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Analysis of Tax Revenue Mobilisation in Tanzania

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LIST OF ACRONYMS

ATAF   African Tax Administration Forum

ARDL   Autoregressive Distributed Lag

BOT   Bank of Tanzania

EAC   East African Community

FYDP   Five-Year Development Plan

GDP   Gross Domestic Product

GOT   Government of Tanzania

GNI   Gross National Income

OC   Other Charges

ODA   Official Development Assistance

OECD   Organization for Economic Cooperation and Development

IMF   International Monetary Fund

MoFP   Ministry of Finance and Planning

SADC   Southern African Development Community

SDGs   Sustainable Development Goals

TRA   Tanzania Revenue Authority

UNECA   United Nations Economic Commission for Africa

URT   United Republic of Tanzania

VAT   Value-Added Tax

WB   World Bank

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ANALYSIS OF REVENUE MOBILISATION IN TANZANIA

1. Introduction

Tanzania has been actively implementing development strategies aligned to international and regional commitments enshrined in visions including the United Nations Sustainable Development Goals (SDGs) and the Africa Agenda 2063. The expected result of the successful implementation of the two agendas is the achievement of inclusive growth based on the structural transformation of African economies. The two agendas share Tanzania's development aspirations as articulated in the Tanzania Development Vision 2025 which was adopted much earlier, ahead of the global and continental commitments (GOT, 2000). Financing the implementation of the two agendas is an immense challenge. UNECA (2015) estimates that low-income, lower-middle-income, and upper-middle-income African countries require an investment-to-GDP ratio of 32.2 percent, 33.6 percent, and 20.5 percent per annum respectively to achieve the SDGs by 2030. UNECA (2018) further estimates that the incremental costs of financing the SDGs in Africa amount to more than US$600 billion per year. It is therefore generally appreciated that to make noteworthy progress towards the goals, African countries must mobilise considerably more domestic revenues, increase private sector participation in development financing and mobilise more external assistance (ODA) or simply take more debt.

Tanzania shares both the Continent's development vision and the challenges of financing its implementation. She has streamlined the SDGs and Continental ambitions in her national planning frameworks, including the sequential medium-term plans (FYDP II (2015/16 – 2020/21) and FYDP III (2021/22 – 2025/26). To address the financing challenge, the government has strived to raise domestic revenue collections, nurturing relations with donors and the private sector, and increasing borrowing.

On the ODA, Tanzania has witnessed a consistent decline in the significance of the source, as traditional donors struggle to meet international targets and increased reluctance across the development finance industry. The indeterminate global economic trends and the evolving health and geopolitical dynamics point to the unsustainability of any hope for improved performance of ODA for financing the SDGs. The trend of ODA receipts for Tanzania over the past decade is summarised in Figure 1.

Figure 1: Net ODA Received, % of GNI
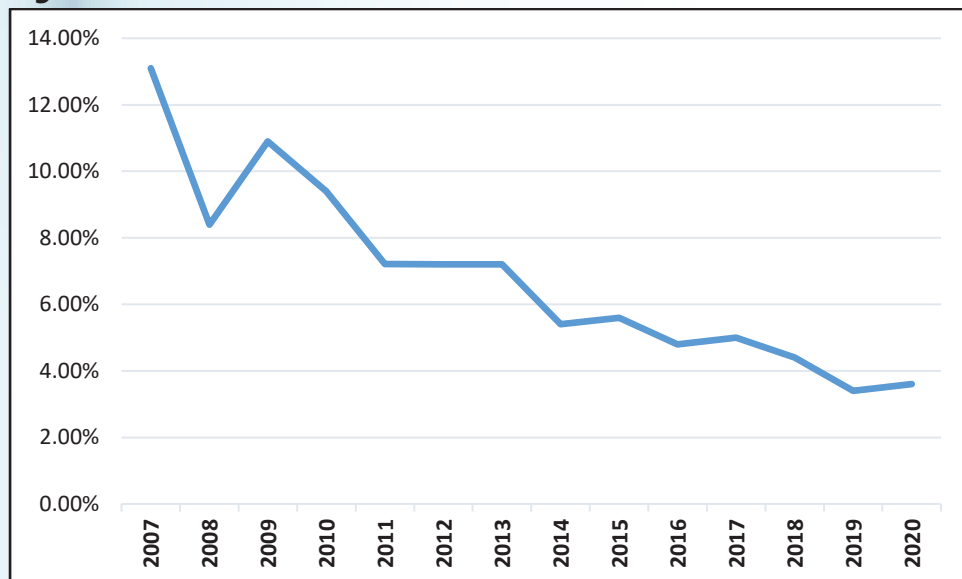
Source: World Bank, 2021

On the revenue front, performance has been equally wanting despite rounds of reform of the tax system aiming to improve its revenue productivity. Compared to other developing countries, Tanzania still performs poorly in domestic non-resource tax revenue as her level of collection relative to GDP is close to the lowest in Sub-Saharan Africa. Moreover, the actual collections have generally fallen below targets over the past decade, as shown in Figure 2.

Figure 2: Tax Revenue Performance Against Targets
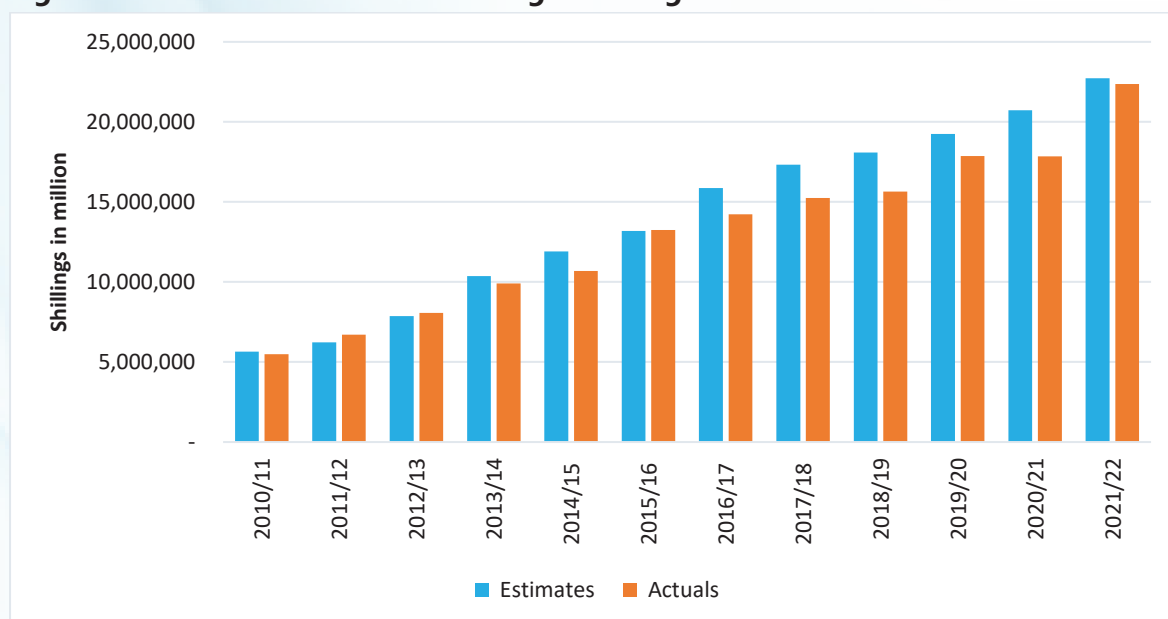
Source: TRA, 2022

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The collective implication of declining ODA and a floundering tax revenue performance is increased reliance on deficit financing (borrowing) with its resultant limitations (Afonso and Jalles, 2013; Akosah, 2013; Mwankemwa and Luvanda, 2022).

This study assesses the feasibility of increased domestic tax revenue mobilisation in Tanzania by responding to the following questions:

(i) How much domestic tax revenue can the country generate?

(ii) How close are the actual collections to this level?

The first is a capacity question, addressing the revenue potential; while the second is an effort question, focusing on issues of willingness (including the fiscal policy framework) and capability to mobilise[1].

The report is organised as follows. Sections 2 and 3 provide a review of the literature and the methodology, respectively. Section 4 justifies the study by arguing that Tanzania requires additional tax revenues to maintain a sustainable budget. It is followed by Section 5 which reviews the tax revenue performance and makes a case for additional tax effort. Section 6 estimates the tax revenue potential and how much of this potential is mobilised, i.e., the tax effort. Section 7 provides the conclusion.

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[1] The two questions are linked since high taxes tend to shrink the revenue potential by discouraging work and investment. Therefore, tax policy ought to strike a difficult balance between achieving minimum disincentives to productive activities and maximising investment in public goods for growth and basic service provision.

2. Literature Review

In Tanzania, phases of tax reforms have been driven by different objectives, especially revenue and economic growth considerations. (Osoro, 1995; Levin, 2001; Kim and Kim, 2018). Before the mid-1980s, the reforms' focus was revenue mobilisation. In 1969 sales tax was introduced to offset the declining import duty revenue caused by the adoption of an import-substitution strategy for industrialization and to raise revenue to support the expanding public sector. In the early 1970s, a progressive income tax was introduced, and the sales tax was widened to broaden the tax base and compensate for the abolition of the excise tax. In the early 1980s import duties and sales tax rates were successively changed to address the persistent macroeconomic imbalance and escalating fiscal deficit.

Nevertheless, the economic growth objectives of taxation began to feature in the mid-1980s, following negotiations with multilateral organizations, especially the IMF, and the economic reforms programme. During this period, import duties and sales tax rates were gradually reduced as well as the marginal income tax rates to encourage economic activity. Later in the early 1990s, investment promotion efforts included tax incentives to attract foreign investments. However, this was soon found to compromise the revenue objective and by 1992 calls were being made to reduce exemptions (GOT, 1991 and GOT, 2013).

2.1 Tax Potential

Limited research has been undertaken to estimate Tanzania's potential tax revenue. Bevan (2001) estimated that Tanzania could generate a tax revenue-GDP ratio of 18 percent in 1999. Further, Levin (2001) used a recursive dynamic neoclassical general equilibrium model to project tax revenue, keeping the rates unchanged, and found that towards the end of the period (2004) the tax revenue-GDP ratio reached 17 percent. Also, using a 27-year panel of 85 non-resource-rich economies Langford & Ohlenburg (2015) estimated the aggregate tax capacity for Tanzania to be 23.6 percent of the country's GDP for 2010. This percentage compared well with the average for low and lower-middle-income countries at 23.2 percent for the period 1984-2010, suggesting that in this context Tanzania is not uniquely different from countries of similar economies.

2.2 Tax revenue performance

Different from tax potential, there has not been a shortage of research on Tanzania's tax revenue performance. In this area, there is a consensus that the country's performance is low; generally, below the average of similar economies (Coulibaly & Gandhi, 2018). This has led to the conclusion that the reforms that have been made to

enhance revenue mobilisation have produced limited results (GOT, 1991; Osoro,1995; GOT, 2013; IMF, 2016). The tax revenue to GDP ratio has not responded to the reforms with the expected results; the response has been slow and sometimes inconsistent, with the ratio fluctuating between 8.1 to 12.5 during the last two decades.

Attempts have been made to explain the failure of the tax system to deliver on its revenue mandate. Osoro (1995) mentions (i) the prevalence of a complicated tax structure despite the reforms; (ii) generous tax exemptions; (iii) high tax evasion resulting from the high tax rates and (iv) failure to undertake reform in tax administration. These factors have remained relevant to date, including number (iv) as the Tanzania Revenue Authority (TRA), established in 1996, struggles to reclaim its lost semi-autonomous status.

Levin (2001) mentions the downsizing of the parastatal sector and the sluggish private sector growth as significant factors, citing the steadily declining corporate tax payments, as a share of GDP since 1994, particularly in the manufacturing sector. Osoro (1995) also links the large informal sector[2] and non-market activities to relatively few tax handles, which increases the difficulties of raising taxation.

Also mentioned are the government/policy decisions to exempt the large agricultural sector and the important mining sector from taxation. (Muganyizi, 2012). Such decisions are not unique to Tanzania, as the tax effort of a country reflects policy choices (tax rates and bases, and any exemptions), and inefficiency in policy enforcement (tax administration, taxpayer compliance, and interactions between the two). Policy choices may also include an intention not to work towards the attainment of the maximum potential tax (Langford & Ohlenburg, 2015).

2.3 Taxation and Growth
Evidence from studies suggests that countries generally prefer natural resource-related revenues over taxation. Thus, tax efforts in resource-rich countries are commonly lower compared to non-resource countries (Bornhorst et al., 2009; Addison & Levin, 2012; Coulibaly & Gandhi, 2018). The rationale for this preference may lie in the differential impact between the two sources of revenue. Most taxes generate distortions and harm economic activity, as opposed to resource revenues that are commonly non-distortionary (Barro 1990; Gemmell, 2001). Therefore, by reducing their domestic tax effort, countries that receive large revenues from the exploitation of natural resource endowments not only enhance the conditions for social efficiency but also reduce the domestic tax burden to foster private sector activities and promote

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[2] Ossoro estimates the size of the underground economy to have grown from about 10% of official GDP in 1967 to 31% by 1990.

growth. Interestingly, the mining sector is one of the least taxed in Tanzania. (Muganyizi, 2012).

2.4 Taxation and Grants

Some literature suggests that countries that receive large quantities of grants are likely to view them as an alternative to domestic revenues resulting in a selective slackening of tax efforts. (See Gupta et al., 2003). This perspective sees grants as a free resource that substitutes for domestic revenues; especially so, if the grants are untied, predictable, and unvarying. This is different from loans which impose a burden of future loan repayments that often induce policymakers to mobilise taxes.

Grants can, however, have long-term revenue benefits when properly utilised. The reduction of tax burden may promote growth by freeing resources for the private sector. This works better when the tax cuts target those that distort private sector incentives.

3. Methodology

The study seeks to assess the feasibility of increased domestic revenue for financing Tanzania's development aspirations. The assessment is undertaken for the aggregate tax revenue as well as its four major tax categories of income tax, value-added tax (VAT), excise duties, and import duties. This is a unique contribution of this study to the literature, as previous assessments of the Tanzanian tax system have focused on the aggregate level (Osoro,1992; Chimilila, 2018). Three procedures were undertaken to assess the performance of tax revenue mobilisation and the feasibility of increased domestic revenue mobilisation in Tanzania. First, we used the most common, and simplest procedure to compare the country's tax-to-GDP ratio with those of comparable economies. Second, we estimated tax buoyancies for each tax category to determine their growth responsiveness to changes in the respective tax base growth. Thirdly, we estimated the taxable capacities of the tax categories and compared them with the respective tax efforts.

3.1 Tax Buoyancy

The study uses a reduced-form regression equation to investigate the impact of changes in GDP growth on changes in tax revenue. Long-run and short-run buoyancy estimates are derived using the Autoregressive distributed lag (ARDL) estimation technique which performs better in small sample sizes and can accommodate the impact of shocks in regressors. In addition, the ARDL considers the trend impact of regressors as it allows the inclusion of more than one lag in a regression function (Pesaran, et al., 2001)).

3.2 Tax Capacity and effort

Tax capacity was estimated using the stochastic frontier analysis (SFA) technique introduced by Farrell (1957) and data envelopment analysis (DEA) introduced by Charnes, et al., (1979). The SFA is a one-step approach using the maximum likelihood method to estimate the parameters of the production function and their technical efficiencies. Therefore, the stochastic tax frontier was estimated simultaneously with the determinants of tax inefficiencies (Battese & Coelli, 1995).

3.4 Data Sources

This study has used a wide range of secondary time series data sourced from different institutions (local and international). Tax buoyancy for each tax category was estimated using quarterly data spanning from 2001/2 to 2020/21. Tax potential and tax effort

across all categories were estimated using annual data from 2000 to 2020. The specific sources are specified in the relevant sections.

The study focuses on tax revenues collected by the Tanzania Revenue Authority (TRA). A focus on tax revenues is justified as this source accounts for over 88 percent of the total domestic revenues. Non-tax revenues collected by TRA, government departments, and the local authorities are not part of this study because they are based on different assumptions and justifications, and therefore, behave differently.

4. Tanzania needs Additional Tax Revenues

Public spending enables governments to fulfil their objectives and promises to citizens on the provision of public goods and services or the redistribution of resources. This is true for rich and poor countries. In high-income countries, the size of governments tends to be larger in part due to greater demand for social protection. In low-income countries, demand for infrastructure for the provision of economic and social services exerts pressure on rising public spending.

Tanzania is no exception to this. Between 1999/00 and 2020/21, public expenditure rose by twentyfold, from TZS 1.3 trillion to TZS 26.6 trillion. This phenomenal increase in public spending had to be funded, from the government's resources (taxes and non-tax revenues), grants, and loans. Therefore, the government's revenues from taxes and non-taxes rose 26-fold from TZS 0.8 trillion to 20.6 trillion during the same period.

Appendix 1 and **Figure 3** show the increasing trend of public expenditures and revenues over the two decades and the resultant budget deficit. The budget deficit rose 15-fold from TZS 0.4 trillion to TZS 5.99 trillion over the two decades.

Figure 3:Trend of Tanzania's Fiscal Deficit
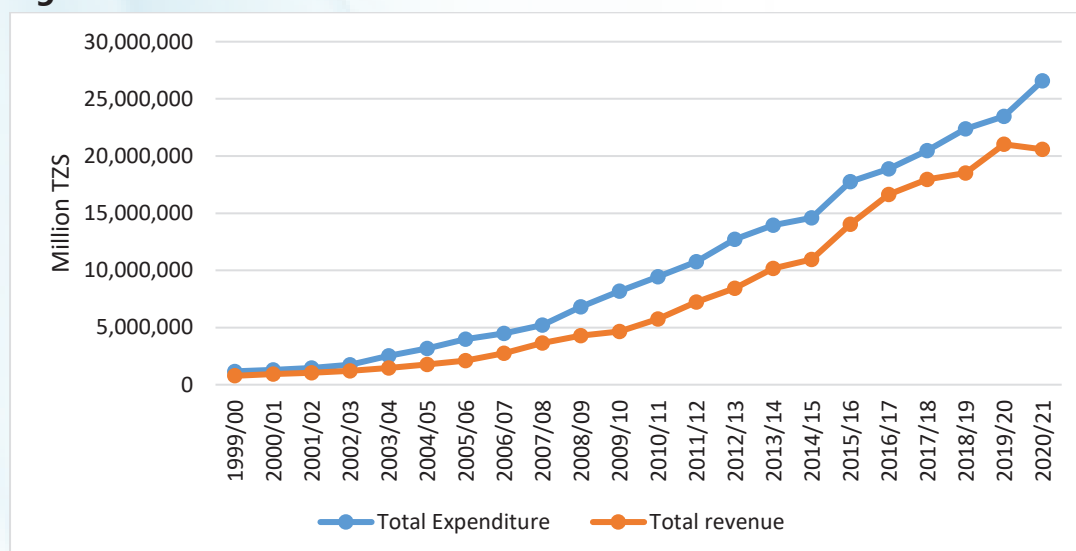
Source: Bank of Tanzania (BOT), 2021

The question is whether this trend of the budget deficit is financially sustainable. The remaining part of this section responds to this question by arguing that although the trend of the Tanzanian budget deficit is financially sustainable, it is not developmentally sustainable. Therefore, the trend of the budget deficit ought to be a matter of concern to the policymakers, and this must be addressed by raising additional tax revenues.

4.1 Sustainability of the Budget Deficit

A simple indicator of budget deficit sustainability is to relate the deficit with economic growth. The argument is that an economy that grows continuously fast enough will outgrow its debt burden. Simply stated, a budget is "sustainable" if the accumulation of annual deficits—the debt—does not grow faster than GDP.

Experts differ on the exact size of a sustainable budget deficit, but they generally cite figures of 4 percent of GDP or less**.** (Afonso & Jalles, 2013; Akosah, 2013; Mwankemwa & Luvanda, 2021). The East African Community (EAC) has adopted a cut-off of 3 percent. **Figure 4** shows that Tanzania consistently moved towards the 3 percent target since 2005/06, achieved it in 2016/17, and stayed within the target for four years until 2020/21 when it was missed. As shown in **Figure 5**, Tanzania also outperformed other EAC members since 2015/16. Therefore, from this simple indicator, the Tanzanian fiscal deficit has been 'sustainable' in recent years.

Figure 4: Trend of Tanzania's Budget Deficit to GDP Ratio
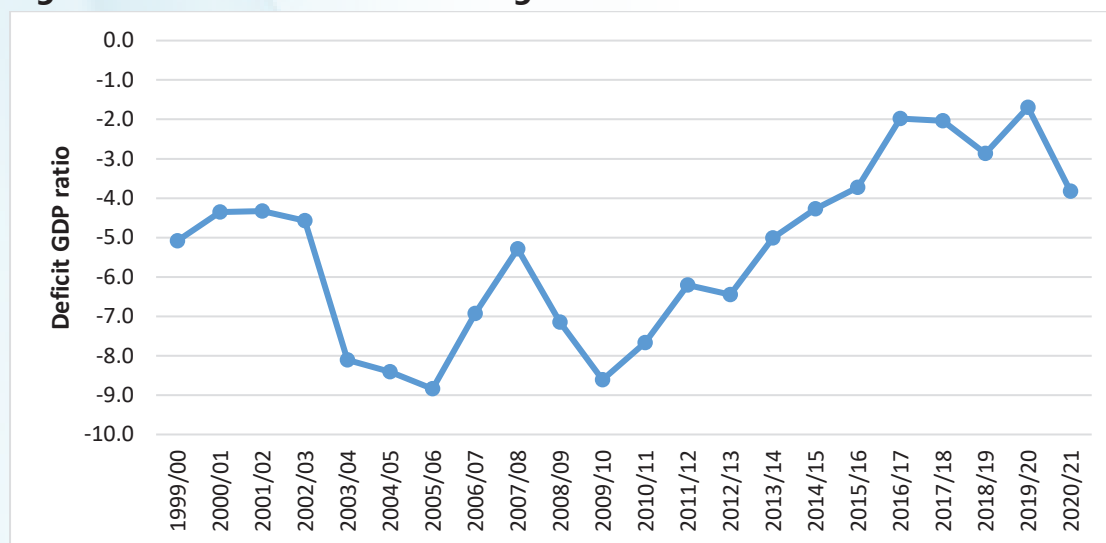
Source: BOT, 2021

Figure 5: Trend of budget deficit to GDP ratios in selected EAC countries[3]
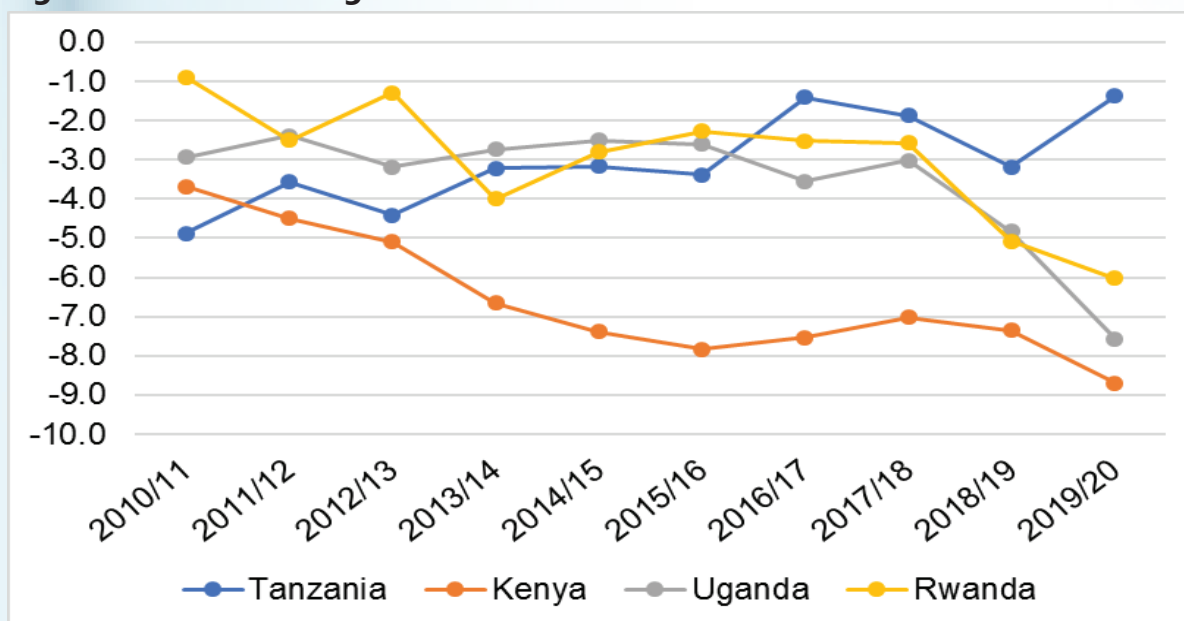
But the ability of a government to continuously finance its budget deficit depends not only on the growth and size of its budget deficit and the economy but also on the interest rates on borrowed money to finance it and inflation (Langdana & Murphy, 2014). Interest rates affect the cost of debt services, and inflation reduces the real value of nominal liabilities and thus the real value of the outstanding debt and debt service costs. Therefore, based on the Dornbush Model of Fiscal Deficit Sustainability, the effective (real) cost or burden of the debt service is derived as:

EBDS as percent of GDP= (Debt/GDP) x (Real interest rate-GDP growth rate)

Table 1 shows the trend of the effective burden of debt service (EBDS) for Tanzania as well as the relevant factors influencing it.

Table 1: Trend of the Effective burden of debt service

Year	Debt service/GDP	Nominal interest rate[4]	GDP growth rate	Inflation rate	Real interest rate	EBDS percent GDP
2007/08	1.04	13.66	7.05	8.65	5.0	-2.1
2008/09	0.77	10.57	5.5	11.25	-0.7	-4.7
2009/10	2.53	8.5	5.9	9.7	-1.2	-18.0
2010/11	2.31	8.18	7.15	9.9	-1.7	-20.5
2011/12	3.23	11.89	6.5	14.35	-2.5	-28.9

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[3] Figure 5 incorporates grants as part of revenue.
[4] one-year treasury bill rates are used as a proxy since interest payments are usually financed through short-term loans.

2012/13	3.97	14.5	6.2	12	2.5	-14.7
2013/14	3.57	14.38	7.15	7	7.4	0.8
2014/15	4.17	13.95	7	5.85	8.1	4.6
2015/16	5.07	15.24	6.95	5.39	9.9	14.7
2016/17	6.37	14.18	6.85	5.25	8.9	13.2
2017/18	6.56	9.44	6.9	4.41	5.0	-12.3
2018/19	5.73	7.56	7	3.48	4.1	-16.7
2019/20	5.76	6.36	5.9	3.38	3.0	-16.8
2020/21	5.20	7.90	5.00	3.70	4.2	-4.2

Source: Authors' computation

The results show that from 2007/08 to 2020/21, Tanzania has gone through three phases. During the first and third phases, 2007/08 - 2012/13 and 2017/18 - 2020/21, the country's debt service did not exceed the economy's ability to continuously fund it. During the two phases, the burden of debt service was financially sustainable. However, the situation was different during the second phase, 2013/14 - 2016/17, when the debt service exceeded the economy's ability to absorb it through economic growth and inflation. These trends are more easily depicted in Figure 6.

Figure 6: Trend of the effective burden of debt service percent GDP
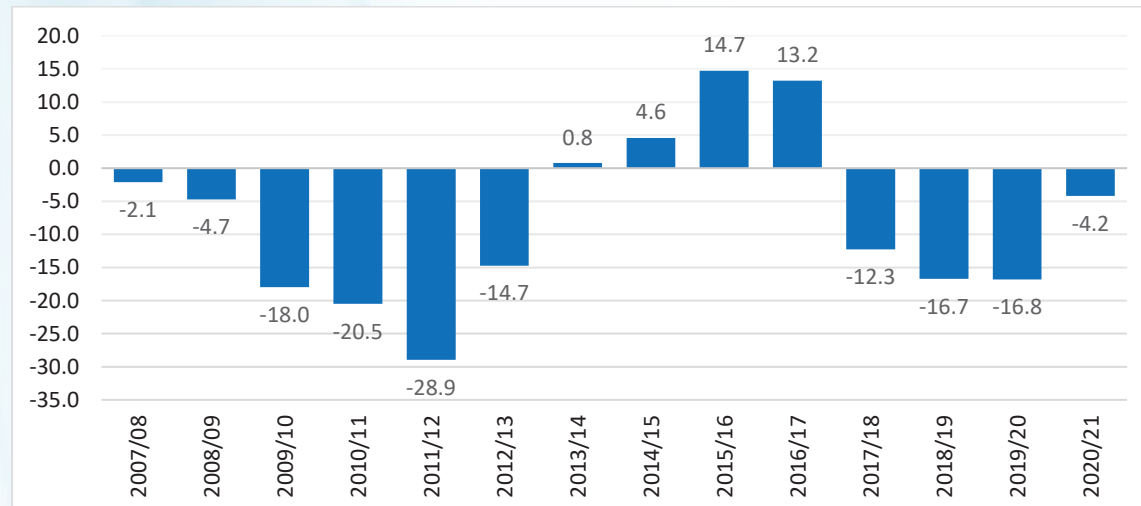
Source: Authors' computation

What explains these results?

From the Dornbush Model, three variables determine the results, namely the debt service to GDP ratio, economic growth, and real interest rate. **Table 1** shows that economic growth is not at the centre of the story since the country's GDP growth did not change significantly during any of the phases. It averaged 6.4 percent and 6.2

percent during the first and third phases and 7.0 percent during the second phase. The debt service to GDP ratio does not tell the story either. The average ratio was lowest (2.3 percent) during the first phase and highest (5.8 percent) during the third phase, the periods the debt service did not impose pressure on the economy; compared to 4.8 percent during the second phase when the debt service exerted significant pressure on the economy.

So, the story is in the real interest rate. The average real interest rate was 0.23 percent and 4.08 percent, during the two phases when debt service did not impose pressure on the economy; compared to 8.58 percent when the economy faced significant pressure from debt service. This shows that in Tanzania, the management of interest rates and inflation is critical in managing pressure from debt services. The results also suggest that the deficit-GDP ratio must be complemented with other indicators to guide decisions on debt service management.

4.2 Does the trend of the budget deficit raise a policy concern?

In ten out of fourteen years reviewed, the indicator of the burden of debt service shows that the country's burden was financially manageable. This can be comforting although the fact that 29 percent of the time the debt service imposed significant pressure on the economy cannot be ignored. However, even if in general the debt service burden was financially manageable, the question of whether the budget deficit-imposed policy constraints on the government budget is relevant and must be addressed.

In general, a rising budget deficit leads to one or all three policy options: (i) enhanced government borrowing with its consequences on the future budgets, intergenerational equity, and the resource crowding-out on the private sector, (ii) varying public expenditure priorities, and (iii) increased tax and non-tax revenue mobilisation. In the following, we focus on policy option (ii) to make a case for policy option (iii), the focus of the study. We do so by reviewing the structure and trend of public expenditures and their consequences on fiscal policy space.

Figure 7 shows a gradual but consistent policy shift between development and recurrent expenditures, in favour of the former. Between 2002/3 and 2020/21 the share of the recurrent expenditures declined from 81 percent to 56 percent, as the development expenditures were favoured with the balance. A government decision made in 2015/16 to fix the share of the development budget at 35-40 percent, effectively made the development expenditures a binding commitment in the budget.

Figure 7: Trend of Recurrent and Development Expenditures
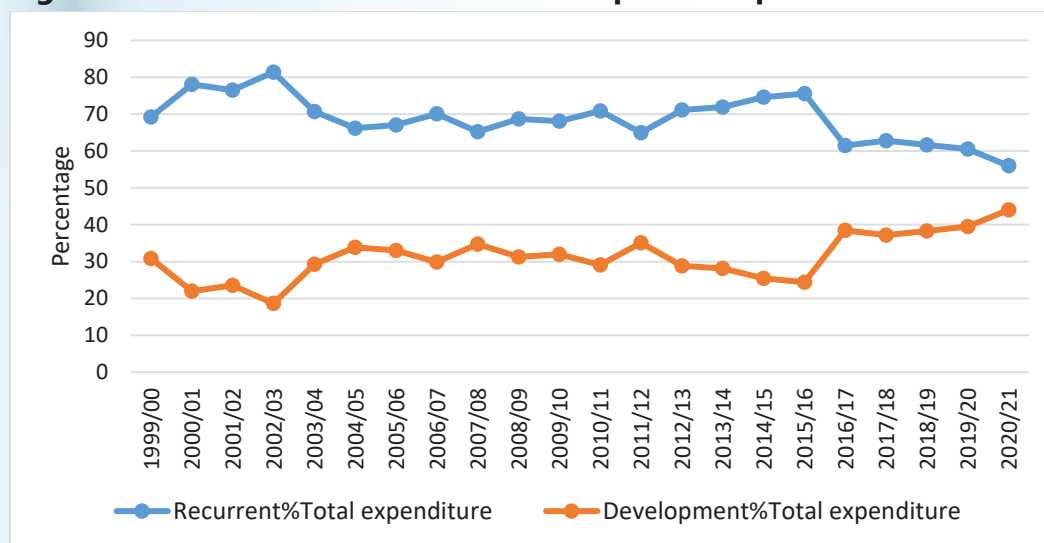
Source: BOT, 2021

The impact of the policy shift in favour of development expenditures is seen in the structure and trend of the recurrent expenditures presented in Figure 8, showing the share of the 'other charges' (OC) declining consistently. This is because wages, salaries, and interest payments are equally binding commitments that must be met[5]. Therefore, the share of OC within the recurrent expenditures was halved from 68 percent in 2003/04 to 34 percent in 2020/21.

4.3 What are the policy implications of the shrinking OC?

First, is the limited fiscal policy space or expenditure limitations imposed on the policymakers to exercise discretionary decisions; to the extent that productivity-enhancing expenditures may be compromised. This is made worse by the fact that even within the already constrained OC, provision has been made for protected expenditures, those considered to be too sensitive to cut. They include ration allowances; prisoners' food; examination expenses; allowances for foreign service officers; contributions to regional and international organizations; personnel allowances for retired state leaders; subventions to political parties; on-call allowances; and constituency allowances. Therefore, out of the already constrained OC, these protected expenditures are 'mandatory' and must be funded.

The second and most important policy implication is a shrinking operational budget to support the expanding infrastructure. This dilemma of a rapidly expanding capacity

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[5] It is also interesting to note that the share of interest payments has been rising faster than the other recurrent expenditure items.

amidst a shrinking operational budget is not a new phenomenon in Tanzania. It is a repeat of the 1970s and 1980s when capacity expansion went hand in hand with high-capacity underutilization, resulting in declining productivity in the manufacturing sector (Wangwe, 1979). Declining OC in public expenditure is reflected in the inadequacy of staff and supplies in health, education, water, and public offices, to mention a few. The result is a seemingly contradictory phenomenon in which public facilities are expanding at the same time as public services are declining.

Figure 8: Structure and trend of the recurrent expenditures
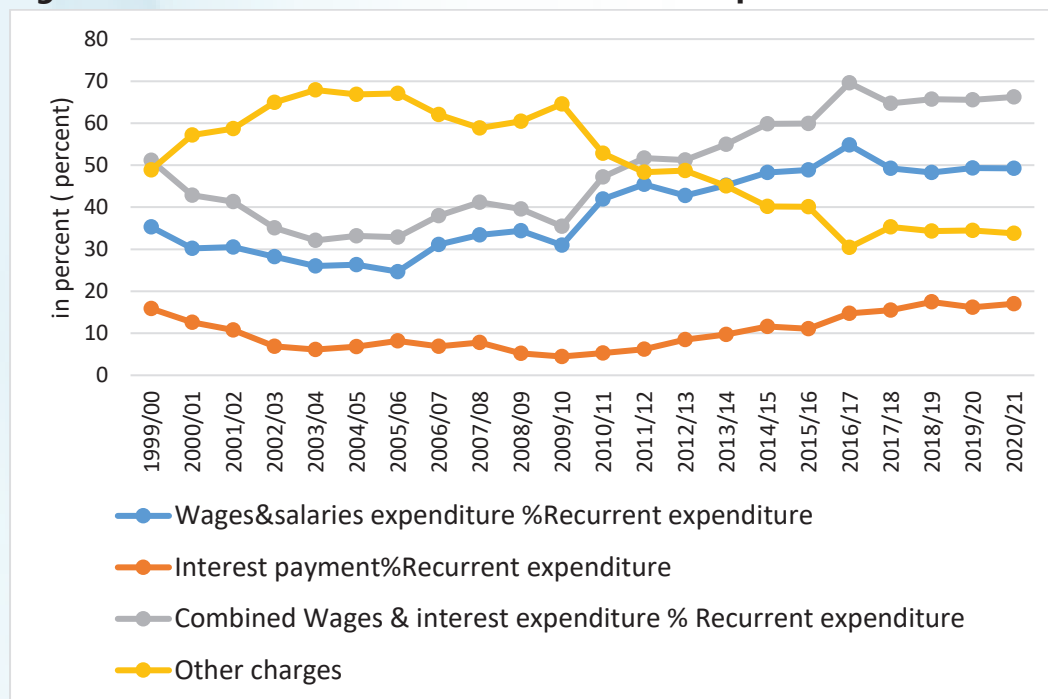
Source: BOT, 2021

4.4 Implications of the Results

Two seemingly contradictory conclusions arise from the above discussion. First, the fiscal deficit is financially manageable; to a large extent, the country's budget deficit is financially sustainable and does not pose unnecessary pressure on the economy. Second, the rising burden of debt service, together with the other expenditure priorities has produced a structure of expenditures that leaves very little room for OC as well as discretionary decisions (policy space). The outcome is the poor performance of the expanding public infrastructure. This is a policy and developmental concern arising from a constrained budget and must be addressed.

The question is how to address the policy concern without compromising development priorities. The caution not to compromise development priorities has ruled out a reduction of public expenditures and points to the enhancement of domestic revenue mobilisation as the only plausible policy choice. This policy option is preferred by governments because it provides more flexibility and has fewer risks[6]. Therefore, in the following sections, we explore the possibilities for enhancing domestic public resource mobilisation in Tanzania.

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[6] There are benefits to sharing resources and responsibilities with the private sector in the form of private-public partnership (PPP) for a common cause. But this option is not discussed here.

5. Performance of Tax Revenues in Tanzania

Tax regimes are defined by country policies, aimed to achieve the broad objective of enhancing the socio-economic as well as political development of a country. Nevertheless, decisions to levy specific taxes or change particular tax rates are context specific. (See Box 1).

Box 1: Drivers of Taxation

1) *Raise more revenue*. Tax revenues are used to finance the provision of basic public services, general administrative activities, and strategic capital projects within the country.

2) *Redistribute income and wealth*. Through the income tax system, the government can narrow the gap between the rich and the poor by introducing a system of progressive taxation.

3) *Discourage the production and consumption of harmful goods and services*. It is through taxes that the production, as well as consumption of harmful goods and services, are discouraged. This is commonly done through the imposition of excise taxes and usually leads to higher prices which ultimately discourages the consumption of harmful goods within the country. Recently excise taxes are being used to raise tax revenues (context (i) above) when they are imposed on non-harmful products and services whose demand is price inelastic.

4) *Control inflation*. In some cases, inflation may be difficult to control without taxation. Indirect taxes (especially excise and sales/VAT taxes) are sometimes used by governments to control expenditures and subsequently stop or slow down inflation.

5) *Protect young industries*. For developing economies governments may use taxation (specifically import duty) to protect the newly established industries from competition with firms in foreign countries.

6) *Correct adverse balance of payment*. Taxes may be used to correct an unfavourable balance of payment. When there is so much importation of foreign goods, the government may decide to increase the tax rate on these goods to reduce importation.

7) *Prevent dumping*. Some companies may decide to export and sell their products to other countries cheaper compared to where the goods were originally produced, or even compared to the cost of production. This has a detrimental effect on the economies of the importing countries as it ruins their local industries. As such the governments of importing countries may impose indirect taxes (specifically import duties) to curb the 'dumping' effect.

8) *Retaliate*. Taxation can also be used as a measure of retaliation in the international trading market.

9) *Promote Economic Growth and Employment*. Taxation may be used to achieve growth and/or employment objectives. The government may introduce fiscal incentives and tax concessions to promote specific sectors/projects, and to achieve the desired employment level.

10) *Promote Savings*. Taxation may be used to instil a culture of savings and investments in the country.

The Tanzanian tax regime is largely driven by the revenue context, although considerations are made not to become overly distractive on the other economic and social objectives. Based on the revenue reports published by the Tanzania Revenue Authority (TRA) and the Ministry of Finance and Planning, the country's tax structure features five major categories of tax revenue, namely *income tax, value-added tax (VAT), import duties, excise duties, and others.*

Income tax comprises tax paid on income from employment, business, or investment received by all forms of a person (Corporations, employed and self-employed individuals, taxes withheld on incomes like interest and dividend, capital gains tax, etc.). *VAT and excise duties* comprise such tax/duty on imports and domestic value-added or consumption. *Import duty* refers to a tax collected on imports by the customs authorities. The "Others" category, on the other hand, comprises every other revenue type administered by TRA during the period, including port and airport departure charges, motor vehicle taxes, stamp duty, property taxes, etc. The composition of the *"others"* category has witnessed frequent changes, as items were added and removed periodically.

Figure 9 presents the structure of the tax revenue collected by TRA over the 1999/00-2020/21 period. The tax regime is dominated by income and value-added taxes which accounted for, on average, 64 percent of the tax revenue collected during the period. Over the period, the structure changed only slightly, with the value-added tax ranked first in the early years followed by income tax swapping positions in 2011/12. Excise tax, fluctuating between 11 and 19 percent, did not exhibit the expected significant dynamism, given the rising Tanzanian middle class. The contribution of import duties has been low and diminishing, due to the poor imports performance[7] as well as regional economic cooperation protocols, especially the East African Community (EAC) and the Southern African Development Community (SADC).

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[7] For example, between 2014 and 2020 imports of goods and services declined by 32 percent from 13.5 to 9.2 billion dollars.

Figure 9: Contribution of major tax categories to tax revenue
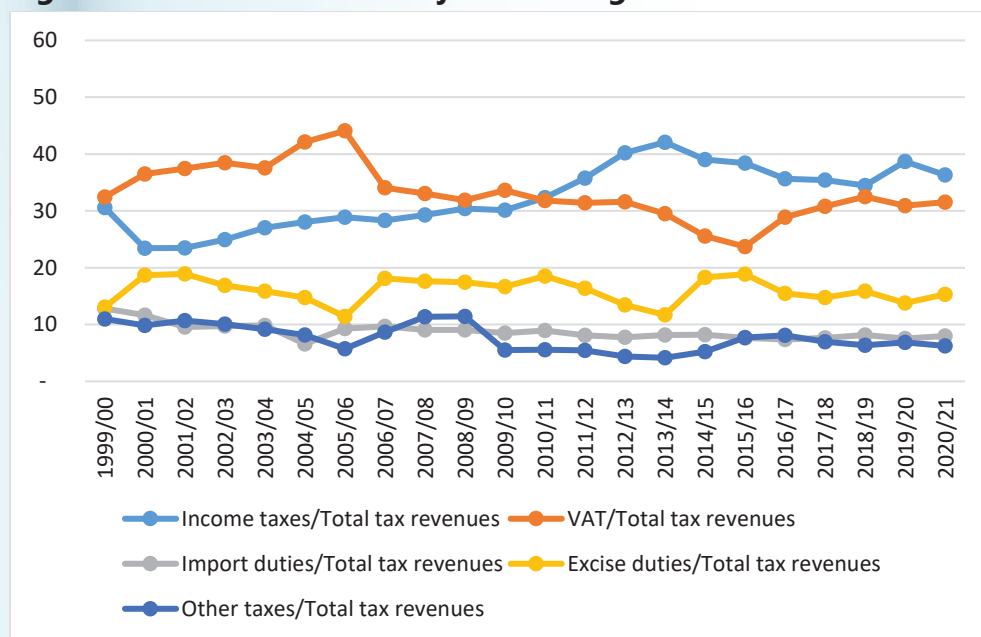
Source: BOT, 2021

From the growth perspective, the performance of tax revenue collection during 1999/00-2020/21 has been good. Tax collection rose from TZS 0.7 trillion to TZS 17.3 trillion, representing a 2,429 percent growth over the period. This was a good performance, in comparison to the growth of GDP which was 1,937 percent during 1999/00-2020/21. The best performer was income tax whose collection rose by 2,773 percent, followed by excise tax by 2,739 percent and VAT by 2,248 percent. Import duty collection also grew by 1,406 percent.

However, the more appropriate performance criterion is to compare the tax revenue collected with the performance of the economy or the respective tax base. Figure 10 shows that the tax to GDP ratio rose slowly, from 8.9 percent in 1999/00 to 11.5 percent in 2008/09, and fluctuated between 10.6 percent and 12.5 percent during 2008/09-2020/21. The best performer was income tax, whose ratio increased from 2.2 percent in 2000/01 to 5.0 percent in 2013/14 but then declined gradually to 3.8 percent in 2020/21. VAT, whose ratio rose gradually but consistently from 2.9 percent in 1999/00 to 4.1 percent in 2004/5, fluctuated thereafter between 2.9 percent and 4 percent. The other tax categories either showed fluctuating or declining performance. In addition to the regional protocols, the poor performance of import duty arises from its base, imports of goods and services, which as mentioned earlier declined significantly between 2014 and 2020. The question is whether this performance is good or bad.

Figure 10: Trend of Tax to GDP ratios of major tax categories
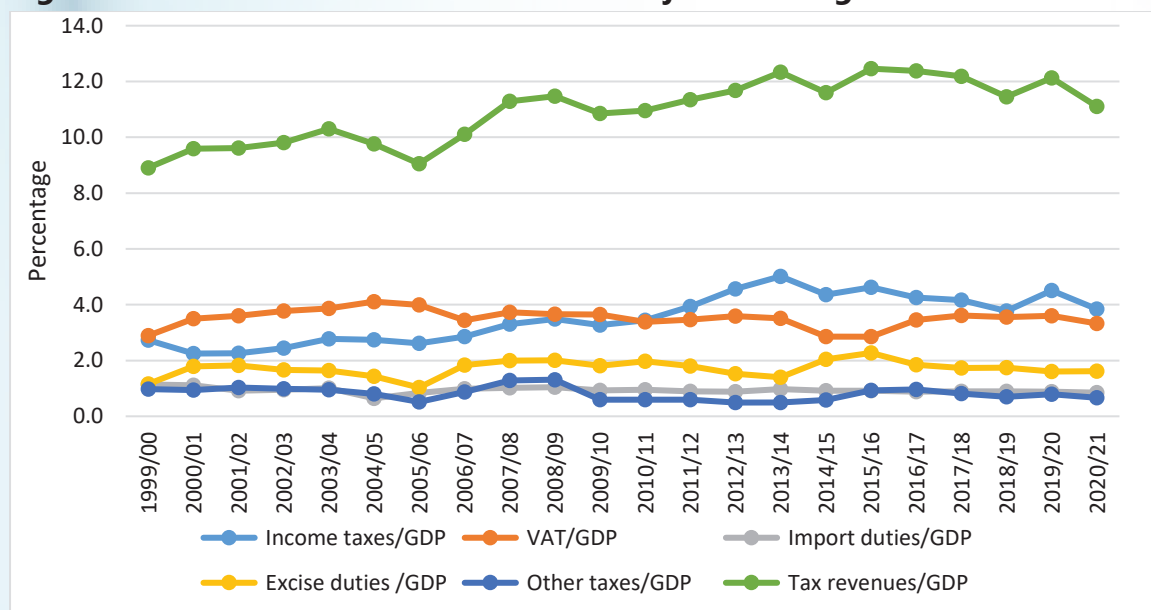
Source: BOT, 2021

Figure 11 shows that the average tax-to-GDP ratio for forty-four Sub-Saharan African countries from 2013 to 2018 was 16.3 percent; this being above Tanzania's performance at 11.8 percent. The results also demonstrate significant performance differences across the region, ranging from 3.6 percent (Nigeria) to 31.7 percent (Seychelles). These results are comparable with those by Coulibaly and Ghandi (2018) which placed Tanzania below the SSA average of 15 percent from 2000 to 2015. Our computation also shows a low performance of 12.1 percent for Tanzania from 2012/13 to 2017/8. Therefore, from the regional perspective, the performance of Tanzania's domestic revenue mobilisation falls below the average. In addition to SSA, this conclusion remains valid for the regions of SADC with an average performance of 19.8 percent and the EAC (excluding South Sudan) at 14.6 percent from 2013 to 2018.

Figure 11: List of SSA Countries by Tax Revenue to GDP Ratio

Country	Ratio
Seychelles	31.7
Djiboute	30.8
Namibia	30.1
Eswatini	29.1
Lesotho	29.1
South Africa	28.6
Mozambique	23.2
Togo	22.2
Zimbabwe	22.1
Senegal	22.0
Gabon	21.1
Mauritius	20.0
Mauritania	19.7
Kenya	18.1
Burkina Faso	18.1
Ghana	17.6
Ivory Coast	17.4
Malawi	17.3
Gambia	17.2
Rwanda	16.6
Sub Saharan Average	16.3
Mali	16.1
Comoros	15.5
Zambia	15.2
Niger	14.4
Cameroon	14.4
Botswana	14.0
Burundi	13.6
Guinea	13.3
Bennin	13.2
Uganda	13.1
Liberia	11.9
Tanzania	11.8
Ethiopia	11.6
Madagascar	11.5
Sierra Leone	11.1
Guinea-Bissau	10.3
Angola	9.2
Eritrea	8.0
Chad	7.7
D R Congo	7.6
C A Republic	6.9
Cape Verde	6.9
Equatorial Guinea	5.9
Nigeria	3.6

Source: OECD/AUC/ATAF, 2020

5.1 What does this performance tell us about the Tanzanian tax regime?

It is expected that as the economy grows, the tax revenue also increases. Tax buoyancy explains this relationship between the changes in tax revenue growth and the changes

in GDP growth. It is the responsiveness of tax revenue growth to changes in GDP growth. A tax is said to be buoyant if its revenue increases more than proportionately in response to a rise in its base. It measures the responsiveness of tax mobilisation to economic growth or the base.

Table 2 shows the trend of average tax buoyancy over the period under review. Tax buoyancy is measured as the annual (percent) growth of tax revenue divided by the annual (percent) growth of GDP.

Table 2: Trend of average tax buoyancy in Tanzania

	Total Tax revenues	Income taxes	VAT	Import duties	Excise duties
2000/01 - 2008/09	1.25	1.19	1.27	1.02	1.91
2008/09 - 2015/16	1.09	1.30	0.75	0.92	1.29
2015/16 - 2020/21	0.88	0.89	1.22	0.85	0.59
2000/01 - 2020/21	1.08	1.13	1.09	0.93	1.34

Source: Authors' computation

Results show that the tax regime was slightly buoyant at 1.08 during the two decades; implying that an extra percent of GDP increased tax revenue by 1.08 percent. The results show differentiated performance across tax categories, with excise tax recording the highest buoyancy at 1.34, compared to import duty with the lowest buoyancy at 0.93. Figure 12 shows that over the period tax revenue performance experienced three distinct phases. The periods of (i) reasonably good performance, 2000/01-2008/09, (ii) moderate performance, 2008/09-2015/16, and low performance 2015/16-2010/21.

The overall tax regime has recorded declining buoyancy from 1.25 to 1.09 and 0.88 for the first, second, and third phases respectively. The results also show differentiated performance across the tax categories; with excise tax and import duty showing declining performance, VAT fluctuating (V-shaped) performance, and income tax fluctuating (inverted-V-shaped) performance. The good performance recorded by excise tax over the years was influenced by an exceptionally good performance during the first phase; after which its performance declined. The good performance of VAT during the third phase was influenced by a one-year unprecedented growth of VAT

collections (38 percent) during 2016/17, but this could not be sustained. (See details in Appendix 2).

The results lead to the following conclusions. First, the tax regime in Tanzania has been marginally buoyant (1.08) over the two decades. Thus, if the economy were to grow by 10 percent tax revenue would grow by 10.8 percent. Second, over the period, tax buoyancy has declined from 1.25 in 2000/01 - 2008/09 to 1.09 during 2008/09-2015/15, and further to 0.88 during 2015/16 - 2020/21. Thus, if the economy were to grow by 10 percent during the last five years, tax revenue would grow by only 8.8 percent. This is not good news to the policymakers, tax administrators as well as users of public services. Third, none of the major tax categories have displayed performance robustness over the two decades. The performance of both import duties and excise taxes has steadily declined over the three phases, while income tax and VAT fluctuated. Generally, the results show a declining capacity of tax revenues to adjust to economic growth.

The econometrics results presented below have also supported some of the above findings and provided more insights into their short and long-term impact on the government budget.

The relationship between tax revenue and GDP may be expressed mathematically as

$$\ln TR_t = \alpha + \beta \ln GDP_t + \varepsilon_t \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (1)$$

Where TR_t denotes the tax revenues for year t, GDP_t stands for the GDP for year t, and ε_t is the error term. Adopting the Autoregressive Distributed lag (ARDL) model allows us to analyse dynamic relationships to determine both the short and long-run variability of tax revenues through a single equation (Gupta, et. al., 2021).

$$\ln TR_t = \delta_1 \ln TR_{t-1} + \lambda_1 \ln GDP_t + \lambda_2 \ln GDP_{t-1} + \varepsilon_t \quad \dots\dots\dots\dots\dots\dots \quad (2)$$

This framework suggests that the variability of tax revenues is determined by tax revenues from the previous period, as well as current and preceding GDP.

Table 3 presents the results of short-run and long-run tax buoyancies of the overall tax revenues and the four tax categories of income taxes, VAT, excise taxes, and import duties. Using equation (2), tax buoyancy for each tax category was estimated using quarterly data spanning from 2001/2 to 2020/21 obtained from the Bank of Tanzania (BOT) and the Ministry of Finance and Planning.

For the overall tax regime, the long-term coefficient of 0.96 indicates that the long-term tax revenues are not growing as fast as GDP, implying that tax revenues for financing the national budget are not sustainable. Furthermore, the corresponding

short-term coefficient of 0.58 suggests the tax regime cannot adjust to shocks; it cannot work as a good automatic stabilizer. Thus, the overall tax regime can neither provide short-run stabilisation assurance nor guarantee long-run fiscal sustainability. This may be due to a general absence of progressivity in the tax system.

The long-term results presented in Table 3 are different from those in Table 2. It must be noted that the econometrics results are likely to provide better ground for policy discussions due to their robustness and ability to capture the trend.

Table 3: Short run and long run estimations of tax categories

		Long-run	Short run
Income taxes	Coefficient	1.03	1.03
	std. error	0.08	0.08
	t.statistic	12.63	12.63
	p.value	0.00	0.00
VAT	estimate	0.87	0.52
	std. error	0.03	0.03
	t.statistic	35.09	20.89
	p.value	0.00	0.00
Excise taxes	estimate	1.01	1.01
	std. error	0.08	0.08
	t.statistic	12.96	12.96
	p.value	0.00	0.00
Import duties[8]	estimate		3.05
	std. error		0.20
	t.statistic		15.34
	p.value		0.00
Import duties[9]	estimate	0.92	-0.50
	std. error	0.02	0.02
	t.statistic	41.68	-22.73
	p.value	0.00	0.00
Total Tax revenues	estimate	0.96	0.58
	std. error	0.04	0.04
	t.statistic	26.26	15.89
	p.value	0.00	0.00

Source: Authors' computation

[8] Tax buoyancy of import duty has been computed using total value of imports as its tax base. However, after conducting bounds test, there was no cointegration found between import duties and total import values.
[9] Tax buoyancy of import duty has been computed using GDP.

The findings for the tax categories show that income and excise taxes are buoyant in the long and short run. Both categories are automatic stabilizers of shocks in the short run, as well as assuring fiscal sustainability in the long run. The results reflect the progressivity of the income taxes, making the case for this as a robust source of tax revenue mobilisation in the country. On the other hand, excise taxes typically levied on luxurious products and targeting the middle class, are usually levied on products and services whose demand is price inelastic. It is therefore a robust source of tax revenue mobilisation.

The buoyancy results for VAT are less than one in both the short-run and long-run, implying that the source is neither an automatic stabilizer in the short run nor a provider of fiscal sustainability in the long run.

Finally, the short-run results for import duties are significantly greater than one, implying that this source is an automatic stabilizer in the short run. However, there was no long-run relationship found between import duty and its base, namely imports. This may reflect the poor performance of the tax base as well as the regional protocols which discourage taxes to be imposed on regional imports.

There are no recent studies on Tanzanian tax buoyancy[10]. However, results from studies involving other African countries support our finding that the Tanzanian tax system is among the poor performers. For example, Gupta et al., (2021) reported mixed results obtained from 25 Sub-Saharan African countries over the 1980 to 2017 period. The long-term tax buoyancy coefficients were significantly smaller than one in three countries, not significantly less than one in five countries, and exceeding one by a small margin in 17 countries. The results for the short-term tax buoyancy coefficients were significantly smaller than one in 5 countries, not significantly different from one in 14 countries, and significantly higher than one in six countries. Further, Mandela (2015) found that over the period 1972 – 2014, the tax systems for Kenya and South Africa portrayed both long-term and short-term tax buoyancy.

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[10] Osoro (1993) estimated the tax buoyancy from 1969 – 1990 using a proportional adjustment technique and found a buoyancy of 1.06.

5.2 Implications of the Results

These results show that income and excise taxes provide short-term stabilization, as well as long-term sustainability to the government budget. For the income tax, the explanation lies in its progressivity, and for the excise tax, the reason falls in the taxed products and services whose demand is largely price inelastic. These sources are therefore more reliable sources of revenue than VAT and import taxes; the former is generally regressive, and its tax base has been declining[11], and the latter is constrained by the regional protocols and a declining tax base in recent years. These results suggest that more effort be made in the collection of income and excise taxes to support its budget in the short and long term.

From the economic growth perspective, income tax is also the preferred source of tax revenue because it is less distortionary in resource allocation. Similarly, excise taxes levied to discourage the production and consumption of harmful goods and services provide social benefits that may promote economic growth[12].

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[11] During 2000-2020 the VAT tax base (aggregate final consumption as percent of GDP) declined practically consistently from 84.9 percent to 65.9 percent.

[12] The recent tendency to use excise taxes as a source of revenue may produce distortive results, especially when levied on non-final products and services- communications, financial services, etc.

6. Taxable Capacity and Tax Effort

Section 4 has shown that the country's burden of debt service has been generally financially manageable. However, the combined pressure with other budget commitments-imposed policy rigidities that reduced the efficiency and effectiveness of the rapidly expanding public service and infrastructure. This unhealthy situation can be addressed by mobilising additional domestic public resources. However, as shown in Section 5 Tanzania's tax revenue performance has not only been below the expectations of its policymakers but also of countries with a comparable economic profile. Thus, the various tax reforms undertaken in Tanzania have failed to raise tax buoyancy to expected levels. In this section, we explore the drivers of tax revenue mobilisation and, assess the scope and options to boost revenues to the desired levels.

A country's tax revenue performance is driven by two factors, namely tax capacity, and effort in tax revenue mobilisation. The tax capacity defines the potential tax revenues as a percent of GDP that can be mobilised, given the structural features of a country. Tax effort, on the other hand, is the extent to which actual tax revenue reaches the estimated capacity. It is reflected in policy choices (tax rates and bases, and any exemptions), and inefficiency in policy enforcement (tax administration, taxpayer compliance, and interactions between the two) which could cause revenues to fall short of a country's taxable capacity. As mentioned earlier, policy choices may also include an intention not to work towards the attainment of the maximum potential tax (Langford and Ohlenburg, 2015). Thus, by strengthening tax capacity and improving implementation, there is scope for raising tax revenues above the current levels.

Literature suggests that the tax revenue potential of a country is structurally determined by the stage of economic development, the size of the informal sector, and sectoral composition (Langford & Ohlenburg, 2015). Further, a country's revenue potential is contingent upon a set of economic, demographic, and institutional factors. (Langford & Ohlenburg, 2015; Amoh, 2019; Insaidoo, & Obeng, 2020; Addison & Levin, 2012). Since taxable capacity is structurally determined, enhancing tax capacity remains to be a medium- to long-term policy objective, as opposed to improving implementation which can yield immediate results. In this section, we identify factors that impacted Tanzania's domestic resource mobilisation and further estimate the tax potentials for the various tax categories, and the resultant tax effort.

6.1 Framework of Analysis

The revenue potential of a country is not observable; therefore, it must be estimated. Based on the stochastic frontier framework, the potential tax-to-GDP ratio for a specified set of inputs and environmental factors can be projected as,

$$T_t/Y_t = f(X_t; \beta) \quad \text{... (1)}$$

The left-hand side is the observed tax (T) to GDP (Y) ratio at time t. On the right-hand side, $f(X_t; \beta)$ is an expression for the 'production function' by which a vector of inputs **X** is transformed into tax revenues, in line with parameter vector $\boldsymbol{\beta}$. This production function is interpreted as defining the maximum tax-to-GDP ratio that could be achieved if policies were set to raise maximum potential tax revenues, the policies were fully enforced, and there were no random shocks to collections (Insaidoo & Obeng, 2020; Langford & Ohlenburg, 2015).

In practice, tax administrations collect fewer tax revenues due to inefficiency. Thus,

$$T_t/Y_t = f(X_t; \beta) * \lambda_t . \quad \text{... (2)}$$

where $\lambda = (0,1)$ is the level of inefficiency in revenue collection. If $\lambda = 1$, the tax administration is collecting the optimal amount of tax revenue using the available inputs. When $\lambda < 1$, the tax administration is not making the most of the available inputs. As tax collection T is assumed to be strictly positive (T > 0), the degree of technical inefficiency is also assumed to be strictly positive ($\lambda > 0$). Thus, the inefficiency effect of λ is to lower the tax collection from its potential level.

Tax revenue collection is also affected by random shocks, implying that,

$$T_t/Y_t = f(X_t; \beta) * \lambda_t * e_t \quad \text{... (3)}$$

where e represents random shocks, reflecting factors such as one-off windfalls, as well as measurement errors, and model misspecification.

The basic econometric model for the stochastic frontier analysis is generated by taking the natural logarithms of the model in equation (3).

$$ln(T_t/Y_t) = \ln\big(f(X_t; \beta)\big) + \ln\lambda_t + e_t \quad \text{... (4)}$$

Assuming that $f(X_t; \beta)$ is linear in logs, that j inputs are defining the country's tax base, and defining $u_t = -\ln\lambda_t$ yields:

$$ln(T_t/Y_t) = \beta_0 + \sum_{i=1}^{j} \beta_i lnX_t + e_t - u_t \quad \text{... (5)}$$

Tax effort or inefficiency can be derived, as the ratio between actual tax revenue and the stochastic frontier tax revenue, as follows:

$$TE = \left[ln(T_t/Y_t) = \beta_0 + \sum_{i=1}^{j} \beta_i lnX_t + e_t - u_t \right] / \left[ln(T_t/Y_t) = \beta_0 + \sum_{i=1}^{j} \beta_i lnX_t + e_t \right] = -u_t \ldots\ldots (6)$$

6.2 Variables and Data

As stated above, a country's tax revenue potential is determined by economic, demographic, and institutional factors. Tax effort on the other hand captures factors immediately under government control. Below are the explanatory factors that we have used in this study and their likely effect on tax revenue mobilisation.

Economic Factors

Income is expected to have a positive effect on tax revenue mobilisation. The rising income per capita enhances the capacity of citizens to spend and the state to levy and collect taxes. In addition, as the economy develops, so do institutional (administrative, technological, and compliance) capacities for revenue mobilisation.

Openness to international trade may have varied results on revenue performance. Liberalisation has been found to lower economic growth for some developing countries, hence limit the expansion of domestic tax revenues. In addition, the tariff revenue losses following trade liberalisation can be hard to replace with domestic sources. (Dutt et al., 2020). On the other hand, in some countries trade openness has been productivity and growth-enhancing and hence promotes the expansion of domestic tax revenues. (Brun and Gnangnon, 2017). Further, standardised international trade institutions and processes enhance revenue performance by simplifying and facilitating revenue mobilisation.

The sectoral composition of an economy has a varied effect on tax revenue mobilisation. The increasing shares of manufacturing and services are expected to have positive effects on revenue performance since they tend to be associated with modernization and formalization which facilitate tax revenue mobilisation. However, the opposite is expected of agriculture since a large part of the sector is characterized by informality which stifles revenue mobilisation.

Financial deepening contributes positively and significantly to non-resource tax revenue mobilisation, especially in "low-income" compared to "high-income" countries. (Lompo, 2021). By facilitating participation in economic activities, financial deepening has productivity and growth-enhancing effects with positive results on tax revenue mobilisation.

Private sector credit is expected to have a positive effect on tax revenue mobilisation. Credit is an important link in money transmission; it finances production, consumption,

and capital formation, which in turn enhances economic activity. Credit to the private sector may also reflect higher levels of formalisation and record-keeping, supporting tax administration.

Foreign grants are expected to harm revenue mobilisation as governments view them as an alternative to increasing domestic revenue mobilisation, resulting in a selective slackening of tax efforts. (Gupta et al., 2003). This is especially so if the grants are untied, predictable, and unvarying.

F*oreign loans* may impact positively a country's revenue if they are spent to finance pro-growth projects, which consequently expand the taxable base. Further, the borrowing governments have the pressure to raise domestic revenue to pay back the loans. (Insaidoo & Obeng, 2020). However, concessionary loans provide less pressure on the borrowing government and may slacken tax efforts as a result. (Gupta, et al., 2003).

Government investment expenditure is usually reflected in the development of capital goods such as social and economic infrastructure, and improvements in human capital which have a positive effect on tax revenue mobilisation. (Cyan et al., 2013). The visible outcomes of these investments are expected to increase the willingness of taxpayers to pay taxes. (Insaidoo & Obeng, 2020).

Government consumption expenditure may not necessarily reach its destination due to leakages, and citizens' willingness to pay taxes is unlikely to increase with government expenditure which they cannot relate to. Therefore, its impact on revenue mobilisation is likely to be low or negative (Insaidoo & Obeng, 2020). Afonso and Jalles (2013) found that government spending on public wages, interest payments, subsidies, and government consumption negatively affects output growth and public expenditure on social security and welfare is less growth-enhancing.

Inflation used as a proxy for *macroeconomic instability* is expected to harm revenue performance as it increases uncertainty on investment return, which reduces investment and leads to erosion of tax revenue mobilisation. Further, shrinkage of the tax base may arise from decisions by economic agents to change their asset portfolios in favour of non-taxable assets. Inflation may also affect consumer confidence and lower consumption (increase savings) which may erode tax performance. (Insaidoo & Obeng, 2020) and Langford & Ohlenburg, 2015).

Exchange Rate volatility is detrimental to tax revenue mobilisation. Directly, by making trade riskier, negatively affecting the international trade flows, and causing risk-averse international trade players to reduce the volume of transactions thereby triggering revenue shortfalls. Indirectly, by affecting investment and consumption decisions, it

leads trade players and investors to substitute domestic for foreign markets thereby reducing the tax base (Kwesi et al., 2021).

Demographic Factors

Urbanisation is expected to have a positive effect on tax revenue mobilisation as urban communities are generally likely to possess a larger share of income and wealth than their rural counterparts. In addition, urban institutional setups tend to provide greater handles for tax collection than rural setups.

Age dependency measured as the ratio of the dependent population (less than 15 and greater than 64) to the working population (15-64 years) may have a varied effect on revenue performance. A higher age dependency ratio is associated with greater public demand for education, health, and social protection, which is likely to trigger not only increased tax collection efforts but also a willingness to pay tax. A lower dependency ratio on the other hand implies a higher tax capacity.

Education level is expected to have a positive effect on tax revenue mobilisation as it captures a variety of factors associated with a higher level of development that also support a higher tax capacity (Langford & Ohlenburg, 2015). In addition, a direct effect of higher education levels may be to raise citizens' appreciation of how and why to pay taxes.

Institutional Factors

Developing countries face many institutional constraints that impact negatively on revenue mobilisation. In general, corruption is a major problem in tax administration, and so is the low quality of governance.

Control of Corruption Index. A high level of corruption (low index) is expected to harm tax revenue mobilisation. The immediate result of corruption is to introduce unfairness in tax policies and administration. In addition to lowering the tax-GDP ratio, it also causes long-term damage to the economy by detracting investment, increasing the size of the underground economy, distorting tax structures, and corroding the tax morality of taxpayers. All of these in turn further reduce the long-term revenue-generating potential of the economy. On the contrary, a high level of the corruption index is considered to reflect the higher capacity of the government to control corruption, including limiting tax evasion. Hence, the sign of the associated coefficient is expected to be positive (Verdier, et al., 2022).

Table 4 presents a summary of the variables used, data sources, and how they are categorized in the model specification[13].

Table 4: Variables used and sources of data

Variable	Source	Category in model specification		
		x	zp	ze
Dependent variable				
Tax GDP ratio	MOFP, BOT			
Economic factors				
GDP per capita (real values, natural log)	WDI	x		
Non-agriculture GDP per capita (real values, natural log)		x		
Final Consumption % GDP	WDI	x		
Imports as % GDP	BOT	x		
Manufacturing as % GDP	WDI	x		
Agriculture as % GDP	WDI	x		
Services as % GDP	WDI	x		
Trade openness as % GDP	WDI	x		
Inflation (annual rate)	BOT		zp	
Exchange rate, annual % change	BOT		zp	
Foreign Grants % GDP	WDI			ze
2-years lag External Debt % GDP	BOT	x		
Broad money % GDP	WDI	x		
2-years lag Dev. Exp. % GDP	BOT	x		
Recurrent Exp. % GDP	BOT			ze
Private sector credit as % GDP	WDI	x		
Demographic factors				
Education level (Education index)	UNDP	x		
Urban population as % Total population	WDI	x		
Age dependency ratio	WDI			ze

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[13] Adapted from Langford & Ohlenburg (2015)

Institutional factors				
Control of Corruption index (100=less corrupt)	ICRG			**ze**

Notes: zp and ze are observable environmental variables that are not direct inputs into tax collection, but that influence potential tax capacity (zp) or the level of effort (ze).

The tax bases used for the different tax categories are presented in Table 5.

Table 5: Tax bases for the different tax categories

Tax category	Tax base
Aggregate Tax revenues	GDP per capita (real values, natural log)
Income tax	Non-agric. GDP per capita (real values, natural log)
VAT	Final consumption as % of GDP
Excise taxes	Final consumption as % of GDP
Import taxes	Total imports as % of GDP

6.3 Results and Discussion

Multicollinearity tests were performed to identify and eliminate explanatory variables with high correlation. Appendices 3a, 3b, 3c, and 3d present the results of multicollinearity tests. The descriptive statistics of the variables used after eliminating those with high multicollinearity are reported in Table 6. The Table also reports Pearson's correlation coefficients of the explanatory variables with the tax-to-GDP ratios of the different tax categories.

Table 6: Descriptive Statistics of the variables used

	N	Mean	SD	Min	Max	Corr. Total	Corr. Income	Corr. VAT	Corr. Import	Corr. Excise
TaxGDP (Total revenue)	21	10.973	1.046	9.271	12.416	1				
TaxGDP (Income tax)	21	3.523	0.831	2.254	4.803		1			
TaxGDP (VAT)	21	3.538	0.275	2.857	4.050			1		
TaxGDP (Import duty)	21	0.930	0.080	0.741	1.129				1	
TaxGDP (Excise duty)	21	1.730	0.226	1.235	2.158					1
Tax base (Total revenue)	21	753.773	149.533	522.077	985.448	0.871				
Tax base (Income tax)	21	1825.870	383.779	1292.780	2401.410		0.970			
Tax base (VAT) (%)	21	74.445	5.089	65.918	84.906			0.289		
Tax base (Import duty) (%)	21	19.824	6.035	11.499	31.384				0.312	
Tax base (Excise duty) (%)	21	74.445	5.089	65.918	84.906					-0.088
Inflation (%)	21	6.828	3.303	3.290	16.001	0.008	0.030	-0.018		0.199
AgricultureGDP (%)	21	25.902	1.321	23.246	28.742	0.727	0.682	-0.393	-0.221	0.202
ManufacturingGDP (%)	21	8.839	0.611	7.659	9.858	-0.571	-0.455	0.479	0.049	-0.426
ExternaldebtGDp (%)	21	37.645	10.293	21.931	54.354	-0.570	-0.537	0.418	-0.408	-0.535
DeveExpendGDP (%)	21	5.190	1.329	2.425	7.023	0.637		-0.505	0.302	0.330
RecurrentExpendGDP (%)	21	11.342	1.552	8.544	13.566	0.219	0.322	-0.331	0.260	0.228
Age dependency ratio (%)	21	89.336	1.189	85.867	90.084	-0.387	-0.366	0.126	0.295	0.032
Control of Corruption index	21	30.381	4.353	22	38	0.623	0.670	-0.251	-0.248	-0.034

Source: Authors' computation

Determinants of Potential Tax Revenues

The stochastic tax frontiers for the various tax categories were estimated using a time-varying decay model. Two specifications of the model were considered as shown in **Table 4**. The first included direct inputs (x) into the stochastic tax frontier, as well as environmental factors that are not direct inputs but influence tax capacity (z_p). The second specification added environmental factors that influence the level of tax effort (z_e). As shown in **Table 7**, for all the tax categories, the model was significantly improved by adding the environmental factors that influence the level of tax effort (z_e). Therefore, Model Specification 2 was considered to be more appropriate in describing the stochastic tax frontiers of the various tax categories in Tanzania and forms the basis of our subsequent discussions.

For the aggregate tax revenues, the coefficient for the tax base is statistically significant and has the right sign. This result is supported by theory and other studies which inform that a country experiences an increase in potential tax revenues, with an expansion in its taxable base. (Insaidoo & Obeng, 2020). The coefficient for external debt is statistically significant but has an unexpected sign. Thus, an increase in external debt reduces the aggregate tax potential. This result may arise when the external loans are largely concessionary and considered grants which introduce disincentives to domestic revenue mobilisation. In this context, external loans are seen as an alternative to domestic revenues.

The results for environmental factors that influence the level of tax effort are consistent with expectations. The coefficients for age dependency and the share of recurrent expenditures to GDP are statistically significant and have the right signs. The results support other studies and confirm that: (a) Taxpayers are willing to pay taxes to support increased public expenditures such as those of health and education for the dependent young and old populations[14] (Langford & Ohlenburg, 2015). (b) Taxpayers are more willing to pay taxes to finance activities that they can easily associate results with. In addition to being easily associated with leakages, government consumption expenditures are less likely to produce visible outcomes (Brafu-Insaidoo and Obeng, 2020).

For the **income tax** category, the coefficients for the tax base and external debt are statistically significant and have the right signs. Thus, the potential income tax revenues rise with an expansion in its taxable base, the non-agricultural GDP per capita. However, contrary to the aggregate tax revenues, external debt impacts positively income tax potential, suggesting that the loans are used to finance pro-growth

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[14] In addition, tax authorities tend to work harder to raise taxes to meet the increased obligations.

activities that enhance the income tax frontier. It also suggests that the tax authorities would normally increase efforts to collect income taxes to service public external debt in the future.

The environmental factors which played a significant role in enhancing the aggregate tax potential and tax mobilisation are not so critical to income taxes. This may be an important distinguishing feature between direct and indirect taxes[15].

For the **value-added tax (VAT)** category, the coefficient for the tax base is statistically significant but has an unexpected sign. This is likely a result of the regressive nature of the tax. Indeed, over the 21 years (2000-2020), the VAT tax base (aggregate final consumption as a percent of GDP) declined practically consistently from 84.9 percent to 65.9 percent while the VAT revenue to GDP fluctuated between 2.8 and 4.5 percent. Thus, as the base was declining, tax authorities applied pressure to raise more VAT. These findings are consistent with those by Insaidoo & Obeng (2020) who found domestic VAT in Ghana to relate negatively with its base. The coefficient for manufacturing output is statistically significant and has the right sign. Thus, the growth of manufacturing output supports the expansion of the VAT frontier. Age dependency, however, has not worked as an environmental factor that influences the level of tax effort (z_e). The negative relationship between the age dependency ratio and the VAT-GDP ratio implies the lack of taxpayers consciously relating tax compliance with public service, especially health and education. Therefore, the high dependency ratio is more likely to constrain growth and consumption, thus shrinking the tax frontier.

For the **excise tax** category, the coefficients for the tax base and the development expenditure are statistically significant and have the right signs, implying that both variables support the growth of excise tax capacity. These results show that, generally, excise taxes in the country target goods and services that are luxurious or socially destructive and are therefore progressive and tax frontier enhancing. Further, the visibility of the impact of government investment expenditure is expected to increase the willingness of taxpayers to pay taxes. External debt on the other hand reduces tax efforts and works to shrink the tax frontier. As mentioned earlier, this may be the case when the loans are concessionary and predictable.

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[15] That income taxpayers are less responsive to environmental factors that influence effort is an interesting research area.

Table 7: Determinants of potential tax revenues for various tax categories

Variables	Total Tax revenues		Income tax		VAT		Import duties		Excise duties	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Intaxbase	0.42**	0.59***	1.16***	1.21***	-1.62***	-1.33***	-0.11	0.11	1.32*	1.67**
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.24)	(0.49)	(0.10)	(0.04)
Inflation	0.03	-0.01	0.08**	0.06	-0.00	-0.00			-0.02	0.02
	(0.28)	(0.81)	(0.04)	(0.25)	(0.99)	(0.92)			(0.82)	(0.75)
Inagric % GDP	0.15	0.08	0.28	0.44	-0.27	-0.14	-0.68*	0.30	-0.03	-0.07
	(0.66)	(0.75)	(0.32)	(0.14)	(0.45)	(0.72)	(0.07)	(0.50)	(0.96)	(0.91)
Inmanuf % GDP	-0.08	-0.06	-0.22	-0.18	0.73***	0.54***	-0.16	-0.36*	-1.46***	-1.82***
	(0.62)	(0.62)	(0.28)	(0.36)	(0.00)	(0.01)	(0.54)	(0.05)	(0.00)	(0.00)
Inlagextdebt2 % GDP	-0.08*	-0.12***	0.18***	0.23***	0.03	-0.04	-0.15*	-0.06	-0.21*	-0.37***
	(0.07)	(0.00)	(0.00)	(0.00)	(0.70)	(0.55)	(0.05)	(0.47)	(0.09)	(0.00)
Inlagdev2 % GDP	-0.05	0.03			-0.14**	-0.14	0.06	0.39***	0.09	0.34**
	(0.54)	(0.66)			(0.05)	(0.13)	(0.41)	(0.00)	(0.51)	(0.03)
Age dependence		0.06***		0.02		-0.06**		0.07***		0.04
		(0.00)		(0.35)		(0.04)		(0.01)		(0.33)
Recurrent % GDP		-0.04***		0.01		0.01		-0.11***		-0.12***
		(0.00)		(0.43)		(0.71)		(0.00)		(0.00)
Control corruption index		-0.00		-0.00		0.01		-0.02**		-0.01
		(0.94)		(0.71)		(0.14)		(0.04)		(0.60)
Constant	-5.10***	-10.99***	-11.84***	-13.58***	-2.77***	2.01	-6.16***	-7.89**	-7.26***	-9.77**

Variables	Total Tax revenues		Income tax		VAT		Import duties		Excise duties	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.46)	(0.00)	(0.01)	(0.00)	(0.01)
Sigma Constant	-5.41***	-7.66***	-4.65***	-6.57***	-6.03***	-3.29***	-2.91***	-6.50***	-4.75***	-4.20***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Gamma Constant	1.37	-5.38	1.53	-2.91	-34.39	3.43	2.77	-2.78	-2.45	0.93
	(0.00)	(0.80)	(0.00)	(0.72)	(0.00)	(0.00)	(0.00)	(0.55)	(0.61)	(0.00)
Mu Constant	-0.16*	-0.04	-0.05	-0.32	0.21***	0.55***	-0.60**	-0.35	-0.99	-3.88
	(0.08)	(0.96)	(0.33)	(0.88)	(0.00)	(0.00)	(0.02)	(0.82)	(0.81)	(0.70)
Eta Constant	-0.86**	0.09	-0.38***	0.03	-0.15***	-0.12***	-1.06***	0.09	-2.88	-4.85
	(0.01)	(0.87)	(0.00)	(0.93)	(0.00)	(0.00)	(0.00)	(0.81)	(0.84)	(0.80)
Wald-Chi Square	136.383	279.604	428.568	649.085	27.140	61.975	8.483	49.266	23.304	60.977
P value	0.000	0.000	0.000	0.000	0.000	0.000	0.132	0.000	0.001	0.000
Observations	19	19	19	19	19	19	19	19	19	19

Asterisks *** 1%, ** 5% and * 10%. Model (1) means without Environmental variables and Model (2) means with Environmental Variables

The coefficient for the recurrent expenditure is statistically significant and has the right (negative) sign, implying that tax revenue shares are expected to reduce with increases in government consumption expenditures[16]. As mentioned earlier, taxpayers are generally unwilling to pay taxes when they cannot easily identify the economic or social benefits of public expenditure.

For the **import duties** category, the tax base (imports as a percent of GDP) does not support the expansion of the tax capacity. This finding differs from those of the other tax categories and may be explained by the declining trend of imports in recent years as well as the regional trade protocols which have systematically reduced import duty rates to support the movement of goods among member-states. The coefficient for manufacturing output is statistically significant, with a negative sign, suggesting that increased manufacturing output does not support the expansion of the tax frontier. This may be an outcome of a policy decision to adopt low or zero rates for intermediate and capital goods imports (which account for around 75 percent of the imports), in addition to exemptions[17] granted through TIC. Government Investment (development) expenditures on the other hand create opportunities for further growth and support the expansion of tax capacity.

The coefficients for age dependency and recurrent expenditures are significant and have the right signs. Their interpretations were discussed earlier. The environmental factors that influence the level of tax effort (z_e) have played a more prominent role in the import duty category than in the other categories. The coefficient for the control of corruption is significant but has an unexpected sign. Thus, efforts to control corruption play a negative role in supporting revenue mobilisation[18].

Efficiency in the Tax System

Table 8 reports the efficiency levels of the tax categories. At the aggregate level, the country is utilizing less than half its tax potential, which is 11 percent against 23.6 percent of GDP. Our estimates of tax capacity compare well with the findings by Langford and Ohlenburg (2015) who predicted the aggregate tax capacity for Tanzania to be 23.6 percent of the country's GDP in 2010. However, their high corresponding tax effort of 0.62 was driven by the questionable tax-to-GDP ratio of 14.6 percent used in the computation.

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[16] In some developing economies government consumption expenditure has been associated with increased corruption and part of the planned consumption expenditures does not reach its destination.

[17] Between 2000-2010 exemptions accounted for 11.9 percent of the value of imports of goods.

[18] This unexpected finding calls for further investigation.

The tax category with the highest level of efficiency is VAT. As mentioned earlier, this may be due to its regressivity during the period of declining consumption. The high level of efficiency in the collection of VAT could in part be attributed to the tax administration reforms that have included increased automation and the introduction of EFDs. The tax category with the lowest level of efficiency is income tax. This may be due to its widely untaxed tax base. A large informal sector in combination with a small corporate sector explains a non-performing income tax. The low levels of efficiency in the collection of income tax could also be explained by the exemptions in the corporate sector which reduce the taxable base[19]. The results for the various categories are presented in Appendix 4.

Table 8: Average of Tax effort, Potential tax ratio, and Actual tax ratio per category

Categories	Tax effort	Potential tax ratio	Actual tax ratio
Excise duties	46.870	3.717	1.730
Import duties	35.484	2.599	0.930
Income taxes	12.107	30.019	3.523
VAT	96.204	3.696	3.538
Tax revenues	**47.081**	**23.632**	**10.973**

Source: Authors' computation

The results show clearly that greater mileage would be gained by focusing efforts on the income tax category. This source, which accounted for 36 percent of the country's tax revenue during the last decade, not only has the highest potential (30 percent of GDP) but experiences the lowest tax efficiency level (12 percent of GDP). Excise duties which also showed good buoyancy performance had room left for tax revenue mobilisation.

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[19] In his budget speech for the year 2013/14 the Minister of Finance, Hon. William Mgimwa reported that, tax exemptions amounted to 4.3 percent of the GDP in year 2011/12, against a medium-term target of 1 percent.

7. Concluding Remarks

Over the past two decades, the budget of the Government of Tanzania has risen significantly to match the rising needs of its citizens. This has also led to an increasing budget deficit, as revenues fell short of expenditures.

Analysis shows that the budget deficit is financially sustainable. This is good news for the government and policymakers, but only when considered in isolation from the priority expenditures. When viewed as part of the package of government expenditure priorities, the message changes. The limitations imposed by the mandatory expenditures, including interest payments, salaries and wages, and development expenditures, significantly reduce the policy space and the flexibility needed to optimize the benefits of such expenditures. The mandatory expenditures have risen at the expense of other charges (OC), resulting in capacity underutilisation of the expanding public infrastructure and declining public service provision. Therefore, to improve public service provision it is vital to raise more domestic revenues.

Mobilising sufficient domestic revenues, however, requires enhanced efforts to raise the performance of tax revenues; as the current tax system is underperforming, by any measure. The inadequacy of the capacity of the tax revenues to adjust to economic growth has resulted in the country's tax-to-GDP ratio being one of the lowest in Sub-Saharan Africa, SADC, and the EAC. Thus, the long-term and short-term tax buoyancy coefficients show that the overall tax regime can neither provide short-run stabilisation assurance nor guarantee long-run fiscal sustainability.

As expected, the buoyancy results show differentiated performance across the tax categories. Both income and excise taxes are buoyant in the long and short run, implying that they are automatic stabilizers of shocks in the short run, as well as assuring fiscal sustainability in the long run. The results reflect the progressivity of the income taxes and their robustness as a source of revenue mobilisation in the country. On the other hand, excise taxes typically levied on luxurious products and targeting the middle-class, are usually levied on products and services whose demand is price inelastic, making it a robust source of tax revenue mobilisation. These sources are therefore more reliable sources of revenue than VAT and import taxes which do not possess these qualities. Therefore, the government needs to put more effort into income and excise taxes to support its budget in the short and long term. Both VAT and import duty are regressive and have experienced declining bases.

From the economic growth perspective, income tax is also the preferred source of tax revenue because it is largely less distortionary in resource allocation. Similarly, excise

taxes levied to discourage the production and consumption of harmful goods and services provide social benefits that may promote economic growth.

The stochastic tax frontier analysis has also supported the buoyancy results as the country is utilising only about 47 percent of its tax revenue potential. The results also show that greater mileage would be gained by focusing efforts on the income tax category. This source which, on average, accounted for 36 percent of the country's tax revenue during the last decade, not only has the highest potential (30 percent of GDP) but experiences the lowest tax efficiency level (12 percent of GDP). Excise duties also had room left for tax revenue mobilisation.

In addition, the results of the stochastic tax frontier analysis show that for all the tax categories, the model was significantly improved by adding the environmental factors that influence the level of tax effort (z_e). Therefore, for optimal impact, the change in focus to the more buoyant tax instruments (income tax and excise duties) requires to be accompanied by an enhanced tax effort, driven by the three components of tax policy, tax administration, and tax compliance.

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List of Appendices

Appendix 1: Total expenditure, total revenues, and Deficit (In million TZS)

	Total Expenditure	Total Revenue	Deficit
1999/00	1,168,779	777,645	-391,134
2000/01	1,305,035	929,624	-375,411
2001/02	1,466,136	1,042,955	-423,180
2002/03	1,733,385	1,217,517	-515,868
2003/04	2,516,943	1,459,303	-1,057,640
2004/05	3,164,216	1,773,709	-1,390,506
2005/06	3,972,608	2,097,648	-1,874,960
2006/07	4,474,681	2,739,022	-1,735,659
2007/08	5,208,996	3,634,581	-1,574,415
2008/09	6,811,828	4,293,074	-2,518,753
2009/10	8,173,749	4,661,540	-3,512,209
2010/11	9,439,407	5,736,266	-3,703,141
2011/12	10,764,528	7,221,409	-3,543,120
2012/13	12,714,236	8,442,611	-4,271,625
2013/14	13,958,162	10,182,455	-3,775,707
2014/15	14,603,714	10,957,765	-3,645,949
2015/16	17,759,598	14,048,034	-3,711,564
2016/17	18,889,969	16,639,831	-2,250,138
2017/18	20,468,072	17,944,887	-2,523,185
2018/19	22,380,143	18,527,293	-3,852,850
2019/20	23,461,691	21,021,719	-2,439,972
2020/21	26,585,307	20,594,735	-5,990,571

Source:BOT

Appendix 2: Tax buoyancy

	Tax revenue growth	Income taxes growth	VAT growth	Import duties growth	Excise duties growth
2000/01	1.71	-0.60	2.94	0.81	6.01
2001/02	1.01	1.03	1.24	-0.51	1.11
2002/03	1.15	1.63	1.35	1.28	0.34
2003/04	1.37	2.01	1.19	1.46	0.91
2004/05	0.76	0.92	1.30	-0.72	0.43
2005/06	0.67	0.79	0.86	2.37	-0.29
2006/07	1.76	1.62	0.10	2.11	6.07
2007/08	1.74	1.98	1.54	1.27	1.55
2008/09	1.11	1.35	0.87	1.11	1.04
2009/10	0.60	0.55	0.99	0.18	0.30
2010/11	1.06	1.33	0.53	1.19	1.56
2011/12	1.23	1.94	1.15	0.59	0.45
2012/13	1.21	2.16	1.27	0.88	-0.12
2013/14	1.47	1.82	0.84	1.92	0.30
2014/15	0.49	-0.12	-0.60	0.48	4.98
2015/16	1.52	1.41	0.99	1.05	1.78
2016/17	0.95	0.36	2.70	0.62	-0.53
2017/18	0.81	0.74	1.58	1.27	0.27
2018/19	0.23	-0.19	0.80	0.93	1.06
2019/20	1.87	3.86	1.16	0.78	-0.14
2020/21	-0.10	-0.84	0.07	0.46	1.08

Source: Authors' computation

Appendix 3 (a) Correlation relating to total tax revenue tax base

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1	IGDPperCapita	1.00																
2	Lmanu	-0.65	1.00															
3	Lagri	0.73	-0.61	1.00														
4	Lservice	-0.96	0.57	-0.78	1.00													
5	Lopen	-0.01	0.31	-0.32	0.14	1.00												
6	Linfla	-0.27	0.44	-0.29	0.35	0.81	1.00											
7	Lexchange	0.98	-0.71	0.76	-0.96	-0.12	-0.35	1.00										
8	lgrantGDp	-0.90	0.72	-0.78	0.92	0.40	0.57	-0.94	1.00									
9	lagextdebt2	-0.34	0.09	-0.23	0.22	-0.66	-0.57	-0.22	0.03	1.00								
10	lagdev2	0.67	-0.21	0.15	-0.54	0.58	0.28	0.57	-0.37	-0.64	1.00							
11	Lbroad	0.38	-0.13	-0.05	-0.21	0.83	0.56	0.29	-0.01	-0.74	0.83	1.00						
12	Lcredit	0.77	-0.42	0.47	-0.64	0.55	0.24	0.69	-0.49	-0.75	0.80	0.77	1.00					
13	Educationindex	0.92	-0.59	0.62	-0.83	0.32	0.06	0.88	-0.70	-0.60	0.80	0.68	0.92	1.00				
14	Urbanpop	0.99	-0.64	0.75	-0.98	-0.08	-0.33	0.99	-0.93	-0.29	0.63	0.32	0.72	0.89	1.00			
15	agedepratio	-0.70	0.51	-0.54	0.79	0.59	0.70	-0.73	0.84	-0.20	-0.24	0.20	-0.14	-0.43	-0.75	1.00		
16	corruption	0.82	-0.42	0.56	-0.88	-0.11	-0.31	0.81	-0.78	0.02	0.51	0.14	0.45	0.67	0.83	-0.75	1.00	
17	recurrent	0.03	0.10	-0.16	0.14	0.89	0.70	-0.06	0.32	-0.74	0.52	0.84	0.61	0.38	-0.04	0.59	-0.27	1.00

Source: Authors' computation

Appendix 3 (b) Correlation relating to income taxes tax base

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1	lnonagricGDP	1.00																
2	lmanu	-0.44	1.00															
3	lagri	0.66	-0.61	1.00														
4	lservice	-0.84	0.57	-0.78	1.00													
5	lopen	0.29	0.31	-0.32	0.14	1.00												
6	linfla	0.02	0.44	-0.29	0.35	0.81	1.00											
7	lexchange	0.84	-0.71	0.76	-0.96	-0.12	-0.35	1.00										
8	lgrantGDp	-0.71	0.72	-0.78	0.92	0.40	0.57	-0.94	1.00									
9	lagextdebt2	-0.61	0.09	-0.23	0.22	-0.66	-0.57	-0.22	0.03	1.00								
10	lagdev2	0.77	-0.21	0.15	-0.54	0.58	0.28	0.57	-0.37	-0.64	1.00							
11	lbroad	0.56	-0.13	-0.05	-0.21	0.83	0.56	0.29	-0.01	-0.74	0.83	1.00						
12	lcredit	0.91	-0.42	0.47	-0.64	0.55	0.24	0.69	-0.49	-0.75	0.80	0.77	1.00					
13	Educationindex	0.93	-0.59	0.62	-0.83	0.32	0.06	0.88	-0.70	-0.60	0.80	0.68	0.92	1.00				
14	Urbanpop	0.89	-0.64	0.75	-0.98	-0.08	-0.33	0.99	-0.93	-0.29	0.63	0.32	0.72	0.89	1.00			
15	agedepratio	-0.43	0.51	-0.54	0.79	0.59	0.70	-0.73	0.84	-0.20	-0.24	0.20	-0.14	-0.43	-0.75	1.00		
16	corruption	0.68	-0.42	0.56	-0.88	-0.11	-0.31	0.81	-0.78	0.02	0.51	0.14	0.45	0.67	0.83	-0.75	1.00	
17	recurrent	0.32	0.10	-0.16	0.14	0.89	0.70	-0.06	0.32	-0.74	0.52	0.84	0.61	0.38	-0.04	0.59	-0.27	1.00

Source: Authors' computation

Appendix 3 (c) Correlation relating to VAT/Excise duties tax base

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1	lfinalcons	1.00																
2	lmanu	-0.44	1.00															
3	lagri	0.66	-0.61	1.00														
4	lservice	-0.84	0.57	-0.78	1.00													
5	lopen	0.29	0.31	-0.32	0.14	1.00												
6	linfla	0.02	0.44	-0.29	0.35	0.81	1.00											
7	lexchange	0.84	-0.71	0.76	-0.96	-0.12	-0.35	1.00										
8	lgrantGDp	-0.71	0.72	-0.78	0.92	0.40	0.57	-0.94	1.00									
9	lagextdebt2	-0.61	0.09	-0.23	0.22	-0.66	-0.57	-0.22	0.03	1.00								
10	lagdev2	0.77	-0.21	0.15	-0.54	0.58	0.28	0.57	-0.37	-0.64	1.00							
11	lbroad	0.56	-0.13	-0.05	-0.21	0.83	0.56	0.29	-0.01	-0.74	0.83	1.00						
12	lcredit	0.91	-0.42	0.47	-0.64	0.55	0.24	0.69	-0.49	-0.75	0.80	0.77	1.00					
13	Educationindex	0.93	-0.59	0.62	-0.83	0.32	0.06	0.88	-0.70	-0.60	0.80	0.68	0.92	1.00				
14	Urbanpop	0.89	-0.64	0.75	-0.98	-0.08	-0.33	0.99	-0.93	-0.29	0.63	0.32	0.72	0.89	1.00			
15	agedepratio	-0.43	0.51	-0.54	0.79	0.59	0.70	-0.73	0.84	-0.20	-0.24	0.20	-0.14	-0.43	-0.75	1.00		
16	corruption	0.68	-0.42	0.56	-0.88	-0.11	-0.31	0.81	-0.78	0.02	0.51	0.14	0.45	0.67	0.83	-0.75	1.00	
17	recurrent	0.32	0.10	-0.16	0.14	0.89	0.70	-0.06	0.32	-0.74	0.52	0.84	0.61	0.38	-0.04	0.59	-0.27	1.00

Source: Authors' computation

Appendix 3 (d) Correlation relating to import duties tax base

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1	limportGDP	1.00																
2	lmanu	0.21	1.00															
3	lagri	-0.25	-0.61	1.00														
4	lservice	0.09	0.57	-0.78	1.00													
5	lopen	0.99	0.31	-0.32	0.14	1.00												
6	linfla	0.78	0.44	-0.29	0.35	0.81	1.00											
7	lexchange	-0.05	-0.71	0.76	-0.96	-0.12	-0.35	1.00										
8	lgrantGDp	0.33	0.72	-0.78	0.92	0.40	0.57	-0.94	1.00									
9	lagextdebt2	-0.69	0.09	-0.23	0.22	-0.66	-0.57	-0.22	0.03	1.00								
10	lagdev2	0.58	-0.21	0.15	-0.54	0.58	0.28	0.57	-0.37	-0.64	1.00							
11	lbroad	0.83	-0.13	-0.05	-0.21	0.83	0.56	0.29	-0.01	-0.74	0.83	1.00						
12	lcredit	0.60	-0.42	0.47	-0.64	0.55	0.24	0.69	-0.49	-0.75	0.80	0.77	1.00					
13	Educationindex	0.38	-0.59	0.62	-0.83	0.32	0.06	0.88	-0.70	-0.60	0.80	0.68	0.92	1.00				
14	Urbanpop	-0.03	-0.64	0.75	-0.98	-0.08	-0.33	0.99	-0.93	-0.29	0.63	0.32	0.72	0.89	1.00			
15	agedepratio	0.57	0.51	-0.54	0.79	0.59	0.70	-0.73	0.84	-0.20	-0.24	0.20	-0.14	-0.43	-0.75	1.00		
16	corruption	-0.10	-0.42	0.56	-0.88	-0.11	-0.31	0.81	-0.78	0.02	0.51	0.14	0.45	0.67	0.83	-0.75	1.00	
17	recurrent	0.91	0.10	-0.16	0.14	0.89	0.70	-0.06	0.32	-0.74	0.52	0.84	0.61	0.38	-0.04	0.59	-0.27	1.00

Source: Authors' computation