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Tax Structure and Inclusive Growth in Selected Sub-saharan Africa Countries

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Abstract

Sub-Saharan Africa has shown a disappointing record of accomplishment in the transition from economic growth to inclusive growth. The role of taxation in this regard has equally thrown up mixed reactions in both theoretical and empirical literature. Therefore, this study examines how tax structure can make regional economies more or less inclusive. It uses data spanning 1991 to 2020 for 12 selected sub-Saharan African countries. Both linear and Non-linear panel autoregressive distribution lag models were employed to analyse the relationship. The result established a long-run asymmetric relationship between tax structure and inclusive growth. It demonstrated clearly that progressive tax structure, public expenditure on education, and trade openness have long-run positive impacts on inclusive growth. However, regressive tax structure has a negative but significant impact on inclusive growth. The study concluded that the relationship between tax structure and inclusive growth is asymmetric. It points out that, in sub-Saharan Africa, increasing progressive taxes promotes inclusive growth in the long run. However, the economic growth of the region becomes inclusive when people with broader financial shoulders carry the heaviest tax burden. The study, therefore, recommends implementing a progressive tax policy design, as this would foster inclusive growth in sub-Saharan Africa. It is equally recommended that revenue, particularly tax revenue, should be an infrastructure target.

Key Words: Tax structure, Inclusive gowth, SSA
JEL Classification: H23, O23, O47

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1 Introduction

Transformational growth can occur uniformly across a country or in a manner that creates inequalities across regions. Unemployment, inequality, and poverty are the main issues that the top growth of the 2000s and 1990s did nothing to address, according to a report by the Organisation for Economic Co-operation and Development (OECD, 2012). A similar finding was made by Arendar (2014), which estimated that the wealthiest 85 people in the globe own as much as the poorest 3.5 billion people combined,therefore, underlining the importance of equitable growth (African Development Bank, 2014).

Despite the solid growth performance in Africa, poverty reduction and inequality have been much slower (World Bank, 2020). For example, the current high growth in a few sub-Saharan African (SSA) countries left many people behind. The region is experiencing rising rates of both extreme poverty and unemployment. In 2018, the rate of poverty in sub-Saharan Africa was 40 percent, while it was less than 15 percent worldwide (World Bank, 2020). Economic progress has failed to translate into long-term human development or prosperity. As a result, it cannot be denied that many nations, particularly in Africa, are pushing for growth inclusiveness to improve their citizens' standard of living. This agitation has resulted in political unrest within the regions (such as Arab Spring in North Africa, ENDSARS in Nigeria, Fees Must Fall in South Africa and other African countries like Sudan).

The increase in the inequality gap has also raised concern among international organisations, regional organisations, and individual countries (Rafael & Raquel, 2013). Given the level of inequality, having growth is not enough. It is also vital that the growth is genuinely inclusive and enjoyed by everyone. Therefore, the government is recognized as an important player who can employ fiscal instruments, especially tax structure, to ensure that economic progress reaches all citizens and strengthens social harmony. The importance of tax structure for an inclusive and sustainable society has resuscitated in-depth debate in economic development. Nonetheless, much of the literature surrounding tax plans for inclusive growth is examined in developed and developing Asian economies (Atif & Mohazzam, 2012; Khan, Khan, Safdar, Munir, & Andleeb, 2016; Brys, Perret, Thomas, & O'Reilly, 2016). Thus, drawing influence for sub-Sahara Africa may lead to wrong judgment. Most studies on inclusive growth in SSA had little or no emphasis on the tax structure and inclusive growth in SSA. Consequently, this research is crucial at this stage of economic development when attempts

are being made to restructure the fiscal policy of individual countries, particularly their tax system, for its crucial role in the economic equation.

After the introduction, covered in section one, the rest of the paper is organized as follows: section two covers the theoretical and empirical literature, section three explains the methodology used in this paper, section four focuses on empirical results, while section five gives the conclusion and policy recommendations.

2 Literature Review

2.1 Conceptual Review

This section discusses inclusive growth and the tax structure.

2.1.1 Inclusive Growth

Broad-based growth, "pro-poor growth", and inclusive growth are frequently employed interchangeably. The notion of "pro-poor growth" was propounded by Kakwani, Pernia, et al. (2000). It focuses on the reduction of inequality or the increase in income share that accrues to the poor. Later, efforts are redirected toward ending poverty in and of itself, which call for an improved quality of life for the poor. However, growth is viewed as being in the poor's favour if it reduces inequality and poverty while also raising their portion of the national income (de Arjan & Sukhadeo, 2013).

Developing countries have prioritized inclusive growth recently, ensuring that neither the underprivileged nor the middle class are left out. The goal is to remove obstacles to growth and establish an equal opportunity for investors. Thus, a welfarist approach or one that emphasizes (re)distribution opposes a growth-inclusive one. For the majority or, especially, the most marginalized, inclusive growth occurs when opportunities are expanded and access to them is improved (Adedeji, Du, & Opoku-Afari, 2013). Economic growth, in line with this theory, is required to shrink absolute poverty, and this pattern is crucial for long-term growth (McKay, 1997). For a nation to grow, it is imperative to have a diverse range of industries and a workforce matching the demand (Osborne, Kearns, & Yang, 2013). This inclusivity ensures that everyone has a fair

opportunity to thrive by guaranteeing an unbiased regulatory environment, and equal access to resources and markets.

Inclusive growth, as illustrated by the Asian Development Bank's framework, extends beyond traditional forms of economic expansion. It is a kind of growth that generates novel economic opportunities and guarantees that every citizen of a country, especially the poor, have equitable access to those opportunities (Ali & Son, 2007). According to Ranieri, Ramos, et al. (2013), inclusive growth refers to economic expansion that allows more people to improve their material well-being. However, as International Policy Centre for Inclusive Growth puts it, inclusive growth makes sure that each person partakes in the growth process and that the rewards are distributed fairly to all. In addition, it reaffirms the premise that economic growth alone is insufficient to produce long-term improvements in people's standard of living unless the benefits of such growth are distributed equitably (Joumard, Pisu, & Bloch, 2012). Therefore, the main components of inclusive growth include the level and distribution along non-income and income dimensions among these socioeconomic strata, making it a multidimensional notion (Anand, Mishra, & Peiris, 2013).

2.1.2 Tax Structure

The three critical elements in forming an efficient tax system are tax rate, tax base, and tax rate variability. The fluctuation in tax rates determines whether the tax system is proportional, regressive, or progressive. As Widmalm (2001) suggested, this blend of physical and human capital taxes is essential in achieving government goals. According to Lee, Jian, et al. (2017) , a well-structured tax system is crucial in providing a financial base for social expenditures and protecting the population from poverty and unexpected risks.

According to Kakinaka and Pereira (2006), a proportional tax design is a flat tax design in which everyone pays a uniform tax rate despite income or wealth. It is intended to achieve parity between average and marginal tax rates. Proponents of proportional taxes believe that the absence of a tax penalty for higher earnings encourages people to work more and stimulates the economy. In the lower-income group, the rate of proportional tax will be progressive when personal allowances are granted.

2.2 Theoretical Framework

Economic growth and well-being are connected to explore how tax structure influences inclusive growth. Thereby, demonstrating how tax structure is taken into account by production function as a factor that affects output and ensures the welfare of the entire population, resulting in overall inclusive economic growth. The focus here is on the utilitarian social utility function, which holds that growth, and its distribution are the main components of inclusive growth (Kakwani et al., 2000). Then, Ali and Son (2007) show that the generalized concentration curve is the cumulative distribution of a social mobility curve with a fundamental welfare function that satisfies transfer and improves its argument features. Only when two social mobility curves don't meet can the amount of inclusion be determined by ranking the curves.

The level of inclusion can be determined by ranking social mobility curves, but only if two social mobility curves don't cross each other. An increase in the social mobility curve at that time shows that growth is happening for everyone. The earlier two properties: growth and distributional dimension, replicate income and substitution effect, respectively in Lorenz curve. Based on the transfer property/distributional dimension, any social transfer from the rich to a poor person will have a higher generalized concentration curve. This indicates that income redistribution through social spending or progressive tax structure shifts upward the generalized concentration curve, which signifies a higher degree of inclusiveness. In addition, greater affluence will result in a higher generalized concentration curve because the curve's arguments are expanding (Anand et al., 2013).

The mathematical expression of the framework as proved by Anand et al. (2013) shows that income equity (w) depends on social mobility index or area $\bar{y}^* = \int_i^{100}(\bar{y} \cdot d_i)$ on the above graph and mean income ($\bar{y}$). That is,

$$w = \frac{\bar{y}^*}{\bar{y}} \tag{1}$$

such that the extent of income equity ranges between zero and one ($0 \leq w \leq 1$). The closer it is to one, the lower the income inequality. If everyone in a population earns the same income ($\bar{y}^* = \bar{y}$), the income distribution will be perfectly equitable (i.e., $w = 1$). However, in a scenario where only an individual earns income in an economy, the income distribution will be perfectly unequal (i.e., $w = 0$). By rearranging

equation 1, we get

$$\bar{y}^* = w \cdot \bar{y}. \tag{2}$$

The above equation shows that inclusive growth requires an increase in $\bar{y}^*$. For that to be achieved mean income y and or income equity index w must increase: An increase in mean income can be attained through economic growth, while an increase in the income equity index can be realized through an increase in equity.

As demonstrated in equation (3), the degree of inclusivity is determined by the level of changes in output level and equitable income index. The total differential of equation (2) gives:

$$d\bar{y}^* = w \cdot d\bar{y} + dw \cdot \bar{y} \tag{3}$$

Where $(w \cdot dy)$ is the contribution of change in income to change in inclusiveness whien equity is constant, and $(dw \cdot \bar{y})$ is the contribution of change in equity to change in inclusiveness when income is constant. Equation (3) is divided by equation (2) to decompose inclusive growth into income growth rate of change in equity. That is,

$$\frac{d\bar{y}^*}{\bar{y}^*} = \frac{d\bar{y}}{\bar{y}} + \frac{dw}{w} \tag{4}$$

This implies that any inclusive growth policy framework should target growth/efficiency and equity. The endogenous growth model establishes a connection between the income growth component and fiscal actions, in particular, tax structure. Barro and Sala-i Martin (1992) revised version of the AK model included a tax system that increased output within strict budgetary limits.

2.3 Empirical Literature

According to Yunker (2010) 's study, a minor annual capital wealth tax can significantly decrease wealth inequality over a considerable period. The study post further that inheritance taxes offer more advantages over corporate income and personal taxes in terms of distortion. It promotes fairness in income and opportunities across generations. Inheritance and gift taxes can limit intergenerational inequality and promote equal opportunity by reducing and distributing estate holdings upon death.

A study by Arnold (2008) delves into how tax structure affects GDP in 21 OECD countries. Their study adopts the error-correction model to propose an order for tax instruments promoting growth. The most growth-friendly taxes are determined to be property taxes, particularly recurring taxes on immovable property, followed by other property and consumption taxes. Personal income taxes are less effective than consumption and property taxes, whereas corporate income taxes have a negative influence on GDP per capita. However, the study's limitation is that it only focuses on tax growth and does not consider distribution.

Acosta-Ormaechea, Sola, and Yoo (2019) investigate the relationship between economic growth and tax composition in OECD nations using baseline equation of ARDL model. They discovered that increasing income taxes while decreasing property and consumption taxes could lead to sluggish economic growth. The inverse link between income taxes and economic growth was larger for personal income taxes, social security benefits, and income taxes than for corporate income taxes. The was limited to the impact of tax composition on economic growth as against inclusive growth.

Keho (2013) analyse the economic growth-taxation nexus in Cote d'Ivoire. The research employed a two-stage modelling technique. According to the findings, the greater tax burden and direct tax portion of total tax revenue are associated with slower economic growth. A substantial tax burden can have a significantly greater detrimental impact compared to a minor proportion of direct taxes. These findings suggest that i) tax receipts and, by extension, the budget deficit is dependent on economic bustle; ii) transferring the burden of taxation from direct to indirect tax is likely to have a positive impact on economic output. This study focused on the impact of tax to GDP on economic growth and gave little attention to the tax structure.

Oseni and Onakoya (2013) utilize a multivariate cointegration model to assess the effects of fiscal measure on sectoral production in Nigeria from 1981 to 2011. The study's empirical findings indicate a co-integration exists between the four fiscal policy variables and five subsectors. Additionally, the research suggests that fiscal policy variables significantly influence the sectoral production. The analysis findings indicate that the expected impact of fiscal policy variables, specifically those related to productive expenditure on building and construction, is not as significant as previously assumed, despite the substantial annual allocation of

funds to this sector. The findings suggest that the absence of discriminatory taxes in Nigeria has played a role in fostering the nation's economic advancement. However, this study does not examine every aspect of the Nigerian economy. Furthermore, it concentrates solely on the effect of fiscal measures on productivity.

Saibu (2015) adopts least squares method to investigate the empirical link between taxes and economic development in South Africa and Nigeria. The analysis results indicate that the nonlinearity hypothesis about taxation's impact in South Africa is refuted, whereas a noteworthy non-linear relationship is detected in Nigeria. Based on the research results, it has been determined that the most effective tax rate for promoting economic growth in South Africa and Nigeria is around 15% of the GDP per capita. The tax rate in question is anticipated to generate economic growth rates of 6 and 8 per cent, surpassing the current mean growth rates of 4.51 and 2.84 per cent for Nigeria and South Africa, respectively. The study focuses exclusively on the threshold phenomenon of aggregate tax revenue without any explicit reference to a specific category of taxes.

Stoilova (2017) examines the influence of tax structure on economic growth in the 28-EU member states. The descriptive research focused on international differences in overall tax burden and tax structure design. On the other hand, the empirical approach examines the effect of taxes on economic development using panel data regressions. According to the study, a tax structure based on selective consumption taxes and property and personal income taxes promotes economic growth. The ephasis of the tax structure is not on inclusive growth.

Zulfiqar (2018) investigates the effect of fiscal policy on various economic aspects such as inequality reduction, poverty reduction, productive employment generation, and the achievement of inclusive economic growth in Pakistan. The study employed vector autoregressive (VAR) models and cumulative impulse response functions (IRFs) to estimate elasticities for the different public expenditure and tax components. The research findings indicate that fiscal policy lacks efficacy in fostering comprehensive and equitable economic progress. It further displays that the fragile correlation between fiscal policy and the promotion of inclusive economic growth poses a challenge to the fundamental principles and ideals of the latter in an emerging country.

Dladla and Khobai (2018) investigate the influence of taxes on economic growth in South Africa. The

study used the ARDL approach to conduct the analysis. The findings of the empirical analysis show that there exists an inverse relationship between taxation and economic growth in the context of South Africa. The research findings suggest a significant interdependence exists among economic growth, commerce and openness, capital, and taxation. It also implies that fiscal policy is crucial to South Africa's long-term economic growth. The study focuses on taxation's impact on South Africa's economic growth.

Traore (2019) examines the effects of various government tax components on the inclusivity of growth in developing nations. The research also investigates the influence of institutional factors on tax policies execution. The result suggest that tax policy exerts a noteworthy threshold impact on inclusive growth solely in the presence of high-quality institutions, characterized by low levels of corruption and a robust bureaucratic policy. Furthermore, the research indicates that there exists an ideal taxation rate beyond which any augmentation in the individual income tax rate is likely to impede inclusive growth. The analysis of the threshold phenomenon has indicated that the value-added tax (VAT) revenue positively impacts the promotion of inclusive growth commencing from a specific threshold.

Neog and Gaur (2020) investigate the relationship between the tax framework of India and its economic progress spanning the years 1980 to 2016. Neog and Gaur used the ARDL to examine excise tax, income tax, and corporate tax share on long-term development. The findings indicate that these tax shares have an adverse effect on long-term development. Concurrently, the customized sharing feature is augmenting the growth in productivity. In the immediate, a decrease in the corporate tax rate has a negative effect on economic growth. The study is restricted to the influence of taxes on growth in a time series scenario.

Yinusa, Aworinde, and Odusanya (2020) research the effects of inclusive growth, institutional quality and financial development through the utilization of Asymmetric Cointegration VAR. The work reveals that in Nigeria, there exists a persistent association between financial development, institutional quality, and inclusive growth. In addition, it was discovered that changes to equilibrium for financial development, institutional quality, and inclusive growth in Nigeria are asymmetric. The statement posits that the inclusive growth of Nigeria is significantly impacted by financial development and institutional quality. The study's main limitation lies in its restricted scope, which solely concentrates on Nigeria and neglects to consider the potential influence of taxation or tax framework on promoting inclusive growth. Given the curtailment of

studies in the Sub-Saharan African context and the possibility that the relationship between tax structure and inclusive growth could be nonlinear, this study investigated the relationship using linear and nonlinear ARDL specifications with a special focus on Sub-Saharan Africa.

3 Methodology and Data

Following the use of the modified macro concept of concentration curve (Anand et al., 2013) and endogenous fiscal policy or political economy (Barro & Sala-i Martin, 1992), the linear ARDL by Pesaran, Shin, and Smith (1999) for the symmetric effect is adopted as shown below.

$$GDPPE_{it} = \sigma_0 + \beta_1^0 X_{it} + \beta_1^0 Tax\_GDP_{it} + \epsilon_{it} \tag{5}$$

Where $i = 1, 2, ...N$; $t = 1, 2, ..., T$, wherein N and T symbolise the cross sectional and time dimension of the panel respectively. GDPPE is inclusive growth, tax progressivity index is considered as tax structure Tax_GDP.

The macro data volatility-based index developed by Kakinaka and Pereira (2006) was adopted to measure the tax progressivity index ($Tax\_GDP = \frac{\hat{\sigma}T_t}{\hat{\sigma}Y_t}$). Where $\hat{\sigma}T_t$ is the tax revenue proportional standard deviation in period t, and $\hat{\sigma}Y_t$ is that of the income in period t. Kakinaka and Pereira (2006) defined proportional standard deviation as standard deviation value divided by the mean value. The adopted non-linear ARDL model by Shin, Yu, and Greenwood-Nimmo (2014) is an extension of the linear ARDL model proposed by Pesaran et al. (1999) . At this point, the tax structure or progressivity index is disintegrated into negative and positive shocks in order to scrutinise the asymmetric nexus between inclusive growth and tax structure.

$$GDPPE_{it} = \rho_0 + \delta_1^+ Tax\_GDP_{it}^+ + \delta_1^- Tax\_GDP_{it}^- + \beta_1^0 X_{it} + \epsilon_{it} \tag{6}$$

The positive tax shock (progressive tax structure) and negative tax shock (regressive tax structure) are measure as:

$$Tax\_GDP_{ij}^+ = \sum_{j=1}^{t} \Delta Tax\_GDP_{ij}^+ = \sum_{j=1}^{t} \max(\Delta Tax\_GDP_{ij}, 0) \tag{7}$$

$$Tax\_GDP_{ij}^{-} = \sum_{j=1}^{t} \Delta Tax\_GDP_{ij}^{-} = \sum_{j=1}^{t} \min(\Delta Tax\_GDP_{ij}, 0) \tag{8}$$

Data for the analysis is sourced from the World Bank- Development Indicators (WDI) and PRS Group -International Country Risk Guide (ICRG) (2021). The analysis uses yearly data from 1991 to 2020 for 12 selected sub-Saharan Africa countries (Madagascar, Burkina Faso, Tanzania, Togo, Angola, Kenya, Nigeria, Côte d'Ivoire, Gabon, Botswana, Namibia, South Africa). Four countries each were selected from upper income, lower middle income and low-income countries based on data availability. The region was selected given the sharp growth rates in some of its countries which left many people behind in mid 2000s.

4 Empirical Results

4.1 Unit Root Test

It is possible to apply the linear ARDL and NARDL models successfully regardless of the variables' integration order. However, the variables under consideration must not be I(2) in order to comply with the pragmatic bounds testing approach for cointegration; otherwise, the projected findings will be inaccurate. The results of the unit root test (i.e., LEVIN, LIU CHU, ADF- Fisher, and PP- Fisher) for the various income group panels is shown in the table 1.

SERIES	STATIONARY	LEVIN, LIU CHU	ADF-FISHER	PP-FISHER	NO. OF TEST METHODOLOGIES SUPPORTING H0	CONCLUSION
GDPPE (INCLUSIVE GROWTH)	Level	-1.6344 0.0511	19.6068 0.7189	10.8496 0.99	NONE	I (1)
	1ST Difference	-9.085 0.0000	153.987 0.0000	167.536 0.0000	THREE	
TAX_GDP	Level	-2.6584 0.0039	25.7138 0.3678	32.381 0.1178	ONE	I (1)
	1ST Difference	-12.7573 0.0000	195.155 0.0000	221.283 0.0000	THREE	
GEX_EDU	Level	1.6718 0.9527	28.0873 0.2564	23.7107 0.4782	NONE	I (1)
	1ST Difference	-1.1339 0.1286	121.299 0.0000	143.738 0.0000	TWO	
TOP	Level	-0.5634 0.2866	30.4272 0.171	21.9692 0.5811	NONE	I (1)
	1ST Difference	-13.9607 0.0000	181.572 0.0000	201.056 0.0000	THREE	
POLSTAB	Level	-8.4277 0.0000	81.9882 0.0000	74.6915 0.0000	THREE	I (0)
	1ST Difference	-10.4562 0.0000	175.031 0.0000	191.437 0.0000	THREE	

Source: Author's Compilation

Note: * significance at 10%, **significance at 5%, ***significant at 1%., The bandwidths for PP tests are determined by the Newey-West Bartlett kernel.

Table 1: **Summary of Unit Root Tests**

The LEVIN, LIU CHU, ADF- Fisher, and PP- Fisher results in table 1, indicate that the series were integrated at I (0) and I (1). Explicitly speaking, the political stability index (LPOLSTAB) was stationary at level while inclusive growth (LGDPPE), tax structure (LTAX_GDP), government spending on education (LGEX_EDU), and trade openness (LTOP) were stationary at the first difference. As a result, the I (0) and I (1) characteristics further supported the ARDL cointegration approach's applicability and justification. The number of test method(s) that agreed with the series' stationary status was taken into consideration while making the conclusion, as it is clearly shown in the table 1.

4.2 Cross-Sectional Dependence Test

Table 2 below shows Breusch Pagan LM and Pesaran CD cross-sectional test results. Most importantly, the Breusch Pagan LM test is typically applicable where the number of cross-sectionals is relatively small, like the panels in this study.

Group/Test	SSA
Breusch Pagan LM	42.555
Pesaran Scaled LM	-3.085***
Pesaran CD	-0.346

Source: Author's Compilation (2023), Note: * significance at 10%, **significance at 5%, ***significant at 1%.

Table 2: **Cross-Sectional Dependence Test**

The results show that the null hypothesis of no cross-sectional dependence is accepted at a 5% significant level for the majority of the tests. In other words, there isn't enough data to rule out cross-sectional independence. This suggests that each country is mostly independent of one another.

4.3 Results of the ARDL

The result in Table 3 show that the short-run impact of tax structure on inclusive growth provides negative but not statistically significant effects so also the long-run coefficient revealed an insignificant positive effect on inclusive growth in sub-Saharan Africa at 5% significant level, suggesting that the tax structure does not have symmetric effect on inclusive growth.

Variable	Coefficient	t-Statistic	P-value
Long Run Equation			
LTAX_GDP	0.046345	1.833541	0.0679
LGEXP_EDU	0.045312	1.663520	0.0974
LTOP	0.085187	4.280677	0.0000
LPOLSTAB	0.230766	4.373238	0.0000
Short Run Equation			
COINTEQ01	-0.348763	-3.917999	0.0001
D(LGDPPE(-1))	0.261630	4.045734	0.0001
D(LTAX_GDP)	-0.000653	-0.018880	0.9850
D(LGEXP_EDU)	-0.032110	-1.337332	0.1823
D(LTOP)	0.000630	0.017831	0.9858
D(LPOLSTAB)	0.009670	0.115752	0.9079
C	3.027716	3.687800	0.0003
@TREND	0.004276	3.141260	0.0019

Notes: *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent level, respectively. Robust t-statistics are in parentheses. GDPPE is GDP per person employed (constant 2017 PPP $); Tax is tax revenue (percent of GDP) progressivity; EDU is government expenditure on education, total (% of government expenditure); GDP is gross domestic product followed by trade openness (percent of GDP), Political stability index and population growth. Figures in bracket are standard error.

Source: Author's Computation (2023)

Table 3: **Results of Linear ARDL**

The long-run symmetric estimates demonstrate that tax structure has a significant positive symmetric effect on inclusive growth in sub-Saharan Africa. It further indicates that there is no proportional change in inclusive growth due to changes in the tax structure. Thus, the long-run tax structure elasticity of inclusive growth is inelastic. The tie between inclusive growth and tax structure is notably symmetrical in the long run. This supports the findings of Saibu (2015), who acknowledges that taxation does not have significant symmetric impact on economic growth in Nigeria. The coefficient of education expenditure (LGEXP_EDU) is also significantly positive. The implication is that a change in the ratio of expenditure on education to total government expenditure will lead to a change in inclusive growth. Also, it shows that government expenditure on education is inclusive growth inelastic and that the rate of education expenditure tends to

grow with inclusive growth.

The long-run coefficient of trade openness (LTOP) displays a significant effect on inclusive growth in the linear model. It implies that a change in trade openness results in a lesser change in the inclusive growth rate. Therefore, making the long-run elasticity of trade openness to inclusive growth inelastic. The political stability variable displays a statistically significant long-run positive impact on inclusive growth. Given this, a change in political stability will cause a change in inclusive growth. The implication is that, on average, when the political stability index increases by 1 percent point, inclusive growth will improve by 0.23 percent point. The significant negative error correcting term is 34.9 per cent for the panel SSA model. It reveals that the short-run symmetric influences in the panel research are restored to the long-run equilibrium at a rate of 34.9% each year, further confirming the cointegration among the series.

Variable	Coefficient	t-Statistic	P-value
Long Run Equation			
LTAX_GDP_POS	0.384246	5.687066	0.0000
LTAX_GDP_NEG	-1.053033	-5.773885	0.0000
LGEXP_EDU	0.313511	2.802388	0.0055
LTOP	0.298356	4.039095	0.0001
LPOLSTAB	0.074267	0.690644	0.4905
Short Run Equation			
COINTEQ01	-0.130857	-2.143656	0.0331
D(LTAX_GDP_POS)	0.048131	0.893769	0.3723
D(LTAX_GDP_NEG)	0.019454	0.252186	0.8011
D(LGEXP_EDU)	-0.081775	-2.316349	0.0214
D(LTOP)	-0.009393	-0.355678	0.7224
D(LPOLSTAB)	-0.004876	-0.042420	0.9662
C	0.984392	1.993869	0.0473
@TREND	-0.005474	-2.100062	0.0368

Notes: *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent level, respectively. Robust t-statistics are in parentheses. GDPPE is GDP per person employed (constant 2017 PPP $); Tax is tax revenue (percent of GDP) progressivity; EDU is government expenditure on education, total (% of government expenditure); GDP is gross domestic product followed by trade openness (percent of GDP), Political stability index and population growth. Figures in bracket are standard error.

Source: Author's Computation (2023)

Table 4: **Result of Nonlinear ARDL**

The findings indicate that LTAX_GDP_POS (positive partial sum of squares of tax structure) has an asymmetrically significant impact on inclusive growth (LGDPPE), implying that positive shock in tax (i.e

progressive tax structure) spurs inclusive growth by 0.38 per cent at 1 percent significant level. On the other hand, the LTAX_GDP_NEG (negative partial sum of squares of tax progressivity index) shows a significant coefficient of -1.053, meaning the negative shocks from the tax structure index (i.e., regressive tax structure) decrease inclusive growth by 1.05 per cent. These results are related to the fact that inclusive growth decreases faster with a regressive tax structure than its increases with a progressive tax structure.

The long-run coefficient of government expenditure on education (LGEXP_EDU) is positive (0.31) and very significant. All other things being equal, it hints that a 1 per cent decrease (rise) in government expenditure on education is closely associated with a decrease (rise) in inclusive growth by 0.31 per cent in the long run. In the short run, a 1% rise (decrease) in government expenditure on education causes a 0.082% decrease (rise) in inclusive growth. Consequently, it indicates that the effect of government expenditure on education significantly depends on the time horizon; while it has a considerably harmful impact in the short run, it contributes significantly to the improvement of inclusive growth of sub-Saharan Africa in the long run.

Furthermore, trade openness (LTOP) is positive and significant at 1 per cent. It implies that inclusive growth will change due to a change in trade openness. A 1 per cent rise in trade openness will increase inclusive growth by 0.29 per cent. In addition, the speed of adjustment in this model is negative and significant, as expected. By implication, its value of 0.131 means that the short-run situation is adjusted to the long-run steady state at 13.1 per cent per year.

5 Conclusion and Recommendations

The study examines how the tax structure affects economic activities that promote inclusive growth in sub-Saharan Africa. The region was selected given the sharp growth rates in some of its countries, which have left many people behind. It utilizes panel linear ARDL and panel non-linear ARDL to analyse the symmetric and asymmetric impacts of the tax structure on inclusive growth, respectively. The models combine long-term, short-term, and adjustment coefficient estimates to evaluate tax structures in sub-Saharan Africa. Specifically, the non-linear ARDL also decomposed tax structure into progressive and regressive components for robust evaluation and decision-making.

In the asymmetric results, only a long-run relationship exists between tax structure and the inclusive growth and statistically significant. The coefficients of progressive tax and regressive tax structure are significant with different sign. It demonstrates that fairness in the tax structure is crucial in promoting inclusive growth sub-Saharan Africa. That is the economic growth of sub-Saharan Africa becomes inclusive when people with broader financial shoulders carry the heaviest tax burden. Therefore, at the present stage of the economies of sub-Saharan Africa, increasing progressive taxes to redistribute income to the poor promotes vertical equity and inclusive growth. However, the evidence further shows that progressive tax structure does not increases inclusive growth as much as regressive tax reduces it. Thus, decisionmakers should weigh the benefits of the progressive tax structure with potential unfavourable effects of a regressive tax structure.

Trade liberalization is also vital to inclusive growth in sub-Saharan Africa. The more trade is liberalized in the lower- and upper-middle income groups, the greater their inclusive growth will be in the long term. The negative short effects of share of government education expenditure on inclusive growth is revers in the long run. Therefore, it would be beneficial to make tax an infrastructure target in sub-Saharan Africa. Also, it is important to eradicate all forms of trade cutback in the form of high tariffs on some essential goods and services in order to take full advantage of trade openness. This study highlights the need for further research to gain a deeper understanding of the significant impact that tax structure has on promoting inclusive growth. Future research should consider modelling each income group within sub-Saharan Africa separately and conduct a comparative analysis.

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