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Research Article

Financial System Development and Taxes on Exports of Sub-Saharan Africa

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Abstract

Globally, taxes on exports are designed to regulate trade, control domestic supply of goods, generate revenue and achieve broader economic objectives. While export taxes can benefit domestic industries and local economies, they pose several risks that can ultimately undermine tax revenue accruing to the government if not balanced with robust financial sector reforms. This study examined the effect of financial system development on taxes on exports of Sub-Saharan Africa. Financial system development was measured by financial system access, financial system depth, financial system efficiency and financial system stability. Taxes on exports was surrogated by the log of total levies on goods being transported out of the country or services being delivered to nonresidents by residents. The study utilized ex-post facto research design. Purposive sampling was adopted to select 20 countries from a population of 48 Sub-Saharan African countries. Validated data were collated from the Global Financial Development and World Bank Development Indicators (WDI) for a period of 20 years (2004-2023). Data were analyzed using descriptive and inferential (multiple regression) analysis. The study employed panel data regression analysis and found that financial system development had a joint significant effect on taxes on exports. The study recommended that governments of Sub-Saharan African countries should simplify access to trade finance to boost export volumes, initiate capital market reforms to enhance foreign exchange liberalization and boost government revenue.

Keywords: *Financial system access, financial system depth, financial system development, financial system efficiency, financial system stability, Taxes on exports, Sub-Saharan Africa*

1. Introduction

Sub-Saharan Africa exhibits varying tax revenue performance across its regions, influenced by differing economic structures and policy approaches. In Eastern Africa, countries like Kenya and Rwanda have made notable progress, with tax revenue-to-GDP ratios of 16.6% and 14.6%, respectively, supported by VAT and income tax reforms, however, countries like Uganda and Tanzania still struggle with low tax compliance, leading to ratios of around 12-14% (Hussen, 2023). West Africa shows a stark contrast, where resource-rich nations such as Nigeria and Ghana generate significant revenues from oil, minerals, and VAT. Nigeria's tax-to-GDP ratio remains low at 6.7%, while Ghana's VAT reforms pushed its tax revenues higher (Obadiaru et al., 2024). Central Africa, dominated by oil-dependent economies like Congo and Gabon, shows moderate growth in tax revenues, although Equatorial Guinea faces continued economic contraction due to falling oil production (African Development Bank, 2024). In Southern Africa, South Africa leads the region with a robust tax revenue-to-GDP ratio of 25-27%, driven by a diversified economy and a strong tax system, while other nations like Mozambique and Zambia are improving tax collection efforts to support growth (Jima & Makoni, 2023).

Over the years, Eastern Africa has maintained relatively low tax revenue-to-GDP ratio compared to other regions. With its economies largely dependent on agriculture and the informal sector, despite tax reforms aimed at improving compliance and broadening the tax base, domestic resource mobilization remains low standing at 16.6% for Kenya, 12.3% for Uganda, 14.6% for Rwanda, and 12% for Tanzania (African Development Bank. 2024; Ramadhan & Zuhura, 2022). Poor tax compliance, inefficient tax policies, and inadequate domestic tax mobilization threaten sustainable development, particularly in infrastructure. Kenya's tax revenue-to-GDP ratio, which ranges from 17-19%, is supported by a strong VAT system and progressive income tax, with ongoing efforts to enhance digital tax collection (Kadenge, 2021; Abdulai et al., 2024). Tanzania's ratio, ranging between 11-14%, is driven by VAT, excise, and customs duties, with attempts to improve tax compliance. Uganda's ratio which is between 12-14%, with significant revenues from VAT and corporate taxes, though the prevalence of the informal sector hampers the process of tax collection. Rwanda's ratio, ranging from 15-16%, reflects substantial progress in tax reforms, especially in VAT and income tax collections (Zalle, 2024).

The average maximum tax collection potential for Sub-Saharan Africa is estimated to be 19.6% of GDP, which is 7.5 percentage points less than the global average (Okafor et al., 2023; Hussen, 2023; Adenike et al., 2024). The low tax rates that are contributing to the deterioration of public finances are highlighted by the Brookings Institution in its annual Foresight Africa report (Ogunbiyi & Fadairo, 2021; Ndu & Nguru, 2022). Obadiaru et al (2024) in a comparative study of Asia and the Pacific (19.1%), Latin America and the Caribbean (21.9%), and OECD countries (33.5%), Sub-Saharan Africa has a lower average tax to GDP rate of 16.5%. According to the report's estimations, a number of Sub-Saharan African countries contribute substantially less to GDP through tax income, with Ethiopia having the lowest rate at about 6% (Mascagni et al., 2021). Abiola et al. (2020); Adegbie et al. (2023); Akande and Abimbola (2020). Aluko et al. (2022) documented that in comparison to other regions, Africa has a low average tax-to-GDP ratio, which indicates the limited financial resources that African nations have to work with. Aguguom et al. (2023) opined that this constraint erodes their capacity to allocate resources efficiently.

Other factors thought to be responsible for the inefficiencies and under-performances in tax revenue mobilization efforts in Sub-Saharan African countries include, corruption and mismanagement, incompetent and ineffective tax agencies and under-optimization of tax collection enhancement technology (Adebola & Olufemi, 2021; Aguguom et al., 2023, Fashina & Olubusoye, 2020). From the Nigerian perspective, the subject of tax revenue sufficiency is significant given the high level of perceived tax injustice and suboptimal tax revenue utilization. For instance, Kola-Olusanya (2020); Kouadio and Gakpa (2020); Chettri et al., (2023); Hussen, (2023) documented that declining revenues and rising debt levels have triggered fiscal deficits.

Globally, financial system development represents a veritable mechanism for mobilizing tax income (Khan et al., 2020). Mobilizing tax income is crucial for three reasons (IMF, 2018). Firstly, in increasing investments, countries must raise funds in order to meet the goals of long-term growth. Secondly, mobilizing tax revenue is a tactic for achieving fiscal consolidation as debt levels rise and thirdly, effective regulatory framework, strong institutions and increased state capacity are facilitated by a significant revenue collection capacity (OECD, 2021). Adefolake and Omodero (2022); Megnigang (2024) reported that the world's developing nations continue to have the lowest tax receipts relative to their GDP and sadly, these nations have far greater needs for public spending. Ahamed (2018); Ajide & Bankefa, (2017); Akinadewo et al., (2023)., project that financial system development has the capacity to bring about unprecedented speed in business transactions and revolutionize tax systems thus positively influencing tax revenue outcomes in these countries (Ajide & Bankefa, 2017; Akinadewo et al., 2023). Financial system development aids tax revenue collection performance, mitigates tax avoidance and evasion and facilitates accurate analysis of tax data (Alfo et al., 2023; Alinaghi & Reed, 2021). An et al. (2020); Getachew (2019) reported that financial system development is closely correlated with tax revenue while the findings of Kavya and Shijin (2020) showed that financial system development and tax regulatory institutions are essential to emerging nations' ability to collect higher taxes.

The objective of this study is to analyse the effect of financial system development on taxes on exports of Sub-Saharan Africa. Only few studies have explored the influence of financial system development and tax revenue, thus creating a gap for further research in this area. Several existing studies on financial system development and tax revenue are focused on global or developed economies, leaving a significant gap in research with respect to emerging economies. Different studies have construed financial system development from limited dimensions particularly from the perspectives of financial deepening and financial inclusion. Majority of the studies examining the effect of financial system development on tax revenue utilized an aggregate measure of tax revenue (tax revenue to GDP). Only few works have examined the link between financial system development and the different components of tax revenue. The current study closes these gaps by aligning specifically to the unique socioeconomic and political contexts of Sub-Saharan Africa and adopting a multidimensional perspective of financial system development, incorporating depth, access, efficiency and stability dimensions.

In the light of the above discourse, the following research objective, question and hypothesis was formulated as thus:

***Research Objective**:* Investigate the effect of financial system development on taxes on exports of Sub-Saharan Africa.

***Research Question**:* What is the effect of financial system development on taxes on exports of Sub-Saharan Africa?

***Research Hypothesis**:* Financial system development has no significant effect on taxes on exports of Sub-Saharan Africa.

2. Literature Review and Theoretical Framework

2.1 Conceptual Review

Taxes on Export: Tax revenue from exports emanate from taxes imposed by the government on products exported out of a country (Ihenyen & Ogbise, 2022). Tax revenue from exports is concerned with taxes imposed on products shipped outside the country or services rendered by citizens to non-citizens of a given country (Jan-Emmanuel et al., 2021; Kabamba & Mabi, 2022). The majority of tropical agricultural products are currently liable to export taxes. In Sub-Saharan African countries, products like cocoa, coffee, cotton, coconut oil, tobacco, spices, groundnuts, and palm oil, diamonds, bauxite, copper, iron ore, tin, are subject to export taxes (Kassa, 2021; Kadenge, 2021). Taxes on exports are payable per unit of a product, or on ad valorem basis, which is expressed as a percentage tax on the product's worth (Mascagni et al., 2021; Kunofiwa, 2020). Taxes on exports restrictions come in form of all kinds of export levies and they have the capacity to lower the volume of exports (Kilimvi & Adepehin, 2023; Li & Lin, 2023; Maganya, 2020). Taxes on exports are also employed as a mechanism to balance trade policies. Tax on raw commodities exports can effectively subsidize the local processor that uses those raw materials as their main input by lowering their domestic price (Awa & Ibeanu, 2020). This enhances competitiveness of the manufacturing sector in the global market as well as profitability from decreased input costs (Jaison & Matthew, 2020).

Financial System Development: Financial system development connotes the process of enhancing and expanding a country's financial system aimed at improving efficiency, all-inclusiveness and stability among its financial institutions for superior and quality service delivery (Abdul et al., 2021). Ahamed (2018), proposes that financial system development entails enhancing all institutions, markets, instruments and regulations that facilitate the flow of funds within an economy, support revenue generation, risk management as well as economic growth. Ajide and Bankefa (2017) revealed that there is a close correlation between financial system development and tax revenue, suggesting that the mechanisms of tax revenue are only effective when the financial system of a country is developed as characterized by improved depth, access, efficiency and stability. Akande and Abimbola (2020) opined that financial system development strengthens the tax regulatory framework of a country and reinforces tax institutions for effective functioning.

Financial System Access: Financial system access can be construed from the dimensions of financial institution access and financial market access. In this regard, financial institution access is defined as the ability of individuals, corporate businesses and other players in an economic system to easily obtain financial services from financial institutions such as banks, credit unions, insurance companies, investment firms and other organizations that provide financial products and services (Gnangnon, 2022; Guo & Fu-Sheng, 2020). Guo and Fu-Sheng (2020) emphasized that financial institution access is central and crucial to support economic activities and facilitate financial inclusion. This enables individuals and businesses to easily access finance, save and borrow money, make investments manage risks and conduct transactions efficiently.

Financial System Depth: Financial system depth refers to the extent to which financial institutions and markets are integrated and diversified within a given economy (Nnyanzi et al., 2018; Nyasha & Odhiambo, 2019). Olorunfemi and Adeyemi (2020) opined that financial system depth encompasses diverse aspects and these aspects include the range of financial services offered, the size and volume of transactions, and the strength of the regulatory framework guiding the compliance and functionality of financial institutions and markets. Taiwo (2020) posited that several factors are germane to issues regarding financial institutions depth. They range from market penetration, product diversity, institutional diversity, regulatory framework, financial intermediation, and market size.

Financial System Efficiency: Financial system efficiency is a cornerstone of a developed financial system (Gnangnon, 2022). Financial system efficiency gauges how fast and accurately market prices reflect information about its currently available value. Additional ideas include allocative efficiency, which measures how well the financial system channels funds from ultimate lenders to ultimate borrowers so that the funds are used most productively, and functional/operational efficiency, which is inversely related to the costs that investors bear for making transactions (Kundt, 2017). Financial system efficiency can also imply the extent to which prices accurately represent all pertinent and available information. Since there are no available cheap or overvalued stocks, markets that are efficient have prices that already take into account all available information, making it impossible to "beat" the market.

Financial System Stability: Financial system stability encapsulates the resilience and soundness of financial institutions and markets (Topcu & Coban, 2017). Financial system stability is a crucial aspect of a healthy financial system, ensuring

that financial institutions and markets continue to serve customers and support economic policies without undue risk of failure (Ramadhan & Zuhura, 2022; Sayar et al., 2020). It also ensures less disruption of operational activities through sustained provision of liquidity (Benzarti; 2021). Financial system stability translates to stabilizing the economy in all respects (Dauda & Makinde, 2021; Diabate & Koffi, 2023). Several studies have documented that financial system stability has a multifaceted effect on tax revenue (Abiola et al. 2020; Adekunle, 2021).

2.2 Theoretical Review

Ability to Pay Theory: Ability to pay theory is traceable to the proposition of Adams Smith that underscores the fundamental idea that individuals with the capacity to pay more should pay a greater percentage of their income in taxes. The theory was popularized within the field of public finance through the publications of scholars as John Stuart Mill, Aurthur Cecil Pigou and Knut Wicksell. The theory essentially maintains that individuals, businesses and corporate entities should be taxed progressively in accordance with their income and that the burden of tax payment should be equal on every tax payer. The theory further assumes that governments will expend greater resources trying to enforce compliance to tax laws, if the ability to pay principle is neglected (King and Levine, 2018). Drost, (2012) asserts that tax compliance is facilitated by easy to pay tax laws and equitable distribution of the tax burden such that citizens are not discouraged from exercising their civic responsibilities.

Financial Intermediation Theory: Financial intermediation theory as propounded by Gurley and Shaw in the year 1960 is concerned with the significance of savings as a strong prelude to investment and business expansions. The financial intermediation theory assumes that financial systems fundamentally rest on three tripod models of resource allocation modalities, risk management model and liquidity provision. The theory assumes that financial intermediaries channel funds from willing savers to desiring borrowers of funds (Anderson, 2017). The theory holds that risk management is significant in mitigating and diversifying some inherent financial risks in financial allocation and assets management. The theory intensifies the roles of financial intermediation through risk management, by diversifying and managing risk through various financial products. A critical tenet of the theory is that liquidity provision is a core function of financial intermediation, connecting lenders and borrowers. Several scholars have written extensively in respect of the significance of financial intermediation theory. Beckmann et al. (2018) posits that financial intermediaries have the obligation to balance resource deficits and surplus within an economic system. Financial intermediation diversifies the risk of lenders, resolves information asymmetry and facilitates transactions (Blesse et al., 2019; Bird et al., 2008).

2.3 Empirical Review

Adewara et al. (2023) sought to ascertain the impact of multiple taxation on profitability of small and medium enterprises (SMEs) in Ekiti State Nigeria. The study adopted survey research, using structured questionnaires to sample the opinions of the respondents. The result of the analysis revealed a negative impact of multiple taxation on the profitability of the selected SMEs. Destek et al. (2020) considered the relationship between financial developments, tax revenue and income inequality in Turkey. Adopting ARDL estimation, the study found that financial development from the banking sector point of view exerted a negative influence on tax revenue and income inequality in Turkey. The study recommended that government and policymakers, legislate a workable framework to enhance tax revenue mobilization and reduce inequalities. In contrast, the study does not corroborate the findings of Prowd & Kollie (2021); Ihenyen & Ogbise (2022); Ndu & Uguru (2022), that established a significant positive association between financial inclusion and tax revenue.

Promise et al. (2023) investigated the effect of tax revenue on economic growth of Nigeria. Secondary data was sourced from Federal Inland Revenue Service. The analysis showed that tax revenue from value added tax significantly impacted economic growth of Nigeria for the period investigated. Promise et al. (2023)'s study is in tandem with the studies of Prowd & Kollie, (2021). Similarly, Oyinkansola and Omodero (2023) analyzed the effect of statutory tax audit on tax revenue in Nigeria. The result of the analysis demonstrated that tax audit exerted negative effect on tax revenue. Etim et al. (2021) analysed the effect of tax revenue on economic growth of Nigeria. The study employed ex-post facto research design, using secondary time series data extracted from the Central Bank of Nigeria Statistical Bulletin and also from the Federal Inland Revenue Services financial published report. The study employed descriptive statistics and multiple regression analysis for the data estimation. The result of the analysis showed that tax revenue from income, profits and capital gains as well as tax revenue from goods and services had significant impact on economic growth.

Oz-Yalaman (2019) investigated the effect of financial development on tax revenue. The conducted analysis revealed a significant effect of financial development on tax revenue from various sources open to the government. Oladele et al. (2019), examined the nexus between tax enforcement techniques and revenue generation, highlighting a strong correlation between tax audits, penalties, and adherence to tax rules.

Adebola and Olufemi (2021) conducted a study on the impact of tax audits on tax compliance and tax revenue in the Southwest region of Nigeria. The study utilized primary data collected through questionnaires administered to selected respondents. The findings revealed a statistically significant relationship between tax audits, and tax revenue, particularly

in the context of customs, import duties, and tax revenue from exports. Furthermore, Jan-Emmanuel et al. (2021) investigated the influence of tax administration on taxpayer compliance in Kogi State. Primary data were gathered using questionnaires, and the chi-square method was employed for analysis. Regression analysis highlighted the substantial impact of administrative tax compliance expenses on tax revenue in Kogi State. Jan-Emmanuel et al. (2021)'s study is in agreement with the studies of (Piketty et al., 2018; Jaison & Matthew, 2020).

Bandara and Weerasooriya (2021) emphasized the critical role of tax system development in understanding expert perspectives on tax revenue compliance and its interplay with various variables. They reviewed multiple secondary studies, indicating that factors such as tax rates, availability of tax information, taxpayer perceptions, legal frameworks, and costs of compliance can predict tax adherence. The study underscored how tax system development significantly influences tax revenue compliance. Similarly, Yazidu and Ashenafi (2021) examined financial system development, tax revenue and economic growth in Sub-Saharan Africa. The study employed ex-post facto research model, using secondary data of time series for a period of 25 years of selected Sub-Saharan African countries. A total of 15 Sub-Saharan African countries were sampled in the study. The study explored multiple regression analysis and a consideration of pre and post estimation tests. The result of the panel data analysis showed that financial system development had a significant effect on customs and other import duties and tax revenue from export of goods and services. The result of the study demonstrated that financial system development enhances tax revenue and economic development in the selected and sampled Sub-Saharan African countries. This study corroborates the findings of (Prowd & Kollie, 2021; Oulai 2022; Ramnath & Patricia, 2021).

3. Methodology

This study investigated the effect of financial system development on taxes on exports of Sub-Saharan Africa. The study adopted *ex-post facto* research design using data extracted from a sample of 20 Sub-Saharan African countries from the population of 48 countries in the region. The data coverage was for a period of 20 years spanning 2003 to 2023. Descriptive analysis was conducted to examine the statistical properties of the variables. Furthermore, pairwise correlation and Feasible Generalized Least Squares (FGLS) regression was applied to analyze the data.

Model Specification

Functional Relationship

TEP = *f*(FSA, FSD, FSE, FSS)…….....……..(1)

Model

$$TEP_{it} = \alpha 0 + \alpha_1 FSA_{it} + \alpha_2 FSD_{it} + \alpha_3 FSE_{it} + \alpha_4 FSS_{it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where

TEP = Taxes on exports, FSA = Financial system access, FSD = Financial system Depth, FSE = Financial system efficiency and FSS = Financial system stability, i=cross-sectional, t= time series, β= coefficient of the variables, α = constant, μ the error terms.

4. Data Analysis, Results and Discussions

This section of the study presents the result of the analysis on the effect of financial system development variables (Financial System Access (FSA), Depth (FSD), Efficiency (FSE), and Stability (FSS) on taxes on exports, represented by the dependent variable, LnTEP (natural logarithm of Taxes on Exports). Using the fixed-effects model with feasible generalized least squares regression technique, the analysis corrects for heteroskedasticity, autocorrelation and cross-sectional dependence in the data, ensuring the reliability of the estimated coefficients. Table 1 outlines the characteristics of the variables as depicted by the mean, minimum, maximum and standard deviation values.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev	Min	Max
Financial System Development Measures				
FSA	0.192	0.195	0.00	0.92
FSD	0.088	0.09	0.01	0.54
FSE	0.123	0.072	0.04	0.88
FSS	0.111	0.045	0.04	0.67
Tax Revenue Indicator				
TEP	41,500.37	305,349.30	0.00	5,855,098.00

Source: *Researcher's Computation (2025).* ***Note:*** *FSA = Financial System Access, FSD = Financial System Depth, FSE = Financial System Efficiency, FSS = Financial System Stability, TEP = Taxes on Exports, TGS = Taxes on*

FSA (Financial System Access)

The mean value for FSA stands at 0.192, indicating a relatively low level of financial system access within the observed sample. The standard deviation of 0.195 suggests a considerable degree of variability across the observations, reflecting the diverse extent to which access to the financial system varies in the sample. The minimum value of 0.00 indicates some instances where financial access is non-existent, while the maximum value of 0.92 reveals cases where access is relatively high. The broad spread, as indicated by both the standard deviation and range, suggests that FSA is a highly variable measure across the sample, potentially driven by differing regional or institutional contexts.

FSD (Financial System Depth)

The mean for FSD is 0.088, which suggests that, on the average, the depth of the financial system within the sample is relatively shallow. The standard deviation of 0.09 indicates a moderate level of dispersion around this mean. With a minimum value of 0.01 and a maximum of 0.54, the data reflects significant variation in financial system depth. The large range, coupled with the low mean, could point to the presence of countries or regions with very underdeveloped financial sectors, as well as others with moderately developed financial systems.

FSE (Financial System Efficiency)

The mean of 0.123 for FSE suggests a low average level of financial system efficiency across the sample. The relatively low standard deviation of 0.072, in comparison to the mean, indicates that the majority of observations are clustered closer to the mean, implying limited variation in financial system efficiency. The minimum value of 0.04 and maximum of 0.88 show a broad range in efficiency, with some cases reflecting very inefficient systems and others approaching a high level of operational efficiency. The data suggests that while the overall efficiency of financial systems may be low, there are instances of significant efficiency in some economies.

FSS (Financial System Stability)

The average value for FSS is 0.111, suggesting that financial system stability is generally low within the sample. The standard deviation of 0.045 is relatively small, indicating that the values of FSS do not deviate drastically from the mean, and most of the sample values are somewhat concentrated. The minimum value of 0.04 and maximum of 0.67 suggest that while stability is generally low, there are notable variations, with some systems demonstrating higher stability than others. The limited spread in the data, points to relatively uniform conditions concerning financial stability across the sample.

TEP (Taxes on Exports)

The mean value of TEP is 41,500.37 USD, indicating a moderate average level of taxes on exports. However, the standard deviation of 305,349.30 USD is exceptionally large, suggesting significant variability in the extent of export taxation. The minimum value of 0.00 and the maximum of 5,855,098.00 USD reveal a wide range of export tax policies, with some countries imposing no export taxes and others imposing substantial taxes. This substantial variability reflects differences in the trade and fiscal strategies employed by countries within the sample

Table 2: Correlation Table

Variable	FSA	FSD	FSE	FSS
Correlation Results				
FSA	1			
FSD	0.342	1		
FSE	-0.333	0.065	1	
FSS	-0.073	0.299	0.146	1

Source: *Researcher's Work (2025).* ***Note:*** *FSA = Financial System Access, FSD = Financial System Depth, FSE = Financial System Efficiency and FSS = Financial System Stability*

The correlation coefficients depict the nature of association between the variables. Financial System Access (FSA) has a weak positive correlation with Financial System Depth (FSD). This is evidenced by the coefficient of 0.342. This suggests that increasing access to financial services is slightly correlated with an increase in financial system depth and that countries with better access to financial systems may also experience deeper financial systems. It can be inferred that for meaningful financial deepening, access must be accompanied by policies promoting financial innovation, sustainable credit practices and robust institutional framework.

Financial System Access has a weak negative relationship with Financial System Efficiency and Financial System Stability FSE (-0.333), FSS (-0.073). This implies an inverse relationship between FSA, and FSE as well as FSS. The weak association between financial system access and financial system stability might connote that efforts to increase

financial system access might introduce risks that could slightly weaken stability. On the long run, financial inclusion efforts, if not properly implemented might marginally affect stability. A negative correlation of this magnitude does not pose a multicollinearity concern, as it is relatively distant from the threshold that would suggest a problematic overlap in information between these variables. The weak association indicates opportunities for financial institutions to scale access without significantly compromising efficiency. While there might be minor declines in efficiency in the short term, increasing financial access can have broader economic benefits that could enhance efficiency in the long run.

The correlation between Financial System Depth and Financial System Efficiency is weak and positive at 0.065. This result connotes that in general, deeper financial systems are generally more efficient as they are characterized by specialization, competition, economies of scale and other such factors that improve efficiency. However, even though financial depth can contribute to efficiency, there are other key factors that play critical roles in this regard. Financial System Depth has a weak positive association with Financial System Stability as shown by the coefficient of 0.299. This weak positive association indicates that as financial systems deepen, there is a slight improvement in their stability as a result of better diversified financial services. However deeper systems can be prone to risks that undermine stability as depth alone does not guarantee stability.

Financial System Efficiency and Financial System Stability have a weak positive association (0.146). This association reflects that financial system efficiency supports stability by reducing costs, improving resource allocation and managing risks. However, this relationship is moderated by several factors and without appropriate safeguards, highly efficient systems may introduce vulnerabilities that can weaken stability of the financial system. Conversely, FSS (Financial System Stability) exhibits a low association between the other variables; FSA (-0.073), FSD (0.299), and FSE (0.146). The weak correlations suggest that while financial system stability may interact with other financial system measures, the interactions are not strong enough to cause issues in model specification. Overall, the correlation analysis indicates that the variables are sufficiently independent of one another, and multicollinearity is not a significant concern for the analysis. The relationships observed here suggest that each variable captures distinct aspects of financial system performance.

Table 3: Test of Hypothesis

Model 2/Variable	Coeff	Std. Err	T-Stat	Prob
FSA	-6.526	0.136	-48.14	0.000
FSD	-2.229	0.064	-34.99	0.000
FSE	4.892	0.096	50.97	0.000
FSS	6.628	0.225	29.40	0.000
Cons	1.098	0.078	14.00	0.000
Diagnostics				
F-Stat (Prob)	3.39 (0.0000)			
R-Squared	0.312			
Adjusted R-Squared	0.231			
Hausman Test	$chi^2_{(1)}$ = 19.54 (0.0006)			
Testparm Test/LM Test	$F_{(4, 43)}$ = 4.43 (0.0000)			
Heteroskedasticity Test	$chi^2_{(20)}$ = 27,342.29 (0.000)			
Autocorrelation Test	$F_{(1, 19)}$ = 27.371 (0.0000)			
Cross sectional Independence Test	12.115 (0.0000)			

Source: *Researcher's Work (2025).* ***Note:*** *FSA = Financial System Access, FSD = Financial System Depth, FSE = Financial System Efficiency and FSS = Financial System Stability. Dependent Variable: LnTEP @5% significance level.*

Interpretation (Diagnostic Tests)

Table 4 shows the result of the Hausman test carried out to determine the choice and appropriateness of the estimation technique employed for this model. The Hausman specification test has as its null hypothesis that the difference in coefficients of a model is not systematic and hence the random effect estimation technique is appropriate. The result of the diagnostic test reveals that the fixed-effect model is best suited for this analysis with p- value (0.0006) < 0.05. The Lagrange Multiplier Test (Testparm Test) depicts a result a p-value of (0.0000), < 0.05 reaffirming the appropriateness of the fixed-effect model.

The model was tested for heteroscedasticity using the Breusch -Pagan/Cook-Weisberg test. The probability value for the heteroscedasticity test was 0.000, indicating that the model is not homoscedastic. This means the residuals do not have constant variance over time, leading to the rejection of the null hypothesis of homoscedasticity.

The autocorrelation test showed a probability value of 0.000, which indicates a significant presence of serial correlation in the coefficients and residuals of the model. The null hypotheses of no first order correlation are therefore rejected. Furthermore, the cross-sectional independence test conducted through the use of Pesaran's test for cross sectional independence revealed a probability value of 0.000 < 0.05, confirming the presence of cross-sectional dependence in the model. This implies that the residuals are correlated. In the light of the presence of heteroskedasticity, serial correlation, and cross-sectional dependence in the model, the regression was estimated using robust standard errors to address these econometric issues effectively.

Regression Equation Results

$LnTEP_{it} = \alpha_0 + \alpha_1 FSA_{it} + \alpha_2 FSD_{it} + \alpha_3 FSE_{it} + \alpha_4 FSS_{it} + \mu_{it}$

$LnTEP_{it} = 1.098 - 6.526 FSA_{it} - 2.229 FSD_{it} + 4.892 FSE_{it} + 6.628 FSS_{it} + \mu_{it}$

The regression estimates reveal that Financial System Access (FSA) and Financial System Depth (FSD) have a significant negative effect on taxes on exports (LnTEP) with coefficients and probability values of (α = -6.526, p= 0.000, α =-2.229, p= 0.000) respectively. This connotes that a one percent increase in FSA and FSD respectively, translates to a decline of US$6.526 billion and US$2.229 billion in taxes on exports respectively.

Conversely, Financial System Efficiency (FSE) and Financial System Stability (FSS) recorded significant positive relationships with taxes on exports (LnTEP), (α = 4.892, p = 0.00 and α = 6.628, p= 0.00). This suggests that respectively, a one percent increase in FSE and FSD necessitates an increase in taxes on exports to the tune of US$4.892 billion and US$ 6.628 billion.

The R-squared value of 0.312 implies that approximately 31.2% of the variation in LnTEP is explained by the independent variables in the model, while the remaining 68.8 % is depicted by other factors not captured in the model. The adjusted R-squared value of 0.231, compensates for the addition of new variables, and suggests that 23.1% of the changes in the dependent variable are caused by the joint effect of the explanatory variables in the model.

Decision

On the premise of the *F* statistics with p-value of 0.0000, which is lower than the 5% level of significance chosen for this study, the null hypothesis for the model which states that financial system development does not significantly affects taxes on exports of Sub-Saharan Africa is rejected. This connotes that the model explains a statistically significant amount of variance. The study therefore accepts the alternate hypothesis connoting that financial system development has significant effect on taxes on exports

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Discussion of Findings

The fixed-effects model with robust standard errors provides strong evidence that financial system development plays a critical role in shaping export tax revenues. The findings suggest that improving financial system access, depth, efficiency, and stability can lead to more efficient tax collection systems, which in turn affect the level of export taxes. Despite some statistical concerns such as heteroskedasticity, autocorrelation, and cross-sectional dependence, the model's robustness, as indicated by the diagnostic tests, supports the validity of the results. Specifically, the results of the regression analysis suggest that the development of financial systems significantly influences export tax revenues. The negative relationship between Financial System Access, Depth, and taxes on exports, suggests that more accessible and deeper financial systems reduce the reliance on export taxes. This could be because broader access to financial systems reduces the need for reliance on taxes on exports as a source of government revenue. As financial systems improve, alternative revenue mechanisms, such as income taxes or value-added taxes, may be more effectively utilized, leading to a decrease in export-related tax burdens.

Conversely, deeper financial systems are suggestive of a more developed financial infrastructure and greater financial intermediation, is associated with a reduction in taxes on exports. This could be explained by the fact that countries with deeper financial systems are able to generate more revenue from domestic sources, decreasing their reliance on export taxes. Deeper financial markets may foster economic diversification, reducing the dependence on exports and thereby lowering the need for high export taxes. On the other hand, the positive relationships between Financial System Efficiency and Stability with export taxes indicate that more efficient and stable financial systems are associated with higher export taxes, likely due to better enforcement and revenue collection mechanisms. Efficient financial systems are likely to improve government revenue collection mechanisms and enhance the ability of governments to track and enforce tax policies, leading to higher tax collections from export activities.

Financial System Stability reduces the risks associated with cross-border trade, allowing governments to collect more revenue from export taxes as trade volumes rise. Stability in the financial system can also foster investor confidence, potentially leading to greater trade and, consequently, higher export tax receipts. The model exhibits a reasonable fit,

with R-squared and adjusted R-squared values of 0.312 and 0.231, respectively, indicating that the model explains a significant portion of the variation in export tax revenues. The results therefore showed that the constructs of financial system development jointly exerted a significant effect on taxes on exports of Sub-Saharan Africa. This result corroborates the findings of previous studies with similar results (Arvin et al., (2021); Dalango & Weerasooriya (2021); Ayneshet, (2020); Abiola et al., (2020); Olufemi et al., (2020); Gnangnon, (2022); Promise et al., (2023); Akinola & Akinrinola, (2023); Ndu & Uguru, (2022); Piketty et al., (2018), Adenike et al (2024). On the contrary, the studies of Akhand, (2018); Deb et al., (2019); Dimitrios et al., (2024); Diabate & Koffi, (2023); Li & Lin, (2023); Victory et al., (2022); Osirim et al., (2022); Kassa, (2021) and Oz-Yalaman (2019), reported insignificant effect.

5. Conclusion and Recommendations

The study analyzed the effect of financial system development on taxes on exports, and the findings revealed that Financial System Access (FSA) and Financial System Depth (FSD) had a significant negative relationship with the dependent variable, while Financial System Efficiency (FSE) and Financial System Stability (FSS) exerted a positive significant effect on taxes on exports. However, the combined statistics of the explanatory variables showed a significant effect. The study therefore concludes that financial systems development has a significant effect on taxes on exports in Sub-Saharan Africa. The significant relationship between financial system development and tax revenue as evidenced in the results of the analysis portends several implications for tax administrators. A well-developed financial system affects tax enforcement, collection, compliance, and policy formulation, requiring tax authorities to adapt their strategies to maximize revenue efficiency and optimal utilization. The large variability in tax structures across the Sub-Saharan African region as depicted by the outcome of the descriptive analysis, requires tax administrators to leverage technology to improve tax compliance and efficiency, expand tax bases through digital and informal sector taxation, adapt tax policies to local contexts and enhance regional tax coordination to avoid harmful tax competition. Consequent to the findings in this paper, it is recommended that the governments of Sub-Saharan African countries and policymakers should develop capital markets for export oriented investments, strengthen trade finance and credit access by export oriented businesses and institute strategic and strong export tax policies that are transparent and equitable to boost trade competitiveness.

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