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Assessing Tax Effort and Tax Buoyancy in Malawi: An ARDL Approach

Chalanda, Tinenenji

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Assessing Tax Effort and Tax Buoyancy in Malawi: An ARDL Approach

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by

Tinenenji Chalanda

Student Number: **2744812**

Supervised by Dr Nyasha Mahonye

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ABSTRACT

This study assesses tax effort and tax buoyancy in Malawi using an Autoregressive Distributed Lag (ARDL) model to analyze the responsiveness of tax revenue to macroeconomic factors. The findings indicate that Malawi's tax system is less buoyant, with tax revenues responding more to short-term economic fluctuations than to long-term GDP growth. Inflation appears to be the most significant determinant of tax revenue, while tax effort indices suggest that Malawi collects revenues within its estimated capacity. However, inefficiencies in tax administration, structural economic constraints, and a high degree of informality limit the country's ability to optimize revenue collection. The study highlights the need for broadening the tax base, improving tax compliance, and enhancing administrative efficiency to strengthen domestic resource mobilization. Key policy recommendations include reducing reliance on indirect taxation, addressing tax compliance issues, and leveraging technology to enhance tax administration. The study also identifies gaps in existing research, particularly the need for more granular analyses of sectoral tax performance and the role of governance in tax collection.

DECLARATION

I declare that the work presented in this research paper is own and that it has never been presented for any academic purpose at this or any other University. Where other people's work has been used, acknowledgement has been duly made. I am responsible for any errors made in this paper.

Signature  Date 28/02/2025

TABLE OF CONTENTS

ABSTRACT 3
DECLARATION 4
TABLE OF CONTENTS 5
LIST OF FIGURES 7
LIST OF TABLES 7
CHAPTER 1 8
INTRODUCTION 8
1.2 OBJECTIVES 9
1.3 RESEARCH QUESTIONS 9
1.4 PROBLEM STATEMENT 9
1.5 OUTLINE OF THE THESIS 11
CHAPTER 2 12
TAX REVENUE PERFORMANCE IN MALAWI 12
2.1.1 INTRODUCTION 12
2.1.2 TAX ADMINISTRATION AND LAW 12
2.1.3 TAX REVENUE PERFORMANCE 13
2.2 CHALLENGES WITH TAX ADMINISTRATION IN MALAWI 13
2.3 TAX RATES IN COMPARISON TO REGIONAL COUNTERPARTS 14
2.4 CONCLUSION 15
CHAPTER 3 17
LITERATURE REVIEW 17
3.1 INTRODUCTION 17
3.2 THEORETICAL FRAMEWORK 17
3.3 EMPIRICAL LITERATURE REVIEW 18
3.3 CONCLUSION 20
CHAPTER 4 21
METHODOLOGY 21
4.1 INTRODUCTION 21
4.2 MODEL SPECIFICATION, DATA AND VARIABLES 21
4.3 ESTIMATION PROCEDURE 23
4.4 MEASUREMENT OF TAX EFFORT 25
4.5 CONCLUSION 25
CHAPTER 5 27
ESTIMATION AND INTERPRETATION OF RESULTS 27
5.1 INTRODUCTION 27

5.2 TAX CAPACITY AND TAX BUOYANCY 27
5.2.1 Descriptive Statistics 27
5.2.2 Stationarity Tests 28
5.2.3 ARDL Bounds Test for Cointegration 29
5.3 TAX INDICES ESTIMATIONS 34
5.4 CONCLUSION 36
CHAPTER 6 37
CONCLUSION AND POLICY RECOMMENDATIONS 37
6.1 SUMMARY OF RESULTS 37
6.2 POLICY RECOMMENDATIONS 39
6.3 RESEARCH GAPS AND FURTHUR STUDIES 39
6.4 CONCLUSION 39
REFERENCES 41
Appendix 1 43

LIST OF FIGURES

Figure 1: Tax Type Revenue Performance 2000-2022 13

LIST OF TABLES

Table 1: Tax Performance in Comparison to Selected Regional Counterparts 15
Table 2: Descriptive Statistics 27
Table 3: CMR Test Results for Stationarity 28
Table 4a. Pesaran/Shin/Smith (2001) ARDL Bounds Test 29
Table 5: Tax Effort Indices 35

CHAPTER 1
INTRODUCTION

Effective domestic resource mobilization is crucial for every country's fiscal policy. With the exception of a few resource rich-countries, tax revenues provide governments with a stable and dependable source of revenues to finance the growth agenda. The need for self-sufficiency in development financing has become even more crucial post Covid-19 as the world at large went through a global crisis, leading to a funding squeeze that has affected aid dependent countries.

Tax revenue performance varies according to region and size of countries. In their tax statistics report for 2021, the Organization for Economic Co-operation and Development (OECD) showed that the tax to GDP ratio for African countries averaged 15.6% compared to 34.1% in OECD countries; 21.7% in the Latin America and the Caribbean; and 19.8% in Asia and the Pacific (OECD 2023). The International Monetary Fund (IMF) reports a tax-to-GDP ratio of 15% for developing countries to take off economically (IMF, 2017). For Malawi in particular, the tax to GDP ratio has averaged 13% over the past 5 years which is below the African average of 15.6% as presented by the OECD. Following Malawi's rebasing of the GDP from the 2010 base to the 2017 base which occurred in 2019, the tax-to GDP ratio reduced significantly from 18% recorded in 2016 to 10% in 2017. While high tax-to-GDP ratio does not inherently indicate that a country is operating more efficiently than others (Mkandawire 2010), it offers a reliable metric for comparing countries and holding all other factors constant, it serves as a strong indicator of the efficacy of both tax policy and tax administration within a country.

According to data extracted from the Ministry of Finance Annual Economics Reports, for the period between 2019 and 2023, tax revenues accounted for an average of 80% of total government expenditures between 2018/19 and 2022/23 fiscal years, underscoring the need for a robust tax policy framework that balances revenue generation without over burdening the fiscus. Economically, Malawi classifies as a least developed country with a GDP per capita of $695 according to the World Bank's World Development Indicators (WDI) as of 2023.

The country, like many developing countries in Africa, faces several structural challenges that do not only impact tax revenue performance, but affect economic performance in general (Gupta, 2007). These include low levels of domestic value addition, commodity dependency and high levels of informality among other problems. As of 2020, the World Bank estimated the informal economy output at 40%, making Malawi one of the top countries with a substantial informal sector. Malawi is also an agro-based economy with agriculture accounting for about a third of

GDP and employing over 80% of the working population, which might also impact tax revenue performance as the agricultural sector is usually highly subsidized by government. Additionally, the country also faces other infrastructural issues including limited power production to support manufacturing and poor road infrastructure. All these structural issues put more pressure on government to rely heavily on tax revenues for the national budget. Moreover, tax compliance remains a significant issue due to inadequate enforcement mechanisms and widespread corruption (Masiya, Chafuwa & Donda, 2015).

Estimating the tax effort and the responsiveness of tax revenues to macroeconomic indicators is therefore of utmost importance for a country like Malawi to assess whether the country is efficient in domestic resource mobilization. Knowing the capacity of the country to collect tax revenues not only provides the government with the estimates needed to draw a national budget within its coffers and assess the efficiency of the revenue administration agency, but it also gives an indication of when a country is overtaxing the economy through higher tax rates

1.2 OBJECTIVES

The objectives of the study are:

1. To assess the robustness of tax revenue collection in Malawi by estimating the tax effort, tax capacity and tax buoyancy,
2. To assess the degree or responsiveness between macroeconomic factors and tax revenue collection in Malawi; and;
3. To assess how economic, institutional, demographic factors vary in the degree of their effects to tax revenue collection in Malawi.

1.3 RESEARCH QUESTIONS

Specifically, this study will aim to answer the following questions;

1. To what extent does Malawi's tax effort align with its potential tax capacity?
2. How responsive is tax revenue collection in Malawi to changes in gross domestic product?
3. How do different factors such as economic, institutional, demographic factors vary in the degree of their effects to tax revenue collection in Malawi?

1.4 PROBLEM STATEMENT

Tax effort and tax buoyancy are two critical concepts in public finance that assist with the diagnosis of challenges facing domestic resource mobilization with specific focus on tax revenue

collection. While tax effort assesses the extent to which a country utilizes its tax base relative to its potential, offering valuable insights into revenue mobilization efficiency and the adequacy of tax policies (Naape & Mahonye, 2021), tax buoyancy captures the responsiveness of tax revenues to changes in national income, reflecting both economic growth and the impact of discretionary tax measures (Akar & Şahin, 2015). These two indicators are pertinent in evaluating the effectiveness of tax systems, guiding revenue forecasts, and formulating evidence-based fiscal policies.

Despite the various initiatives employed by the Malawi Government to strengthen tax revenue collection, Malawi continues to grapple with a persistently low tax-to-GDP ratio which currently falls below the African average of 15.6%. This low tax-to-GDP ratio is an indication of inefficiencies in tax administration, tax policy and other structural and institutional constraints that challenge the country's ability to mobilize domestic resources effectively. These inefficiencies have long lasting effects on fiscal sustainability and economic growth considering that over 80 percent of the national budget is financed by taxes.

While existing literature has explored tax revenue determinants in Malawi, significant gaps remain. Studies by Chilima (2023), and Masiya et al. (2015) have primarily relied on aggregate tax revenue data and focused on a narrow range of explanatory variables, including GDP, GDP per capita, and sectoral contributions to GDP. This approach, while informative, overlooks other important dimensions such as the influence of governance, the impact of population on tax and the disaggregation of tax lines. The majority of the existing studies have paid insufficient attention to the interplay between institutional quality, compliance behavior, and tax administration capacity in shaping tax performance.

Malawi's unique structural and institutional challenges which includes a substantial informal economy and commodity and import dependence further complicate efforts to enhance tax revenue collection. In the absence of a comprehensive assessment of the factors affecting tax effort and buoyancy, it remains a challenge to frame context specific tax policy that would support enhanced revenue collection. Therefore, a multidimensional analysis is necessary to uncover the root causes of Malawi's tax revenue shortfalls to identify untapped revenue potential and propose actionable solutions.

This study will add on to the existing literature by disaggregating tax lines for precise assessment, with focus on value added tax (VAT), corporate income tax (CIT) and Pay as You

Earn (PAYE) which cumulatively contribute about 70% of tax revenues in Malawi. Additionally, the study contributes to the existing body of literature by incorporating variable that are rarely examined, such as consumption data, good governance indicators (as a proxy for corruption), and the examination of the relationships between the determinants of tax revenue and the determinants of tax effort.

1.5 OUTLINE OF THE THESIS

The rest of this thesis is organized as follows; Chapter 1 provides introduction to the thesis which provides motivation for the thesis, objectives of the study and significance of the study. Chapter 2 provides an overview of tax revenue performance in Malawi focusing on revenue performance for the last decade and also a comparative analysis of tax revenue performance in Malawi in comparison to regional counterparts. Chapter 3 will discuss the theoretical framework and empirical literature on the determinants of tax effort and tax buoyancy and also the theoretical assumption of the autoregressive distributed lag (ARDL) model. Chapter 4 will present the econometric models used in the study and how the model will be specified. Chapter 5 will provide the interpretation of findings and the recommendations from the study. Finally, chapter 6 will conclude the thesis.

CHAPTER 2
TAX REVENUE PERFORMANCE IN MALAWI

2.1.1 INTRODUCTION

This chapter will present a brief about overall tax revenue performance in Malawi. The chapter will focus on the structure of the tax administering authority, the tax legislations, the revenue performance over the last 20 years, the challenges facing tax revenue collection in Malawi considering its status as a least developed country and finally, a comparative analysis of tax indicators between Malawi and selected regional counterparts.

2.1.2 TAX ADMINISTRATION AND LAW

Tax revenues in Malawi are collected by the Malawi Revenue Authority (MRA), a semi-autonomous agency which was established by an Act of Parliament in 1998 and officially began its operations in 2000 after combining the functions of the income tax division of the Ministry of Finance and the Customs office. Operating under the strategic oversight of the Ministry of Finance, the MRA is responsible for the assessment, collection, and enforcement of taxes (MRA Annual Report, 2023). Its critical mandate includes enhancing compliance, minimizing tax evasion, and optimizing revenue mobilization to fund national development priorities.

The Authority has two revenue collecting division, the domestic taxes division responsible for collecting all taxes generated within the borders of Malawi and the Customs and Excise Division responsible for collecting taxes on international trade (MRA annual report 2023). With regard to tax revenue collection, the Domestic Tax Division administers two main tax laws, the Taxation Act which guides the administration of income taxes such as CIT, PAYE, Capital Gains Tax and Non-Resident Tax and the VAT Act which prescribes the VAT rate and the list of products and supplies subjected to or exempted from VAT. Domestic taxes account for between 70% and 75% of total taxes in Malawi.

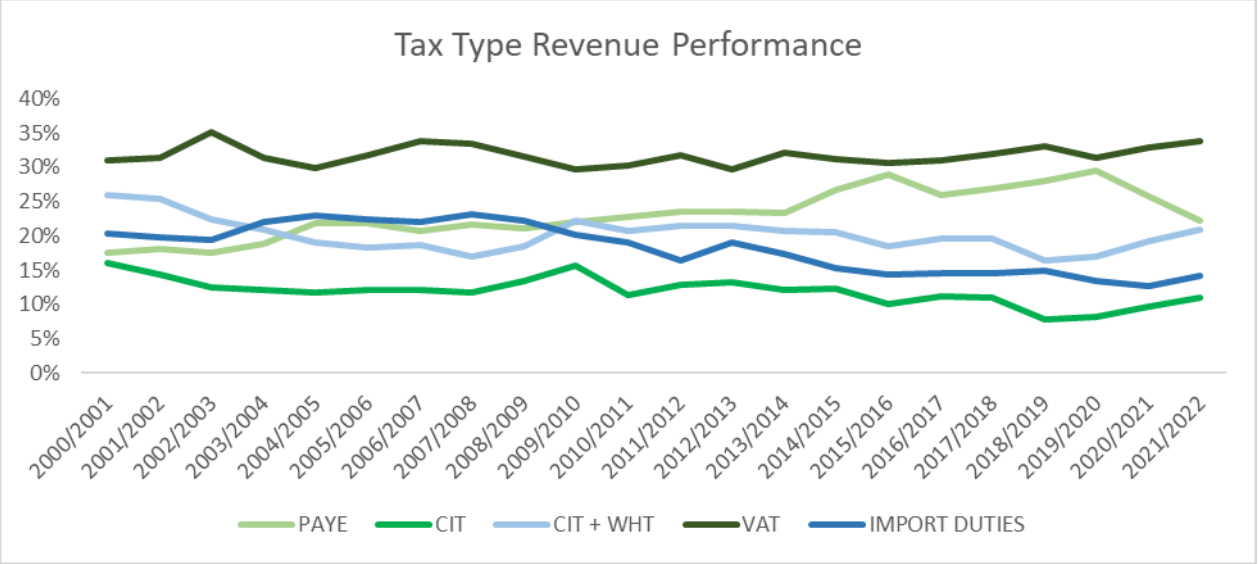
The Customs and Excise division on the other hand administers the Customs and Excise Act which includes import duty, import excise and other import surcharges. The Customs and Excise tax also administers the advance income tax (AIT) at importation on reference from the Taxation Act for presumed business imports for individuals not registered for Income Tax. The analysis to be done in this study will therefore hinge mostly on the operations of the domestic taxes division. VAT however will be included both at supply and importation to provide an overview of overall consumption in Malawi.

2.1.3 TAX REVENUE PERFORMANCE

Statistics on taxes in Malawi show that VAT remains the top revenue contributor in Malawi, contributing over a third of total taxes in Malawi, which is typical for developing countries with less sources of revenue. PAYE is the second largest revenue contributing tax line although it has been exhibiting declining trends over the last 5 years (see figure 1) despite labor force participation rate remaining relatively stable at 69% according to 2023 WDIs. The contribution of PAYE to total taxes has significantly reduced from 28% in 2017 to 22% in 2022. This decline could be an indication of different factors including the impacts of the increase in the tax-free bracket from MK45,000 (USD24) per month to MK100,000 (USD54) in 2021.

CIT, when including withholding tax on supplies is the third largest contributing tax line accounting for about 20% of total revenues. However, when withholding taxes are excluded, CIT alone accounts for roughly 11% of total revenues.

Figure 1: Tax Type Revenue Performance 2000-2022



Source: Author plot from data provided by MRA

2.2 CHALLENGES WITH TAX ADMINISTRATION IN MALAWI

High Levels of Informality

Malawi is considered to be one of the countries with a high informal sector in the region and also worldwide. While statistics on the extent of the informal sector are unavailable, the World Bank in 2021 reported that informal unemployment accounting for over 90% of total employment in Malawi.

In attempt to capture small business operating informally in the tax net, the Government of

Malawi passed amendments to the Taxation Act in 2021 to repeal the turnover tax (an income tax for small business with an annual turnover of MK10 million [1] (USD 5300) and introduce the presumptive tax with specific taxes for various income range. The Presumptive taxes were specifically designed to promote voluntary compliance and encourage registration by simplified taxation processes. The block management system was also implemented to complement the presumptive taxes by easing access to various services by taxpayers (MRA Annual Report 2023). However, full implementation of the presumptive tax policy has stalled due to delays in gazetting the regulations. As of December 2024, Malawi still operates small businesses based on their annual turnover.

Inadequate levels of Automation

Over the past years, Malawi has been trying to modernise its tax systems in a bid to improve efficiency, enhance compliance and close revenue loopholes. One of the most notable reforms has been the deployment of the Msonkho Online (MO) system, an integrated tax administration system designed to streamline tax registration, filing, and payment processes (MRA Annual Report 2023). Although not fully operational, MO represents a major step towards modernizing Malawi's tax administration. The system was first (partially) rolled out in 2021 with VAT and PAYE included in the pilot. Prior to this, only international trade taxes collected at the boarder were systemized under ASYCUDA World while all domestic taxes were operating manually. The lack of a fully-fledged system to manage domestic taxes which contributes the majority of the taxes could present several loopholes in revenue collection.

2.3 TAX RATES IN COMPARISON TO REGIONAL COUNTERPARTS

The tax rates in Malawi are relatively closer to what is obtainable in the region. For instance, the VAT rate of 16.5% is slightly above the Southern African Development Community (SADC) regional average of 16%. The CIT rate of 30% is also closer to what is obtainable in the region with the exclusion of Botswana which has a lower CIT rate of 22%. The tax rates for Malawi in comparison to a selected number of countries within the region has been presented in table 1 below.

[1] 1 USD equivalent to MK1885 as of December 2024.

Table 1: Tax Performance in Comparison to Selected Regional Counterparts

Indicator	Malawi	Zambia	Tanzania	Mozambique	South Africa	Botswana	Namibia
VAT Rate	16.5%	16%	18%[2]	16%	15%	14%	15%
Corporate Income Tax (CIT)	30%	30%	30%	32%	28%	22%	32%
Highest PAYE Bracket	35%	37.5%	30%	32%	45%	25%	37%
Tax-to-GDP Ratio[3]	12.5%	16.2%	15%	21.8%	27.2%	13.6%	19.7%

Source: OECD tax statistics (2023), PWC country tax summaries (2024)

2.4 JUSTIFICATION FOR SELECTING MALAWI AS A CASE STUDY

Malawi offers a distinctive context for analyzing tax effort, capacity, and buoyancy due to its specific economic and institutional features as presented in the sections above. As one of the least developed countries facing significant structural challenges including a large informal sector, heavy reliance on agriculture, and limited industrialization, the country faces constraints on the government's ability to mobilize domestic revenue effectively. Unlike many resource-rich African countries, Malawi's tax-to-GDP ratio remains below the regional average, reflecting inefficiencies in both tax policy and administration that necessitate closer examination. These characteristics make Malawi a suitable and insightful case study for understanding the challenges and opportunities of domestic resource mobilization in low-income countries.

2.5 CONCLUSION

This chapter has presented the tax revenue performance in Malawi, focusing on the structure and role of the MRA, the prevailing legislative frameworks and the revenue performance over the last 20 years. The discussion highlighted the dominance of VAT and PAYE as top revenue contributors despite declining trends in PAYE which might be attributed to policy changes such as the significant increase in the tax-free bracket. The analysis also discussed the main challenges facing tax administration in Malawi which include high informality and inadequate automation. The chapter also presented a comparative analysis of tax indicators in Malawi in comparison to selected regional counterparts. On this background, the next chapter will present

[2] VAT rate for mainland Tanzania. For Zanzibar, it is 15%
[3] Tax-to-GDP ratios as of 2022 and they exclude social security contributions

the empirical and theoretical literature review supporting the research question.

CHAPTER 3
LITERATURE REVIEW

3.1 INTRODUCTION

This chapter will present the review of existing literature of both the theoretical and empirical foundations of tax effort and tax buoyancy both in Malawi and in the region, highlighting existing consensus and gaps on the subject matter. The chapter will also discuss the theoretical underpinning of the ARDL model which will be used for estimation in the succeeding chapters.

3.2 THEORETICAL FRAMEWORK

3.2.1 Tax Optimality

Optimal tax theory is an economic framework aimed at designing tax systems that effectively balance revenue generation and social welfare while minimizing economic distortions. The theory has two central principles of efficiency and equity. The principle of efficiency aims at reducing deadweight loss associated with taxation while equity concerns the fair distribution of tax burdens across different income groups and sectors of the economy. Based on this theory, an optimal tax system would be one where revenue growth is in line with economic expansion (Akar & Şahin, 2015). The concept of equity is pertinent in developing economies like Malawi, where a large informal sector complicates the implementation of direct taxes (Bird & Zolt, 2003; Ayee, 2007).

The theory of optimal taxation informs this study as it guides the assessment of whether Malawi's tax system is sufficiently responsive to economic growth. It offers a framework for evaluating the efficiency of tax collection in response to GDP changes and other macroeconomic factors. According to Optimal Tax Theory, a well-functioning tax system should automatically adjust to economic conditions, ensuring that revenue grows in line with GDP without distorting productive behaviour (Stiglitz & Rosengard, 2015). With regard to tax effort, the theory frames the evaluation of tax effort by assessing whether Malawi is fully exploiting its tax potential. This involves determining whether the current tax policies capture as much revenue as possible without creating significant economic distortions.

3.2.2 Econometric Modelling: The ARDL Approach

The Autoregressive Distributed Lag (ARDL) model is one of the critical econometric tools that is used to explore the dynamic relationships between variables in the context of macroeconomic analysis. The model, pioneered by Pesaran and Shin (1999), allows researchers to examine the short- and long-run relationships between variables even when these variables have mixed

integration orders. This is very crucial in studies of tax effort and buoyancy as it facilitates the analysis of composite macroeconomic variables such as GDP, inflation, and institutional quality without the need for pre-testing stationarity of the variables. Therefore, the ARDL model's flexibility and robustness makes it a preferred choice for empirical research, especially in contexts where the relationship between the variables may evolve over time.

One of the key advantages of the ARDL model is its capacity to handle both I(0) and I(1) variables, meaning that it can be applied to time series data that may contain variables that are stationary at level (I(0)) or become stationary after differencing (I(1)). This is important when dealing with macroeconomic data, where different variables may exhibit different properties in terms of stationarity. The ARDL model therefore provides a more flexible framework for analyzing long-run relationships which is beneficial for studies on tax effort and buoyancy where macroeconomic variables exhibit varying degrees of stationarity.

3.3 EMPIRICAL LITERATURE REVIEW

The empirical literature on tax effort and buoyancy in developing countries has been extensive, with a particular focus on understanding the determinants and constraints faced by countries with low tax revenues such as Malawi. Most of these studies have assessed tax effort and buoyancy of a country using econometric models that consider various economic variables such as GDP growth, inflation, trade openness, and government policies. In the case of Malawi, a country heavily reliant on agriculture and with a substantial informal sector, understanding the dynamics of tax revenue mobilization has been an important area of research.

One of the early studies on tax effort in developing countries, conducted by Gupta (2007), identified a number of key determinants influencing tax revenue generation, including economic structure, institutional capacity, and governance quality. Gupta (2007) found that countries with higher levels of income, better governance, and stronger institutional frameworks had a high tax revenue generation capacity. These findings corroborate with several subsequent studies including Gérard and Naritomi (2018) and Chigome and Robinson (2021), who emphasize that good governance and effective tax administration are crucial for enhancing tax effort in developing economies. In the case of Malawi, the MRA has made significant strides in improving revenue collection, but challenges such as administrative inefficiencies and corruption continue to limit tax effort (Chilima, 2023).

Mkandawire (2010) also conducted a study on tax effort in developing countries and found the

large informal economy, characterized by subsistence farming, presents a significant challenge to effective tax collection. This is because while agriculture in developing countries contributes a significant portion of GDP, it is difficult to tax because it operates largely outside the formal economy which makes it hard and expensive to tax and also the sector is usually exempted from taxation. This argument was also presented by Bird and Zolt (2003) who agreed that the informal sector poses a significant barrier to increasing tax effort especially in developing countries. In Malawi, the dominance of agriculture and informality could limit the ability of the government to effectively tax a large part of the economy, making it harder to increase tax effort despite improvements in tax administration.

Chipeta (1998) conducted one of the earliest studies on tax buoyancy in Malawi and found that while VAT showed a moderate degree of buoyancy, other taxes such as income taxes were less responsive to economic growth. This is consistent with the findings of Stotsky and WoldeMariam (1997), who argued that countries with economies dominated by agriculture and the informal sector tend to have lower tax buoyancy. The low buoyancy in direct taxes in Malawi can therefore be attributed to the narrow tax base and the challenges in capturing income from informal activities.

Akar and Şahin (2015) used econometric models to examine tax buoyancy in Turkey, and their findings are relevant for understanding the dynamics of tax systems in developing economies like Malawi. They found that VAT and other consumption-based taxes exhibited higher buoyancy, reflecting the sensitivity of tax revenues to changes in consumption patterns. In Malawi, the reliance on VAT is a response to challenges in taxing income from the informal and agricultural sectors. However, this overreliance on consumption taxes, while improving tax buoyancy in the short term, has raised concerns about equity, as they tend to be regressive. A similar point is made by Mkandawire (2010), who argues that indirect taxes disproportionately burden low-income households, exacerbating income inequality in developing countries.

More recently, Chilima (2023) employed an Autoregressive Distributed Lag (ARDL) model to assess the relationship between economic growth and tax revenue in Malawi, finding that while economic growth had a positive effect on tax revenues, the response was not as strong as might be expected in more industrialized economies. This low elasticity of tax revenues to economic growth suggests that Malawi's tax system is relatively less responsive to changes in economic activity. The findings align with the work of Gupta (2007), who emphasized that in countries with a large informal sector and limited industrialization, the responsiveness of tax revenues to

economic growth tends to be lower.

In their analysis of tax optimality, Stotsky and WoldeMariam (1997) emphasized the need for developing countries to strike a balance between direct and indirect taxes in order to achieve an efficient and equitable tax system. They argued that while indirect taxes like VAT are easier to administer, they often fail to address issues of equity. This is particularly relevant in the case of Malawi, where the reliance on VAT and other consumption-based taxes exacerbates income inequality. The lack of a strong income tax base limits the ability of the government to impose progressive taxes that can better address wealth disparities. Tax reforms that broaden the tax base by capturing income from the informal sector and improving compliance with direct taxes could help move Malawi toward a more optimal tax system.

3.3 CONCLUSION

The chapter has reviewed existing literature on theories of tax effort and tax buoyancy in Malawi and in the region. The empirical literature on tax effort and buoyancy reveals that a combination of factors, including economic structure, administrative capacity, governance, and tax reforms, play crucial roles in shaping the tax systems of developing countries like Malawi. While Malawi has made progress in improving tax effort and buoyancy, significant challenges remain, particularly related to the informal sector, administrative inefficiencies, and the overreliance on indirect taxes. Addressing these challenges through targeted reforms, enhanced governance, and regional cooperation will be key to improving the country’s tax system and achieving fiscal sustainability

CHAPTER 4

METHODOLOGY

4.1 INTRODUCTION

This section presents the methodology of the study, the model specification and the justification of the variables used in the estimation of tax effort and tax buoyancy in Malawi using the ARDL approach. The section will provide a detailed outline on what econometrics techniques will be utilized to avoid spurious regressions and ensure robust assessment. The rest of this chapter is structured as follows: section 4.2 discusses the model specification, the variables and the data sources, section 4.3 will discuss the estimation procedure and econometric tests to be carried out while section 5 concludes the chapter.

4.2 MODEL SPECIFICATION, DATA AND VARIABLES

This study employs the ARDL model to examine both short-run and long-run relationships between tax revenue and its determinants in Malawi. The ARDL model's flexibility in handling variables of mixed integration orders (I(0) and I(1)) makes it particularly suited for this analysis, as Malawi's macroeconomic variables are expected to exhibit diverse stationarity properties.

For the purposes of this study, a linear ARDL framework is adopted rather than a nonlinear ARDL (NARDL) approach. This is because a linear specification is justified by the research objective, which focuses on estimating average tax buoyancy across the full sample period, rather than modelling potential asymmetric responses to positive and negative changes in the explanatory variables. While NARDL models (Shin et al., 2014) are useful for capturing such asymmetries, the linear ARDL approach (Pesaran & Shin, 1999; Pesaran et al., 2001) offers a more parsimonious specification, reduces estimation complexity, and avoids over-parameterisation risks in small-sample annual datasets such as Malawi's.

The buoyancy model will be specified as follows:

$$\Delta TR_t = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta X_{t-i} + \sum_{j=0}^{q} \gamma_j \Delta Z_{t-j} + \lambda_1 TR_{t-1} + \lambda_2 X_{t-1} + \lambda 3 Z_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$\Delta TR_{t\,(VAT)} = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta X_{t-i} + \sum_{j=0}^{q} \gamma_j \Delta Z_{t-j} + \lambda_1 TR_{t-1} + \lambda_2 X_{t-1} + \lambda 3 Z_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1.2)$$

$$\Delta TR_{t\,(CIT)} = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta X_{t-i} + \sum_{j=0}^{q} \gamma_j \Delta Z_{t-j} + \lambda_1 TR_{t-1} + \lambda_2 X_{t-1} + \lambda 3 Z_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (1.3)$$

$$\Delta TR_{t\,(PIT)} = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta X_{t-i} + \sum_{j=0}^{q} \gamma_j \Delta Z_{t-j} + \lambda_1 TR_{t-1} + \lambda_2 X_{t-1} + \lambda 3 Z_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (1.4)$$

Where:

- TR_t is the tax revenue at time t, which captures the levels of tax revenues collected at a particular period, measured as a percentage of the GDP. As presented above, three sub equations will be run, derived from equation 1 above. The first equation will measure cumulative tax revenue while the other three equations will separate VAT, CIT and PIT as presented in equations 1.2, 1.3 and 1.3. The rationale of the separation is to effectively capture which of the tax lines is more buoyant.
- X_t represents the set of macroeconomic variables which include GDP, inflation, exchange rate (MK/USD[4]), the share of manufacturing in GDP and the share of Agriculture in the GDP. The variables directly affect economic output and hence the base taxation. To avoid multicollinearity, the variables will be introduced in the model separately.
- Z_t represents structural factors which include governance (captured through the polity indices) and population. These variables have also been included in the model as they affect the efficiency of the tax administration in mobilising resources.
- Δ denotes the first difference operator,
- p and q are optimal lag lengths,
- β_i,γ_j and λ_1,λ_2,λ_3 are coefficients to be estimated,
- ε_t is the error term

The study utilizes annual time series data for Malawi covering the period 1980 to 2023. The data is sourced from the World Bank's WDIs, the IMF' International Financial Statistics (IFS),

[4] Malawi Kwacha per 1 unit of the United States Dollar

the Worldwide Governance Indicators (WGI) and National Statistics of Malawi (NSO). These datasets have been selected for their accuracy and hence the data will not require extensive data cleaning.

4.3 ESTIMATION PROCEDURE

The estimation will be performed as outlined below:

Unit Root Testing: To ensure the robustness of the ARDL model, all variables will undergo unit root testing to determine their order of integration. These tests will establish whether the variables are I(0), I(1), or a combination of both, which is critical for confirming the suitability of the ARDL approach. The unit root test will be done using the Clemente-Montañés-Reyes (CMR) Innovative Outlier (I0) test, which accounts for structural breaks in the data. The CMR test has been chosen over the standard stationarity tests like the Augmented Dickey-Fuller (ADF) or Phillips-Perron (PP) due to its ability to account for structural breaks in the dataset. For instance, the devaluations in 1997, 2012 and 2022 are expected to cause sudden shifts in the economic variables, therefore the CMR test provides more reliable results in the presence of structural changes, reducing the risk of incorrectly concluding that a series is non-stationary when it is actually stationary with breaks. All variables found to be integrated of order two [I(2)] will be excluded from the model since they cannot be run in the model.

The CMR test is specified as;

$$\Delta Y_t = \alpha + \beta t + \sum_{j=1}^{m} \theta_j B_{t-j} + \phi Y_{t-1} \sum_{i=1}^{k} \delta_i \Delta Y_{t-i} + \epsilon t \qquad \ldots\ldots\ldots\

(1998). If the test statistic is more negative than the critical value at a given significance level (e.g., 1%, 5%, or 10%), we reject the null hypothesis and conclude that the series is stationary with structural breaks. If the test statistic is greater than the critical value, we fail to reject the null hypothesis, implying that the series still contains a unit root despite structural breaks.

Bounds Test of Cointegration*:* In the presence of mixed order of integration, which is common in time series macroeconomic variables bounds testing approach will be employed. The model will test the two hypotheses: null hypothesis of no cointegration and the alternative hypothesis of cointegration. If the calculated F-statistic exceeds the upper critical bound, the null hypothesis will be rejected, indicating the presence of a long-run relationship. If the F-statistic falls below the lower bound, the null hypothesis will be accepted, confirming no long-run relationship. If the F-statistic is between lower-bound and upper bound, then the test of cointegration is inconclusive

Once cointegration has been established, the ARDL model will be estimated using Ordinary Least Squares (OLS). The optimal lag length for the estimations will be selected based on the Akaike Information Criterion (AIC).

The error correction model: The error correction model (ECM) derived from the ARDL model will capture the short-term adjustments, while the long-term coefficients will be derived directly from the level terms in the ARDL model. The results from the model will inform how buoyant the tax revenues are in relation to the determinants. If tax revenue grows faster than GDP (thus elasticity is greater than 1), the tax system will be deemed buoyant. The ECM will be based on equation 1 above.

4.3.2 Diagnostic Tests and Robustness Checks

To ensure that the results of this study are reliable and valid, a number of diagnostic tests shall be performed. Considering that equations 2,3 and 4 are just breakdowns of equation 1, the robustness check will focus on the main equation, which is equation 1 to avoid unnecessary redundancy. The tests to be conducted are presented below:

The Breusch-Godfrey Lagrange Multiplier (LM) test: This test will be employed to test for serial correlation in the residuals. The null hypothesis is that there is no serial correlation while the alternative hypothesis is that there is serial correlation. If the estimated p-value (the probability of obtaining test results at least as extreme as the observed results) is less than the

prescribed significance level, the null hypothesis shall be rejected.

The Breusch–Pagan/Cook–Weisberg test: This test will be employed to measure and control for heteroscedasticity in our model for more viable results. The null hypothesis is that there is no heteroscedasticity and the null hypothesis will be rejected if the p-value is less than the significance level.

The Jarque-Bera test : This test will be used to test for the normality of the residuals. The null hypothesis to be tested is that the residuals are normally distributed while the alternative hypothesis is that the residues are not normally distributed. The null hypothesis will be rejected if the p-value is less than the significance level.

CUSUM test: These tests will be used to assess the stability of the ARDL model with the null hypothesis that the model is stable and the alternative hypothesis that the model is unstable. If the CUSUM plots are within the critical bounds of the model, the interpretation will be that the model is stable.

4.4 MEASUREMENT OF TAX EFFORT

Once the ARDL model has been estimated and the presence of a long-run relationship (cointegration) among the variables has been confirmed using the bounds test, the study will then proceed to estimate tax capacity (the maximum potential tax revenue that Malawi can collect given its economic, institutional, and structural characteristics) based on the coefficients from the ARDL model presented in equation 1. Once the capacity has been estimated, the study will then proceed to measure the tax effort which compared the actual tax revenues collected compared to the potential revenues that can be collected based on the established long-run relationships.

The tax effort indices, for each year will be calculated using the following equation:

TE= (Tax revenue Collected/Estimated Tax Revenue) *100 ……. (3)

A tax effort index of greater than 1 indicates overperformance while an index of less than indicates lower effort. A tax effort of equal to one indicates that the country is operating at full capacity.

4.5 CONCLUSION

The chapter has presented a comprehensive framework for estimating tax effort and tax capacity for Malawi using the ARDL bounds testing approach. The ARDL bounds testing approach has been favoured over other traditional tests like the Johansen cointegration test because of its

flexibility in handling variables with different orders of integration and its ability to provide both short-run and long-run estimates the diagnostic tests and robustness checks ensure the reliability and validity of the results, providing much more accurate estimations that can guide tax policy formulation in Malawi. Based on the estimations presented in this chapter, the next chapter will present the results of the tests conducted.

CHAPTER 5
ESTIMATION AND INTERPRETATION OF RESULTS

5.1 INTRODUCTION

This chapter presents the findings of the study on estimating tax effort and tax buoyancy in Malawi using the ARDL model outlined in the preceding section. Section 5.2 outlines the descriptive statistics, which provide insights into the trends of the variables that affect tax revenue in Malawi. The econometric results of the ARDL model including the robustness tests for the model are presented in the next section which gives us the buoyancy estimates for Malawi. And finally, the tax effort indices for Malawi are computed.

5.2 TAX CAPACITY AND TAX BUOYANCY

5.2.1 Descriptive Statistics

Table 2 below presents the descriptive statistics for the variables used in the model, providing insights into structural and macroeconomic issues that impact tax revenue performance in Malawi.

Table 2: Descriptive Statistics

VARIABLE	MEAN	S-DEVIATION	MIN	MAX	OBS
Tax to GDP (%)	16.24	2.31	10.96	20.22	43
CIT to GDP (%)	2.53	1.00	1.18	4.93	43
PIT to GDP (%)	2.86	0.93	1.72	4.78	43
VAT to GDP (%)	4.76	0.60	3.74	6.17	43
Nominal GDP (Billions)	1,642.93	2,977.42	1.06	12,202.61	43
Annual Inflation (%)	19.09	11.93	7.52	60.46	43
Shadow Economy Size	40.10	0.72	38.76	41.18	31
Share of Manufacturing in GDP	20.87	3.76	17.26	33.44	43
Share of Agriculture in GDP	27.23	4.63	18.58	37.25	43
Population (Millions)	12.71	4.10	6.52	20.93	43
Polity Measure	1.07	6.96	-9.00	6.00	39
Exchange Rate (MWK/USD)	211.87	299.44	0.85	1055.07	43

Source: Author computations from provided data

The statistics as presented in table 2 above suggest a developing country with significant structural and macroeconomic issues that can affect tax revenue collection. While the share of agriculture in the GDP has reduced from 37% in 1992 to around 23% in recent years, the high dominance of agriculture in overall economic output still imposes challenges to revenue collection given the levels of informality (also evidenced in the 40% level of informal economy) and tax exemptions which limits the potential of direct taxation for the sector. On the other hand, the manufacturing sector, though relatively significant at about 20%, still has potential for more expansion considering that the country is a predominantly importing country.

With regard to macroeconomic indicators, high and volatile inflation, with a mean of 19.09% and a maximum of 60.46%, undermines the stability of the tax system. Inflation erodes the real value of tax revenues, particularly for taxes that are not frequently adjusted, such as specific excise duties. It also creates uncertainty for businesses and households, potentially reducing compliance and economic activity. Furthermore, the exchange rate volatility, with the MWK/USD rate ranging from 0.85 to 1055.07, complicates tax administration, especially for taxes levied on imports and exports. A depreciating currency can increase the cost of imported goods, reducing consumption and, consequently, VAT revenues.

Additionally, the population statistics, with an average of 12.71 million people and significant variability, suggest that Malawi's tax administration must cater to a diverse and geographically dispersed population. This increases the cost of tax collection and requires significant investment in administrative capacity and technology to ensure efficient revenue mobilization.

5.2.2 Stationarity Tests

Table 3 presents the results of the unit root test using the CMR test.

Table 3: CMR Test Results for Stationarity

Variable	Model	Breakpoints	(rho - 1) Coefficient	t-statistic	P-value	5% Critical Value	Order of Integration
GDP	IO	2012, 2016	-10.94062	-3.412	0	-5.49	I (0)
TaxRevtoGDP	IO	2000	-0.46957	-3.491	0.005	-4.27	
dTaxRevtoGDP	IO	2001	-1.13803	-8.081	0.57	-4.27	I (1)
CITtoGDP	IO	1991	-0.37226	-3.422	0.006	-4.27	
dCITtoGDP	IO	1985	-1.12274	-7.553	0.137	-4.27	I (1)
VATtoGDP	IO	2016	-0.54442	-4.257	0.003	-4.27	I (0)
PITtoGDP	IO	2002	-0.28087	-2.907	0.035	-4.27	
dPITtoGDP	IO	2016	-1.51227	-6.566	0.002	-4.27	I(1)
AnnualInflation	IO	1994	-0.29421	-3.645	0.263	-4.27	
dAnnualInflation	IO	1994	-1.61963	-8.034	0.065	-4.27	I (1)
ShadowEconomy	IO	2011	-0.27149	-4.764	0.002	-4.27	I (0)
Manshare	IO	1991	-0.45107	-7.991	0	-4.27	I (0)
Agrishare	IO	1992	-0.51243	-2.518	0.236	-4.27	
dAgrishare	IO	1993	-2.77382	-5.059	0.221	-4.27	I (1)
Controlofcou	IO	2000	-0.73812	-4.093	0.016	-4.27	I (0)
Xconstant	IO	2005	-0.61542	-3.823	0.007	-4.27	
dXconstant	IO	2005	-1.92311	-6.764	0.025	-4.27	I (1)
Population	IO	1990	-0.45678	-2.987	0.145	-4.27	
dPopulation	IO	1991	-1.50723	-7.224	0.038	-4.27	I (1)

Source: Author computations
"d" in front of a variable name presents the first difference of the variable

The findings demonstrate that certain variables, including GDP, VAT to GDP, share of shadow economy, share of manufacturing and control of corruption are stationary at level, I(0). The (rho - 1) coefficients for these variables are negative and statistically significant, as indicated by t-statistics that exceed the 5% critical value in absolute terms and p-values below the 0.05 threshold.

The breakpoints discovered in GDP and the other variables are important in understanding the movement of the variables over time and for ensuring precise modelling. It is evident from these results that the 2012 devaluation altered the movement of the variables. Dummy variables were therefore created to account for the structural breaks observed in our variables. Unfortunately, the variable *exchange rate* could not be included in this model as it was integrated at order (2) but we expect the pass on price effect to be reflected in the inflation and GDP variables.

5.2.3 ARDL Bounds Test for Cointegration

The next section will present the results of the bounds tests for cointegration. As already discussed, the bounds test was chosen over the Johansen cointegration test for its ability to handle variables that are stationary at both level and first differencing. The results will be presented separately for each of the equations in 4.2.

5.2.3.1 Equation 1, Dependent Variable = Total Tax Revenue/ GDP

For this main equation, we first run the ARDL model with macroeconomic factors as our dependent variables before introducing the demographic variable of population and structural variable of political stability. The rest of the equations will introduce all the variables into the model at once.

The results with just the economic variables are presented in table 4 (a and b) below.

Table 4. ARDL Bounds test for Tax Revenue as Dependent Variable

Table 4a. Pesaran/Shin/Smith (2001) ARDL Bounds Test

Test	Statistic	Critical Value (0.1)	Critical Value (0.05)	Critical Value (0.025)	Critical Value (0.01)
F-Statistic	11.75	2.45	2.86	3.25	3.74
T-Statistic	-6.043	-2.57	-2.86	-3.13	-3.43

4b. Error Correlation Test

Variable	Coefficient	Standard Error	t-Statistic	P-Value
Adjustment Term				
L1. dNominalTaxRevtoGDP	-0.9671	0.16	-6.04	0
Long-run Coefficients				
NominalGDP	3.41E-09	1.96E-09	1.74	0.093
Manshare	-0.0005216	0.0006878	-0.76	0.454
Dagrishare	-0.000767	0.0020803	-0.37	0.715
dAnnualInflation	0.0008681	0.0003942	2.2	0.035
Short-run Coefficients				
D1.NominalGDP	-2.27E-08	8.18E-09	-2.78	0.009
D1.dagrishare	-0.0006369	0.0016029	-0.4	0.694
LD.dagrishare	-0.0013588	0.0008536	-1.59	0.122
D1.dAnnualInflation	-0.0004366	0.0002889	-1.51	0.141
Constant	0.0105179	0.0147172	0.71	0.48

Source: Author Stata Computations

The ARDL bounds test results indicate a significant long-run relationship between the variables. The calculated F-statistic (11.750) exceeds the upper bound critical value at all conventional significance levels, allowing us to reject the null hypothesis of no levels relationship. Additionally, the t-statistic (-6.043) is lower than the lower bound critical values, further confirming the presence of cointegration among the variables.

Surprisingly, despite the coefficient on nominal GDP is positive (3.41e-09), it is not statistically significant at the 5% level ($p = 0.093$) suggesting a weak relationship between nominal GDP and tax revenue in the long run, which may indicate inefficiencies in tax collection despite economic growth. The manufacturing sector share and agricultural sector share exhibit negative coefficients (-0.0005216 and -0.000767, respectively), but neither is statistically significant ($p = 0.454$ and $p = 0.715$). This suggests that structural changes in these sectors do not have a strong impact on tax revenue as a percentage of GDP.

On the other hand, annual inflation has a positive and statistically significant coefficient (0.0008681, p = 0.035), implying that higher inflation levels are associated with increased tax revenue. We expect similar results to be evident in equation (2) for VAT considering the consumptive nature of the economy.

The first lag of the tax revenue has a coefficient of -0.9671, which is highly significant (p = 0.000) suggesting a strong error correction mechanism, with nearly 97% of the disequilibrium from the previous period being corrected within one year. The short-run coefficient on the first difference of nominal GDP ('NominalGDP_D1') is negative and statistically significant (-2.27e-08, p = 0.009), suggesting that short-term fluctuations in economic output have a negative impact on tax revenue as a percentage of GDP. The coefficient on the first lag of agricultural share ('dagrishare_LD1') is negative (-0.0013588) but not significant (p = 0.122), while the first difference of inflation ('dAnnualInflation_D1') is also negative but not significant (-0.0004366, p = 0.141).

The estimated long-run elasticity of tax revenue to nominal GDP is 3.41e-09, which is not statistically significant. The short-run response is negative (-2.27e-08), indicating that in the short term, economic growth does not necessarily lead to proportional increases in tax revenue collection. Given these results, tax revenue in Malawi appears to have low buoyancy.

Addition of Demographic and Institutional Factors

The results[5] show a positive relationship between population and tax revenue, but it is statistically insignificant indicating that population growth alone is not a primary driver of tax revenue collection. With regards to the polity measure, there is statistical significance at the 5% level. This suggests that periods of political stability are associated with an increase in tax revenue relative to GDP.

For the rest of this chapter, we shall explain the results of the equations and the tables (bounds test) shall be included in the appendix**.**

5.2.3.2 Equation 2, Dependent Variable = VAT/ GDP

The error correction term (ECT) coefficient for lagged VAT-to-GDP is -0.4409, statistically significant at the 5% level (p = 0.013), suggesting that deviations from the long-run equilibrium

[5] Tables presented in the appendix

are corrected by approximately 44.1% in the next period. However, the estimated long-run coefficients for nominal GDP, manufacturing share, agricultural share, inflation, population, and the political stability are statistically insignificant, implying that these factors do not exhibit a strong long-term influence on VAT revenue performance. The results of the relationship between VAT and inflation is rather surprisingly, indication deeper administrative, policy and structural issues.

The ARDL bounds test results yield an F-statistic of 2.127, which falls below the lower bound critical value at conventional significance levels. Similarly, the t-statistic for the error correction model is -2.645, which does not surpass the critical threshold for rejecting the null hypothesis of no long-run relationship. Consequently, there is insufficient statistical evidence to confirm a stable long-run equilibrium relationship between VAT revenue and its explanatory variables. These findings suggest that VAT revenue dynamics in Malawi may be driven more by short-term fluctuations and external shocks rather than systematic long-run determinants, underscoring the need for further investigation into structural and administrative factors influencing tax collection efficiency.

5.2.3.3 Equation 3, Dependent Variable = CIT/ GDP

The error correction term (ECT) coefficient for lagged CIT-to-GDP is **-0.9634**, statistically significant at the 1% level ($p < 0.001$), indicating that deviations from the long-run equilibrium are corrected by approximately **96.3%** within a single period. This suggests a rapid adjustment of CIT revenue to shocks. However, in the long run, the estimated coefficients for nominal GDP, manufacturing share, agricultural share, inflation, population, and political stability (dXConstant) are all statistically insignificant, implying that these variables do not exert a persistent effect on CIT revenue performance. In the short run, changes in nominal GDP and inflation are also not statistically significant, though inflation (D1) has a marginally significant negative effect at the 10% level ($p = 0.073$), suggesting some short-term responsiveness of CIT revenue to inflationary changes.

The ARDL bounds test results indicate an F-statistic of **6.399**, which exceeds the upper bound critical values at conventional significance levels, confirming the presence of a stable long-run equilibrium relationship between CIT revenue and its explanatory variables. Additionally, the t-statistic for the error correction model is **-5.354**, surpassing the critical threshold for rejecting the null hypothesis of no long-run relationship. These results suggest that while individual long-run coefficients are not statistically significant, there exists a meaningful equilibrium relationship

guiding CIT revenue trends in Malawi. The strong and rapid adjustment process, combined with the presence of a cointegrating relationship, implies that CIT revenue dynamics are largely driven by short-run fluctuations and external shocks.

5.2.3.4 Equation43, Dependent Variable = PIT/ GDP

The ARDL regression results indicate a strong and statistically significant adjustment mechanism in personal income tax revenue performance in Malawi. The error correction term (ECT) coefficient of -1.0988 ($p < 0.001$) suggests that deviations from the long-run equilibrium are corrected by approximately 109.9% within a single period, implying a rapid adjustment process. This finding highlights the responsiveness of PIT revenue to short-term shocks but raises concerns about potential overcorrection, which may introduce volatility in tax revenue collection. The long-run coefficients for nominal GDP, sectoral composition (manufacturing and agriculture shares), inflation, and population growth are statistically insignificant, indicating that PIT revenue as a share of GDP is not systematically driven by these macroeconomic variables over the long term. In the short run, GDP fluctuations exhibit a weak negative effect on PIT revenue ($p = 0.065$), suggesting that economic contractions may momentarily suppress revenue collection, possibly due to compliance challenges or shifts in the tax base. The ARDL bounds test confirms a long-run equilibrium relationship, with the F-statistic (6.865) exceeding the upper critical values, supporting the existence of cointegration between PIT revenue and the explanatory variables.

These findings suggest that PIT revenue in Malawi is highly responsive to short-run economic shocks but lacks strong structural determinants in the long run. The rapid adjustment process implies that while revenue collection mechanisms are reactive, they may not be anchored in a stable macroeconomic framework. The weak long-run relationships indicate that factors such as economic growth, sectoral shifts, and inflation do not significantly influence PIT revenue performance, underscoring the need for broader structural tax reforms.

5.2.4 Robustness Checks

5.2.4.1. The Breusch-Godfrey LM test for autocorrelation

The Breusch-Godfrey LM test for autocorrelation was conducted to assess whether serial correlation is present in the residuals of the regression model. The test statistic for one lag is $\chi^2 = 0.095$ with 1 degree of freedom, and the corresponding p-value is 0.7577. Given that the p-value is much greater than the conventional significance levels (e.g., 0.05 or 0.10), we fail to reject the

null hypothesis indicating that there is no statistical evidence of serial correlation in the model's residuals.

5.2.4.2 The Breusch–Pagan/Cook–Weisberg test for heteroskedasticity

The Cook–Weisberg test was conducted to check for heteroskedasticity in the regression model's residuals. The test statistic is $\chi^2(1) = 0.18$, with a corresponding p-value of 0.6699. Since the p-value is significantly higher than conventional significance levels (0.05 or 0.10), we fail to reject the null hypothesis suggesting that the residuals exhibit homoskedasticity and the error variance remains constant across observations.

5.2.4.3 The Jarque-Bera Test for Normality

The Jarque-Bera test was performed to assess whether the residuals follow a normal distribution. The test yields a joint test statistic of $\chi^2(2) = 2.25$ with a p-value of 0.3244. Additionally, the individual skewness and kurtosis p-values are 0.2367 and 0.4030, respectively. Since the p-value exceeds the standard significance levels, we fail to reject the null hypothesis. This result indicates that the model's residuals do not exhibit severe deviations from normality, supporting the validity of statistical inferences drawn from the regression results.

5.2.4.4 The CUSUM Test for Structural Stability

The CUSUM test was applied to evaluate whether the regression parameters remain stable over time. The test statistic is 0.3423, which is well below the critical values at the 1% (1.1430), 5% (0.9479), and 10% (0.8499) significance levels. Since the test statistic falls within the accepted range, we fail to reject the null hypothesis. This confirms that the regression coefficients are stable over the sample period (see appendix for CUSUM plot).

5.3 TAX INDICES ESTIMATIONS

5.3.1 Estimations

Based on the results presented in section 5.2, we proceed to predict tax revenues which were then used to compare with the actual tax revenues to obtain the tax effort indices. The indices have been presented in Table 5 below.

Table 5: Tax Effort Indices

Year	Tax Effort	VAT Effort	CIT Effort	PIT Effort
1982	0.96	0.98	0.92	0.98
1983	1.01	0.97	1.00	1.02
1984	1.01	0.98	0.99	1.01
1985	1.00	1.02	1.02	0.99
1986	1.00	1.00	1.05	0.97
1987	0.99	0.99	0.99	1.01
1988	1.00	1.01	0.95	1.01
1989	1.01	1.02	1.06	0.99
1990	1.00	1.02	1.02	1.02
1991	0.98	0.99	1.00	0.95
1992	1.00	0.95	1.00	0.97
1993	0.99	1.02	0.96	1.01
1994	1.01	0.99	0.97	1.01
1995	1.03	1.00	0.98	1.00
1996	1.01	1.01	1.02	0.99
1997	1.01	0.99	1.05	1.00
1998	1.01	1.01	0.99	1.05
1999	1.01	1.02	1.02	1.01
2000	1.01	1.02	1.01	1.02
2001	1.00	1.00	1.01	1.00
2002	0.97	0.98	0.97	0.98
2003	0.98	0.99	0.96	0.98
2004	1.02	1.01	1.01	1.02
2005	0.99	0.99	0.98	1.01
2006	1.00	1.00	0.99	1.00
2007	1.00	1.01	1.00	1.00
2008	1.00	1.01	1.00	1.01
2009	1.00	1.00	1.02	1.00
2010	1.00	1.00	1.02	1.00
2011	1.00	1.00	0.98	1.00
2012	1.00	1.00	1.01	1.00
2013	1.01	1.01	1.02	1.01
2014	1.01	1.02	1.01	1.01
2015	1.00	1.00	1.01	1.01
2016	1.00	1.00	0.99	1.01
2017	1.01	1.01	1.02	1.01
2018	0.98	0.99	0.99	0.99
2019	1.00	1.00	0.97	1.00
2020	0.99	0.99	0.98	1.00
2021	1.00	1.00	1.00	0.98
2022	1.00	1.00	1.00	0.98
2023	1.00	0.99	1.01	1.00

The tax effort measures from 1982 to 2023 indicate relative stability, with values fluctuating around 1.00, suggesting that Malawi's tax system has generally been operating at its expected capacity. VAT effort remains consistently close to 1.00, reflecting a steady collection of consumption taxes. CIT effort shows more variability, with peaks above 1.05 in some years (e.g., 1986, 1997) and dips below 0.95 in others (e.g., 1988, 2003, 2019), suggesting fluctuations in corporate tax compliance or profitability. PIT effort remains mostly stable but trends slightly downward in recent years (e.g., below 1.00 from 2021 to 2023), possibly indicating declining efficiency in personal income tax collection. The overall tax effort aligns

with this pattern, showing minor deviations but mostly returning to 1.00, implying that Malawi's tax system has maintained its revenue mobilization performance over time, with occasional inefficiencies in corporate and personal income taxation.

5.4 CONCLUSION

The chapter has presented the results of the estimations of tax buoyancy and tax effort in Malawi using the ARDL model. The results suggests that tax revenues are less buoyant in Malawi in relation to the GDP. The majority of the changes in tax revenues are a result of short-term fluctuations. Inflation appears to be the most significant variable affecting total revenues in Malawi although surprisingly, it is less significant for VAT revenues. Given the estimated variables, used in estimating the tax effort indices, Malawi collects revenues within its capacity.

CHAPTER 6
CONCLUSION AND POLICY RECOMMENDATIONS

6.1 DISCUSSION OF RESULTS

This study has analyzed tax effort, tax capacity and tax buoyancy of Malawi between 1980 to 2023 in order to determine the efficiency of domestic resource mobilization and the responsiveness of tax revenues to macroeconomic factors. The results indicate that Malawi's tax system is not highly buoyant, meaning that tax revenues do not automatically increase in proportion to GDP growth. This weak buoyancy indicates highlights inefficiencies in the tax system that could be a result of either tax policy or tax administration gaps. The results of this study also reveal that tax revenue trends in Malawi are more influenced by short-term fluctuations than long-term economic fundamentals, pointing to a need for structural reforms to enhance the sustainability of tax revenues. This finding is consistent with Chilima (2023) and Gupta (2007), who similarly observed low tax revenue responsiveness to economic growth in countries with large informal sectors and structural challenges. It also aligns with the theoretical perspectives of Mkandawire (2010) that structural constraints in developing economies limit buoyancy

One of the key findings of the study is that inflation has a stronger influence on tax revenues than GDP growth, which is somewhat unexpected. This implies that Malawi's tax revenue performance is partially dependent on inflationary pressures rather than actual improvements in economic productivity. This result partly supports the findings of Akar and Şahin (2015), who showed that tax revenues often reflect price level changes, though the weak effect of inflation on VAT observed in this study contrasts with other studies that report higher VAT buoyancy (Chipeta, 1998). This discrepancy could be attributed to underreporting and administrative inefficiencies highlighted by Masiya et al. (2015).

Institutional factors such as population growth and political stability show a positive but mild effect on tax revenue collection, indicating that economic factors are more significant that institutional factors in Malawi. This result contrasts with Gupta (2007) and Gérard and Naritomi (2018), who argue that governance quality substantially influences tax performance. However, it reinforces the view that in contexts like Malawi, structural economic issues often overshadow institutional effects

The study's tax effort analysis suggests that Malawi is collecting revenues within its estimated tax capacity, with effort indices hovering around 1.00. However, disaggregated results show

variability across different tax types, albeit marginal, particularly for corporate income tax (CIT) and personal income tax (PIT). The declining trend in PIT effort, for example, may indicate weaknesses in wage taxation, potentially linked to a shrinking formal employment sector or policy changes such as increased tax-free thresholds. The variability in CIT effort could reflect economic cycles, compliance levels, or policy-driven tax incentives that affect corporate tax liabilities. These findings echo other studies such as Mkandawire (2010) and Bird and Zolt (2003), who emphasize the challenges of taxing formal employment in economies with large informal sectors. The variability in CIT effort could reflect economic cycles, compliance levels, or policy-driven tax incentives that affect corporate tax liabilities, consistent with the literature indicating cyclical sensitivity and policy impacts on CIT as highlighted by Chilima (2023)

Finally, structural factors such as a large informal economy, weak tax compliance, and administrative inefficiencies continue to hinder tax performance. The high level of informality, estimated at over 40% of GDP, limits the government's ability to broaden the tax base and mobilize revenue from a wider pool of economic activities. Additionally, inadequate digitalization and weak enforcement mechanisms create loopholes that further reduce tax collection efficiency. Addressing these issues requires a comprehensive policy approach that combines enhanced tax administration, stronger enforcement, and policy reforms aimed at reducing informality and improving compliance.

6.1.1 Contribution to Literature and Gap Closure

The results obtained from this study contributes to the existing body of literature in the following ways;

- The use of disaggregated tax data in addition to total tax revenues bring in a new insight in the responsiveness of certain tax type to their respective determinants. For instance, while total revenue showed to have been influenced by inflationary pressures, the consumption tax of VAT of which the expectation is that should respond swiftly to inflationary changes showed contrasting results, highlight a key deficiency in VAT monitoring in Malawi.
- The finding that Malawi's tax revenues are more influenced by inflationary pressures than real economic growth challenges conventional assumptions and highlights structural weaknesses in the tax system. This insight expands on the literature that largely emphasizes economic growth as the primary driver of tax buoyancy.

6.2 POLICY RECOMMENDATIONS

To enhance tax revenue collection and improve efficiency, the following policy recommendations are proposed based on the outcomes of this study:

1. Considering that tax revenue growth is found to be more driven by inflation than by real macroeconomic growth, it is important to enhance tax compliance monitoring. Improved enforcement mechanisms are needed to ensure that tax collections respond effectively to GDP growth once the effects of inflation are accounted for.
2. The surprising lack of responsiveness of VAT, a consumption tax, to inflation signals underreporting. Therefore, VAT monitoring systems should be improved to better capture actual consumption and reduce revenue leakages.
3. Considering the variability in tax buoyancy across corporate and personal income taxes, it is crucial to periodically assess tax incentives to evaluate their impact on tax revenue responsiveness and minimize potential revenue erosion in these sectors

6.3 RESEARCH GAPS AND FURTHUR STUDIES

Despite its contributions, this study identifies several gaps that require further research. One of the main gaps in this study was the lack of a strong variable to measure governance and its effects on tax revenue collection. As such, future research may consider incorporating parameters such as control of corruption for more robust results.

Other areas of further research include:

- *Sectoral Tax Performance*: More granular research is needed to understand the tax effort and buoyancy of specific industries, such as financial and insurance, manufacturing, mining, and service sectors.
- *Impact of Tax Incentives*: Additional research is required to assess the effectiveness of tax incentives in attracting investment versus their impact on overall tax revenue.
- *Compliance levels.* Further research should incorporate compliance gaps to effectively assess the buoyancy of tax revenues.

6.4 CONCLUSION

The study has provided empirical evidence that Malawi's tax system is constrained by weak tax buoyancy and inefficiencies in administration. While the country collects taxes within its estimated capacity, there is room for improvement through broadening the tax base,

strengthening compliance, and enhancing administrative efficiency. Addressing the structural and institutional challenges identified in this study will be crucial for achieving sustainable domestic resource mobilization and reducing overreliance on external financing.

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Appendix 1: Regression Results

A. ARDL Regression Results and bounds test for dNominalTaxRevtoNominalGDP

Variable	Coefficient	Std. Error	t-Statistic	P-Value
L1. dNominalTaxRevtoGDP	-0.0379	0.1536	-0.25	0.807
NominalGDP	-1.90E-08	6.74E-09	-2.81	0.009
L1. NominalGDP	2.16E-08	8.12E-09	2.66	0.012
Manshare	-0.0002006	0.0006827	-0.29	0.771
Dagrishare	-0.0007446	0.0006929	-1.07	0.291
dAnnualInflation	0.0001958	0.0003001	0.65	0.519
dPopulationMil	0.032701	0.0255457	1.28	0.21
dXConstant	0.0151359	0.0059158	2.56	0.016
Constant	-0.0085443	0.0182762	-0.47	0.644

Test Statistic	Value	Critical Value (0.1)	Critical Value (0.05)	Critical Value (0.025)	Critical Value (0.01)
F-Statistic	10.411	2.12	2.45	2.75	3.15
T-Statistic	-6.559	-2.57	-2.86	-3.13	-3.43

B. ARDL Regression Results and bounds test for dVATtoNominalGDP

Variable	Coefficient	Std. Error	t-Statistic	P-Value
L1. dVATtoNominalGDP	-1.018661	0.1813262	-5.62	0
NominalGDP	7.27E-10	7.15E-10	1.02	0.318
Manshare	-0.000257	0.0002671	-0.96	0.344
Dagrishare	0.0002413	0.0003051	0.79	0.435
dAnnualInflation	0.0001341	0.0001442	0.93	0.36
dPopulationMil	0.0042626	0.0100545	0.42	0.675
dXConstant	0.0005637	0.0022907	0.25	0.807
Constant	0.0046498	0.0073026	0.64	0.529

Test Statistic	Value	Critical Value (0.1)	Critical Value (0.05)	Critical Value (0.025)	Critical Value (0.01)
F-Statistic	7.66	2.12	2.45	2.75	3.15
T-Statistic	-5.618	-2.57	-2.86	-3.13	-3.43

C. ARDL Regression Results and bounds test for dCITtoNominalGDP

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**P-Value**
L1. dCITtoNominalGDP	-0.9633672	0.1799504	-5.35	0
NominalGDP	4.25E-10	5.94E-10	0.72	0.479
Manshare	-0.0000124	0.0002386	-0.05	0.959
Dagrishare	-0.0000897	0.0002594	-0.35	0.732
dAnnualInflation	-0.0000757	0.0001324	-0.57	0.572
dPopulationMil	0.0092856	0.0090699	1.02	0.314
dXConstant	0.0028331	0.0021082	1.34	0.189
Constant	-0.0034494	0.0061592	-0.56	0.58

Test Statistic	Value	Critical Value (0.1)	Critical Value (0.05)	Critical Value (0.025)	Critical Value (0.01)
F-Statistic	6.399	2.12	2.45	2.75	3.15
T-Statistic	-5.354	-2.57	-2.86	-3.13	-3.43

D. ARDL Regression Results and bounds test for dPITtoNominalGDP

Variable	Coefficient	Std. Error	t-Statistic	P-Value
L1. dPITtoNominalGDP	-1.098849	0.1896133	-5.8	0
NominalGDP	1.71E-10	4.11E-10	0.42	0.68
Manshare	-0.0002141	0.0001598	-1.34	0.19
Dagrishare	-0.0000391	0.0001615	-0.24	0.811
dAnnualInflation	-0.0000335	0.0000912	-0.37	0.716
dPopulationMil	0.0036916	0.0059516	0.62	0.54
dXConstant	0.000917	0.0013836	0.66	0.513
Constant	0.0044849	0.0048698	0.92	0.364

Test Statistic	Value	Critical Value (0.1)	Critical Value (0.05)	Critical Value (0.025)	Critical Value (0.01)
F-Statistic	6.865	2.12	2.45	2.75	3.15
T-Statistic	-5.795	-2.57	-2.86	-3.13	-3.43

Appendix 2: Robustness Tests for the Main Equation

Test	Test Statistic	Chi-square (df)	p-value	1% Critical Value	5% Critical Value	10% Critical Value
Breusch–Pagan/Cook–Weisberg (Heteroskedasticity Test)	0.18	$\chi^2(1)$	0.6699	-	-	-
Breusch-Godfrey LM (Autocorrelation)	0.095	χ^2 (1)	0.7577	-	-	-
Jarque-Bera (Normality Test)	2.25	$\chi^2(2)$	0.3244	-	-	-
CUSUM Test (Structural Stability)	0.3423	-	-	1.143	0.9479	0.8499

Appendix 3: CUSUM Plot

