An assessment of Tax Revenue Performance Using Tax Capacity and Tax Effort: The Case of Southern African Development Community (2000-2020)

By

CHIKWEDE, Klery

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

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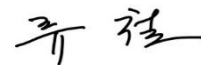
For the Degree of

MASTER OF DEVELOPMENT POLICY

Committee in charge:

Professor Park, Jin, Supervisor

Professor Liu, Cheol

Professor Lee, Seohyun

Approval as of December, 2022

DECLARATION

I, Klery Chikwede, make a declaration that this thesis is my own piece of work and that the entire contents are as a result of my effort only, not any other people save for the professional advice and guidance of my supervisors Professor Park, Jin and Professor Liu, Cheol. No other institution has never received a submission of this research project wholly or in part for awarding any academic degree. I have acknowledged all the sources of material used in this research paper.

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Signature:

ABSTRACT

The paper assesses tax revenue performance in the Southern African Development Community by empirically estimating the member countries' tax capacity and tax effort to determine member states that are near or far from their tax capacity using the standard regression approach. Tax revenue mobilization is of paramount importance for a country's development and subsequent regional socioeconomic development; therefore, it is imperative to heighten the understanding of whether the current tax systems in the region provide enough tax revenue to meet public expenditure needs. Literature suggests that several economic, demographic, and institutional aspects restrict tax collections. In this regard, the study finds that the level of economic growth, financial deepening, and trade openness positively and significantly influence tax revenue mobilization. On the other side, urbanization, the share of agriculture in GDP, and the size of the shadow economy are negatively and significantly impacting on tax capacity. More so, the low levels of governance quality are having detrimental effects on tax collection and the effect is larger compared to other determinants. Overall low tax collection in the region is attributable to both low tax capacity and administrative inefficiencies. It is also established in the study that the impact of changes in tax structure and systems and external shocks should not be overlooked. The ranking of member countries into different groups of performers has assisted in providing broad guidance for tax policy design and reforms. However, the cross-cutting issue is the need for improving governance to build effective and efficient systems.

Keywords: Tax revenue performance, tax effort, tax capacity, SADC

DEDICATION

To my son Cayden for having to endure everything during my absence at a tender age and my niece Cherry for playing the mother role to Cay. What a sacrifice as a young-adult Cherry!

ACKNOWLEDGMENTS

I extend my deepest gratitude to my supervisors, Professor Park, Jin and Professor Liu, Cheol for their dependable guidance and extensive knowledge which enhanced my understanding of the issues. I am grateful to Professor Christopher Plumb's new insights on research writing, my academic advisor Professor Changkeun Lee's advice. For the one and half years I have been at KDI school of Public Policy Management, I have greatly benefited from the experience and knowledge on public policy issues through all the professors who taught me in various courses. May they receive my sincere gratitude. I am also grateful to all the other Professors at KDI School and the non-teaching staff for the support rendered throughout my entire study.

Special acknowledgements go to KOICA for providing the scholarship. Without KOICA's financial support this program would not have been possible. I am grateful for the assistance I received from KOICA coordinators, KOICA management team at KDIS and the rest of the staff. My sincere gratitude is also extended to the management of Ministry of Foreign Affairs and International Trade supporting this manpower development program. For all the other staff members and colleagues in my department at MoFAIT, you are greatly appreciated for the assistance you rendered in one way or the other.

Finally, I am deeply indebted to my family, in-laws, friends, and the church at home and in Sejong who have been the motivational support. Thank you for standing for me during my son's medical procedure which took place during my absence. Your invaluable support is humbly appreciated. Above all others, I thank the Almighty God with whom I find strength and rest every day.

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CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 Introduction

There is a growing recognition that domestic resource mobilization (DRM) is a key instrument for sustained and inclusive development. This issue is enshrined in sustainable development goal (SDG) 17.1 calling states to 'strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection'. Domestic resources consist of both tax and non-tax revenues, but taxation is on the global front-burner because of its significant role in income redistribution, avoiding externalities, and strengthening state capacity apart from the financing role (Akitoby et al., 2020; see also, Dare et al., 2019). The issue of tax revenue mobilization has received wider and revived consideration for the past two decades as underscored by various commitments and initiatives: the Monterrey Consensus of 2002, the Busan Agreement of 2011, the Tax Initiative signed in Addis Ababa in 2015, and Collaboration on Tax Platform of 2016. From the resolutions of these commitments, it is clear that most countries agree that domestic tax revenues must be the primary financing source in developing countries while external financial resources should only play a supplementary role.

Southern African Development Community (SADC) requires huge financial resources to sustainably finance its socio-economic development primacies and regional strategic urgencies. Further to that, the region requires significant progress on tax revenue mobilization if it is to meet the SDGs by 2030 and or lift its members' economies from the COVID-19 pandemic-induced fallout. Yet, the tax collections in the region are very low and the rate of increase is very slow, which is a growing concern for policymakers. According to ATAF (2021), the average tax ratio for SADC was 18.28% in 2020 which is an increase from 2019 by 0.2

percentage points. This was far lower than (almost half of) OECD's 2020 average tax ratio of 33.5% as reported by OECD (2021). Most African regional blocs have set a tax ratio of 20% of GDP as a macroeconomic convergence criterion. If this is used as a benchmark to measure performance in SADC, most members are far below this standard signalling underperformance. Thus, an assessment to check whether member states have attained their full tax potential and whether the maximum effort is being exerted to utilize such tax capacities is a crucial matter deserving of serious consideration if optimal policy options are to be designed to maximize tax collections.

Various issues make tax revenue mobilization important in SADC. Following the adoption of the SDGs, SADC needs to mobilize additional resources to finance those commitments. Coulibaly and Gandhi (2018) argue that African countries need to raise revenue from tax by 4 percent of GDP to meet the SDG commitments. In addition, the region is faced with rising public debt levels hence the need for tax revenues as a fiscal consolidation strategy. According to SADC (2020), government debt for SADC doubled from 28.5 to 56.1 percent of GDP from 2007 to 2018 and further grew to 67.1% of GDP in 2020 due to the pandemic. The 2008/2009 global financial and economic meltdown caused a cut in official development assistance (ODA) to SADC from around 8 percent of gross national income (GN1) in 2008 to 1.8 percent in 2018 (SADC, 2020). Further to that, the FDI inflows into the region have remained relatively low narrowing the prospects for external financing. Moreso, the COVID-19 pandemic is increasingly eroding tax collections due to declining economic performance and likely worsening tax compliance (Chang et al., 2020). The pandemic is also enormously worsening the debt situation as member states are borrowing to curtail the induced adverse effects. These issues have made SADC governments more aware of the need to optimize tax revenue mobilization options, but the quality of the measures to be undertaken matters.

1.2 Background of the study

One of the mandates of SADC is to promote regional integration. In this respect, the bloc Secretariat plays a facilitation and coordination role in guiding fiscal policies in line with the macroeconomic convergence and cooperation on taxation programs in the region. It also ensures that the region's policies are in harmony with each other and are aligned with other regional and international targets. However, there is not much progress on the tax cooperation program since the recent pledge by member states toward achieving Agenda 2063 and the recent adoption of the SDGs. More so, progress on building effective tax systems in the region is somewhat slow. Yet, the successful implementation of policies and programs in SADC is heavily reliant on the fruitful mobilization of domestic resources, particularly tax resources.

According to the Regional Indicative Strategic Development Plan (RISDP 2020 - 2030), the financing requirements of the region can be broken down into two categories namely financing for coordination and financing for development. The coordination function is mainly funded through membership contributions and development assistance from international partners but the development function requires wide and innovative sources. Therefore, the Resource Mobilization Strategy in line with the RISDP (2020 -2030) identifies public finance, ODA, debt relief, domestic savings, FDI, and development finance as potential sources. Nevertheless, tax revenues, remains the most important financing instrument in the region. The RISDP (2020 – 2030) emphasizes the need for refining the region's tax legislation and closing tax loopholes to free up additional revenues for financing the development of the region. The appropriate decision in this regard should, however, be well informed by empirical evidence from the assessment of the nature and extent of tax capacity and tax effort in the region.

There is a burgeoning body of scholarship on tax revenue performance assessment focusing on the estimation of tax capacity and tax effort (see Fenochietto et al., 2013; Langford & Ohlenburg, 2016; Dalamagas et al., 2019; McNabb et al., 2021). Although these concepts are important, the empirical literature on SADC is limited despite the fact that mobilizing additional tax revenues is still a challenge in SADC. A few studies investigate the factors that limit tax collection in the SADC region in a cross-country setting without measuring the nature and extent of the tax capacity and tax effort (see Glenday & Hollinrake, 2005; Robinson, 2005; Ade et al., 2018). Only a recent study by Chigome and Robinson (2021), in as much as I know, has empirically estimated tax capacity and tax effort in SADC using the SFA. However, there is a dearth of research that comprises additional variables, varied estimation methods, specification choices as well as newer data sets. It is, therefore, clear that the lack of specialized tax policy empirical works in the region to guide tax policy coordination and reforms is also limiting progress on tax issues in SADC.

1.3 Statement of the Problem

Most SADC members have lagging indicators in most of the SDGs. The Sustainable Development Goals Center for Africa and Sustainable Solutions Network (2020) reports mostly declining and stagnation trends in education, health, and public infrastructure provision. This puts the region in dire need of additional resources to achieve the rising short-term requirements of its citizens and put the member countries on a long-term socio-economic development trajectory. As such, this calls for SADC governments to urgently seek alternative and inventive ways of financing public goods and services. Tax remains essential as a key instrument for mobilizing domestic resources for funding developmental programs and the provision of public services. Nevertheless, as it stands, the tax collections in the region are very low given the high regional developmental needs hence the need for finding means for optimizing tax revenue collections.

Policy options on optimizing tax revenue mobilization efforts, however, need to be adequately informed by empirical evidence on the outcomes of the evaluation of existing tax frameworks in the region. The knowledge of taxable capacity and tax effort assists to guide countries to select the most appropriate policy options (Korsu, 2021; see also Cyan et al., 2013). However, the existence of such precise knowledge in SADC is still questionable. These concepts are not new but are now more important than ever as they guide countries on both where they can get additional tax revenues and how they might get there. More so, the failure of most members to reach the macroeconomic convergence target suggests that SADC countries have constraints in their tax collection systems. Nonetheless, it is not clear if these limitations can be attributed to low tax capacity or the unwillingness of governments to utilize the already attained maximum tax capacity to finance projects that can produce additional revenues, or the susceptibility of tax resources to external shocks.

Thus, the call for concern on the performance of tax revenues in SADC is not only about its sufficiency to cover the budgetary needs but also about whether members efficiently attain their potential tax revenue. It is against this background that this paper uses tax effort and tax capacity in assessing the performance of tax revenues for the 16 SADC member countries covering the period 2000 to 2020 to check if members are operating below or above their potential and ascertain the most suitable policy actions needed to raise the required additional revenues. In addition, this paper also checks if external shocks have influenced tax revenue performance in the region. To close the research gap, this paper revisits the issue by making several methodological innovations. These include the addition of important variables omitted by previous research and varying the estimation method from previous research work. Thus, I use the standard regression model to perform the quantitative analysis, and to validate my

findings I compare the results with those obtained by Chigome and Robinson (2021) who used the stochastic frontier model for the same region over a period which lies within the period covered by this study.

1.4 Research Objectives

This paper assesses tax revenue performance in SADC by empirically estimating and analyzing tax capacity and tax effort as well as inspecting if the changes to tax revenue performance over the period 2000 to 2020 could have been due to the region's vulnerability to external shocks. More specifically the study aims to:

i. Investigate the factors that determine tax revenue performance in SADC.

ii. Determine whether member countries have attained their full tax potential given their handles and whether the maximum effort has been exerted to utilize such tax capacities.

iii. Establish the degree to which low tax capacity explains low tax collection in the region.

iv. Ascertain the extent to which administrative inefficiencies explain low tax revenues in SADC.

v. Evaluate whether there have been significant external shocks in the region over the period 2000 to 2020 that could have influenced tax revenue performance.

1.5 Research Questions:

i. What factors determine tax revenue performance in SADC?

ii. Are tax systems in the region operating below or above their tax potential and how do member states rank in terms of tax effort?

iii. To what extent does low taxable capacity explain low tax collections in the region?

iv. To what extent do administrative inefficiencies explain low tax collections in SADC?

v. Have there been significant external shocks in SADC over the period 2000 to 2020 that could have influenced tax revenue performance? If yes, what is the extent of the influence?

1.6 Research Hypotheses

In this paper I test the following hypotheses:

i. The level of economic development, urbanization, trade openness, the share of agriculture in GDP, financial deepening, the size of the informal sector, foreign aid, and governance quality are significant in explaining tax revenue performance.

ii. Tax effort in the region is insufficient to attain the potential tax capacity,

iii. The low tax revenues in the region are attributed to low tax capacity;

iv. Administrative inefficiencies are significant in explaining low tax collections in SADC

v. There are significant external shocks over the period 2002 to 2020 influencing tax revenue performance in SADC.

1.7 Significance and justification of the study

The tax effort and tax capacity benchmarks estimated will enable the ranking of the member states into different categories of performers. Analysis of different performance levels helps in understanding why some members are achieving and why some are lagging. According to Bird (2008), policy advice should be exact showing where specific policy recommendations are required and where generalizations can be made since a one size fits all approach is not always fitting. Therefore, the kind of analysis adopted in this paper can guide SADC governments and their revenue authorities in the selection of appropriate tax policy designs and reforms specific to their countries to enhance tax revenue mobilization.

Grote (2017) argues that inadequate empirical information and data make decision-making hard and limits debate on tax reform resulting in ill-designed tax systems and policies. Keen (2012) once contended that the seemingly slow or no progress on tax issues in SADC was being prolonged by a lack of tax policy scholarship and insufficiency of coordination of policy guidance. Therefore, this paper may be a welcome contribution to the SADC secretariat as they may find the results useful in designing regional tax harmonization policies and reforms which are key instruments for effective regional integration.

Furthermore, this study adds to the body of scholarship on tax revenue performance in two ways. First, by making use of a different estimation approach (fixed effects standard regression model) from the previous work (SFA used by Chigome and Robinson, 2021) to enable comparison and validation of results. Second, by using a narrative approach to determine if the vulnerability of the member states to external shocks has had any influence on tax capacity and tax effort from 2000 – 2020. This is also another deviation from Chigome and Robinson (2021) who instead examined the changes in tax legislation in SADC from 2002 to 2016. This mixed methodology provides a footing for other researchers in conducting further studies on tax performance in the region.

1.8 Methodology

In this paper, I use the mixed methods approach in an attempt to provide broad guidance to tax policy design in the SADC region. Thus, I make use of both quantitative and qualitative analysis whereby qualitative analysis helps in explaining the quantitative approach results. In stage one, I use the standard regression model to investigate the factors that affect tax capacity, estimate the potential tax capacity given those factors, and calculate the tax effort indices for SADC member states and the region's average. In stage 2, I compare my results to those obtained by Chigome and Robinson (2001) who used a stochastic tax model to determine the

determinants of tax revenue performance in SADC and to estimate tax effort and tax capacity. The use of a different quantitative method assists in validating the results obtained since the region of study is the same and period covered falls within the period covered by this study. Cyan et al. (2013) argue that the modified standard regression approach to capture governance quality and the SFA model are substitutable. In stage 2 of employing the qualitative analysis, I conduct an extensive review of the literature to check the existence of any significant external shocks and provide a narrative analysis of the effects of these shocks on tax revenue. Some of the literature to extract the information include annual and periodical reports by tax authorities and governments of member states and other relevant scholarly articles. This study covers the period from 2000 to 2020.

1.9 Road map of the paper

Having given the introduction and the background of this paper in Chapter 1, Chapter Two presents an overview of tax structure and systems in SADC. Chapter Three provides a review of both theoretical and empirical scholarship. The methods and data are outlined in Chapter Four. Chapter Five conducts a discussion on the key findings and discussion of the quantitative results in the first section followed by a narrative analysis of the influence of member countries' vulnerability to shocks on tax revenue performance in the region. Chapter Six provides the conclusion, policy recommendations, and suggested areas to be further studied.

CHAPTER TWO

OVERVIEW OF SADC TAX STRUCTURES AND SYSTEMS

2.1 Introduction

To establish the suitable course of action necessary to raise enough tax revenue, it is important to undertake a comprehensive analysis of tax policies and tax systems in the region. This chapter, therefore, presents a synopsis of the existing tax systems and tax policies in the SADC region to cast light on the context in which the analysis was accomplished. After the introduction, I give an overview of the history of SADC in pursuit of tax systems enhancement and performance toward macroeconomic convergence. After the background, I draw attention to the assessment of tax systems in the region and share information on SADC's tax performance and trends. Thereafter, I present the chapter conclusion.

2.2 Background of SADC

SADC[1] was set up in 1980 as a development coordinating conference and later changed to a development community in 1992. Figure 1 shows the current map of SADC. The main intentions of the regional bloc include achieving regional integration, attaining a full economic union, and eradicating poverty by supporting each other to resolve common issues. However, SADC member states are also part of other groupings like EAC, SACU, and COMESA which sometimes give rise to some problems of divided loyalty and economic orientation (Rossouw, 2017; see also Glanday & Hollinrake, 2005). SADC is still a developing region and requires additional revenue to further its socio-economic development. Taxation is, therefore, an important tool for domestic resource mobilization towards raising the required additional

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[1] Southern African Development Community (SADC) is a Regional Economic Community that consists of 16-countries as shown in Figure 1.

finances for development. The block has various legal and institutional instruments that direct

and give a standard to the work of its members.

Figure 1:

Map of SADC and the names of the 16 members

Notes. Adapted from SADC (2020)

2.2.1 Legal instruments for improving tax systems in SADC

One of the legal instruments to guide tax policy and systems at SADC level are protocols. The

region has 26 protocols including those which are not yet in force. Tax policy and other related

matters are contained in the Protocol on Finance and Investment amalgamated on 18 June 2006

but came into force on 16 April 2010. A tax subcommittee was then established to guide the

coordination of tax policies in the region so that inefficiencies in tax collection are eliminated,

tax bases are protected and hindrances to trade and investment are minimized (Robinson, 2005).

Chapter 4, Article V of the Protocol on Finance and Investment provides that members should cooperate on taxation issues and coordinate their tax regimes. In this regard, some progress has been made toward the formulation and harmonization of tax policies in the region. SADC received financial assistance from the European Union through the Regional Economic Support (REIS 2013-2017) under the European Development Fund (EU-SADC Regional Economic Integration Support, 2018). The assistance was meant to promote good tax governance in the region, and it culminated in the development of SADC Guidelines for Cooperation in VAT and Excise Taxes launched in 2016 aimed at harmonizing the two classes of taxes in the region. The cooperation in VAT could be one of the reasons behind VAT being the major tax revenue contributor in the region. Further to that, significant progress has also been made on tax treaties and information exchange which saw the region producing the SADC Model Tax Agreement and SADC Agreement on Assistance in Tax Matters which were signed in 2012. To this effect the region now has a tax expenditure model which guides how to assess the costs of various tax incentives, so that the members cooperate and develop fair tax systems and regimes.

2.2.2 Institutional instruments for improving tax systems in SADC

To build tax capacity, IMF (2017) suggests that developing countries need to establish well-functioning Tax Policy Units (TPUs). The role of TPUs is to inform evidence-based tax policy which promotes reliability in tax systems and encourages coherent, fair, and efficient administrable tax systems. Even though most SADC members have made considerable effort in setting up Autonomous/ Semi-autonomous Tax Authorities (ATAs), little success has been made in the establishment of specialized TPUs. Only South Africa (SA) has successfully set up a specialized TPU, others are still to match SA in terms of the TPU's functions and role in guiding tax reform (Grote, 2017).

Furthermore, to enhance tax systems and tax policy reforms of its members, SADC needs to set up a comprehensive tax database to allow easy access to tax information. The information includes tax rates, implementation dates, exemptions, and allowances for direct and indirect taxes, levies, and tax incentives as well as tax agreements, statistics on tax revenue collections, and tax collection instruments (SADC, 2006). Nevertheless, SADC is still to build such a database. OECD (2021) emphasizes the need for comprehensive statistics on tax revenue because it is the foundation for tax analysis and assessment as well as the development and customization of better tax policies. However, it is difficult to reliably access, up-to-date, complete and consolidated data from the SADC database due to poor maintenance. Researchers willing to carry out studies on tax-related issues for the region have to rely mainly on IMF and WB and to some extent have to approach the relevant authorities of the member countries. However, the second approach is difficult and sometimes almost impossible.

2.3 Tax performance, structures, and systems in SADC

To assess tax performance, Slemrod (2016) argues that there is a need for understanding the tax systems and structures of the region. Slemrod claims that these tax systems and structures can be understood from four angles namely tax rates and bases, rules of remittances, rules of enforcement, and administrative standpoint. To stay within the focus of this paper I only confine my attention to the overview of tax rates and bases in the region. Before discussing these concepts, I elucidate the tax performance of the region using tax levels and show how it compares with other RECs.

2.3.1 Tax performance

Figure 2 shows SADC member countries' tax level performancefrom 2000 to 2019. In general SADC member states have low tax ratios showing declining but heavy fluctuating trends for the period understudy. In chapter 4, the paper discusses the possible factors contributing to the slow growth in tax ratios and the nature of the external shocks that could be causing some of these heavy fluctuations.

Figure 2:

Total tax level performance for SADC countries from 2000 to 2019
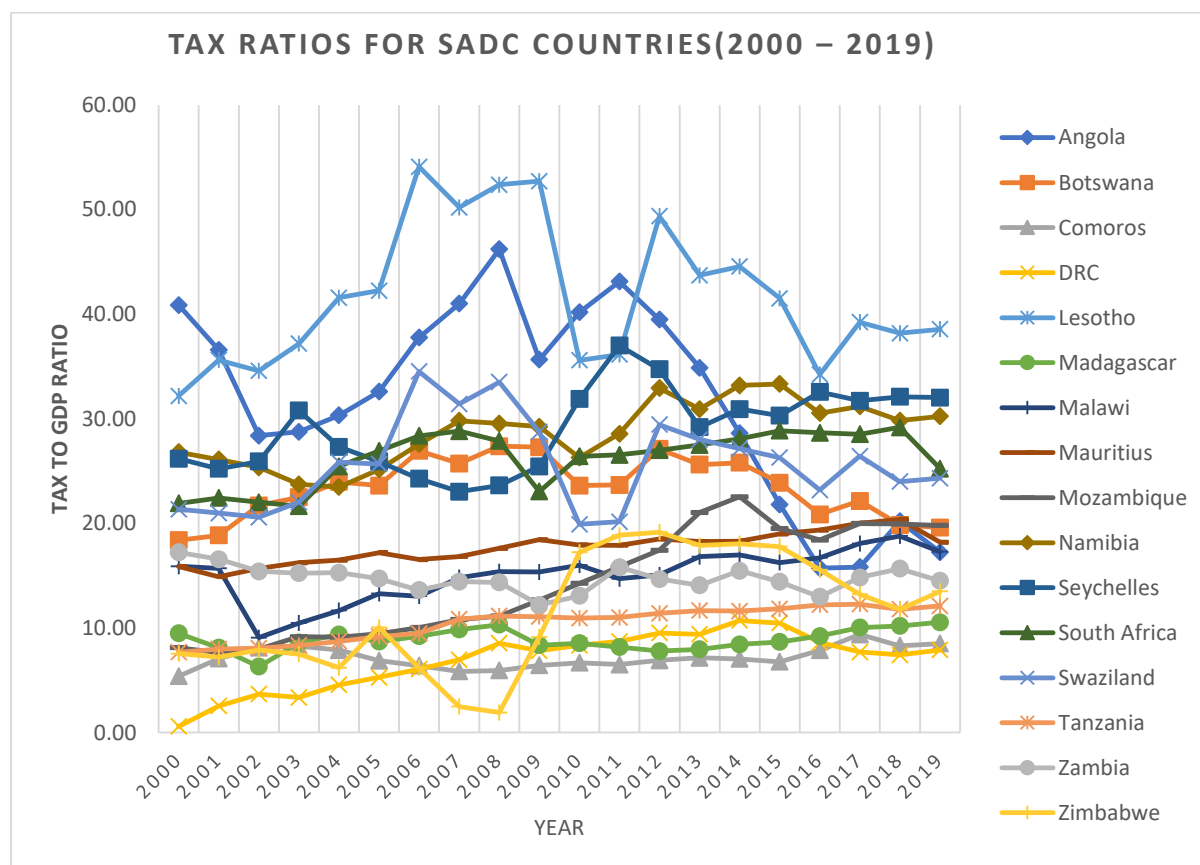
Notes. Compiled from data adapted from the IMF (2022) database

Compared to other RECs[2] in Africa, SADC seems to be performing well in terms of tax levels but this could be due to the dominance of countries like South Africa, Seychelles, Mauritius, and Lesotho hence the need to assess individual member states' tax capacity, and tax effort. Figures 3a and 3b show a comparison of the tax ratios of SADC to other regional groupings.

Figure 3a: *Tax ratio trends 2000-2018*   **Figure 3b:** *Tax ratio trends 2010 -2020*
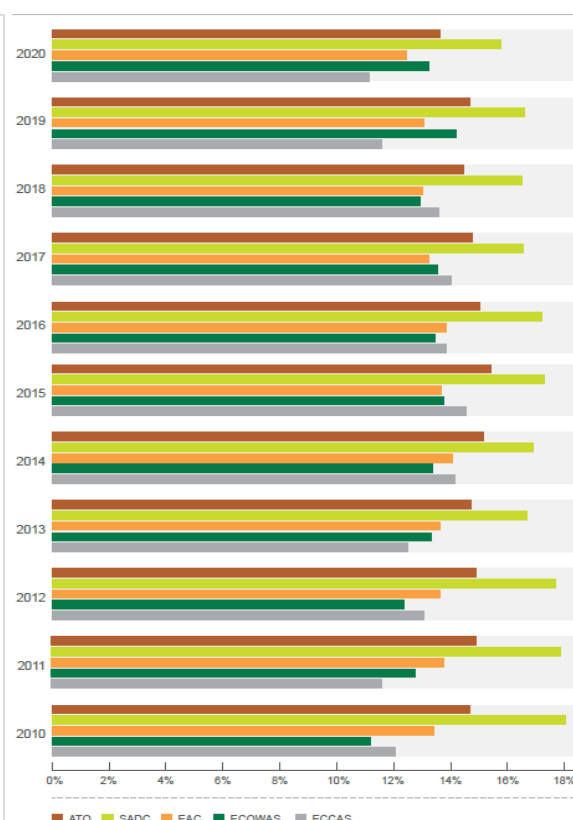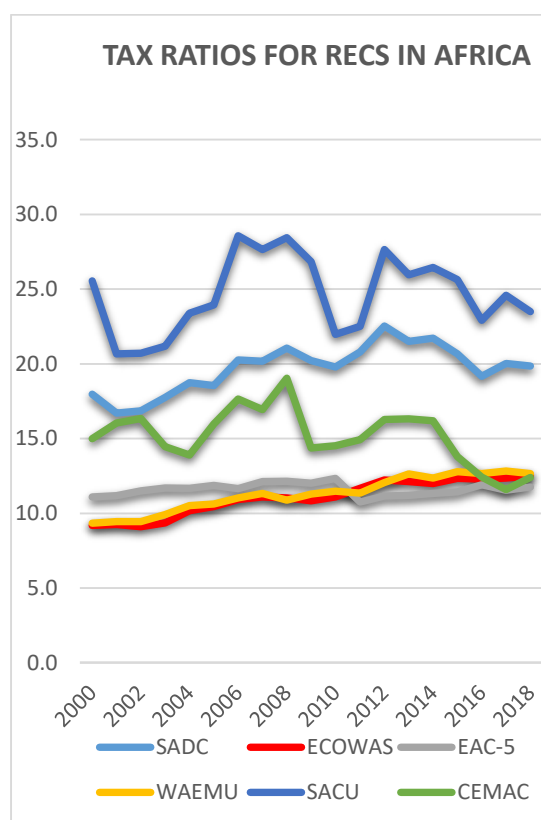
Notes: Figure 3a - constructed using data adapted from IMF (2022) database

Figure 3b - adapted from ATAF (2021)

Other regional blocs have set convergence benchmarks for tax ratios. For instance, ECOWAS has set its target of 20% for the tax ratio. SADC has not yet set a convergence target for the tax ratio but if the criterion of 20% (the target used by most of the African RECs) is applied to

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[2]These other RECs include the ECOWAS; EAC-5; COMESA; SACU; WAEMU and the Economic and Monetary and CEMAC.

SADC for the period 2000 to 2019, it is clear that most SADC members do not meet the benchmark (see Table 1). Only those members with the performance shaded have surpassed this standard. This justifies why this paper examined if member countries have attained the potential levels and if they are exerting sufficient effort.

Table 1:

SADC member states' tax ratios against the 20% tax ratio benchmark

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Angola	40.9	36.6	28.4	28.7	30.3	32.6	37.8	41.0	46.2	35.6	40.2	43.1	39.5	34.9	28.6	21.8	15.7	15.8	20.2	17.2
Botswana	18.4	18.8	21.7	22.5	24.0	23.6	26.9	25.7	27.4	27.3	23.6	23.7	27.1	25.6	25.8	23.9	20.9	22.1	19.8	19.6
Comoros	5.4	7.1	8.1	8.3	7.9	6.9	6.4	5.8	5.9	6.4	6.7	6.5	6.9	7.1	7.0	6.8	7.9	9.4	8.3	8.5
DRC	0.6	2.5	3.7	3.4	4.6	5.3	6.1	7.0	8.5	7.8	8.3	8.7	9.5	9.4	10.7	10.5	8.6	7.7	7.4	7.9
Lesotho	32.2	35.6	34.6	37.2	41.6	42.2	54.1	50.2	52.4	52.7	35.6	36.1	49.4	43.7	44.6	41.5	34.2	39.2	38.2	38.6
Madagascar	9.5	8.1	6.3	8.6	9.4	8.7	9.2	9.8	10.3	8.3	8.5	8.2	7.8	8.0	8.4	8.7	9.2	10.0	10.2	10.5
Malawi	15.9	15.7	9.1	10.5	11.7	13.3	13.0	14.8	15.4	15.3	16.0	14.7	15.1	16.8	17.0	16.2	16.7	18.1	18.8	17.3
Mauritius	15.9	14.9	15.7	16.2	16.5	17.2	16.5	16.8	17.6	18.4	17.9	17.9	18.5	18.3	18.3	19.0	19.4	20.0	20.4	18.2
Mozambique	8.1	7.6	8.0	9.2	9.1	9.4	10.0	10.8	11.1	12.7	14.3	15.8	17.4	21.0	22.5	19.5	18.4	20.0	19.9	19.8
Namibia	26.8	26.1	25.4	23.7	23.5	25.1	27.6	29.8	29.5	29.2	26.3	28.6	32.9	30.9	33.2	33.3	30.5	31.2	29.8	30.2
Seychelles	26.2	25.2	25.9	30.8	27.3	25.9	24.3	23.0	23.6	25.4	31.9	37.0	34.7	29.2	30.9	30.3	32.6	31.7	32.1	32.0
South Africa	21.9	22.4	22.0	21.6	25.4	26.9	28.4	28.8	27.9	23.0	26.4	26.6	27.0	27.5	28.1	28.9	28.7	28.5	29.2	25.2
Swaziland	21.3	21.0	20.6	22.0	25.9	25.7	34.5	31.4	33.5	28.7	19.9	20.2	29.4	28.0	27.1	26.3	23.2	26.4	24.0	24.3
Tanzania	7.7	8.0	8.1	8.3	8.7	9.2	9.5	10.8	11.1	11.1	10.9	11.0	11.4	11.7	11.6	11.8	12.2	12.3	11.8	12.1
Zambia	17.2	16.6	15.4	15.2	15.3	14.7	13.6	14.4	14.4	12.2	13.1	15.8	14.7	14.1	15.5	14.4	13.0	14.8	15.7	14.5
Zimbabwe	7.5	7.2	7.9	7.5	6.2	10.0	6.2	2.5	1.9	9.1	17.2	18.9	19.2	17.9	18.0	17.8	15.6	13.2	11.8	13.5

Notes. Compiled using data adapted from the IMF (2022) database

2.3.2 Tax structures

In the previous section, I analyzed the tax performance of SADC countries in terms of tax levels. However, there is a chance that the changes in tax ratios are a due to the changes in the tax structure. Therefore, in this section, I analyze the tax structures of member countries' major tax categories. Table 3 shows member countries' tax categories and their contribution to total tax revenue for some selected years.

Table 2:

SADC member countries' tax categories (% of total revenue 2006 -2020)

Country	Category of tax (% of revenue)	2006	2008	2010	2012	2014	2016	2018	2020
Angola	Tax on income, profits & capital	43.19	48.74	34.15	31.92	30.66	42.41	32.78	-
	Taxes on international trade	2.25	3.79	3.78	2.51	4.12	3.44	2.71	-
	Taxes on goods and services	3.55	4.85	6.01	3.75	5.17	8.06	4.85	-
	Other taxes	1.73	2.74	3.49	2.74	3.90	8.00	3.53	-
Botswana	Tax on income, profits & capital	25.12	26.56	29.40	24.01	28.44	29.28	28.23	27.21
	Taxes on international trade	24.16	25.54	19.50	34.19	28.10	20.54	27.68	33.36
	Taxes on goods and services	8.83	15.21	15.39	13.31	10.73	12.12	14.66	16.69
	Other taxes	0.06	0.08	0.11	0.12	0.10	0.10	0.13	0.12
Lesotho	Tax on income, profits & capital	14.64	16.92	21.65	17.87	20.97	26.52	25.44	38.55
	Taxes on international trade	17.85	16.17	8.65	13.62	14.47	9.65	10.55	0
	Taxes on goods and services	29.74	28.24	24.04	27.45	30.54	28.64	30.79	31.71
	Other taxes	0.13	0.09	0.05	0.01	0.01	0.01	0.00	0.00
Madagascar	Tax on income, profits & capital	9.24	17.03	19.03	19.77	17.97	17.99	18.13	20.13
	Taxes on international trade	24.78	32.28	10.21	11.72	10.34	10.97	11.84	11.27
	Taxes on goods and services	11.91	16.81	39.73	50.43	46.63	41.67	42.51	41.08
	Other taxes	3.75	0.76	0.14	0.12	0.08	0.28	0.32	0.08
Malawi	Tax on income, profits & capital	-	-	26.36	35.24	35.61	38.25	42.02	40.04
	Taxes on international trade	-	-	5.85	6.97	7.98	6.87	7.57	6.69
	Taxes on goods and services	-	-	30.48	36.71	35.86	33.76	37.82	37.78
	Other taxes	-	-	0.12	0.15	0.09	0.07	0.04	0.07
Mauritius	Tax on income, profits & capital	17.47	18.16	19.94	17.95	18.81	19.24	20.75	23.94
	Taxes on international trade	16.83	11.43	2.18	1.85	1.36	1.35	1.20	1.07
	Taxes on goods and services	48.72	52.66	55.06	58.48	56.64	56.01	58.09	54.76
	Other taxes	0.55	0.72	1.98	1.80	2.87	2.48	1.87	2.10
Mozambique	Tax on income, profits & capital	-	-	20.71	29.55	35.50	35.77	39.80	37.82
	Taxes on international trade	-	-	4.68	5.48	6.74	7.13	6.60	5.76
	Taxes on goods and services	-	-	35.66	34.28	31.48	37.00	33.47	30.65
	Other taxes	-	-	1.41	1.57	2.37	6.10	5.04	6.79
Namibia	Tax on income, profits & capital	32.29	34.45	42.41	38.26	35.59	40.40	35.44	40.29
	Taxes on international trade	38.11	36.29	25.57	36.31	36.27	27.59	28.18	40.23
	Taxes on goods and services	19.16	19.31	23.60	18.06	21.61	25.07	22.06	17.64
	Other taxes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Seychelles	Tax on income, profits & capital	12.72	15.82	26.36	27.88	30.07	29.44	32.47	-
	Taxes on international trade	11.47	12.39	17.98	20.90	6.42	5.10	3.80	-
	Taxes on goods and services	35.15	35.96	38.27	32.32	48.69	48.15	47.69	-
	Other taxes	0.00	0.00	0.00	0.00	0.00	0.00	1.51	-
South Africa	Tax on income, profits & capital	50.51	54.45	48.52	48.20	46.95	47.96	48.48	46.25
	Taxes on international trade	4.23	3.16	3.40	4.07	3.37	3.26	3.66	2.98
	Taxes on goods and services	34.43	31.35	34.75	34.17	32.77	32.82	34.17	33.18
	Other taxes	1.33	1.24	1.22	1.32	1.31	1.24	1.32	0.98
Tanzania	Tax on income, profits & capital	-	-	18.53	24.28	31.94	32.50	26.32	-
	Taxes on international trade	-	-	5.22	5.87	6.46	8.93	6.74	-
	Taxes on goods and services	-	-	31.85	38.63	39.72	44.06	43.01	-
	Other taxes	-	-	7.33	2.51	2.92	3.18	2.38	-
Zambia	Tax on income, profits & capital	35.31	32.78	39.84	42.41	34.61	34.02	35.96	40.84
	Taxes on international trade	9.12	9.91	7.75	8.40	5.95	4.39	5.63	4.97
	Taxes on goods and services	32.76	31.88	29.79	29.80	42.65	27.86	38.00	29.15
	Other taxes	0.00	0.00	0.00	0.72	0.97	1.10	1.64	2.24
Zimbabwe	Tax on income, profits & capital	-	-	29.98	32.14	-	32.62	33.32	-
	Taxes on international trade	-	-	30.90	19.49	-	7.72	7.66	-
	Taxes on goods and services	-	-	28.96	35.81	-	46.78	41.23	-
	Other taxes	-	-	0.00	0.00	-	2.78	6.67	-

Notes. Compiled using data adapted from the World Bank (2022) database

Table 2 shows that Botswana, Lesotho, and Namibia rely more on trade taxes, even though Botswana's major share of tax revenue comes from a combination of both income and trade taxes. This could be attributed to their SACU membership together with Eswatini and South Africa. However, their major trading partner South Africa does not rely much on trade taxes but rather on income and consumption taxes. Other countries that are heavily reliant on income and consumption taxes in the region are Malawi, Mauritius, Mozambique, and Zambia. Angola's income tax contributes more to the total revenue than the combination of trade, consumption, and other taxes. Another notable feature of SADC's tax structure is that Tanzania, Zambia, and Zimbabwe derive more revenue from indirect taxes than direct taxes unlike Malawi, Mozambique, and South Africa whose direct taxes contribute more to total tax revenue.

From the analysis, it is clear that SADC has diverse tax structures which could be one of the reasons why the harmonization of indirect taxes has been somehow difficult to attain. Approximately half of SADC members depend on direct or trade taxes. This also explains why the total move from trade to consumption taxes and the formation of an FTA has not been possible yet. Over the period 2000 to 2020, all other countries have not had substantial changes in their tax structures except for Seychelles which shifted from over-dependence on trade taxes goods and services levies. Nevertheless, it may still be argued that the diversity in tax structures may explain the variations in the amount of taxes collected.

2.3.3 Major tax forms and their performance

Although there are numerous taxes, the assessment of tax systems in this study only draws attention to the major tax forms[3] that are most common in the region. The first major tax

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[3] The major forms are Personal Income Tax (PIT), Value Added Tax (VAT), Corporate Income Tax (CIT), Excise Tax, and Import Tariffs.

revenue form is the CIT – corporate taxes on profits, which is found in all the SADC countries. Robinson (2005) argues that CIT is more prone to double taxation but member states have their ways of dealing with the issue. The second form is PIT – the taxes levied on personal incomes. In SADC, PIT is more effective in the formal than the informal sector because member countries extensively use withholding taxes except for Seychelles which does not have a payroll system (Robinson, 2005; Chigome & Robinson, 2021). However, the efficacy of PIT in mobilizing tax revenues in SADC is being hampered by limited financial inclusion and the high growth of the informal sector. Bird and Zolt (2014) also note that as VAT took the center stage the role of PIT in SADC and other developing countries became compromised.

The third major form of tax is the VAT which was introduced as a replacement to trade taxes and to enhance the mobilization of revenue. Most SADC countries introduced VAT systems in early 2000 or before 2000 (Quak, 2018) except for Angola which introduced the system in 2019. Although SADC has committed to cooperation and coordination on VAT, the move towards harmonization is being challenged by variations in tax policy mixes due to the differences in economic and political structures. The fourth one is an excise duty which is charged on specific goods such as alcohol, energy, etc. Excise duties are charged for two reasons: to initiate behavioral change and/or mobilize tax revenue. SADC also has some guidelines on harmonizing excise duty on particular goods like alcohol. However, unique challenges befalling member countries force them to deviate from implementing the guidelines. For instance, the case of fuel shortage in Zimbabwe has always made the country deviate from the regional guidelines. Import tariffs form the last major form of taxes. As the region is moving towards an FTA, the reliance on import duties has never been common in the region due to the envisaged potential revenue losses.

As previously pointed out that there is a possibility of having tax levels being influenced by existing tax structures and systems, it is important to also extend my analysis to review the member countries' current tax rates on these major taxes and their performance against some benchmarks found in literature as best practices or ideal tax structures and systems. Table 3 gives a summary of the tax rates on major tax forms and the performance of these tax forms.

Table 3:

SADC member countries' tax rates and performance of the tax forms (2020)

	SADC MEMBERS[4]												
Indicator	RC	MC$_1$	MC$_2$	MC$_3$	MC$_4$	MC$_5$	MC$_6$	MC$_7$	MC$_8$	MC$_9$	MC$_{10}$	MC$_{11}$	MC$_{12}$	MC$_{13}$
Tax rates														
VAT (standard %)	15	14*	12	15	20	16.5	15	17	15	15	15*	18*	16	14.5*
CIT (standard %)	≤35	20*	22	25*	20	30	15*	32	32*	33*	28*	30	35	24*
PIT (standard %)	≤35	17*	25	30*	20*	30	15*	32	37	15	45*	30	37.5*	40*
Performance against the set benchmark														
CIT (% of total revenue) ≥35	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Trade taxes (% of total revenue) > 20	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No
Progressive PIT rate (%)	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Indirect taxes > direct taxes	Yes	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes
Recurrent expend. > capital expend.	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wages & salaries (% of total spending) <10	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
Provision of tax incentives to attract FDI	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes. Compiled using data adapted from the World Bank (2022) database and ATAF (2021)

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[4] RC is the regional comparator, MC$_1$ is Angola; MC$_2$ is Botswana; MC$_3$ is Lesotho; MC$_4$ is Madagascar; MC$_5$ is Malawi; MC$_6$ is Mauritius; MC$_7$ is Mozambique; MC$_8$ is Namibia; MC$_9$ is Seychelles; MC$_{10}$ is South Africa; MC$_{11}$ is Tanzania; MC$_{12}$ is Zambia; MC$_{13}$ is Zimbabwe
*Significant changes in tax rates

In Table 3 tax rates marked * denotes cases for which the tax rates changed over the period 2000 to 2020. With the new VAT system adopted in October 2019, Angola raised its standard VAT rate from 10% (2004-2018) to 14% (2019-2020). The PIT rate which was 15% (2004-2009) was also increased to 17% (2010-2020), though in 2021 the rate was further increased to 25%. The CIT rate which was initially 35% (2004-2014) was also cut to 20% (2015-2020) and then further cut to 25% in 2021.

Zimbabwe cut its standard VAT rate in 2020 from 15% (2012-2019) to 14.5%. The current standard CIT rate is 24% which was being applied since 2020. However, from 2017 to 2019, a CIT rate of 25% was applied, a cut from 25.75% (2012 – 2016) and 30.9% (2006-2012). For PIT the country made a lot of adjustments since 2004. The PIT rate of 46.4 (2004) was cut to 36.05 (2006); raised to 48.93 (2007-2008); reduced to 36.05% (2009-2011); raised to 46.35% (2012); then reduced to 45% (2013-2014). From an increased PIT rate of 51.5% (2015-2018) the rate was reduced to 45% (2019) and further reduced to 40% (2020).

South Africa raised its VAT system from 14% (2006-2017) to 15% (2018-2020) and this new rate is currently in use as well as its standard PIT rate from 40% (2004-2016) to 45% (2017-2020). On the other hand, the CIT rate of 37.58% (2001-2005) was reduced to 36.89% (2006-2007); further cut to 34.55% (2008-2012), and further cut to 28% (2013-200). Lesotho reduced the CIT rate from 35% (2004-2006) to 25% (2007-2020); reduced the PIT rate from 35% (2006-2014) to 30% (2015-2020) and increased the VAT rate from 14% (2003-2017) to 15% (2018-2020).

The rest of the countries have almost constant rates over the period with only slight changes for a few countries. Zambia increased the PIT rate from 35% to 37.5% starting in 2017 while Madagascar lowered the PIT rate from 30% (2007-2009) to 23% (2010) and further lowered it to 20% (2013-2020). Mauritius lowered the CIT rate to 15% (2008-2020) from 25% (2002-2007) and 35% (2000) and its PIT rate from 30 (2004-2007) to 15 (2008-2020). Then Namibia only lowered its CIT rate from 34% (2011-2012) to 33% (2013-2015) and 32% (2016-2020). Similarly, Seychelles only altered the CIT rate over the period from 40% (2004-2007) to 33% (2010-20). Tanzania only made changes to its VAT rate from 20% (2006-2008) to 18% (2010-2020).

Figure 4:

Variations in the current CIT and PIT rates
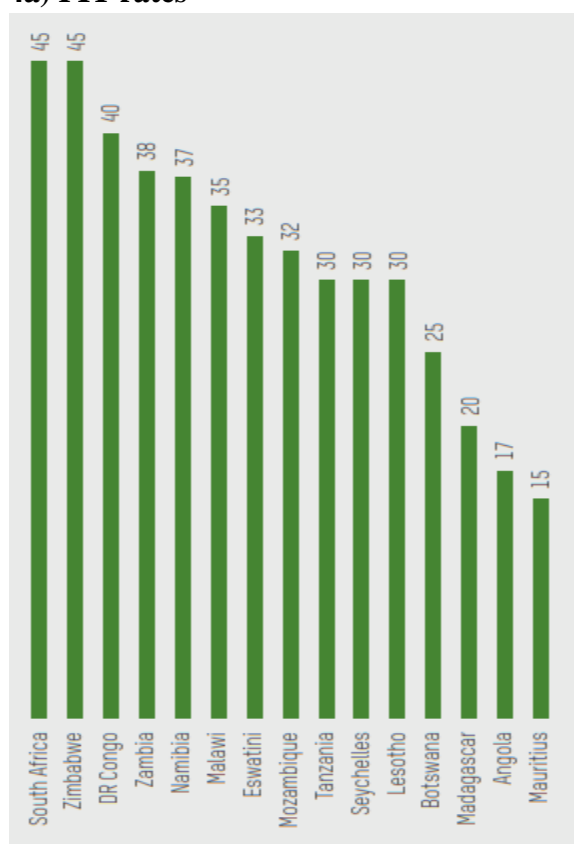
4a) PIT rates   **4b) CIT rates**
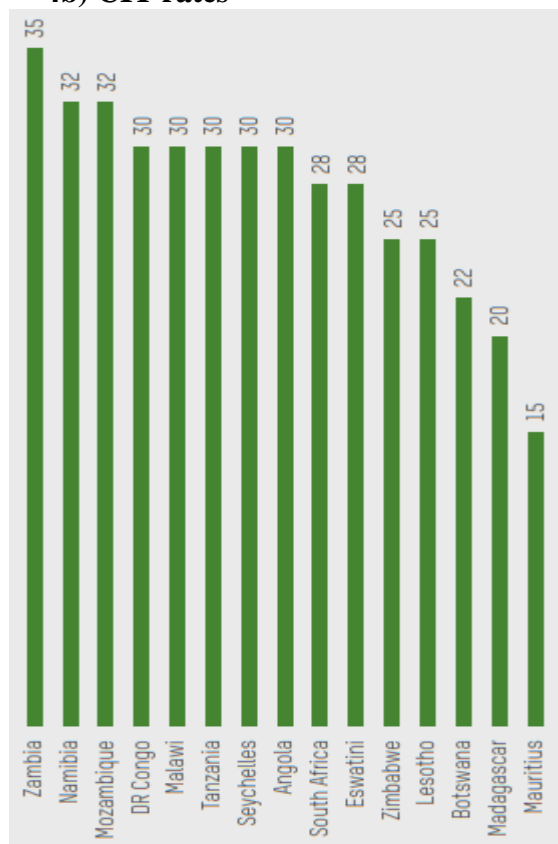
Notes. Adapted from ATAF (2021)

The above analysis of member countries' standard tax rates on CIT, PIT, and VAT reveals that there are some significant changes in tax rates over the period for most members which may also explain the variations in tax levels. In terms of the benchmarks, it is clear that regardless of the tax level variations, SADC's tax systems are more inclined towards serving recurrent expenditure as opposed to capital expenditure which increases the necessity for mobilizing extra tax revenues. Furthermore, the tax rates vary significantly across member states as shown Figure 4 and b as at December 2021.

2.3.4 Regional comparison of major tax forms

Figure 5 shows the regional analysis of the contribution of these taxes to total revenue and how SADC compares with other RECs [for a detailed country analysis see ATAF (2021)]. According to the ATAF (2018; 2019), the major tax in all the RECs is VAT. The VAT contribution to total tax revenue in SADC stood at 35% while PIT the second largest contributor stood at 23% in 2016. The third tax revenue contributor in SADC is corporate tax income. However, for ECOWAS the second-largest contributor to the total tax revenue region is customs taxes accounting for 17% in 2016. For EAC excise taxes seem to be much more important accounting for 15% of total revenue compared to less than 10% in other regions in 2016. ATAF (2019) reports that in 2017 the contribution of VAT to total tax revenues rose by 2% from the 2016 figure while the contribution of PIT fell by 1% as shown in Figure 4. In addition, the contribution of CIT to total tax revenues increased by 1% while other taxes lost 2%.

Figure 5:

Tax to GDP ratios, per tax type: Regional Analysis 2017

Region	VAT	PIT	CIT	Excise	Import Duty	Other Customs	Other DT
ATO Average	34%	17%	15%	8%	10%	4%	11%
ECOWAS	33%	13%	14%	6%	16%	6%	13%
EAC	33%	17%	11%	16%	8%	9%	6%
SACU	39%	29%	21%				7%
SADC	37%	22%	17%	0%	5%		9%
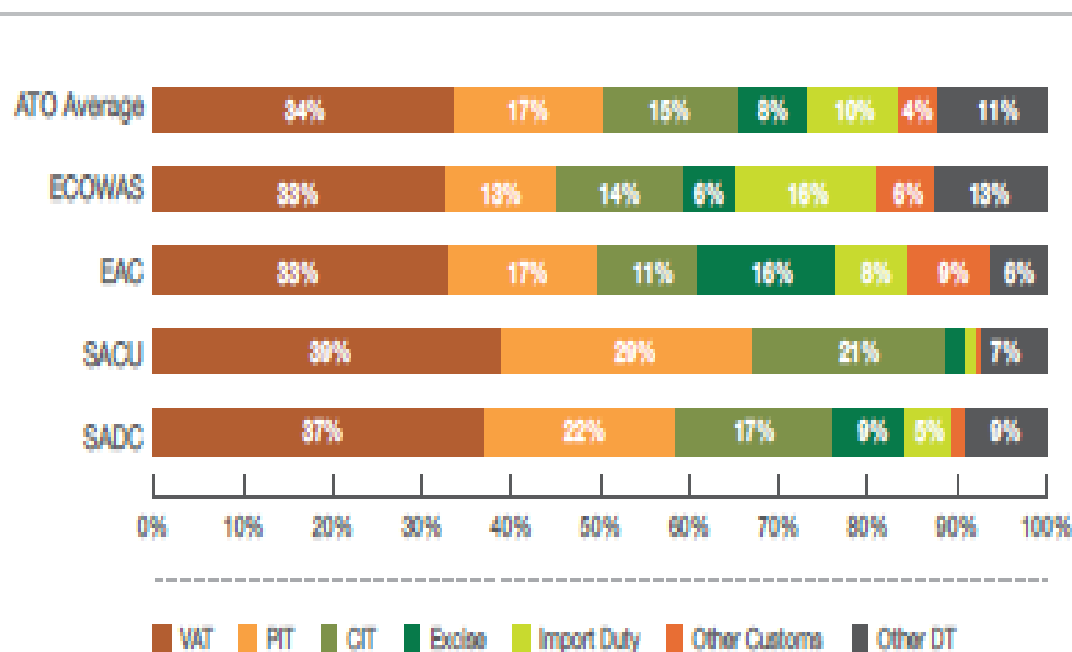
Notes. Adapted from African Tax Administration Forum (2019)

2.4 Macroeconomic convergence criteria

To optimize domestic resource mobilization, countries need stable macroeconomic environments. In this regard, the European Union (EU) and other regional blocs in SSA like ECOWAS have established some macroeconomic convergence criteria to motivate members to endeavour to achieve macroeconomic stability. Likewise, SADC adopted a regional strategy – RISDP in 2003 with a framework covering 2005 – 2015, followed by another one covering 2015 – 2020, and the current one covering 2020 – 2030 in which six macroeconomic convergence standards have been set. Through the Memorandum of Understanding (MOU) on Macroeconomic Convergence signed on 8 August 2002, the then member states (14 countries) agreed to converge to a macroeconomic environment with similar policies on inflation, budget deficits, public debts, foreign reserves, and current accounts. A macroeconomic convergence surveillance unit was also established to support the process through the provision of policy

guidance and advice to SADC members. Unfortunately, SADC has not yet set a convergence criterion for tax ratio like other regional communities (RECs) like ECOWAS did, despite the prevailing call for mobilizing domestic funds to fund public programs as opposed to over-reliance on external resources. Table 4 shows the existing convergence targets for SADC from 2008 to 2021.

Table 4:

SADC's convergence targets 2008 – 2018

Criterion Issue	2008	2012	2015	2018	2021
Inflation rate	One-digit inflation rate	5%	5%	3%	3%
Budget deficit	≤ 5% of GDP	≤ 3% of GDP as anchor toward 1%	≤ 3% of GDP as anchor toward 1%	≤ 3% of GDP as anchor toward 1%	≤ 3% of GDP as anchor toward 1%
Public debt	≤60% of GDP	≤60% of GDP	≤60% of GDP	≤60% of GDP	≤60% of GDP
Current account balance (% of GDP)	≤9% of GDP	≤9% of GDP	≤9% of GDP	≤3% of GDP	≤3% of GDP
Foreign reserves	Three months' import cover	>6 months import cover	>6 months import cover	>6 months import cover	>6 months import cover
Central bank credit to the government	<10% of last year's tax income	<10% of last year's tax income	<5% of last year's tax income	<5% of last year's tax income	<5% of last year's tax income

Notes. *Compiled from data adapted from Kumo (2011) and Rossouw (2017)*

According to the SADC Annual Report 2021/2022, only two members have achieved all three primary standards (inflation rate, budget deficit, and public debt) in 2021 and these are the

Tanzania and the DRC. Similarly, in 2020, only DRC and Tanzania are reported to have attained all the set primary targets. This is a decline from the 2019 results in which 5-member states (Tanzania, DRC, Seychelles, Madagascar, and Lesotho) attained the set macroeconomic convergence standards. Over the period 2019 to 2020, none of the member countries managed to attain both secondary targets (economic growth and international reserves). According to the summary results of 2015 presented by Chigome and Robinson (2021), on average member states seem to be fairly performing in primary than secondary criteria [For more details on the analysis see Chigome and Robinson (2021, p.100); see also Rossouw (2017, p.8)]. It is, however, difficult for member states to adhere to the set convergence standards for two reasons. Firstly, SADC members have diverse economies hence policy positions taken to address the different national development needs tend to differ; secondly, member countries face different external shocks hence the need for flexibility in implementing policies (Kumo, 2011; Mainza, 2017). Therefore, it may be argued that the lack of an enabling macroeconomic environment is limiting tax revenue mobilization in the region.

2.5 Conclusion

From this chapter, three issues emerge. First, the tax performance of member countries in terms of tax levels is characterized by low, heavily fluctuating, and slowly growing trends. Second, the tax structures and systems in the region are very diverse and characterized by substantial changes in tax rates. Third, SADC is far from meeting the set macroeconomic convergence targets. Given this background, it is clear that the issue of low tax ratios in the region requires an in-depth analysis of tax capacity and tax effort issues to check if there are some deficiencies

CHAPTER THREE

SCHOLARHIP REVIEW

3.1 Introduction

This section reviews the scholarship on tax revenue performance from those I consider to be in the spirit of this work since the 1990s to the most recent ones in 2021, to the best of my knowledge. Numerous studies among the growing body of literature on tax revenue performance assessment argue that tax policy design and reform should be informed by the level of taxable capacity and tax effort (Dalamagas et al., 2019; McNabb et al., 2021; see also Ghura, 1998; Bird; et al. 2008). In this regard, I constrain this literature review to those studies that tax capacity and tax effort in their assessment. I also limit my focus to cross-country studies excluding studies of singles members of SADC since this research paper ivolves regional analysis. Before delving much into the discussion on the findings and contributions of these previous empirical works, it is prudent to define key concepts.

3.2 Definition of Key Concepts

3.2.1 Tax

How is tax defined in economic terms? OECD (1996) claims that "the term taxes is confined to compulsory, unrequited payments to general government" (p.2). However, James and Nobes (1998) raised two concerns about this definition. First, the word unrequited means that whatever government provides in return is proportionate to the taxpayer's payments yet in most cases the benefits extended to the public are not in proportion to the taxpayer's payments. Second, they argue that the phrase general government is problematic since what constitutes general government varies from country to country. Therefore, James and Nobes defined taxes as compulsory levies made by the public to the government. Nevertheless, Messere and Owens (1987) argued against the use of the word compulsory since some payments are compulsorily paid by the public but not classified as taxes e.g. passport fees. According to OECD (2021),

tax revenues are described as the funds collected from levies on personal and corporate incomes and fees charged on business profits, goods, and services as well as owning and transferring property, payroll taxes, and so on. These collections can either be direct (imposed directly on the persons liable) or indirect (imposed on goods and services). This paper adopts the definition by OECD (2021) which is used by many international organizations such as ILO, Eurostat, etc for statistical standardization.

3.2.2 Tax Capacity

Defining tax capacity has not been an easy task. Many researchers have defined tax capacity in various ways (see Stern, 1989; Berry & Fording, 1997; Le et al., 2012). According to Berry and Fording (1997), tax capacity is the capability of the government to fund its public expenditure through taxes, but Ahmad and Stern (1989) argue that taxable capacity is the capability of people to pay taxes and the government's capacity to collect those taxes. The former definition explains the capability in terms of the use of the tax resources while the latter explains the capability in terms of mobilizing the tax resources. Although both acknowledge the existence of maximum potential, they do not show what could be limiting the achievement of that maximum. Therefore, Le et al. (2012) defined it as the estimated tax ratio which is obtained through regression having considered a country's economic, institutional, and demographic characteristics among others. This paper adopts the definition by Le et al. (2012) which reflects the capability of citizens and businesses to pay taxes and the government's capacity to collect these tax resources given the existence of various hindrances.

3.2.3 Tax effort

How is tax effort defined? Tax effort indicates the degree to which countries use their tax capacity (Ahmad & Stern, 1989; Kim, 2007; Fenochietto & Pessino, 2013). Cyan et al. (2013)

add that tax effort is "the ratio between actual tax collection and potential tax or revenue [which] serves as an effective indicator and point of departure for tax reforms and as an enduring indicator of the sufficiency of government revenues" (p.5). There is consensus among researchers in defining tax effort as a ratio of the actual value to the predicted value although the methods of estimating the predicted value vary. A tax effort index greater than 1 or below 1 implies fully utilized capacity or underutilized tax capacity respectively.

3.3 Theoretical Literature Review

The examination of how taxes are determined and how the countries perform in mobilizing them in developing countries has been heavily underpinned by three main approaches: economic, administrative, and political. According to Di John (2006), the economic and administrative approaches have widely informed the research on tax performance determinants and policy debates on tax reforms in developing countries. Therefore, in this paper, I briefly describe the economic, administrative, and political approaches (but for more information on these approaches see Di John, 2006; see also Chigome & Robinson, 2021) for detailed information on how political factors have been influencing tax performance in SADC). Nevertheless, in an attempt to offer more practical policy options for optimizing tax revenue mobilization, this paper also considers the influence of external shocks on tax revenue performances.

3.3.1 Economic Approach

The economic approach focuses on understanding tax system structures and fiscal reforms adoption by assessing the equity-efficiency trade-off (Di John, 2006). The traditional point of view of tax design has always been to ensure that it is possible to finance public expenditure most efficiently and equitably. In this regard, governments tend to raise taxes in a distortionary

way. Two ways are suggested for judging tax systems - Di John suggests a general equilibrium framework while IFS (2010) proposes optimal theory as it includes the effects of tax systems on distribution and efficiency.

Apart from examining the equity-efficiency trade-off, the economic approach also investigates the impact of the development level and structure of the economy on how much is collected and how the tax structure is designed. For instance, low-income countries are made up of huge share of agriculture, a high degree of informality, and many small establishments giving rise to small wages as well as limited total consumer spending. These factors minimize the countries' chances of depending on certain types of taxes like PIT but rather depend on indirect taxes which reduce tax collection capacity. Although this approach gives insights into the economic determinants of tax collection, it ignores the influence of institutional and political factors on governments' capability in creating and implementing taxes. Furthermore, the economic approach does not give explanations on why tax structures can vary in comparable economies. Therefore, this paper also adopts other approaches to shed light on taxation performance in SADC.

3.3.2 Administrative Approach

The administrative approach focuses on explaining the factors that influence governments' capability in collecting tax revenues from an institutional design point of view. Thus, the central focus is on finding ways to improve the efficacy and efficiency of the systems through changes in institutional arrangements (Bird, 1989). Bird asserts that effectiveness is defined as the extent of predictability, transparency, and enforceability of tax systems by a fair judiciary while efficiency refers to all the administrative costs arising from collecting various taxes and costs in ensuring compliance and tax laws enforcement. The recommendation from the

approach is that tax rates and tax laws should be simplified while revenue authorities are made independent for enhancing capabilities in tax collection. It is therefore argued that the formulation of tax reform policies without paying particular attention to administrative issues is misleading. Although this approach touches base on administrative limitations to tax performance, it is criticized for not shedding light on three issues. First, the approach fails to explain why and how bureaucratic capacities change. Second, it does not explain why there are variations in countries' tax capacities. Third, although it acknowledges the need for legal instruments, it does not explain why there is little or no enforcement of good tax policies.

3.3.3 Political approach

The political approach posits the variations in countries' taxation patterns and revenue mobilization efforts are a product of history. Di John (2006) argues that the historical view clearly shows that the way states are formed, their growth capacities, and survival capabilities determine their abilities to tax and collect revenue. Di John also argues that political managements also have important roles in taxation such as mediating conflicts between interest groups, linking the state to the civilians, providing political support for tax policy implementation, and advocating for the provision of quality public goods and services and tax breaks when necessary. Therefore, the type of political system determines the nature of the tax systems in a country. For example, countries run by left parties tend to back higher tax levels and progressive tax systems unlike governments run by conservative parties. The political approach also cast light on the resource curse-taxation nexus as well the effect of colonials' legacies on tax systems and structures. Thus, the analysis of tax performance based on economic factors, institutional frameworks, and other technical issues is not complete because it does not consider political issues.

Therefore, the paper argues that these three approaches – economic, administrative, and political contexts have a complementary role in explaining why tax capacity varies across countries including those in the same region. Therefore, in assessing tax revenue performance for SADC countries, factors from all three categories have been incorporated into the statistical models.

3.4 Empirical Literature Review

3.4.1 Approaches to Assessing Tax Revenue Performance

Having defined the key concepts, it is important to also review the approaches that have been used to assess tax revenue performance using tax capacity and tax effort. Measuring tax revenue performance has been a challenging task both in theory and empirically. There are two broad estimation methods – the average tax ratio and the potential tax revenue. The former, according to Lanford & Ohlenburg (2016), takes the share of tax in GDP to be a fair proxy gauge of tax effort to make comparisons across countries or with regional averages. However, this is only sensible when intending to make comparisons of tax performances for countries that are in the same income group and have identical economic, demographic, and institutional structures. The latter, however, acknowledges country-specific differences and hence uses multiple regression in estimating potential tax capacity, then calculating tax effort. Potential tax capacity and tax effort indices estimated in this manner provide a better measure of tax performance (Le et al, 2012).

Using the potential tax revenue method, many researchers have estimated tax capacity and tax effort using various approaches which include the traditional/ standard regression (see Cyan et al. 2013; Crivelli & Gupta, 2014; Chang et al., 2020), stochastic frontier analysis (see Fenochietto et al., 2013, Lanford & Ohlenburg, 2016; Maweje & Sebudde, 2019; Chigome &

Robinson, 2021), budget balance (see Cyan et al., 2013), utility maximization (see Dalamagas et al., 2019) and the welfare maximization (see Leuthold, 1991; Ghura, 1998). These approaches tend to only differ in how they estimate potential tax capacity but have a similar way of calculating the tax effort indices. In this literature review, I only explain in detail the two approaches that inform the methodology adopted in this study (but for a detailed discussion on all these approaches see, Cyan et al. 2013; Dalamagas, 2019).

The standard regression approach models the tax ratio to be explained by proxy variables of the tax base and economic structure and through that regression analysis potential tax revenue is estimated (Akitoby et al. 2020). The method considers economic and structural features that are probable to affect tax capacity forming the basis for comparing the size of government revenue across member states given differences in taxable bases (Cyan et al., 2013). Although this approach yields a clear indicator, it has limitations in fully informing policy since the economic and structural determinants considered are usually not responsive to change in the short term. However, the model can be extended to include some tax instruments to explain tax effort variations in the short run and the role of institutions in determining tax capacity though the data for institutional variables is highly subjective (Bird et al., 2008). This study adopts the modified model to capture the influence of governance quality on tax revenue performance.

The SFA uses a function that estimates the possible revenue that nations could gather from given packages of defining factors allowing for the estimation of technical inefficiency in collecting revenues and the investigation of contributing factors (Dalamagas et al., 2019). Thus, unlike the standard regression which assumes that all countries are at the same level of technical efficiency, SFA distinguishes between different levels of technical inefficiencies by various member states. The analysis is done in two stages: firstly, tax effort is modeled using the SFA,

and secondly, the model identifies the determinants of inefficiencies in tax effort such as corruption (Battese & Coelli, 1992; Pitt & Lee, 1981). The SFA is useful for interpreting specific institutional factors which constrain tax efforts. However, just like the regression method, the tax gap estimated does not have a close link with the country's revenue needs (Cyan et al., 2013). Therefore, there is a need for using complementary methods like the budget balance approach which estimates country-specific revenue targets to inform clear national tax reform policies. To the best of my knowledge, only one study (Chigome and Robinson, 2021) has covered SADC in the same context as this study, therefore instead of estimating another model using SFA, I compare my results with the findings of Chigome and Results to check the validity of our findings.

3.4.2 Assessment of Tax Revenue Performance

There is a growing body of literature on tax revenue performance assessment drawing attention to the guesstimate of tax capacity and tax effort and finding the determinants (see Le et al., 2012 – developing countries, Coulibaly & Gandhi, 2018 – SSA; Dalamagas et al., 2019 – sample of 30 developed countries; Korsu, 2021 – ECOWAS; McNabb et al., 2021 – both low- and high-income countries). This idea of assessing tax revenue performance through the estimating tax capacity and tax effort was first pioneered by Lotz and Morss (1970) who made the first attempt to explain differences in tax effort by examining the difference between the actual and potential tax collections obtained through a regression model. This was then followed by Bahl (1971) who made the first attempt to separate tax revenue performance determinants into those that influence tax capacity and those that influence tax effort. Thereafter, the tax effort scholarship gained impetus within the IMF giving rise to influential empirical works such as IMF (1971; 1975; 1979). However, the focus on the SADC region as

a whole was somehow non-existent. In all these earlier studies and the current studies, three strands of literature emerge on factors that determine tax ratios.

The first strand of the empirical works draws attention to the role of economic and structural factors and concludes that GDP per capita, trade openness, size of the agriculture sector and other economic sectors, degree of the informality of economic activities, reliance on foreign aid, financial deepening, natural resource endowment and rate of inflation remains useful in explaining tax capacity (e.g., Dalamagas et al., 2019; Chigome & Robinson, 2021). The second strand of scholarship sheds more light on the key role of institutional variables such as corruption level, degree of accountability, and government effectiveness in tax collections though there is no consensus on the exact variables that could be good proxies (e.g., Langford & Ohlenurg, 2016; see also Ghura, 1998; Bird, 2006). The third strand of literature cast light on the importance of demographic variables in tax revenue collections (Bird et al., 2004; Cyan et al., 2013; Maweje & Sebudde, 2019). However, there is also no unanimity on which variables would be the most suitable, though population structure, degree of urbanization, and education level are significant factors.

Although many studies focused on an analysis of low-and high-income countries or a comparison of the developed and developing, this literature review discusses in detail cross-country studies in Sub-Saharan Africa (SSA) to bring the context closer to the scope of this study. Most studies were using the OLS to assess the tax effort but Leuthold (1991) was the first one to switch to an autoregressive model for a panel of 8 African countries. Leuthold included foreign gifts and grants to the explanatory variables used in previous studies and still found similar results. Stotsky and WoldeMariam (1997) chose to use the fixed effects model for a panel of 43 SSA countries in examining tax efforts covering a period from 1990 - 1995.

Their results also confirmed those of previous studies except for the nexus between the share of mining and tax effort which was found to be negative which is contradictory to previous studies which found a positive relationship (cf. Ghura; 1998).

Ghura (1998) also contributed to the discussion by investigating the effect of corruption on tax revenue collection which was a shift from the previous studies which mainly focused on economic and structural factors. Ghura also added some variables to capture the impact of economic policies (inflation level, changes in exchange rate, and structural reforms) and human capital measures. The period of study was from 1985 to 1996 for 39 SSA countries. Corruption and inflation are found to have negative association with tax ratio while structural reforms and the human capital index are found to be positively related to the tax ratio. The study also found that the CFA Franc dummy had a negative influence on the tax ratio suggesting that some regional factors may influence tax collections hence the need for further analysis at the regional bloc level.

Coulibaly and Gandhi (2018) analyzed tax revenue performance in Africa by estimating the tax capacity and efficiency of 41 SSA countries using the SFA covering the period 2000 to 2015. The study finds that the low tax revenues in the region are attributable to a low tax capacity of 20% of GDP and inefficiencies in collections, thus, an estimated tax efficiency score of 0.78 on average. The tax capacity and tax efficiency scores are far lower than the OECD. Therefore, to close the lacunae between developing and developed countries there is a need for tax policy reforms to address tax capacity and tax effort issues. According to Coulibaly and Gandhi, the tax capacity in SSA is largely determined by the level of economic development, the degree of informality, and the composition of economic sectors while tax efficiency is determined by governance factors such as the level of corruption and the degree

of democratic accountability. Coulibaly and Gandhi predict that increasing tax efficiency to 1 (short-term intervention) can help African countries to increase their tax revenues by 3.9% of GDP.

Caldeira et al. (2019) extended the period of tax effort analysis and began their analysis from 1980 – 2015 covering 42 SSA countries using SFA. They managed to separate revenue from natural resources from that of other revenue sources. The study finds that on average 13.2% of GDP is being collected by SSA countries in other economic sectors and the estimated average tax effort is 0.57. Thus, if tax potential is fully used the countries could raise taxes worth about 23.2% of GDP from these non-resource sectors. In line with other studies, they also find that economic development levels and financial development levels and how open the economy are significant determinants for non-resource tax revenue collections. Natural resource and the share of agriculture are found negatively impacts non-resource tax collections.

Given the heterogeneity of the African economies, it is important to check the state of play for African subregions than generalize. In this regard, Korsu (2021) investigates the factors determining non-natural resource tax revenue collections in the Economic Community of West African States (ECOWAS) region and estimates the efficiency. Using the SFA via the maximum likelihood approach Korsu examines 15 ECOWAS member states covering a period from 2001 to 2015. The study finds that the member states with high natural resource taxes have lower efficiency in tax collection hence the need for tax authorities to restructure their tax policies to favor direct taxes, not the natural resources taxes that are more volatile. This dimension taken by Korsu is relatively less common in literature in SSA because the study specifically focused on a regional bloc and non-natural resource tax only which is argued to be more reliable for informing effective tax policy. Although this is a regional bloc study results

for SADC could be different from ECOWAS hence the need for assessing tax revenue performance in SADC.

Chigome and Robinson (2021) assess tax revenue performance in SADC by estimating the tax capacity and tax effort using SFA via the maximum likelihood approach. The study analyzes a sample of 13 members from 2002 to 2016. They find that the levels of economic and financial sector growth, inflation, and how open an economy is in terms of trade influence tax capacity whereas corruption and inflation affect the tax effort. In addition, transient tax effort was found to be higher than persistent tax effort meaning there is more effort being put into tax administrative issues than tax policy. Although the study combines the quantitative method with a qualitative analysis, the focus is only put on the analysis of tax legislation by member states. However, Chapter Two of this paper has shown that the tax ratios over the period 2000 – 2020 are heavily fluctuating for almost all the 16 members. Thus, there could be some external shocks that are also disturbing tax collections hence this present study deviates from Chigome and Robinson by examining these shocks and the extent to which they are limiting tax capacity and tax effort in SADC which will be a new contribution to the body of literature.

Nonetheless, there is limited literature on the influence of exogenous shocks on tax revenue performance (but see Morrisey et al. 2016). In their study Morrissey et al. considered three types of shocks namely exchange rate pressure, terms of trade and the intensity of natural disasters to check the vulnerability of tax revenue to these shocks. The study finds that tax revenue is more vulnerable to shocks in developing countries compared to the developed countries and the results were robust for all the three types of shocks. Of the three types of shocks examined, terms of trade had the highest impact on tax revenue mobilization. Morrissey et al. also made a comparison of the developing countries by categorizing them according endowments (non-resource rich vs resource rich) and political regimes (democratic vs non-

democratic). The findings are that democratic countries are more resilient to shocks than non-democratic countries while resource rich countries are more prone to ToT shocks and exchange rate pressure than non-resource rich developing countries.

A great deal of literature has drawn attention to the assessment of tax revenues using tax capacity and tax effort in SSA (see Ghura, 1998; Le et al. 2012; Coulibaly & Gandhi, 2018). Yet, despite the importance of these notions in the assessment of tax revenues, the empirical literature on SADC has been limited (but see Chigome & Robinson, 2021). A few studies assess tax revenue performance in the SADC region in a cross-country setting but only investigate the factors that limit tax collections without measuring the extent of the tax gap (e.g., Glenday, 2005; cf. Robinson, 2005; Ade et al., 2018). To the best of my knowledge, only Chigome and Robinson (2021) assess tax capacity and tax effort for SADC using the stochastic frontier approach (SFA). However, there is a dearth of research that comprises additional variables, varied estimation methods, varied specification choices as well as newer data sets. To close the scholarship gap, this paper revisits the issue by also making several methodological innovations such as the addition of important variables omitted by previous research such as the extent of informality and agriculture share, and using a different estimation method (standard regression model) used by previous research with same study context to compare and validate results.

The reviewed literature cast light on some key concepts that can be used to effectively assess tax revenue performance. Figure 5 shows the conceptual map for assessing and analysing tax revenue performance constructed using initial hints drawn from the reviewed theoretical and empirical research works. However, one issue that has not been given much attention in literature on SADC is the magnitude and speed to which the tax revenue-to-GDP ratio needs to be raised. Against this background, this study, therefore, conducted tax performance

assessment through the calculation of tax effort indices for SADC member states and determined by how much the tax capacity for each member country falls short of its tax effort, how fast the gaps could be closed and what measures should be undertaken.

3.5 Conceptual Framework for Tax Revenue Performance

Figure 5:

Conceptual Model for Tax Revenue Performance
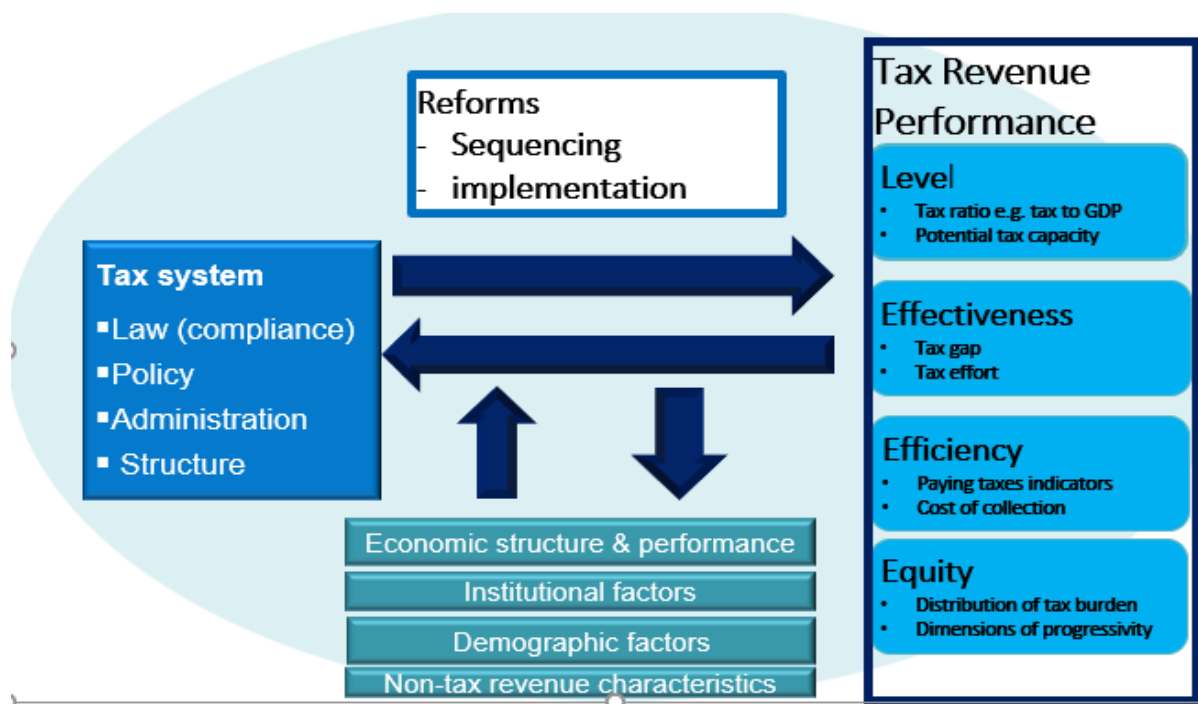
Notes. Constructed using notes from the reviewed literature

3.6 Conclusion

From this chapter, four broad conclusions that inform the direction of this study are drawn. First, several estimation techniques (standard regression, SFA, budget balance, welfare maximization, and utility maximization) have been used for estimating tax capacity and tax effort over the years The SFA has stood up to be widely used because of its ability tax effort determinants from those of tax capacity though Cyan et al. still argued that SFA and the

modified standard regression are substitutable. Second, GDP per capita, trade openness, size of the agriculture sector, reliance on foreign aid, financial deepening, and rate of inflation have been used to explain tax capacity in developing countries and have remained key explanatory variables to date. Third, demographic and institutional characteristics are meaningful in explaining tax capacity though there is still no unanimity on the precise variables to incorporate in the models or the best proxy measures to use. Fourth, whilst investigating the determinants of tax revenues is still important, it has increasingly become important for researchers to assess if countries have attained their full tax potential and check if the maximum effort is being exerted to utilize such tax capacities.

CHAPTER FOUR:

METHODS, DATA, AND DATA SOURCES

4.1 Introduction

This chapter shares the details of the methodology adopted to perform the statistical analysis

necessary for answering the research questions. I adopted a mixed methods approach in which

I conducted both quantitative and qualitative analysis. Under the quantitative methods, I used

the standard regression model to estimate the tax capacity and calculate tax effort. Therefore,

this chapter presents the general and specific model specifications, model selection methods,

and diagnostic tests. Also presented are details on data and data sources.

4.2 Standard Regression Model

The study adopts the methodology applied by previous research (see Piancastelli, 2001; Gupta,

2007; Davoodi & Grigorian, 2007; Le et al., 2008). The estimation of taxable capacity is based

on a regression analysis specified in general terms as follows:

$$yit = \alpha + \beta Xit + YYit + \delta Zit + \varepsilon it \qquad (1)$$

where yit represents the total tax revenue as a percent of GDP in country i at time t, α is a

constant, Xit is the vector of structural variables, Yit is the vector of institutional variables, and

Zit is the vector of policy variables. All the variables are expressed in logarithms.

The appropriate panel model specification is guided by performing the following suitability

tests: The Fixed Effects test (Pooled OLS vs FEM); the Breush and Pagan Lagrange Multiplier

(Pooled OLS vs REM) and the Hausman test (FEM vs REM).

If FEM is chosen it will be specified as $yit = \gamma i + \beta Xit + YYit + \delta Zit + \varepsilon it$ (2)

If REM is chosen it will be specified as $yit = \gamma + \beta Xit + YYit + \delta Zit + ui + \varepsilon it$ (3)

where γi is the country-fixed effect and ui is the country-specific error term. Before the

regressions, some diagnostics tests are also performed and these include multicollinearity,

autocorrelation, heteroscedasticity, skewness, cross-sectional dependence, and panel unit root tests. The rationale of these test is explained later in this chapter.

The specific model for estimating potential tax capacity using panel data is expressed as:

$$\frac{Tax}{GDP_{it}} = \beta0 + \beta1 gdppc_{it} + \beta2\, urbanpop_{it} + \beta3\, topen_{it} + \beta3 agric_{it} + \beta4 infor_{it} + \beta4 fid_{it} + \beta4 faid_{it} + \beta4 cc_{it} + \varepsilon_{it} \quad (4)$$

Whereby all the variables are expressed in logarithms except for control of corruption and:

$Tax/GDP=$ total tax revenue as a percentage of GDP

$gdppc$ $=$ per capita real income (constant 2015 US dollars)

$urbanpop =$ demographic variable; urban population to total population in the present study

$topen$ $=$ trade openness; in this paper – (exports + imports) as a percentage of GDP

$agric$ $=$ agriculture value-added as a percentage of GDP

$infor$ $=$ degree of informality; - DGE estimates of informal output (% of official GDP)

fid $=$ financial deepening measure; Broad money (M2) as a percentage of GDP

aid $=$ foreign aid; in this case, net ODA (% of GNI)

cc $=$ governance quality measure; in this case - control of corruption index

ε_{it} $=$ error term that captures omitted variable bias and measurement errors

$i; t$ $=$ member countries in the region; time in years

βn $=$ vector of the unknown parameters; and

$\beta0$ $=$ a constant

Following (Davoodi & Grigorian, 2007; Attiya & Umaima, 2012), tax effort is the ratio of actual tax revenue to the optimal tax revenue. Thus, the calculation of the tax effort index is as follows:

$$Tax\ Effort\ (TE) = \frac{\frac{Tax}{GDPit}}{\frac{Tax^\wedge}{GDPit}} \qquad (5)$$

$\frac{Tax}{GDPit}$ is the actual tax-to-GDP ratio while $\frac{Tax^\wedge}{GDPit}$ is the potential tax capacity estimated from

equation 4. The actual tax revenue [$\frac{Tax}{GDPit}$] is given by the official statistics published by OECD,

IMF, UN, EUROSTAT, World Bank, etc. For this study, the official statistics used for the tax

ratio are from the IMF database. The optimal tax revenue [$\frac{Tax^\wedge}{GDPit}$] coincides with the fitted or

predicted values of a regression of the actual tax revenue on a predetermined set of independent

variables as in equation 4. The values of tax effort will be above zero and positive. A tax effort

index greater than one indicates that a country performs well above its potential tax capacity,

whereas the value that lies below one implies the member country falls short of its potential

tax capacity and probably has more potential to raise significant additional tax revenue. The

results of this model are presented in Chapter Five.

4.3 Diagnostic tests

Considering that there are potential threats that may affect the validity and reliability of the

research results, there is a need for choosing a methodology that would keep such threats

minimal. Therefore, the study also conducts some diagnostic tests associated with panel

regression.

4.3.1 Multicollinearity test

Multicollinearity is the presence of a perfect linear relationship among the explanatory

variables (Gujarati, 2004). This presents challenges in regression since it becomes hard to split

up the impact of one independent variable from the other on the dependent variable. To test for

multicollinearity, the *collin* command in *Stata 17* which allows for the computation of various

collinearity measures such as VIF, R-squared, eigenvalues, condition index (CI), and tolerance

will be used. If multicollinearity exists (*corr>0.8 of VIF>10*) between any two independent variables, one of such variables will be dropped to correct for multicollinearity.

4.3.2 Hausman test

To test for endogeneity and to decide between the use of FEM and REM, the study will use the Hausman test. It considers whether the unique errors are associated with the regressors or not. The hypotheses will be stated as H_0: unique errors (ui) are not correlated with regressors and H_1: unique errors (ui) are correlated with regressors. If $p < 0.05$, the FEM will be chosen, otherwise the REM is chosen.

4.3.3 Heteroscedasticity test

The presence of heteroscedasticity negatively affects model parameters and efficiency estimates (Colombi et al., 2017) by producing spurious regressions. In testing for heteroscedasticity, the Cook-Weisberg test will be employed. The hypotheses are stated as H_0: The variance of the error term is constant and H_1: The variance of the error term is not constant. If $p < 0.05$, the null hypothesis is rejected, meaning there is heteroskedasticity. If found to be present, heteroscedasticity can be corrected by using robust standard errors.

4.3.4 Test for cross-sectional dependence/contemporaneous correlation

Woodridge (2003) argues that cross-sectional dependence is problematic in long-time series macro panels of over 20 years. If $T > N$ Breush-Pagan is used to test for independence while if $T > N$ then other methods like Perasan's CD, Friedman's, or Free's test would be the most appropriate. In this study, the most suitable test for cross-sectional dependence is the Perasan since the number of periods (21 years) is greater than the number of entities (14 countries). The

null hypothesis is that residuals across entities are not correlated and if $p < 0.05$ the null hypothesis is rejected meaning there is cross-sectional dependence.

4.3.5 Panel unit root test

The *Levin-Lin-Chu test* and *Fisher test* in STATA 17 are used to test for stationarity. These tests are based on the p-values of individual unit root tests. It assumes that all series are non-stationary against the alternative hypothesis that at least one series in the panel is stationary (Merryman, 2013).

4.4 Data and data sources

The period for the study is from 2000 to 2020. To identify the factors that affect potential tax revenue which can be obtained from the regression analysis, the study is guided by the hypothesis that tax capacity is dependent on country differences in terms of economic, demographic, and institutional characteristics. The data is collected from various sources. Data for macroeconomic variables are drawn from World Development Indicators or IMF databases. The data for governance indices or member states' institutional quality measures are obtained from World Governance Indicators and Transparency International. Regression analysis would be done using a statistical package (Stata/SE 17.0).

4.5 Explanation of Variables to be used

4.5.1 Dependent Variable

Following the reviewed literature, the ratio of tax revenue collected as a percentage of GDP is the dependent variable (see Le et al., 2012; Korsu, 2021).

Table 5: *Summary of the Independent Variables*

Variable	Description	Expected sign
GDP per capita (gdppc constant 2015 US$)	The level of development determines the amount of revenues to be raised (Le et al., 2013; McNabb et al., 2021).	Positive
Demographic variable (DEM)	The study will use the ratio of the urban population to the total population. An increase in urbanization is likely to push demand for more public services hence more tax revenue is needed (Ndiaye & Korsu, 2014).	Positive
Trade openness (TOPEN)	Trade openness is measured by trade (export plus imports) as a percentage of GDP. More trade openness is likely to lower taxes collected on imports and exports; or if linked to higher economic growth rates, may lead to a rise in tax collections due to an increased tax base (Addison & Levin, 2012).	either positive or negative
Agriculture value-added as a percentage of GDP (AGR)	Agriculture, forestry, and fishing (value-added) as a % of GDP is used as the proxy. The agricultural sector is one of the major contributors to economic activity in developing countries and yet the sector is difficult to tax as it operates mainly in the informal sector. Thus, a rise in the share of agriculture in GDP dampens tax mobilization efforts.	Negative
Financial deepening (FID)	Broad money (M2) as a percentage of GDP will be used as a proxy for financial deepening. Countries with robust financial institutions tend to have high-performing tax revenue since there will be a variety of ways to inject capital into businesses and as they flourish more tax revenues can be collected.	Positive
The informal sector (INFOR)	The Dynamic General equilibrium (DGE) model estimates informal output (% of official GDP) are used. The greater the size of a shadow economy the lower the tax revenue capacity as more economic agents are likely to avoid or evade taxes.	Negative
Foreign aid (AID)	Net ODA received (% of GNI). Fjeldstad (2013) indicates that aid can be used to strengthen tax systems in LDCs. On the other hand, some argue that has a crowding-out effect on tax capacity (Gupta et al., 2003; Ahmed & Mohammed, 2010; Thornton, 2014).	either positive or negative.
Governance quality (GOVQ)	The study used control of corruption, government effectiveness, regulatory quality, and political stability as proxy measures for governance quality. Governance quality is one of the key aspects which determine the adequacy of tax collection (Tanzi & Davoodi, 1997; Gupta, 2007). The higher the degree of controlling corruption in a country, the less the tax revenue that is lost hence the higher the tax capacity.	A negative coefficient is expected.

4.6 Conclusion

The Chapter provides details on the qualitative method. Under the qualitative approach, I will provide a narrative analysis of the influence of external shocks premised on the fact that other than the above regressors, external shocks and changes in tax structure are possible determining factors. The overview of SADC's tax structures and systems is presented in Chapter 2.

CHAPTER FIVE

PRESENTATION OF RESULTS AND DISCUSSION

5.1 Introduction

In this chapter, I present and discuss the results of the study for both the quantitative analysis and the qualitative analysis. The first section of this chapter presents the findings on the determinants of tax revenue performance and the estimation results of the tax capacity and tax effort indices for SADC member countries over the period 2000 to 2020. This chapter also presents the descriptive statistics of the panel data used, model selection results, and diagnostic test results. After the presentation and discussion on the quantitative approach results, I present a detailed comparison of the findings of this study to Chigome and Robinson (2021) who used the SFA method instead for the same study context. The chapter then presents the results of the qualitative analysis on the influence of external shocks on tax revenue mobilization efforts in SADC over the period under study.

5.2 Descriptive Statistics

Table 6 presents the descriptive statistics of balanced panel data for 14 SADC member countries covering a period from 2000 to 2020. Although the data had some missing entries, the degree of the entries was too small hence I used extrapolation and interpolation to fill in the missing entries. To effectively clean the data, I ensured that the collected data was for the same member states for the same periods. I also made sure that there were no double entries. The descriptive statistics are based on 294 observations consisting of 21 periods and 14 members for 12 variables. Malawi and Seychelles were excluded for lack of data on the degree of openness and degree of informality respectively. SADC has a mean tax ratio of 19.14% with a standard deviation of 10.90. This tax ratio is 14% less than the OECD countries' average which has remained around 33% over the same period (OECD, 2021).

Table 6:

Summary statistics of balanced panel data for 15 SADC countries

Variable	Mean	Standard Deviation	Min Value	Max value
taxgdp	19.14236	10.89869	0.5855501	54.08171
gdppc	2595.258	2403.963	294.6471	10643.77
urbanpop	39.15189	13.3606	19.548	70.877
topen	80.53608	34.34319	23.98087	175.798
agric	13.77464	10.11305	1.798135	35.78286
infor	37.44228	11.04099	20.2092	65.14412
fid	36.25528	25.43074	2.857408	163.6504
faid	5.67001	6.551792	0.0338024	62.1866
ge	-0.5377818	0.7535001	-1.884151	1.056674
cc	-0.4008458	0.6874466	-1.572393	1.216737
rq	-0.4887063	0.7680735	- 2.236245	1.12727
ps	-0.1787258	0.8321429	-2.476551	1.200234

5.3 Standard Regression Method

5.3.1 Model selection

Under the quantitative approach, an attempt was made to answer the research questions using the standard regression and the results are herein presented. In the previous chapters, this paper argued that the tax performance in SADC as measured by tax revenue levels differs across member states due to the variations in tax structures and systems. In this chapter, I present evidence of the impact of institutional, demographic, and economic factors on tax capacity and tax effort. Thus, there are bound to be differences but it is better to statistically validate the assumption. Henceforth, I checked for the presence of either fixed or random effects to select the most appropriate model specification that corresponds to the type of panel data collected.

A Hausman test is conducted to choose between FEM and REM. According to Green (2008), the Hausman test checks if unique errors are correlated with the explanatory variables under the null hypothesis that the appropriate model is the random effects. The p-value of 0.0004 for

the model run with government effectiveness (*ge*) as the proxy for governance and a p-value

of 0.0006 when control of corruption (*cc*) obtained from the tests are both less than 0.05, thus,

they are significant hence we reject the null hypothesis suggesting that FEM is the most suitable

model (see Table 7 for detailed results). The STATA command *testparm* confirmed that time-

fixed effects are needed when running the model. A fixed effects model is appropriate when

analyzing the effects of variables that vary over time. One of the most important assumptions

of this model is that other time-invariant features could have been omitted hence it controls for

those characteristics to minimize biasedness.

Table 7: *Hausman (1978) specification test: FEM vs REM (using ge)*

Test: difference in coefficients not systematic
Chi2 (8) = (b-B) ' [(V_b-V_B) ^ (-1)] (b-B)
= 28.56
Prob>chi2 = 0.0004

Hausman (1978) specification test: FEM vs REM (using ce)
Test: H_0: difference in coefficients not systematic
Chi2 (8) = (b-B) ' [(V_b-V_B) ^ (-1)] (b-B)
= 27.60
Prob>chi2 = 0.0006

5.3.2 Diagnostic tests

To adopt the most efficient model for assessing tax capacity and calculating tax effort in the

region, various diagnostic tests were conducted to ensure that unbiased estimates are obtained.

These include the multicollinearity test, unit root test, cross-sectional dependence test,

autocorrelation test, normality, and heteroscedasticity test.

Multicollinearity test

Before selecting the appropriate model to use under the standard regression, I test for

multicollinearity. If the predictor variables are highly correlated it lowers the precision of the

estimated coefficients thereby weakening the statistical power of the chosen model. Results in Table 8 show the absence of multicollinearity (all correlation coefficients are less than 0.8) among regressors after dropping three governance indices - government effectiveness, regulatory quality, and political stability which were highly correlated with corruption. To use them for robustness checks, they will only be introduced into the model one at a time.

Table 8: *Multicollinearity test – matrix of correlations*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) gdppc	1.000							
(2) urbanpop	0.579	1.000						
(3) topen	0.228	-0.056	1.000					
(4) agric	-0.689	-0.539	-0.554	1.000				
(5) infor	-0.628	-0.359	-0.413	0.436	1.000			
(6) logfid	0.745	0.387	0.311	-0.568	-0.623	1.000		
(7) faid	-0.554	-0.372	-0.206	0.525	0.299	-0.466	1.000	
(8) ge	0.797	0.384	0.286	-0.618	-0.677	0.763	-0.360	1.000

Unit root test for panel data

Table 9: *Panel unit root test using Levin-Lin-Chu*

Variable	p-value	Order	Options	Additional test
taxgdp	0.0007	I(0)		
gdppc	0.0007	I(0)		
urbanpop	0.0000	I(0)		
topen	0.0106	I(0)		
agr	0.0000	I(0)		
infor	0.0001	I(0)		
logfid	0.0732	I(0)	trend	If option lags(0) is chosen the p-value is 0.0179;
aid	0.0139	I(0)		
cc	0.0354	I(0)	lags(0)	The generated p-values from Fisher test (dfuller) show that at least one panel is stationary
ps	0.0000	I(0)		
ge	0.0016	I(0)		
rq	0.0241	I(0)		

The results of Levin-Lin-Chu's test for unit root test for panel data in Table 9 show that all series have a unit root. Under the Levin-Lin-Chu, there are five options for the panel unit root test: trend, noconstant, lag_spec, demean, and kernel_spec. Variable control of corruption (cc) became stationary found to be stationary after including the time trend. Financial deepening

(fid) was not stationary at all levels, for all options, and all panel unit root tests presented in STATA hence had to be transformed into logarithms after which it became stationary if the time trend is included.

Cross-sectional dependence test

Cross-sectional dependence causes contemporaneous correlation which results in biasedness. It becomes an issue of concern if periods exceed at least 20 years. The observations in this paper were for 21 periods hence I had to check if residuals are correlated across member countries. The insignificant p-values shown in Table 10 suggested that there is no cross-sectional dependence in both specifications.

Table 10:
Cross-sectional dependence test using the Pesaran CD test (ge)

Test: H_0: residuals are not correlated

Pesaran's test of cross-sectional independence = -1.384

Pr = 0.1665

Average absolute value of the off-diagonal elements = 0.353

Cross-sectional dependence test using the Pesaran CD test (cc)

Test: H_0: residuals are not correlated

Pesaran's test of cross-sectional independence = -1.015

Pr = 0.3099

Average absolute value of the off-diagonal elements = 0.378

Autocorrelation test

Serial correlation is an issue of concern if dealing with panel data covering over 20 years. The presence of autocorrelation is problematic as it tends to unnecessarily increase R-squared while reducing the standard errors of the coefficients. Significant p-values for the two models shown in Table 11 makes us reject the null hypothesis of no serial correlation leading us to conclude

that the data have first-order autocorrelation. Using STATA commands this can be corrected

by using newey or cluster options to ensure that our estimates are robust.

Table 11:

Woogridge's test for autocorrelation (serial correlation); government effectiveness

Test: H_0: nofirst-orderautocorrelation
F (1, 13) = 51.869
Prob>F = 0.0000

Wooldridge's test for autocorrelation (serial correlation); control of corrption

Test: H_0: nofirst-orderautocorrelation
F (1, 13) = 44.898
Prob>F = 0.0000

Heteroscedasticity test

The existing *xtest3* in STATA is used to test for heteroskedasticity in fixed effects models. A

sequence of random variables is said to be heteroscedastic when the variances of the errors are

non-constant across observations which is a violation of the regression assumption of constant

variance. The null hypothesis of the test is constant variance (homoskedasticity). The *xttest3*

results in Table 12 show the presence of heteroskedasticity. To fix the heteroskedasticity in the

standard regression I used the option 'robust' in conducting the random fixed effects regression

model to obtain white sandwich estimators.

Table 12:

Test for heteroskedasticity using xttest3 (ge)

Test: H_0: sigma(i)^2 = sigma^2 for all I (constant variance)
LR chi2(13) =   1038.19
Prob > chi2 =   0.0000

Test for heteroskedasticity using xttest3 (cc)

Test: H_0: sigma(i)^2 = sigma^2 for all I (constant variance)
LR chi2(13) =   1844.44
Prob > chi2 =   0.0000

5.3.3 Estimation Results

The results of the fixed effects regression models estimated using the *cluster-country level* option for standard errors to fix heteroskedasticity and serial correlation are presented in Table 13. Columns (1), (2), (3), and (4) represent the regressions on tax revenue when various institutional variables are introduced in the model one at a time as possible determining factors. The regressions carried out capture the entire period. As shown in Table 14, the coefficients have the signs that were anticipated under the priori-expectations. Additionally, most of them are significant except for political stability and foreign aid. Another exception is that the financial deepening variable loses its significance when the control of corruption and political stability variables are included in the models.

i. Determinants of tax capacity

Share of agriculture

The study finds a negative and significant relationship between the share of agriculture in GDP and tax capacity (coefficients ranging from 0.54 to 0.56 units). As widely established in the literature, agriculture is a hard-to-tax sector hence an increase in agriculture value added (% of GDP) is likely to reduce the amount of taxes possible to collect due to the reduction in the tax base. The finding of this study on the share of agriculture as a key factor in influencing the amount of tax revenue collection is in line with the findings of various scholars (see Cyan et al., 2013; Fenochitto et al., 2013; Mawejje & Sebudde, 2021).

Table 13: *Determinants of Tax Capacity in SADC 2000 – 2020*

	Dependent Variable: Total Tax Revenue (% of GDP)			
	(1)	(2)	(3)	(4)
gdppc	0.0020	0.0016	0.0020	0.0016
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
	[0.000***]	[0.000***]	[0.000***]	[0.001***]
urbanpop	-0.532	-0.419	-0.49898	-0.445
	(0.099)	(0.097)	(0.098)	(0.0997)
	[0.000***]	[0.000***]	[0.000***]	[0.000***]
topen	0.076	0.081	0.0755	0.081
	(0.0142)	(0.0146)	(0.0143)	(0.0145)
	[0.000***]	[0.000***]	[0.000***]	[0.000***]
agric	-0.549	-0.537	-0.558	-0.550
	(0.094)	(0.096)	(0.094)	(0.096)
	[0.000**]	[0.000***]	[0.000***]	[0.000***]
infor	-0.395	-0.423	-0.377	-0.476
	(0.126)	(0.129)	(0.127)	(0.139)
	[0.002***]	[0.001***]	[0.003***]	[0.001***]
logfid	1.917	1.313	1.945	1.3011
	(0.858)	(0.862)	(0.866)	(0.859)
	[0.026**]	[0.129]	[0.026**]	[0.131]
faid	0.023	0.019	0.019	0.020
	(0.050)	(0.051)	(0.050)	(0.051)
	[0.64]	[0.708]	[0.704]	[0.692]
ge	-4.627			
	(1.272)			
	[0.000***]			
cc		-3.436		
		(1.371)		
		[0.051*]		
re			-4.362	
			(1.312)	
			[0.001***]	
ps				0.756
				(0.735)
				0.305
constant	41.888	43.404	40.500	47.050
	(8.927)	(9.131)	8.993	(9.791)
	[0.000***]	[0.000***]	[0.000***]	[0.000***]
Observations	294	294	294	294
R^2: within	0.3380	0.3061	0.3330	0.3085
R^2: between	0.4763	0.5174	0.5072	0.5051
R^2: overall	0.4512	0.4800	0.4772	0.4678

Notes. Figures in parenthesis ( ) are the standard errors

Figures in brackets [ ] are the p-values

*** p<.01, ** p<.05, * p<.1

The level of economic development

The study uses the GDP per capita constant (2015 US$) as the proxy indicator. From the regression results, a one-unit positive change in GDP per capita is likely to increase the average tax-to-GDP ratio by 0.002. This result is robust across all the model specifications in this study and is in line with the findings of the bulk of the literature reviewed. (see Fenochietto & Pessino, 2013; Chigome & Robinson, 2021; McNabb et al, 2021). Thus, this study also establishes that economic development is a key determinant of tax revenue performance. For SADC countries to be able to raise the much-needed additional tax revenues, the focus should be put on expanding the economic activities to raise the per capita incomes.

Trade openness

An increase in trade openness by one unit has the potential to increase tax revenues by about 0.008 units. Since trade openness is highly related to higher growth rates, open economies tend to grow faster thereby increasing the tax base (see Addison & Levin, 2012; see also Ghura, 1998). However, trade openness may also reduce the amount of taxes collected from exports and imports (see Bird et al., 2008; Karagoz, 2013). Nevertheless, in SADC, due to the movement towards FTA, reliance on trade taxes has never been common due to the foreseen potential revenue losses. Therefore, the positive effect of trade openness seems to well outweigh the negative impact which explains the positive coefficient. This result is also confirmed by Chigome and Robinson (2021) in their study on the same region for a different period and a different set of entities and corroborates Le et al. (2012)'s results on a sample of 110 high and low-income countries. Thus, in SADC, trade openness is a key determining factor of tax capacity.

Size of the informal sector

The study establishes that an increase in the degree of informality in the member states' economic activities is likely to reduce tax capacity by 0.4 units on average. Schneider et al. (2010) argue that the size of the informal sector is a significant determinant of the tax base. As the size of the informal sector increases, efficient collection of taxes may not be possible because it is difficult to track the shadow economy's incomes and profits. This is the case for SADC with 37% of its total output coming from the informal sector and member states reaching an informal output of 65% of GDP. My findings confirm the results of the previous empirical works (see Le et al., 2012; Chigome & Robinson, 2021; McNabb et al., 2021).

Financial Deepening

There are various proxies (e.g., broad money as a percentage of GDP, gross capital formation, etc.) that can be used to assess the influence of the growth of the financial sector on tax revenue collection but this study used broad money. Literature posits that growth in the financial sector of an economy allows the flow of capital e.g., credit to businesses and if used productively, it increases incomes and profits hence an increase in tax collection (see Cyan, et al. 2014). A caution on the interpretation of the coefficient of financial deepening is required since a multiplicative change in the regressor is related to a linear change. Having found the financial deepening not stationary even after lagging or differencing, I had to transform it into logarithms. Therefore, the result should be interpreted as a 1% increase in financial deepening is likely to increase the tax ratio by 0.019. The positive and significant coefficient result is also confirmed by other studies (e.g. Ndiaye & Korsu, 2014; Chigome & Robinson, 2021). However, when political stability and control of corruption variables are used in the models, financial deepening loses its significance.

Urbanization

As previously discussed, there is no consensus in the literature on the proxy variables to use to represent demographic characteristics. But this study used the urban population as a percentage of the total population. The study established a negative and significant relationship between urbanization and tax capacity. The results suggest that a one-unit increase in urbanization is likely to increase tax capacity in SADC by around 0.4 to 0.5 units. A possible explanation for why in SADC urbanization and tax capacity have negative results is that instead of encouraging the shift to formalization, the movement of people to urban areas is actually increasing the size of the informal sector hence tax collection is difficult. This is because most of the SADC member states are experiencing economic downturns and are highly characterized by a lack of formal jobs hence urbanization is having a distortionary effect on tax capacity. Other studies which used population growth and age dependency found that an increase in these variables harms tax collection (e.g., Le et al., 2012).

This result is contradictory to the findings of other researchers who found a positive and significant relationship. For example, Kunofiwa (2021)'s study of the determinants of tax revenue in upper-middle economies argued that urbanization is likely to encourage the movement from the informal to the formal sector which enhances the amount of revenue collected. However, this was only so after using the FEM and Dynamic GMM models. When REM and pooled OLS were used the coefficient lost its significance. The second results corroborated with the findings of Chigome and Robinson (2021) who also found a positive but insignificant coefficient for their study on SADC.

Foreign Aid

The study established a positive relationship between foreign aid and tax collection. However, the results were insignificant across all the models. Gupta (2007) finds positive and significant coefficients. Literature posits that the effect of foreign aid on tax collection can be positive or negative (Fjeldstad, 2013). On one hand, foreign aid can be used to strengthen tax systems and structures in developing countries thereby increasing tax capacity. On the other hand, foreign aid may have a crowding effect on tax capacity in the sense that if governments receive astronomical amounts of aid, they find no motivation to pursue domestic resource mobilization strategies (see Ahmed & Mahommed, 2010; Thornton, 2014).

A possible explanation of the insignificant coefficient is that the aid being advanced is not targeted at enhancing the countries' tax systems and structure but may have other developmental agendas. Also, if there is rampant corruption then even targeted aid is lost through the porous tax systems. Park (2011) notes that the success of any development drive depends on competent governments to make appropriate decisions at the appropriate time. Park further argues that for aid to be more effective in meeting the set objectives, strengthening the capacities of the administering institution is key. Thus, it can be concluded that if aid is well-targeted to enhance public governance in tax administration, tax collection capacity will be boosted. The foreign assistance from the EU towards strengthening governance in member states' tax administration and harmonizing VAT in the region has had a positive impact on tax collection.

Governance Indices

One of the most important variables for determining tax capacity and tax effort, tax structures, and systems is governance quality (Gupta, 2007). For countries to be able to collect adequate tax revenues, they need to build efficiency in their tax collection systems. Thus, this study

investigated the effects of various governance indices like government effectiveness, control of corruption, political stability, and regulatory quality on tax capacity. Considering the descriptive statistics on the governance measures SADC is characterized by very low levels of these factors (the average estimates are: ge = -0.54; cc = -0.40; re = -0.49; and ps = -0.18). Thus, these lower ratings are likely to have a negative influence on tax collection. This expectation matched what the study established. For example, lower levels of control of corruption represent high corruption levels hence an increase in corruption is likely to have a negative effect on tax collection and this result was significant at the 10% level. This finding resonates with the findings of Liu, C. and Mikesell (2019) and Mawejje and Sebudde (2019) that corruption is a key determinant of tax revenue performance, systems, and structures. The study also established that the existing lower levels of government effectiveness and regulatory quality prevalent in the region are inhibiting tax capacity. However, political stability had positive and insignificant results and this finding is in line with the findings of Chigome and Robinson (2021) who also found a positive but significant coefficient. Also, worthnoting is that when political stability is used in the model, financial deepening loses its significance.

ii.   Tax capacity and tax effort estimation results: SADC (2000 -2020)

The random effects standard regression model enabled the prediction of the potential tax capacity which I then used to calculate tax effort indices for the member countries. Tax effort is the index that is obtained from dividing the actual tax revenue-GDP ratio by the predicted potential tax revenue-GDP ratio. Table 14 shows estimated values of the tax effort, tax capacity, and the average tax revenue-GDP for each member country considered in the study for the period 2000 to 2020.

Tax capacity Performance

Over the period 2000 to 2020, the estimated average potential tax capacity for the region is 19.14% of which eight of the members are below this average. If benchmarked against the median potential tax capacity of 15.375 calculated for the sample of 14 members, half of the member states (Tanzania, DRC, Comoros, Madagascar, Zimbabwe, Angola, and Mozambique) are below the median and can be regarded as countries with low tax capacities. From the sample of 14 countries, only three members (Eswatini, Lesotho, and Mauritius) are above the upper quartile of 28.31% in terms of potential tax capacity. Thus, from these findings, I argue that the region on average has low tax capacity.

Table 14: SADC's a*verage actual tax capacity, potential tax capacity, and tax effort*

Country	Average tax ratio	Predicted tax capacity	Predicted tax effort	TE rank in the region
Angola	31.05%	14.61%	2.12	1
Botswana	18.23%	19.69%	0.93	8
Comoros	7.18%	12.48%	0.58	13
Congo Dem. Rep.	6.89%	7.83%	0.88	11
Eswatini	25.59%	32.91%	0.78	12
Lesotho	41.50%	36.89%	1.12	4
Madagascar	8.91%	9.55%	0.93	8
Mauritius	17.67%	38.51%	0.46	14
Mozambique	14.46%	15.37%	0.94	7
Namibia	28.72%	26.77%	1.07	5
South Africa	26.15%	19.49%	1.34	3
Tanzania	10.49%	5.64%	1.86	2
Zambia	14.69%	15.38%	0.96	6
Zimbabwe	11.52%	12.87%	0.90	10
SADC Average	18.79%	19.14%	1.06	

Notes. Calculated using estimates from the regression results.

Tax effort Performance

In terms of tax effort, the literature posits that a tax effort that is greater than 1 shows that a country performs well above its potential capacity while a tax effort that lies below one means a country falls short of its potential tax capacity. On average the region has a tax effort index of 1.06 which may mean that SADC as a whole is well-performing above its tax potential.

However, this implication should be taken with caution since the region has 16 members with differences in terms of demographic, institutional, and economic characteristics. Therefore, an in-depth analysis of tax effort performance at the country level is necessary to effectively guide policy-making since the differences in tax effort indices may call for a different set of policies.

Therefore, if member states are benchmarked against a tax effort of 1, only 5 members (Namibia, Lesotho, South Africa, Tanzania, and Angola are performing well above their tax capacity. If ranked against their tax effort performance, Angola has the highest tax effort of 2.12 followed by Tanzania with 1.86. The least performers in terms of tax effort are Comoros with an index of 0.58 followed by Mauritius with 0.46.

Performance classification based on both tax capacity and tax effort)

To differentiate high tax effort performers from low tax effort performers I used a benchmark of 1, thus those members with tax effort index below 1 fall under low tax effort while those with indices above 1 fall under high tax effort. In terms of tax capacity, I use a benchmark of 15.375% which is the median of the sample. A country is considered a low tax capacity member if its predicted tax capacity falls below 15.375% and if otherwise it is regarded as a high tax capacity member. From these estimated results on tax effort and taxable capacity and benchmarks, four groups of performers emerge. The results are shown in Table 15.

Low tax capacity and low tax effort group

This category contains the highest number of member states. Countries in this group have underutilized tax capacities. This means that tax collection for these countries (DRC, Madagascar, Comoros, Zimbabwe, and Mozambique) is very low and tax effort falls short of the potential tax capacity. However, these member states have the potential to improve their

tax policy and administrative reforms. This can be achieved by directing efforts toward strengthening economic activities and encouraging investments, after which revenue enhancement can be pursued. From the section on determinants of tax revenue performance, we noted how important governance issues are turning out to be in influencing tax collection. In particular, it has emerged that the region has low government effectiveness, low control of corruption, and low regulatory quality. Therefore, countries in this group may need to focus on improving governance quality to build efficiency in tax administration and lowering tax compliance and administrative costs. Furthermore, the majority of the countries in this group have highly informal economies hence the need of finding ways to either formalize the small enterprises or ways of taxing the informal sector to minimize tax evasion and avoidance

Table 15:

Classification of SADC members using tax capacity and tax effort 2000 – 2020

Tax effort			
		Low	**High**
Tax capacity	**Low**	Congo Dem. Rep. Madagascar Comoros Zimbabwe Mozambique	Tanzania Angola
	High	Zambia Botswana Eswatini Mauritius	South Africa Namibia Lesotho

High tax capacity and high tax effort group

Only Southern African Customs Union (SACU) members are in this group except for Eswatini, and Botswana (who recently joined SACU). Given that there is overutilization of tax capacity in this category, further growths in tax revenues have the potential for introducing unwanted economic distortions. Thus, the focus of these countries should not be entirely on revenue but

on enhancing their efficiency in tax collection, minimizing tax-induced distortions, rebalancing the tax mix, and enhancing the business environment through rationalization of tax regimes. Improving the quality of governance is also key to enhancing efficiency.

Low tax capacity and high tax effort group

From our sample, only Angola and Tanzania are in this category. These member states seem to have fallen into a trap whereby the existing tax capacity is low maybe due to widespread tax evasion, narrowing tax bases, or inefficiencies in tax administration. The most probable reason for this trap could be the over-exploitation of one source of tax revenue. From my previous analysis of member states' tax structures and tax systems, we note that Angola raised its VAT rate from 10% to 14% in 2019 which could explain why the sudden jump in tax effort. For Tanzania, the issue of a very narrow tax base has been a serious policy concern for a long time (see Langford, 2015). To sustainably break out of these traps, these countries should focus on widening their tax bases, improving their tax administration, and strengthening their functions. Parallel reforms should also be instituted to create a conducive regulatory environment to encourage private investment, and face-lift the tax systems to minimize both tax collection costs and economic distortions induced by taxes. The empirical evidence on tax revenue performance determinants has revealed the importance of improving governance quality particularly regulatory quality and government effectiveness and I cannot over-emphasize this necessity.

High tax capacity and low tax effort group

In this category, we find Mauritius, Zambia, and the other two SACU members, Botswana and Eswatini. These member states collect more taxes relative to the regional average but their tax efforts remain low considering their economic, structural, demographic, and institutional

characteristics. Even though these member countries have already attained high tax capacities, they still have room to increase their tax effort by implementing reforms that minimize distortions. They may also consider the need to restructure their tax policy mix depending on the tax burdens. Like the rest of the group, countries in this category are also encouraged to take necessary actions to enhance the quality of governance so that an efficient tax system is attained.

5.4 Comparative Analysis: Standard Regression Results vs SFA Results

Table 16: *Comparison of tax effort, tax capacity, and average tax ratio estimates*

Study	C & R (2021)	Present study	C & R (2021)	Present study	C & R (2021)	Present study
Method	SFA	SR (FEM)	SFA	SR (FEM)	SFA	SR (FEM)
Period	2002-2016	2000-2020	2002-2016	2000-2020	2000-2016	2000-2020
Indicator	Average tax ratio	Average tax ratio	Predicted tax capacity	Predicted tax capacity	Predicted tax effort	Predicted tax effort
Country						
Angola	19.06%	31.05%	23.60%	14.61%	0.81	2.12
Botswana	25.2%	18.23%	26.15%	19.69%	0.96	0.93
Comoros	-	7.18%	-	12.48%	-	0.58
DRC.	-	6.89%	-	7.83%	-	0.88
Eswatini	27.01%	25.59%	21.15%	32.91%	1.28	0.78
Lesotho	50.63%	41.50%	21.94%	36.89%	2.31	1.12
Madagascar	-	8.91%	-	9.55%	-	0.93
Mauritius	18.15%	17.67%	29.11%	38.51%	0.62	0.46
Mozambique	25.23%	14.46%	20.00%	15.37%	1.26	0.94
Namibia	28.71%	28.72%	25.63%	26.77%	1.12	1.07
South Africa	26.85%	26.15%	26.53%	19.49%	1.01	1.34
Tanzania	10.77%	10.49%	17.64%	5.64%	0.61	1.86
Zambia	14.64%	14.69%	19.48%	15.38%	0.75	0.96
Zimbabwe	18.05%	11.52%	19.01%	12.87%	0.95	0.90
SADC Ave.	**24.22%**	**18.79%**	**22.90%**	**19.14%**	**1.06**	**1.06**

Table 16 compares the results of the present study conducted on a sample of 14 SADC members covering the period 2000 to 2020 with the estimation results obtained by Chigome

and Robinson (2021) on a sample of 12 SADC members covering the period from 2002 to 2016. One interesting thing to note is that the average tax effort for SADC is the same (1.06) for the two slightly different samples and slightly different periods. The estimation methods are different – the present study used fixed effects standard regression while Chigome and Robinson used the stochastic frontier approach. The average tax ratio for the region for the 2000-2020 period (24.22%) is lower than the average tax ratio for the 2002-2016 period (18.79%) which shows declining tax ratios in the region. This is the same for predicted tax capacity which has gone down from 22.90% (2002 - 2016) to 19.14% (2000-2020) which also shows declining tax performance. Overall Chigome and Robinson found low tax capacities and low tax effort in the region which corroborates the findings of this study.

On the determinants of tax revenue performance, the findings that gdp per capita constant, financial deepening, and trade openness are positively and significantly related to tax capacity resonate with the findings of Chigome and Robinson and the coefficient for per capita income is the same. However, the results for the demographic variable which is urbanization and financial aid have contradictory results. In terms of governance quality, the two studies use the same proxy indicators. The results in terms of the direction of the effects are the same though in terms of significance the results are different. Nevertheless, both studies conclude that low governance quality undermines tax collection in SADC even though the estimation methods used were different.

5.5 The Impact of Shocks on Tax Revenue Performance

Sustainable development in SADC will require member states to optimize their tax revenue options to effectively finance the development requirements. However, we note that most member states are failing to attain their potential tax capacity (see Table 15). Although I have adequately analyzed the impact of economic, institutional, and demographic factors on tax

revenues, the issue of the influence of external shocks on tax collection has not been sufficiently addressed. According to Morrisey et al. (2016), the influence of shocks varies depending on the level of development of economies, the type of the shock, the capacity (administrative and political) to respond to the changes, and the tax structure and systems of the economies. Morrisey et al. assert that this analysis is important because it gives insights not only into how shocks affect tax collection but also into the stability and predictability of tax revenues to be collected. Therefore, this section analyzes the extent to which the region has been exposed to external shocks and the impact this has had on tax collection over the period 2000 to 2020.

5.5.1 Natural Disasters

Every year, Africa is hard hit by various natural disasters, and SADC member countries are not an exception. These disasters include, storms, floods, droughts, and extreme hot temperatures and but the first three are the most prevalent in SADC with drought shocks topping the list. SADC members which have experienced the highest number of disaster events over the period from 2000 to 2019 are Mozambique (55 events), South Africa (54 events), and DRC (41 events). These shocks have had an influence on tax revenue mobilization which is one possible explanation for the heavy fluctuations in tax level trends, though resilient systems that are in pace differentiate the effect on tax revenue collection.

i.   Floods and storms

According to CRED (2019), from 2000 to 2019, floods and storms were the most rampant natural phenomena with floods accounting for about 64% of disaster events in Africa and storms 15%. However, in terms of the number of people affected, they both account for only 20%. Table 17 shows the top ten worst storms that have affected Africa over the period under

study. The most worrisome point is that eight of these storms occurred in SADC member states. Although Comoros, Seychelles, and Mauritius are not included in the top list they have been heavily affected by storms over the period which may explain why they have a low tax effort.

Table 17: *Top ten worst storms in Africa*

	Country	Storm	Year	Total Deaths
1.	Mozambique, Zimbabwe	Cyclone Idai	2019	901
2.	Madagascar	Cyclone Galifo	2004	363
3.	Zimbabwe	Storm Dineo	2017	251
4.	Mozambique	Cyclone Nadya	1994	240
5.	Madagascar	Daisy, Geralda	1994	200
6.	Senegal	Tornado	1999	165
7.	Somalia	Cyclone 3A	2013	162
8.	Madagascar	Cyclone Gretelle	1997	140
9.	Madagascar	Eline, Gloria	2000	130
10.	Madagascar	Storm Hubert	2010	120

Notes. Adapted from CRED (2019)

ii.   Droughts

As reported by CRED (2019), drought shocks were the most impactful from 2000 to 2019 accounting for 80% of the disaster effects. The 2003 and 2004 droughts in South Africa affected around 15 million and 12 million people respectively. According to SADC (2016), during the 2014/15 and 2015/16 farming seasons, SADC experienced the worst droughts in the past three decades which resulted in a 40% reduction in agricultural output leaving 41 million people food insecure[5]. The situation forced Botswana, Eswatini, Lesotho, Malawi, Namibia, and Zimbabwe to declare drought emergencies while South Africa and Mozambique declared partial disasters. SADC Climate Service Centre (SADC CSC, 2019) also reports that the

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[5] 58% of the population in Eswatini, 38% in Malawi, 34% in Lesotho, and 29% in Zimbabwe became food insecure due to these drought shocks

2018/2019 cyclone Idai had significant damage pushing Mozambique and Zimbabwe into drought. IPCC predicts that as the impact of climate change intensifies, the region is expected to have increased recurrent droughts if mitigation measures are not put in place. Thus, if this situation is not addressed the prospects for mobilizing additional tax revenues remain compromised.

How do natural hazards influence domestic tax revenue mobilization?

Several channels through which natural hazards influence tax collection is well established in the literature (see CERDI, 2015). The first effect is the negative impact that the natural disaster shocks have on economic activities which lower exports and imports and ultimately reduce direct and indirect tax revenues. The second effect is the depletion of capital stock as a result of natural disasters. According to the neoclassical growth model, if capital stock is destroyed, the country moves out of its steady-state equilibrium as noted through the lowered production frontier and per capita output. The third effect is the damage to economic infrastructure which may disrupt social services provision forcing businesses to shut down temporarily or permanently. If both public and private entities experience losses due to disasters, potential tax revenue prospects for the government are compromised. However, the influence of natural disaster shocks on tax revenue mobilization is dependent on the economic structure and taxation systems of each member state. This explains why in some member states the prevalence of natural disaster shocks was negative while in some it had no effect.

5.5.2 COVID-19 pandemic

The advent of COVID-19 has seen most people in the world losing their incomes and livelihoods, and SADC countries are not an exception. To cushion their people, most member states have reduced or eliminated taxes on medical equipment and supplies. Although it is for

a good cause this has a negative influence on tax revenue mobilization. Several COVID-19-induced changes in tax revenue mobilization are noted which include the closure of the informal sector and declining formal economic activities, reduction in tax rates, tax deferments, and compromised tax administrative roles. As established in previous chapters, SADC economies are highly informal with the shadow economy output contributing around 25-65% to the total GDP. The coming of the pandemic has seen most of the informal enterprises being forced to shut down which has had a negative impact on formal entities that rely on the informal sector for inputs. As such the reduced spending patterns of both the formal and informal employees have had a lowering effect on VAT collections. Aslam et al. (2022) argue that the COVID-19 shock has not only damaged the VAT tax base but also CIT and PIT. Thus, the declining economic factors in both the formal and informal sectors due to COVID-19 have constrained tax revenue mobilization hence the declining trend in tax ratios in 2020 relative to 2019 is noted. However, the tax ratio trends also show a fall in tax ratios in 2019 compared to the period before 2019 which reflects the impact of other external factors.

Chikova and Millimouno (2021) have analyzed several case studies one of which is DRC. DRC is reported to have instituted exemptions on all forms of levies, duties, taxes, and fees on pharmaceutical supplies for a period of 6 months during COVID-19. In addition, DRC suspended VAT on basic goods for a period of 3 months. These could possibly explain the lower levels of tax collection in 2020 by DRC. Botswana introduced a tax deferment of 75% on self-assessment tax (SAT) for the second and third quarters of 2020 with companies to start payment by March 2021. In addition, Botswana reduced the refund period from 60 to 21 days. Although tax deferments offer breathing spaces for companies to have cashflows, it leads to a late collection of much-needed revenues. More so, Mauritius scrapped the penalties or interests that are normally charged on late tax payments or returns submission during the lockdown

period. While this action eases the obligations of the taxpayer, it complicates the compliance monitoring tasks of tax administration authorities and may reduce compliance in the future as people feel a bit relaxed which has a detrimental effect on tax revenue mobilization. Furthermore, COVID-19 induced a shift from face-to-face to online service which saw a lot of SADC member states having challenges in enforcing compliance and collecting lower taxes due to lower levels of digitalization.

CHAPTER SIX

CONCLUSION, POLICY IMPLICATIONS AND AREAS FOR FURTHER STUDY

6.1 Introduction

Chapter Five presented the major findings from both the quantitative and qualitative analysis followed by a discussion to attempt to interpret the results and answer the research questions. This final chapter presents a summary of the study, key findings, and policy implications as well as the conclusion, limitations of the study, and suggested areas for further research.

6.2 Summary of the study

The study sought to assess tax revenue performance in SADC by estimating tax capacity and tax effort to determine whether member countries have attained their full tax potential given their handles and whether the maximum effort has been exerted to utilize such tax capacities. This was against the background that the region needs to raise additional funds to finance its member countries' socio-economic development primacies, regional strategic urgencies, and international commitments. Such an analysis was aimed at revealing whether the low tax collections in the region are because of low tax capacities, administrative inefficiencies, changes in tax structure and systems, or the influence of external shocks to provide broad guidance for tax policy design and reforms. Five questions guided the research and these are: i) What factors determine tax revenue performance in SADC? ii) Are tax systems in the region operating below or above their tax potential and how do member states rank in terms of tax effort? iii) To what extent do low taxable capacity explain low tax collections in the region? iv) To what extent do administrative inefficiencies explain low tax collections in SADC? v) Have there been significant external shocks or changes in tax structure and systems in SADC over the period 2000 to 2020 that could have influenced tax revenue performance? If yes, what is the extent of the influence?

This study employed a mixed approach in assessing tax revenue performance in SADC. The quantitative approach was focused on investigating the determinants of tax revenue performance, estimating the potential tax capacity, and calculating the tax effort for each member state. The theoretical and empirical reviews guided the selection of the dependent variable (actual tax to GDP ratio and the regressors (per capita income, trade openness, financial deepening measure, level of urbanization, size of the informal economy, foreign aid, the share of agriculture in total GDP and governance measures (government effectiveness, regulatory quality, control of corruption and political stability). The quantitative approach used the fixed effect regression for panel data to deviate from the previous research done on the same region with the same focus. Since to the best of my knowledge, there is limited literature on tax revenue performance assessment using tax effort and tax capacity (but see Chigome & Robinson, 2021), the choice of standard regression enabled a comparison of the estimation methods (standard regression vs SFA) and validation of results.

The qualitative approach was aimed at supplementing the standard regression results by providing a narrative analysis of the influence of changes in tax structure and systems, and external shock on tax revenue mobilization. Chapter Two provided SADC's historical background in line with taxation issues and the prevailing macroeconomic convergence targets to give insights into the study context. Chapter Two also gave an overview of SADC's tax structures and systems by presenting the country-level and regional-level trends and analyzing the significant changes in tax rates and tax bases and how the member countries are performing. The main purpose for this was to also highlight the possible influence of changes in tax systems on tax revenue performance. The second part of Chapter Five gave a narrative analysis of the influence of external shocks such as droughts, and the COVID-19 pandemic on tax revenue

performance in an attempt to explain the heavy fluctuations in average tax ratios, estimated tax effort, and tax capacity indices over the period.

The literature review considered three theories (economic, administrative, and political approaches) to get insights into factors that are considered when assessing tax revenue performance. All the issues raised by the theoretical approaches are found to be valid in this study in determining tax revenue performance. Other studies discussed under the empirical review also informed the choice of methodology model specification and variable selection as discussed in Chapter Four.

6.3 Key findings and policy implications

From Chapter Two, three key issues arise. First, though the region has set some macroeconomic convergence targets, the study finds that the region has so many challenges in attaining the set targets. The SADC secretariat should be empowered to be able to hold accountable any member state that deviates from the set targets. Second, the region has significant variations in tax structures, composition, and systems which is challenging tax harmonization and optimal tax revenue mobilization. The implication of this is that the region is not yet prepared to move towards unification of tax systems, thus obstacles impeding that need to be tacked first e.g. achieving consistency in macroeconomic indicators. Third, over the period 2000 – 2020, there are significant changes in tax legislation and tax rates which could be some of the possible reasons for heavy fluctuations in tax revenue performance. Therefore, the region should consider the realignment of tax policy to achieve efficiency.

The empirical results revealed that the level of economic development, trade openness, and level of financial deepening has a positive and statistically significant impact on tax capacity.

The only exception is that financial deepening loses its significance if control of corruption and political stability indices are considered as the indicators for governance quality. Therefore, the member states should be encouraged to pursue policies that encourage growth and policy reforms that enhance financial development toward regional financial integration. The issue of trade openness is debatable because the region has always pushed the FTA agenda yet some of the members states particularly those that are SACU members except for South Africa heavily depend on trade taxes. Even the shift to VAT was meant to reduce the dependence on trade taxes which seems to be impossible as yet.

The size of the informal sector, the share of agriculture to GDP, and urbanization are significant factors for determining tax revenue performance but have a limiting effect on tax collection. Thus, the size of the degree of informality of economic sectors is relatively large and cannot be ignored. To improve SADC's taxation, there is a need for widening tax bases by extending adequate support to the informal sector and ensuring that they are formalized and well-integrated into the formal economy. Adopting the ease of doing business reforms and finding alternative ways to tax the informal sector without hurting them are key issues.

When the quality of governance is considered, low government effectiveness, low regulatory quality, and poor mechanisms to control corruption are also found to be strong deterrents for mobilizing taxes. Although financial aid and political stability are exhibiting the expected signs, in this study they were found to be insignificant. One important thing to note is that of late, the significance of governance indices has become much stronger while the size of governance indices has increased as shown also in the empirical analysis of this study. Thus, the issue of enhancing governance needs to be seriously prioritized in all tax capacity-tax effort categories.

On tax capacity and tax effort, the study finds that half of SADC members have low tax capacity while only 5 members have high tax effort. The study finds that, on average, SADC has a tax effort of 1.06 which may suggest that at the regional level, SADC is well-utilizing its tax potential, but this implication should be taken with caution. This is because when the country-level analysis is considered using the tax effort and tax capacity estimates, many member states are poorly performing either in tax capacity or in tax effort. As such after classifying the member state according to tax capacity and tax effort four groups of performers emerge with varied policy suggestions for each category (see Table 16).

First, member states with both low tax capacity and low tax effort may have better opportunities to mobilize additional tax revenues without distorting their economies. Second, member states with low tax capacity and high tax effort may have less scope to raise additional tax revenues given the associated distortions that will come along with that. Third, member states with low tax capacity are also in a trap hence they need to create a favorable environment for private sector investment and revamp their tax systems but again they ought to think about the tax distortionary effects. Fourth, those member states with high tax capacity and high tax effort should turn their attention to ways of enhancing efficiency to mobilize additional revenues.

Last but not least the study finds that from 2000 to 2020, there have been significant shocks that have undermined tax revenue mobilization. These shocks include climate change-induced droughts, storms, and floods. The region has also been hard hit by COVID-19 which had raised a plethora of challenges and has seen changes in tax bases, alterations of tax rates, and complications in tax administration. More so, declining economic activities have been witnessed in both the formal and informal sectors which all have a reducing effect on tax revenue collection.

6.4 Conclusion

Taxation is highly considered the most sustainable way of financing public expenditure in SADC. Nonetheless, the member states continue to face gaps between the actual and theoretical tax revenue potential. This calls for tax policy reforms to close these lacunae, but a one size fits all approach cannot work for SADC given the differences in members' characteristics. As such the estimation of taxable capacity and calculation of tax efforts have enabled the study to consider these variations and categorized the member countries into four different groups of performers to provide broad policy guidance. The cross-cutting recommendation is the need for improving governance quality) by all the various categories. The specific recommendations are:

i. **Low tax capacity and low tax effort group:** they have better opportunities to mobilize additional tax revenues without distorting their economies. Focus should on directing efforts toward strengthening economic activities and encouraging investments, after which revenue enhancement can be pursued.

ii. **High tax capacity and high tax effort group:** the focus of these countries should not be entirely on revenue but on enhancing their efficiency in tax collection, minimizing tax-induced distortions, rebalancing the tax mix, and enhancing the business environment through rationalization of tax regimes.

iii. **Low tax capacity and high tax effort group:** focus on widening their tax bases, improving their tax administration, and strengthening their functions. Parallel reforms should also be instituted to create a conducive regulatory environment to encourage private investment, and face-lift the tax systems to minimize both tax collection costs and economic distortions induced by taxes.

iv. **High tax capacity and low tax effort group:** These have room to increase their tax effort by implementing reforms that minimize distortions. They may also consider the need to restructure their tax policy mix depending on the tax burdens.

Even though tax revenue performance assessment is necessary to inform policy, it has never been easy to measure. The empirical analysis, however, finds that the results obtained by previous research (see Chigome & Robinson, 2021) are closer to this study's tax capacity and tax effort estimates including the determinants of tax revenue performance considered under their study. Overall, the low tax revenue performance in SADC is attributable to both low tax capacity and administrative inefficiencies. In addition, the tax systems in the region are operating below the potential tax capacity. Firstly, the region is faced with several challenges emanating from the impact of external shocks such as droughts and the COVID-19 pandemic, etc. which have also constrained tax revenue collection drastically.

The findings of this study should be cautiously interpreted since it might be possible that there are some errors in modeling tax capacity and tax effort and how the actual tax ratio was measured. Designing tax policy reforms requires a detailed country analysis hence this study should not be a substitute for specific country analysis but rather a complimentary. The use of the TADAT framework to assess tax revenue performance is also encouraged to have a detailed qualitative perspective to complement the quantitative approach in this study.

Future studies should aim to on building a model that incorporates changes in tax rates, changes in legislation, and external shocks and systems to be able to test their influence empirically. Also, member country assessment of tax revenue performance using the TADAT framework is also key to complementing this empirical analysis.

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APPENDICES

A. PREDIAGNOSTIC TESTS

Multicollinearity

i.   Showing presence of multicollinearity

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) gdppc	1.000										
(2) urbp	0.579	1.000									
(3) topen	0.228	-0.056	1.000								
(4) agric	-0.689	-0.539	-0.554	1.000							
(5) infor	-0.628	-0.359	-0.413	0.436	1.000						
(6) logfid	0.745	0.387	0.311	-0.568	-0.623	1.000					
(7) faid	-0.554	-0.372	-0.206	0.525	0.299	-0.466	1.000				
(8) cc	0.673	0.262	0.329	-0.520	-0.720	0.639	-0.341	1.000			
(9) ge	0.797	0.384	0.286	-0.618	-0.677	0.763	-0.360	0.887	1.000		
(10) ps	0.581	0.191	0.274	-0.423	-0.568	0.647	-0.293	0.808	0.762	1.000	
(11) re	0.744	0.353	0.226	-0.493	-0.758	0.678	-0.308	0.892	0.931	0.777	1.000

ii.   Multicollinearity fixed by dropping highly correlated variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) gdppc	1.000							
(2) urbanpop	0.579	1.000						
(3) topen	0.228	-0.056	1.000					
(4) agric	-0.689	-0.539	-0.554	1.000				
(5) infor	-0.628	-0.359	-0.413	0.436	1.000			
(6) logfid	0.745	0.387	0.311	-0.568	-0.623	1.000		
(7) faid	-0.554	-0.372	-0.206	0.525	0.299	-0.466	1.000	
(8) cc	0.673	0.262	0.329	-0.520	-0.720	0.639	-0.341	1.000

Panel Unit root test results

Variable	p-value	Order	Options	Additional test
taxgdp	0.0007	I(0)		
gdppc	0.0007	I(0)		
urbanpop	0.0000	I(0)		
topen	0.0106	I(0)		
agr	0.0000	I(0)		
infor	0.0001	I(0)		
logfid	0.0732	I(0)	trend	If option lags(0) is chosen the p-value is 0.0179;
aid	0.0139	I(0)		
cc	0.0354	I(0)	lags(0)	The generated p-values from Fisher test (dfuller) show that at least one panel is stationary
ps	0.0000	I(0)		
ge	0.0016	I(0)		
rq	0.0241	I(0)		

B. MODEL CHOICE

Fixed Effects Model; option vce cluster(countryid)

tgdp	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
gdppc	.002	0	4.45	0	.001	.003	***
urbanpop	-.532	.099	-5.39	0	-.726	-.338	***
topen	.076	.014	5.31	0	.047	.104	***
agric	-.549	.094	-5.86	0	-.733	-.364	***
infor	-.395	.126	-3.13	.002	-.644	-.147	***
logfid	1.917	.858	2.24	.026	.228	3.606	**
faid	.023	.05	0.47	.64	-.075	.122	
ge	-4.627	1.272	-3.64	0	-7.131	-2.122	***
Constant	41.888	8.927	4.69	0	24.313	59.463	***

Mean dependent var	19.142	SD dependent var		10.899
R-squared	0.338	Number of obs		294
F-test	17.362	Prob > F		0.000
Akaike crit. (AIC)	1569.874	Bayesian crit. (BIC)		1603.027

*** p<.01, ** p<.05, * p<.1

Random Effects Model; option vce cluster(countryid)

tgdp	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
gdppc	.001	0	3.25	.001	.001	.002	***
urbanpop	-.347	.077	-4.50	0	-.498	-.196	***
topen	.077	.014	5.48	0	.05	.105	***
agric	-.564	.086	-6.54	0	-.733	-.395	***
infor	-.294	.098	-3.00	.003	-.485	-.102	***
logfid	1.366	.843	1.62	.105	-.287	3.019	
faid	.025	.051	0.50	.619	-.074	.124	
ge	-4.141	1.123	-3.69	0	-6.342	-1.94	***
Constant	34.643	7.38	4.69	0	20.179	49.107	***

Mean dependent var	19.142	SD dependent var		10.899
Overall r-squared	0.546	Number of obs		294
Chi-square	160.273	Prob > chi2		0.000
R-squared within	0.326	R-squared between		0.585

*** p<.01, ** p<.05, * p<.1

Hausman (1978) specification test (included government effectiveness)

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| | —— Coefficients —— | | | |
| | (b) | (B) | (b-B) | sqrt(diag(V_b-V_B)) |
	fe	re	Difference	S.E.
gdppc	.0020293	.0014027	.0006266	.000184
urbanpop	-.5320555	-.3469639	-.1850916	.0646678
topen	.0755014	.0772547	-.0017533	.004124
agric	-.5488447	-.5636749	.0148302	.0429461
infor	-.3952766	-.2937315	-.101545	.0838181
logfid	1.917089	1.365623	.5514664	.2687591
faid	.0234347	.02516	-.0017253	.01031
ge	-4.626754	-4.141407	-.4853463	.6650735

```
                b = consistent under Ho and Ha; obtained from xtreg
        B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

            chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                    =        28.56
        Prob>chi2 =        0.0004
```

Hausman (1978) specification test (included control of corruption)

```
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```

| | —— Coefficients —— | | | |
| | (b) | (B) | (b-B) | sqrt(diag(V_b-V_B)) |
	fe	re	Difference	S.E.
gdppc	.0016095	.0008868	.0007227	.0002105
urbanpop	-.4190631	-.2687143	-.1503488	.0629182
topen	.0805231	.0801525	.0003706	.004299
agric	-.5367832	-.5248892	-.011894	.0455299
infor	-.4231175	-.2992413	-.1238762	.084048
logfid	1.312989	.9157548	.3972338	.2573534
faid	.0191625	.0129346	.0062279	.0112028
cc	-.4361614	-1.567037	1.130875	.7616852

```
                b = consistent under Ho and Ha; obtained from xtreg
        B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

            chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                    =        27.60
        Prob>chi2 =        0.0006
```

C. POST-MODEL SELECTION DIAGNOSTIC TESTS

Cross-sectional Dependence Test

Cross-sectional dependence test using the Pesaran CD test (ge)

Test: H_0: residuals are not correlated

Pesaran's test of cross-sectional independence = -1.384

Pr = 0.1665

Average absolute value of the off-diagonal elements = 0.353

Cross-sectional dependence test using the Pesaran CD test (cc)

Test: H_0: residuals are not correlated

Pesaran's test of cross-sectional independence = -1.015

Pr = 0.3099

Average absolute value of the off-diagonal elements = 0.378

Heteroskedasticity Test (Modified Wild Test)

Test for heteroskedasticity using xttest3 (ge)

Test: H_0: sigma(i)^2 = sigma^2 for all I (constant variance)

LR chi2(13) =   1038.19

Prob > chi2 =   0.0000

Test for heteroskedasticity using xttest3 (cc)

Test: H_0: sigma(i)^2 = sigma^2 for all I (constant variance)

LR chi2(13) =   1844.44

Prob > chi2 =   0.0000

Autocorrelation Test

Woogridge's test for autocorrelation (serial correlation); government effectiveness

Test: H_0: nofirst-orderautocorrelation

F (1, 13) = 51.869

Prob>F = 0.0000

Wooldridge's test for autocorrelation (serial correlation); control of corrption

Test: H_0: nofirst-orderautocorrelation

F (1, 13) = 44.898

Prob>F = 0.0000

D. Standard Regression results – Fixed Effects Model

Fixed Effects Model (clustered-country level) Regression results– government effectiveness

tgdp	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
gdppc	.002	0	4.45	0	.001	.003	***
urbanpop	-.532	.099	-5.39	0	-.726	-.338	***
topen	.076	.014	5.31	0	.047	.104	***
agric	-.549	.094	-5.86	0	-.733	-.364	***
infor	-.395	.126	-3.13	.002	-.644	-.147	***
logfid	1.917	.858	2.24	.026	.228	3.606	**
faid	.023	.05	0.47	.64	-.075	.122	
ge	-4.627	1.272	-3.64	0	-7.131	-2.122	***
Constant	41.888	8.927	4.69	0	24.313	59.463	***

Mean dependent var	19.142	SD dependent var	10.899
R-squared	0.338	Number of obs	294
F-test	17.362	Prob > F	0.000
Akaike crit. (AIC)	1569.874	Bayesian crit. (BIC)	1603.027

*** p<.01, ** p<.05, * p<.1*

Fixed Effects Model (clustered-country level) Regression results– control of corruption

tgdp	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
gdppc	.002	0	3.55	0	.001	.003	***
urbanpop	-.419	.097	-4.34	0	-.609	-.229	***
topen	.081	.015	5.53	0	.052	.109	***
agric	-.537	.096	-5.60	0	-.726	-.348	***
infor	-.423	.129	-3.28	.001	-.677	-.169	***
logfid	1.313	.862	1.52	.129	-.385	3.011	
faid	.019	.051	0.37	.708	-.082	.12	
cc	-3.436	1.371	-2.51	.051	-3.135	2.263	*
Constant	43.404	9.131	4.75	0	25.428	61.38	***

Mean dependent var	19.142	SD dependent var	10.899
R-squared	0.306	Number of obs	294
F-test	14.999	Prob > F	0.000
Akaike crit. (AIC)	1583.725	Bayesian crit. (BIC)	1616.877

*** p<.01, ** p<.05, * p<.1*

Fixed Effects Model (clustered-country level) Regression results – regulatory quality

tgdp	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
gdppc	.002	0	4.31	0	.001	.003	***
urbanpop	-.499	.097	-5.15	0	-.69	-.308	***
topen	.076	.014	5.29	0	.047	.104	***
agric	-.558	.094	-5.93	0	-.743	-.373	***
infor	-.377	.127	-2.96	.003	-.628	-.127	***
logfid	1.945	.866	2.25	.026	.24	3.65	**
faid	.019	.05	0.38	.704	-.08	.118	
re	-4.362	1.312	-3.33	.001	-6.944	-1.78	***
Constant	40.501	8.993	4.50	0	22.795	58.206	***

Mean dependent var	19.142	SD dependent var		10.899
R-squared	0.333	Number of obs		294
F-test	16.973	Prob > F		0.000
Akaike crit. (AIC)	1572.114	Bayesian crit. (BIC)		1605.266

*** p<.01, ** p<.05, * p<.1*

Fixed Effects Model (clustered-country level) Regression results –political stability

tgdp	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
gdppc	.002	0	3.40	.001	.001	.002	***
urbanpop	-.445	.1	-4.46	0	-.641	-.248	***
topen	.081	.014	5.57	0	.052	.109	***
agric	-.55	.096	-5.71	0	-.74	-.361	***
infor	-.476	.139	-3.42	.001	-.749	-.202	***
logfid	1.301	.859	1.51	.131	-.39	2.992	
faid	.02	.051	0.40	.692	-.08	.121	
ps	.756	.735	1.03	.305	-.691	2.204	
Constant	47.05	9.791	4.81	0	27.774	66.326	***

Mean dependent var	19.142	SD dependent var		10.899
R-squared	0.309	Number of obs		294
F-test	15.171	Prob > F		0.000
Akaike crit. (AIC)	1582.692	Bayesian crit. (BIC)		1615.845

*** p<.01, ** p<.05, * p<.1*