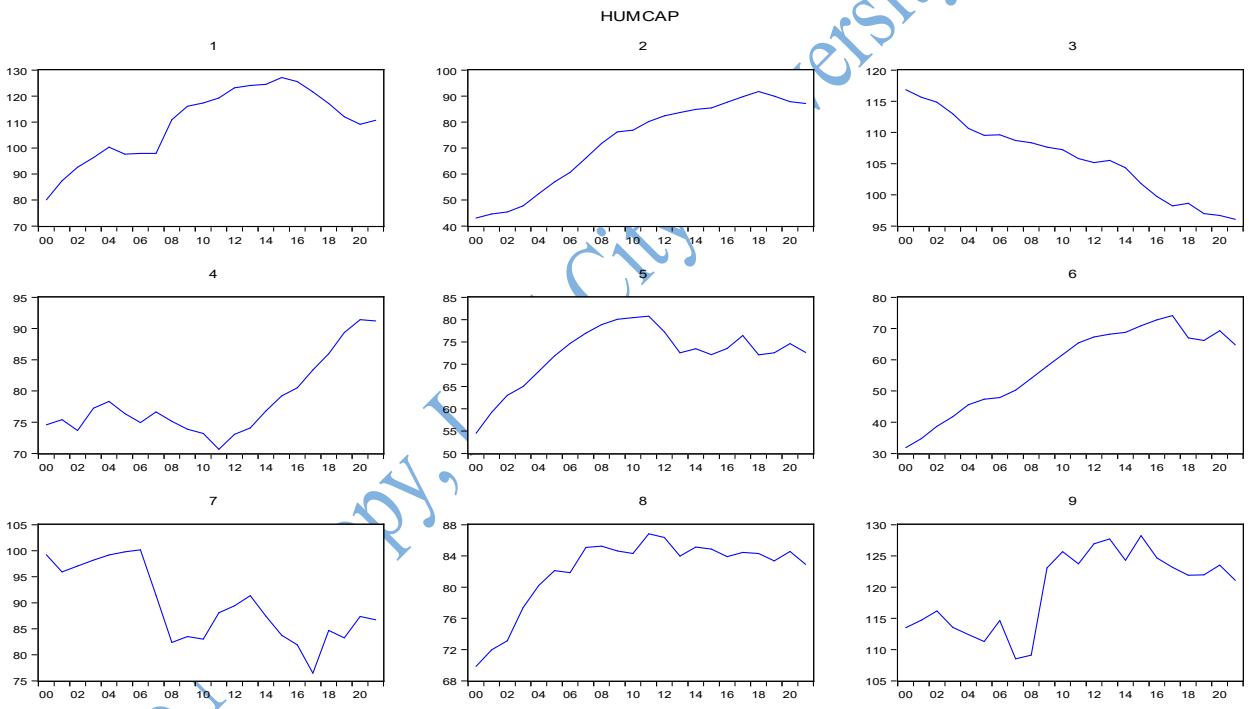

Figure 4.7: Human Capital in ECOWAS

Source: WDI (2023)

The graph in Figure 4.8 depicts the rate of Interest in the nine selected West African countries. In Benin the rate of interest decreased between 2000 and 2012, then, rose from 2014 to 2020. In Burkina Faso, Interest rate dropped from 2000 to 2012, but later increased between 2014 and 2020. In Cabo Verde, the rate of interest drastically fluctuated between 2000 and 2020. In

Gambia, IRS fluctuated between the year 2000 and 2020. While Mali IRS dropped from 2000 to 2012, but started increasing slowly between 2014 and 2020. In Niger the IRS slightly declined between 2000 and 2004, but drastically dropped between 2006 and 2012, while there was a slight increase in IRS from 2014 to 20220. Nigeria recorded a high fluctuation in IRS from 2000 to 2020. However, in Senegal the IRS declined, between the year 2000 and 2012. Meanwhile, the IRS rose from 2014 to 2020. In Togo, the IRS dropped between 2000 and 2012. While, a little growth was recorded in the IRS from 2014 to 2020.

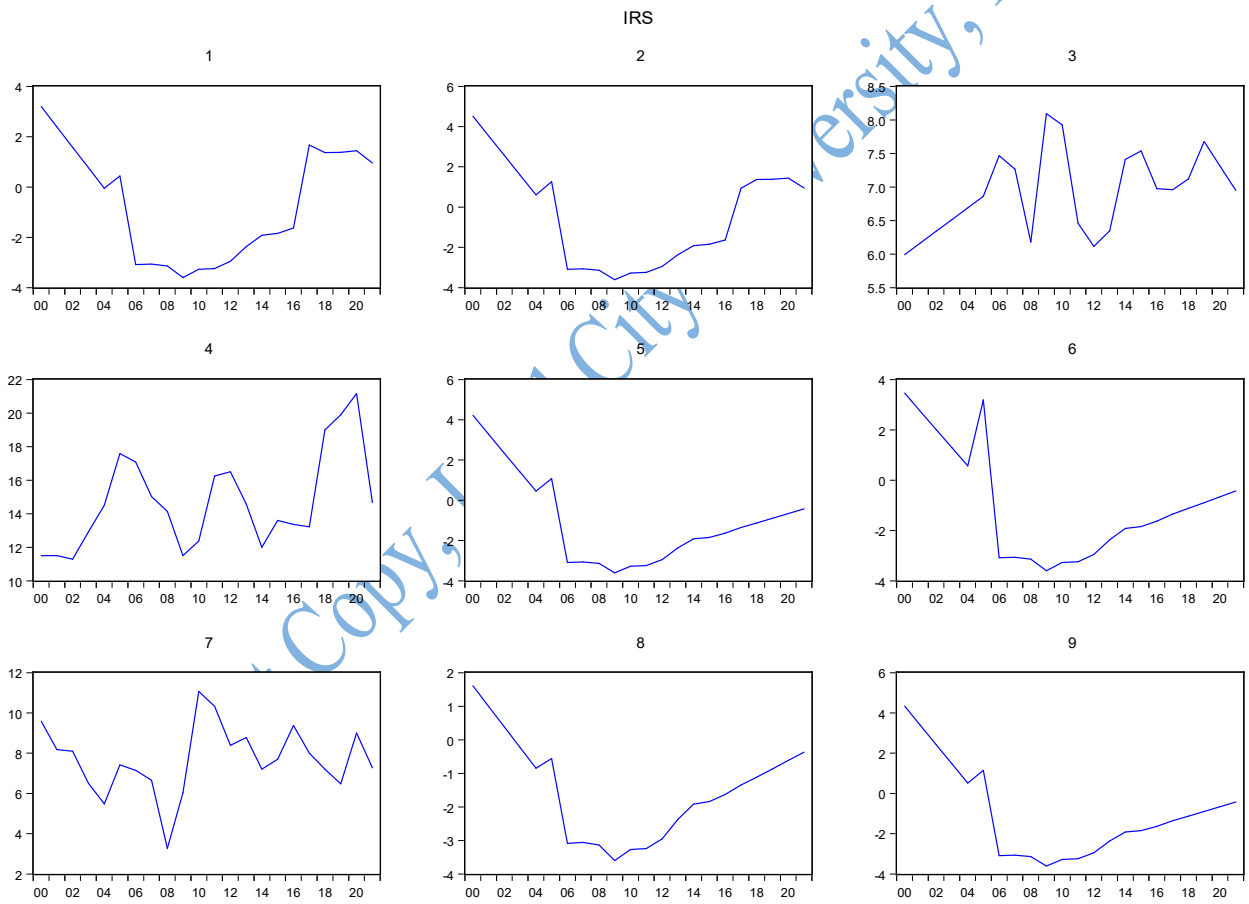

Figure 4.8:Interest Rate Spread in ECOWAS

Source: WDI (2023)

4.2 Descriptive and Correlation Analysis

The average AGRIVA score is 24.228, with a slightly negatively skewed distribution. The data show a relatively normal kurtosis, but deviates slightly from normality based on the Jarque-Bera test ($p = 0.054$). Researchers should be cautious about the distribution's shape when applying parametric tests.FDI has a mean of 3.006 and a positively skewed distribution with heavy tails (kurtosis = 5.007). The Jarque-Bera test ($p < 0.001$) indicates significant non-normality. This suggests potential outliers or non-normal behavior, and non-parametric tests might be more appropriate for analysis.

Human capital (HUMCAP) exhibits a symmetric distribution with a mean of 87.487. The data show normal kurtosis and pass the Jarque-Bera test for normality ($p = 0.480$). This suggests a relatively normal distribution, supporting the use of parametric tests. The variable INI has a mean of 0.132 with a slightly positively skewed distribution. The Jarque-Bera test ($p = 0.282$) suggests approximate normality. Researchers can reasonably assume normality for this variable when conducting parametric analyses.

IRS has a mean of 2.639 with a positively skewed distribution and heavy tails (kurtosis = 3.215). The Jarque-Bera test ($p < 0.001$) indicates significant non-normality, suggesting caution in interpreting results based on parametric assumptions. LCPI's mean is 4.592, and the distribution is slightly positively skewed with very heavy tails (kurtosis = 8.271). The Jarque-Bera test ($p < 0.001$) shows significant non-normality, emphasizing the need for non-parametric methods or data transformations.

The variable LGDPPC has a mean of 6.774 and a slightly positively skewed distribution. While kurtosis is normal, the Jarque-Bera test ($p = 0.034$) indicates a departure from normality. Researchers may need to consider non-parametric tests or transformations for this variable.

Public expenditure (PUBEXP) has a mean of 13.047 and a slightly negatively skewed distribution. The data show normal kurtosis and pass the Jarque-Bera test for normality (p = 0.335). This suggests a relatively normal distribution, supporting the use of parametric tests.

In summary, the descriptive statistics highlight the distributional characteristics of each variable, providing insights into their central tendency, spread, and shape. Researchers should carefully choose statistical methods based on these characteristics and, when necessary, consider data transformations or non-parametric tests to ensure the robustness of their analyses.

Table 4.1: Descriptive statistics

	AGRIVA	FDI	HUMCAP	INI	IRS	LCPI	LGDPPC	PUBEXP
Mean	24.22805	3.006158	87.48669	0.131840	2.639431	4.592375	6.774412	13.04711
Median	25.13860	2.392570	84.60490	0.131300	0.950000	4.623773	6.658011	13.70930
Maximum	41.36690	13.84760	128.2520	0.169000	21.15830	5.870133	8.275965	23.72610
Minimum	3.826770	-2.574580	31.84690	0.086700	-3.601670	3.387778	5.262058	0.951747
Std. Dev.	9.160553	2.840126	21.57444	0.017961	5.837796	0.294084	0.673032	4.387109
Skewness	-0.352991	1.362134	-0.032212	0.077834	0.996511	0.306087	0.446933	-0.231237
Kurtosis	2.543604	5.006789	2.583178	2.468754	3.215272	8.270723	2.862501	2.773978
Jarque-Bera	5.830349	94.45288	1.467601	2.528249	33.15242	232.2810	6.747684	2.185992
Probability	0.054195	0.000000	0.480081	0.282486	0.000000	0.000000	0.034258	0.335211
Observations	198	198	198	198	198	198	198	198

Source: Author's computation (2023)

The result of the Correlation Coefficient is presented in Table 4.1. The result presents that there is a weak negative correlation between AGRIVA and FDI suggesting a slight tendency for the pair to move in opposite directions. Also, a moderate negative correlation exists between AGRIVA and HUMCAP indicating that as AGRIVA increases, HUMCAP tends to decrease and vice versa.

The result presents that there is a moderate positive correlation between AGRIVA and INI suggesting a slight tendency for the pair to move in the same directions. This signifies that, as AGRIVA increases, INI tends to increase.

Also, a negative correlation exists between AGRIVA and IRS suggesting that, the relationship between the pair is not strong. And there is a slight tendency for the pair to move in opposite directions.

The result as well presents that there is a weak negative correlation between AGRIVA and LCPI suggesting a slight tendency for the pair to move in opposite directions. Also, the result shows that, the relationship between the pair is not strong.The result presents that there is a strong negative correlation between AGRIVA and LGDPPC indicating a significant negative relationship between the pair. Signifying that as AGRIVA increases, LGDPPC tend to decrease.

Also, there is a weak negative correlation suggesting a slight tendency for the pair to move in opposite directions. The result also that, the relationship between the pair variables is not strong.

The result presents that there is a very weak positive correlation between FDI and HUMCAP indicating a low relationship between the two variables.Also, there is a very weak negative correlation between FDI and INI suggesting a low relationship between the pair. The result reveals that there is a moderate positive correlation between FDI and IRS suggesting that as FDI increases, IRS tends to increase as well. This signifying that there is a tendency for the two variables to move in the same directions.

The result presents a very weak positive correlation exists between FDI and LCPI indicating that there is a minimal relationship between the two variables.

Also there is a moderate positive correlation that exists between FDI and LGDPPC suggesting a moderate relationship between the pair.The result also presents a moderate positive correlation between FDI and PUBEXP. This indicating that there is a moderate relationship between the two variables.HUMCAP and INI Likewise, there is a strong negative correlation that exists between HUMCAP and INI indicating a significant negative relationship between the two variables. This implies that as HUMCAP increases, INI tend to decrease. The result also shows that there is a negative correlation between HUMCAP and IRS suggesting a slight tendency for the pair to move in opposite directions. Also the result reveals that the relationship between the two variables is not strong.

The result shows a weak positive correlation between HUMCAP and LCPI indicating that there is a slight tendency for the two variables to move in the same direction. Also the relationship between the pair is not strong.

Likewise, the result presents that, there is a strong positive correlation that exists between HUMCAP and LGDPPC suggesting a significant positive relationship between the two variables. This indicates that as HUMCAP increases, LGDPPC tends to increase.

The result presents a moderate negative correlation between HUMCAP and PUBEXP indicating a moderate negative relationship between the pair. Also, there is a weak negative correlation between HUMCAP and PUBEXP, suggesting a slight tendency for INI and IRS to move in opposite directions. This also implies that, relationship between the two variables is not strong.

The result reveals that there is a strong positive correlation that exists between INI and LCPI, suggesting a significant positive relationship between the two variables. This implies that as INI increases, LCPI tends to increase.

Likewise, there is a weak negative correlation between INI and LGDPPC, indicating a slight tendency for the two variables to move in opposite directions. This signifies that the relationship between INI and LGDPPC is not strong.The result presents a very weak positive correlation between INI and PUBEXP, indicating a minimal relationship between the two variables.Also, there is a very weak positive correlation that exists between IRS and LCP, suggesting a minimal relationship between the pair.

The result also shows that there is a weak positive correlation between IRS and LGDPPC indicating a slight tendency for the pair to move in the same direction. This also expresses that the relationship between the two variables is not strong.Likewise, the result shows that there is a strong negative correlation that exists between IRS and PUBEXP suggesting a significant negative relationship between the two variables. This indicates that, as IRS increases, PUBEXP tends to decrease. The result presents that there is a moderate positive correlation between LCPI and LGDPPC, indicating a moderate positive relationship between the two variables. Also, there is a very weak positive correlation between LCPI and PUBEXP suggesting a minimal relationship between the two variables.The result presents likewise a very weak positive correlation between LGDPPC and PUBEXP, indicating a minimal relationship between the pair.

Table 4.2: Correlation Analysis

	AGRIVA	FDI	HUMCAP	INI	IRS	LCPI	LGDPPC	PUBEXP
AGRIVA	1							
FDI	-0.19	1						
HUMCAP	-0.41	0.05	1					
INI	0.371	-0.024	-0.384	1				
IRS	-0.239	0.271	-0.041	-0.246	1			
LCPI	-0.129	0.039	0.069	0.396	0.06	1		

LGDPPC	-0.710	0.207	0.510	-0.137	0.20	0.36	1	
PUBEXP	-0.165	0.232	-0.216	0.035	-0.36	0.06	0.03	1

Source: Author's computation (2023).

4.3 Stationarity and Cointegration Tests

Table 4.3 presents the results of the Unit Root Test on the variables in this study. The result presents that variables AGRIVA, FDI, HUMCAP, INF, and PUBEXP are found to be integrated of order 1 (I(1)), meaning that they are non-stationary at levels, but become stationary after differencing once. On the other hand, INI, IRS, and GDP are integrated of order 0 (I(0)), indicating stationarity at levels without the need for differencing.

4.3: Unit Root Test

Table Variables	At Levels	At Fist Difference	Conclusion
	ADF Statistics	ADF Statistics	
AGRIVA	21.304	125.081***	I(1)
FDI	15.863	56.362***	I(1)
HUMCAP	24.829	38.146***	I(1)
INI	53.623***		I(0)
IRS	41.442***		I(0)
INF	7.583	7.182***	I(1)
GDP	41.208***		I(0)
PUBEXP	21.48	65.239***	I(1)

Source: Author's computation (2023)

4.4 Empirical Results

4.4.1 Results of Objectives One and Two

The result of objectives one and two presents that, the Hausman test is highly significant (p-value of 0.000), indicating a preference for the fixed effect model. This suggests that the individual-specific effects are important in explaining the relationship between the variables. The model exhibits a high goodness of fit, as indicated by the R-squared value of 0.734, suggesting that the included variables explain a substantial portion of the variance in the dependent variable. The F-statistic is significant, reinforcing the overall significance of the model. Other fit indicators, such as the Akaike Information Criterion (AIC) and the log-likelihood, support the model's appropriateness.

Also, the result presents that, AGRIVA exhibits a substantial and statistically significant negative association with the dependent variable. Specifically, for each unit increase in AGRIVA, the dependent variable decreases by approximately 0.001 ($p < 0.001$). This relationship holds true even when accounting for individual-specific effects.

PUBEXP:

The result also indicates that, PUBEXP shows a notable and statistically significant negative relationship with the dependent variable. An increase of one unit in PUBEXP is associated with a decrease of approximately 0.002 in the dependent variable ($p < 0.001$), considering individual-specific effects.

FDI:

The result shows that, FDI does not demonstrate a statistically significant relationship with the dependent variable in the fixed effect model, with a coefficient of approximately 0.001 ($p > 0.05$).

This suggests that FDI may not be a significant predictor when considering individual-specific effects.

HUMCAP:

Also, the result presents that HUMCAP does not have a statistically significant impact on the dependent variable in the fixed effect model, with a coefficient of approximately 0.000 ($p > 0.05$). This indicates that HUMCAP may not be a significant predictor when considering individual-specific effects.

IRS:

The result reveals that, IRS also lacks a statistically significant relationship with the dependent variable in the fixed effect model, with a coefficient of approximately 0.0001 ($p > 0.05$). This suggests that IRS may not be a significant predictor when accounting for individual-specific effects.

LCPI:

Also, the result presents that, LCPI reveals a substantial and statistically significant positive association with the dependent variable. Specifically, an increase of one unit in LCPI is linked to an increase of approximately 0.013 in the dependent variable ($p < 0.001$), even when considering individual-specific effects.

LGDPPC:

The result also indicates that, LGDPPC demonstrates a notable and statistically significant positive relationship with the dependent variable. An increase of one unit in LGDPPC is associated with an increase of approximately 0.013 in the dependent variable ($p < 0.001$), considering individual-specific effects.

Constant:

Also, the constant term, representing the intercept, is not statistically significant in the fixed effect model, with a coefficient of approximately 0.026 ($p > 0.05$).

Table 4.4: Public expenditure, agriculture productivity and income inequality

Variables	Fixed Effect Model	Radom Effect Model
AGRIVA	-0.001***	-0.0004***
	(0.0002)	(0.0002)
	[-4.230]	[-2.067]
PUBEXP	-0.002***	-0.001**
	(0.0005)	(0.004)
	[-4.944]	[-3.407]
FDI	0.001	0.001**
	(0.000)	(0.0003)
	[0.747]	[1.866]
HUMCAP	0.000	0.000
	(0.0001)	(0.0001)
	[1.492]	[0.087]
IRS	0.0001	-0.001***
	(0.0004)	(0.0003)
	[0.142]	[-2.3]
LCPI	0.013***	0.021***
	(0.0034)	(0.0031)
	[3.785]	[6.571]
LGDPPC	0.013***	0.005**
	(0.0035)	(0.003)
	[3.787]	[1.685]
Constant	0.026	0.032**
	(0.019)	(0.018)
	[1.361]	[1.729]
R Squares	0.734	0.377
Adjusted R	0.713	0.354
S.E of Regression	0.01	0.011
Sum of Squared Residual	0.017	0.021
Log of Likelihood	646.689	
F Statistics	33.559	16.428
Prob (F Statistic)	0.000	0.000
Mean Dependent Variable	0.132	0.029
S.D Dependent Variable	0.018	0.013
Akaike Info Criterion	-6.371	
Durbin Watson Stat	0.209	0.104
Hausman Test	47.809***	

Source: Author's computation (2023).

During the analysis, Post Estimation Tests were carried out for the Fixed Effect model which presents that the normality test, suggesting that the residuals do not follow a normal distribution, potentially affecting the reliability of statistical inferences. The serial correlation test indicates the presence of serial correlation in the residuals, suggesting that the assumption of independence is violated.

Post Estimation Test

Test	Statistics	Conclusion
Normality	6.271 ***	Not Normally Distributed
Serial Correlation	457.454 ***	Presence of Serial Correlation

Source: Author's computation (2023).

With the violation of the normality and serial correlation assumptions, the panel ARDL model was estimated and the result is in the long run and short run model results in Table 4.4. The results showed that, the coefficient for AGRIVA is 0.002, indicating a highly significant positive association with income inequality (INI) in the long run ($p < 0.001$). This suggests that a one-unit increase in Agricultural Value Added is associated with a 0.002-unit increase in income inequality, holding other variables constant. The robust T-Test statistic of 6.796 underscores the significance of this relationship, highlighting that AGRIVA significantly contributes to the explanation of income inequality.

The coefficient for PUBEXP is 0.006, demonstrating a highly significant positive impact on income inequality in the long run ($p < 0.001$). This implies that a one-unit increase in Public Expenditure corresponds to a 0.006-unit increase in income inequality, controlling for other factors. The substantial T-Test statistic of 17.027 emphasizes the robustness of this relationship, signifying that PUBEXP is a highly significant determinant of income inequality.

Overall Implications:

The positive coefficients for both AGRIVA and PUBEXP suggest that, in the long run, increases in Agricultural Value Added and Public Expenditure are associated with higher levels of income inequality.

Policymakers may want to carefully consider the implications of agricultural policies, as reflected in AGGRIVA, and public expenditure policies, as reflected in PUBEXP, on the long-term dynamics of income distribution.

The statistical significance of these relationships, supported by the T-Test statistics, underscores the reliability of the findings and their potential policy relevance.

In summary, the long-run model provides compelling evidence that both Agricultural Value Added and Public Expenditure play substantial roles in shaping income inequality. Policymakers can leverage these insights to formulate effective strategies aimed at addressing or managing income inequality concerns in the broader economic context.

Long Run Estimates

Variables	**Coefficient**	**Standard Error**	**T Test**
AGGRIVAL	0.002 ***	0.0003	6.796
PUBEXP	0.006 ***	0.0003	17.027

Source: Author's computation (2023).

The short-run model offers a nuanced perspective on the dynamics of income inequality (INI), highlighting the contributions of specific variables. The coefficient of 0.709 DINI(−1) suggests a highly significant positive association with income inequality in the short run ($p < 0.001$). This implies that past levels of income inequality persistently influence current levels. For each one-unit increase in the lagged income inequality, there is a substantial 0.709-unit increase in income

inequality in the current period. The T-Test statistic of 17.501 underscores the significance of this relationship.

The coefficient of -0.0001 for D(AGRIVA) indicates a statistically significant negative association with income inequality in the short run ($p < 0.05$). This suggests that short-term changes in Agricultural Value Added are associated with a slight decrease of -0.0001 units in income inequality. The T-Test statistic of -1.965 highlights the statistical significance of this relationship.

The coefficient of -0.0002 D(PUBEXP) implies a statistically significant negative association with income inequality in the short run ($p < 0.05$). This indicates that short-term changes in Public Expenditure are linked to a reduction of -0.0002 units in income inequality. The T-Test statistic of -1.997 emphasizes the statistical significance of this relationship.

The coefficient of -0.020 ** for the ECM, suggests a statistically significant negative association with income inequality in the short run ($p < 0.01$). This implies that the model adjusts by -0.020 units toward its long-run equilibrium for each one-unit deviation from the long-run equilibrium in the previous period. The T-Test statistic of -3.489 indicates the statistical significance of this adjustment mechanism.

The Mean and Standard Deviation of the dependent variable, along with the Akaike Information Criterion (AIC), support the overall fit of the model.

The sum of squared residuals is low, suggesting a well-fitted model. However, the normality test ($p < 0.001$) raises a potential concern, indicating that the residuals may deviate from a normal distribution, warranting further investigation.

The short-run dynamics of income inequality are significantly influenced by past inequality levels, changes in Agricultural Value Added, and shifts in Public Expenditure.

Policymakers may consider short-term adjustments in agricultural policies (AGRIVA) and public expenditure policies (PUBEXP) to potentially mitigate income inequality.

The ECM highlights a mechanism through which the model corrects deviations from the long-run equilibrium, emphasizing the dynamic nature of income distribution.

In summary, the short-run model provides valuable insights into the immediate factors influencing income inequality, providing policymakers with nuanced information for targeted interventions and economic management strategies.

Short Run Estimates

Variables	**Coefficient**	**Standard Error**	**T Test**
DINI (-1)	0.709 ***	0.040	17.501
D (AGRIVA)	-0.0001**	0.0001	-1.965
D (PUBEXP)	-0.0002**	0.0001	-1.997
ECM (-1)	-0.020 **	0.0005	-3.489
DINI (-1)	0.709 ***	0.040	17.501
Mean Dep. Var	0.001	S.D Dep. Variable	0.003
S.E of Regression	0.002	Akaike Info Criterion	-9.187
Sum Squared Residual	0.001	Normality Test	1621 ***
Log Likelihood	947.491		

Source: Author's computation (2023).

4.4. Results of Objectives Three

The result presents that, based on the results and the Hausman test, the fixed effect model is more suitable for capturing the individual-specific effects in this analysis. Thus, the result states that the coefficient for Agricultural Value Added (AGRIVA) is positive, but not statistically

significant, indicating that the observed changes in this variable are not associated with a statistically significant impact on the dependent variable.

PUBEXP: The coefficient for Public Expenditure (PUBEXP) is positive, but not statistically significant, suggesting that variations in public expenditure are not significantly linked to changes in the dependent variable within the scope of this model.

FDI: The coefficient for Foreign Direct Investment (FDI) is positive and highly statistically significant, suggesting that increases in FDI are associated with a significant positive impact on the dependent variable.

HUMCAP: Human Capital (HUMCAP) exhibits a negative and highly statistically significant coefficient, implying that higher levels of human capital are linked to a significant reduction in the dependent variable.

IRS: The coefficient for Institutional Quality (IRS) is negative and highly statistically significant, indicating that improvements in institutional quality correspond to a significant decrease in the dependent variable.

LCPI: The coefficient for the Legal and Corruption Perception Index (LCPI) is positive and highly statistically significant, suggesting that a positive change in this index is associated with a substantial increase in the dependent variable.

LGDPPC: Gross Domestic Product per Capita (LGDPPC) demonstrates a positive and statistically significant coefficient, implying that higher levels of GDP per capita are associated with a significant increase in the dependent variable.

AGRPUB: The coefficient for the interaction term between Agricultural Value Added and Public Expenditure (AGRPUB) is negative and highly statistically significant, indicating that the combined effect of these two variables has a significant negative impact on the dependent variable.

Constant: The constant term is not statistically significant, suggesting that the model does not necessarily require a constant intercept.

Table 4.4:

Variables	Fixed effect model	Radom Effect Model
	0.001*	0.001***
AGRIVA	(0.0004)	(0.0004)
	[1.630]	[2.759]
	0.001	-0.0002
PUBEXP	(0.001)	(0.0006)
	[1.183]	[-0.271]
	0.0002	0.001***
FDI	(0.0003)	(0.0003)
	[0.645]	[3.705]
	0.0001	-0.004***
HUMCAP	(0.0001)	(0.000)
	[0.1284]	[-9.712]
	-0.0001	-0.001***
IRS	(0.0004)	(0.0002)
	[-0.310]	[-8.088]
	0.018***	0.028***
LCPI	(0.003)	(0.003)
	[5.377]	[10.102]
	0.009***	0.004***
LGDPPC	(0.003)	(0.002)
	[2.485]	[2.443]
	-0.0001***	-0.000
	(0.000)	(0.000)
AGRPUB	[-4.753]	[-1.449]
	-0.007	0.002
Constant	(0.002)	(0.016)
	(0.386)	(0.114)
R Squares	0.764	0.507

Adjusted R	0.743		0.486
S.E of Regression	0.009		0.013
Sum of Squared Residual	0.015		0.031
Log of Likelihood	658.334		
F Statistics	36.606		24.261
Prob (F Statistic)	0.000		0.000
Mean Dependent Variable	0.132		0.132
S.D Dependent Variable	0.018		0.018
Akaike Info Criterion	-6.478		
Durbin Watson Stat	0.217		0.125
Hausman Test		197.3***	

Source: Author's computation (2023)

The normality test suggests that the assumption of normally distributed residuals is reasonable, which is important for the validity of statistical inference. Since the residuals are reasonably normally distributed, the estimates of coefficients are likely unbiased, and standard errors are reliable.

The significant serial correlation test indicates a potential issue. Serial correlation can affect the efficiency and unbiasedness of coefficient estimates. If left unaddressed, it might lead to biased standard errors and invalid hypothesis tests. Serial Correlation: Given the presence of serial correlation, it is essential to explore techniques to address this issue, such as panel ARDL model.

Post Estimation Test

Test	**Statistics**	**Conclusion**
Normality	2.405	Normally Distributed
Serial Correlation	367.449 ***	Presence of Serial Correlation

Source: Author's computation (2023).

Table 4 presents the Panel ARDL model result. This result suggests that AGRIVA's coefficient is 0.006, and it is highly statistically significant ($p < 0.001$). This suggests that a one-unit increase in Agricultural Value Added is associated with an estimated 0.006-unit increase in the dependent variable in the long run. The T-test statistic of 4.309 indicates the significance of this relationship.

The coefficient for Public Expenditure is 0.005, and it is also highly statistically significant ($p < 0.001$). This implies that a one-unit increase in Public Expenditure is associated with an estimated 0.005-unit increase in the dependent variable in the long run. The T-test statistic of 3.925 emphasizes the significance of this relationship.

The coefficient for the interaction term AGRPUB is -0.0004, and it is highly statistically significant ($p < 0.001$). The negative sign indicates that the combined effect of Agricultural Value Added and Public Expenditure has a significant negative impact on the dependent variable in the long run. The T-test statistic of -5.358 underlines the statistical significance of this interaction effect.

An increase in Agricultural Value Added is associated with a positive impact on the dependent variable in the long run. This might suggest that improvements or growth in the agricultural sector contribute positively to the observed outcomes.

Increased Public Expenditure is also associated with a positive impact on the dependent variable over the long run. This implies that higher levels of government spending contribute positively to the observed outcomes.

The interaction term AGRPUB captures the joint effect of Agricultural Value Added and Public Expenditure. The negative coefficient indicates that the combined effect of these two variables

has a negative impact on the dependent variable in the long run. This interaction term provides valuable insights into the joint influence of these two factors.

Policymakers may consider fostering growth and improvements in both the agricultural sector and public expenditure to positively impact the dependent variable in the long run.

The negative interaction effect suggests that careful consideration should be given to the combined impact of Agricultural Value Added and Public Expenditure. It may be necessary to balance investments in both sectors to avoid potential negative consequences on the dependent variable.

In summary, the long-run estimates provide a comprehensive view of the relationships between the variables, emphasizing the importance of both Agricultural Value Added and Public Expenditure in influencing the observed outcomes. The negative interaction effect highlights the need for a nuanced understanding of the joint impact of these factors in the long run.

Long Run Estimates

Variables	Coefficient	Standard Error	T Test
AGRIVA	0.006 ***	0.001	4.309
PUBEXP	0.005 ***	0.001	3.925
AGRPUB	-0.0004	0.0001	-5.358

Source: Author's computation (2023).

The coefficient of the First Difference of Income Inequality lagged by one periodDINI (-1)) is 0.600, and it is highly statistically significant ($p < 0.001$). This indicates that a one-unit increase in the lagged first difference of income inequality is associated with an estimated 0.600-unit increase in the dependent variable in the short run. The T-test statistic of 11.783 emphasizes the significance of this relationship.

D (AGRIVA) (First Difference of Agricultural Value Added):

The coefficient for the first difference of Agricultural Value Added is -0.0004, and it is not statistically significant ($p > 0.05$). This suggests that changes in Agricultural Value Added do not have a statistically significant immediate impact on the dependent variable in the short run.

D (PUBEXP) (First Difference of Public Expenditure):

The coefficient for the first difference of Public Expenditure is -0.001, and it is not statistically significant. This implies that immediate changes in Public Expenditure do not have a statistically significant impact on the dependent variable in the short run.

D (AGRIPUB) (First Difference of the Interaction Term):

The coefficient for the first difference of the interaction term AGRPUB is 0.000, and it is not statistically significant. This suggests that changes in the interaction between Agricultural Value Added and Public Expenditure do not have a statistically significant immediate impact on the dependent variable in the short run.

CONSTANT (Constant Term):

The constant term has a coefficient of 0.007, and it is statistically significant at the 0.05 significance level. This indicates that even in the absence of changes in the independent variables, there is a statistically significant constant impact on the dependent variable in the short run.

ECM (-1) (Error Correction Term lagged by one period):

The coefficient for the lagged Error Correction Term is -0.085, and it is statistically significant. This term represents the speed of adjustment towards the long-run equilibrium. A negative coefficient suggests that the model adjusts towards equilibrium in the short run.

Overall Implications:

DINI (-1):

Immediate changes in lagged first differences of income inequality have a significant and positive impact on the dependent variable in the short run.

D (AGRIVA), D (PUBEXP), D (AGRIPUB):

Changes in Agricultural Value Added, Public Expenditure, and their interaction do not have a statistically significant immediate impact on the dependent variable in the short run.

CONSTANT:

The constant term represents the baseline impact on the dependent variable even when there are no changes in the independent variables. This impact is statistically significant in the short run.

ECM (-1):

The negative coefficient suggests that there is a speed of adjustment towards the long-run equilibrium in the short run.

Policymakers may focus on understanding and addressing the factors contributing to immediate changes in income inequality to mitigate potential short-term impacts.

The lack of immediate impact from changes in Agricultural Value Added, Public Expenditure, and their interaction in the short run suggests that the effects of these variables may take time to manifest.

In summary, the short-run model results provide insights into the immediate effects of changes in certain variables on the dependent variable. The significant coefficients highlight areas where policymakers may need to focus their attention to address short-term dynamics in the system.

Short Run Estimates

Variables	**Coefficient**	**Standard Error**	**T Test**
DINI (-1)	0.600 ***	0.051	11.783
D (AGRIVA)	-0.0004	0.001	-0.331
D (PUBEXP)	-0.001	0.002	0.576
D (AGRIPUB)	0.000	0.0001	0.094
CONSTANT	0.007**	0.004	1.955
ECM (-1)	-0.085	0.040	-2.122

Mean Dep. Var	0.001	S.D Dep Variable	0.003
S.E of Regression	0.002	Akaike Info Criterion	-9.476
Sum Squared Residual	0.0004	Normality Test	249***
Log Likelihood	995.109		

Source: Author's computation (2023).

The mean of the dependent variable in the model is 0.001, signifying the average value of the observed outcomes. The standard deviation, measuring the spread of values around the mean, is 0.003, indicating a relatively low level of variability in the dependent variable.

The standard error of regression is 0.002, reflecting the average distance between observed values and the regression line. This low standard error suggests a good fit of the model to the data, indicating that the predicted values closely align with the observed outcomes.

The Akaike Information Criterion (AIC) stands at -9.476, a measure of the model's goodness of fit. Lower AIC values, in this case, indicate a better balance between model complexity and fit to the data, suggesting a well-fitted model.

The sum of squared residuals, representing the sum of squared differences between observed and predicted values, is 0.0004. This low value indicates that the model's predictions closely align with the actual data points, further supporting the model's good fit.

The log likelihood, a measure of how well the model explains the observed data, is 995.109. This high log likelihood value suggests that the model provides a good explanation for the given data.

However, the normality test, with a highly significant test statistic of 249 ($p < 0.001$), raises concerns about the normality of residuals. While this departure from normality may not necessarily invalidate the results, it indicates caution in the interpretation of certain statistical inferences.

In summary, the diagnostic measures collectively suggest that the model fits the data well, providing reliable predictions. However, the potential departure from normality in residuals prompts a need for further exploration or adjustments to ensure the robustness of certain statistical inferences drawn from the model.

4.5 Discussion of Findings

The study found that agriculture productivity and public expenditure positively and significantly influence income in ECOWAS. It implies that increased productivity primarily benefits large-scale commercial farmers or those with access to modern agricultural technologies which therefore exacerbate existing income disparities. Thus, agriculture productivity widen gap between the wealthier agricultural producers and smallholder farmers, contributing to overall income inequality. Additionally, the distributional effects of agricultural productivity gains, including access to markets and value chains, play a crucial role in shaping income distribution patterns. This follows the submission of previous study that 29 Economies experienced fall in the effective redistribution of the fiscal measures adopted, and also the redistributive effect of Fiscal policies increased more than 35% in countries like Angola, Mozambique, South Africa and Togo[1]. It supports the argument by a study that economic inequality is broadened when government spends more on secondary and undergraduate education programs[2].

It is in line with the result of a study that public spending and debt do not ensure a distributive effect in the countries understudy[4].

It negates the findings that basic primary education policy sponsored by public expenditure abates unequal distribution of income[2]. Also, it is contrary to the results that government spending, education expenses, and health spending are indirectly related with income inequality in developed nations[3].

In addition, the positive and significant impact of public expenditure on income inequality in ECOWAS suggests how these funds are allocated. If public spending primarily benefits higher-income groups or is directed toward projects that do not address the needs of the economically disadvantaged, it can contribute to increased income inequality. Inefficient or corrupt allocation of public resources may result in a situation where the intended benefits of public expenditure fail to reach those who need them most. For example, if agricultural subsidies disproportionately favor large agribusinesses rather than smallholder farmers, it could contribute to income concentration and exacerbate inequality.

It negates the findings that agricultural activities will enable the rural farmers to improve the level of their income, which helps them from their poor state[5]. Also, it is against the result that agricultural productivity growth has been identified as one of the key factors used in the developed and growing countries to reduce poverty.

The negative and insignificant impact of public expenditure and agriculture productivity on income inequality suggests that the joint effect of agriculture productivity and public expenditure does not significantly alter the existing income distribution patterns in ECOWAS. In economic terms, this could imply that despite efforts to enhance productivity in the agricultural sector and increase public spending, the outcomes do not translate into a substantial change in the distribution of income among different segments of the population. One potential economic implication is that the strategies or policies implemented to boost agriculture productivity and increase public expenditure may not be well-targeted or effectively addressing the root causes of income inequality in the region. For instance, if public funds are not directed toward initiatives that directly benefit marginalized or low-income groups, or if the gains in agriculture productivity are not reaching smallholder farmers, the desired impact on income inequality may

not materialize. Additionally, a negative and insignificant impact could indicate broader structural issues within the economy that go beyond the agricultural sector. Factors such as unequal access to education, healthcare, and opportunities for economic advancement may still play a dominant role in shaping income distribution, despite efforts in the agricultural domain.

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Chapter Five

Summary, Conclusion and Recommendation

5.1. Summary of Findings

The study examined the tripartite relationship among public expenditure, agricultural productivity and income inequality for 9 out of the 15 ECOWAS countries. Fixed and Random Effect Panel estimation techniques as well as Panel Autoregressive Distributed Lag Methods were employed, while the Hausman test was used in determining the appropriate estimated model. In analyzing the effect of public expenditure on income inequality in ECOWAS, the Hausman test indicated that the fixed effect model is more suitable for capturing the individual-specific effects in the analysis. Results showed that public expenditure has a negative and significant effect on income inequality for the period analysed. For FDI, interest rate and human capital, there is no significant relationship with income inequality. However, a positive and significant relationship was observed for inflation and GDP per capita on income inequality.

The second objective examined the effect of agricultural productivity on income inequality in the selected ECOWAS countries using the fixed effect model. Results showed a significant and negative relationship between agricultural productivity and income inequality. The effect of other variables remains same as observed in the first model. For the PARDL, results showed that agricultural productivity has a highly significant positive association with income inequality in the long run.

For the third objective, the study analysed the interactive effect of public expenditure and agricultural productivity on income inequality for the selected ECOWAS countries. The Hausman test indicates that the fixed effect model is more suitable for capturing the individual-specific effects in this analysis. Thus, the result states that the coefficient for Agricultural Value

Added (AGRIVA) is positive, it is not statistically significant, indicating that the observed changes in this variable are not associated with a statistically significant impact on the dependent variable. The coefficient for Public Expenditure is positive but not statistically significant, suggesting that variations in public expenditure are not significantly linked to changes in the dependent variable within the scope of this model. The coefficient for Foreign Direct Investment (FDI) is positive and highly statistically significant, suggesting that increases in FDI are associated with a significant positive impact on the dependent variable.

Panel ARDL model suggests that agricultural productivity has a highly statistically significant relationship with income inequality, while public expenditure also has a highly statistically significant relationship with income inequality. For the interactive effect of agricultural productivity and public expenditure, the effect is significant and negative. The interaction term captures the joint effect of Agricultural Value Added and Public Expenditure. The negative coefficient indicates that the combined effect of these two variables has a negative impact on the dependent variable in the long run. This interaction term provides valuable insights into the joint influence of these two factors.

5.2 Conclusion

The study examined the nexus among agricultural productivity, public expenditure and income inequality for selected countries between 2000 and 2021. For the relationship between public expenditure and income inequality, a negative and significant effect was recorded on income inequality for the period analysed. For PARDL result is in the long run and short run, results showed that agricultural productivity has a highly significant positive association with income inequality. In analyzing the effect of agricultural productivity on income inequality, a significant

and negative relationship was recorded. This also corroborate the findings from the PARDL, results.

For the interactive effect of public expenditure and agricultural productivity on income inequality for the selected ECOWAS countries, the effect is significant and negative. The negative coefficient indicates that the combined effect of these two variables has a negative impact on the dependent variable in the long run.

5.3 Recommendations

From the results of the study, the following recommendations are made:

1. Government should increase public expenditure on agricultural activities so as to improve agricultural productivity, enhance employment generation and alleviate poverty in the economy. Investments in education, healthcare, and social safety nets can improve human capital development and reduce income inequality.
2. Government should increase more budget allocation in the agricultural sector to enhance sustainable growth and economic development. More youths who are newly employed in the agricultural sector should be encouraged and highly remunerated inorder to promote efficiency.
3. Government should establish and promote financial institutions that provide affordable credit to farmers for purchasing inputs, machinery, and technology, while ensuring that these financial services are accessible to smallholder farmers, including women and youths.
4. Substantial investment in agricultural education and vocational training to equip farmers with the skills and knowledge needed for modern and sustainable farming

practices.

5.4 Contribution to Knowledge

The study contributes to the existing body of knowledge in the following ways:

a) As compared with previous studies, this study examined the tripartite relationship between public expenditure, agricultural productivity and income inequality. Most existing studies have examined the effect of any two of these variables, however this study differs from others by analyzing the tripartite relationship among the three variables.

b) The study focused on nine selected ECOWAS countries while concentrating on countries with a high level of income inequality amongst other ECOWAS countries.

c) The study examined the interactive effect of agricultural productivity and public expenditure on income inequality for the selected ECOWAS countries.

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Appendix

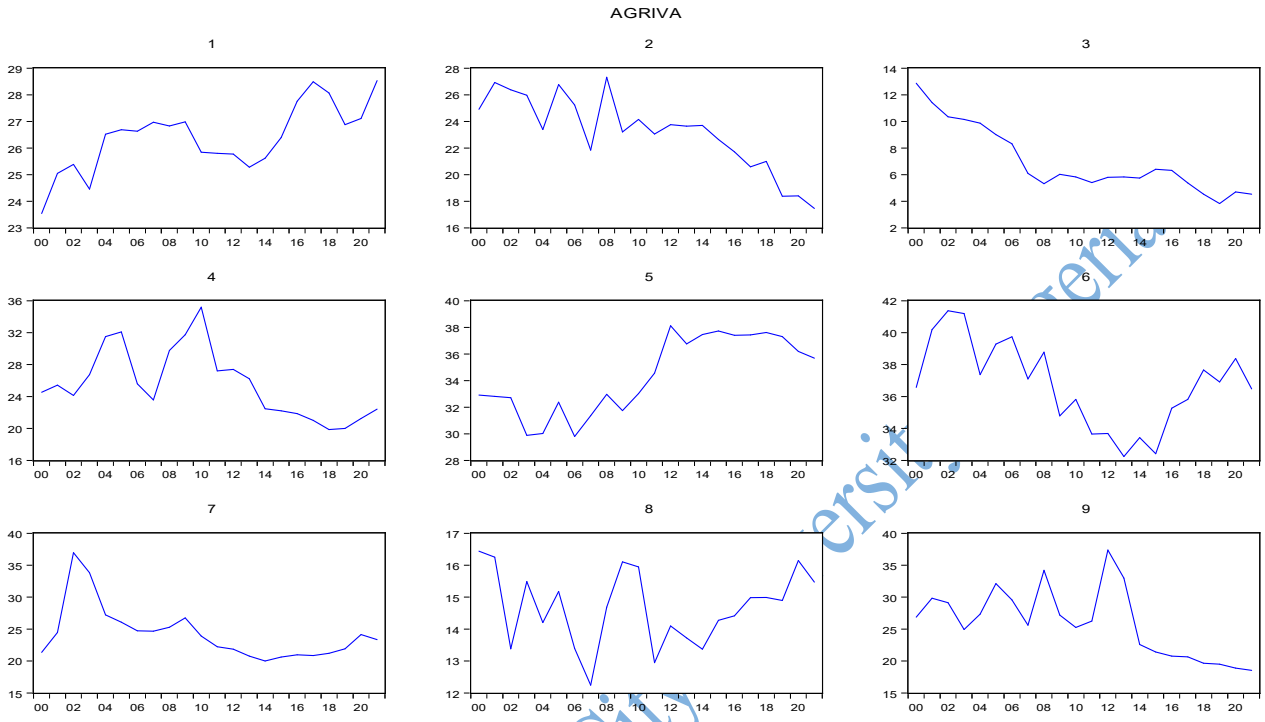

Figure 4.1: Agricultural productivity in ECOWAS

Source: WDI (2023)

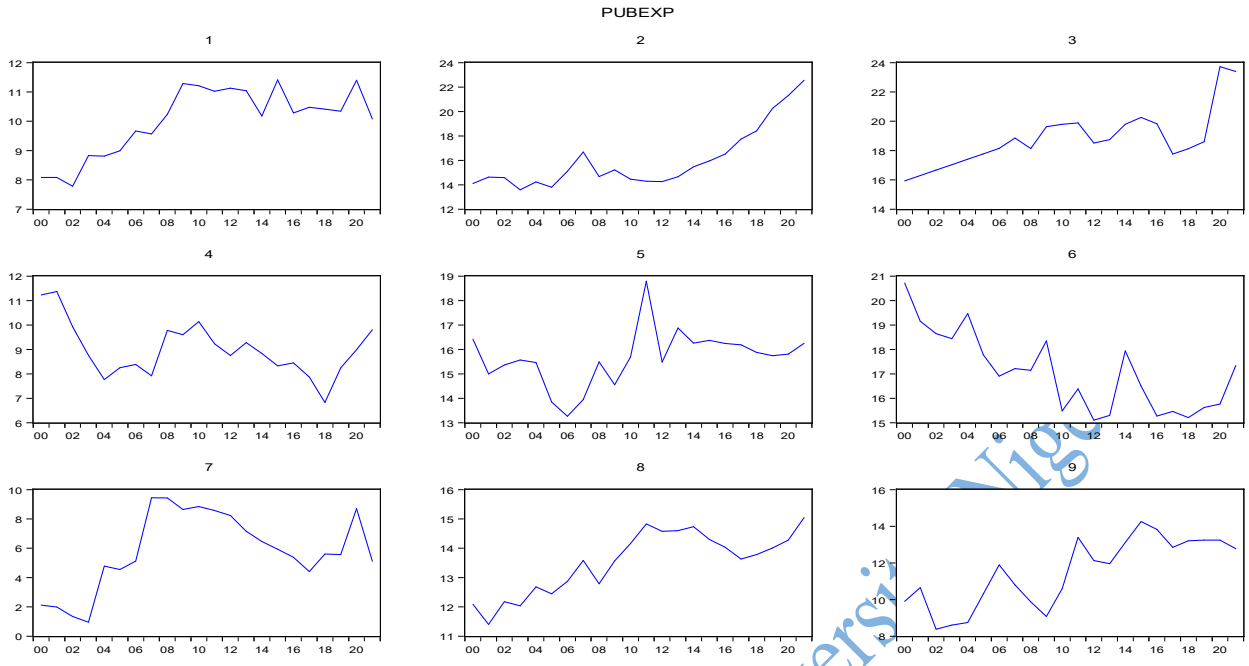

Figure 4.2: Public Expenditure in ECOWAS
Source: WDI (2023)

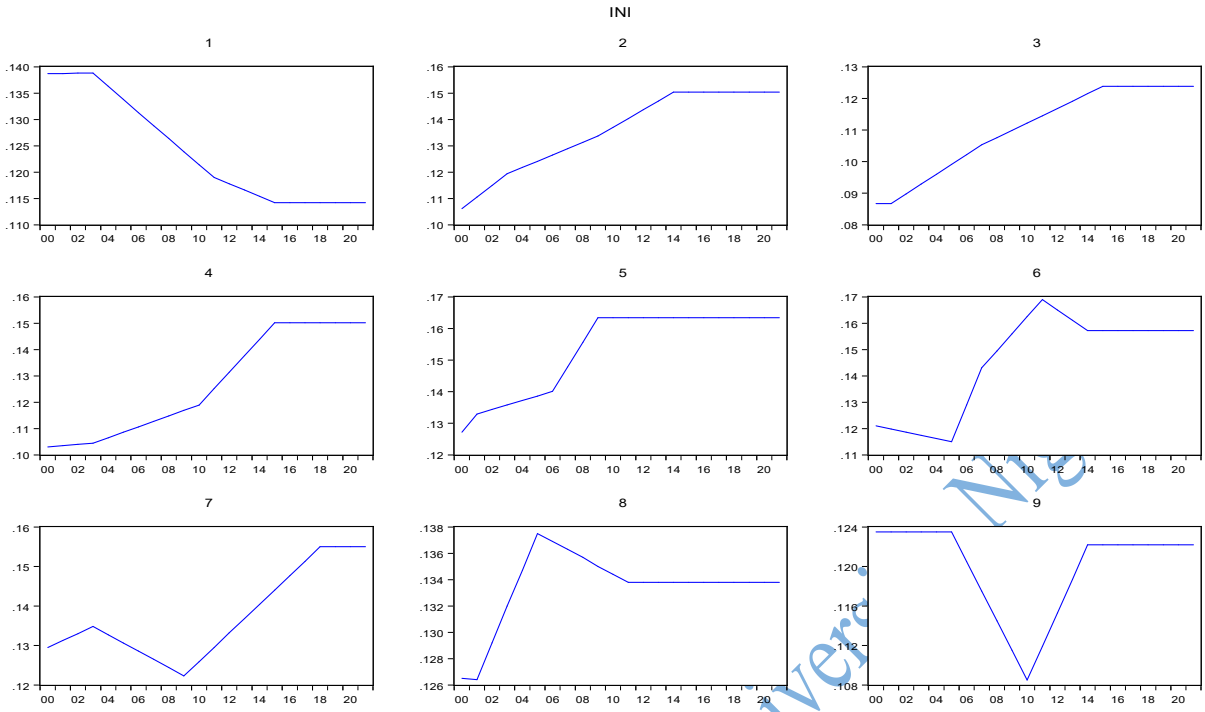

Figure 4.3: Income inequality in ECOWAS

Source: WDI (2023)

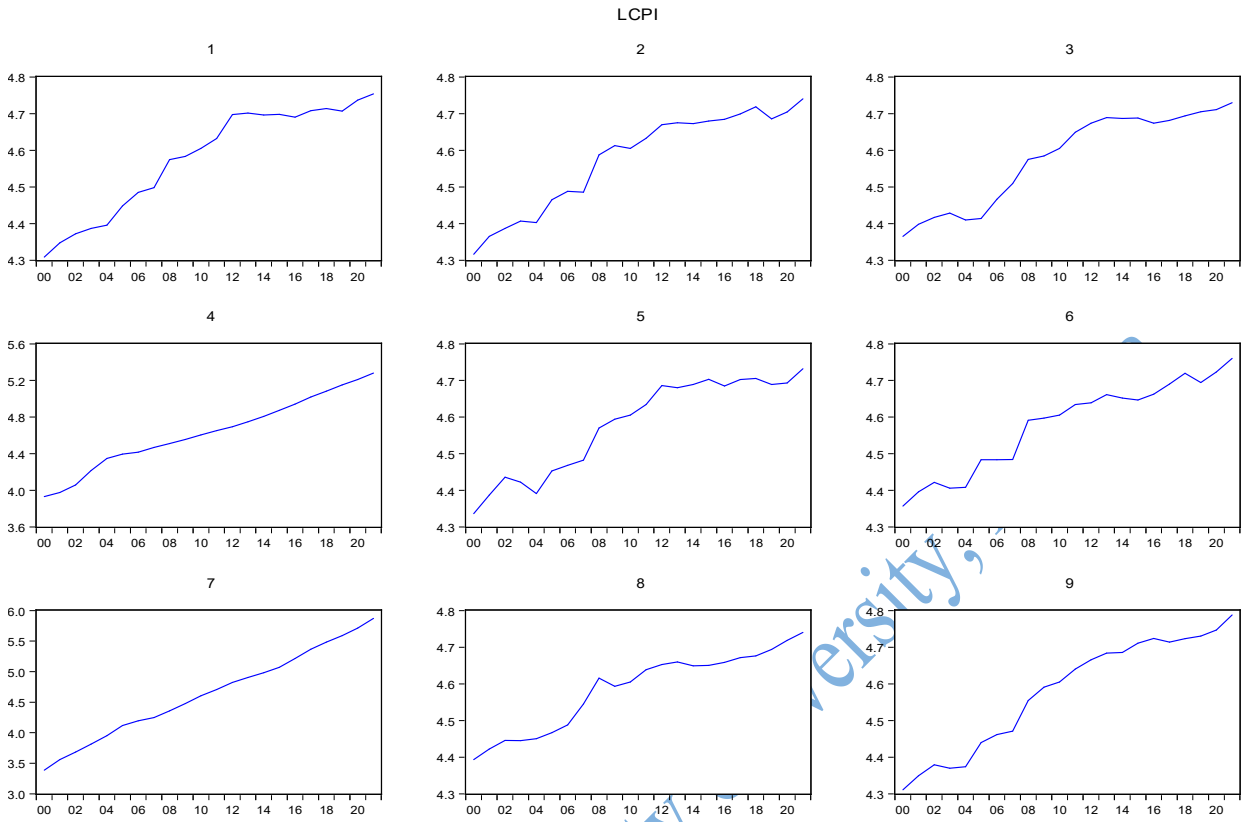

Figure 4.4: Inflation rate in ECOWAS

Source: WDI (2023)

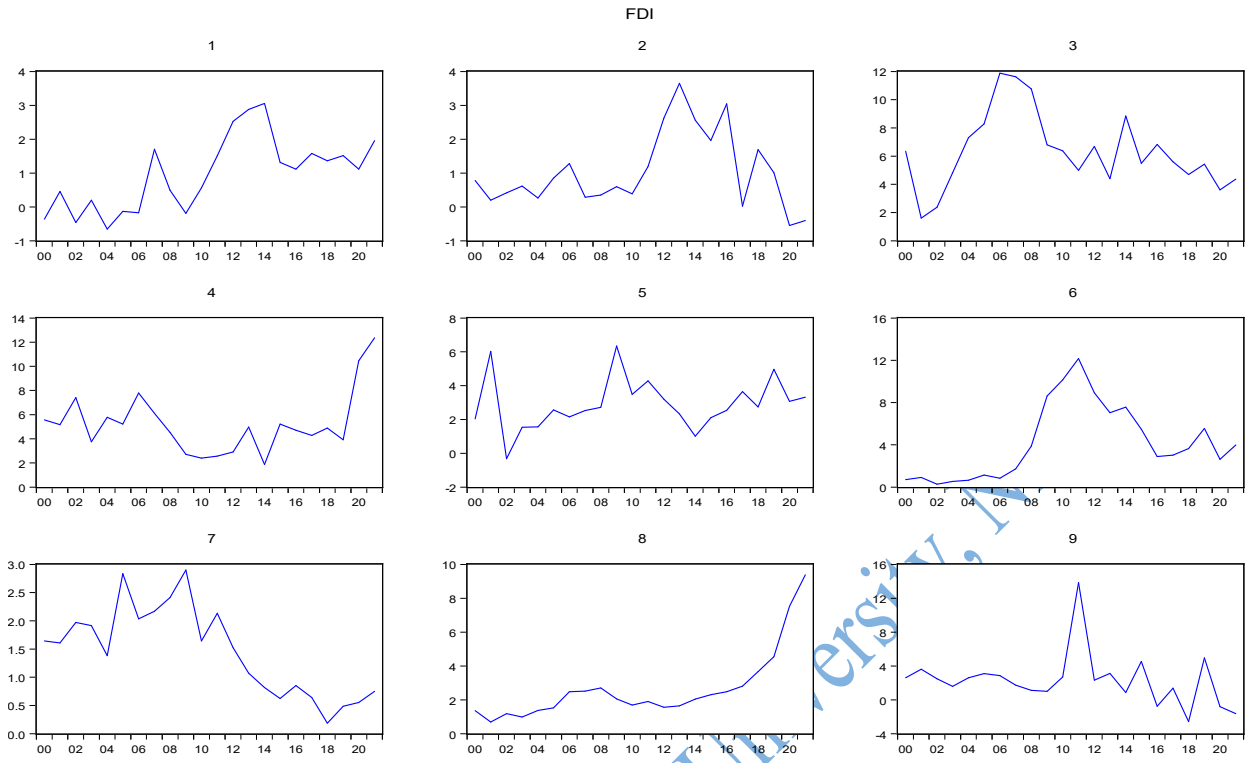

Figure 4.5: Foreign Direct Investment in ECOWAS

Source: WDI (2023)

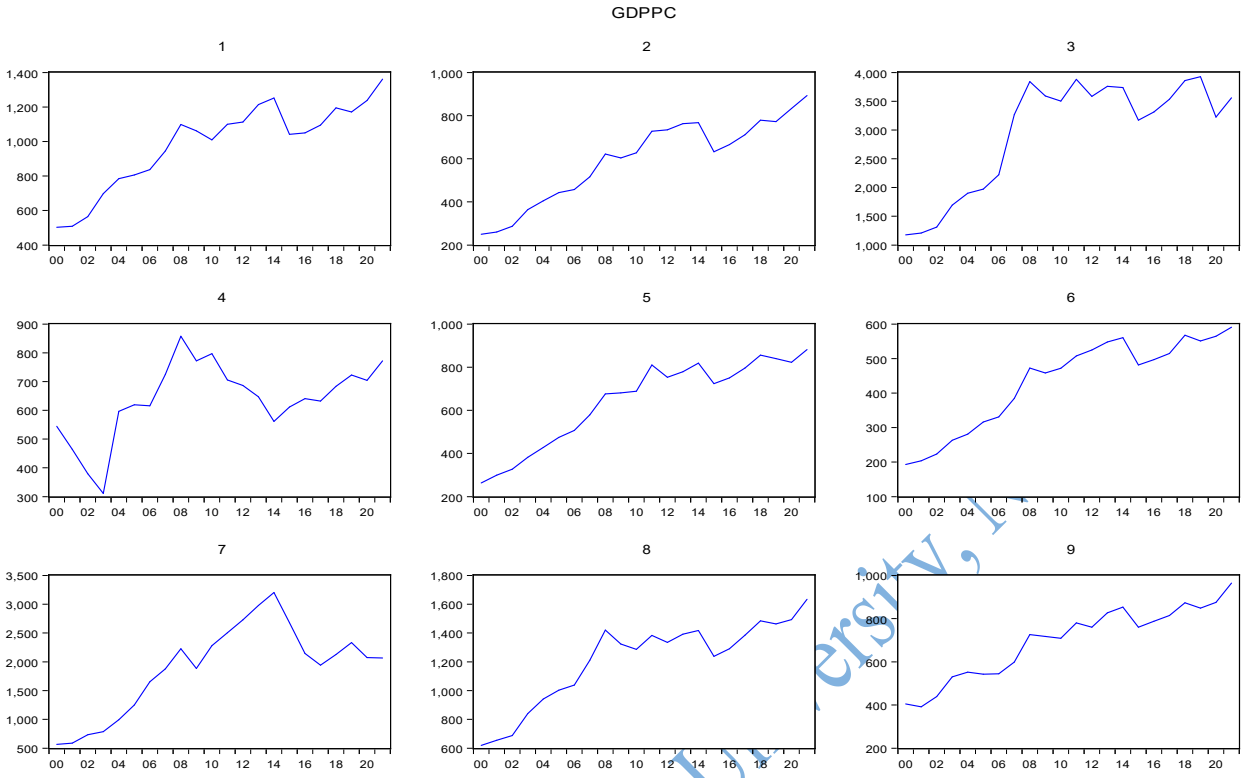

Figure 4.6: Gross Domestic Product Per Capita in ECOWAS

Source: WDI (2023)

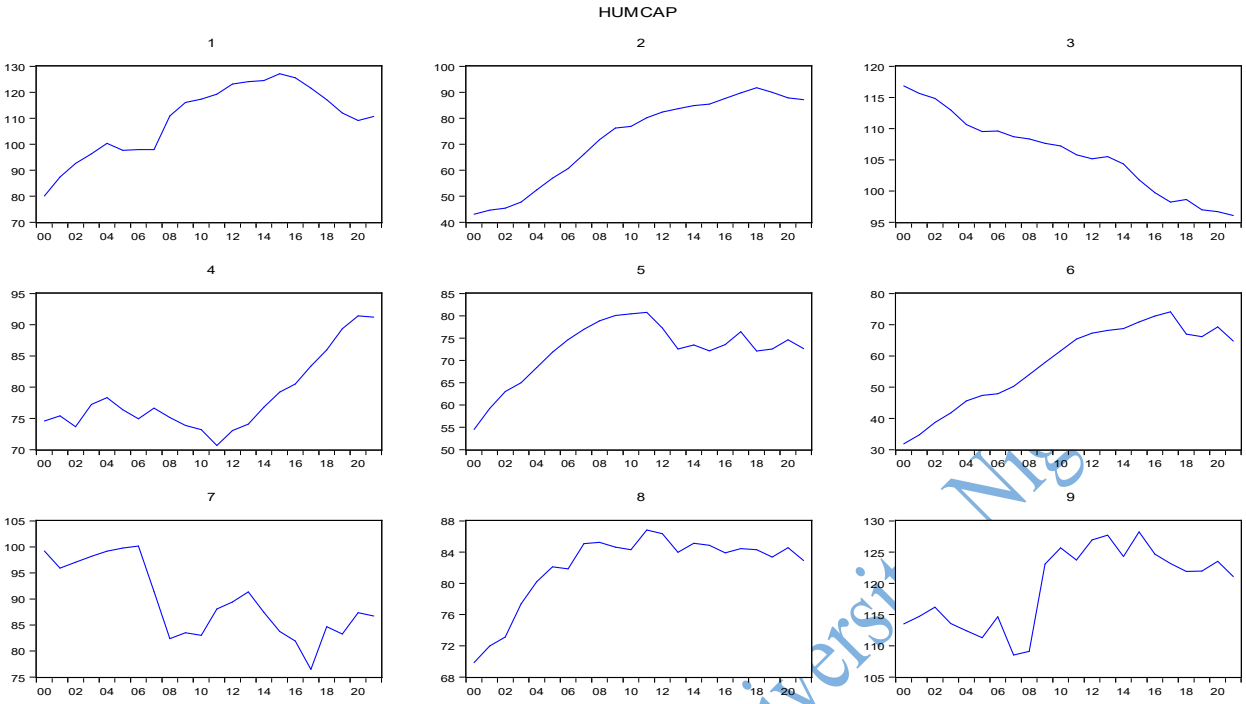

Figure 4.7: Human Capital in ECOWAS

Source: WDI (2023)

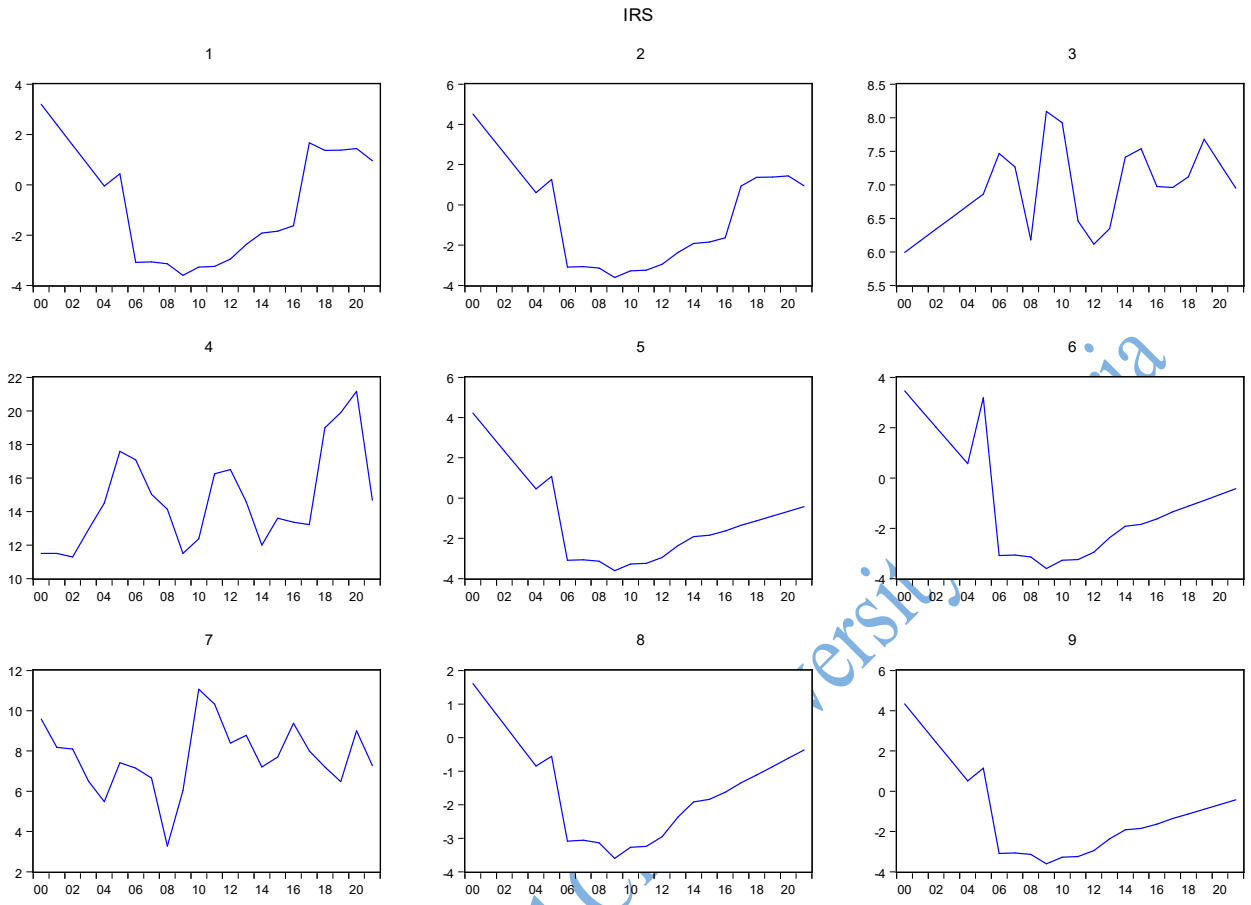

Figure 4.8: Interest Rate Spread in ECOWAS

Source: WDI (2023)

Table 4.1: Descriptive statistics

	AGRIVA	FDI	HUMCAP	INI	IRS	LCPI	LGDPPC	PUBEXP
Mean	24.22805	3.006158	87.48669	0.131840	2.639431	4.592375	6.774412	13.04711
Median	25.13860	2.392570	84.60490	0.131300	0.950000	4.623773	6.658011	13.70930
Maximum	41.36690	13.84760	128.2520	0.169000	21.15830	5.870133	8.275965	23.72610
Minimum	3.826770	-2.574580	31.84690	0.086700	-3.601670	3.387778	5.262058	0.951747
Std. Dev.	9.160553	2.840126	21.57444	0.017961	5.837796	0.294084	0.673032	4.387109
Skewness	-0.352991	1.362134	-0.032212	0.077834	0.996511	0.306087	0.446933	-0.231237
Kurtosis	2.543604	5.006789	2.583178	2.468754	3.215272	8.270723	2.862501	2.773978
Jarque-Bera	5.830349	94.45288	1.467601	2.528249	33.15242	232.2810	6.747684	2.185992
Probability	0.054195	0.000000	0.480081	0.282486	0.000000	0.000000	0.034258	0.335211
Observations	198	198	198	198	198	198	198	198

Source: Author's computation (2023)

	AGRIVA	FDI	HUMCAP	INI	IRS	LCPI	LGDPPC	PUBEXP
AGRIVA	1							
FDI	-0.19	1						
HUMCAP	-0.41	0.05	1					
INI	0.371	-0.024	-0.384	1				
IRS	-0.239	0.271	-0.041	-0.246	1			
LCPI	-0.129	0.039	0.069	0.396	0.06	1		
LGDPPC	-0.710	0.207	0.510	-0.137	0.20	0.36	1	
PUBEXP	-0.165	0.232	-0.216	0.035	-0.36	0.06	0.03	1

Source: Author's computation (2023).

Table Variables	At Levels	At Fist Difference	Conclusion
	ADF Statistics	ADF Statistics	
AGRIVA	21.304	125.081***	I(1)
FDI	15.863	56.362***	I(1)
HUMCAP	24.829	38.146***	I(1)
INI	53.623***		I(0)
IRS	41.442***		I(0)
INF	7.583	7.182***	I(1)
GDP	41.208***		I(0)
PUBEXP	21.48	65.239***	I(1)

Source: Author's computation (2023)

Table 4.4: Public expenditure, agriculture productivity and income inequality

Variables	Fixed Effect Model	Radom Effect Model
AGRIVA	-0.001*** (0.0002) [-4.230]	-0.0004*** (0.0002) [-2.067]
PUBEXP	-0.002*** (0.0005) [-4.944]	-0.001** (0.004) [-3.407]
FDI	0.001 (0.000) [0.747]	0.001** (0.0003) [1.866]
HUMCAP	0.000 (0.0001) [1.492]	0.000 (0.0001) [0.087]
IRS	0.0001 (0.0004) [0.142]	-0.001*** (0.0003) [-2.3]
LCPI	0.013*** (0.0034) [3.785]	0.021*** (0.0031) [6.571]
LGDPPC	0.013*** (0.0035) [3.787]	0.005** (0.003) [1.685]
Constant	0.026 (0.019) [1.361]	0.032** (0.018) [1.729]
R Squares	0.734	0.377
Adjusted R	0.713	0.354
S.E of Regression	0.01	0.011
Sum of Squared Residual	0.017	0.021
Log of Likelihood	646.689	
F Statistics	33.559	16.428
Prob (F Statistic)	0.000	0.000
Mean Dependent Variable	0.132	0.029
S.D Dependent Variable	0.018	0.013
Akaike Info Criterion	-6.371	
Durbin Watson Stat	0.209	0.104
Hausman Test	47.809***	

Source: Author's computation (2023).

Post Estimation Test

Test	Statistics	Conclusion
Normality	6.271 ***	Not Normally Distributed
Serial Correlation	457.454 ***	Presence of Serial Correlation

Source: Author's computation (2023).

Long Run Estimates

Variables	Coefficient	Standard Error	T Test
AGGRIVAL	0.002 ***	0.0003	6.796
PUBEXP	0.006 ***	0.0003	17.027

Source: Author's computation (2023).

Short Run Estimates

Variables	Coefficient	Standard Error	T Test
DINI (-1)	0.709 ***	0.040	17.501
D (AGRIVA)	-0.0001**	0.0001	-1.965
D (PUBEXP)	-0.0002**	0.0001	-1.997
ECM (-1)	-0.020 **	0.0005	-3.489
DINI (-1)	0.709 ***	0.040	17.501
Mean Dep. Var	0.001	S.D Dep. Variable	0.003
S.E of Regression	0.002	Akaike Info Criterion	-9.187
Sum Squared Residual	0.001	Normality Test	1621 ***
Log Likelihood	947.491		

Source: Author's computation (2023).

Variables	Fixed effect model	Radom Effect Model
	0.001*	0.001***
AGRIVA	(0.0004)	(0.0004)
	[1.630]	[2.759]
	0.001	-0.0002
PUBEXP	(0.001)	(0.0006)
	[1.183]	[-0.271]
	0.0002	0.001***
FDI	(0.0003)	(0.0003)
	[0.645]	[3.705]
	0.0001	-0.004***
HUMCAP	(0.0001)	(0.000)
	[0.1284]	[-9.712]
	-0.0001	-0.001***
IRS	(0.0004)	(0.0002)
	[-0.310]	[-8.088]
	0.018***	0.028***
LCPI	(0.003)	(0.003)
	[5.377]	[10.102]
	0.009***	0.004***
LGDPPC	(0.003)	(0.002)
	[2.485]	[2.443]
	-0.0001***	-0.000
	(0.000)	(0.000)
AGRPUB	[-4.753]	[-1.449]
	-0.007	0.002
Constant	(0.002)	(0.016)
	(0.386)	(0.114)
R Squares	0.764	0.507
Adjusted R	0.743	0.486
S.E of Regression	0.009	0.013

Sum of Squared Residual	0.015		0.031
Log of Likelihood	658.334		
F Statistics	36.606		24.261
Prob (F Statistic)	0.000		0.000
Mean Dependent Variable	0.132		0.132
S.D Dependent Variable	0.018		0.018
Akaike Info Criterion	-6.478		
Durbin Watson Stat	0.217		0.125
Hausman Test		197.3***	

Source: Author's computation (2023)

Post Estimation Test

Test	Statistics	Conclusion
Normality	2.405	Normally Distributed
Serial Correlation	367.449 ***	Presence of Serial Correlation

Source: Author's computation (2023).

Long Run Estimates

Variables	Coefficient	Standard Error	T Test
AGRIVA	0.006 ***	0.001	4.309
PUBEXP	0.005 ***	0.001	3.925
AGRPUB	-0.0004	0.0001	-5.358

Source: Author's computation (2023).

Short Run Estimates

Variables	Coefficient	Standard Error	T Test
DINI (-1)	0.600 ***	0.051	11.783
D (AGRIVA)	-0.0004	0.001	-0.331
D (PUBEXP)	-0.001	0.002	0.576
D (AGRIPUB)	0.000	0.0001	0.094
CONSTANT	0.007**	0.004	1.955
ECM (-1)	-0.085	0.040	-2.122
Mean Dep. Var	0.001	S.D Dep Variable	0.003
S.E of Regression	0.002	Akaike Info Criterion	-9.476
Sum Squared Residual	0.0004	Normality Test	249***
Log Likelihood	995.109		

Source: Author's computation (2023).

Biodata

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G. Publication (if any): NIL

…… ……

Signature Date

University Compliance Certification

This is to certify that this thesis written by Abimbola Elizabeth ADETUNJI with Matric No: LCU/PG/002673 in the Department of Economics, Faculty of Management and Social Sciences, Lead City University, Ibadan, is in full compliance with the approved University format and style.

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Signature Date