UNIVERSITY OF CAPE COAST

TAX COMPOSITION AND INCOME INEQUALITY IN SUB-SAHARAN AFRICA

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BY

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DECLARATION

Candidate's Declaration

I hereby declare that this research is the result of my own original work and that no part of it has been presented for another degree in this university institution or elsewhere.

Candidate's Signature:……. Date:……

Name: James Amoah Edusei

Principal Supervisor's Declaration

I hereby declare that the preparation and subsequent presentation of the work were supervised according to the guidelines on supervision of thesis prescribed by the University of Cape Coast.

Supervisor's Signature:…… Date:……..

Name: Dr Francis Kwaw Andoh

ABSTRACT

The study examined the differential effect of income and consumption tax on income inequality in Sub-Saharan Africa and their thresholds effect. The study used 26 countries from SSA and data collected from 1990 to 2017. The study used the GMM panel estimation methods in achieving the objectives of the study.

The results of the study revealed that the income tax is significant in reducing income inequality in SSA but it has a threshold effect beyond which it turns to increase income inequality. Also, consumption tax does not have any significant effect on income inequality in sub-Saharan Africa and the threshold effect is also not significant. The study recommends that the governments of sub-Saharan Africa in conjunction with fiscal authorities like Ministry of finance of these countries should focus on income tax if they wish to reduce income inequality. The fiscal authorities in SSA countries should set an optimal income tax rate of 9.2 percent which is necessary to reduce income inequality to boost economic activities.

KEY WORDS

Consumption Tax

Gini Index

Income Tax

Capital Assets

Horizontal Inequality

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LIST OF ACRONYMS

AR	Autoregressive
CPI	Consumer Price Index
EU	European Union
FDI	Foreign Direct Investment
FE	Fixed Effect
GDP	Gross Domestic Product
GDPGR	Gross Domestic Product Growth Rate
GMM	Generalized Method of Moments
ILO	International Labour Organization
LIS	Luxembourg Income Study (LIS)
NRR	Natural Resources
OECD	Organization of Economic Co-operation and Development
RE	Random Effect
SSA	Sub-Saharan Africa
UNICEF	United Nations Children Fund
VAT	Value Added Tax
WDI	World Development Indicators

CHAPTER ONE

INTRODUCTION

This chapter provides context for the study, a summary of the problem, study objectives, and research hypotheses. It also discusses the study's relevance and how the chapters are organized.

Background of the Study

Sub-Saharan Africa (SSA) has made great progress in economics during the previous two decades. Government initiatives have been critical in this process, with advances in important areas such as primary school attendance and access to preventative healthcare (Osei-Assibey, 2013). Nonetheless, Sub-Saharan Africa is becoming an increasingly unequal sub-continent, with the benefits of economic growth and poverty reduction not being distributed evenly across states, gender, and income quintiles.

This trend has the ability to undermine earlier achievements, destroy social relationships, and greatly delay poverty reduction efforts. The gap between rich and poor has shrunk in many crucial measures, such as net primary school enrolment, vaccination rates, sanitation access, and childhood stunting. On closer scrutiny, however, some of these advances do not appear to be helpful; for example, the stunting gap between rich and poor children has only shrunk because indicators for specific groups appear to have deteriorated. Furthermore, other indicators such as income, under-five mortality, and access to skilled birth attendants have clearly demonstrated increased inequality, with the richest groups pushing ahead and the poorest falling behind (Osei-Assibey, 2013; UNICEF, 2013).

The wealth disparity has increased to levels not seen since the 1970's cusp of the Great Depression (Burman, 2012). In most rich and developing nations, inequality has grown in recent decades (Brys, Perret, Thomas, & O'Reill, 2016). Some of the major drivers of global inequalities include technological changes that have increased the wage gap in favour of the highly educated, changes in employment patterns that have resulted in a rise in the share of part-time and low-paying jobs, demographic changes, and a fall in the contribution of the tax system and transfer payments to the reduction of inequality (Brys et al., 2011; 2016).

In recent years, income inequality and wealth distribution has become more topical in the public and academic discourses in sub-Saharan African (SSA) countries, with this region being one of the regions that has seen the least progress in terms of improving living standards (World Bank, 2010). According to the African Development Bank (2012), SSA contains six of the world's ten countries with the highest levels of inequality. A review of figure 1 reveals that the trends of income inequality has been largely unstable for the past 26 years. For instance, income inequality declined steadily from a little over 49.9 percent to 49.5 percent from 1990 to 1992, rising above 50 percent from 1993 to 2002, then below 49.5 percent from 2005 to 2012 and above 49.5 percent from 2013 to 2015.

Figure 1: Trends in income inequality from in selected SSA

Source: Author's construct, 2020.

According to World Inequality Lab researchers in 2020, this period coincides with the reversal of various post-World War II initiatives aimed at closing economic gaps in these countries and areas. They argue that nations and regions that did not have a postwar egalitarian system, such as the Middle East, SSA, and Brazil, have maintained relatively constant but exceptionally high levels of inequality. Inequality manifests itself as a highly skewed distribution of income, and it is on the rise. For the first time since 1928, the wealthiest 1% of households collected more than 21% of total income in 2007, according to Picketty and Saez (2011). During the Great Depression, the highest earners' income share fell to around 10% in the 1950s, 1960s, and 1970s before gradually recovering beginning in the 1980s (Burman, 2012). The highest-

earning 0.1 percent of households exhibit a similar pattern. In 2007, their income share hit an all-time high of 10.5 percent (Burman, 2012).

Increased globalization and trade openness, the creation of a winner-take-all society in which the top earners make significantly more than the bottom earners, and the depreciation of the actual value of the minimum wage have all aided this tendency (Burman, 2012). Furthermore, fiscal consolidations may have an impact on inequality through their general equilibrium consequences (Ciminelli, Ernst, Merola, & Giuliodori, 2019). Fiscal adjustments, according to Ball et al. (2013), diminish output and raise unemployment. This reduces wage share, which tends to increase inequality due to lower-income groups' comparatively bigger proportion of wage income. Furthermore, Bastagli et al. (2012) contend that companies' proclivity to retain high-skilled personnel, who often have higher salary levels, might be another factor contributing to rising inequality during times of budgetary austerity. On the other hand, in nations with tight labor markets, corporations may find it more difficult to lose labor, restricting the extent of these channels. To summarize, a theoretical forecast on the influence of fiscal consolidations on inequality is dependent on both the precise policy measures implemented and the underlying assumptions of the economic structure (Ciminelli et al., 2019).

While removing basic obstacles to success is the most effective technique for reducing excessive inequality, it is clear that the tax system has a significant impact on diminishing or rising income discrepancies, especially in the short to medium term (Pickering & Rajput, 2017). Concerns about equity drove the development of individual and corporate income taxes (Delaney, Brownlee, & Sellick, 2000). The composition of taxes in terms of the relative

dominance of income or consumption tax influences net inequality in two ways. First, taxes vary in their progressiveness, and so the combination of taxes accounts for a portion of the difference between market inequality (prior to governmental intervention) and net inequality. Second, tax composition impacts economic incentives (e.g., labour market incentives), which in turn affects net inequality indirectly (Drucker, Krill, & Geva, 2017). In addition, the tax composition has various channels of impact on economic growth. Tax policy affects economic incentives related both to investment and labour decisions, more specifically, it influences the financial profitability of investments and it changes the amount of effort workers choose to invest, and skills they choose to acquire (Drucker et al., 2017).

During the eighteenth century, many governments relied on regressive tariffs and excise taxes for the majority of their revenue. The individual income tax began as a 1% surtax on high-income individuals, rising to a 6% surtax for the ultra-rich, resulting in a considerable increase in government revenue needs (Burman, 2012). During the first 30 years of its existence, the income tax remained a "class tax," impacting only a tiny part of the population with extraordinarily high salaries. The federal government's revenue demands soared during WWII, and payroll tax withholding turned the income tax into a "mass tax," impacting the great majority of the country's working population (Burman). Despite this, the income tax remains progressive. Indeed, the income tax is currently a significant source of income supplementation for low-income working families (Burman, 2012).

Other tax structures are being implemented in countries where inequality is a major concern. The economic cost of progressive taxation, or the extent to which the income tax can reduce inequality, is a matter of debate. Some argue that there has never been a greater need for a tax system that is highly progressive (Marr & Huang, 2012). A lump-sum tax could be the most equitable option if everyone had the same ability to earn income, but that has never been the case (Pickering & Rockey, 2011). The dilemma for policymakers is determining how much inequality should be reduced by tax systems in light of the costs and social norms regarding fairness. This research looks at income disparity and the impact of taxation in lowering it.

Statement of the Problem

One of the most contentious issues in economics is the function of tax policy, particularly its efficacy in influencing inequality in emerging nations (Bird & Zolt, 2005). Taxation has recently returned to the forefront of policy and research agendas. Most major economists have reintroduced taxes as a significant tool for promoting more equitable income distribution (Duncan & Sabirianova, 2016; Atkinson, 2015; Piketty, & Zucman 2014). The SDG 10, objective 1, aims to reduce economic disparity within and across nations. Income disparity may be lowered within and across nations by implementing fiscal, wage, and social protection policies that gradually produce more equality. Africa is in an especially vulnerable situation since its taxes have always been lower than those in other areas of the world. Over the last decade, inequality has increased, and it is currently higher than in other regions (World Bank, 2016). This raises the question as to whether the tax system and its composition

(income and consumption tax to be specific) play an important role in mitigating or deepening inequalities.

The second question is whether the income tax threshold has an impact on the degree of income disparity when it comes to taxation (both income and consumption tax). This is an important question because, even if any of the tax structures decreases income disparity, when does the policy become unfavorable?

While comprehending this topic is critical, the majority of present research and policy debate focuses on industrialized countries. Less attention is devoted to SSA, which has been hurt the most in terms of inequity and tax revenues. This analysis contributes to the current literature in two ways: firstly, it examines the influence of income taxes and their thresholds on income disparity; and second, it estimates the effect of consumption taxes and their thresholds on inequality.

Purpose of the Study

The goal of this study is to examine the differential effect of income and consumption tax on income inequality as well as the threshold beyond which income and consumption taxation hurts/helps inequality in Sub-Saharan Africa.

Objectives of the Study

Specifically, the study seeks to

1. Examine the effect of income tax on income inequality in SAA.
2. Estimate the effect of consumption tax on income inequality in SSA.
3. Examine the threshold effects of income tax on income inequality in SSA

4. Examine the threshold effect of consumption tax on income inequality in SSA

Hypotheses of the Study

1. H_o: Income tax has no significant effect on income inequality.
2. H_o: Consumption tax has no significant effect on income inequality.
3. Ho: Income tax has no significant threshold effect on income inequality
4. Ho: Consumption tax has no significant threshold effect on income inequality

Significance of the Study

The importance of tax composition in the implementation of policies aimed at decreasing income inequality merits special emphasis, particularly in Sub-Saharan Africa. Indeed, taxes have generated many aggregate gains for this region. However, even if one believes that the distributional consequences of tax system are second-order relative to the first-order issues of inequality reduction in SSA, an understanding of tax composition is still critical to the unequal distribution of income despite its aggregate benefits, tax composition cannot be taken for granted because inadequate analysis can have a major policy repercussion.

Essentially, the study adds to literature by investigation the consequences of tax composition on inequality and its implications for SSA in recent years to provide relevant policy recommendations and measures in guiding policy makers to ameliorate the tax system towards reducing income inequality. For instance, the current Ghana government has declared “Ghana Beyond Aid”. This study will help in introducing appropriate tax policies that will minimise the high levels of income inequality in SSA.

It will also help the authorities to understand the extent to which tax composition and income inequality correlate, so as to adopt more efficient policy instrument geared towards reducing income inequality. The study's findings will help to establish appropriate tax and strategies for all sectors of the SSA in order to eliminate income inequality.

Delimitations of the Study

The study's goal was to examine income and consumption taxes and how they affect income disparities in Sub -Saharan Africa (SSA) from 1990 to 2017. The study includes 26 Sub-Saharan African countries. Due to unavailability of data point on some of the countries in SSA, the study only considered 26 countries for the period 1990 to 2017 for analysis. The Blundell-Bond System GMM estimator is used in this study because it is more consistent and efficient than static panel estimators.

The study was motivated by the scarcity of yearly data for several of the study's important factors. The Gini coefficients for most Sub-Saharan African nations were difficult to collect, and only a handful were available at the Standardize Income Inequality Database and the WDI. This resulted in the study's selection of 26 African nations.

Limitations of the Study

Because there were insufficient data one all SSA countries only 26 nations were used for this study. The reason for this was a lack of observations on a few of the variables. The study ignores the region's different income groups and fails to investigate how the impact of tax composition differs by income group. Regardless of these weaknesses, the study's conclusions are legitimate and valuable for policy analysis.

Organization of the Study

The research is divided into five chapters. The background, problem statement, objectives, significance of the investigation, limitations, and study organization are all included in the first chapter. The second chapter reviews the pertinent literature, including a discussion of the theories and an examination of empirical data. The third chapter goes over the research design, model specification, data type, data processing and analysis, and other topics. Chapter Four summarizes the main findings of the study and discusses them in light of the literature. The study's main findings, as well as recommendations for additional research, are described in the fifth chapter.

CHAPTER TWO

LITERATURE REVIEW

Introduction

The section focuses on the reviewed literature on the influence of income and consumption taxes on income disparity in Sub-Saharan Africa. It is divided into two sections: the first gives a synthesis of the conceptual or theoretical review of tax and income inequality, and the second gives a summary of the study. The second section presents a review of empirical studies already done on the subject. In this sense, the study examined studies and thoughts by other authors and researchers.

Concept of Taxation

A tax is a "compulsory financial charge or some other type of levy imposed upon a taxpayer (an individual or legal entity) by a governmental organization in order to fund various public expenditures" (McCluskey & Franzsen, 2017). Thus, taxation is the process in which governments legally charge and receive levies from individual or organizations. Both nonpayment and tax evasion or opposition, is prohibited and punishable by law. Taxes can be paid in cash or in labor equivalents, and they can be paid directly or indirectly. Taxes include income tax, consumption tax, social security tax, payroll tax, wealth tax, property tax, and tariffs.

The Concept of Inequality

The word "inequality" conjures up a variety of pictures in the mind of a reader or listener, depending on their level of education. Inequality may be viewed as a divergence from a certain concept of "equality" (Cowell & Van Kerm 2015). Inequality "can be defined as different people having varying

degrees of something, which is often expressed in terms of income or consumption but is equally applicable to other aspects of living standards that exhibit a continuous pattern of variation, such as education level or degree of malnutrition". There are three degrees of inequality: global (between all individuals on the earth), international (between states), and national (within countries).

According to Krugman (2014), inequitable remuneration and high wages have concentrated wealth in the hands of a few high net worth individuals, rather than the high capital-to-income ratio predicted by Piketty and Zucman (2014). Wage income at the top is expanding rapidly, resulting in large discrepancies between top executives and ordinary workers, resulting in the accumulation of wealth in a few hands (Krugman, 2014). Technology is mostly responsible for the high pay of the earning elites and CEOs. The significant pay disparity is also influenced by social and political influences (Piketty, 2014). Globalization, technological advancement, lower tax rates for the wealthy, demographic shifts, and differences in pay and salary distribution are viewed as important causes of inequality (Kayizzi-Mugerwa, 2001; Krugman, 2007).

It is also crucial to distinguish between vertical and horizontal disparities. Vertical inequality refers to differences between people, whereas horizontal inequality examines discrepancies between groups based on age, gender, geography, ethnicity, or religious affiliation. A country's instability may be exacerbated by high horizontal inequality. According to Alesina and Perotti (1996), wealth disparity fosters social and political dissatisfaction and, as a result, may lead to socio-political instability. According to their research, socio-political instability reduces investment, which has long-term economic effects.

According to Cornia and Court (2001), it is necessary to differentiate between "traditional" and "modern" causes of inequality. Traditional reasons include variables such as land allocation, urban bias, and educational disparity, while modern causes are thought to be connected to liberal economic regimes and policies introduced in developing nations on a wide scale in the 1980s and 1990s. The conventional explanations are attributed to the beginning level of inequality in various countries, while the current growth in inequality in some countries is attributed to new factors associated with quickly changing liberalizing economic regimes.

Theoretical Reviews

This section covers theoretical framework of the study. Theories related to tax and inequality are discussed, particularly the endogenous growth model, comparative model, ability to pay model, and benefit theory.

Endogenous growth model

Economic growth model (EGM) maintains that the economic growth is primarily the result of internal forces, rather than external forces. It argues that increase in productivity can be linked directly to innovation growth and increase in investment in human capital by the government and the private sector.

Since the earliest work of Barro (1990), King and Rebelo (1990), and Lucas (1990), endogenous growth theory has thoroughly researched the effects of fiscal policy on welfare and development (1990). These studies are extremely clear in terms of their implications, but they have largely focused on the impact of government spending or taxes on growth, ignoring inequality. The policy implications of this study are coherent with the bond between variables stylized facts observed in the majority of OECD countries since 1970, namely the rise

in direct to indirect tax revenue ratios. The government can levy two types of taxes: income taxes and consumption taxes.

The study then defines the ideal direct vs indirect tax-mix and its implications for the composition of income inequality. In the Ramsey solution, both the tax and public expenditure ratios listed above grow over time (Marrero, 2010). As a result, rising government expenditure on public consumption supported by income tax rather than consumption tax may be considered as optimal policy strategy to reduce income disparity.

This result suggests that rising public consumption necessitates more government funding. Consumption taxes or income taxes can be levied to fund government expenditures. Because households do not understand and accept the reality that higher salary generates more general consumption, financing public expenditure via indirect taxation tends to over accumulate capital assets and result in an overcrowding-out of private spending; thus, substituting consumption through income taxes may correct this inefficiency and be optimal. As a result, because private and public capital complement each other in the production function, the shift in tax composition discourages public investment. As a result, a positive relationship between the income versus consumption tax ratio and income inequality may be viewed as an optimal policy move in SSA countries. The study also shows that this finding holds true even when both knowledge spillover effect and the presence of public capital in the production function causes the competitive process to accumulate insufficient physical capital.

Benefit theory of taxation

The benefit principle of taxation states that the state should tax individuals depending on the advantages they obtain from any particular government activity (Lamberton, De Neve & Norton, 2013). The more advantages a person obtains from the state's operations, the more taxes he or she should pay. This would contribute to the reduction of inequality. Taxes, according to the benefit theory, serve a similar function to market pricing in that they help define what projects the authority will pursue and who will contribute for it. If a society's tax burden was tightly regulated by the benefit principle, resource distribution through the public sector would immediately respond to consumer desires (Lamberton, De Neve & Norton, 2013).

A proportional income tax, according to Peters, “is a type of benefit tax because the tax payment is proportional to the revenue enjoyed under the protection of the state" (Peters, 2004). According to this logic, the state's social, legal, and economic structures enable people to earn and keep their money, and the value of those services is proportional to their income. As a result, according to the benefit theory, taxes should address income inequality in society and benefit both the rich and the poor.

Application of benefit theory of taxation

In practice, the benefit principle is most commonly applied to taxes when there is a clear and measurable link between a taxed item and its use by individual taxpayers primarily to address income inequality. The gasoline tax is the most commonly cited example of a benefit tax. Taxes on fuel are used to construct and maintain highways. According to the benefit theory, those who buy more gasoline either drive longer distances or drive heavier, less fuel-

efficient vehicles. In other words, those who benefit the most from the existence of roads, pay the most taxes.

The benefit principle suffers from a number of logistical and philosophical shortcomings. To begin with, there are practically fewer taxes that subject themselves easily to the benefit principle. Secondly, according to one perspective, if the benefit principle was rigorously applied, poor individuals would have to pay the highest proportional taxes because they are often the group that benefits most (proportionally) from social and government services.

Ability-to-pay theory

One of the primary taxes ideas is the ability-to-pay hypothesis. According to the theory, taxes should be levied based on how much money people earn. According to the capacity-to-pay argument, taxes should be related to people's income or ability to pay taxes (Batt, 2012). Taxation based on a person's ability to pay looks rational and acceptable (Batt, 2012). For instance, if individual A has a greater taxable potential than person B, the latter must be required to pay more taxes. The ability-to-pay hypothesis of taxes ignores the quantity of these services that taxpayers actually utilize. For example, even if they do not have children in a school system, all taxpayers contribute to public schools.

Application of ability-to-pay theory

It appears that levying taxes on this basis, as described above, will result in fairness. However, problems are likely to develop. The truth is that when this notion is put into reality, problems arise. The problem stems from the idea of ability to pay. Economists disagree on the precise definition of a person's ability. According to some economists, having a property is a fantastic method to

measure one's ability to pay. This theory is definitely rejected since if a person makes a significant revenue but does not invest it on real estate, he would be tax-free. Some economists also argue that the amount of money spent should be used to assess a person's ability or willingness to pay taxes. The greater the tax, the greater the expenditure, and vice versa. The position is flawed and unjust in every way. A person who has a large family must spend more money than someone who has a small family. The majority of economists feel that an individual's capacity to pay should be judged by their income. If one person earning is greater than that of others, the first should be required to pay more to state assistance than the latter. As a result, in the existing tax systems of the world's countries, earnings have been regarded as the greatest test for establishing a person's capacity to pay. As a result, it may be claimed that the ability to pay hypothesis would ensure that the impoverished are not overwhelmed and are instead provided relief through the free services that are available to them.

Theory of Optimal Taxation

The theory states that, given all limitations, a tax system should improve social welfare. The idea of optimum taxation regards social planners as utilitarian (Mankiw, Weinzierl, & Yagan, 2009). To put it simply, it is usually assumed that everyone in society has the same interests when it comes to, instance, leisure and consumption. The purpose of the government is to select the tax regime that will maximize the welfare of its citizens.

Following the determination of an objective function, the governments must define the restrictions that he or she faces in establishing a tax system. Ramsey (1927) proposed one method: imagine the government generating a

certain amount of tax revenue solely through indirect taxes. Ramsey illustrated that certain taxes must be levied in inversely to the elasticity of end user demand for the product, with commodities with inelastic demand being taxed more severely.

It is preferable not to influence that consumer's choices at all if there are no market imperfections, such as a preexisting externality. A one-time tax accomplishes the government goal. Lump-sum taxes are rarely used in the world for a variety of reasons. Most importantly, this tax is levied equally on affluent and poor people, putting a higher proportional burden on the latter. When governments successfully impose a one-time local tax (a "community charge"), the levy becomes extremely unpopular (Passell, 1990). As a result, it implies that the social planner must deal with variation in taxpayers' capacity to pay. If the social planner detects disparities in intrinsic ability among taxpayers, he or she may be able to reintroduce direct taxes, but these direct taxes would be conditional on ability. Because these taxes will not be based on any specific decision, they would not skew incentives, and the planner would be able to achieve equality while incurring no efficiency costs.

Mirrlees (1971) sparked the development of additional best possible tax models by proposing an establishment of the planner's problem that guide action unexplained variability among taxpayers. Individuals differ in their natural ability to generate revenue in the most basic sense of the term. The planner can see income, which is determined by both capacity and effort, but he or she cannot see either ability or effort directly. Individuals will be deterred from exerting as much effort to earn that profit if the planner those with high ability. By identifying unobserved heterogeneity, declining marginal utility of

consumption, and incentive effects, the Mirrlees approach specifies the formal tradeoff between equity and performance that actual leaders face, and it has become the standard paradigm for tax theorists.

Under the Mirrlees paradigm, the optimum tax problem has become a game of imperfect knowledge between taxpayers and the authorities. The authority wishes to tax people of high capability and transfer funds to those of low capability; however, the government must ensure that the tax regime does not encourage those of high capability to pretend to be of low capability. Indeed, the "disclosure principle" is frequently invoked in current Mirrleesian analysis. Any optimal allocation of resources, according to this famous game theoretic conclusion, may be attained with a strategy in which people willingly divulge their kinds in response to the incentives supplied.

Empirical Reviews

This section discusses the finding of the scholars on the consequence of tax composition on income inequality on single countries, regional blocks, and globally. This section will proceed to find the research gap of the study.

Effects of Taxes (income and consumption tax) on income inequality

Pickering and Rajput (2018) investigated the political economy of tax composition. They looked at income and spending taxes, using the median voter as a key figure in the theoretical framework under consideration. They analyzed WDI data for over 100 nations from 1990 to 2012. Their analysis indicated that income taxes grow with inequality, building on Meltzer and Richard's (1981) findings by adding spending taxes and income taxes. Their research, however, discovered that as inequality rose, spending taxes increased first and

subsequently fell. The amount to which income taxes are imposed compared to spending grows clearly with inequality.

Using data from the US Census Bureau, Bellani and Scervini (2015) assessed the effects of social heterogeneity on in-kind redistribution. Choices are formed in relation to I consumer spending, i.e. net income; (ii) the quantity and (iii) the type of public goods financed by taxes. Income inequality rises as in-kind redistribution falls, according to the study's findings. This demonstrates that the composition of taxes has an effect on income disparities.

Duncan and Peter (2016) investigate the effects of structural progressivity changes in tax systems on income disparities. They discovered that progressiveness decreases inequality in observed income but has a much smaller influence on real inequality, as estimated by consumption-based Gini, using various distinct measures of progressivity for a large panel of nations from 1981 to 2005. According to an empirical comparison study, the gap between observed and actual inequality is significantly greater in states with feebler legal systems. They also discovered that in situations where pro-poor redistribution is preferred, structural progressiveness has a superior levelling effect.

Berman, Ben-Jacob, and Shapira (2016) proposed a hypothetical method grounded on realistic modeling of wealth inequality dynamics for characterizing the impact of private savings and income distribution on inequality. According to the study, personal savings significantly impact wealth disparity, and their corresponding fall over the last 30 years might be linked to the present wealth inequality increase. Again, while raising income taxes naturally reduces income disparities, it may also result in a slight rise in wealth inequality and vice versa. In practice, plausible income tax changes have been shown to have little effect

on wealth disparities. Furthermore, it has been discovered that regulating income disparities, such as through progressive taxation, has a relatively minor impact on wealth inequality in the short run. As a result of the findings, restricting income disparity appears to be an ineffective approach for regulating wealth inequality.

Wang and Caminada (2011) investigated income inequality and the redistributive effect of social payments in 36 countries using the Fiscal Redistribution method developed by Jesuit and Mahler (2004) and Mahler and Jesuit (2006). Their research discovered that fiscal redistribution had varying effects on inequality reduction. European nations, on average, have lower levels of economic inequality than other countries. Belgium has the greatest redistribution, whereas Colombia and Peru have very minor overall redistributive impacts. Transfers lower income inequality by more than 85% on average, whereas taxes contribute for just 15% of overall redistribution. Continental European nations obtain the highest amount of decrease in baseline income inequality among all welfare states. They discovered that in most countries, income taxes account for even more than 50 % of global reduction in income disparity.

Fuest, Niehues, and Peichl (2010) used two methodologies to investigate the redistributive implications of various tax benefit mechanisms in the expanded European Union. According to a study of inequality using the sequential accounting technique, rewards seem to be the most efficient way to reduce inequality around the globe. In contrast, the factor source decomposition technique reveals that benefits have little impact and may even contribute marginally positively to inequality. In contrast, taxation and social contributions

are perhaps the most essential factors in reducing income disparities. The authors justified these somewhat contradicting results by pointing to the two methodologies' differing normative foci, demonstrating that benefits serve purposes other than redistribution.

The type and level of stratification in peasant communities frequently influences peasant-state relations in developing countries. There is little chance of peasant collaboration where there is a fixed class structure, and wealthy landowners frequently join forces with the government to manipulate the rural poor. While the exact nature of rural classification is unknown, "small" and "medium" peasants can band together for mass bargaining and effectively bargain for government assistance in their communities. Using data collected on the nature of peasant participation in the Harambee self-help development movement in rural Kenya, Barkan and Holmquist (1989) validated this prediction. Efficacious peasant-state renegotiation has helped Kenya's democratic structure gain legitimacy. According to the study's findings, participation and labor payments follow an inverse U-shape in relation to landholding, whereas cash payments increase as landholding increases.

Since 1980, Aguiar and Bils (2015) investigated how increase in income inequality has been mirrored by the upsurge in consumption disparity. They accomplished this by developing an alternative measure of consumption spending based on a demand system to account for systematic measurement error in the Consumer Expenditure Survey, which has been performed continuously since 1980. Their estimate was based on the relative spending of high- and low-income households on pleasures vs essentials. This twofold differencing corrects for measurement error, which varies by good and income

over time. They discovered that consumption disparity mirrored income inequality considerably more closely than direct reactions on expenditures.

Obadic, imurina, and Sonora (2014) investigated the effects of labour market establishments and regulations and tax strategies, on income disparities among EU countries. From 2000 to 2011, they examined the effects of labour, capital, and consumption tax, social security contributions, and labour market institutions using static panel models. They demonstrated that total social contributions and labour taxes significantly reduce income disparities between EU member countries. They realized that tax policy, precisely the choice of taxes, and labour market institutions, especially union membership, reduce income disparities in the EU-28 over the course of the research.

Maina (2017) investigates the use of consumption taxes in Kenya to reduce poverty and achieve income equality. Ordinary least squares models were used to demonstrate how consumption taxes affect welfare by affecting GDP per capita. Consumption taxes are regressive, according to the data. The consumption tax was connected to GDP per capita in a positive way. The study suggested that differentiated rates be used only sparingly. Lower rates should be applied to necessities, as the poor employ a greater percentage of their revenue on them than the wealthy. Tax revenue can be used to provide critical services to the poor. It is vital for the government to maintain the tax system's effectiveness while also redistributing wealth.

There are a few studies on the impact of taxes on poverty and income distribution in different countries. Bhasin (2012) looked into the effects of trade tariffs on inequality and poverty in Ghana. The authors used the framework of computable general equilibrium. The study discovered that substituting VAT

for import taxes reduces poverty incidence and improves income distribution, but substituting VAT for export taxes increases poverty and has a negative influence on income distribution. According to Ilaboya and Ohonba (2013), taxation has a substantial adverse influence on income disparities in Nigeria. They claimed that taxes might be utilized to minimize economic disparities. Rather, tax reforms that have reduced progressivity, particularly at the top of the distribution, have been identified as the primary causes of inequality by Atkinson etal. (2011). Similarly, Facundo et al. (2013) contended that the primary source of inequality is lower top marginal tax rates.

Other determinants of Inequality

Wan, Lu, and Chen (2005) investigated regional inequality in China by estimating an income-generating function that integrated trade and FDI variables, and then using the value-decomposition method to quantify the contributions of globalization to regional income inequality. They discovered that FDI and globalization account for a positive and significant portion of regional inequality, and that this proportion is increasing over time, while capital is one of the main and most significant suppliers to regional inequality.

Feenstra and Hanson emphasized the impact of outsourcing intermediate products manufacturing on wage disparity (1997). Indeed, trade liberalization and FDI enable a portion of intermediate products manufacturing to be transferred from developed to developing nations. These commodities are deemed unskilled-labor demanding by Northern technology standards. In contrast, they are seen as skill-intensive items in Southern nations. As a result, outsourcing helps to improve skill levels. This has the unintended consequence of increasing pay disparity. More broadly, Northern enterprises' offshoring of

some stages of the manufacturing process as well as activities associated to the tertiary sector (call centers, hotlines, and back-office services) adds to an increase in the relative need for skilled labor in host countries (Kirkegaard, 2007).

Natural resource rents have a reduction in income inequality, according to Buccellato and Alessandrini (2009); however, Mallaye, Timba, and Yogo (2015) discovered that oil rent has a negative effect but a positive effect when combined with corruption. From 2001 to 2010, Aristizábal-Ramrez, Canavire-Bacarreza, and Jetter (2015) examined the individual-level factors of wage inequality in Bolivia, Colombia, and Ecuador. They examined salaries using both traditional wage regressions and decompositions of standard Gini indices, employing a comprehensive yearly data set from surveys in all three nations. Although public perception and traditional Gini indices claimed that Colombia had the most uneven income distribution among these countries, their findings suggested otherwise. If one considers educational achievement to be part of one's personal responsibility, the Colombian income distribution looks to be more equitable than that of Bolivia or Ecuador. In 2010, educational attainment accounted more than 10.9 percent of the Gini coefficient in Colombia, 6.3 percent in Ecuador, and just 2.4 percent in Bolivia. The study's findings revealed that the origins of income inequality vary significantly between nations.

Checchi and van De Werfhorst (2018) investigated the impact of educational disparities on income inequality using a country-cohort approach. The study was carried out in accordance with neoclassical economic theory, which predicted a positive association between skill inequality and earnings inequality, with educational attainment inequality adding little on top of skill

inequality, and sociological theory of social closure, which argued that educational attainment inequality was more important than skill inequality in predicting earnings inequality. Using educational policy as a tool, they investigated the causal effects of educational attainment and inequality.

Burgess, Dickson, and Macmillan (2020) looked at the effect of selective education on income inequality. Using a large, representative household longitudinal panel survey, they investigated adult wage disparities in England between people who nurtured up in a selective educational structure and those who grew up in a comprehensive education system. Even after accounting for a variety of background factors and current location, those who attended selective school districts had a significantly more unequal pay distribution. According to the study, this was due to disparities in educational systems.

Research Gaps

There has been a lot of research on fiscal policy and income distribution, taxes (including direct and indirect taxes), and distributive efficiency, but there has been very little research on income tax, consumption tax, and income inequality in SSA. There has been a gap in the literature regarding the provision of much-needed information on how progressive changes in SSA tax systems have influenced income distribution in the area. Due to a lack of relevant and up-to-date information and data, policy formulation in this area is difficult, and the indices used to measure inequality may not capture all aspects of inequality. As a result, this study performs an empirical analysis to evaluate how different tax compositions (income and consumption taxes) effect income disparity, with a focus on income taxes and consumption taxes.

Chapter Summary

The study discussed the theoretical and empirical framework of the effects of tax composition on income inequality, as well as the research gap, in this section. This chapter emphasized a number of theories of taxation including the endogenous growth model, comparative model, ability to pay model, and benefit theory. While theories say that tax reduces income inequality, empirical evidence tells quite a different story. Thus, for SSA, the theoretical claim that tax composition tends to reduce income inequality, particularly in poor countries, is either not experimentally supported or the data is inconclusive. Many research on how taxes affect income inequality have failed to achieve a consensus on the nature of the link.

CHAPTER THREE

RESEARCH METHODS

Introduction

This section describes the methodology. Specifically, it provides the research design, data type and source, tools used, empirical definition of the model, description of model variables, and estimation procedure.

Research Design

The study addresses the hypotheses using explanatory research under the quantitative research technique. The quantitative method eliminates qualitative judgment by analyzing data with a quantitative model (panel statistical model).

This research is also grounded in the positivist school of thought. The positivist school of thought holds that the objective knowledge pursued systematically by researchers is based on relational rules (Creswell, 1999). Furthermore, positivist philosophy assumes that knowledge is externally objective and that researchers are rigorously impartial and detached from the subject under study. It ensures that the researcher's personal beliefs and biases do not influence the study and thus jeopardize its validity (Creswell 1999).

The extent to which a study's findings can be reproduced and duplicated in comparable situations is referred to as reliability in positivist philosophy. When positivist research principles are followed, the research has a high possibility of dependability, allowing for confident replication.

Measurement and Definition of Variables

The measurement and definition of the variables used are presented in this section. The following is a brief description of each of the study's 11 variables:

The Gini Index

This variable quantifies the degree to which income or spending distributions among people or households within a country or subpopulation diverge from a completely equal distribution. The Gini coefficient is assumed to have a value between 0% and 100%. A Gini coefficient of 0% represents complete equality (equal share of income or spending), whereas a Gini coefficient of 100% represents perfect inequality (which means only one person or household has all the income). The main issue in cross-country analysis is the presence of missing values in data on income inequality. It is available in Solt's Standardized World Income Inequality Dataset (SWIID) (2009). It has been used as a proxy for income inequality in studies such as Law, Tan, and Saini (2014), Solt (2015), as well as Sturm and De Haan (2016).

Table 1: Summary of Variable Definitions, Data Sources and Expected Signs

Variables	Variable Description	Sources	Expected Signs
Income inequality	This measure of income equality and ranges from 0(perfect income equality) to 100 (perfect income inequality)	Standardized World Income Inequality Database (SWIID)	N/A
Income tax	Tax revenue (% of GDP)	World Bank, WDI	Negative
Consumption Tax	Taxes on goods and services (&) value added of industry and services	World Bank WDI	Positive
GDP Growth Rate	At purchaser's price is the sum of gross value added by all resident producers in the economy	World Bank, WDI	Negative (-)
Inflation	Inflation, GDP deflator (annual %	World bank WDI	Positive (+)
Trade Openness	Sum of exports and imports of goods and services (% of GDP)	World Bank, WDI	Positive
Foreign Direct Investment	Net inflow as percentage of GDP	World Bank, WDI	Positive (+)
Government Expenditure	General government final consumption expenditure (% of GDP)	World Bank, WDI	Negative (-)/Positive (+)
Population density	people per sq. km of land area	World Bank, WDI	positive
Natural Resources	Total natural resources rents (% of GDP	World Bank, WDI	Negative (-)/Positive (+)
Unemployment Rate	% of total labour force unemployed	World Bank, WDI	Positive

Source: Authors' Construct 2020

Data Type and Source

The study employs an unbalanced panel data from 26 countries in Sub Saharan Africa (SSA) consisting of 29 annually observations covering the period 1990-2017. The study's coverage is limited to 2017 due to a lack of data on the Gini coefficient as a measure of income inequality. The data set contains 11 variables. These are: Gini coefficient as the dependent variable, income tax, consumption tax as the main independent variables, while foreign direct investment, population density, inflation rate, natural resources, GDP growth rate, government expenditure and employment rate as the control variables.

Variables Justification and Expected Signs

Table 2 presents the apriori expectation signs of the study as well as the sources of the various variables. The expected signs for the tax compositions are negative with the exception of consumption tax which is thought to increase inequality, detailed in Table 2.

Table 2: Summary of Variables, Expected Signs and Data Source

Variables	Expected Sign	Data Source
Income tax	Negative (-)	WDI
Consumption tax	Positive (+)	WDI
Government expenditure	Negative (-)/Positive (+)	WDI
Foreign Direct Investment	Negative (-)	WDI
Population density	Positive (+)	WDI
GDP growth rate	Negative (-)	WDI
Trade Openness	Positive (+)	WDI
Inflation	Positive (+)	WDI
Natural resources	Negative (-)/Positive (+)	WDI
Unemployment Rate	Negative (-)	WDI

Source: Author's Construct.

Estimation Techniques

There are a number of techniques that could be used. Due to the nature if the data involved, the study employed panel estimating approaches such as static panel of fixed and random effects could be used. However, due to the endogeneity issues that is likely to be encountered in the estimation, a dynamic panel approach of Generalized Method of Moment (GMM) is also used. The approach is explained in detail.

The System-GMM Technique

Arellano and Bond's (1991) GMM technique provides efficient estimates and the benefit of consistency in the presence of arbitrary heteroscedasticity, but at the expense of potentially poor finite sample performance (Baum, Schaffer, & Stillman, 2012). The dynamic panel model has been shown to be best estimated using the GMM estimation technique to solve the issue of endogeneity under the Fixed Effect (FE) because it demonstrates that the dependent variable's lag influences its current value. Furthermore, the GMM outperforms alternative estimators for simple cross-section regressions and other dynamic panel data models. The results are more accurate because the technique avoids biases caused by missing elements, endogenous right-hand-side variables, omission of beginning efficiency, and measurement error.

Model Diagnostic Test

To examine the validity and consistency of the system GMM estimator, two conditions must be met: The error term cannot be serially correlated, and the instruments must function properly. The tests listed below are used to carry out these verifications.

Hansen test for over-identifying restrictions

According to Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998), if the instruments used in the study are valid, the GMM estimator's findings must be consistent. The instrumented variables are exogenous and unrelated to the error term, according to the null hypothesis. If the null hypothesis is not rejected, the instruments are validated.

Arellano-Bond test for serial correlation

This test allows us to test the hypothesis that first difference regression errors are not serially connected. The AR (2) test for serial correlation employs the standard coefficient covariance matrix and is based on the estimate residual. The absence of a null value shows that there is no second order serial correlation between the faults in the first difference.

Empirical Model Specification

The empirical model followed the works of Wan, Lu and Chen (2006), Fuest, Niehues, and Peichl (2010) and Maina (2017). To estimate the first objective of the study, thus, the effect of income taxes and its thresholds on income inequality, the empirical model based on the system GMM is stated as follows;

$$G_{it}=\alpha_0 + \gamma_0 \boldsymbol{G_{it-1}} + \gamma_1 TI_{it} + \gamma_2 (TI_{it})^2 + \gamma_3 UNEMP_{it} + \gamma_4 POPD_{it} + \gamma_5 GOVEXP_{it} + \gamma_6 NR_{it} + \gamma_7 INF_{it} + \gamma_8 GDPGR_{it} + \gamma_9 TO_{it} + \gamma_{10} FDI_{it} + \mu_{it} + v_{it} \ldots\ldots\ldots\ldots (1.1)$$

To achieve the second objective thus estimate the effect of consumption taxes and its thresholds on income inequality, the empirical model is stated as follows;

G_{it}=$\alpha_0 + \gamma_0 \boldsymbol{G_{it-1}} + \gamma_1 TC_{it} + \gamma_2 (TC_{it})^2 + \gamma_3 EMP_{it} + \gamma_4 POPD_{it} +$

$\gamma_5 GOVEXP_{it} + \gamma_6 NR_{it} + \gamma_7 INF_{it} + \gamma_8 GDPGR_{it} + \gamma_9 TO_{it} + \gamma_{10} FDI_{it} +$

$\mu_{it} + v_{it}$ … . . …(1.2)

Where,

$\boldsymbol{G_{it}}$ is Income Inequality, $\boldsymbol{G_{it-1}}$isLag of Income inequality, $\boldsymbol{TI_{it}}$is Income tax $\boldsymbol{TC_{it}}$isConsumption tax , $\boldsymbol{UNEMP_{it}}$is Unemployment rate, $\boldsymbol{POPD_{it}}$ is Population Density $\boldsymbol{INF_{it}}$is Inflation, $\boldsymbol{FDI_{it}}$is Foreign Direct Investment, **TO**$_{it}$ is Trade Openness $\boldsymbol{NR_{it}}$is Natural resources $\boldsymbol{GOVEXP_{it}}$= Government final Consumption Expenditure $\boldsymbol{GDPGR_{it}}$= Growth of rate of gross domestic product**,**

$(TI_{it})^2 is\ the\ square\ term\ of\ Income\ tax, (TC_{it})^2\ is\ the\ square\ term\ of\ Consumption\ t$

= represent fixed effect by country $\boldsymbol{v_{it}}$ = the error term

$\boldsymbol{i}$ = countries

$\boldsymbol{t}$ = time in year

Threshold effect

In equations 1.1 and 1.2, the study adopted the quadratic approach to carrying out the threshold effect. The square terms in the two equations represent the turning points at which income and consumption taxes have effect on income inequality. Thus, from equation 1.1, the calculation of the threshold effect was

G_{it}=$\gamma_1 TI_{it} + \gamma_2 (TI_{it})^2$……………………………………..…………….1.3

The first derivative of equation 1.3 was

d(G_{it})/d(TI)= $\gamma_1 + 2\gamma_2$(TI)

At the turning point of Income tax, the first derivative will be set to zero

0=$\gamma_1 + 2\gamma_2$(TI)

$-\gamma_1 = 2\gamma_2$(TI)

$\gamma_2 = -\gamma_1/2TI$……..……1.4

Therefore, at the turning point of income tax, we estimate equation 1.4 at the mean of income tax, given the value of γ_1

Again, from equation 1.2, the square term represented the threshold effect. Thus

$G_{it}=\gamma_1 TI_{it} + \gamma_2(TC_{it})^2$……..….1.5

The first derivative of equation 1.5 was

d(G_{it})/d(TI)= $\gamma_1 + 2\gamma_2$(TC)

At the turning point of Income tax, the first derivative will be set to zero

0=$\gamma_1 + 2\gamma_2$(TC)

$-\gamma_1 = 2\gamma_2$(TC)

$\gamma_2 = -\gamma_1/2TC$……1.4

Therefore, at the turning point of income tax, we estimate equation 1.5 at the mean of consumption tax, given the value of γ_1

Chapter Summary

The purpose of this chapter was to go over in detail the approach that was used to evaluate the data for this study. The first to explain the positivist approach to research was the study design. The empirical model also included variables' measures and sources. Based on data availability, the study used a sample of 26 Sub-Saharan African countries. All variables (dependent, independent, and control) were specified in empirical models. The estimation technique was also discussed.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

Introduction

The findings of the study are analyzed and presented in this section. It begins with the descriptive statistics of this study, then moves on to a correlation analysis, and finally to the results of the study's objectives, which are presented in the form of regression tables.

Descriptive Statistics

From 1990 to 2017, Table 3presents summary descriptive statistics for twenty-six (26) SSA countries. The mean values represent the overall model's average of the variables. The standard deviation also indicates the dispersion of data around the mean value. It also indicates how close the data is to the mean value throughout the given time period. Furthermore, the range indicates the dispersion of data in each model as measured by the highest and lowest values. The range denotes the extent of variation in the variables. The greater a variable's range of values, the greater its level of variation, and vice versa.

Table 3: Summary Statistics

Variable	Obs	Mean	Standard Deviation	Min	Max
Gini Index	754	46.758	6.425	37.5	66.5
Real GDP growth	754	4.004	4.802	-50.248	35.224
Income Tax	754	34.649	11.125	10.815	89.399
Consumption Tax	754	9.286	3.42	1.12	24.338
Inflation	754	9.648	14.194	-60.496	183.312
Trade openness	754	62.261	24.416	19.684	161.894
Unemployment Rate	754	11.546	6.378	1.773	32.631
Foreign Direct Investment	754	3.067	4.567	-6.057	42.093
Government expenditure	754	15.481	5.326	2.047	41.888
Population Density	754	115.93	161.832	1.74	623.302
Natural Resource Rent	754	9.948	9.254	.001	56.61

Source: Author's Computation (2020).

The mean value of income inequality (Gini Index) is approximately 47 percent, with a standard deviation of 6.42 percent, according to Table 3. The maximum and minimum values are roughly 67 and 38%, respectively. This demonstrates that there is little variation in the values of income inequality across SSA. SSA accounts for 47 percent of all income inequality based on the mean value.

According to the table, SSA has an average GDP growth rate of 4%, with a deviation of 4.8 percent, and the minimum and maximum growth rates are approximately -50 and 35%, respectively. The GDP growth rates of the countries under consideration differ greatly from their mean values because the standard deviation is greater than the mean.

Income tax has an average value of 34.649% of GDP and a deviation of 11.125%. The lowest and extreme values are 10.815 and 89.399% respectively. Consumption tax has an average value of 9.286% and a deviation of 3.42 percent. The maximum and minimum percentages are 1.12% and 24.338%, respectively.

According to the table, the average value of Foreign Direct Investment (FDI) is 3.067% of GDP, with a deviation of 4.567% of GDP. Foreign direct investment can range from -6.057% to 42.093% of GDP. Because the deviation is slightly higher than the mean, this demonstrates that there is variability in foreign direct investment. Government spending accounts for approximately 15.5 percent of GDP on average, with a deviation of 5.3%. Government spending at the minimum and maximum levels is approximately 2.05% and 41.9 percent of GDP, respectively. This implies that variation in government spending is minimal.

The inflation rate has a score of around 9.6 percent on average and deviates from the mean by 14.2 percent. This implies that the mean values of inflation vary greatly, with the minimum and maximum values of inflation being approximately -60.5 percent and 183.3 percent, respectively.

With a deviation of 6.38 percent, the mean employment rate is 11.55 percent. 1.77 and 32.63 percent are the minimum and maximum percentages, respectively. The result shows that deviation is less than the average value of the employment rate, implying that the mean values of the countries under consideration in terms of employment rate vary little.

The average value of trade openness is 62.26 percent of GDP, with a deviation of 24.416%. This means that trade openness within the countries under consideration accounts for approximately 62 percent of GDP. The corresponding minimum and maximum trade openness values are 20 percent and 162 percent, respectively.

According to the study, the average population density in SSA is 115.933 people per square kilometer of land area, with a standard deviation of 161.832. The population density per land area in the selected SSA countries ranges from 1.74 to 623.302 square kilometers. Finally, the average value of natural resource rent (NRR) is shown to be 9.948 percent of GDP. Natural resource rent deviates 9.254 percent from its mean, with the lowest and highest values being 0.001% of GDP and 56.61% of GDP, respectively.

Multicollinearity Test

Before running the panel regression analysis, it was necessary to ensure that there was no perfect or near collinearity among the explanatory variables. The first step in the multicollinearity test is to create a pairwise correlation matrix. The pairwise correlation matrix displays the correlation coefficients as well as the corresponding direction. The multicollinearity problem, according to Gujarati and Porter (2009), does not exist when correlations between variables are less than 0.80. In this study, and in accordance with Gujarati and

Porter (2009), a correlation coefficient greater than 0.8 indicated the presence of high collinearity among the variables. Based on Table 4, there is no indication of multicollinearity among the variables used in the analysis. This is due to the fact that the lowest and highest correlations observed in Table 4 are 0.002 and 0.428, respectively. The lowest correlations exist between the GDP growth rate and the employment rate, while the highest correlation exists between government spending and the Gini Index. Income tax positively relate with Gini Index. All else being equal, this means that as income taxes rise, income inequality rises as well. The consumption tax has a weak and negative relationship with Gini index. As a result, as consumption taxes rise, income inequality falls, and vice versa. The study found a weak negative correlation (-0.304) between income tax and consumption tax.

Table 4: Matrix of correlations

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Gini Index	1										
2. Real GDP Growth	0.016	1									
3. Income tax	0.406	0.044	1								
4. Consumption Tax	-0.141	0.013	-0.304	1							
5. Inflation	0.096	-0.046	0.061	-0.090	1						
6. Trade openness	0.418	0.044	0.130	0.014	0.015	1					
7. Unemployment rate	0.355	0.002	0.180	0.062	-0.136	0.263	1				
8. Foreign Direct Investment	-0.016	0.012	0.061	0.103	0.010	0.102	-0.003	1			
9. Government expenditure	0.428	-0.027	0.168	0.249	-0.035	0.369	0.169	-0.003	1		
10. Population Density	-0.385	0.065	-0.223	0.336	-0.124	-0.264	-0.075	0.159	-0.014	1	
NRR	-0.198	0.015	0.311	-0.179	0.125	-0.026	-0.259	0.060	-0.118	-0.25	1

Source: Author's computation (2020)

Trends of income inequalities in SSA

Figure 2 (as seen in appendix) shows the trend analysis of income inequality in SSA from 1990 to 2018. From the figure the study indicates that while some of the countries depict an increasing trend in income inequality, others also show deceasing trends. For instance, countries like Angola, Burundi, Cameroon, Cape verde, Egypt, Ghana, Madagascar, Kenya Morocco, Tanzania, Togo and Zambia show that from 1990 to 2018, income inequality has been increasing in these countries. Other countries such as Botswana, Burkina Faso, Malawi, Guinea, Cote D'ivoire, Lesotho, Mali, Namibia, South Africa and Zimbabwe show decreasing trends in income inequality.

Results and Discussion of the GMM Results

The objectives were initially analyzed using static panel, specifically fixed and random models and the results are presented in Table 6, but due to endogeneity problem suggested by the GMM result as suggested by the significance of the lagged value of Gini index, the result discussion will be based on the GMM estimation or the dynamic panel estimation. Given that income inequality or Gini index (dependent variable) may exhibit some level of persistence, such that the previous value of income inequality influences its current and future values, the study adopts the dynamic panel model specifically GMM to deal with this problem of persistence which the static panel models (fixed and random effect) do not have control over. In lieu of this, the study incorporated into our analysis the lagged value of Gini index so as to determine its effect on the dependent variable.

The GMM results as indicated in Table 4 and 5. Table 4 looked at income tax and its threshold estimations while controlling for the other variables. Table 5 examines the consumption tax and its estimated thresholds while controlling for other variables. Tables 4 and 5 show that the lagged value of income inequality has a substantial effect on Gini index. According to the study's findings, the lag of income inequality effects present and future income inequality levels.

The coefficients of the lagged value of income inequality are indicated as 1.0725 percent and 1.0453 percent respectively at 1% significance level. As a result, the lag of income inequality significantly and positively increases income inequality in SSA. This confirms the issues of persistence where previous years values of income inequality having a significant impact on its current values.

Effect of income tax on income inequality in Sub Saharan Africa

Table 5 shows the result of income tax and its threshold effect on income inequality in SSA.

Table 5: Effect of income tax and its threshold effect on income inequality in Sub Saharan Africa

Variables	Coefficient	Robust Standard Error
Lagged Gini Index	1.0725***	0.0141
Real GDP Growth	0.0068	0.0046
Income Tax	-0.0557***	0.0124
Income Tax squared	0.0030**	0.0001
Inflation	0.0029	0.0021
Trade Openness	-0.0078***	0.0018
Employment Rate	0.0098	0.0079

Table 5: Cont.

Foreign Direct Investment	0.0128**	0.0059
Government Expenditure	0.0033	0.0076
Population Density	0.0022***	0.0008
Natural Resource Rent	0.0353***	0.0058
Constant	-2.3007	0.7007
Observations	728	
Number of Countries	26	
Prob > F	0.000	
AR (1)	0.324	
AR (2)	0.535	
Hansen test for overid.	0.959	

Note: Robust standard error option was used. *p< 0.1, **p< 0.05, ***p< 0.01 indicates significance at 10%, 5% and 1% respectively.

Source: Author's computation, 2020.

Table 4 shows that the income tax coefficient is -0.0557 and significant at 1% level significance. It implies that 1% increase in income tax results in a 0.056% reduction in income inequality. It implies that as government collect more income tax, these taxes are then being used to undertake programmes and projects to boost economic activities. As this happens, people get actively involved in economic activities which eventually improves their standard of living and hence bridging the inequality gap. This study's findings was confirmed by Piketty (2014), who discovered that income and property taxes, in particular, reduce inequalities. It also backs up the findings of Alvs and Afonso (2019), who state that taxes, as the government's primary source of revenue, are used to meet the government's financial needs in order to carry out its policies and correct any inequalities. The findings of this study, on the other hand, contradict Meltzer and Richard's (1981) finding that income taxes rise with income inequality.

While assessing the threshold effect of income tax on income disparity, the square term coefficient of income tax is revealed. The coefficient of the square term of income tax is positive and significant at the 5% level of significance. This indicates that income tax variable becomes positive at a certain point. From the calculation of the threshold effect (as shown in the Appendix B), the study reveals that the threshold effect is 9.2 percent. This implies that as income tax increases, income inequality decreases until an optimal level of 9.2 percent of income tax. After this a further increment in income tax induces income inequality to increase. This indicates that income tax has a curve-linear relationship on inequality in sub-Sahara Africa.

According to the study, the employment rate coefficient is -0.085 and statistically significant at 1%, implying that a 1% increase in employment results in a 0.085% decrease in inequality. This outcome is expected because, all else being equal, an employed individual will be able to afford the basic necessities of life and thus improve his or her welfare, resulting in a reduction in inequality.

With a coefficient of -0.0078, trade openness is statistically significant at the 1% alpha level. A percentage increase in trade openness reduces income inequality by 0.0078 percent. This finding confirms the findings of Sarah Polpibulaya (2016), who discovered that decreases in trade openness led to decreases in income inequality. This study, however, contradicts the findings of Feenstra, Lipsey, and Bowen (1997), who discovered that increased trade openness leads to an increase in income inequality.

Again, with a coefficient of 0.0128, FDI positively affect income inequality. The result implies that a 1% increase in foreign direct investment causes a 0.0128 percent increase in income inequality, all else being equal. It could be explained that an increasing influx of foreign firms into a domestic economy makes it very difficult for the domestic firms to compete and stay in operations. As this happens many of these multinational repatriates their earning to their own countries which would otherwise have been spent in the economy in the form of government intervention program to help bridge the inequality gaps.

Population density positively affect income inequality and the coefficient of population density is 0.0022. As a result, for every unit upsurge in population density, income inequality rises by 0.0022 units. Also, for natural resource rent, the result indicates positive and significant relationship with income inequality in both models. Thus, a one percent increase in natural resource rent induces income inequality by 0.0353%. This gained support from Borzadaran, Behname, and Mostafayi (2013), who discovered that natural resource rent positively affect inequality.

Effect of consumption tax and its threshold on income inequality in Sub Saharan Africa

Table 6 shows the results for consumption tax and its threshold on income inequality in SSA.

Table 6: Effect of consumption tax and its threshold on income inequality in Sub Saharan Africa

Variables	Coefficient	Robust Standard Error
Lagged Gini Index	1.0453***	0.0133
Consumption Tax	-0.0409	0.0299
Consumption Tax Square	0.0015	0.0014
Real GDP growth R	0.0073	0.0045
Inflation	0.0055***	0.0020
Trade Openness	-0.0083***	0.0018
Employment Rate	0.0170**	0.0077
Foreign Direct Investment	0.0095*	0.0057
Government Expenditure	0.0006	0.0074
Population Density	0.0008	0.0008
Natural Resource Rent	0.0263***	0.0054
Constant	-2.0767	0.6641
Observations	728	
Number of Countries	26	
Prob > F	0.000	
AR (1)	0.420	
AR (2)	0.770	
Hansen test for overid.	0.980	

Note: Robust standard error option was used. *p< 0.1, **p< 0.05, ***p< 0.01 indicates significance at 10%, 5% and 1% respectively.

Source: Author's computation, 2020.

According to Table 6, the coefficient of consumption tax is -0.0409. This coefficient is a negative number that is statistically insignificant. It implies that, all else being equal, an increase in the consumption tax has no effect on income inequality. This could plausibly imply that SSA consumption taxes take into account customers' individual circumstances when making purchases. This explains why its impact on income inequality in SSA is minimal. The outcome of this study challenges the common belief that consumption taxes do not take into account the individual circumstances of taxpayers.

The findings of this study contradict those of Kato (2003), who revealed a negative relationship. The threshold effect of consumption tax reveals no statistically significant relationship between consumption tax and income inequality. The coefficient of the square term of consumption tax in Table 6 is 0.0015, which is statistically insignificant.

Both inflation and the unemployment rate positively affect income inequality. As a result, 1% increase in inflation causes a 0.0055% increase in income inequality, whereas a one-point increase in employment causes a 0.0170-point increase in income inequality.

The trade openness coefficient is -0.0083 and significant at the 1%. This means that increasing trade openness by one percentage point reduces income inequality by 0.008 percent. Sarah Polpibulaya (2016) backed up this finding by discovering that increased trade openness increases income inequality in overall countries. Anderson (2005) also demonstrated that increased trade openness has an impact on income inequalities within developing countries by influencing asset, spatial, and gender inequalities, as well as income distribution. This finding runs counter to Feenstra, Lipsey, and Bowen's (1997)

theory, which predicted that increased trade openness leads to increased income inequality across countries.

According to the study, the unemployment rate coefficient is 0.0170 and significant at 5%. This means that a 1% rise in unemployment results in a 0.017% rise in income inequality. This result is expected since an unemployed individual will not be able at least afford the basic necessities of life and hence this will add to worsen his or her welfare leading to increase income inequality.

Once again, FDI is significant and positively related to income inequality. With 0.0095 coefficients. A percentage increase in FDI causes income inequality to rise by 0.0095 percent. It implies that an increasing influx of foreign firms into a domestic economy makes it very difficult for the domestic firms to compete and stay in operations. As this happens many of these multinational repatriates their earning to their own countries which would otherwise have been spent in the economy in the form of government intervention program to help bridge the inequality gaps.

The natural resource rent (NRR) coefficient is 0.0263 at 1% significance level. As a result, 1% increase in natural resource rent leads to a 0.0263% increase in income inequality. This finding backs up the findings of Buccellato and Alessandrini (2009) and Borzadaran, Behname, and Mostafayi (2013), who discovered that NRR positively affect inequality. The findings contradict those of Mallaye, Timba, and Yogo (2014), who discovered a negative relationship.

From the results, the study reveals that real GDP growth, government expenditure and population density have positive but insignificant relationship with income inequality.

Post Estimation Results for GMM

The test for autocorrelation (AR) and the Hansen test of over identifying restrictions are the two main post estimation tests in GMM. Tables 5 and 6 contain the results of the autocorrelation (AR) test. The study tests for first and second order autocorrelation, and the Hansen test of over identifying restrictions. Table 5 clearly shows that the study failed to reject the null hypothesis of no first and second order autocorrelation, with P-values of 0.324 and 0.535, respectively. Similarly, the results in Table 6 failed to reject the null hypothesis of no serial correlation for AR (1) and AR (2), leading us to conclude that the moment conditions are valid because there is no serial correlation.

The Hansen over-identification test values in Tables 4 and 5 are 0.959 and 0.980, respectively, indicating that the study failed to reject the null hypothesis of no over-identification restriction. The researcher can conclude that the results are consistent and valid based on the post estimations.

Chapter Summary

The descriptive statistics, correlation analysis, and trend analysis of income inequality were followed by an empirical examination of the effect income and consumption tax on income inequality in the SSA region. Also discussed are the findings for the threshold effect of tax composition on income inequality. The GMM results were discussed, and finally, post-estimation tests were performed.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This final chapter summarized the major findings of the study based on a brief overview of the problem statement, objectives, research questions, methodology, and hypotheses tested. The chapter also provided conclusions based on the major findings of the study. Finally, policy recommendations to relevant authorities and stakeholders were made.

Summary

The goal of this research was to look into the effects of income and consumption taxes, as well as the thresholds for these taxes, on income inequality in SSA. A dynamic panel estimation method of Generalised Method of Moment (GMM) on twenty-six (26) SSA countries from 1990 to 2018 was used to achieve the research objectives.

Based on the first objective, which sought to examine the effects of income tax and its threshold effect on income inequality in SSA, the study discovered that income tax has a negative and statistically significant effect on income inequality in SSA Africa. According to the study's findings, increasing income taxes by one percentage point reduces income inequality by 0.056 percent. All else being equal, the threshold effect of income taxation on income inequality is estimated to be around 9.2 percent. The implication is that governments generate enough revenue from revenue collection. This could be channeled into projects and programmers meant to improve living standard of the poor to help bridge the inequality gap between the poor and rich.

Concerning the second objective of the study, which investigated the effect of consumption taxes and its threshold effects on income inequality in SSA, there is a negative but insignificant relationship between consumption tax and income inequality. For the threshold effect of consumption tax is statistically insignificant though the quadratic term shows positive relationship between consumption tax and income inequality.

Conclusions

This study's findings show that income tax significantly reduces income inequality in SSA and that a threshold effect exists. This was explained by the fact that an increase in income tax composition leads to more revenue mobilization by the revenue generating authorities in SSA. With higher income, government will be able to channel these revenues into creating jobs and providing social security programs in the form of intervention policies aimed at bridging the inequality gaps within the society but there is a threshold beyond which it turns to be negative. This result even though deviates from the proposition that taxes tend to widen inequality gaps, the findings of study align itself with the school of thought that believe that with taxes, inequality gap could be bridged, ceteris paribus.

Finally, the study also revealed that consumption tax has no effect nor threshold effect on income inequality in SSA. This could plausibly mean that consumption taxes in SSA consider the personal situation of consumers as they purchase. This is accounting for why its effect on income inequality is insignificant in SSA. Unlike most consumption taxes that do not take into consideration the personal situations of taxpayers, the result of this study contradicts that position.

Recommendations

Based on the study's findings, the following recommendations are made: Firstly, it is recommended that governments of sub-Saharan Africa in conjunction with fiscal authorities like Ministry of finance of these Sub-Saharan Africa countries should focus on income tax if they wish to reduce income inequality. This will aid in reducing income inequality and promote an equitable and sustainable growth through appropriate income and consumption tax policies. Strategies meant for inequality reduction should be prioritized by the fiscal authorities of SSA so as to provide a much more redistributive income in the form of transfer payments to the less privileged in the society.

Secondly, the study recommended that tax authorities such as Ministry of finance of the SSA countries should try as much as possible to ensure that the optimal tax or threshold does not exceed 9.2 percent which is necessary to boost economic activities so as to help induce a further reduction in income inequalities observed in the region.

Areas for Future Research

While it is necessary to determine the effect of tax composition and thresholds on income inequality in SSA as a whole, more in-depth research on the topic at the country level. Future research could consider categorizing countries based on their income status for comparative analysis, as this will inform a specific policy direction intended for each income category.

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APPENDICES

Appendix A

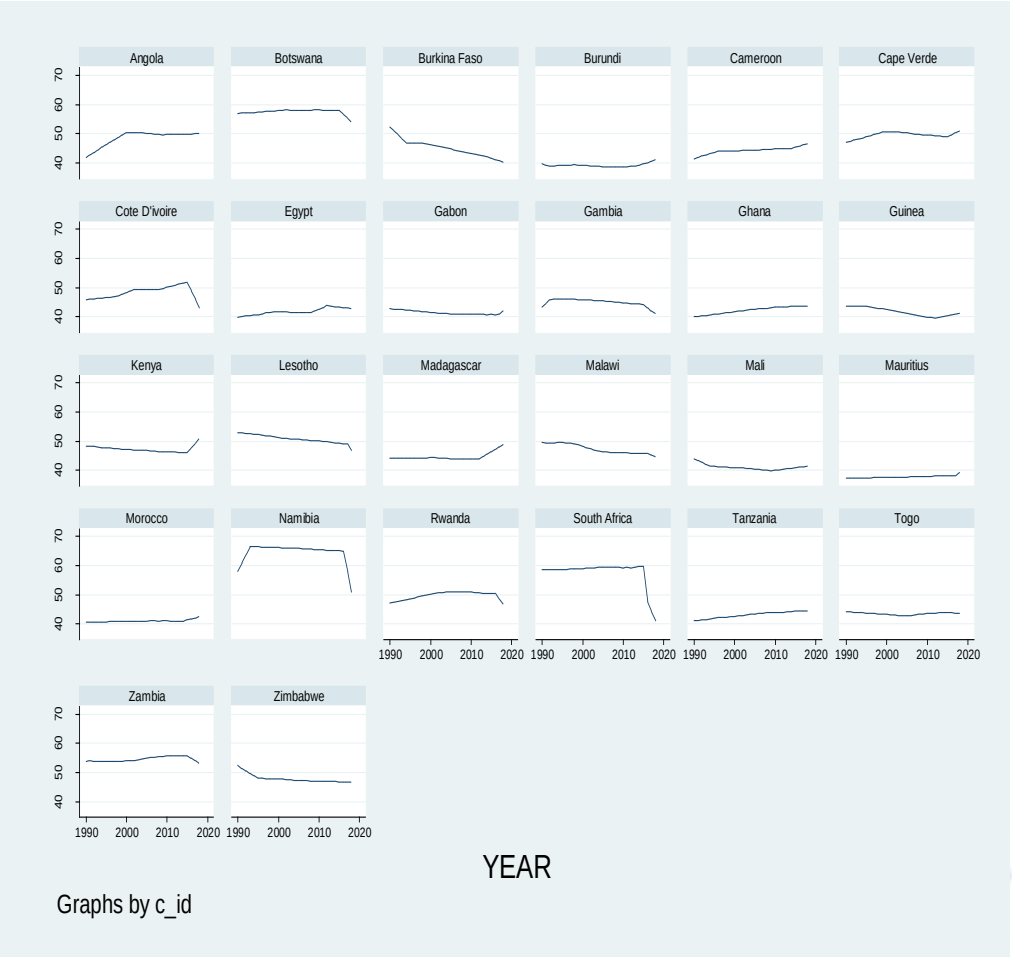

Figure 2: Trends of Income inequality Across Selected Countries in SSA

Source: World Development Indicators (2020)

Note: GINI_DISP represents Gini Index

Appendix B

$$Income\ Inequality_{it} = -2.3007 + -0.0557\text{Inc\_Tax}_{it} + 0.003\text{inc\_taxSq}_{it}$$

$$0 = -0.0557 + 2 * 0.0030\ \text{Inc\_Tax}$$

$$0.006\ \text{Inc\_Tax} = 0.0557$$

$$\text{Inc}_{\text{Tax}} = \frac{0.0557}{0.0060} = 9.2\%.$$