AFRICAN JOURNAL OF CUSTOMS AND FISCAL STUDIES (AJCFS)

A Biannual Journal of Customs and Taxation

ISSN: 2665-0517 (Print) ISSN: 2665-0509 (Online)

Volume 5, Issue Number 2, 2026

Frequency: Published Biannually – June and December

ISSN: 2665-0517 (Print) ISSN: 2665-0509 (On-line)

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ISSN:2665-0517 (Print) ISSN: 2665-0509 (Online)

Published by:

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EDITORIAL

It gives me great pleasure to write the editorial in this Volume 5, Issue 2 of the African Journal of Customs and Fiscal Studies (AJCFS), which contains five original articles addressing emerging issues in taxation, fiscal policy, revenue mobilization, and natural resource governance in Tanzania.

The first article examines cooperation between government and multinational corporations in Tanzania's mining sector. It demonstrates how fiscal reforms, strengthened legal frameworks, and constructive engagement between investors and government can enhance the contribution of the mining sector to national development while ensuring a fairer distribution of economic benefits.

The second article explores the potential of carbon credit trading as a source of tax revenue mobilization in Tanzania. The article highlights the growing role of voluntary carbon markets and social enterprises in promoting sustainable development while generating new revenue opportunities and recommends strengthening the regulatory framework governing carbon trading.

The third article investigates the effect of sectoral growth on tax revenue in Tanzania. Using empirical evidence provides insights into how growth in different sectors of the economy influences revenue performance and underscores the importance of promoting productive sectors to strengthen domestic resource mobilization.

The fourth article examines the relationship between Value Added Tax (VAT) structure and voluntary tax compliance behavior in Tanzania, with particular attention to the moderating role of tax service reliability. The findings suggest that reliable and efficient tax services can significantly enhance taxpayer compliance and improve revenue outcomes.

The fifth, analyses the effect of the COVID-19 pandemic on export levy revenue in Tanzania. The article provides evidence on the vulnerability of revenue sources to external shocks and highlights the need for adaptive fiscal strategies to strengthen revenue resilience during periods of economic uncertainty.

I extend my sincere appreciations to the Editorial Board, reviewers, authors and editorial staff for their dedication. The journal remains committed to advancing research on customs and fiscal studies across Africa.

The AJCFS invites submissions of original, high quality, and innovative research in all aspects of customs, taxation and fiscal studies for publication in the next issues.

Prof. Omari Mbura

AJCFS Chief Editor

How Does Cooperation Between Government and Multinational Corporations in Developing Countries Transform the Mining Sector? A Case Study of Tanzania

Amos J. Ibrahim[1]
Evelyne Mwambije[2]

Abstract

The paper is based on Tanzania's experience in managing the mining sector. It provides a qualitative analysis of the importance of cooperation between multinational corporations and the government in transforming the mining sector's contribution to the economy. By highlighting major reforms undertaken by the government in relation to scholars' comments regarding mining in developing countries. The findings show that the government of Tanzania amended the income tax act by including specific clauses on taxation of the mining sector. The new sections have abolished a depreciation allowance of 100 percent for capital assets, introduced ring-fencing and thin capitalization rules. The paper also examines the outcomes of renegotiation between the government and one multinational corporation. The two parties agreed to form a joint venture company where the government own 16 percent. They also agree on sharing future economic benefit 50/50. These findings suggest that cooperation between the two parties would yield desired outcomes for the public.

Keywords: Mining; Mining Tax Regime; Multinational Corporations and Government

JEL Classification: H25, H32, F23, Q32

1. Introduction

Following the work of Sachs and Warner (1995), the concept of the resource curse became popular among scholars. The resource curse phenomenon refers to the tendency of resource-rich countries to lag behind in economic growth when compared to their counterparts. Although there is no evidence of a resource curse in Tanzania, the contribution of the mining sector has been debatable over the years. For instance, its contribution to the gross domestic product (GDP) is on average 3 percent despite being the home of foreign direct investment (FDI). Similar to other resource-rich developing countries, the extraction of resources in Tanzania can be traced back to the colonial era. During that time, the extraction

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sector was under colonial firms. According to Acemoglu et al. (2001), in most countries where the European colonial could not settle due to high level of mortality rate, the colonialcreated institutions that help them to extract resources. Implies that the institutions that were created in Tanzania during colonial era focused on assisting the colonial to extract resources and transfer them to their countries. After the country become independent, the extraction of resources was entrusted to the state-controlled organization. The later approach crippled the productivity of the sector due to various factors including insufficient exploration and investment, and imposition of rules and regulations that hinder profitable private investment (World Bank, 1992).

However, from the mid-1990s, Tanzania embarked on a process of reforming the mining sector. According to the Tanzania investment report (2001), the country experienced a huge flow of FDI in the mining sector after enacting polices that support private investment. The reform led to the formulation of the Mineral Policy of 1997 and the Mining Act of 1998. These two instruments limited the role of the Government in the Mining sector to provide an enabling environment rather than directly engaging in actual mining operations. The reforms attracted a number of investors in exploration and extraction of minerals in the country. In addition, the government entered into agreement with large companies investing in the sector. This is referred to as mining development agreements (MDAs). The MDAs provide fiscal incentives beyond those provided by the fiscal laws and have fiscal stability clause that preclude raising of taxes. See for example (South Africa Resource Watch 2009; and Cooksey 2011).

The outcomes of the reforms undertaken may be considered to be successful, as the country managed to attract multinational corporations in the sector including African Barrick Gold, Ashanti Gold, Resolute Mining, Petra Diamond etc. The country experienced an increase in the sector's contribution to the GDP from 1 percent in 1998 to about 5.1 percent in 2018. The sector also accounts for about 50 percent of foreign earnings, (Economic Survey report, 2018).

Despite these notable contributions from the mining sector, the public complained about the sector's contribution to the government revenue. This situation influenced the discussions among politicians to the extent of demanding a special investigation of the MDAs entered between the government and investors. The government responded by formulating a number of committees to investigate whether the public concerns were of merit or not. For example, in 2004, Kipokola's Committee was set to review the mining policy of 1997 whereas in 2006, the Masha's committee was set to review MDAs and the fiscal regime. While in 2008 the Bomani's Committee was set up to review the mining sector. These committees suggested that tax concessions were among the reasons for poor

contribution of the mining sector to government revenue and to the economy. In response to the committees' recommendations, the government formulated a new mineral policy, 2009 and the Mining Act, 2010. The two instruments led to a number of reforms including establishment of Tanzania Mineral Audit Agency (TMAA), a semi-autonomous government agent responsible for auditing the players in the mineral sector (Mining Commission, Annual Report 2018/19). Despite the aforementioned reforms, the contribution of the mining sector in the economy continued to be debatable. To the extent that, in 2017 the government embarked into the process of reforming the sector again. This time around, the government took a different approach whereby it ordered major review of the mining laws and regulations to address shortcomings observed in previous reports. The government also banned export of unprocessed mineral concentrates and ores.

Following the ban of mineral exports, government formed two committees one led by Professor Nehemia Osoro and the other by Professor Abdulkarim Mruma to investigate the concentrates in the containers that were being exported and the related economic implications. The two Committees completed their assignment and offered their reports to the public. In case of minerals quantity and minerals concentrates, the committees found discrepancies between the declarations and actual quantity. While the company declared that the concentrates consist of gold, silver and copper the committee revealed other minerals such as sulfur, iron, iridium, rhodium, ytterbium, beryllium, tantalum and Lithium. This served as a process of eliminating information asymmetric between the multinational corporations and the government (Osoro Committee 2017, and Mruma Committee 2017).

Of interest is how the government responded on these issues. The first and foremost response was to strengthen the mining tax laws and regulations through the amendment of existing and formulation of new mineral laws. Thereafter, the government entered into negotiations with the company for the best approach of extracting minerals that will benefit both parties. The outcomes of negotiations, which lasted for about 3 years, were announced in January 2020. Where, *inter alia*, the two parties agreed to operate in a joint venture by forming a joint corporation where the government owns 16 percent non-dilutable free carry interest, and shares 50 percent in future economic profit. It is against this background that this article seeks to examine the role of both Multinational Corporations and the Government in changing the history of the mining sector in developing countries, particularly in Tanzania (The Diplomat, 2020).

The rest of the article is organised as follows; section two provides the literature review; section three presents the methodology; section four presents analysis and findings; section five presents discussion of findings while section four section provides conclusion and recommendation.

2. Literature review

There is an abundance of literature that focus on natural resources that try to explain the economics of natural resources. In most cases, taxation and natural resources seem to be inseparable as long as the mining operations are under the private sector. In this regard, scholars such as Hotelling (1931), Burness (1976), and Dasgupta and Heal (1979) focus on the impact of taxation on the extraction of natural resources. They agree that time-variant royalty taxes affect a firm's decision on the rate of extraction hence the life span of the mine. They argue that it depends on the market interest rate, royalty tax may influence the firm to either increase, or maintain or decrease the rate of extraction hence affecting the life span of the mine.

While Hotelling and his followers focus on the impact of taxation on extraction. Scholars such as Garnaut and Clunies Ross (1975) focus on taxation of economic rent that refers to super normal profit delivered by firms in the mining sector. They propose the introduction of resource rent tax as an additional tax. The prerequisite for this taxation instrument is for the government to expense both operations and capital expenditure and allow a firm to carry forward losses with accrued interest. Thus, when the project turns positive it implies that there is an excess profit, which could be taxed without affecting a firm's decision. Llyod (1984) argues that the government may tax excess profit at any rate less than 100 percent. This peg on the idea that when the project turns into positive the firm might have covered its investment together with its expected return.

On the other hand, there are studies focusing on how resources influence economic growth. For example, Hartwick (1977) while extending the work of Solow (1974), concludes that for an economy to achieve a constant rate of consumption over time it must invest all the net returns (resource rents) in reproducible and productive capital such as machinery. This is referred to as the Hartwick rule. It emphasizes the concept of intergenerational equity that resources should benefit both the current and posterior generations. These scholars emphasize on the importance of investing all proceeds from the mineral resources into reproducible and productive capital. That the society should consume the income generated by these reproducible and productive capitals. By doing so the society can generate sustainable consumption over generations, see for example, Norway's sovereignty wealth fund.

Sachs and Warner (1995) study the relationship that exists between natural resources and economic growth. They use a cross-sectional dataset of 98 countries that comprise of resource-rich and non-resource-rich countries. The authors conduct an empirical study to

investigate whether there is a difference in economic growth between the two groups of countries. They find that the economy of countries rich in natural resources tends to grow slower than their counterparts; this is what is referred to as the resource curse. However, other studies, notably, Mehlum *et al.* (2006) demonstrate that the resource curse disappears with good governance. That those countries with strong institutions benefit from natural resources more than their counterparts.

In fact, one aspect of the institutions is having a sound tax regime. According to Van de Ploeg and Venable (2011) there are mainly four challenges related to natural resources in developing countries. These include the design of fiscal and contractual regimes, the capture of resource rents by the government, the appropriate saving and spending of resource revenues. This study, therefore, investigates if the recent mining reforms in Tanzania address these issues as the reforms focus on strengthening the mining codes and contractual regimes.

It is worthwhile to note that most of studies that focus on mining in developing countries highlight the need for transparency in contractual agreements and mining operations to ensure the sector's contribution to the economy. These studies argue that governments tend to enter into secretive agreements with multinational corporations that turn out to be unfavorable to the public interest, see for example Gajigo *et al*. (2012); South African Resource Watch (2009); and Tilton (2004). Specifically, the Southern Africa Resource Watch (2009) mentions Tanzania as among countries with secretive agreements that offer tax concessions or incentives beyond those stipulated in mining laws. Our interest is to examine if the current reforms address these issues.

3. Methodology

This study follows a systematic documentary review approach where various documents are reviewed for the purpose of gathering relevant information related to the study. We systematically review various documents related to the fiscal reforms undertaken in the mining sector in Tanzania. The study also collects secondary data from various sources with an objective of analyzing the sector's contribution to the Tanzanian economy.

The review of documents included various committee reports related to mining operations, mining codes, MDAs, negotiation reports, and budget speeches. The mining codes reviewed include but not are limited to the mineral policy of 1997 as amended 2009, the mining act, 1998 together with its amendments, 2010 and 2018; Income Tax Act 2004 as amended in 2016, and the Natural Wealth and Resources Act, 2017. The review of these documents

aims at assessing whether or not the reforms address the shortcomings highlighted in various studies focusing on the mineral sector in developing countries. In the same vein, the study also reviews the outcomes of the re-negotiation between Barrick Mining Corporation and the Government with the aim of identifying lessons on how cooperation between governments and Multinational Corporations may transform the resource curse phenomenon into a resource blessing.

4. Analysis and findings

4.1 Contribution of the mining sector to Tanzania economy

Being capital-intensive the mining sector has limited contribution to the economy. Using the input-output model, Thomas (2010) finds a weak linkage of the mining sector with the rest of the economy in Ghana, indicating that the sector has minimal backward and forward linkages with the rest of the economy when compared to other sectors such as manufacturing. Similarly, Gajigo *et al*. (2012) analyze the impact of mining on economic development in 34 African countries. They document that both forward and backward linkages of the mining sector with the rest of the economy are limited, hence hindering its contribution to development. They also note that the sector is capital-intensive hence it offers a limited number of jobs compared to other sectors. They conclude that the main channel through which the economy can benefit is through taxation. (Note that in Tanzania even taxes from the mining sector had been negligible mainly because of Tanzania's tax legislation, generous incentives and sometimes asymmetric information.

In this study, we analyze the contribution of the mining sector in four aspects, namely, contribution to FDI, GDP, foreign earnings and taxes.

4.2 Foreign direct investment (FDI)

The formulation of Mineral Policy, 1997 and the Mining Act, 1998 paved the way for foreign investors in the mining sector. The country welcomed the mining giants who embarked on exploration and development of gold mining. According to the Tanzania Investment Report (2001), the flow of FDI in the mining sector accounted for about 66 percent of the total flow in the country. Since then, investment in the mining sector accounts for a large share of the stock of FDI in a country. On average, the share of the mining sector in the stock of FDI in the country is about 45 percent. This implies that the mining sector has been a driver for attracting foreign investment hence shaping the economic activities within the country. Figure 1: highlights the stock of FDI in million US dollars for the period of thirteen years, it has been increasing over time at the national level as well as in the mining sector.

This remarkable investment in the sector is associated with an increase in gold production in the country. Figure 2, gives highlights of gold production from 2001to 2018. In fact, most investments became productive in 2001, three years after the enactment of the Mining Act, 1998. Gold production accounted for more than 80 percent of mineral production in the country (see figure 5) and contributed significantly in terms of foreign earnings.

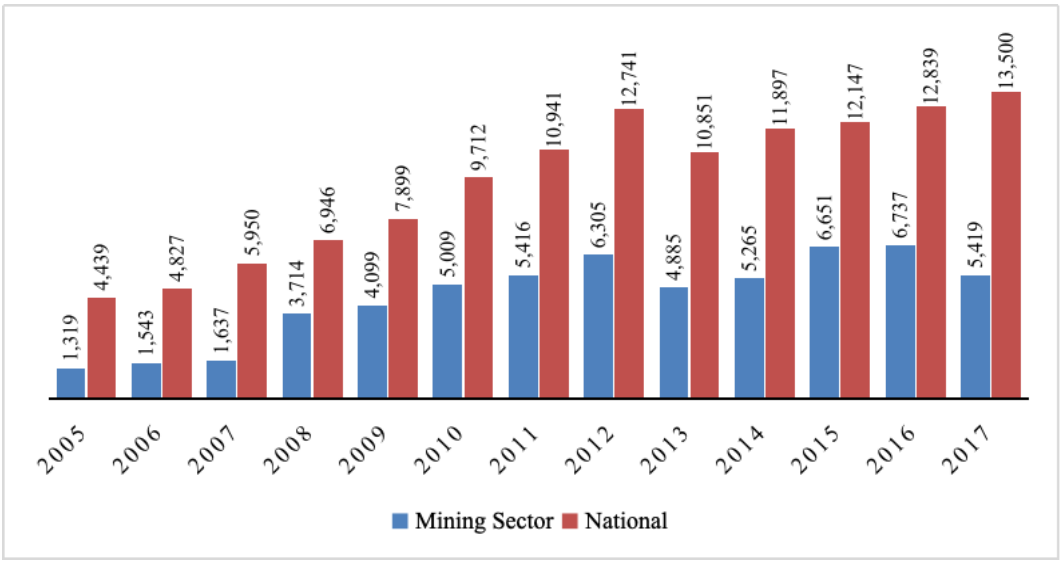

Figure 1: Stock of FDI in million US$, 2005 to 2017

Source: Tanzania Investment Reports (2001; 2004; 2009; and 2018)

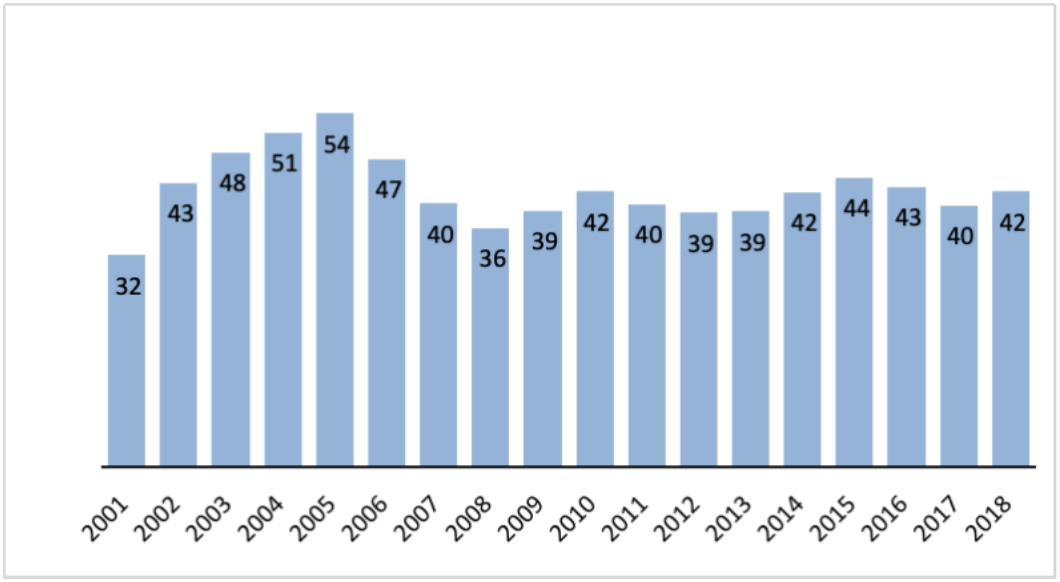

Figure 2: Gold Production in "000" kilogram (kg) for the period, 2001 to 2018

Source: Tanzania Mineral Audit Agency (2012; 2015) and Mining Commission (2020)

4.3 Gross Domestic Products (GDP)

The contribution of the mining sector to GDP has been increasing over the years. Looking at figure 3, the sector's contribution has increased from 1 percent in 1998 to about 5 percent in 2019. This is a remarkable contribution taking into consideration that the sector has limited linkage with the rest of the economy. In fact, this is an indication that the mining reforms have been successful in transforming the sector. The average contribution stands at 3 percent whereas from 2009 onwards its contribution is above the average. This period is associated with the second reform that resulted in the formulation of Mineral Policy, 2009 and the Mining Act, 2010. The new policy emphasizes creating a conducive environment for sustainable investment, promoting the linkage of the mining sector with the rest of the economy and strengthening institutional capacity for effective monitoring of the sector. The latter objective led to the formation of TMAA that was responsible for monitoring mining operations (Mineral Policy 2009).

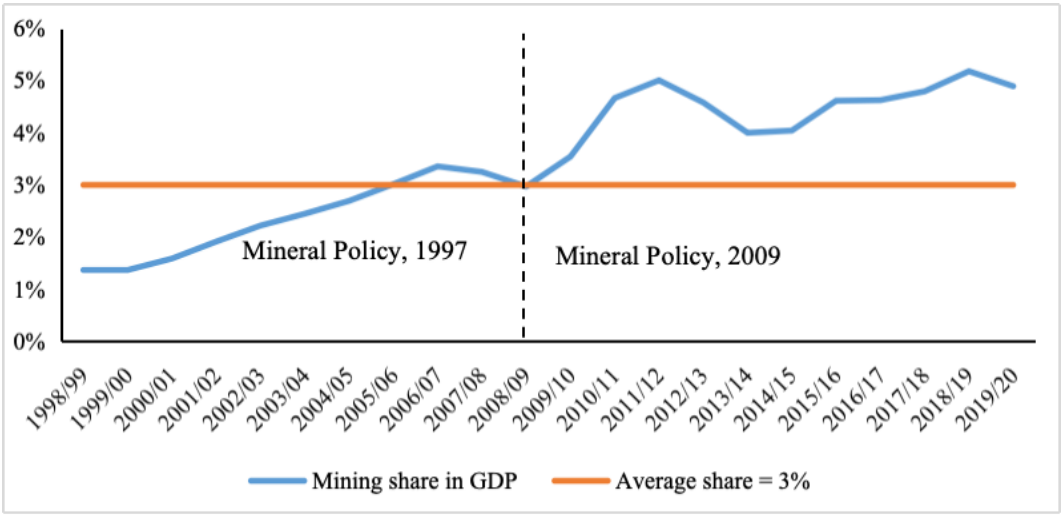

Figure 3: Share of mining activities in GDP

Source: Tanzania Economic Survey (2001; 2012; 2015 and 2020)

4.4 Foreign earnings

In terms of foreign earnings, the sector emerged to be one of the main contributors to government earnings. As depicted in Figure 4, the share of minerals in total export averages 22 percent over the two decades. Its contribution to total exports has increased from 2 percent in 1998 to about 23 percent in 2019. The increase is associated with the period of reforms in the mining sector in the country. Figure 5 shows that gold constitutes a large

share of minerals exports in the country. This implies that the gold mining derives changes observed in the mineral sector.

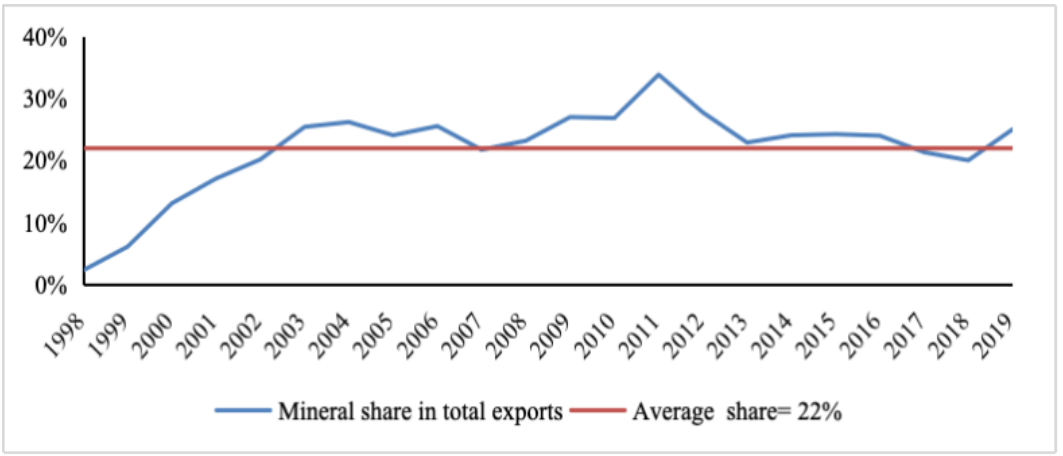

Figure 4: Share of Mineral Exports to Total Exports

Source: Tanzania Economic Survey (2001; 2012; 2015 and 2020)

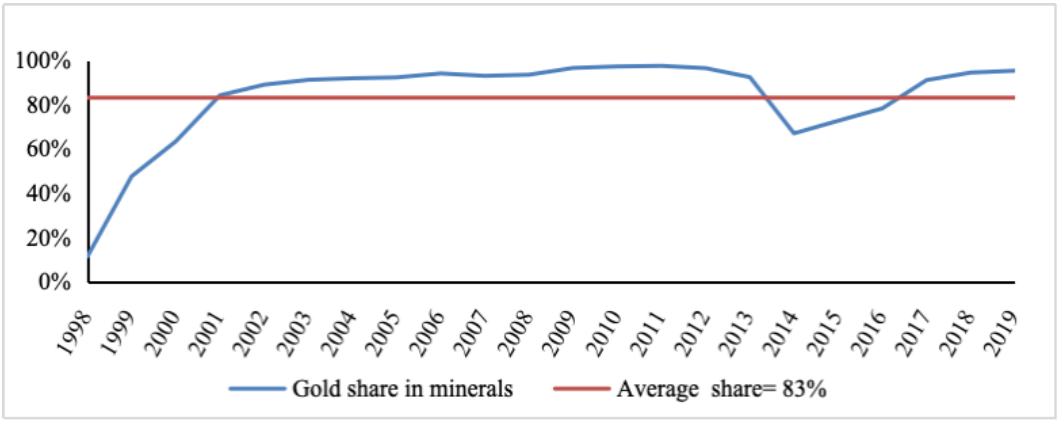

Figure 5: Share of Gold in Minerals Exports

Source: Author's Computation

4.5 Central government taxes

The contribution of the mining sector to total tax revenue is as summarized in Figure 6. Based on the availability of data, we analyze the contribution of the mining sector to total tax revenue for about 15 years. Figure 6 shows that on average the sector contributes about 3 percent of tax revenue. However, for many years the contribution was below average that suggests that the observed average, which suggest that the observed might have been influenced by taxes paid in year 2012 by Resolute Company when closing its business due

to gold exhaustion. The TMAA conducted a special audit prior to the closure of mining operations and the company paid its tax dues.

For many years, the sector's contribution to the government coffers has been the center of debate among the public and politicians. Notably, Gajigo et al. (2012), in their analysis of the mining contribution in 34 African countries, document the concern that mining companies are not contributing their fair share to government revenue due to generous tax concessions. This is the main reason why most countries keep renegotiating with the multinational corporations in the mining sector.

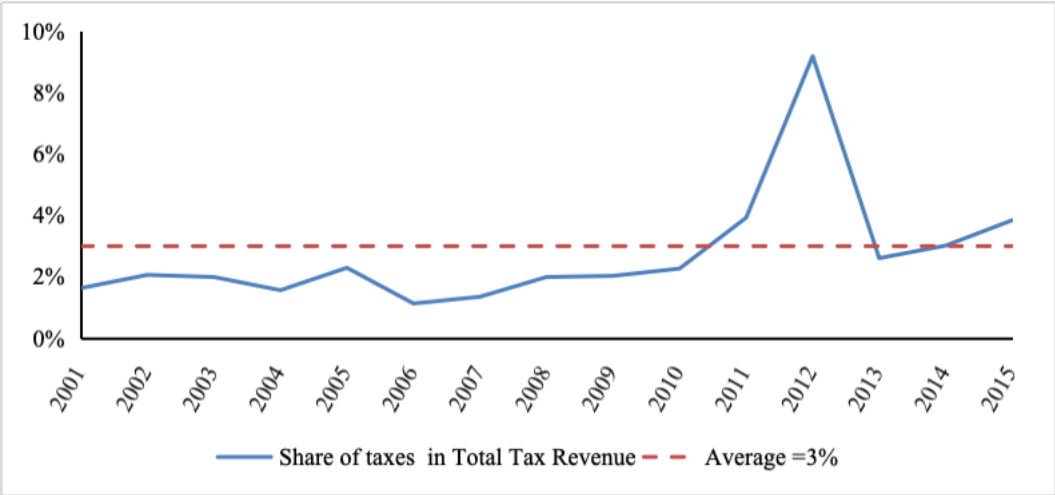

Figure 6: Mining Contribution to Tax Revenue

Source: Author's Computation (2026)

4.6 Royalty payment

Apart from taxes collected by the central government through various taxation instruments, the mining operator or prospector pays royalty to the government on mineral extracted. This is considered an economic rent paid to the State (as the owner of the minerals) by the mining operator for the extraction of non-renewable resources. Both the MDA and mining law stipulate the rate of royalty to be used by the mining operator when computing royalty. Despite investors' compliance with paying the amount due, there has been an outcry that the royalty rates are low hence the government has not been getting its fair share.

Therefore, based on the suggestions of Kipokola's committee (2004), Masha Committee (2006) and Bomani Committee (2008) the government through TMAA conducted a study on royalty forms and rates. The Mineral Audit Agency (2009) report on royalty tax rates

recommend changes in computation from net smelter return form to gross value form and change of rates from 4 to 5 percent for diamond, and 3 percent to 4 percent for precious minerals including gold. These changes are reflected in the Mining Act, 2010. Thus, from July 2010 the new rates and a formula for computing royalty become operational. This may partly explain the difference observed in royalty paid by the large mining companies before and after 2010, see Figure 7. When we compare the years 2009 and 2011 the government uptake of royalty doubled, suggesting that the reform has been productive.

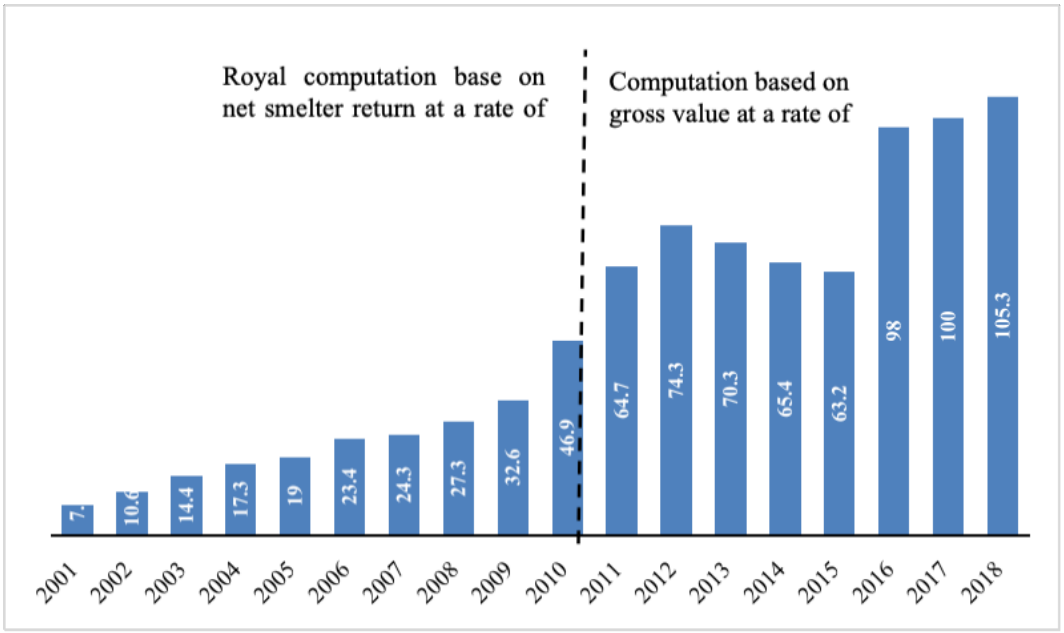

Figure 7: Royalty paid by large mining companies in "000" USD, 2001-2018

Source of data: Tanzania Mineral Audit Agency (2015) and Mining Commission (2018)

5. Discussion of findings

5.1 Mining Reforms in Tanzania, 2015 to 2020

When the fifth government assumed power, it came with the ambition of minimizing government expenditure while enhancing domestic resource mobilization. To achieve the latter objective, the government embarked on a number of reforms, notably the enhancement of the electronic collection of all government revenue through the government electronic payment system (GePG). Thus, all government payments whether from the ministries, agencies, local government authorities or central government, started to be collected electronically. To support this move, the government enacted the National Payment System Act, 2015 and its regulations for the purpose of controlling electronic money issuers. The

law provides guidelines for non-bank electronic money issuers in order to protect the public against unreliable service providers under the supervision of the Bank of Tanzania.

In the same vein of enhancing domestic resource mobilization, the government again re-assessed the contribution of the mining sector hence the commencement of a series of reforms in the sector. According to the Ministry of Finance and Planning (2019) in a report of the economic survey 2018, p. 3 states that "*ongoing government initiatives aim to reform the industry including the control of extraction and the prevention of the unregulated sale of minerals to ensure that the benefits of natural resources accrue to the nation"*. This implies that the reforms focus on ensuring that minerals contribute to the well-being of society.

The reforms include the amendment of the Income Tax Act of 2004 by introducing specific clauses on taxation of the mining sector. The reforms also amended the Mining Law, 2010, to capture beneficiation activities within mining operations as well as the establishment of the Natural Wealth and Resources (permanent sovereignty) Act, 2017. The latter clarifies issues related to ownership of natural resources and requirements for beneficiation. The following subsections analyze these reforms in relation to the challenges raised by various researchers regarding the mining sector in developing countries, particularly in Africa.

5.2 Income Tax Act, 2004 as amended in 2016

Companies operating in the mining sector are subject to income tax obligations like any other companies. However, in practice, these companies receive special treatment when it comes to the computation of tax liability. Like many other developing countries, Tanzania adopted the concessional approach where each multinational corporation has a contractual agreement with the government, referred to as a MDA. Among others, the MDA stipulates how the corporation will pay taxes. Cooksey (2011) highlights a number of tax concessions secured by investors beyond those stipulated in the tax laws and regulations. Thus, over the years, the government has been undertaking reviews with the intention of improving the mining sector's contribution to government revenue.

The most notable amendment to the income tax law is the recognition of the mining sector as a specialized area that needs special treatment in taxation matters. The revised Income Tax Act, 2016 has a section namely Division IV titled "*Prospecting and Mining"*, which provides guidance on the taxation of the mining sector. This division applies to a person conducting mining operations or activities undertaken under a separate license for the processing, smelting or refining of minerals. It provides guidelines on the treatment of

various mining fiscal issues that have been at the centre of scholarly discussion such as ring-fencing, the realization of mining license and the immediate depreciation of capital goods.

Regarding mining licenses, section 65C of the Income Tax Act states that each mineral right shall constitute a separate mining operation. This implies that a person who is subsequently granted a mining license, must operate within the area specified in the prospecting license. Further, it requires a separate computation of tax liability for each project, thus income from one mining operation should not be reduced by a loss from any other activity. This practice is referred to as ring-fencing. This concept can be traced back to the work of Garnaut and Clunies-Ross (1975) who proposed the resource rent tax. When Tanzania opened the sector to foreign investment in the mid-1990s, it did not implement ring-fencing. Therefore, it enabled companies to offset losses among different projects; hence, mining operated for many years without paying corporate taxes. According to OECD (2018) ring-fencing rules, may affect the extent to which costs and income can be transferred between related mines in the same country, thereby reducing the potential loss of government revenue arising from related-party transactions within a country. Hence, this amendment is beneficial to the country and align with international best practice.

The income tax Act also amended the procedures for computing depreciation allowances. The previous arrangement allowed accelerated depreciation where a company was entitled to claim 100 percent of the cost of capital expenditure (Ibrahim and Konishi, 2014). According to Zee et al. (2002), this kind of arrangement might induce a firm to purchase short-lived assets to take advantage of the full depreciation allowance. The revised Income Tax (2016), requires firms to place expenditure incurred in respect of mineral or petroleum operations during a year of income in a separate pool and depreciate them at a rate of 20 percent. This implies that the cost of assets is spread over the five years instead of being fully expensed in the same year of income as it was before the most recent amendment.

The Income Tax law also addresses the issue of the realization of mineral rights. Section 65H of the Income Tax Act (2016) recognizes mineral rights as assets, that are separate from any other interest. It further provides guidance on the time of realization, stating that mineral rights should be treated in the same manner as other investment assets for tax purposes. In Tanzania, the realization of an investment asset is subject to capital gain tax, which implies that the same should apply to the realization of the mineral rights. Some studies advocate the need for capital gain tax when mineral rights change hands. For instance, Otto et al. (2006) noted that capital gain tax on the disposal of mineral assets is not common among developing countries compared with developed countries. Similarly,

the International Study Group report on the African mineral regime (2011) argues that, "African states should consider imposing a capital gains tax on any mineral property sold before mining operations begin". They recommended this after that many exploration companies sell most exploration companies, sell their mineral rights to other companies without paying taxes. In this regard, this amendment is also beneficial to the host country and is likely to contribute to domestic revenue mobilization.

5.3 The natural wealth and resources (Permanent Sovereignty) Act 2017

In a move to ensure sustainable management of the natural resources, the Tanzanian government enacted a law that clearly explains matters related to ownership, beneficiation and, dispute resolution concerning natural resources. Concerning the ownership, section 4 of the Natural Wealth and Resources Act, 2017 stipulates that the people of the United Republic of Tanzania shall have permanent sovereignty over all-natural wealth and resources, whereas the government shall exercise the ownership and control on behalf of the public. This section, therefore provides clarity on the issue of ownership of natural resources in the country.

In the same vein section 9 of the Natural Wealth and Resources Act, 2017 emphasizes on the beneficiation of extracted resources. It prohibits the exportation of raw resources for beneficiation outside the country and encourages the exportation of processed minerals. This aims at ensuring value addition to extracted ores prior to exportation. Since the beneficiation may involve the construction of smelting industry this may create forward linkage, increase employment and enhance government revenue from the sector. The latter has been taken care of by the government by including a provision in the Income Tax Act, 2016 that provides guidance on the taxation of the smelting industry. Generally, if beneficiation is conducted within the country, it may improve the mining sector's linkages with the rest of the economy. For discussion on forward and backward linkage of the mining sector with the rest of the economy, see, Thomas (2010) and Gajigo *et al* (2012).

Moreover, section 11 of the Natural Wealth and Resources Act prohibits proceedings in foreign courts. It states, "*disputes arising from extraction, exploitation or acquisition and use of natural resources shall be adjudicated by judicial bodies or other organs established in the United Republic of Tanzania and in accordance with laws of Tanzania*." This is contrary to previous arrangements where the MDAs required international arbitration through agencies such as the International Center for the Settlement of Investment Disputes (ICSID) (Mainhardt-Gibbs, 2007). The renegotiation process between the government and

Barrick Gold on the dispute raised in 2017 is probably an application on how to handle disputes locally.

Further, this newly enacted act gives the right to the National Assembly the right to review agreements related to the extraction, exploitation or acquisition and use of natural wealth and resources. This practice may improve transparency in the extractive sector, as it has been one of the criticisms of mining development agreement. Most studies highlight an issue of secrecy in the mining agreements as a hindrance to the sector's contribution to the economy. For example, Southern African Resources Watch (2009) discusses how transparent taxation and fair taxes can overturn the resource curse phenomenon. They argue that most contracts are secretive and offer tax concessions beyond those allowable by laws.

5.4 Mining tax codes (Mining Act 2010 as revised in 2018)

This is the principal legislation, which provides guidance on matters pertaining to mining activities in Tanzania. Administrative issues covered include the agencies responsible for the administration of mining activities, the process of securing mining licenses, dispute settlement, environmental issues and the tax instruments applicable to the mining sector or other than income tax. The review comprehensively addresses various issues with the view of enhancing the contribution of the mining sector to the economy. Nevertheless, in this article, we highlight only a few fundamental issues.

The revised Mining Act reviews the royalty rates levied on various minerals. For metallic minerals (gold, copper, silver) from 4 to 6 percent and for precious stones such as diamond, ruby and tanzanite from 5 to 6 percent. It also introduces clearing fees of 1 percent on the gross value of mineral export. These changes may have an impact on the mining investment. According to Hotelling (1931), royalty payment has a direct impact on the extraction behavior of a firm. However, its impact depends on the specific conditions of imposition, as they may increase, decrease or maintain the same rate of extraction.

The revised Mining Act also institutes state participation in mining activities. It requires the government to have a non-dilutable share of not less than 16 percent as a free carried interest in the capital of a mining company subject to the type of minerals and the level of investment. The law also allows the government to acquire shares in a mining company of up to 50 percent determined based on the total value of the tax expenditures enjoyed by the mining company (s. 10, pp. 22). The practice of the government holding shares in mining companies is popular among African countries see for example Gajigo, et al. (2012). However, the difference lies in the model of financing, here the government

suggests that the tax concessions available to mining companies are considered sufficient payment for government's share in the mining operations. On the other hand, this practice may discourage investors from tax concessions.

The Mining Act further requires each administrative or geographical region to establish mineral houses. This has helped to bridge the gap between the mineral dealers and artisanal miners. Section 27C of the Mining Act stipulates that the Commissioner for Mining shall establish a number of the mineral houses, each comprising a minerals auction center, a mineral exchange and a mineral clearing house. This approach seeks to combat mineral smuggling in the country and to assist small-scale miners in obtaining a reliable market with fair mineral prices. According to the Budget Speech (2020), there are 28 markets and 25 mineral trading centress. This has addressed a market access problem for artisanal miners and has increased government revenue. According to the Mining Commission (2020), the establishment of such mineral centres and markets has increased government revenue collection compared with the previous period. For instance, the first mineral market was established in Geita Region on 17th March 2019. as shown in Figure 8, a significant change in both the quantity of minerals sold and government revenue collection can be observed, resulting from the establishment of the mineral market.

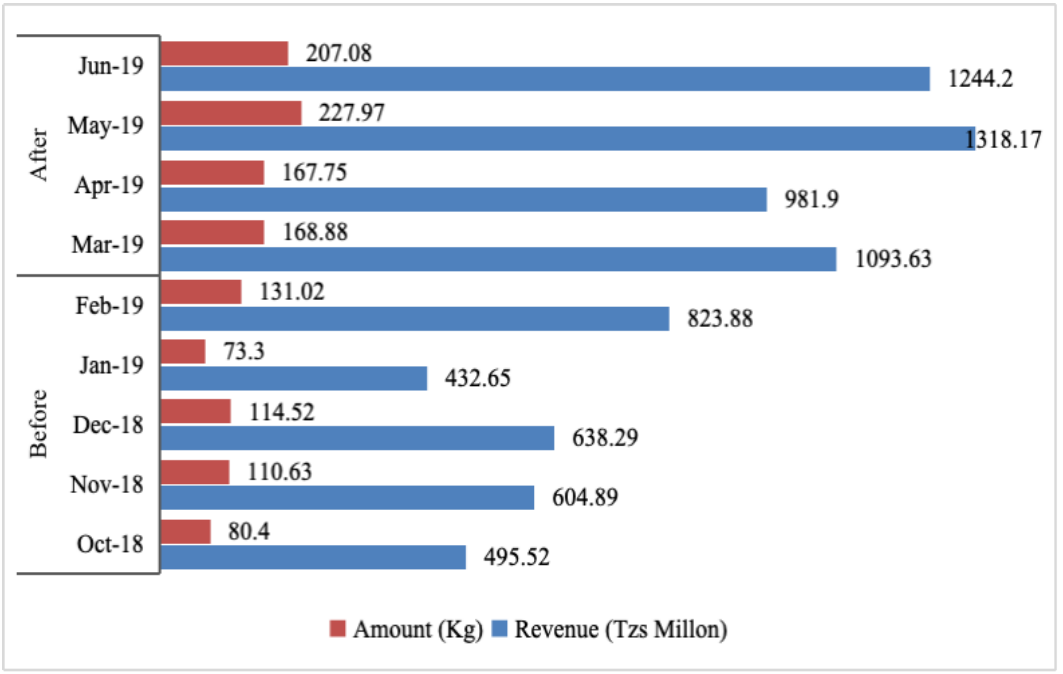

Figure 8: Mineral production and revenue collection before and after the establishment of Geita mineral market.

Source of Data: Mineral Commission, annual report 2018/19.

6. Conclusion and implications of the study

As part of reforms, the government of Tanzania entered into negotiations with Barrick Gold regarding its mining operations. This was the result of findings presented by two committees, which examined the mineral contents, and the legal and economic implications of containers held at the port of Dar es Salaam. Barrick Gold is one of the largest Multinational Corporations operating in Tanzania with about six major projects, namely; the Bulyanhulu Gold Mine, the Buzwagi Gold Mine, North Mara Gold Mine, the Tulawaka Gold Mine, the Nyanzaga Gold Project and the Kabanga Nickel Project (TMAA, 2012). However, a review of the TMAA report of 2015 indicates that the ownership of these projects had changed to Acacia Mining. This stimulated public debate on how this change in ownership occured.

Following the committees' report in May 2017, the government and the Barrick Gold entered into renegotiation aimed at resolving the identified issues. This process spanned almost three years. It is worth noting that these negotiations took place after all major reforms had been finalized thus the government drew on the new mining codes. In January 2020, the government of Tanzania announced the outcomes of the negotiations. According to the Budget Speech (2020), the two parties agreed on establishing a joint venture company in which the government holds 16 percent and Barrick Gold holds 84 percent. They also agreed on sharing t future economic benefits on a 50/50 basis, see also The Diplomat, (2020).

How the government will share in the 50 percent of the future economic benefit remain unclear. However, if this means that the government may tax up to fifty percent of future profits, this would constitute a resource rent tax. Garnaut and Clunies-Ross (1975) were the first to propose a resource rent tax in the extractive sector. Their proposal focused on enhancing mining taxation in developing countries on the grounds that the extractive sector is dominated by multinational corporations. However, in practice, various forms of resource rent taxes are predominant in developed countries such as Denmark, Norway and Australia (Lund, 2002 and 2011).

Furthermore, the recent outcome of the negotiations between the government and Barrick Gold points a new direction, suggesting that the governments in developing countries that wishes to maximize their share of revenue from mining operations should strengthen their mining fiscal regime and collaborate with the multinational corporations. The approach adopted by Tanzania suggests that a government needs to be well informed prior to entering

negotiations with a multinational corporation. In other words, there should be information symmetry between the two parties in order to establish a productive and fair mining regime.

The findings of this article suggest that the mining reforms implemented from 2015 to 2020 have addressed a number of issues raised by various scholars focusing on the mining sector in developing countries. Critical issues related to taxation, ownership, transfer of rights and beneficiation are well articulated in the new mining codes. The reforms also address the management of resource revenue, a matter that has been a central of scholarly debate. Finally, the outcomes of the negotiations between the government of Tanzania and Barrick Gold company are noteworthy. The agreement to share economic benefit on a 50/50 basis in future operations represents one of the remarkable achievements for both parties. This suggests that a sound fiscal regime is attainable through transparent cooperation between Multinational corporations and the Government.

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Harnessing Carbon Credit Trading for Tax Revenue Mobilization in Tanzania: The Role of Voluntary Markets and Social Enterprises

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Abstract

This study explores the potential for generating tax revenue from carbon credit trading in Tanzania's voluntary carbon market (VCM), with a focus on the role of social enterprises. The objective was to evaluate how social enterprises contribute to community-based carbon offset initiatives while promoting sustainable development and domestic revenue growth. Employing a qualitative research design, the study analyses secondary data from 2022 to 2024, drawing on government reports, REDD+ documentation, and voluntary market registries. The findings reveal that Tanzania's emerging VCM has attracted over USD 1 billion in investment and generated approximately TZS 14.3 billion in revenue. Social enterprises play a key role by reducing transaction costs and facilitating local engagement; yet their impact is constrained by fragmented regulations and unclear tax guidelines. The study concludes that Tanzania's VCM holds significant untapped tax potential. It recommends establishing a unified legal and tax framework, subsidizing certification costs, and incentivizing social enterprises to enhance their contributions to climate finance.

Keywords: Carbon credit trading, Tax revenue mobilization, Voluntary Markets, Social enterprises, Tanzania.

JEL Codes: Q56, Q58, H23, O55

1. Introduction

The greenhouse gas (GHG) emissions, particularly carbon dioxide (CO_2), methane, and nitrogen oxides - remain a major driver of global climate change, with fossil fuel combustion being the principal source. These emissions have accelerated global warming, resulting in severe environmental and socioeconomic consequences. In response, international climate policy has increasingly embraced market-based instruments such as carbon pricing and emissions trading systems as cost-effective tools for mitigating climate change. Leading global institutions, including the World Bank, the United Nations Environment Programme (UNEP), the International Monetary Fund (IMF), and the International Institute for

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Sustainable Development (IISD), endorse carbon pricing through taxation or trading as not only a mechanism for reducing emissions but also a potential source of sustainable public revenue..

Global experiences, notably in the European Union, illustrate how well-designed carbon pricing frameworks can support climate objectives while promoting green economic transformation. These frameworks demonstrate the critical role of fiscal instruments, such as carbon taxes, levies, and credit trading schemes in mobilising resources and incentivizing low-carbon transitions. Tanzania is uniquely positioned to benefit from such mechanisms due to its abundant natural resources, particularly its extensive forest cover, which includes natural forests, woodlands, mangroves, and bee reserves. These ecosystems provide vital carbon sinks, making Tanzania a strong candidate for participation in the voluntary carbon market (VCM). When leveraged effectively, carbon credit trading can serve as a dual-purpose tool generating environmental benefits through carbon sequestration while contributing to domestic resource mobilization, especially when implemented through socially driven enterprises.

However, despite its natural endowment, Tanzania continues to grapple with deforestation and forest degradation, which threaten its carbon sequestration potential. The government has responded with a series of regulatory and institutional reforms, including the establishment of the Tanzania Forest Services (TFS) and the National Carbon Monitoring Centre (NCMC), and the enactment of the Environmental Management (Control and Management of Carbon Trading) Regulations of 2022 and 2023. These efforts mark important steps toward formalizing carbon trading. Nonetheless, the sector remains nascent, and empirical evidence on how carbon credit trading, particularly within the voluntary market—can be harnessed to generate tax revenue remains limited. One of the most underexplored aspects is the role of social enterprises, organisations that combine economic activity with social and environmental missions. Social enterprises in Tanzania are increasingly active in areas such as reforestation, renewable energy, and sustainable agriculture, positioning them as key players in the generation of carbon offsets. Yet their capacity to engage effectively in carbon markets is often hindered by challenges such as limited financial capital, high certification costs, inadequate technical expertise, and weak policy support.

This study addresses these gaps by assessing the potential for tax revenue mobilisation through carbon credit trading in Tanzania's voluntary carbon market, focusing on the following questions: What is the current state of tax revenue generation from Tanzania's VCM? How do social enterprises contribute to carbon offset initiatives? What regulatory and fiscal barriers constrain their participation? The remainder of the paper is organised

as follows: Section 2 presents the literature review; Section 3 covers the methodology; Section 4 presents the findings; Section 5 provides conclusions and recommendations; and Section 6 identifies areas for further research.

2. Literature Review

2.1 Theoretical literature

This study employs a targeted theoretical approach, combining Pigouvian Taxation Theory, the Double Dividend Hypothesis, and Institutional Theory to understand the relationship between carbon credit trading and tax revenue mobilisation. Pigouvian Taxation Theory (Pigou, 1920) provides the underlying rationale for carbon pricing as a mechanism to correct negative externalities arising from greenhouse gas emissions. It supports government intervention—through taxes or markets to internalise the social costs of pollution. Recent research supports the applicability of Pigouvian principles in climate change policy, as carbon pricing is seen as one of the most effective means of addressing negative externalities (Stiglitz & Stern, 2017; World Bank, 2023). However, some scholars contend that in low- and middle-income countries, the effectiveness of Pigouvian policies is limited by poor governance, informality, and weak monitoring (Aghion et al., 2021). In the Tanzanian context, although carbon credit trading embodies Pigouvian principles, its effectiveness in mobilising tax revenue hinges on the capacity to regulate, monitor, and value predominantly private and decentralised transactions.

The Double Dividend Hypothesis (Goulder, 1995) suggests that environmental taxes can yield a "win-win" outcome in terms of both environmental and economic efficiency. Recent empirical evidence is inconclusive. Some evidence suggests that reinvesting environmental tax revenues in productive activities or reducing distortionary taxes can boost welfare and growth (Freire-González, 2018; OECD, 2022). Others, however, note potential negative distributional impacts, particularly in low-income countries where carbon pricing can be regressive if not carefully managed (Klenert et al., 2018). In Tanzania, given limited fiscal capacity and equity challenges, a "double dividend" from carbon markets is not a foregone conclusion. Rather, it depends on the design, taxation regime, and distribution of revenues from carbon credit trading. Accordingly, this study treats the Double Dividend Hypothesis as a conditional proposition rather than an a priori conclusion, contingent on specific tax design, incentive structures, and reinvestment strategies within the VCM framework.

Institutional Theory (Scott, 1995) complements these economic analyses by highlighting the importance of regulation, governance, and institutional capacity. Recent research demonstrates that carbon markets, particularly VCMs, are critically dependent on institutional

quality—including the clarity and enforcement of regulations and effective stakeholder coordination (Buchanan et al., 2020; Keohane & Victor, 2016). Insufficient or fragmented institutions can result in market distortions and inefficiencies, limited participation, and revenue losses. In Tanzania, although carbon trading regulations were introduced in 2022, institutional deficiencies persist in taxation guidelines, inter-agency coordination, and the recognition of social enterprises. These deficiencies undermine the government's capacity to mobilise tax revenues from carbon trading effectively. Institutional Theory is therefore central to this study's analytical framework, explaining why the mere existence of carbon market opportunities does not automatically translate into successful revenue mobilisation.

Together, these theories offer a coherent and critically informed framework for examining the relationship between carbon credit trading and tax revenue mobilisation. Pigouvian Taxation Theory clarifies the economic rationale for carbon taxation; the Double Dividend Hypothesis articulates the potential fiscal and environmental gains; and Institutional Theory identifies the governance conditions required for those gains to be realised. Critically, the combined application of these theories enables the study to move beyond normative judgements and explore the practical conditions under which Tanzania's voluntary carbon market can drive sustainable development and domestic revenue generation.

2.2 Empirical literature

2.2.1 Experiences from other countries

Empirical studies reinforce the theoretical claims regarding the effectiveness of carbon pricing but emphasise that their success depends heavily on policy design and socioeconomic context. Auffhammer (2016) and Andersson and Atkinson (2020) argue that carbon pricing mechanisms are effective tools for reducing greenhouse gas emissions when implemented thoughtfully. However, poorly designed policies may impose regressive impacts, particularly on low-income groups. Fullerton and Metcalf (2020) caution that implementing carbon taxes without correcting existing market distortions—such as subsidies for fossil fuels can undermine emissions reduction goals. Moreover, the manner in which environmental tax revenues are recycled significantly influences their overall effectiveness. Landa Rivera et al. (2016) demonstrate

Case studies from Brazil and India (Grottera et al., 2017; Ojha et al., 2017) indicate that channelling carbon tax revenues into productive sectors minimises GDP losses. In contrast, studies from Ethiopia and ASEAN countries (Telaye et al., 2019; Nurdianto & Resosudarmo, 2016) suggest that lump-sum transfers may be more appropriate in contexts with weaker administrative capacity or greater income inequality. Despite growing global interest in carbon markets, relatively few studies focus specifically on voluntary carbon markets in Sub-Saharan Africa—particularly regarding the taxation of carbon credit trading, the role

of social enterprises in revenue generation, and how regulatory frameworks influence both fiscal outcomes and sustainable development.

Carbon taxation and credit trading mechanisms are gaining momentum across the East African Community (EAC), with countries such as Kenya, Uganda, Rwanda, Burundi, Tanzania, and the Democratic Republic of Congo (DRC) exploring their potential to address climate change while mobilising domestic revenue. Regional studies underscore the importance of developing robust regulatory frameworks, improving market accessibility, and engaging stakeholders in order to harness the fiscal and environmental benefits of carbon markets. Kenya and Uganda have prioritised regulatory reforms and investment attraction, while Rwanda has focused on reducing transaction costs and enhancing market efficiency.

2.2.2 Empirical studies from the united republic of Tanzania

Carbon pricing mechanisms in Tanzania encompass both carbon taxes and emissions trading systems (ETS). These instruments cap emissions and allow the trading of permits or credits, creating incentives for firms to adopt cleaner technologies. Carbon offset projects including reforestation and renewable energy generate tradable credits under mechanisms like the Clean Development Mechanism (CDM) and voluntary standards such as the Gold Standard. Each carbon credit typically represents one tonne of CO_2 -equivalent emissions reduced or avoided. These credits are increasingly traded globally, attracting investment from major corporations and enhancing the financial viability of emissions reductions. The policy and institutional environment is shaped by international climate agreements. The United Nations Framework Convention on Climate Change (UNFCCC) (1992) set the foundation, followed by the Kyoto Protocol (1997), which introduced binding targets and carbon trading mechanisms. The Paris Agreement (2015) expanded this through Nationally Determined Contributions (NDCs) and market-based tools like green financing. (UNFCCC, 2010). As a signatory, Tanzania aligns its domestic efforts with these frameworks, leveraging global mechanisms and institutional support to participate in carbon markets and advance sustainable development goals.

In Tanzania, carbon taxation is emerging as a strategic tool under consideration, supplementing a range of existing environmental levies—including fuel levies, excise duties on petroleum, VAT on petroleum products, motor vehicle taxes, and plastic bag levies—which collectively generated over TZS 5.3 trillion between 2015 and 2022. These levies demonstrate a "double dividend" effect by simultaneously generating revenue and promoting environmental protection.

Tanzania has established a solid policy and legal foundation for carbon trading through instruments such as the National Environmental Policy (2021), the Climate Change Response Strategy (2021–2026), and the Environmental Management (Control and Management of Carbon Trading) Regulations, 2022, all guided by the Environmental Management Act Cap. 191. These are further supported by the National Environmental Master Plan for Strategic Interventions (2022–2032) and the National Carbon Trading Guidelines (2022). Zanzibar also maintains aligned frameworks through its Environmental Policy (2013) and Climate Change Strategy (2014–2030).

Tanzania's participation in international carbon markets is coordinated by institutions such as the Vice President's Office, the National Climate Change Focal Point, and the National Carbon Monitoring Centre (NCMC), and aligns with the country's REDD+ Strategy. The 2022 carbon trading regulations emphasise transparent registration, community involvement, and adherence to international standards. Revenue from carbon trading is intended to support infrastructure, social services, and environmental projects (NCMC, 2024).

Since the enactment of the carbon trading legislation in October 2022, Tanzania has attracted over USD 1 billion (approximately TZS 2.3 trillion) in investment, with more than 20 multinational companies operating in the sector. Early gains include TZS 14.3 billion in carbon credit revenues in Tanganyika District and direct financial benefits to communities in Kagera and Katavi regions (Daily News, 2023). Companies such as Carbon Tanzania and Living Way Limited have implemented successful projects like the Ntakata Mountains Project, which combines forest conservation with rural development. The Tanzania Wildlife Management Authority has also initiated carbon credit sales from major forest reserves (Carbon Tanzania, 2021, 2022).

Despite these advances, Tanzania faces challenges that may hinder the full realisation of carbon trading benefits. Studies by Mwakalasya (2020), Kihupi (2019), and Ngowi (2018) highlight constraints such as limited institutional capacity, regulatory gaps, and restricted market access. To unlock the full potential of carbon trading for sustainable development and enhanced tax revenue, further reforms are needed—particularly in strengthening institutional frameworks, improving REDD+ readiness, and ensuring inclusive stakeholder engagement.

2.2.3 Taxation and revenue flows from climate policy instruments (2015–2022)

Tanzania's climate-related tax revenue streams between 2015 and 2022 reflect the country's growing commitment to addressing environmental challenges through fiscal policy.

As part of global efforts to combat climate change, Tanzania has been exploring carbon taxation as a strategy to promote sustainable development. Although still in its early stages, this approach aligns with international climate action agendas and signals Tanzania's commitment to environmental stewardship. The existing framework of environmental taxes and levies such as fuel levies on petrol and diesel, petroleum levies, and excise duties on imported motor vehicles not only generates substantial public revenue but also supports environmental improvement, resulting in a "double dividend" effect (Patterson III, 2000; Schlegelmilch & Joas, 2015). Furthermore, value-added tax (VAT) on petroleum products, motor vehicle taxes, and excise duties on plastic bags continue to bolster government revenue while contributing to climate-related policy objectives (TRA, 2021). The analysis of this period reveals the following notable trends:

Dominance of Fuel-Related Taxes: Fuel-related taxes emerged as the dominant source of climate-related revenue in Tanzania between 2015 and 2022, with excise duty on petroleum imports generating TZS 1.64 trillion and the fuel levy contributing TZS 1.41 trillion. These figures underscore the central role of petroleum-based taxation in the country's environmental fiscal strategy. Notably, the steady year-on-year increases particularly from 2017/18 to 2021/22 reflect both rising fuel consumption and government responsiveness through price or policy adjustments, reinforcing fuel taxation as a key driver of domestic resource mobilisation for environmental objectives.

Vehicle-Related Duties: Vehicle-related duties constituted a major component of climate-related revenue, with import duty on vehicles contributing TZS 1.57 trillion, ranking third overall. Additionally, excise duty for aged vehicles and motor vehicle taxes jointly generated TZS 1.24 trillion, reflecting policy efforts to discourage the importation of older, high-emission vehicles. The sharp rise in excise duty for aged vehicles from TZS 120.7 billion in 2015/16 to TZS 244.1 billion in 2021/22 highlights a strategic fiscal approach aligned with environmental goals to reduce emissions from aging vehicle fleets.

Support to Renewable Energy: The petroleum levy allocated to the Rural Energy Agency (REA) generated a total of TZS 507.7 billion between 2015 and 2022, serving as a critical earmarked revenue source for advancing rural electrification through renewable energy initiatives. The noticeable spike in collections in 2020/21 (TZS 88.9 billion) underscores the government's growing commitment to climate mitigation and the energy transition, particularly in underserved areas, aligning fiscal policy with national sustainability and development goals.

Minimal Revenue from VAT on Plastics: Despite the significant environmental risks posed by plastic waste, VAT on plastics generated only TZS 17.5 billion over the seven-year period, making it the lowest source of climate-related tax revenue. This modest contribution highlights a potential gap in policy enforcement or limited tax scope, suggesting a missed opportunity for both enhanced revenue mobilisation and stronger environmental regulation targeting plastic pollution.

The year 2021/22 marked the peak in revenue collection across most climate-related tax categories, likely reflecting a combination of rate adjustments, enhanced enforcement, and post-COVID-19 economic recovery. Over the seven years, the total revenue from the listed levies reached approximately TZS 6.38 trillion, underscoring the government's effective use of climate-linked fiscal instruments—particularly in the transport and energy sectors—to advance both environmental and revenue mobilization goals.

These trends indicate a strong and growing potential for expanding environmental taxation in Tanzania beyond traditional sources such as fuels and vehicles, creating opportunities for the introduction of plastic levies, emissions-based charges, and carbon credit taxation. Existing revenue patterns from petroleum and vehicle taxes demonstrate that there is sufficient fiscal space to integrate carbon pricing within the current tax framework. Moreover, the findings underscore the emerging but largely untapped role of social enterprises and voluntary carbon markets in advancing climate finance provided that appropriate regulatory structures and incentive mechanisms are established, as summarized in Table 1.

Table1: Revenues from Climate Change Related Taxes, Duties and Levies (2015-2022)[a]

Year	Fuel Levy	Petroleum Levy - REA	Excise Duty on Imports – Petroleum	Import duty - Vehicles	Excise Duty for aged motor Vehicle	Motor vehicle taxes	VAT on Plastics
2015/16	160,523	79,419	174,932	213,639	120,665	58,045	2,847
2016/17	164,797	67,482	178,502	227,373	114,750	55,169	1,546
2017/18	172,457	67,192	224,498	149,394	85,504	22,248	2,922
2018/19	193,945	78,903	271,087	209,706	105,546	28,307	2,975
2019/20	155,646	58,113	198,606	254,429	172,798	24,854	2,736
2020/21	219,548	88,983	305,150	207,482	140,102	32,412	2,033
2021/22	340,123	67,605	282,686	309,298	244,107	38,650	2,483
Total	**1,407,039**	**507,697**	**1,635,460**	**1,571,320**	**983,472**	**259,684**	**17,541**

Source: REPOA (2022)

[a] Figures in TZS million

3. Methodology

3.1 Research design

This study adopted a qualitative research design, relying primarily on secondary data and documentary analysis to assess the intersection of carbon credit trading, taxation, and social enterprise participation in Tanzania's voluntary carbon market (VCM). The study covered the period from 2022 to 2024 and aimed to identify the institutional, fiscal, and policy-related enablers and constraints shaping Tanzania's carbon market.

3.2 Data type and collection methods

This study relied on secondary qualitative data collected through a systematic documentary review. Documentary review is widely used in qualitative research to analyse existing records and institutional documents in a structured manner (Creswell, 2014; Bowen, 2009). Data were gathered from publicly available sources, including policy documents, regulatory frameworks, tax records, and environmental management reports. Additional materials including project evaluations, REDD+ documentation, and voluntary carbon market registries were reviewed to provide contextual depth.

The documentary review involved systematic identification, screening, and extraction of relevant information from official publications and institutional reports (Bowen, 2009). This approach is appropriate where direct primary data collection is limited, as it allows for the analysis of policy and institutional developments over time (Creswell, 2014).

3.3 Data sources

Data sources include the Vice President's Office (Environment Division), Tanzania Revenue Authority (TRA), Tanzania Forest Services (TFS), Tanzania Wildlife Authority (TAWA), Tanzania National Carbon Monitoring Centre (NCMC), Rural Energy Agency (REA), Business Registrations and Licensing Agency (BRELA), and Tanzania Investment Centre (TIC). These sources provided insights into both the operational realities and the policy frameworks influencing the carbon market.

3.4 Population

The study population comprised all carbon credit trading activities and associated taxation and regulatory data in Tanzania's voluntary carbon market (VCM) from 2022 to 2024. This encompassed carbon trading projects, carbon credit trading activities, and taxation

and regulatory records reported by various institutions. Available evidence indicates that Tanzania's VCM involves more than 20 multinational corporations and a rising number of carbons trading projects, reflecting growing market participation (NCMC, 2024; Daily News, 2023). These market transactions and documents inform the quantitative component of this study.

3.5 Sample size and sampling technique

Given the nature of the data, the study adopted a census (complete enumeration) approach, incorporating all available and relevant carbon trading, regulatory, and taxation-related data for the study period (2022–2024) into the analysis. This approach was adopted because Tanzania's voluntary carbon market is nascent and small, with a limited number of observable transactions and projects. Accordingly, the study did not employ sampling but drew on all available data points from institutional and market databases. Where full data coverage was unavailable, purposive selection was applied to ensure that only relevant, complete, and reliable data were included. This ensured that the dataset used in the analysis adequately represents the structure and operation of the VCM in Tanzania.

3.6 Data analysis

The study employed quantitative data analysis techniques, incorporating quantitative content analysis and descriptive statistics to examine patterns in carbon credit trading and tax revenue mobilization in Tanzania's voluntary carbon market (VCM). Quantitative content analysis was used to systematically code and quantify information extracted from policy documents, regulatory reports, and market records. Key indicators—including carbon trading volumes, taxation provisions, certification costs, and levels of social enterprise participation were extracted and converted into measurable variables.

Descriptive statistical methods, including frequencies, percentages, and trend analysis, were then applied to summarise and interpret the data across the study period (2022–2024). In this analysis, carbon trading volume served as the dependent variable, while taxation policies, certification costs, and social enterprise engagement were treated as explanatory variables. Owing to data limitations and the emerging nature of Tanzania's VCM, advanced econometric techniques were not applied. Instead, the combined use of quantitative content analysis and descriptive statistics enabled the identification of patterns, relationships, and policy-relevant insights regarding market performance and revenue potential.

4. Findings and Discussions

4.1 Findings

This study set out to explore the status, opportunities, and challenges of Tanzania's voluntary carbon market (VCM), with a particular emphasis on the role of social enterprises in supporting both environmental sustainability and domestic resource mobilisation. The findings provide important insights into the evolving nature of the VCM and offer practical implications for fiscal policy, regulatory reform, and climate governance.

4.1.1 Alignment with existing literature and theoretical foundations

The study's findings confirm and extend existing literature on the potential of carbon markets in developing countries. Consistent with Auffhammer (2016) and Andersson and Atkinson (2020), the study confirms that carbon trading mechanisms—particularly in the voluntary segment—can serve as tools for achieving the dual goals of emissions reduction and economic development. The steady growth of social enterprise involvement in carbon-positive sectors—such as reforestation, renewable energy, and sustainable agriculture—aligns with broader global trends, wherein local actors increasingly engage in voluntary carbon markets to access new sources of finance and contribute to environmental goals.

However, this study diverges from the assumption, found in some prior works, that carbon markets are self-propelling once established. Contrary to optimistic projections (e.g., World Bank, 2021), the Tanzanian case illustrates that without targeted policy reforms and institutional support, domestic participation remains low and revenue potential underutilized. This underscores a significant departure from earlier models that may have underestimated the structural barriers in developing economies, including high transaction costs, weak institutional coordination, and inadequate policy coherence.

4.1.2 Sectoral engagement by social enterprises

A central contribution of this study lies in mapping the sectoral concentration of social enterprises within Tanzania's voluntary carbon market (VCM). The qualitative analysis revealed a strong presence in three main sectors: reforestation and afforestation (40%), renewable energy (35%), and sustainable agriculture (25%), as shown in Figure 1.

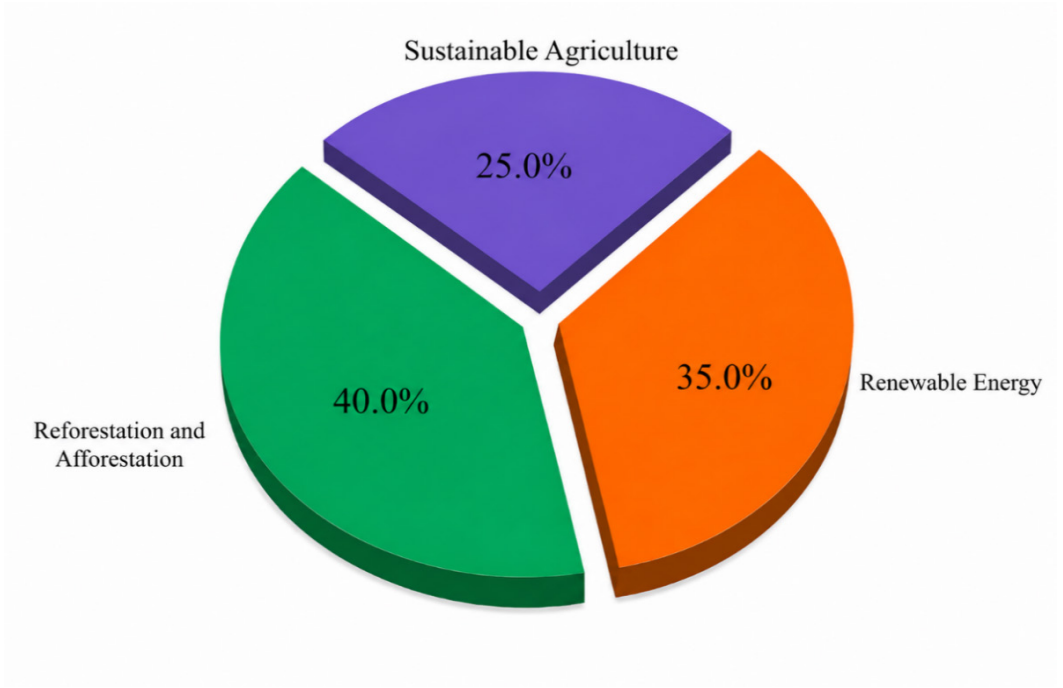

Figure 1: Sectorial focus of social enterprises in Tanzania's voluntary carbon market

Source: World Bank (2022)

This pattern reflects sectors in which social enterprises are able to deliver measurable climate benefits while contributing to national environmental priorities. The dominance of reforestation activities underscores the appeal of nature-based carbon solutions, while significant engagement in renewable energy signals a shift towards clean energy alternatives. Meanwhile, the focus on sustainable agriculture reflects efforts to promote climate-smart farming practices. Collectively, these sectors represent the primary channels through which social enterprises are advancing carbon mitigation and sustainable development goals in Tanzania. These findings extend earlier research (Grottera et al., 2017) by offering localised data from Tanzania, thereby filling a knowledge gap in region-specific engagement patterns. The alignment of social enterprise activity with internationally recognised carbon offset standards further contributes empirical evidence in support of theoretical propositions concerning environmental entrepreneurship as a driver of sustainable development in the Global South.

4.1.3 Regulatory and taxation gaps

Consistent with Fullerton and Metcalf (2020), the findings confirm that fragmented regulatory environments and unclear taxation rules severely constrain the development

of Tanzania's voluntary carbon market. The current tax framework lacks provisions specifically tailored to carbon credit trading, creating legal ambiguity for both enterprises and investors. Furthermore, the widespread informality of social enterprises, compounded by weak inter-agency coordination, impedes regulatory oversight and effective tax collection. This study contributes to the existing literature by highlighting these structural and policy gaps within a country-specific context, demonstrating how the absence of a harmonised fiscal and legal framework results in missed opportunities for both domestic revenue mobilisation and climate finance. These findings challenge the assumption that carbon markets inherently generate economic benefits in the absence of strong institutional foundations. Figure 2 illustrates the key regulatory and taxation barriers facing Tanzania's voluntary carbon market. The most significant barrier (40%) is the absence of a specific tax policy for carbon credits, which creates uncertainty and deters participation. This is followed by the informal operation of social enterprises (35%), which limits their access to finance and government support. The lack of coordination among key stakeholders (25%) further contributes to fragmented oversight and weak policy implementation. Collectively, these constraints significantly undermine the country's ability to grow a robust and impactful voluntary carbon market.

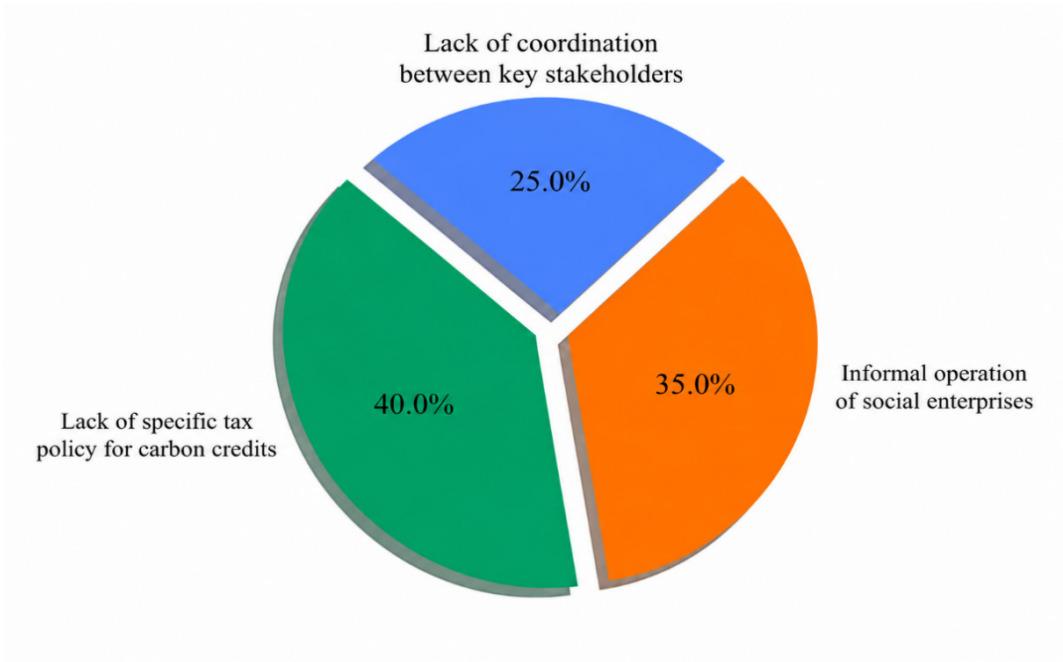

Figure 2: Regulatory and taxation gaps in Tanzania's voluntary carbon market

Source: Ecosystem Marketplace (2023)

4.1.4 Revenue Potential and policy implications

Although the study did not produce precise quantitative revenue projections owing to data limitations, it clearly demonstrates that Tanzania's voluntary carbon market holds significant untapped potential for domestic revenue mobilisation. The rising global demand for voluntary carbon offsets presents a timely opportunity that Tanzania can seize, provided that critical policy and structural barriers are addressed. Consistent with the Double Dividend Hypothesis (Goulder, 1995), the study reaffirms that well-designed environmental tax instruments can simultaneously deliver fiscal and ecological benefits.

The study identifies actionable policy priorities that align with the goals of inclusive green growth, including subsidising certification costs, establishing clear tax rules, and strengthening institutional capacity for carbon accounting and project implementation. Figure 3 presents a breakdown of these priorities, with the largest share (35%) emphasising the need for a harmonised legal and taxation framework, reflecting its foundational role in enabling market growth and investor confidence. This is followed by subsidising certification costs (25%), which remain a significant financial barrier, especially for smaller actors. Tax incentives for carbon initiatives and capacity building for enterprises each account for 20% of the identified priorities, highlighting the importance of both fiscal support and technical empowerment. Together, these policy measures underscore the need for a coordinated and inclusive reform agenda to unlock the full economic and environmental potential of Tanzania's VCM. The following is Figure 3.

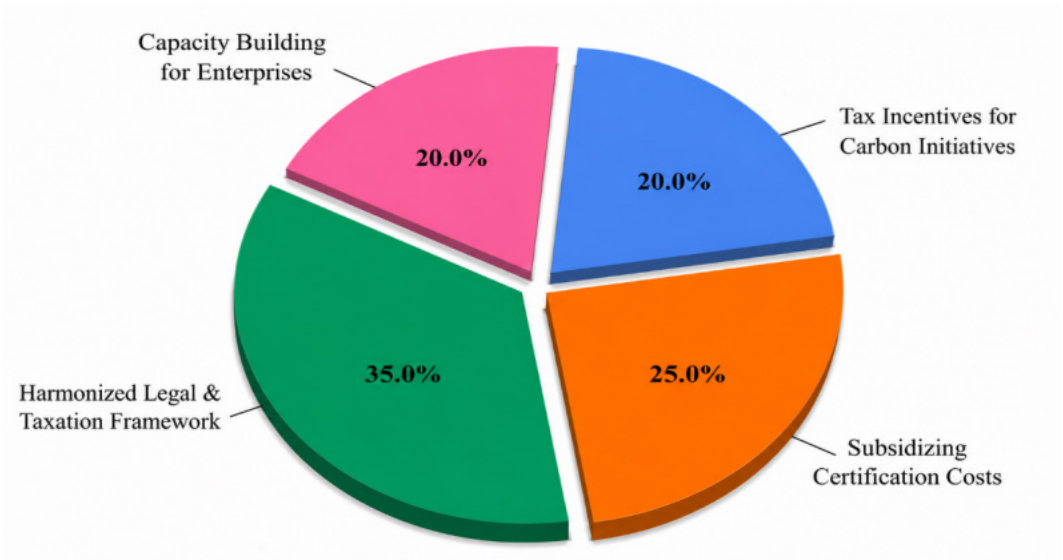

Figure 3: Author's synthesis based on literature of review (Ecosystem Marketplace, 2023; World Bank, 2022; UNDP, 2023)

4.2 Discussion of findings

This study provides a comprehensive analysis of Tanzania's emerging voluntary carbon market (VCM), underscoring its significant yet underutilized potential for climate finance and domestic revenue mobilisation through the active participation of social enterprises. Key sectors including reforestation and afforestation (40%), renewable energy (35%), and sustainable agriculture (25%)—have seen growing engagement from social enterprises, as illustrated in Figure 1. These sectors align closely with Tanzania's environmental priorities and demonstrate the capacity of social enterprises to deliver measurable climate benefits.

However, the findings reveal that structural and policy deficiencies continue to impede the market's development. Chief among these challenges is fragmented regulatory environment, Figure 3 outlines the key policy priorities for addressing these gaps. The most critical priority is the establishment of a harmonised legal and taxation framework (35%), followed by subsidising certification costs (25%), and introducing tax incentives and capacity building for enterprises (20% each). These targeted reforms are essential for reducing entry barriers, enhancing transparency, and fostering institutional readiness. In sum, Tanzania's VCM holds significant promise for contributing to climate finance and sustainable development.

Yet realising this potential depends on the government's ability to implement coordinated, inclusive, and forward-looking policy reforms that create an enabling environment for social enterprises and other stakeholders to thrive.

5. Conclusion and implications of the study

This study assessed the potential for tax revenue generation from carbon credit trading in Tanzania's voluntary carbon market (VCM), with specific focus on the role of social enterprises. The findings indicate that while Tanzania's VCM remains at an early stage of development, it holds considerable promise—particularly in high-impact sectors such as reforestation, renewable energy, and climate-smart agriculture. Social enterprises are emerging as key actors in these sectors; yet their full contribution to both fiscal and environmental goals remain constrained by a range of systemic challenges.

Among the key issues identified are the absence of a dedicated tax framework for carbon credits, high certification and verification costs, limited technical capacity among stakeholders, weak institutional coordination, and the informality of many social enterprises. These factors collectively undermine regulatory clarity, restrict market access,

and reduce the government's ability to mobilise tax revenue from carbon trading activities. Furthermore, the limited integration between carbon market initiatives and national development frameworks such as the Nationally Determined Contributions (NDCs), the REDD+ Strategy, and the Sustainable Development Goals (SDGs)—limits the long-term sustainability and impact of these efforts. To address these challenges, the following policy recommendations are proposed.

First, a harmonised legal and tax framework specific to carbon credit trading should be developed to enhance investor confidence and ensure effective revenue collection. Second, the establishment of a Carbon Project Development Fund is recommended to subsidise certification and monitoring, reporting, and verification (MRV) costs, especially for small-scale and community-based actors.

Third, targeted capacity-building programmes should be implemented to equip social enterprises, local authorities, and environmental agencies with the technical knowledge needed to participate effectively in the carbon market. Fourth, institutional coordination should be strengthened through the formation of an inter-agency task force to align fiscal, environmental, and regulatory mandates.

Fifth, efforts should be made to formalise social enterprises by streamlining registration processes and extending legal recognition, thereby expanding the tax base and improving

oversight. Finally, carbon market initiatives should be strategically integrated into Tanzania's broader climate and development policies to maximise their dual impact on climate resilience and fiscal sustainability. In conclusion, Tanzania's voluntary carbon market has the potential to become a key driver of sustainable development and domestic resource mobilization. Realising this potential will require proactive, evidence-based reforms that enable an inclusive, transparent, and well-regulated carbon economy.

6. Areas for further research

While this study provides a foundational analysis of Tanzania's voluntary carbon market and its potential for domestic revenue generation, further research is needed to inform more targeted and effective policy interventions. One key area for future inquiry is the development of quantitative models to forecast potential tax revenues from carbon credit trading under various regulatory and market scenarios. Such modelling would offer valuable insights into the fiscal implications of alternative policy choices. Additionally, comparative studies examining the regulatory frameworks of successful voluntary carbon markets in

other countries of the Global South could provide practical lessons for Tanzania. A further critical area for research is the assessment of the social impacts and equity considerations of carbon trading, particularly regarding how revenues are redistributed and whether social enterprises are effectively promoting inclusive development. Exploring these dimensions will be essential to ensuring that Tanzania's carbon market evolves in a manner that is environmentally sustainable, socially just, and economically beneficial.

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The Effect of Sectoral Growth on Tax Revenue in Developing Countries: Empirical Evidence for Tanzania

Heriel E. Nguvava[1], Noah Athanas[2] and Jasson K. Domitian[3]

Abstract

Growth of economic sectors plays a crucial role in domestic revenue mobilization through widening tax bases because of sector value additions and employment. Using Autoregressive Distributed Lag Model (ARDL) and data for Tanzania for the period of 44 years spanning 1980 to 2023, the study investigates the long-run effects of sectoral growth on tax revenue. The results indicate that the industrial sector has a positive and statistically significant effect on tax revenue mobilization. The manufacturing and agriculture sectors have negative and significant effects, implying that their growth have more effect on GDP than tax revenue due to dominance of informality, prevalence of tax exemptions as well as infant manufacturing sector. The service sector has positive and statistically significant effect. These results suggest the need for sustained prioritization in compliance and business formalization, and to properly aligning fiscal and macroeconomic policies to achieve dual objectives of high sector growth and contribution to tax revenue mobilization in Tanzania.

Keywords: Sectoral growth, Tax revenue, developing countries, Tanzania

JEL Classification: H20, O55, O11, C22, E62

1. Introduction

Government policy shapes both the trajectory of economic activity and the revenue base that funds public expenditure. In low- and middle-income economies, the link runs in two directions: structural transformation and diversification raise the productive capacity of the economy, while the fiscal resources generated by that activity are used in turn to support further sectoral expansion (Kazembe et al., 2026; Lengaram et al., 2025). For developing countries, where alternative financing options are limited, the capacity to mobilize tax revenue is therefore not simply a matter of fiscal management but a determinant of whether public services can be delivered and development sustained (Lengaram et al., 2025).

The economy of developing countries such as Tanzania is dominated by agriculture and the informal sector. The government has made deliberate efforts to diversify and stimulate sectoral growth in the country; in particular, the manufacturing and agricultural sectors

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have received special attention due to their multiplier effects in the economy. Various reforms and incentives have been implemented to stimulate the contribution of sectors to the economic growth and development (Lengaram et al., 2025; Kahyarara, 2022; Semboja et al., 2022).

Despite the role of sectoral growth on widening the tax base the realisation of this potential in tax revenue collections remains limited in developing countries. This is particularly so owing to the dominance of agriculture and the informal sector and to the still-developing institutions needed to support formalization and revenue mobilization (Bati, 2025; particularly in East African countries like Sudan & Rwanda, where economic, institutional and policy dynamics vary significantly. This study aims to identify and analyze the key factors influencing tax revenue generation in East African countries, with a particular focus on the contrasting economic and institutional contexts of Sudan & Rwanda. Factors influencing tax revenue, such as GDP per capita, agriculture's role, inflation, foreign investments, trade openness and political stability, are complex and interconnected. The study employs an explanatory research design to understand the relationships influencing tax income. Utilizing a quantitative approach with secondary data from the World Bank spanning 30 years (1994–2023 Semboja et al., 2022; Rahim & Asma, 2019; Mawejje & Munyambonera, 2016). Tanzania's economy remains structurally mixed dominated by agriculture and informal sectors alongside construction, growing manufacturing sector, trade activities and expanding service sector (African Development Bank, 2024; Semboja et al., 2022).

The literature suggests that the nature of sectors, structural and tax administration capacity play significant role in realizing the optimal effects of sectoral growth on tax revenues performance (Mapunda et al., 2026; Bati, 2025; particularly in East African countries like Sudan & Rwanda, where economic, institutional and policy dynamics vary significantly. This study aims to identify and analyze the key factors influencing tax revenue generation in East African countries, with a particular focus on the contrasting economic and institutional contexts of Sudan & Rwanda. Factors influencing tax revenue, such as GDP per capita, agriculture's role, inflation, foreign investments, trade openness and political stability, are complex and interconnected. The study employs an explanatory research design to understand the relationships influencing tax income. Utilizing a quantitative approach with secondary data from the World Bank spanning 30 years (1994–2023 Kamasa et al., 2025;

Rahim & Asma, 2019). This situation raises an important empirical question. To what extent have government initiatives and efforts translated into higher tax revenue mobilizations in developing countries?

The empirical review suggests that the effect of sectoral growth and expansion on tax revenue is contingent and can be positive or negative depending on various factors, including the structure of the economy and tax administration capacity (Kazembe et. al., 2026; Bati, 2025) particularly in East African countries like Sudan & Rwanda, where economic, institutional and policy dynamics vary significantly. This study aims to identify and analyze the key factors influencing tax revenue generation in East African countries, with a particular focus on the contrasting economic and institutional contexts of Sudan & Rwanda. Factors influencing tax revenue, such as GDP per capita, agriculture's role, inflation, foreign investments, trade openness and political stability, are complex and interconnected. The study employs an explanatory research design to understand the relationships influencing tax income. Utilizing a quantitative approach with secondary data from the World Bank spanning 30 years 1994–2023 (Semboja et al., 2022; Rahim & Asma, 2019; Mawejje & Munyambonera, 2016). This paper therefore aims to investigate empirically the effect of sectoral growth in Tanzania and on tax revenue performance to provide evidence-based recommendations for policy and administrative reform.

This study contributes to the existing literature, in which empirical results on the sectoral growth and tax revenues performance nexus are mixed, particularly in developing countries. Using Tanzania as a case study, the paper provides empirical evidence and focuses on the factors that may cause results to diverge from the theoretical conception that sectoral growth leads to expansion of tax base and revenue. The paper also contributes methodologically through the application of ARDL and provides empirical evidence for inform policy formulation in developing countries.

The remainder of the paper is structured as follows: section 2 provides the literature review; section 3 covers the methodology, including data, the empirical model and the estimation technique; section 4 present the results of analysis; section 5 discusses the findings; and section 6 concludes and sets out the policy implications.

2. Literature Review

2.1 Theoretical framework

2.1.1 Endogenous growth theory

In this study, the theoretical foundation of the relationship between sectoral growth and tax revenue is primarily anchored in Endogenous Growth Theory, which can be traced to 1988 According to the theory, the long-run economic growth rate is determined by forces within the economic system, specifically the choices of the private and public sectors

(Howitt, 2010; Romer, 1997); and therefore, sectoral growth can be influenced by factors within the economy. The theory suggests that government policies, reforms, and initiatives as economic factors, determine and drive the economic growth rate, which varies across countries (Romer, 1997).

2.1.2 Structural transformation theory

In this study, Endogenous Growth Theory is complemented by Structural Transformation Theory, which can be traced to the 1940s (Rohit, 2023). This theory explains how the shift of economies from low-productivity, labour-intensive sectors such as agriculture to higher-productivity sectors such as manufacturing and services can affect tax revenue performance. Such transformations enhance value addition, promote formalization in the economy, and eventually broaden the tax base.

The study was further informed by the Tax buoyancy and Tax elasticity Frameworks, which capture the responsiveness of tax revenue to sectoral growth and expansion. Together, these theories provide a framework for understanding how sectoral growth and expansion affects the tax revenue performance of developing countries, and Tanzania in particular.

2.2 Empirical framework

Rahim & Asma (2019) investigated the heterogeneous effects of sectoral growth on tax yields in developing countries using the Generalized Method of Moments (GMM) on data from 94 countries over the period 2000 to 2015. The study generally found that sectoral growth, particularly in the agricultural, industrial, and service sectors plays a significant positive role in tax revenue collections in the main model. When the dataset is split into low-income and high-income developing countries, however, the study finds that in low-income countries sectoral growth across all three sectors has a negative impact on tax yields, while in high-income countries only the agriculture sector has a detrimental effect. This study confirms that the influence of sectoral growth on tax revenue varies across sectors, and highlights that the effects of sectoral growth on tax revenue are not consistent across economies, particularly in developing countries.

Lompo (2024) investigated the effect of financial sector development on tax revenue mobilization in developing countries using the panel data over the period 1995 to 2017. The study found that financial sectors development, which is component of service sector, has significant and positive influence on the ability of government to raise tax revenues. Financial sector development was also found to improve the mobilisation of direct tax

revenues more than indirect taxes. These findings are consistent with Kamasa et al. (2025), who found that financial sector development significantly enhance revenue generation in Ghana in both long and short run; moreover, the study indicates that both direct and indirect taxes are sensitive to sector development. These findings indicate that sectoral growth not only expand the tax bases of incomes and consumption, they enhance the ability of governments to mobilize tax revenues. Moreover, the findings suggest that sectoral growth may have a varied effects across tax categories, being direct or indirect tax particularly in developing countries.

Bati (2025) particularly in East African countries like Sudan & Rwanda, where economic, institutional and policy dynamics vary significantly. This study aims to identify and analyze the key factors influencing tax revenue generation in East African countries, with a particular focus on the contrasting economic and institutional contexts of Sudan & Rwanda. Factors influencing tax revenue, such as GDP per capita, agriculture's role, inflation, foreign investments, trade openness and political stability, are complex and interconnected. The study employs an explanatory research design to understand the relationships influencing tax income. Utilizing a quantitative approach with secondary data from the World Bank spanning 30 years (1994–2023 investigated the determinants of tax revenue in East African countries using a regression model and data from Sudan and Rwanda over the period 1994 to 2023. The study generally found that GDP per capita, as an indicator of economic growth, has a significant effect on tax revenue. The study also indicates that the agricultural sector exerts negative effects on tax revenue; this finding is consistent with Rahim & Asma (2019) who found that both in low-income developing countries and high-income developing countries agricultural sector has detrimental effects on tax revenue.

Evidence in the opposite direction comes from Zimbabwe. Chamisa and Sunde (2025), using ARDL on annual data from 1980 to 2022, reported that private consumption, agricultural output, inflation, and real interest rates each carry significant explanatory weight for income and consumption tax revenues. Of particular interest for the present study, agricultural growth was found to lift revenue rather than suppress it, while the role of the shadow economy remained inconclusive. This Zimbabwean result runs against Bati's (2025) East African finding and Rahim and Asma's (2019) cross-country result, both of which placed agriculture as a drag on revenue. Taken together, the three studies suggest that agriculture's fiscal effect cannot be treated as fixed by the sector itself; what differs across cases is the level of formalization and the structure of taxation. Any agricultural coefficient, including the one estimated here for Tanzania, must therefore be interpreted against country-specific conditions rather than generalized across countries.

An earlier paper by the same authors offers a useful counterpoint. In Chamisa and Sunde (2024), an ARDL specification applied to Zimbabwean data for 1980–2022 reported the opposite agricultural result to their later study. The share of agriculture in GDP showed a negative and statistically significant coefficient in both the short and long run, while the shadow economy was insignificant in the long run but significant in the short. The negative agricultural finding contrasts with Amaglo (2022), whose linear regression on Ghanaian time-series data identified agricultural share as a significant positive predictor of revenue mobilisation. The implication of these findings is that agriculture's fiscal contribution depends on how the sector is organised in each economy. The methodological choice ARDL versus linear regression and the time period sampled may also be the reason for differences. For Tanzania, this means the present study's null result on agriculture should not be read as conclusive but as one further data point in an unsettled literature.

Mapunda et al. (2026) assessed the effect of industrial sector expansion on tax revenue in Tanzania. Using ARDL bounds testing on annual data from 1970 to 2018, the study found that industrial sector growth influences tax revenue collections. Using the ARDL bounds testing on annual data from 1970 to 2018, the study found that industrial sector growth influences tax revenue collections. In particular, the manufacturing sector was found to have a positive influence in the long run but a negative influence in the short run. The utility industry was found to have a negative effect in the long run but a positive effect in the short run, while the mining industry had a negligible influence. The construction industry was found to have detrimental effects in the short run. These findings indicate the existence of varied effects of sectoral growth on tax revenue performance across subsectors.

Mapunda et al (2023) assessed the effect of service sector expansion on tax revenue in Tanzania. Using ARDL bounds testing on annual data from 1970 to 2018, The study generally found that service sector growth has a positive effect on tax revenue. In particular, the trade and government service subsectors have positive effects, while the business service, transportation service, and personal service subsectors indicated insignificant results. However, these findings are not consisted with Mawejje & Munyambonera (2016) who found that growth in service sector had no significant effect on tax revenue performance using ARDL approach and utilizing a quarterly data from Uganda over the period 1999Q3 to 2013Q4, which is a comparable economy to Tanzania. These findings suggest that the effects of sectoral growth on tax revenue vary across the subsectors and geographical contexts.

Kazembe et al. (2026) approach the question from the opposite causal direction. Drawing on a panel of Sub-Saharan economies for 2000–2022 and combining Driscoll-Kraay standard

errors with IV-GMM, they show that higher fiscal revenue mobilisation itself stimulates sectoral expansion, with manufacturing, industry, and services all responding to revenue inflows. The implication is that the relationship between sectoral growth and tax revenue is not unidirectional but reciprocal: taxation funds the public investment, infrastructure, and institutional capacity that sectors draw on to grow. This bidirectionality complicates the interpretation of any single regression, including the one estimated in this paper, since the coefficients on sectoral output may capture both the direct fiscal contribution of those sectors and the lagged feedback from prior revenue-financed expenditure.

3. Empirical strategy

3.1 Data

This study employs mainly secondary data for Tanzania over the period 1980 to 2023. Data were obtained from various sources; tax-to-GDP ratios were obtained from UNU-WIDER Government Revenue Dataset, and sector shares of GDP, inflation and GDP per capita were obtained from World Bank development indicators.

3.2 Model specifications and estimation techniques

The empirical model is specified in its parsimonious form as;

$$y_t = \alpha+\beta_i x_{it}+\gamma_i Z_{it}+\varepsilon_t \quad (1)$$

where y_t represent tax to GDP ratio, x_{it} are sector shares of GDP, Z_{it} are control variables, inflation and GDP per capita, ε_t is the error term and α, β and γ are coefficients to be estimated.

As a priori, coefficients of sector shares (β_i) are hypothesized to be positive and statistically significant. This is because growth in sector shares implies increased value addition and hence an expansion of the tax base.

Since the unit root test results indicate that the variables are a mix of I (0) and I(1), the model in equation (1) is estimated using the Autoregressive Distributed Lag (ARDL) approach developed by Pesaran and Shin (1999). Among the advantages of ARDL is that it addresses the problem of endogeneity when the sample size is limited and variables are integrated of mixed or same order, I(0) or I(1) (Musah et al., 2024; Nkoro & Uko, 2016) the means and variances are constant and not depending on time. However, most empirical researches have shown that the constancy of the means and variances are not satisfied in

analyzing time series variables. In the event of resolving this problem most cointegration techniques are wrongly applied, estimated, and interpreted. One of these techniques is the Autoregressive Distributed Lag (ARDL. The approach has been used in previous studies analysing the long-run and short-run effects of factors on tax revenue (Mapunda et al., 2026; Musah et al., 2024; Mapunda et al 2023; Mawejje & Munyambonera, 2016).

The following equation was used to estimate if sectoral growth has effects on tax to GDP.

The ARDL ($p, q_1 \ldots\ldots q_7$) model is specified as:

$$tax\_GDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i tax_{gdp_{t-i}} + \sum_{j=0}^{q1} \beta_j manuf\_share_{t-j} + \sum_{k=0}^{q2} \delta_k indus\_share_{t-k} + \sum_{l=0}^{q3} \emptyset_l agric\_share_{t-l} + \sum_{m=0}^{q4} \theta_m services\_share_{t-m} + \sum_{n=0}^{q5} \varphi_n inflation_{t-n} + \sum_{r=0}^{q6} \gamma_r logPCI + \varepsilon_t \quad (2)$$

where;

tax_GDP, manuf_share, agric_share, service_share and logPCI represent tax to GDP ratio, manufacturing share, agriculture share, service share, and GDP per capita respectively. ε_t is error term and *t* is time dimension whereas p and q_1 are optimal lag lengths. Moreover, the EC was estimated using an error correction representation of the ARDL model;

$$\Delta tax_{gdp} = \alpha_0 + \sum_{i=1}^{p} \alpha_i \Delta T tax_{gdp_{t-i}} + \sum_{j=0}^{q1-1} \gamma_i \Delta manuf_{share_{t-j}} + \sum_{k=0}^{q2-1} \delta_k \Delta indus_{share_{t-k}} + \sum_{l=0}^{q3-1} \emptyset_l \Delta agric_{share_{t-l}} + \sum_{m=0}^{q4-1} \theta_m \Delta services_{shareI_{t-m}} + \sum_{n=0}^{q5-1} \varphi_n \Delta inflation_{t-n} + \sum_{r=0}^{q6-1} \varphi_n logPCI_{t-r} + \lambda ECT_{t-1} + \varepsilon_t \quad (3)$$

where Δ; denotes first difference (short-run dynamics);

ECM $_{-1}$ captures long-run equilibrium relationship, λ is the speed of adjustment coefficient.

4. Results

4.1 Descriptive Analysis

Descriptive statistics for the variables used in the study are presented in Table 1. Specifically, the table reports the mean, standard deviation, minimum, maximum, Jarque–Bera (JB). Generally, the descriptive statistics shows that variables used in the study exhibit different distributional characteristics and levels of variability.

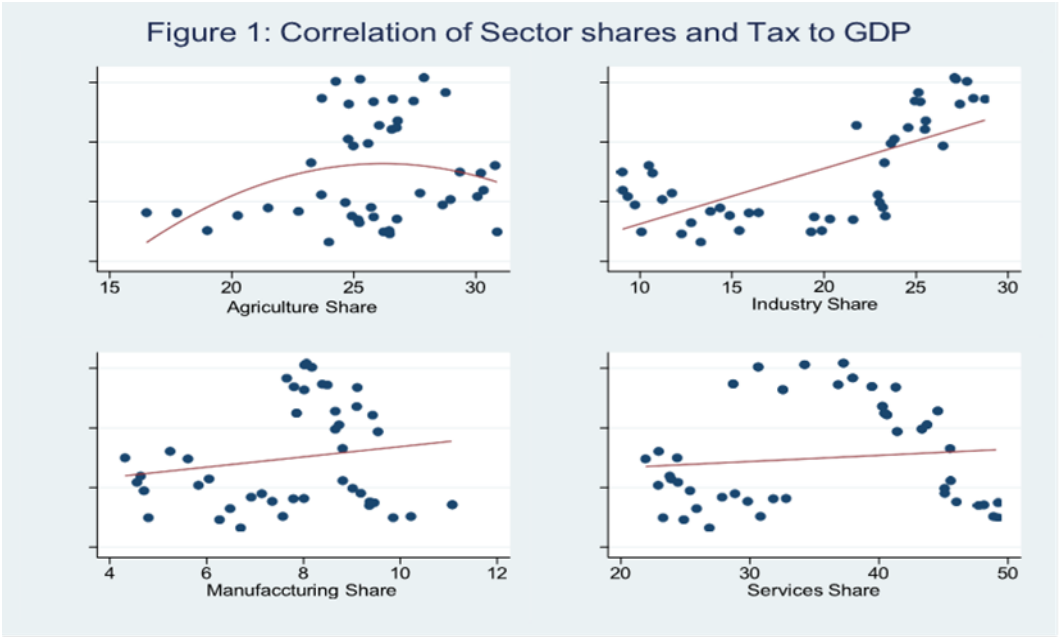
Table 1: Descriptive Analysis Results

Variable	Obs.	Mean	Std. Dev.	Min	Max	JB-Test	Prob>-chi2
Tax to GDP	44	8.987	1.749	6.643	12.171	10.53	0.0052
Agriculture share	44	25.652	3.221	16.503	30.868	6.49	0.0389
Industry share	44	19.224	6.486	8.953	28.672	17.81	0.0001
Manuf. share	44	7.756	1.688	4.323	11.071	2.77	0.2497
Services share	44	35.365	9.053	21.937	49.116	20.56	0.0000
Inflation	44	14.435	9.844	2.28	36.374	4.50	0.1056
GDP per capita	44	12.405	2	8.519	14.886	5.70	0.0578

Source: Author (2026)

4.2 Correlation between sector shares and revenue mobilization

Figure 1 illustrates the nature of the relationship between sector shares and the tax-to-GDP ratio. The pattern appears broadly linear for manufacturing, industry, and service shares, with industry displaying a strong slope coefficient while service and manufacturing exhibit weaker slopes. Agriculture has a nonlinear association with the tax-to-GDP ratio, with a higher agricultural share associated with a lower tax-to-GDP ratio. Despite being a dominant sector in value addition and employment, the sector is dominated by subsistence production and informality, offering a very narrow base. Agriculture in Tanzania contributes more significantly to other fiscal instruments such as fees and levies.



Source: Author computation (2026)

4.3 Unit root tests

Two-unit root tests are employed to test the null hypothesis of non-stationarity of the variables used in the model. First, the Augmented Dickey-Fuller (ADF) test is applied as the baseline test, followed by Phillips–Perron (PP) test. Phillips–Perron (PP) test. The PP is used as the preferred test because it relaxes the assumption of homoscedasticity. Results of both tests are used to confirm the stationarity of variables. The unit root test results reported in Table 2 indicate a mixture of integration orders: agriculture share of GDP and GDP per capita are stationary at level, I (0). The 2remaining variables; tax to GDP, industry share of GDP, manufacturing share of GDP, and inflation are stationary at first difference (I(1)).

Table 2: Result of Unit Root Test

Variable	At level		At first difference		Order of integration
	ADF	P-Perron	ADF	P-Perron	
Tax to GDP	-1.078	-0.773	-8.537***	-8.854***	I (1)
Agriculture share of GDP	-3.157**	-2.964**	-4.181***	-4.056***	I (0)
Industry share of GDP	-0.558	-0.479	-6.439***	-6.459***	I (1)
Manufacturing share of GDP	-2.166	-2.192	-7.216***	-7.257***	I(1)
Service share of GDP	-1.286	-1.461	-5.724***	-5.725***	I (1)
Inflation	-1.488	-1.312	-8.503***	-8.683***	I (1)
GDP per capita	-6.91***	-4.488***			I (0)

Source: Author computation (2026)

***P<0.01, **p<0.05, *p<0.1

4.4 Co-integration Test Results

The study employed Pesaran, Shin and Smith (2001) bound cointegration test to ascertain the long-run relationship of the variables used in the ARDL model the results in Table 3 show that the F-statistic exceeds the critical value band and the t-statistic exceeds the critical upper and lower bounds at all significance levels (10%, 5%, and 1%). These results confirm the existence of a stable long-run equilibrium relationship among the variables in the specified model, thereby rejecting the null hypothesis of no cointegration.

Table 3: Pesaran/Shin/Smith (2001) ARDL Bounds Test

Statistic	Test value	10%		5%		1%	
		Lower	Upper	Lower	Upper	Lower	Upper
F-statistic	10.722	2.12	3.23	2.45	3.61	3.15	4.43
t-statistic	-5.381	-2.57	-4.04	-2.86	-4.38	-3.43	-4.99

Source: Author computation (2026)

4.5 Results of the ARDL Analysis

Table 4 presents the ARDL model estimation results for three specifications; a baseline model without control variables, and two models incorporating inflation and GDP per capita as control variables respectively. Only the long-run effects are presented in the table.

Across all model specifications, the error correction term (ECT) coefficient is negative and statistically significant, confirming the existence of cointegration and indicating that the model adjusts towards the long-run equilibrium relationship between sectoral shares and tax revenue.

Table 4: Results of the ARDL model estimation

Variable	Model 1	Model 2	Model 3
Agric. share of GDP	0.1283	-0.5601*	-0.3154***
Industry share of GDP	0.3971***	1.1151 ***	0.3417***
Manufacturing share of GDP	-0.8786 **	-3.5993***	-1.0973***
Service share of GDP	-0.0152	0.3433 *	0.0578**
Inflation		0.4889 **	0.4254***
GDP per capita			1.0872***
Constant	2.8512	4.2846*	2.8288
Error Correction (ECM_{t-1})	-0.5249***	-0.3963***	-1.5977***
Adjusted R- Squared	0.2173	0.6752	0.7949
Observations	44	44	44

***P<0.01, **p<0.05, *p<0.1

Across all model specifications, the industry sector sector has a positive and statistically significant effect (p<0.01) on the tax-to-GDP. This is as expected given the sector's contribution to the GDP and its rapid growth in Tanzania, particularly in mining and construction. The agriculture and manufacturing sectors have negative and statistically significant effects on tax-to-GDP ratio (P<0.01) after controlling for inflation and GDP per capita (model 3). The service sector has a positive and statistically significant effect at p<0.05 on the tax-to-GDP (model 3). Furthermore, both GDP per capita and inflation have positive and statistically significant effect on the tax-to-GDP. GDP per capita represents the tax base and ability to pay taxes; its increase therefore corresponds to an increase in the tax-to-GDP ratio. Moderate inflation stimulates economic activity and prices. Indirect taxes on imports (ad valorem) and consumption increase with inflation owing to adjustments in nominal prices. Moreover, in all model specifications the coefficient of the Error Correction Term (ECM_{t-1}) is negative and statistically significant, which confirms the cointegration and suggests that in the long-run the model adjusts to equilibrium if any shock create a short-run disequilibrium.

4.6 post-estimation diagnostic Check

Post-estimation diagnostic is presented in Table 6. The results indicate that the ARDL model passes all the standard diagnostics: no serial correlation; there is no evidence of serial correlation, heteroskedasticity, or ARCH effects. The residuals exhibit normal kurtosis, and the IM-test confirms that the overall model is well specified. The stability of the model was assessed using the cumulative sum (CUSUM) and cumulative sum of squares (CUSUM-SQ) tests; the results shown in Figures 2 and 3 confirm that the model is stable and does not suffer from structural breaks. In sum, the post-estimation diagnostic results confirm that the estimated outputs are reliable.

Table 6: Post-estimation diagnostic Check

Test	Statistic	Prob	Decision
Breusch–Godfrey	1.577	0.2091	No serial correlation
Durbin's alternative test	0.575	0.4484	No serial correlation
White / IM-test	40	0.4256	No heteroskedasticity
Skewness	26.25	0.3408	Normal distribution
Kurtosis	0.54	0.4625	Normal tails
ARCH LM test	0.006	0.9358	No ARCH effects
Overall IM-test	66.79	0.3815	Model well specified

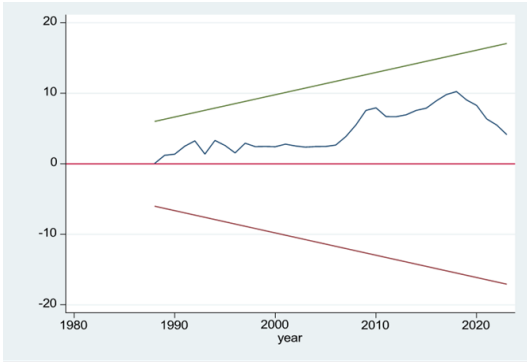


Figure 2: Plot of CUSUM

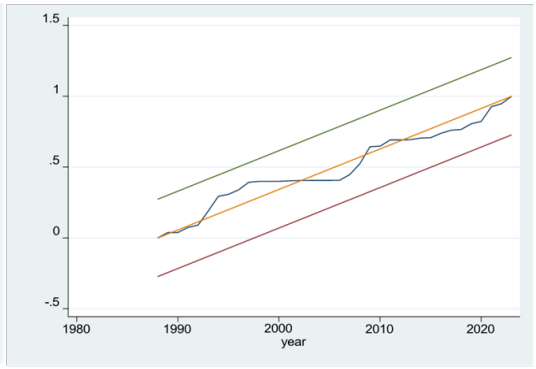


Figure 3: Plot of CUSUM of squares

5. Discussion of findings

The results of the estimated ARDL model reveal a complex relationship between sectoral growth and tax revenues in Tanzania, one that differs from the experiences of other developing countries. Endogenous Growth Theory (Romer, 1997) argues that productivity gains within a sector should translate into wider tax bases. However, as the empirical results

suggest, for some sectors, the picture is more complex, with deviations from apriority expectations driven by structural constraints and institutional factors.

The relationship between an increase in the agriculture sector's share of GDP and tax revenue in the long-run is negative and statistically significant. This is consistent with the findings of Bati (2025), who identified a significant negative impact of agricultural growth on the tax-to-GDP ratio in East African economies using evidence from Sudan and Rwanda. In a similar vein, Rahim and Asma (2019) show that agriculture had a negative effect on tax revenue mobilisation in low-income developing countries. This finding is, however, contrary to the positive effect as reported by Chamisa and Sunde (2025) in the case of Zimbabwe. The negative effect of agriculture on the tax–to-GDP in Tanzania indicates that growth of the agriculture sector contributes disproportionately little to tax revenue. In Tanzania, the agriculture sector is largely characterised by informality and subsistence production, and is among the sectors receiving the most fiscal incentives, including tax exemptions. Nevertheless, the sector is among the leading contributors to economic growth.

The results further indicate that the industrial sector, which includes mining and construction, exhibits positive and statistically significant effects on the tax revenue. These results are consistent with Mapunda et al. (2026), who found that industrial sector growth has positive influence on tax revenue collections.

Notably, the manufacturing sector exhibit negative and statistically significant effect across all model specifications, even after controlling for income and inflation. Mapunda et al. (2026) found a negative effect in the short run and a positive effect in the long-run. Possible explanations for the dampening effect of manufacturing on the tax-to-GDP ratio include: the sector typically operates with narrow profit margins and low productivity due to, among other factors, operational constraints like outdated technology. The sector also has a high reliance on tax exemptions and incentives, which undermines its contribution to direct taxes.

After controlling for income and inflation, the service sector share has a positive and statistically significant effect on tax–to-GDP. These results are consistent with the findings of Mapunda et al. (2023), who found positive effects of the service sector on tax revenuesV in Tanzanian. Mawejje and Munyambonera (2016) found a positive effect but statistically insignificant effect of the service sector on tax revenue in Uganda.

Both income and inflation have positive and statistically significant relationships with tax revenue performance in Tanzania, underscoring the importance of aggregate economic

conditions relative to sectoral composition in driving tax revenue performance. Moreover, the results confirm that to isolate the effects of sectoral growth on tax revenue, per capita income and inflation should be controlled since they a significantly associated with tax to GDP.

The results therefore imply that tax revenue mobilisation in Tanzania occurs through both macroeconomic channels and fiscal gains derived from sectoral productivity. Kazembe et al. (2026) argue that there is a bidirectional relationship between fiscal revenue and sectoral growth, but this relationship may not be symmetric across all sectors in the Tanzanian context. Tanzania's experience thus suggests that the drivers of revenue generation are more related to aggregate income growth and price dynamics rather than sectoral composition (except the industrial sector). This pattern is consistent with the structural realities of an economy with the dominance of informal agriculture activities, a nascent manufacturing sector, and the prevalence of fiscal incentives that undermine tax mobilization.

6. Conclusion and Policy Implications

This study investigates the effects of sectoral growth on tax revenue performance in developing countries using data from Tanzania over the period 1980 to 2023, focusing on the industrial, agriculture, manufacturing, and service sectors. Using the ARDL approach, the study finds differing effects of sector shares on tax revenue mobilization (tax to GDP). While the industrial and service sectors have positive and statistically significant effects, the agriculture and manufacturing shares have negative effects. The negative effects of the agriculture and manufacturing sectors imply that their growth is not proportionately reflected in tax revenue. These sectors are closely linked through their consumption of final and intermediate products. Enhancing the revenue contribution of these sectors will require policies that enable sector growth without undermining contribution to tax revenue. There is a need to rationalise fiscal incentives, improve formalization, and strengthen tax administration to ensure that sectoral growth is matched by commensurate revenue contributions. Formalization and compliance efforts should also encompass the simplification of the regulatory and fiscal framework. Since sectors may contribute differently to various direct and indirect taxes, further research could explore how sectoral growth affects specific tax types, so that the causes of low revenue contribution from particular sectors can be more precisely identified and recommendations made more targeted.

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Do Tax Services Matter? The Moderating Role of Tax Service Reliability in the Relationship between Value Added Tax Structure and Voluntary Compliance Behaviors in Tanzania

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Abstract

This study examines the moderating role of tax service reliability in the relationship between VAT structure and voluntary compliance behaviour using evidence from the Kariakoo and Ilala Tax Regions. A cross-sectional survey of 340 VAT-registered taxpayers (175 from Kariakoo and 165 from Ilala) was analyzed using PLS-SEM. The results show that VAT compliance costs and administrative complexity negatively affect voluntary compliance, while verification audits have a positive and significant effect. Tax service reliability does not significantly moderate the effects of compliance costs and complexity but negatively moderates the relationship between audits and compliance, indicating that improved service reliability may lessen the deterrence effect of audits. The findings highlight the need to simplify VAT procedures, reduce compliance costs, and improve service delivery through expanded digital support, timely responses, clearer guidance, regal reforms. supported by a more effective Tax Ombudsman Service. Extend the literature by incorporating tax service reliability as a moderating factor in a developing-country context.

Keywords: Value Added, Compliance Costs, Administrative Complexity, Tax Verification Audit, Tax Service Quality.

JEL Classification: H25; H26; H32; K34; O55

1. Introduction

Taxes play an important role in the national economy, as they are the major source of revenue through which governments finance essential social and economic activities and services (Ojo, 2020). Through taxpayers' contributions, public infrastructure such as roads, bridges, railways and other transport systems is developed to facilitate commerce and promote socio-economic development (Helcmanovska & Andrejovska, 2021). Moreover, tax revenue supports the provision of public services including education and healthcare, which are essential for building a skilled and healthy workforce (Mpofu, 2022). Taxes also fund social welfare programmes that provide economic support to vulnerable groups, thereby reducing poverty and income inequality (Owusu et al., 2023). These results depend

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critically on governments' ability to mobilise adequate revenue, making tax compliance a major policy concern. While compliance is widely recognised as essential for funding public services, an important question arises: how can tax structures and administration mechanisms be designed to improve compliance rates. A central theoretical foundation for addressing this question is the Classical Taxation Theory (Trotman-Dickenson, 1996).

According to Classical Taxation Theory, a tax system is effective in fostering compliance if it adheres to key principles of taxation, commonly referred to as the canons of taxation (Soyode & Oyedokun, 2019). These principles include economy, simplicity, certainty, convenience, fairness, and efficiency (Marron et al., 2025). The principle of economy emphasizes minimizing the costs of assessment, collection, and compliance, as high compliance costs undermine voluntary compliance (Fidiana, 2021). Simplicity requires tax laws and procedures to be clear and easy to apply, while administrative complexity contradicts this principle and increases the likelihood of non-compliance (Mpofu & Moloi, 2022). Certainty refers to the clearly defined tax obligations regarding when, how, and how much should be paid, and can be strengthened through effective audits and reliable tax services (Marron et al., 2025). Convenience implies that tax filing and payment processes should be easy to complete, as complex procedures or unreliable services lower compliance (Soyode & Oyedokun, 2019). Fairness ensures consistent and equitable application of tax rules, with enforcement mechanisms like verification audits helping to build confidence and trust in the tax system (Mpofu & Moloi, 2022). Efficiency involves raising revenue without imposing unnecessary administrative burdens or creating economic distortions to taxpayers, as high compliance costs and unreliable service delivery weaken efficiency and reduce compliance within the tax system (Kehinde et al., 2025).

In line with these principles, tax authorities globally have undertaken reforms to modernize tax systems and improve compliance (Jerković, 2021). One major reform has been the adoption of Value Added Tax (VAT), a consumption-based tax applied at each stage of production and distribution (de Sousa et al., 2023). Since its introduction in France, VAT has been a major source of revenue worldwide, particularly in the European Union (EU), the United Kingdom (UK), and many developing economies (Bartes, 2018). In addition, tax authorities have invested in technological upgrades, improved service delivery, and taxpayer education to enhance compliance (Shukla & Kumar, 2019; Greenham et al., 2024). Despite these efforts, many low-income countries continue to experience revenue shortfalls due to

persistent noncompliance (Giulia et al., 2023). Although VAT is theoretically efficient and supported by strong audit trails, these advantages are often not fully realized in developing economies where administrative capacity is limited (Brockmeyer et al., 2024; Mascagni et al., 2024). Consequently, VAT performance frequently falls below expectations, with significant compliance gaps limiting tax authorities from fully harnessing the system's potential (Fjeldstad et al., 2020).

Like many countries, Tanzania has prioritized strengthening domestic revenue mobilization through VAT reforms and expansion of the tax base (Fjeldstad et al., 2020). These reforms include digital reporting systems, automated tax processes, legislative adjustments, simplified administrative procedures, stronger taxpayer education, and improved taxpayer services such as the Taxpayer Service Charter and the Tax Ombudsman (TRA, 2024; Ulriksen *et al.,* 2024). However, VAT performance remains below expectations due to low compliance levels (TRA, 2023). VAT contributes only 3.6% to GDP, compared to the national target of 6% and the EAC average of 4.4%. Similarly, efficiency and C-efficiency ratios of 21.9% and 20.7% remain below the EAC average of 25% (Ebrahim et al., 2024).

Further evidence highlights the extent of the compliance gap. Nguvava and Athanas (2022) report that, as of January 2022, 4,575 eligible taxpayers were excluded from the VAT system, resulting in an estimated revenue loss of TZS 23,350.09 billion. Recent data from the Tanzania Revenue Authority (TRA) for the 2023/2024 fiscal year show that only 2,395 of 2,500 registered VAT taxpayers in Kariakoo and 3,600 of 5,645 in Ilala submitted VAT returns (TRA, 2025). These indicators highlight a substantial VAT compliance gap, reflected in low filing rates, taxpayer exclusion, and significant revenue losses.

Despite extensive research on tax compliance, empirical evidence on VAT-specific determinants remains mixed and sometimes contradictory. Studies on compliance costs (Ghani et al., 2020; Mahangila, 2017; Le et al., 2020; and Bruce-Twum, 2023), tax complexity (Abdul and McFie, 2020; Musimenta, 2020; Eneh et al., 2022; Owusu et al., 2023; and Naape, 2023), audit mechanisms (Alshrouf 2019; Kasper and Alm, 2022; Olaoye and Ekundayo, 2019, and Olaoyea and Busarib, 2021), and service reliability (Gosal & Utami, 2020; Nurkholis et al., 2020; Dewi et al., 2022; Yahaya et al., 2023) provide inconsistent findings. Moreover, many of these studies are not VAT-specific and primarily focus on direct effects, limiting their relevance for understanding the interaction between structural and administrative factors in VAT-compliance. Despite extensive studies on tax compliance, limited research has specifically examined VAT compliance in developing countries, particularly in Tanzania. Existing studies largely focus on direct relationships between tax factors and compliance, with limited insight into how administrative and service-

related factors interact to influence compliance behaviour (Musimenta, 2020; Shakkour et al., 2021; Alshira'h, 2024). Moreover, the moderating role of tax service reliability in shaping VAT compliance behavior remains underexplored. This study addresses this gap by examining both direct and moderating effects within the VAT context.

In response to these gaps, the current study examines both the direct effects of VAT compliance costs, administrative complexity, and verification audits on voluntary compliance, as well as the moderating role of tax service reliability in these relationships. The study focuses on individual rather than corporate or larger VAT-registered taxpayers in the Kariakoo and Ilala Tax Regions. Tax service reliability is a potential moderator because it primarily shapes the conditions under which taxpayers perceive, interpret and respond to structural and administrative features of the VAT system.

2 Literature review

2.1 Theoretical foundations

2.1.1 Classical taxation theory

Classical Taxation Theory, introduced by Adam Smith in 1776, provides a foundational framework for designing an effective tax system (Trotman-Dickenson, 1996). The theory assumes a limited role of government, the operation of free markets, and the use of taxation primarily to finance essential public goods and services. It is guided by key principles, commonly known as the canons of taxation, including equality, certainty, convenience, and efficiency (Soyode & Oyedokun, 2019). As tax systems evolved, these principles were expanded to include the ability to pay, economy in administration, clarity in procedures and tax liabilities, and the need for taxes to generate adequate revenue without constraining productivity (Marron et al., 2025). Subsequent contributions have further emphasized simplicity, fairness, flexibility, broad tax coverage, and transparency in tax administration (Fidiana, 2021; Mpofu and Moloi, 2022). Empirical studies also highlight the importance of meeting revenue needs, adhering to benefit principle, supporting macroeconomic management, and ensuring that revenue allocation strengthens the relationship between taxpayers and public services (Kehinde et al., 2025).

Despite its relevance, Classical Taxation Theory has notable limitations when applied to modern VAT regimes. It assumes relatively direct and predictable relationships between tax principles and system performance, without adequately accounting for the complex interactions among compliance factors and the increasing role of tax service reliability

in contemporary tax administration. In practice, taxpayers frequently interact with tax authorities, and these interactions can significantly influence behavior.

This study addresses these limitations by examining both the direct and moderating effects of the VAT-related factors, specifically analyzing how tax service reliability interacts with compliance costs, administrative complexity, and verification audits to influence voluntary VAT compliance.

Notwithstanding these limitations, Classical Taxation Theory remains highly relevant as its principles provide a useful benchmark for evaluating the design and performance of tax systems such as VAT (Marron et al., 2025). This study aligns with these principles by focusing on compliance costs, administrative complexity, verification audits, and tax service reliability. Collectively, these factors reflect the core canons of economy, simplicity, certainty, convenience, fairness, and efficiency.

2.2 Empirical literature review and hypotheses development

2.2.1 VAT compliance costs and voluntary compliance behavior

VAT compliance costs refer to the financial and non-financial expenses taxpayers incur in meeting VAT obligations, including tax payments, administrative fees, time spent on record-keeping and return filing, and the cost of obtaining professional advice (Vishnuhadevi, 2021; Mukherjee & Badola, 2022). Empirical studies examining the influence of compliance costs on voluntary compliance show mixed and contradictory findings. In particular, Musimenta (2020), Ghani et al. (2020), Mahangila (2017), and Onoja and Odoma (2023) found that compliance costs negatively influence compliance. Conversely, Le et al. (2020) reported a positive relationship between compliance costs and compliance, while Alshira'h (2024) found no significant effect. Bruce-Twum (2023) showed that higher compliance costs reduce non-compliance, whereas Blaufus et al. (2019) and Mehmet (2023) confirmed that high compliance costs increase tax evasion.

Empirical evidence on VAT compliance costs remains inconclusive. While several studies (Musimenta, 2020; Mahangila, 2017) report a negative relationship, others (Le et al., 2020) find a positive effect, and some (Alshira'h, 2024) report no significant relationship. These inconsistencies suggest that the impact of compliance costs is context-specific and may depend on institutional and administrative conditions. Based on these mixed findings, the following hypothesis was developed and tested by this study.

Hypothesis 1: VAT compliance costs have a significant influence on voluntary compliance behaviour.

2.2.2 VAT complexity and voluntary compliance behaviour

VAT administrative complexity refers to the difficulties taxpayers face in understanding and complying with VAT regulations, including challenges in interpreting rules, determining correct rates, and meeting reporting requirements (Moreno-Espinosa et al., 2023; Lutfi et al., 2023).

Many empirical studies on tax complexity show contradictory findings. Abdul and McFie (2020) and Musimenta (2020) reported that complexity has a negative influence on compliance. In contrast, Mat Jusoh et al. (2021), Alsqour and Alshirah (2020), Eneh et al. (2022), and Ghani et al. (2020), who showed that simplicity strengthens compliance, found that complexity has a positive influence on compliance. Other studies, such as Owusu et al. (2023), indicate that complexity shapes compliance differently across taxpayers, while Naape (2023) shows that complexity may produce varied outcomes depending on other factors. Overall, empirical studies establish that complexity can have positive, negative, or no influence on voluntary compliance. Based on these mixed findings, the following hypothesis was developed and tested:

Hypothesis 2: VAT administrative complexity has a significant influence on voluntary compliance behaviour.

2.2.3 VAT verification audits and voluntary compliance behaviour

VAT verification audits refer to the systematic examination of a taxpayer's records and documents to ensure compliance with VAT regulations, verify the accuracy of tax declarations, and assess the correctness of input and output VAT reporting (Ebrahim et al., 2024; Tanzania Revenue Authority [TRA], 2024). Empirical studies examining the relationship between tax audits and voluntary compliance have mixed findings. Alshrouf (2019) and Kasper and Alm (2022) found that tax audits have a positive influence on compliance, a result further supported by Olaoye and Ekundayo (2019), Obaid et al. (2020), and Okpeyo et al. (2019). In contrast, Olaoyea and Busarib (2021) reported an insignificant relationship between audits and compliance. Other studies, such as Dare (2020), indicate that tax audits can have mixed effects on compliance behaviour. Overall, the empirical studies suggest that VAT verification audits can have positive, negative, or insignificant

effects on voluntary compliance depending on context and implementation. Based on these mixed findings, the following hypothesis was developed and tested:

Hypothesis 3: VAT verification audits have a significant influence on voluntary compliance behaviour

2.2.4 Tax service reliability and voluntary compliance behaviour

Reliability in tax services refers to the consistent ability of tax authorities to provide accurate, dependable, and timely services, including error-free assessments and the fulfillment of promised actions (Putra & Setiawan, 2020). Empirical studies on tax service reliability report varied findings. Studies by Gosal and Utami (2020) and Susuawu et al. (2020), Nurkholis et al. (2020), Augustine et al. (2020), Ali et al. (2017), Joni and Handryno (2021), Dewi et al. (2022), and Masunga et al. (2020) found that reliable tax services positively influence compliance across different administration contexts. In contrast, Oktaviani and Kusumaningtyas (2019) and Yahaya et al. (2023) found that tax reliability alone may have limited or insignificant influence on compliance when not supported by sufficient taxpayer knowledge. Overall, empirical studies suggest that tax service reliability may influence voluntary compliance either positively or negatively through its interaction with other tax system characteristics. Based on this evidence, the following hypotheses were developed and tested:

Hypothesis 4: Tax service reliability has a significant moderating effect on the relationship between VAT complexity and voluntary compliance behaviour

Hypothesis 5: Tax service reliability has a significant moderating effect on the relationship between VAT compliance costs and voluntary compliance behaviour

Hypothesis 6: Tax service reliability has a significant moderating effect on the relationship between VAT verification audits and voluntary compliance behaviour

2.3 Conceptual framework

According to the study's conceptual framework (see Figure 1), VAT compliance costs positively influence voluntary compliance when they are low and manageable for taxpayers. Administrative complexity positively supports compliance when rules are clear and simple to follow, while VAT verification audits promote compliance when they are perceived as fair,

transparent, and predictable. Tax service reliability is considered a moderating variable that strengthens the influence of compliance costs, administrative complexities, and verification audits by reducing compliance burdens, improving taxpayers' understanding of their tax obligations, and enhancing the transparency of tax administration processes

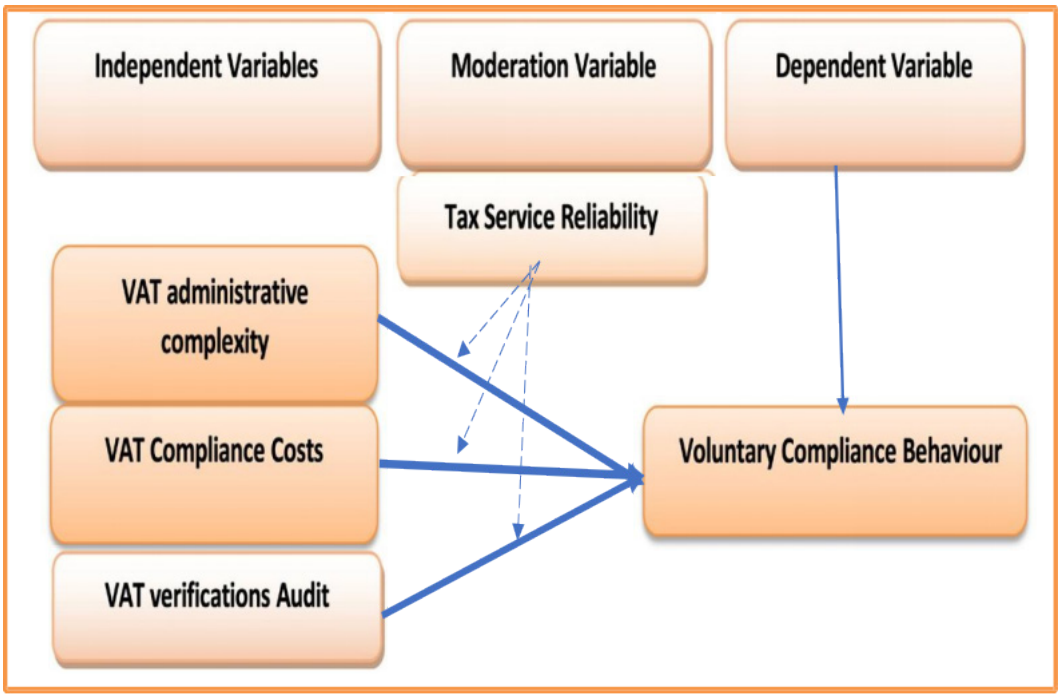


Figure 1: Conceptual framework

Source: Researcher Decomposition (2025)

3. Methodology

3.1 Philosophy, approach, and design

The study is guided by positivist philosophy, which emphasizes the use of observable evidence and measurable data to test relationships among variables. Within this positivist framework, the study adopted a deductive approach, whereby hypotheses are developed based on the classical taxation theory and then tested empirically using quantitative data. A cross-sectional survey design guides the study.

3.2 Populations, sample size, and sampling method

The study population consisted of 8,145 individual VAT taxpayers, with 2,500 from the Kariakoo Tax Region and 5,645 from the Ilala Tax Region. Using Yamane's 1967 formula,

the required sample size was 381; however, the study obtained 340 valid responses, including 175 from Kariakoo and 165 from Ilala, using simple random sampling. Randomization was carried out by first obtaining an updated list of all registered VAT taxpayers to serve as the sampling frame. Each taxpayer was assigned a unique identification code, and a random number generator was used to select respondents, ensuring that every taxpayer had an equal and independent chance of being selected. Given that the study focuses on behavioural aspects of tax compliance, a sample size of 340 is appropriate, as it falls within the acceptable range for behavioural studies. Memon et al. (2020) suggest that a sample size between 30 and less than 500 is adequate, while Kline (2016) notes that SEM requires a large sample, with over 200 considered sufficient for complex models.

3.3 Types of data and data collection methods

The study uses primary quantitative data collected directly from VAT taxpayers in the Kariakoo and Ilala Tax Regions. Data were collected using a structured questionnaire with closed-ended items measured on a five-point Likert scale.

3.4 Data analysis and model specification

The study analyses data using SmartPLS version 4, applying Partial Least Squares Structural Equation Modelling (PLS-SEM) as the main analytical technique. PLS-SEM is appropriate because it accounts for measurement error by linking observed indicators to latent constructs and is suitable for complex models with multiple variables and paths. The structural equations are specified as follows:

Equation 1 (Direct Effects)

$$\eta = \beta\eta + \Gamma\xi + \zeta \quad (1)$$

$$VCB = \beta_0 + \beta_1 VATCC + \beta_2 VATAC + \beta_3 VVA + \epsilon \quad (2)$$

where η represents voluntary compliance behaviour (VCB) (endogenous variable); ξ represents the exogenous latent variables: VAT administrative complexity (VATAC), VAT compliance costs (VATCC), VAT verification audits (VVA), and tax service quality. β denotes coefficients linking endogenous variables, represents coefficients linking exogenous to endogenous variables; and ζ is the disturbance terms.

From equation 1, to incorporate the moderating role of Tax Service Reliability (TSR), the model is extended as follows:

Equation 2 (Moderating Effects)

$$\eta = \beta\eta + \Gamma(\xi + \xi \times TSR) \quad (3)$$

$$VCB = \beta_0 + \beta_1 VATCC + \beta_2 VATAC + \beta_3 VVA + \beta_4 TSR + \beta_5(VATCC \times TSR) + \beta_6(VATAC \times TSR) + \beta_7(VVA \times TSR) + \epsilon \quad (4)$$

From equation 2, ξ×TSR the represents interaction terms between each exogenous variable and tax service reliability (TSR).

3.5 Validity and reliability

Construct validity was ensured by aligning the measurement items with classical taxation theory and relevant empirical studies. Content validity was confirmed through expert review by VAT specialists, while face validity was established through a pilot test involving 30 respondents.

Convergent validity was examined using factor loadings and Average Variance Extracted (AVE), following Ringle et al. (2024), who recommends loadings ≥ 0.50 and an AVE

≥ 0.50. Discriminant validity was evaluated using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio, based on the rule of thumb from Ringle et al. (2023) and Hair et al. (2022). The criterion states that the square root of the AVE should exceed inter-construct correlations and that HTMT values should remain below 0.85.

Reliability was assessed using Cronbach's alpha and composite reliability, including ρ_A and ρ_C, with Hair et al. (2022) recommending threshold values of 0.70 or higher for adequate reliability. To address possible common method bias, both outer and inner VIF values were examined. Outer VIF assessed multicollinearity among indicators, while inner VIF assessed multicollinearity among latent constructs. According to Ringle et al. (2024), VIF values below 3 indicate low multicollinearity and minimal bias concerns.

4. Findings of the study

4.1 Demographic characteristics of the respondents

The demographic findings presented in Table 1 show that VAT taxpayers in Ilala and Kariakoo are predominantly male (58%), although females (42%) are also significantly represented, reflecting increasing female participation in business activities. In terms of age, most taxpayers fall within 31–45 age group (49%), indicating that middle-aged individuals are the main drivers of VAT-compliant taxpayers, while only a small proportion are aged

18–25 (3%). Education levels vary; however, a majority of respondents (67%) have attained at least secondary or higher education, suggesting relatively higher tax literacy and better understanding of VAT obligations. Regarding marital status, most taxpayers are married (58%), which may be associated with greater financial responsibilities that encourage compliance.

Table 1: Distribution of Respondents by Demographic Characteristics

Gender	**Frequency**	**Percent**
Male	196	58%
Female	144	42%
Total	340	100%
Age	**Frequency**	**Percent**
18-25 years	10	3%
26-30 years	109	32%
31-45 years	167	49%
Above 45 years	54	16%
Level of Education	**Frequency**	**Percent**
No formal education or primary level	87	26%
Secondary education or technical education	62	18%
Certificates or Diplomas	71	21%
Undergraduate degree	94	28%
Postgraduate level	26	8%
Marital Status	**Frequency**	**Percent**
Single	117	34%
Married	198	58%
Widowed	25	7%

Source: Survey Data (2025)

4.2 Diagnostic Test Results for Convergent Validity and Common Method Bias

The study assessed convergent validity using factor loadings and Average Variance Extracted (AVE), and evaluated common method bias using inner and outer Variance Inflation Factor (VIF) values. The results presented in Table 2 show that all factor loadings exceed the recommended threshold of 0.50 and that AVE values are above 0.50, thereby confirming convergent validity as suggested by Ringle et al. (2024). In addition, both outer and inner VIF values are below 3, indicating low multicollinearity and suggesting that common method bias is not a concern.

Table 2: Factor Loadings, AVE and VIF

Variable	Indicators	Loadings	Average	Inner VIF	Outer VIF
Tax Services Reliability	Tax service reliability 1	0.828	0.691	1.007	1.887
	Tax service reliability 2	0.878			2.844
	Tax service reliability 3	0.858			2.760
	Tax service reliability 4	0.817			2.162
	Tax service reliability 5	0.769			1.918
VAT Compliance Costs	VAT Compliance Costs 1	0.755	0.590	1.017	1.685
	VAT Compliance Costs 2	0.713			1.898
	VAT Compliance Costs 3	0.793			2.177
	VAT Compliance Costs 4	0.710			1.568
	VAT Compliance Costs 5	0.859			1.757
VAT Administrative Complexity	VAT administrative complexity 2	0.779	0.578	1.311	1.886
	VAT administrative complexity 1	0.759			1.703
	VAT administrative complexity 3	0.776			1.728
	VAT administrative complexity 4	0.670			1.471
	VAT administrative complexity 5	0.809			1.730
VAT Verification Audits	VAT verification audits 2	0.860	0.658	1.325	2.477
	VAT verification audits 1	0.755			1.756
	VAT verification audits 3	0.829			2.187
	VAT verification audits 4	0.838			2.297
	VAT verification audits 5	0.768			1.621
Voluntary Compliance Behaviour	Voluntary Compliance Behaviour 1	0.775	0.627		2.123
	Voluntary Compliance Behaviour 2	0.756			1.887
	Voluntary Compliance Behaviour 3	0.818			2.124
	Voluntary Compliance Behaviour 4	0.781			1.973
	Voluntary Compliance Behaviour 5	0.827			2.175

Source: Survey Data (2025)

Convergent validity is further supported by the structural path coefficients between the latent variables. As shown in Figure 1, VAT verification audits have the strongest effect on voluntary compliance behaviour (0.614), indicating a robust relationship. VAT administrative complexity shows a weaker positive effect ($\beta = 0.181$), VAT compliance costs exhibit a small negative effect ($\beta = 0.070$), and tax service reliability has a slight positive effect ($\beta = 0.066$). Overall, the results indicate that VAT verification audits are the strongest contributor to voluntary compliance, while the other variables show comparatively weaker effects.

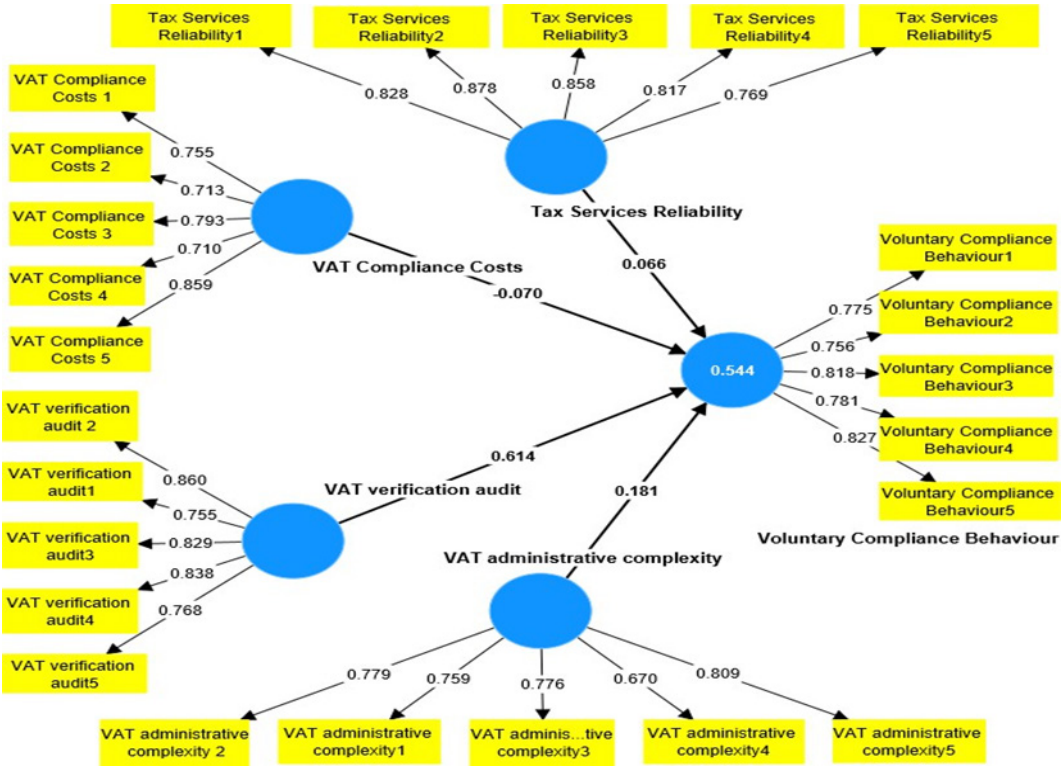


Figure 2: Measurement Model

Source: Survey Data (2025)

4.3 Diagnostic Test Results for Discriminant Validity and Reliability

The study assessed discriminant validity using the Heterotrait–Monotrait (HTMT) ratio and the Fornell–Larcker criterion, and reliability using Cronbach's Alpha and Composite Reliability ss shown in Table 3. All HTMT values are below the 0.85 rule-of-thumb recommended by Ringle et al. (2023), confirming discriminant validity. The Fornell-Larcker criterion is also satisfied, as the square roots of the AVE values exceed the inter construct correlations, consistent with Hair et al. (2022). Reliability is acceptable, with all Cronbach's Alpha and Composite Reliability scores above the 0.70 benchmark recommended by Ringle et al. (2024).

Table 3: Discriminant Validity and Reliability Diagnostic Tests

Fornell-Larcker Criterion					
	TSR	VATCC	VATAC	VVA	VCB
Tax service reliability	0.831				
VAT compliance costs	0.039	0.768			
VAT administrative complexity	0.068	-0.056	0.760		
VAT verification audits	0.057	-0.121	0.485	0.811	
Voluntary compliance behaviour	0.111	-0.152	0.487	0.714	0.792
Heterotrait-Monotrait Ratio					
Variables				HTMT	
VAT Compliance Costs <-> Tax service reliability				0.079	
VAT administrative complexity <-> Tax service reliability				0.083	
VAT administrative complexity <-> VAT Compliance Costs				0.109	
VAT verification audits <-> Tax service reliability				0.071	
VAT verification audits <-> VAT Compliance Costs				0.132	
VAT verification audits <-> VAT administrative complexity				0.572	
Voluntary Compliance Behaviour <-> Tax service reliability				0.122	
Voluntary Compliance Behaviour <-> VAT Compliance Costs				0.162	
Voluntary Compliance Behaviour <-> VAT administrative complexity				0.566	
Voluntary Compliance Behaviour <-> VAT verification audits				0.807	
Reliability Tests					
	Cronbach's alpha	Composite reliability (rho_a)		Composite reliability (rho_c)	
Tax service reliability	0.889	0.910		0.918	
VAT compliance costs	0.836	0.914		0.877	
VAT administrative complexity	0.817	0.832		0.872	
VAT verification audits	0.870	0.875		0.906	
Voluntary compliance behaviour	0.852	0.859		0.894	

Source: Survey Data (2025)

4.4 PLS SEM Predictive Power, Accuracy and Effect Size

Results presented in Table 4 indicate that the direct PLS-SEM model has moderate predictive power with an R^2 value of 0.544. This implies that 54.4% of the variation in voluntary compliance behaviour explained by VAT compliance costs, administrative complexity, and verification audits.

Effect size results indicate a large effect for verification audits, a small effect for administrative complexity, and negligible effects for compliance costs and tax service reliability. The PLS predict results (LMV summary) show positive Q^2 values and lower MAE and RMSE compared to the linear model, confirming predictive relevance and improved predictive accuracy.

Table 4: Results of PLS-SEM direct model

Predictive Power, Accuracy and Size Effect on Prediction-Direct Influence					
	R-square			R-square adjusted	
Voluntary Compliance Behaviour	0.544			0.539	
F-square Size Effect					
Tax service reliability				0.010	
VAT compliance costs				0.011	
VAT administrative complexity				0.055	
VAT verification audits				0.623	
MV Prediction Summary					
Direct Influence	Q^2 predict	PLS-RMSE	PLS-MAE	LM-RMSE	LM-MAE
Voluntary Compliance Behaviour 1	0.281	0.779	0.590	0.793	0.601
Voluntary Compliance Behaviour 2	0.196	0.696	0.510	0.765	0.672
Voluntary Compliance Behaviour 3	0.309	0.655	0.565	0.750	0.656
Voluntary Compliance Behaviour 4	0.421	0.705	0.529	0.718	0.583
Voluntary Compliance Behaviour 5	0.406	0.715	0.537	0.767	0.596

Source: Author (2025)

The moderating PLS-SEM model also demonstrates moderate predictive power with an R^2 value of 0.557 (Table 5). This indicates that 55.7% of the variation in voluntary compliance behaviour is explained when tax service reliability is included as a moderator. All interaction effects are weak, although VAT verification audits remain the strongest predictor. Positive Q^2 values and lower MAE and RMSE again indicate improved predictive accuracy under the moderating model.

Table 5: Results of PLS-SEM moderating model

Predictive Power, Accuracy and Size Effect on Prediction- Moderation Influence of Service Reliability					
	R-square	R-square adjusted			
Voluntary compliance behaviour	0.557	0.548			
F-square Size Effect					
Tax service reliability x VAT administrative complexity -> Voluntary compliance behav.					0.007
Tax service reliability x VAT compliance costs -> Voluntary compliance behaviour					0.009
Tax service reliability x VAT verification audits -> Voluntary compliance behaviour					0.025
MV Prediction Summary					
Moderation influence	Q^2 predict	PLS-RMSE	PLS-MAE	LM-RMSE	LM-MAE
Voluntary Compliance Behaviour1	0.337	0.791	0.606	0.834	0.645
Voluntary Compliance Behaviour 2	0.244	0.861	0.680	0.911	0.710
Voluntary Compliance Behaviour3	0.259	0.861	0.641	0.886	0.661
Voluntary Compliance Behaviour4	0.475	0.664	0.479	0.676	0.482
Voluntary Compliance Behaviour5	0.436	0.633	0.466	0.664	0.477

Source: Author (2025)

4.5 Results of hypothesis testing and discussion of findings

4.5.1 Direct Effect

The study examines the effect of VAT structure on voluntary compliance behaviour in the Kariakoo and Ilala Tax regions, as well as the moderating role of tax service quality. Specifically, the study focused on three objectives: (i) to examine the influence of VAT compliance costs on voluntary compliance behaviour, (ii) to assess the influence of VAT administrative complexity on voluntary compliance behaviour, and (iii) to evaluate the influence of VAT verification audits on voluntary compliance behaviour in the two tax regions. The results of the direct effects presented in Table 6 and Figure 3.

Table 6: Results of hypothesis testing

	Original sample	Sample mean	Standard deviation	T-statistics	P-values
Tax service reliability -> Voluntary compliance behaviour	0.066	0.070	0.039	1.700	0.089
VAT Compliance Costs -> Volun-tary Compliance Behaviour	-0.070	-0.079	0.033	2.149	0.032
VAT administrative complexity -> Voluntary Compliance Behaviour	-0.181	-0.180	0.046	3.893	0.000
VAT verification audits -> Volun-tary Compliance Behaviour	0.614	0.613	0.035	17.404	0.000

Source: Survey Data (2025)

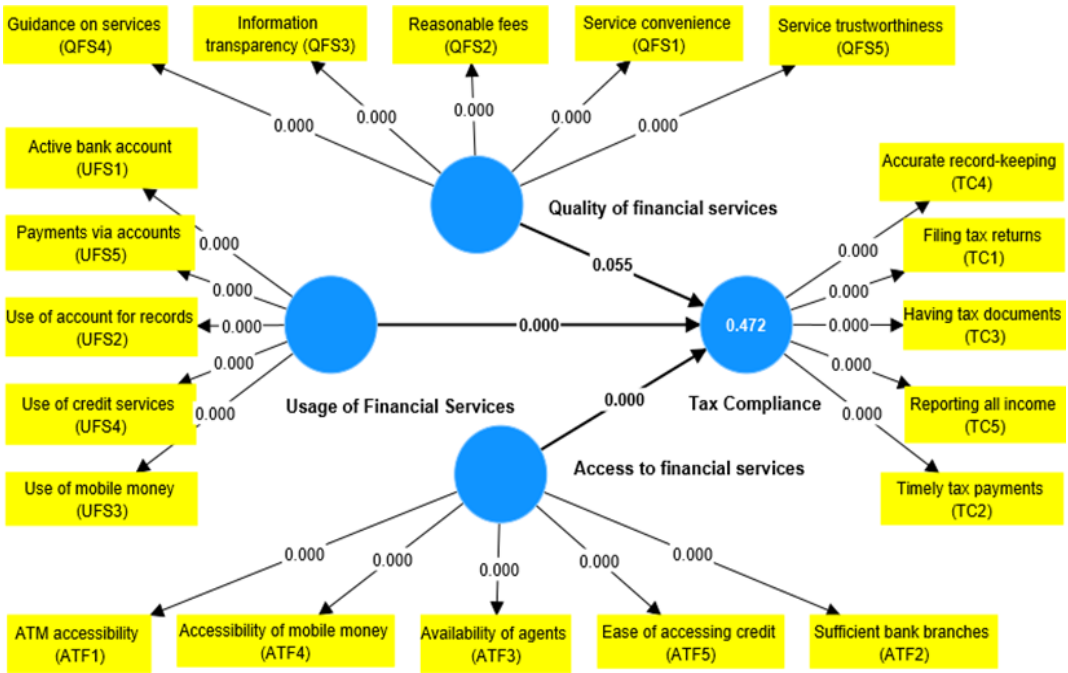


Figure 3: PLS SEM Structure Model **Source: Survey Data (2025)**

4.5.2. Compliance Costs and Voluntary Compliance

The study found that VAT compliance costs have a negative and statistically significant effect on voluntary compliance behaviour (β=-0.070, P<0.05). Therefore, the null hypothesis is rejected. This finding implies that higher VAT compliance costs are associated with lower levels of voluntary compliance. The negative effect arises from the financial

and administrative burdens imposed on taxpayers. Time-consuming record-keeping, complex filing procedures and the need for professional assistance increase both effort and costs, thereby discouraging compliance.

The findings are consistent with those of Musimenta (2020), Mahangila (2017), Matarirano et al. (2019), Mehmet (2023), and Onoja and Odoma (2023), who report that high compliance costs discourage voluntary compliance. These studies attribute the effect of increased effort, time, and financial resources required to meet tax obligations. The findings align with Classical Taxation Theory, particularly the canons of economy, which emphasizes minimizing the costs incurred by taxpayers in meeting their obligations. However, the findings differ from those of Alshira'h (2024), who found no significant effect and Bruce-Twum (2023), who reported that higher costs may deter non-compliance. Similarly, Shakkour et al. (2021), suggest that compliance costs may enhance compliance when taxpayer education is sufficient. These inconsistencies indicate that the effect of compliance costs is context-specific and influenced by institutional and administrative conditions.

4.5.3 VAT Administrative complexity and voluntary compliance

The study found that VAT administrative complexity has a negative and statistically significant effect on voluntary compliance behaviour in the Kariakoo and Ilala Tax regions (β=-0.18, $P<0.05$), leading to rejection of the null hypothesis. The result suggests that increased complexity in VAT reduces voluntary compliance. Complex and unclear tax procedures make it difficult for taxpayers to understand and fulfil their obligations. Frequent regulatory changes, extensive documentary requirements, and limited guidance or support increase confusion and discourage voluntary compliance.

The findings are consistent with Abdul and McFie (2020), Musimenta (2020), Mat Jusoh et al. (2021), Ghani et al. (2020), and Owusu et al. (2023), who report that tax complexity negatively affects compliance by increasing the difficulty of meeting tax obligations. The findings support classical taxation theory, particularly the canon of simplicity, which emphasizes that tax systems should be clear, easy to understand, and free from unnecessary complication to encourage voluntary compliance.

However, contrary findings by Alsqour and Alshirah (2020), Eneh et al. (2022), and Naape (2023) suggest that tax complexity may positively influence compliance in contexts with strong enforcement, higher taxpayer awareness, or better institutional support. These inconsistencies highlight the role of contextual factors such as enforcement strength, taxpayer education, administrative capacity, and trust in tax authorities. In settings where taxpayers are well-informed or closely monitored, complexity may not deter compliance.

This indicates that the impact of administrative complexity varies across environments and depends on local administrative capacity and taxpayer characteristics.

4.5.4 VAT verification audits and voluntary compliance

The study found that VAT verification audits have a positive and statistically significant effect on voluntary compliance behaviour in the Kariakoo and Ilala Tax regions (β=0.61, P<0.05), leading to rejection of the null hypothesis. These results indicate that effective verification audits enhance voluntary compliance behaviour. This effect is attributed to taxpayers' positive perception of the audit process, particularly fairness of audits, accuracy, error-free nature of audit procedures, and timely communication of audit outcomes.

The findings are consistent with Alshrouf (2019), Kasper and Alm (2022), Olaoye and Ekundayo (2019), Obaid et al. (2020), and Okpeyo et al. (2019), who report that audits positively influence compliance by reinforcing fairness, transparency, accountability, and trust in the tax system. The findings align with Classical Taxation Theory through the canons of certainty and fairness, which emphasize predictable, transparent, and clearly enforced tax procedures encourage compliance.

In contrast, Olaoyea and Busarib (2021) and Dare (2020) report insignificant effects, particularly in contexts where audits are perceived as unfair, poorly executed, or unsupported by taxpayer guidance. These differences may be explained by variation in audit quality, enforcement practices, and taxpayer trust.

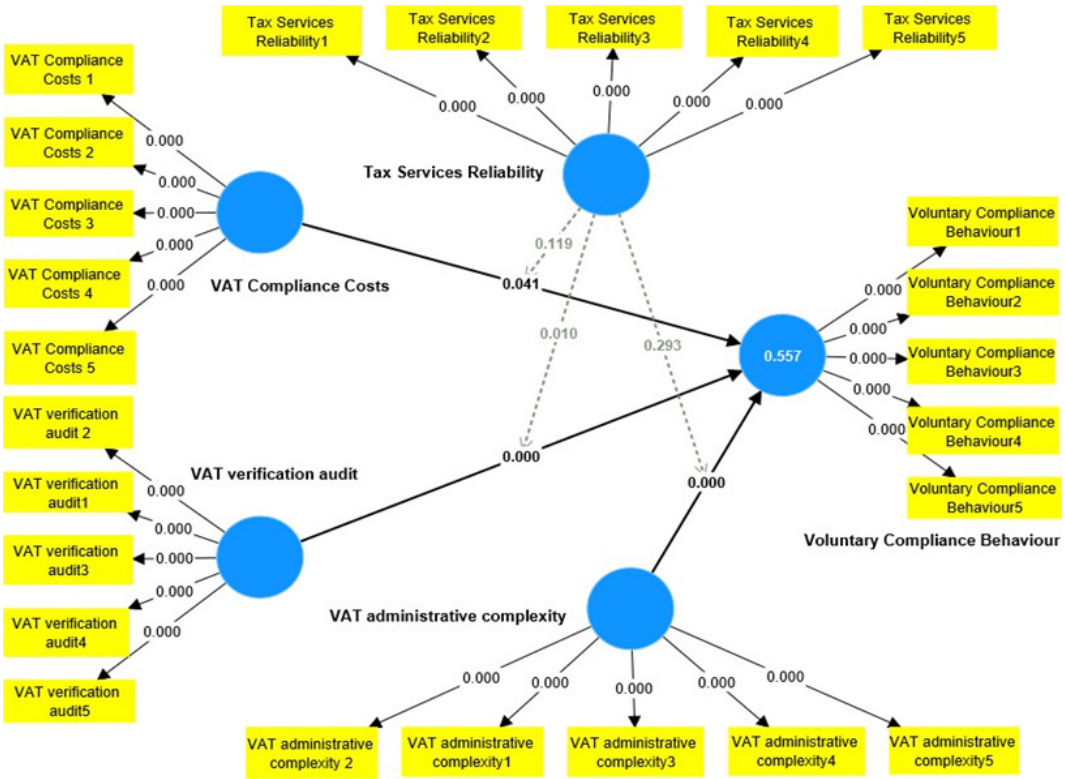
4.5.5 Moderating effects of tax service reliability

The second model examined the moderating effect of tax service reliability on the relationship between VAT structure and voluntary compliance behaviour. The findings are presented in table 7 and figure 4. The results on the relationship between moderating effect of tax service reliability on VAT compliance costs, moderating effect of Tax service reliability on VAT administrative complexity and moderating effect of Tax service reliability on VAT verification audits are presented.

Table 7: Results of Hypothesis Testing

	Original sample	Sample mean	Standard deviation	T - statistics	P - values
Tax service reliability -> Voluntary Compliance behaviour	0.066	0.070	0.039	1.700	0.089
VAT Compliance Costs -> Voluntary compliance behaviour	-0.070	-0.079	0.033	2.149	0.032
VAT administrative complexity -> Voluntary compliance behaviour	-0.181	-0.180	0.046	3.893	0.000
VAT verification audits -> Voluntary compliance behaviour	0.614	0.613	0.035	17.404	0.000

Source: Survey Data (2025)



Source: Data Analysis (2025)

4.5.6 Moderating Effect of Tax Service Reliability on VAT Compliance Costs

The results indicate that the interaction effect is statistically insignificant (β=0.08, p>0.05); suggesting that tax service reliability does not moderate the effect of VAT compliance costs

on voluntary compliance. (Table 6 and figure 4). Therefore, the null hypothesis is not rejected. These findings imply that improvements in tax service reliability do not significantly alter the negative effect of VAT compliance costs on voluntary compliance. This may be attributed to persistent weaknesses in tax services delivery, including delays in responding to inquiries and complaints, limited officer approachability, ineffective communication, and inconsistent levels of competence. These factors fail to reduce the financial and administrative burdens faced by taxpayers.

The findings contrast with previous studies, such as Gosal and Utami (2020), Nurkholis et al. (2020), Joni and Handryno (2021), Ali et al. (2017), Putra and Setiawan (2020), Dewi et al. (2022), Susuawu et al. (2020), Augustine et al. (2020), and Artawan et al. (2020), which report that reliable tax services strengthen trust and support voluntary compliance by building trust and improving taxpayer satisfaction. The findings do not support Classical Taxation Theory, particularly the canons of convenience and efficiency, which emphasizes reducing compliance burdens and facilitating ease of tax compliance.

4.5.7 Moderating effect of tax service reliability on vat administrative complexity

Similarly, the results presented in Table 6 and figure 4 show that the tax service reliability on the relationship between VAT administrative complexity and voluntary compliance behaviour is statistically insignificant ($\beta=0.04$, $p>0.05$). Since the result is statistically insignificant, the null hypothesis is not rejected. These results suggest that tax service reliability does not significantly moderate the relationship between VAT administrative complexity and voluntary compliance behaviour. The result may be explained by persistent structural challenges, including unclear regulations, extensive documentation requirements, and limited taxpayer support, which outweigh the potential benefits of improved service delivery.

These findings differ from prior studies, as they do not align with those of Gosal and Utami (2020), Nurkholis et al. (2020), Joni and Handryno (2021), Ali et al. (2017), Putra and Setiawan (2020), Dewi et al. (2022), Susuawu et al. (2020), Augustine et al. (2020), and Artawan et al. (2020), which consistently show that service reliability strengthens trust, satisfaction, and voluntary compliance. However, most of these studies focus on direct effects rather than moderating relationships. Also, in contexts where administrative complexity is dominant, improvements in service reliability alone may be insufficient to offset compliance challenges. The findings do not align with Classical Taxation Theory, particularly the canons of simplicity and convenience, which emphasize clear tax systems and supportive administrative processes.

4.5.8 Moderating effect of tax service reliability on vat verification audits

The study has found that tax service reliability has a negative but statistically significant moderating effects on the relationship between VAT verification audits and voluntary compliance behaviour (β=-0.13, $p>0.05$) as presented in table 6 and figure 4. Therefore, the study fails to rejects the null hypothesis. This indicates that higher levels of tax reliability do not significantly weaken the positive effect of VAT verification audits on voluntary compliance. This may be explained by a reduced reliance on enforcement when taxpayers perceive improved service delivery, thereby diminishing the deterrence effect of audits.

The findings differ from earlier studies (Gosal & Utami, 2020; Nurkholis et al., 2020; Joni & Handryno, 2021; Ali et al., 2017; Putra & Setiawan, 2020; Dewi et al., 2022; Susuawu et al., 2020; Augustine et al., 2020; Artawan et al., 2020), which consistently show that service quality strengthens trust, satisfaction, and voluntary compliance. The divergence between the previous studies and the current study is attributed to in the specific context of the Kariakoo and Ilala regions, where weaknesses in service delivery reduce the perceived seriousness of audit enforcement. The findings partially align with Classical Taxation Theory through the canons of fairness, certainty, and convenience, but also highlight limitations in the role of service reliability in reinforcing enforcement mechanisms.

4.6 Importance–Performance Map Analysis (IPMA)

The IPMA results presented in figure 5 and figure 6, indicate that VAT verification audits demonstrate high importance and strong performance in both models, indicating a key strength that should be maintained. In contrast, VAT administrative complexity shows moderate importance but low performance, making it a critical area requiring improvement. VAT compliance costs exhibit high performance but continue to exert a negative influence, suggesting the need for continued monitoring and policy attention. Tax service reliability shows relatively low importance and moderate performance, highlighting the need for consistent improvements. Overall, efforts should focus on reducing administrative complexity and mitigating the negative effects of compliance costs, while progressively strengthening service reliability.

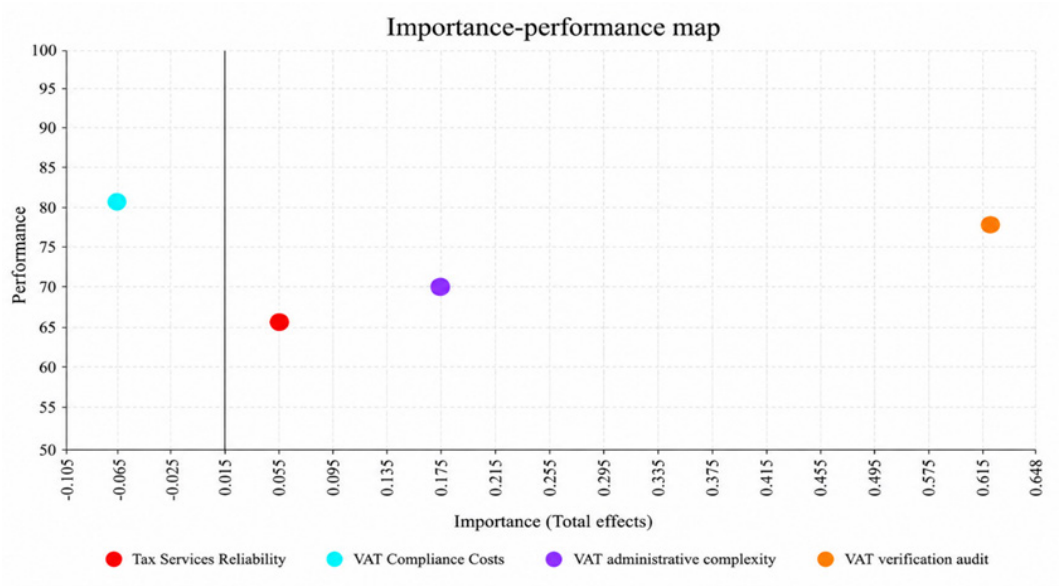


Figure 5: Importance Performance Map-Direct Influence

Source: Data Analysis (2025)

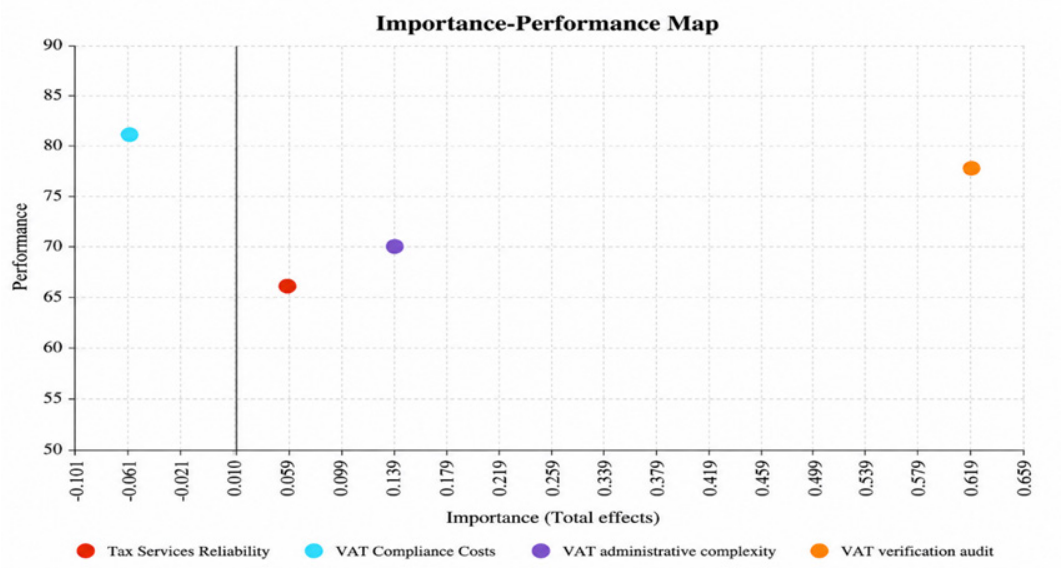


Figure 6: Importance Performance Map-Moderations Influence

Source: Data Analysis (2025)

5.0 Implications of the study

5.1 Practical implications

The findings offer important practical guidance for the Tanzania Revenue Authority in improving voluntary VAT compliance through improvements in tax structure and service delivery. High compliance costs highlight the need for simplified tax preparation processes, improved access to digital platforms, and reduced reliance on professional services. Similarly, the negative effects of administrative complexity underscore the importance of clearer and more accessible VAT regulations, particularly for taxpayers in the Kariakoo and Ilala Tax Regions.

The positive influence of verification audits suggests that fair, transparent, and minimally disruptive audit practices can enhance trust and reinforce perceptions of fairness within the tax system. However, weaknesses in tax service reliability limit the effectiveness of these measures, potentially reducing taxpayer confidence. To address these challenges, the TRA should strengthen service delivery by investing in modern digital systems, enhancing taxpayer education, enforcing the Customer Care Charter, and establishing professional standards for tax consultancy services to ensure equitable and high-quality support for all taxpayers.

5.2 Policy implications

The findings provide important policy guidance for strengthening the VAT system through administrative and institutional reforms. The negative effects of VAT compliance costs and administrative complexity highlight the need to amend the Value Added Tax Act (Cap. 148) to simplify registration, filing, and record keeping procedures. These reforms would enhance clarity and reduce compliance burdens.

Strengthening the VAT framework also requires expanding the mandate of the Tax Ombudsman Service to improve oversight of tax administration, monitor service delivery, and enforce ethical standards under the Tax Administration Act (Cap. 438) and the 2022 Regulations. The Ombudsman should conduct regular assessments, collect taxpayer feedback, and issue actionable recommendations supported by mechanisms that promote transparency and accountability. Additionally, strengthening institutional capacity through expert recruitment and secure digital systems would improve grievance handling and taxpayer access.

5.3 Theoretical implications

The study findings provide partial support for Classical Taxation Theory in the context of Tanzania's VAT system. The results align with the canon of economy, the simplicity, certainty, and fairness. The study's direct effects model aligns with the Classical Taxation Theory canons of economy, simplicity, certainty, and fairness, as higher compliance costs and administrative complexity reduce voluntary compliance, while verification audits enhance it. However, the moderation results do not support the canons of convenience and efficiency, as tax service reliability does not strengthen compliance under conditions of high costs and complexity. This partial alignment suggests that while core principles of Classical Taxation Theory remain relevant, their effectiveness depends on administrative capacity and consistency of service delivery within the tax system.

5.4 Implications of the study

Reducing VAT Compliance Costs: TRA should further digitalize tax services through user-friendly and mobile-compatible platforms, and integrate AI-based support systems to reduce reliance on external consultants. Consultancy fees should also be regulated to ensure they remain affordable.

Simplifying VAT Administrative Complexity: TRA should provide clear and assessable guidance through online platforms, multilingual materials, and regular taxpayer training. The introduction of mobile applications and SMS alerts for deadlines and regular updates would further reduce compliance challenges.

Strengthening VAT verification audits: TRA should adopt advanced technologies, including AI tools, to enhance audit efficiency, provide clear digital explanations of audit outcomes, and ensure transparent and timely follow-up processes

Improving Tax Service reliability: TRA should implement customer relationship management system to improve responsiveness, enforce the Customer Care Charter, and expand taxpayer education through multiple channels including SMS, radio s, and community outreach programmes.

Reducing VAT Compliance Costs through Policy Reform: The Ministry should simplify VAT registration, filing, and payment procedures under the Value Added Tax Act (Cap. 148), and regulate consultancy fees to ensure equitable access to tax services by all taxpayers. Reducing VAT Administrative Complexity: The Ministry should develop a simplified VAT Compliance framework with clear and accessible guidelines, streamline filing and record-keeping requirements and support continuous taxpayer education. Improving VAT

verification audits through Policy Reform: Policies should promote the adoption of modern technologies, such as AI for fraud detection and blockchain for secure audit records while strengthening auditor training and ensure transparent communication and appeals processes.

Institutionalizing Reliable Tax Service Quality: The Customer Care Charter should be revised to establish clear service delivery standards, AI-driven systems should be adopted to improve inquiry handling. Additionally, regulatory frameworks should ensure fair and consistent consultancy fees so that all taxpayers receive reliable and equitable support.

5.5 Limitations and areas for further studies

This study has several limitations. First, the study focused on general VAT compliance behaviour without accounting for sector-specific differences. Based on the scope and findings of this study, future research could examine VAT compliance within specific sectors like retail, manufacturing or services to enable more targeted and specific policy interventions that address industry-specific challenges.

Second, the study employed a cross-sectional research design, which captures data at a single point in time and limits the ability to establish causal relationships between variables. Future studies could adopt longitudinal designs to examine how VAT compliance behaviour evolves over time.

Third, the study focused on individual VAT-registered taxpayers within the Kariakoo and Ilala Tax Regions in Dar es Salaam. Although these regions are economically significant, the findings may not be fully generalizable to other regions or to corporate taxpayers. Future research could extend the analysis to other regions and include different categories of taxpayers to enhance generalizability.

Finally, the study relied on self-reported data collected through questionnaires, which may be subject to response bias, including social desirability bias. Future research could extend the analysis to other regions and include a wider range of taxpayer categories to enhance generalizability.

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Modelling the Effect of Covid-19 on Export Levy Revenue in Tanzania

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Abstract

The study focused on modelling the effect of COVID 19 on export levy revenue in Tanzania. The paper employed an ARDL framework and data for a period of 35 years from 1980 to 2024, covering pre and post pandemic. The results indicate that COVID-19 pandemic had negative although not statistically significant effect on export levy revenue. This result was consistent under different model specifications with inflation, exchange rate and trade liberalization as control variables. The study's policy implications include measures to stabilize value chains, ensure price stability and preparedness and resilience for shocks like the pandemic. The study contributes to literature on effects of pandemic and join debates on the varying impacts of pandemic effects across countries. Area for further research include the assessment of the pandemic effects across tax types and sectors, and alternative interventions to promote domestic value addition.

Keywords: *export taxes; agricultural value additions; exchange rate; inflation; COVID; ARDL*

JEL Classification: H27, H71, E32, C53, O55

1. Introduction

Tanzania's economy has undergone a remarkable structural transformation since the adoption of market-oriented reforms in the mid-1980s, transitioning from a centrally planned system to an increasingly open and trade-dependent market economy (Ngeno, 1996). Liberalization reforms enabled increased opened of the economy, which also spurred economic growth. As Vedasto (2016) found, increased exports, particularly agricultural and mineral, has significant contribution to GDP growth in Tanzania. Tanzania's nominal GDP reached approximately USD 79.9 billion in 2024, making it one of the largest economies in East Africa and among the fastest growing in sub-Saharan Africa, with sustained GDP growth rates averaging between 5% and 7% for much of the preceding decade (African

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Development Bank, 2024). Trade with other countries has allowed the country to earn foreign exchange and revenue and employ individuals (Vedasto, 2016; Epaphra, 2016).

Following the adoption of trade liberalization, Tanzania entered into waves of reforms aiming to remove trade barriers, reduce tariffs and adopt flexible exchange rate policies as well as abolishing taxes on exports in order to stimulate trade. Before the adoption of trade liberalization in 1980s, Tanzania imposed export levy on a wide range of traditional agricultural exports such as coffee, cotton, and tea. Export levy still imposed on exports for selected commodities in order to punish their exportation in raw form to encourage domestic processing and value addition. Export of raw cashew nuts is levied an export tax of 15 percent of the FOB value. Raw hides and skins is levied at 80 percent of FOB value or USD 0.52 per kilogram, and wet blue leather is levied at 10 percent of FOB value (Bouet et al., 2004; East African Community - EAC, 2004; World Trade Organization - WTO, 2019). Beside motives of encouraging domestic value addition, export levy sometimes used for revenue generation across many developing countries (International Monetary Fund - IMF, 2014; OECD, 2022).

Exports and in turn export levy revenue is affected by disruptions in the domestic and global economy that are detrimental to trade. Following the eruption of COVID-19 in late 2019 and its declaration as a global pandemic by the World Health Organization (WHO) in March 2020, it had significantly disrupted the international trading system (Hayakawa and Mukunoki, 2020). Countries adopted lockdown measures which reduced demand for commodities, logistic systems came to a halt leading to global trade contraction by 5.3 percent in 2020 (OECD, 2020), with developing economies being among the most adversely affected (Mena et al., 2022). Despite many countries implemented total lockdown, some implemented partial lockdowns and Tanzania implement almost no lockdowns (Kida et al., 2020). Absence of lockdowns in Tanzania however could not insulate fully the economy from the effects of the pandemic. External sector felt a decline as revenue from tourism fell by 80 percent in 2020 (Gössling et al., 2021) because of a declined demand due to lockdown in countries of tourist origin. Similarly, major exporters of fruits and agricultural products incurred losses of approximately 40 percent (Government of Tanzania, 2020), and GDP growth decelerated from 6.8 percent in 2018/19 to 4.8 percent in 2019/20 and 2.0 percent in 2020/21, the lowest in over two decades (Bank of Tanzania, 2021). Countries that are commodity-dependent experienced sharper and longer revenue contractions than diversified ones (Bhorat et al., 2022; Gnangnon, 2023) due to decline in decline in commodity prices.

The primary factors affecting Tanzania's export revenue included volumes of commodities (cashew nuts, hides and leather products), lower international prices; shipping disruptions at Dar es Salaam and other ports; and weakened purchasing power in major markets, notably India and Vietnam for cashew nuts (Mkenda and Aikaeli, 2021; Ministry of Finance and Planning, 2022). Despite the economic significance of export duties, to the best of our knowledge research on this area is missing and if any so scanty. Similarly, for the case of Tanzania evaluation of effects of COVID-19 pandemic has primarily focussed on volumes and revenue in the value chain leaving out a focus on tax (World Bank, 2023; Mkenda and Aikaeli, 2021). The lack of focus on export tax research is perhaps a result of the tax system that treat export levy as a residual within aggregate trade-tax categories (NBS, 2016; NBS, 2018; Shittu et al., 2021). The study endeavour to bridge this research gap by modelling the effect of COVID-19 on export duties and levy in Tanzania.

The remainder of the paper is organised as follows: Section 2 reviews the theoretical and empirical literature; Section 3 outlines the methodology; Section 4 presents the findings; Section 5 concludes and provide policy implications of the study.

2. Literature Review

2.1 Theoretical framework of export taxation

Classical trade theories such as Ricardian Theory of Comparative Advantage (1817) and the Heckscher–Ohlin Model (1933) predicts country's specialization and trade based on on comparative advantage and factor endowments. Both classical models, however, assume static conditions and cannot account for disruptions arising from global health crises or policy-driven instruments such as export taxation (Toraubally, 2022). These theories underpin Tanzania's specialisation in primary commodities, predicting that the country exports goods in which it enjoys a relative efficiency advantage principally agricultural products and minerals (Bernhofen and Brown, 2018; Utouh and Tile, 2023).

New Trade Theory**,** pioneered by Krugman (1980), however introduced economies of scale and strategic trade policy as a rationale for using export taxation to shift specialisation from raw to processed goods. As such, Tanzania levying duties on raw cashew nuts, hides and leather to incentivise domestic processing (Gebremariam and Ying, 2022). Porter (2011) articulated the infant-industry argument, which justifies temporary protection for emerging industries, while Toraubally (2022) extended this to optimal-tariff theory, showing that countries with market power over a commodity can raise welfare through export taxes. Piermartini (2004), however, warned that export taxes create welfare losses and erode long-run producer incentives.

Taken together, the theoretical perspectives generate competing predictions. Classical theory treats export volumes as mechanically tied to GDP growth, but New Trade Theory and the infant-industry argument suggest that policy-induced duties decouple export levy revenue from real output, particularly when combined with commodity-price volatility. This study therefore tests whether macroeconomic variables (agricultural value additions, exchange rate, and inflation) or policy and structural shocks (COVID-19) dominate the determination of export levy revenue in Tanzania.

2.2 Taxes and exports

Bouet and Laborde (2012) showed that export taxes in commodity-dependent developing economies can generate substantial revenue and encourage value addition, but excessive rates depress producer prices and discourage long-run production. Nevertheless, when export taxes are combined with industrial policy, could support development objectives, but were used in isolation they dampened agricultural exports in East Africa (Ngeno,1996).

For instances, Msuya (2018) noted that cashew nuts and coffee dominate Tanzanian agricultural exports, but that low productivity hinder their contribution to export taxes due to low export volume. Furthermore, there are other factors that affects exports including exchange rate, infrastructure, institutional quality, trade liberalization and trade promotions (Epaphra ,2016; Shah ,2021; Cruz ,2014; and Van Biesebroeck ,2015). A recent study by Gnangnon (2023) finds that export-product diversification reduces volatility in trade-tax revenue, but Ayenew (2022) on the other hand documented that export taxation in commodity-exporting African economies reduces export competitiveness in the medium term despite generating short-run revenue gains.

Also, Mutai et al. (2025) and Aliraqi (2022) reported on the impact of Inflation on exports and they found that there was significant negative impact of Inflation on exports, hence justifying its substantial impact on export revenue.

2.3 The Impact of COVID-19 on Trade and Revenue

Barbero *et al*., (2021) using data of 68 eight countries which exported across 222 destinations in the world found that COVID-19 has negative impact on bilateral trade for parter states who were members of regional trade agreements before the pandemic. Furthermore, negative and significant impact of COVID-19 considered indicators of government actions to counter act the pandemic.

Chin *et al*. (2023) found that high-income countries experienced a COVID-19 positive impact on trade as switch to exporters of medicines and COVID-19-related products. For

middle-income and low-income countries were not significantly affected by COVID-19. This finding implies that trade deterioration during the pandemic were accelerated by other factors rather than the direct influence of COVID-19 itself.

The OECD (2020) reported a 5.3% contraction in global trade in 2020, with the sharpest impact on commodity-dependent developing countries. As Hayakawa and Mukunoki (2021) observed that COVID-19 had negative effect on both exporting and importing countries, resulted reduction of bilateral trade by 10–15% in 2020, however the impacts were accommodated during the first wave. Furthermore, Gössling et al. (2021) documented severe tourism losses in developing countries due to travelling restrictions during the pandemic. However, Mena et al. (2022) showed that diversified exporters experienced shorter and milder contractions.

Furthermore, COVID-19 caused African export to fell sharply in 2020, with contractions of 2.8%, 21.8%, and 13.65% in the first three quarters compared to 2019 (Bakouan et al., 2022). North Africa's exports fell 27.61% and Southern Africa's about 6.96% in 2020 (Ibid..) The study found that emergence measures to counter act COVID-19 fail to mitigate the impact of COVID-19 on trade and exports.

For Tanzania, Kida et al. (2020) found that gold exports remained resilient while agricultural exports declined also estimated that GDP fell 2.5–3.5% below the pre-pandemic baseline. The Bank of Tanzania (2021) documented a decline in export earnings, while the Ministry of Finance and Planning (2022) reported a 15–25% reduction in agricultural export volumes during 2020/21. Bhorat et al (2022) provide a pan-African synthesis showing that the pandemic's fiscal impact was most severe in countries with narrow export bases consistent with the concentration profile observed in Tanzania's export levy receipts.

According to OECD (2022), revenue from international trade taxes declined by 8–15% across sub-Saharan Africa. The African Development Bank (2024) reported a 12% decline in Tanzanian government revenue in 2020/21. The IMF (2021) approved a USD

567.25 million loan to support Tanzania's pandemic response. Ngowi (2010) had earlier documented the effects of the 2008–2009 financial crisis on Tanzania's trade position, although the pandemic's impact proved more severe. The World Bank (2023) emphasised broadening the tax base as the most effective route to sustainable revenue growth. Moore (2023) argues that, in low-income African contexts, stability and predictability of customs revenue outweigh marginal rate increases, reinforcing the case for revenue-smoothing instruments examined.

3. Methodology

3.1 Data and sources

This paper uses annual time series data for Tanzania for a period of 35 years from 1990 to 2024. Data on agricultural value addition, nominal exchange rate, and inflation were extracted from the World Bank Development Indicators. Data on export levy were obtained from Tanzania Revenue Authority (TRA) tax revenue statistics. Data for the construction of COVID-19 dummy were obtained from reports indicating the period of onset of the pandemic and trade liberalization dummy was constructed based on previous reports on economic reforms in Tanzania.

3.2 Analytical strategy

The analytical strategy involved a framework for estimation of the ARDL model. First, the paper conduct unit root test followed by empirical model estimation using ARDL. This was followed by test of cointegration implemented using a framework following Pesaran, Shin and Shin (2001) Bound test. Lastly, model diagnostic tests using model stability statistics and tests of violation of key econometric assumptions of homoscedasticity, serial correlation of error term, normality of errors and model specification.

3.1. ARDL Model

The general ARDL (p, q1, q2, q3, q4) model specified as follows:

$$lnExpdty_t = \alpha_o + \Sigma_{i=1}^{p} \beta_i lnExpdty_{t-i} + \Sigma_{i=0}^{q_1} \gamma_i ln\, AgricVA_{t-i} + \Sigma_{i=0}^{q_2} + \partial_i lnINF_{t-i} + \Sigma_{i=0}^{q_3} \theta_i lnEXR_{t-i} + \Sigma_{i=0}^{q_4} \mu_i Tradelib_{t-i} + \Sigma_{i=0}^{q_5} \omega_t COVID_t + \varepsilon_t \quad (1)$$

where *Expdty* is Export Duty, *AgricVA* is the Agricultural Value Additions, INF is Inflation Rate, EXR denotes Exchange Rate and TradeLib indicates Trade liberalization. The coefficients of interest to be estimated in the model are βi; βj ; γk ; δl ; ηm; α_0 is an intercept and is a white noise error term.

3.3 Short-run Model

Once cointegration is established, the the Error Correction Model (ECM) is employed to estimate the short-run dynamics are as follows;

$$lnExpdty_t = \alpha_o + \Sigma_{i=1}^{p-1} \Delta\beta_i lnExpdty_{t-i} + \Sigma_{i=0}^{q_1-1} \gamma_i \Delta ln\ AgricVA_{t-i} + \Sigma_{i=0}^{q_2-1} \delta_i \Delta lnINF_{t-i} + \Sigma_{i=0}^{q_3-1} \Delta\theta_i lnEXR_{t-i} + \Sigma_{i=0}^{q_4-1} \Delta\mu_i Tradelib_{t-i} + \Sigma_{i=0}^{q_5-1} \Delta\omega_0 COVID_{t-1} + \varphi ECT_{t-1} + \varepsilon_t \quad (2)$$

where the error correction term (ECT) is as follows:

$$ECT_{t-1} = \pi_1 lnExpdty_{t-1} - \pi_0 - \pi_1 lnAgricVA_{t-1} - \pi_2 lnINF_{t-1} - \pi_3 lnEXR_{t-1} - \pi_4 Tradelib_{t-1} - \pi_5 COVID_{t-1} \quad (3)$$

φ represents the speed of adjustment and is expected to be negative and significant

3.4 Long-Run Model

The long-run equilibrium relationship between export tax revenues and its determinants is estimated as follows;

$$lnExpdty_{t-1} = \pi_0 + \pi_1 lnAgricVA_{t-1} + \pi_2 lnINF_{t-1} + \pi_3 lnEXR_{t-1} + \pi_4 Tradelib_{t-1} + \pi_5 COVID_t + \varepsilon_t \quad (4)$$

From the estimated ARDL model, the long-run coefficients are determined as follows;

$$\pi_1 = \frac{\Sigma_{i=0}^{q_1} \gamma_i}{1-\Sigma_{i=1}^{p} \beta_i} \quad \pi_2 = \frac{\Sigma_{i=0}^{q_1} \partial_i}{1-\Sigma_{i=1}^{p} \beta_i} \quad \pi_3 = \frac{\Sigma_{i=0}^{q_1} \theta_i}{1-\Sigma_{i=1}^{p} \beta_i} \quad \pi_4 = \frac{\Sigma_{i=0}^{q_1} \mu_i}{1-\Sigma_{i=1}^{p} \beta_i} \quad \pi_5 = \frac{\Sigma_{i=0}^{q_1} \omega_i}{1-\Sigma_{i=1}^{p} \beta_i} \quad (5)$$

3.2 ARDL Bound Test

The ARDL model is re-parameterized to the unrestricted ECM for a long-run (cointegrating) relationship test, on which the bound test expressed as;

$$\Delta lnExpdty_t = \alpha_o + \Sigma_{i=1}^{p-1} \Delta\beta_i lnExpdty_{t-i} + \Sigma_{i=0}^{q_1-1} \gamma_i \Delta ln\ AgricVA_{t-i} + \Sigma_{i=0}^{q_2-1} \delta_i \Delta lnINF_{t-i} + \Sigma_{i=0}^{q_3-1} \Delta\theta_i lnEXR_{t-i} + \Sigma_{i=0}^{q_4-1} \Delta\mu_i Tradelib_{t-i} + \Sigma_{i=0}^{q_5-1} \Delta\omega_0 COVID_{t-1} + \delta_1 lnExpdty_{t-1} + \delta_2 lnAgricVA_{t-1} + \delta_3 lnINF_{t-1} + \delta_4 lnEXR_{t-1} + \delta_5 Tradelib_{t-1} + \delta_6 COVID_t + \varepsilon_t \quad (6)$$

With respect to Equation (6), the null hypothesis (H_0) and alternative hypothesis (H_1) of the Bound test can be stated as follows:

$$H_o: \ \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = 0$$

$$H_1: \ \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq 0 \qquad (7)$$

With respect to the bounds test it should be mentioned that if F-statistic is lower than the lower bound, the null hypothesis of no long-run relationship would not be rejected. When the F-statistic exceeds the upper bound, however, it means that there is cointegration.

4. Results and discussion

4.1 Descriptive statistics

Table 1 provides a summary statistic of the variables used for model estimation. The statistics in table 3 show that the variables have low variability as measured by standard deviation. Logarithm transformation intended to suppress the data measured in high-magnitude such as export levy revenue and agriculture value addition. High-magnitude data without a log transformation often make the model violate key assumptions such as homoscedasticity making standard errors and p-values unreliable.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Log Export levy	35	21.953	3.315	12.612	26.046
Log Agric. value addition	35	22.936	0.409	22.312	23.608
Log Exchange rate	35	6.992	0.7	5.273	7.862
Log Inflation	35	2.119	0.742	1.117	3.579
COVID 19 dummy	35			0	1
Trade liberalization dummy	35			0	1

4.2 Unit Root Test

Table 2 present results of Unit Root test, conducted to ascertain the order of integration to avoid the risk of spurious regressions Two standard procedures were employed: the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test. Both tests implemented with constant and trend revealed that the variables are integrated of mixed orders, specifically I(0) and I(1) , thereby justifying the subsequent Bound's cointegration test and estimation of ARDLmodel.

Table 2: Unit Root Test

Variable	Augmented Dickie Full-er test (with constant and trend)		Phillip Perron test (with constant and trend)		Order of integration
	Level	First Dif-fer-ence	Level	First Dif-ference	
Export levy	-3.4942**	-8.5664***	-3.4237**	-12.954***	I (1)
Agric. value addition	-2.885	-4.7546**	-2.8995	-4.661**	I (1)
Exchange rate	-5.6539***	-3.3262*	-8.8897***	-3.1436	I (0)
Inflation	-2.3237	-5.4824***	-2.1917	-5.4792***	I (1)

*** p<0.01, ** p<0.05, * p<0.1

4.3 Results of ARDL model estimation

The results of ARDL model estimation are presented in Table 3. Three different model specifications were estimated to analyze the effect of COVID-19 pandemic on export tax revenue in Tanzania. Results show the error correction tem (ECM_{t-1}) is negative and statistically significant indicating the model converges to long-run equilibrium. COVID-19 dummy is not statistically significant in different model specification both in short-run and long-run, however it is negative in model 1 and model 3. These results indicate that COVID-19 reduced export levy in Tanzania during the pandemic period, but the results are not significant. According to Arita et al. (2021), agricultural trade was more resilient to the pandemic than other sectors and that Tanzania's agricultural exports were likely to remain robust despite global trade disruptions. Although Tanzania did not impose strict lockdown, exports of agricultural commodities were hampered chiefly due to hinderances from logistical constraints such as shipping and falling commodity prices.

Results of control variables are mixed. Agriculture value addition has positive and statistically significant effect on export levy both in the short and long-run under different model specifications. This as expected in the priori because agriculture value addition comprise the tax base of export levies, which are predominantly on agricultural commodities. Exchange rate has insignificant effect in short-run but positive and significant effect in the long run. This result is a result of depreciation of Tanzania Shilling (TZS) against major currencies like UD dollar, which increased revenue in local currency units (TZS). Likewise, currency depreciation against foreign currencies make local products cheap abroad (lower relative price) thus boost export competitiveness. Trade liberalization has negative effect both in short and long-run as liberalization was implemented with significant reduction in

tariff rates and scrap of the list of commidities subject to export levy. As Kanaan (2000) noted, average tariff rates droped from 40 percent in 1980s to about 14.2 percent following major reforms and regional integration. Inflation rate has positive effect on export levy. This is because inflation pushes prices upward resulting in more export revenue. As Tanzania maintained a low inflation rate at single digit for decades, it is unlikely that it would be detrimental to trade competitiveness.

Table 3: ARDL model estimation results

Variable	Model 1	Model 2	Model 3
ECT_{t-1}	-0.6747***	-0.978***	-0.8608***
Long Run			
Log Agric. value addition	19.02***	16.48229**	15.6756**
Log Exchange rate	-6.779	-3.9147	-3.790
Log Inflation	3.417**	1.7595**	
COVID 19 dummy	-0.167	0.0580	-0.4147
Trade liberalization dummy		-3.4053*	-4.7967**
Short Run			
D. Log Agric. value addition	12.83**	16.1124**	13.4939*
D. Log Exchange rate	-4.574	-2.1065	-0.5711
D. L. Log Exchange Rate		11.9109**	12.3696*
D. Log Inflation	2.306**	1.7200*	
D. COVID 19	-0.113	0.0567	-0.357
D. Trade liberalization		-3.4835*	-4.1291*
Constant	-252.4**	-3.405	-265.9263**
Observations	33	33	33
R-Squared	0.3633	0.5365	0.4735

*** p<0.01, ** p<0.05, * p<0.1

4.4 ARDL Bound Test

The Pesaran, Shin and Smith (2001) Bounds test was conducted to examine the existence of a long-run relationship among variables of the model; export levy, agricultural value added, exchange rate, inflation, and the COVID-19 dummy variable. The test compares computed and critical values of F and t statistics against the upper bound at the 10%, 5% level and 1% significance levels, such that the test is significant when the critical value is greater that computed statistic at a specific level of significance. The computed F-statistic was 4.502, which exceeded the upper bound critical value at the 10% significance level (3.875) but fell below the upper bound critical value at the 5% level (4.628), yielding mixed evidence. Similarly, the t-statistic of -4.233 exceeded the upper bound critical value at the 10% level but was inconclusive at the 5% level. Nevertheless, the critical values of F and t

are greater that computed values at p<0.01 suggesting presence of long term cointegration of the variables in the model, supporting the estimation of long-run and short-run ARDL coefficients.

Table 4: Pesaran, Shin and Shin (2001) Bound Test

Statistic	Calculated Value	10%		5%		1%	
		I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
F-statistic	4.502	2.565	3.875	3.126	4.628	4.506	6.467
T-statistic	-4.233	-2.533	-3.838	-2.904	-4.288	-3.675	-5.222

3.4 Model diagnostic results

3.4.1 Test of parameter stability

Model stability diagnostic was performed using recursive Cumulative Sum (CUSUM) and recursive Cumulative Sum of Squares (CUSUMSQ) plots in Figures 1 and 2 respectively. A standard recursive CUSUM test detects systematic structural shifts in the regression coefficients. As illustrated in Figure 1, the recursive CUSUM statistic remains well within the 95% confidence bands (the shaded grey region) throughout the entire sample period, confirming model parameter stability at 5% significance level thus indicating robustness of the empirical model. In addition, the recursive CUSUMSQ test also confirm model parameter stability as the CUSUM remained entirely within the critical boundaries at the 5% significance level.

3.4.2 Test of Heteroscedasticity

Test for presence of heteroscedasticity was implemented using Breusch-Pagan/Cook-Weisberg test and White test. The test yielded chi-square statistics of 1.66 and 33 respectively both not statistically significant at p<0.05, indicating the absence of heteroscedasticity meaning the residuals have a constant variance. Absence of heteroscedasticity imply robust parameter estimates.

3.4.3 Test of Autocorrelation

The Durbin-Watson (D-W) test was employed to test the presence of serial correlation of the residuals (autocorrelation). The D-W statistic is 2.405, which is close to the benchmark

value of 2 for no autocorrelation. Thus, the results indicate the absence of serious first-order serial correlation in the residuals.

3.4.4 Model specification test

Ramsey RESET test was conducted to examine model specification errors and the possibility of omitted variables. The test produced an F-statistic of 0.21 not statistically significant at $p<0.05$ indicating the model correctly specified and suffer no omitted variable bias or incorrect functional form. Therefore, the estimated coefficients and statistical inferences derived from the model can be considered reliable for policy analysis and interpretation.

Table 5: Results of residual diagnostic tests

Diagnostic Test	Statistic	p-value	Conclusion
Breusch-Pagan test	$\chi^2 = 1.66$	0.1975	No heteroscedasticity
White-test	$\chi^2 = 33.00$	0.4180	No heteroscedasticity
Durbin-Watson test	DW = 2.405	—	No serious autocorrelation
Ramsey RESET test	F = 0.21	0.8890	Correct model specification

5. Conclusion and policy implications

The study concluded that COVID-19 pandemic had negative however not statistically significant effect on export levy revenue both in the short and long run. The results were consistent under different model specifications with a set of control variables including exchange rate, inflation and trade liberalization. The negative effect is attributed to disruptions in logistics and price during the pandemic. Control variables had mixed effects; inflation has positive effect, exchange rate has positive effect in the long-run, owing to depreciation of currency, which stimulates exports. Trade liberalization dummy has negative effects as it accompanied measures resulted in reduction in tariff rates. The overall model is robust through different diagnostic tests.

This paper brings policy implications and suggest areas for further research, based on the findings above. First, the paper suggests export diversification as a measure to ensure stability of exports. Second, implement mitigation measures to ensure stability of supply chains including strengthening digital customs infrastructure. Third, measures to safeguard price including forward pricing and hedging. Lastly, institutional preparedness to brace the economy against external shocks such as pandemic.

Areas for further research may include analysis across all tax types, trade resilience during disruptions, efficacy of the current export levy in promoting domestic value additions, and alternative policy interventions to promote domestic value addition of the selected commodities as export levy has so far mixed and limited effect.

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1.Structure of the Manuscript

Abstract

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Introduction

This section ought to provide a sufficient background on the problem or subject addressed by a manuscript, objective, significance of the study, and if applicable present the hypothesis or research questions. Finally, the introduction should provide an organisation of the manuscript.

Literature Review

The author ought to provide a critical relevant theoretical and empirical literature review clearly indicating knowledge gaps. Due recognition of works of previous researchers should be provided. Without disregard to the foundational theories, literature review should include recent works. Where relevant, the author should provide a conceptual framework.

Methodology

The methodology section should provide succinct account of the following: Research design, Data types, Data collection techniques (where necessary), Sampling procedure and sample size (where relevant), Study area (where relevant), Data analysis techniques and Limitations (if any). Furthermore, the author should provide a succinct account of research methods adopted.

Findings

The author should indicate clearly the analyses and/or techniques applied in order to arrive at the research findings. Findings must be presented and documented to show clear relationships to the purpose(s) and research question(s). Evidence needed to support conclusions must be clearly identified and amply arrayed, including (but not limited to) the presentation of statistics, charts, and graphs; use of quotations; observational data; references; and citations.

Conclusions and Recommendations

Conclusions and logical inferences should be pertinent, clearly drawn, and convincingly supported by evidence. The author should also include recommendations and areas for further research (if any).

2. Type-setting of Manuscript

Font and margin

Manuscripts should be printed using good-quality papers. Manuscripts must be prepared in Times New Roman, font size 12, singlespaced, with 1 inch (2.54 cm) margins on all sides. Use only one side of A4 paper.

Numbers

Numbers should be written in words up through one hundred. The exceptions to the rule being volume and numbers of magazines and other statistical indicators as well as years. Also, number all pages consecutively in the top centre of the page, beginning with the title page as page 1 of your paper.

Dates

Date should be written as follows: the 1940s (not 1940's); dates should be in the form of: 5 May 1990. When referring to a period, use the form from 1930 to 1960 (not 1930-1960).

Spelling

Authors are advised to use British spelling for their publication. However, if an author writes consistently in American spelling this is acceptable. Authors are requested to consult dictionaries for the differences.

Footnotes

(a) Include footnotes in the text only if their use is unavoidable.

(b) Number them consecutively with a superscript number at the relevant author's name or point in the text.

(c) Separate them from text by using a line across half the page below the main text.

Tables

When constructing a table, keep in mind the physical limitations of the journal's size. The following format shall be used during construction of Tables:

(a) Provide these in separate sheet or appendix in case they cover half a page or more.

(b) Use upper case "T" for the word "Table" when citing tables in the text.

(c) Number them consecutively by using Arabic numbers in the same order they are referred to in the text.

(d) Type adequate and self-explanatory captions above Tables.

(e) Capitalise only the first letter of the first word of captions and column headings in table except where otherwise necessary.

(f) Write the source of the information provided in the Table, using the format: e.g. Bank of Tanzania (2007).

(g) The caption of the table should be placed above the table, left justified.

Illustrations

All illustrative materials are referred to as "Figures"; the journal does not use "Plates," "Maps," or other such terms. Every figure must be cited in the text and

must be numbered sequentially in the order it appears. Do not abbreviate the word "Figure." Example: (Figure 2), (Figures 2–5), (Figures 1 and 2), (Figure 7a–I), (Figures 1, 2, and 5), "As shown in Figure 5..." When constructing figures consider the following:

(a) Provide these in separate sheet or appendix in case they cover half a page or more.

(b) Number figures sequentially by using Arabic numbers in the same order they are referred to in the text.

(c) Use upper case "F" for the word "Figure" when citing figures in the text.

(d) Photographs are only accepted if they have good contrast and intensity.

(e) The caption of the figure should be placed below the figure, left justified.

(f) The source of the figure should be placed below the figure.

3. Citations and List of References

Authors should follow the American Psychological Association (APA) citation style, seventh Edition. Authors are advised to check all references most carefully. The Editorial Board cannot be held responsible for careless referencing, nor can it trace missing details in reference. The references and citation must be written using the following formats.

Reference Examples Books

Booth, W. C., Colomb, G. G., & Williams, J. M. (2008). The craft of research (3rd ed.). University of Chicago Press.

Chapter in a book

Al-Biman, M. (2022). Trade complementarities between Europe and Tanzania. In Trade and investment in East Africa (pp. 85–107). Springer.

Journal articles

Ibrahim, A. J., & Isaya, J. I. (2023). Determinants of tax revenue performance in the East African countries. African Journal of Economic Review, 11(2), 45–67.

Article in conference proceedings

Mwamenya, A. S. (2002). Private sector participation in the financing of public higher education. In Financing of higher education in eastern and southern Africa: Proceedings of the International Conference on Financing Higher Education (pp. 156–163). Dar es Salaam.

Web pages and electronic sources

The United Republic of Tanzania (2006). *The 2006/07 Budget Speech*. Retrieved from [URL] (Accessed: 13 September 2006).

Newspapers

Kisembo, P. (2006, September 13). Survey shows food prices going further down in Dar es Salaam. Daily News, p. 13.

In-Text Reference Citations Simple citation: Jairo (2024) or (Jairo, 2024)

Two authors: Jairo and Ibrahim (2023) or (Jairo & Ibrahim, 2023)

Three or more authors: (Masalu et al., 2022) or Masalu et al. (2022)

Same author, same year: (Nguvava, 2023a, 2023b) or Nguvava (2023a, 2023b)

Several authors in one place or several references by same author: Arrange authors alphabetically and their publications in order of year, oldest to latest. Example: (Chimilila et al., 2011; Mugoya, 2009, 2012)

No author specified: Cite the group or agency issuing the report or the publisher. E.g. (United Nations, 1963), (Committee on Ethics, 1977)

4. Peer Review

AJCFS uses a doubleblind peer review process exclusively. Singleblind and open peer review systems are not accepted.

Initial screening: The Editor assesses each submission for scope, originality, and adherence to guidelines.

Reviewers: Two independent external experts are selected for each manuscript.

Confidentiality: Both authors and reviewers remain anonymous throughout the process. Reviews are based on originality, theoretical contribution, methodological rigour, clarity, and relevance to customs and fiscal studies.

Decisions:

Possible outcomes are: Accept, Minor Revisions, Major Revisions, or Reject.

Timeline: Authors are notified of the first decision within 6–8 weeks.

5. Ethics and Publication Malpractice

AJCFS follows the Committee on Publication Ethics (COPE) Core Practices.

5.1 For Authors*:*

Submitted work must be original and not published or under consideration elsewhere.

Plagiarism: All forms of plagiarism (verbatim copying, paraphrasing without citation, selfplagiarism, mosaic plagiarism) are prohibited. Submissions are screened for plagiarism.

Data integrity: Data must be accurate and verifiable. Fabrication or falsification is a serious offence. The editor may require submition of original data and codes before final decision-making

Authorship: All listed authors must have made substantial intellectual contributions and have approved the final version. The corresponding author must ensure coauthors' consent.

Corrections: If errors are found after publication, authors must promptly notify the Editor.

5.2 Plagiarism Detection All manuscripts submitted to AJCFS are screened using Turnitin similarity detection software. Acceptable similarity index is ≤20%. Manuscripts exceeding this threshold will be rejected.

Notes of Contributors

1.0 General Instructions

The African Journal of Customs and Fiscal Studies (AJCFS) serve as a biannual peer-reviewed outlet for the stimulation of first-rate research on both theoretical and empirical aspects of customs and taxation. The scope of AJCFS is broadly interpreted to include such areas as policy, law and administration in relation to customs, regional integration, international trade and taxation at different tiers of government.

The Editorial Board of AJCFS now wishes to invite submissions of original research results from both the academia and practice in the form of journal papers. A manuscript submitted for consideration by AJCFS Editorial Board must neither have been published nor be under consideration for publication elsewhere, either in part or in its entirety.

The Editorial Board is seeking contributions to cover the following themes or related themes:

- Tax administration and compliance
- International taxation and transfer pricing
- Taxation policy and reforms
- Taxation of specialized sectors (natural resources, telecommunication, financial institutions)
- Customs modernization and trade facilitation

Authors must also abide by the following general instructions:

1. The manuscript must be in English using Times New Roman with font size 12, double spaced and with margins of two inches.
2. A manuscript should typically not exceed 20 pages and should, in no event, exceed 40 pages.
3. The title page should include the paper title, authors' names (starting with first name) and permanent affiliations, and the name, e-mail address and telephone number of the person to whom reviewers' comments, page proofs and reprints should be sent.
4. The following page should include the paper title, an abstract (not exceeding 150 words) and a list of two to six key words.
5. The text of the paper should begin on a new page, section headings should be designated by Arabic numerals (1, 2, 3 etc.), and subsection headings should be numbered as 1.1, 1.2, 1.3 etc. Figures, tables and displayed equations should be numbered consecutively throughout the text (1, 2, 3 etc.). Equation numbers should appear flush left in parentheses and running variables for equations (e.g. i = 1..., n) flush right in parentheses.
6. Acknowledgements and related information should appear in a footnote numbered consecutively and designated by superscripts in the text.
7. References in the text should follow the author-date format. The references should be typed beginning on a new page.
8. Submissions should be made electronically in MS Word format and corrected page proofs must be returned within seven days of receipt. Submission of manuscript should be addressed to:

Coordinating Editor,
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ISO 9001 : 2015 Certified

Published by The Institute of Tax Administration an Integral Part of Tanzania Revenue Authority

ISSN:2665-0517 (Print) ISSN: 266500509 (Online)