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DEPARTMENT OF ECONOMICS

DETERMINANTS OF TAX REVENUE MOBILISATION IN LESOTHO

BY:

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APPROVAL

This dissertation has been examined and approved as meeting the requirements for the partial fulfillment of the Master of Arts degree in Economics.

…… ……

Dr. Kagiso Mangadi Date

(Supervisor)

……..... ……..

HoD Economics Date

DECLARATION

This dissertation was undertaken from October 2019 to July 2020. It is my original work, and it has never been, in whole or in part, presented for the award of any degree at any other university. This excludes the acknowledged references.

Author: Refiloe Jabari

Signature: ……..

Date: ……..

DEDICATION

This study is a dedication to my parents, Moshoeshoe Jabari and Makeisara Jabari. I would not have been where I am today without your support. You have been by my side throughout all my academic journey, and I am forever grateful.

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ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AGOA	African Growth and Opportunity Act
AIC	Akaike Information Criterion
ARDL	Auto Regressive Distributed Lag
CIT	Corporate Income tax
CRP	Common Revenue Pool
CRS	Constant Rate Structure
ECM	Error Correction Model
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GRSD	Global Revenue Statistics Database
HTSTD	Historic Time Series Tax Data
ICTD	International Centre for Tax and Development
IMF	International Monetary Fund
IPCG	Income Profits and Capital Gain
LRA	Lesotho Revenue Authority
MDGs	Millennium Development Goals
MTEF	Medium-Term Expenditure Framework
ODA	Official Development Assistance
OLS	Ordinary Least Square
PIT	Personal Income Tax
SACU	Southern African Customs Union
SBC	Schwarz Bayesian Criterion
SOEs	State-owned Enterprises
SSA	Sub – Saharan Africa

US	United States
VAT	Value Added Tax

ABSTRACT

The study investigates the determinants of tax revenue mobilization in Lesotho. The tax revenue is disaggregated into valued added tax (VAT) and income profits and capital gain (IPCG) taxes. The study's objective is to examine the determinants of total tax revenue, VAT and IPCG taxes. Another aim is to investigate the effects of the Lesotho Revenue Authority (LRA) on these tax revenue categories. The empirical results are estimated using the autoregressive distributed lag (ARDL) estimation technique using the data for the period 1982 to 2017. The results show that the establishment of the Lesotho Revenue Authority has a significant positive effect on tax revenue and its categories, that the total tax is positively affected by per capita GDP, agricultural and services sectors, and remittance inflows. In contrast, official development assistance (ODA) negatively determines tax revenue. When analyzing the determinants of direct taxes represented by IPCG taxes, it is found that only per capita GDP has a positive effect in the long run. Remittances and ODA have a negative long-run effect. In the short run, LRA and GDP per capita have a significant positive effect on IPCG tax revenue. The VAT model findings show that services hinder the VAT revenue while agriculture and ODA boost it in the long run. The short-run dynamics reveal that VAT revenue is affected positively by the share of agricultural value-added and negatively affected by the share of services value-added and remittances. Policies improving agricultural sector and enhancing economic growth are recommended because these variables have the potential to broaden the tax base in Lesotho.

CHAPTER ONE

INTRODUCTION

1.1 Background

Taxes have a fundamental role and place in each country's economy, and they have to be determined at an optimum level to provide revenue for the economy. Revenue from taxes is used to finance public expenses like the provision of public goods, infrastructural investment and social welfare programmes. They are an essential revenue source for developing countries where the public sector is larger than any other sector.

However, most developing countries cannot generate enough revenue domestically and therefore, run fiscal deficits. By definition, domestic resource mobilization refers to the generation of government revenue from domestic resources, from tax or non-tax sources. Culpeper and Bhushan (2010) explained that developing countries could achieve sustainable high growth rates when their resources are allocated to socially productive investments. Governments often use different methods to finance the deficits. These can be funded either through borrowing, receipt of aid, the printing of money and taxation, or a combination of all.

Taxation is the most critical source of government revenue. While foreign borrowing involves massive payments of interests on loans, official development assistance (ODA), and foreign direct investment (FDI) are finite and fluctuate over time. They create uncertainty about planning, budgeting, and expenditures in the public sector for recipient countries (Junquera-Varela *et al.,* 2017). For this reason, domestic revenue mobilisation has become important for financing development goals through tax revenue generation.

The United Nations summit on financing for development also emphasized the importance of domestic revenue mobilisation and showed that tax revenues constitute a more significant portion of domestic revenues (United Nations, 2015). Taxes, therefore, create a critical component of government revenue in almost all economies. They are considered to be a reliable and sustainable source for funding developmental programmes. Tax revenues together with non-tax revenues support the role of the government in providing public goods and services and redistribution of income (Wahrig and Vallina, 2011).

Besides, international donors are increasingly aware that taxation is the only viable strategy to exit foreign aid dependency in the long run (Mascagni *et al*., 2014). Most developing countries are focusing attention on financing their budgets with taxation even though it is not enough. Sub-Saharan African (SSA) countries face challenges in mobilising domestic revenues. Consequently, SSA is the region with the lowest tax revenue-to-GDP ratio, which is affected by structural, economic, and institutional factors (International Monetary Fund, 2018).

Sectors of the economy, agriculture, manufacturing and services form the tax base of a country. Enhancement of these sectors has the potential for higher tax collection because it increases taxable income. Developing countries rely on external funds like remittances, FDI and ODA. Each the sources has a different effect on tax components. Several reasons have been offered to explain the low tax revenue to GDP ratio in SSA. They include tax evasion, tax avoidance and tax exemptions.

The central goals of any tax system are to increase efficiency in tax revenue mobilisation and ensure equity in the tax structure in the economy. The tax system in Lesotho has been through a series of reforms over the years with the motive to achieve these goals. Prominent among the reforms include the establishment of the Lesotho Revenue Authority (LRA) in 2002. The main

objective of the authority was to consolidate and centralise domestic revenue collection and to improve overall efficiency.

Since its establishment, the LRA has introduced several initiatives, which include the introduction of new technologies and the role of unique systems and platforms for revenue mobilisation. In addition, the LRA introduced an initiative of sensitising and educating taxpayers as a strategy to increase voluntary tax compliance in Lesotho. Other initiatives involve ongoing radio and television education programmes and school debates.

Feger (2014) argued that tax revenue determinants affect tax revenue categories differently. It is, therefore, of paramount importance to disaggregate tax revenue into direct and indirect taxes. This study, therefore, seeks to examine the determinants of tax revenue in Lesotho. In particular, it estimates an Autoregressive Distributed Lag (ARDL) model with a series of regressors. Tax revenue isdisaggregated into its sub-components, namely; Value Added Tax (VAT) and tax on Income, Profits and Capital Gains (IPCG).

1.2 Statement of the Problem

As one of the developing countries, Lesotho is faced with revenue shortages to finance its investment programmes.

Lesotho has high government expenditure which is dependent on the South African Customs Union (SACU) receipts. In the 2015/16 fiscal year, the government expenditure reached 50 percent of GDP (World Bank, 2018). SACU receipts have accounted for 54 percent of total revenue and have financed 78 percent of recurrent expenditures since 2005 (Daemane and Motsóene, 2015).

SACU receipts have been declining and are highly volatile. According to SACU (2018), the Common Revenue Pool (CRP) size has been falling. The revenue shares for member countries have shown a downward trend except for South Africa for the past five years, with Lesotho having a decline of 8.5 percent from 2017 receipts. This decline in SACU revenue has led to a fiscal contraction, which poses a significant threat to macroeconomic stability and fiscal balance in Lesotho's economy.

World Bank (2018) showed that total revenue collections in Lesotho continue to decline from a peak of 56 percent of GDP in 2009. The reason for this being the decline in SACU receipts and other external grants. Conversely, government expenditures, mostly recurrent spending, have been increasing massively. Increase in government expenditure has significant implications for fiscal policy, affecting economic growth in the medium to long term. The need to increase capacity for domestic revenue mobilisation is therefore critical.

Koatsa and Nchake (2017) examined the revenue productivity of the Lesotho tax system. They used the concept of buoyancy and elasticity in their analysis. Their conclusion was that the VAT and income taxes are elastic to changes in GDP. Their findings also revealed that tax revenue in Lesotho grows due to an increase in income and not due to tax collection efforts. The reason for the finding is that tax reforms thus far seem to be motivated towards equity and not the efficiency objective of the tax system.

Domestic taxes provide a more stable source of revenue for medium to long term planning. A shift from the reliance on SACU receipts and other external revenue sources towards strengthening domestic capacity to mobilise revenue is necessary for sustaining economic growth and fiscal balance.

According to the Ministry of Finance (2018), the revenue authority is realising a declining trend of the revenue collections in GDP ratios. The standard set by the United Nations (2015) is that a country's tax revenue should be at least 20 percent of GDP to achieve Sustainable Development Goals (SDGs). Lesotho VAT revenue is forecasted to decline as a result of a decrease in the past years GDP growth rates. There is, therefore, a need to mobilise domestic revenues given a persistent volatile trend in SACU revenues.

The dominance of the public sector in the country makes revenue mobilisation to rely heavily on tax collection. Under non-tax revenue, the most critical components are water royalties received from South Africa and dividends from the mines, contributing less than 5 percent of GDP (Ministry of Finance, 2018). The revenue system needs to reduce its dependence on SACU receipts.

The tax revenue is the only sustainable revenue source. Therefore, the country needs to increase its tax base. Much of the empirical analysis of the determinants of tax revenue is based on panel econometrics. It is challenging to distinguish country-specific behaviour of tax revenue determinants in the panel dataset. It is, therefore, vital to consider country-level time series analysis on this matter (Ayenew, 2016).

1.3 Objectives of the Study

The principal objective of this study is to identify the determinants of tax revenue in Lesotho.

The specific objectives are to examine:

- the short-run and long-run determinants of tax revenue;

- the short-run and long-run determinants of VAT and IPCG tax; the effect of the establishment of the LRA on tax revenue mobilisation; and,
- draw policy implications for the Lesotho tax system.

1.4 Significance of the Study

Understanding the determinants of tax revenue is vital for domestic revenue mobilisation. By doing so, each country will know the factors that widen its tax base. A study by Koatsa and Nchake (2017) analysed the productivity of the tax revenue system in Lesotho without establishing its determinants. The analysis used a dummy variable approach to examine the elasticity of tax revenue. The study at hand uses the ARDL estimation technique to empirically assess the determinants of tax revenue in Lesotho from 1982 to 2017. These determinants are necessary for the country to reach optimal tax revenue collection. The government and policymakers will be able to make necessary policy actions based on the tax capacity of a country.

1.5 Organisation of the study

The study is divided into six chapters. Chapter one provides an introduction and background of the study, it also states the problem, the objectives, the significance, and gives the road map to the study. An overview of the Lesotho economy and the tax revenue dynamics are discussed in chapter two. Chapter three presents the review of both theoretical and empirical literature of tax revenue determinants. Methodology covering theoretical and empirical framework is discussed in chapter four, empirical model specification, data sources and estimation techniques are also presented. Chapter five presents the analysis and discussion of the empirical results of the study and lastly, chapter six offers the conclusion and policy recommendations.

CHAPTER TWO

THE ECONOMY OF LESOTHO

2.0 Introduction

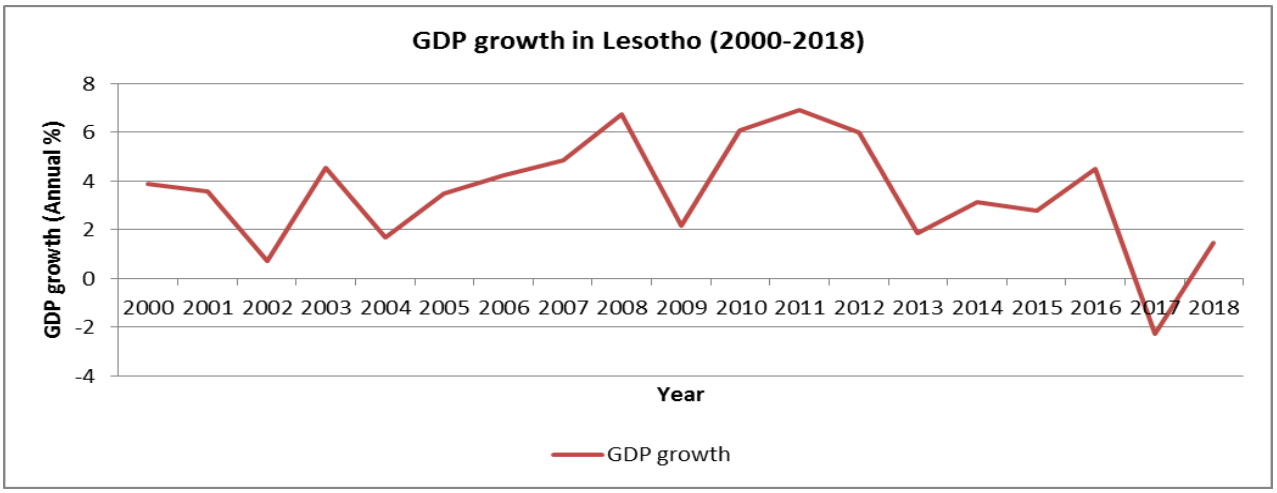
This chapter presents the overview of the Lesotho economy, focusing on microeconomic developments, tax system and main sources of tax revenue. It also discusses tax system, the institutional reforms and sectors of the Lesotho economy.

2.1 Macroeconomic Developments

Lesotho is a small, open economy, with an estimated total population of 2.1 million[1] in 2019. The country is classified as lower-middle-income and has a per capita GDP of $1,324 (World Bank, 2019). Gross domestic product growth has been steady since the early 2000s, with a growth rate average of 3.9 between 2000 and 2016, which resulted in significant reductions in poverty and inequality. While the national poverty rate declined from 56.6 percent to 49.7 percent, food poverty declined from 34.1 percent to 24.1 percent between 2002 and 2017 (World Bank, 2019). Over the same period, the national poverty gap decreased from 29 percent to 21.9 percent. However, the Lesotho economy has been on a downward trajectory since 2017 (Figure 2.1) with a GDP growth rate of 1.8 percent in 2018 and a projected average growth rate of 1.5 percent in the years 2020 to 2023 (World Bank, 2019). This constitutes the lowest average growth rate in over two decades. The primary reason for this downward trajectory is attributed to the reduction in revenue mobilisation including a continuous decline in customs receipts from the (SACU).

[1] World Population Prospects-United Nations Populations Division

Figure 2. 1 Trends in GDP in Lesotho

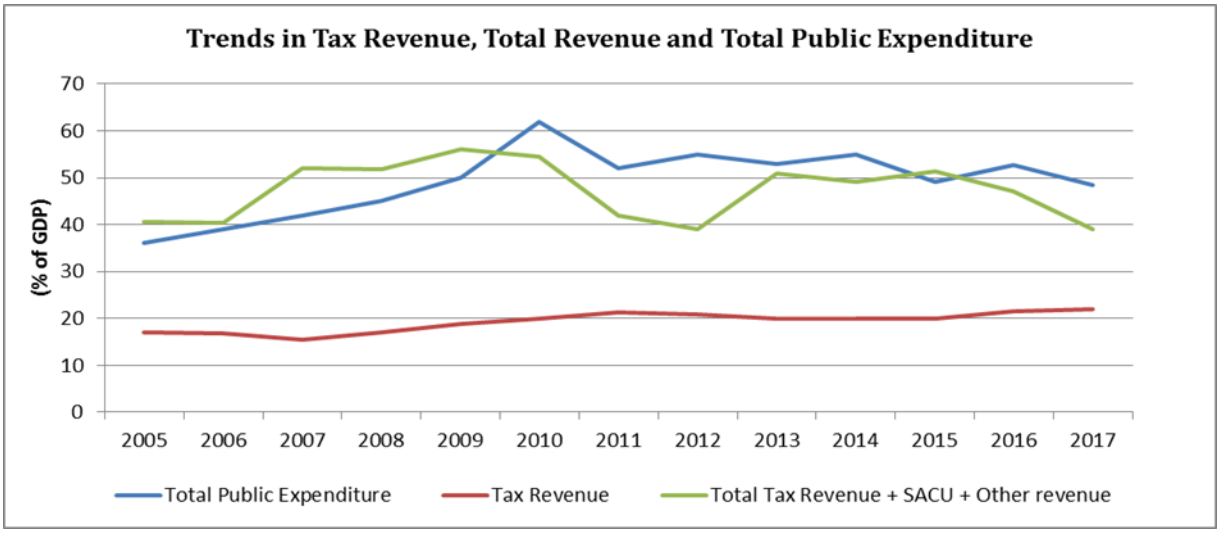


Source: Author's construction based on WDI data

2.2 Tax Revenue and Expenditure Dynamics in Lesotho

The Lesotho economy is heavily dependent on a limited source of tax revenue and customs receipts from the SACU. Consequently, growth follows a cyclical pattern of the receipts.

Figure 2. 2 Domestic, Revenue Collection and Total Public Expenditures, 2005 – 2017



Source: Adapted from Lesotho (MTEF) and World Bank Calculations

Figure 2.2 above shows that total revenue collections, including total domestic taxes, SACU receipts, and other taxes, continue to decline since reaching a high of 56 percent in 2009. The combined revenue mobilisation falls consistently below total public expenditure since 2009. Clearly domestic taxes fall woefully short of total public spending which is exacerbated by the decline in SACU receipts and other external grants. This poses significant implications for fiscal policy which could affect growth in the medium to long term.

Besides, domestic taxes provide a more stable source of revenue for medium to long-term planning with a variance of 4.3 compared to the more volatile total revenue (with SACU receipts) with a variance of 38.5. Consequently, a shift from the reliance on SACU receipts and other external revenue sources towards strengthening domestic capacity to mobilise revenue is necessary for sustaining economic growth and fiscal balance. Thus, the capacity to mobilise domestic revenue is a panacea to the problem of growth cyclicality with the SACU receipts. This study, therefore, aims at examining the short and long-run determinants of tax revenue motivation in Lesotho.

2.3 The Lesotho Tax System

The Lesotho tax system consists of both direct and indirect taxes. Direct taxes are taxes by which the taxpayer cannot shift the burden to someone else, and these taxes are directly paid to the government by the bearer. Direct taxes include personal income tax, corporate tax and property tax. On the other hand, the indirect taxes are levied on goods and services and are collected by an intermediary from the person who bears the ultimate economic burden of the tax, for example, VAT, sales tax, customs and excise duties.

Lesotho undertook the major tax reforms in 1960, the goal was to end the dual tax system which made income that is from the same source to be taxed twice. All income earners were

subjected to income tax of which the maximum was 35 percent. It was paid by everyone based on the grades and scales used. The flat tax rate of 35 percent was imposed on corporations. In 1993, the sales tax rate was 15 percent but it was then reduced to 10 percent. After the establishment of the Lesotho Revenue Authority in 2002, value added tax was introduced to replace the general sales tax. The standard rate for VAT was 14 percent on goods and services.

2.4 Main sources of tax revenue

2.4.1 Value Added Tax (VAT)

VAT is a consumption tax calculated on the value added to goods and services. It applies to all goods and services that are bought and sold for consumption. It was introduced in July 2003 after the establishment of the Lesotho Revenue Authority (LRA). VAT was introduced in an effort to strengthen domestic tax revenue and reduce the reliance of government revenue on SACU receipts. The VAT rate was 14% by then and the level of VAT collected was 79.9% higher than that of General Sales Tax collected in the previous quarter (Lephoto, 2004). Rates for VAT in Lesotho are as follows: 0% on exports and basic commodities, 8% on electricity, 12% on telecommunications and 15% on other goods and services both imported and purchased locally. The agricultural inputs and output are zero-rated. These include the likes of fertilizers, seeds beans, maize, milk and sorghum.

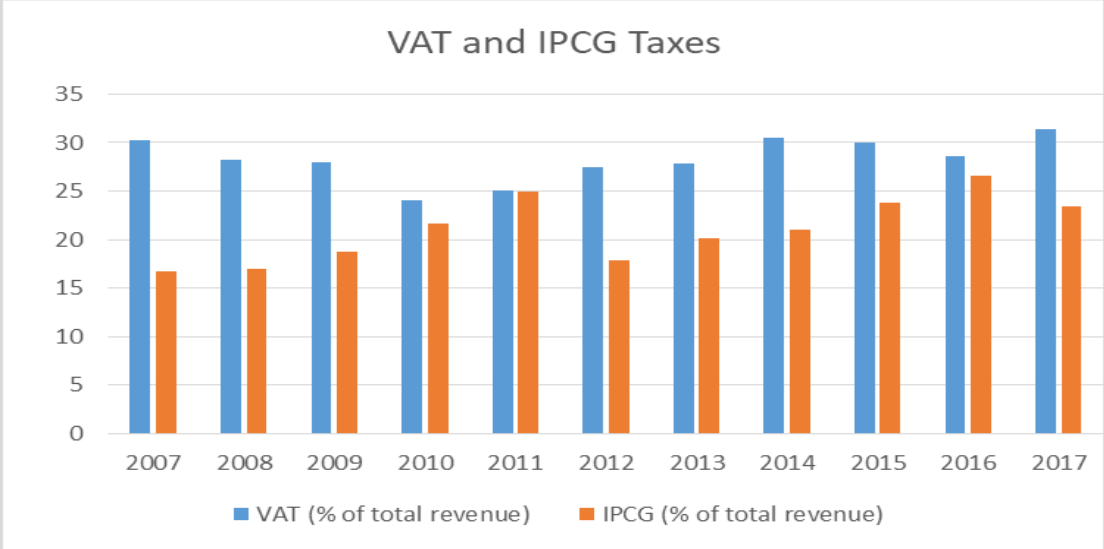
2.4.2. Corporate Income Tax

Corporate Income Tax is imposed on company profits that are made in the year of assessment. Before charging corporate tax, the company income is adjusted. This includes making

permissible deductibles from the gross income. Then the chargeable income is taxed according to the grade scale.

Lesotho charges a corporate income tax of 10 percent from exporting manufacturing goods outside SACU. These goods are mainly textile products. Besides this, a corporate tax of 25 percent is imposed on the profits of foreign company branches.

Figure 2. 3 Share of VAT and IPCG taxes to total revenue



Source: Author's construction based on WDI data

The bar chart above entails the contribution of VAT and IPCG taxes to total revenue in Lesotho for the ten years (2007 – 2017). Value Added Tax alone has a larger share than income profits and capital gain taxes. This proves the fact that developing countries rely heavily on indirect taxes than direct taxes. The factors that contribute to the low collection of direct taxes include the efficiency of the tax system, and institutional factors like governance and accountability.

2.4.3 Customs and excise duties

Southern African Customs Union (SACU) was established in 1910 with the aim of removing trade barriers between member countries (Eswatini, Botswana, Lesotho, Namibia and South Africa). Member countries charge a common tariff for countries outside the union. Excise duties collected by SACU countries are deposited quarterly into the SACU common revenue pool. The countries then share the revenues by using the revenue sharing formula. The SACU receipts have been an important source of revenue for Lesotho for a long time.

2.5 Institutional reform

The Lesotho Revenue Authority (LRA) was established by the Lesotho Revenue Authority Act no. 14 of 2001. It became operational in January 2003. The responsibilities of the authority are to assess, collect and administer revenues on the government's behalf. It is also responsible for law enforcement relating to these revenues. There are several departments within LRA; income tax department, which deals with both personal and corporate income taxes. Customs and excise tax department works on imposition and collection of import and export duties, this department also protects Lesotho against cross-border crime and fighting harmful trade. The sales tax department's role is to collect VAT revenue from all the entities where it is imposed.

The LRA was established to enhance the efficiency and effectiveness of revenue collection and to provide an improved service to the public. Salient features of a good tax system include the system's ability to yield sufficient revenue for the government, and the cost that is spent on the collection of taxes should be minimum.

Lesotho's revenue sources can be classified into four main categories: SACU revenues, tax revenues, grants, and other non-tax revenues like water and diamond royalties, and dividends from state-owned enterprises (SOEs) and parastatals. SACU and tax revenues constitute the largest portion of total government revenue. However, high SACU revenues enabled increased government expenditures, making it difficult to adjust downward when revenues go down.

Lesotho has the highest government spending rates as a percentage of GDP in SSA (World Bank, 2018). It reached almost 50 percent of GDP in the 2015/16 Fiscal Year. Lesotho's government spending as a percentage of GDP is very high compared to other countries in SACU, such as Botswana and Swaziland. The country spends a significant proportion of its budget on capital spending, which could be in line with the lower-middle-income countries' developmental needs. However, recurrent spending is one of the highest when compared to other SSA countries. Lesotho is also one of the biggest spenders on wages in the world, with a wage bill of 18 percent of GDP (World Bank, 2018).

2.6 Structure of the economy

The sectors of the economy in Lesotho are agriculture, manufacturing and services. The service sector is the largest and it contributes the greatest share to the country's GDP as shown in Table 2.1 below.

Table 2. 1 Shares of economic activities to GDP for selected years (% of GDP)

ECONOMIC SECTOR	2003	2006	2011	2016
Agriculture, forestry and fishing	6.3	7.9	5.7	5.8
Mining and Quarrying	4.2	4.7	9.1	9.2
Manufacturing	22.6	21	13.3	17.4
Water and Electricity	4.6	5.1	6.0	5.5
Construction	3.4	4.6	6.4	4.8
Trade, Hotels and Restaurants	8.5	9.1	13.4	12.7
Transport and Communication	4.9	6.4	6.1	6.1
Finance and Business Services	7.9	18.6	13.6	14.4
Public administration, education, health	16.7	11.3	13.1	11.9
Other services	20.9	11.4	13.4	12.3

Source: African Economic Outlook (2017)

Table 1 above indicates the shares of economic activities to GDP for the years 2003 to 2016. It is evident that in the early 2000s, manufacturing was contributing more to GDP (22.6%) than any other sector. The reason for this could be the introduction of the African Growth and Opportunity Act (AGOA), which was designed to boost trade between the United States (US) and African countries. AGOA allows certain products into the US free of duty and tariff. As a result, Lesotho became more attractive to investors. However, the manufacturing sector's contribution to GDP has been declining over the years.

The agricultural sector in Lesotho is dominated by small-scale farmers who produce mainly for consumption. However, productivity in subsistence farming has been affected by severe

droughts in recent years. The contribution of agriculture to GDP has declined significantly since the 1960s and the major cause of the decline is the climate conditions and poor farming methods.

2.7 Conclusion

This chapter discussed the Lesotho economy focusing on macroeconomic developments and government expenditure dynamics. It is evident that the government spending is very high in Lesotho with less resources to generate revenue. Tax system was reformed in the early 2000s with introduction of new tax rates and establishment of LRA to improve efficiency in collection. The country relies on SACU receipts to meet high government expenditure and there is a need to reduce this reliance.

CHAPTER THREE

LITERATURE REVIEW

3.0 Introduction

This chapter details both the theoretical and empirical literature concerning the determinants of tax revenue. Theoretical literature focuses mainly on the productivity of the tax system. The review of literature helps in the choice of variables to be included in the model.

3.1 Theoretical Literature review

Measuring the effectiveness of the tax system in terms of its mobilisation capacity in public finance uses the concepts of tax buoyancy and elasticity. These two concepts need to be separately and clearly defined.

3.1.1 Tax buoyancy

Tax buoyancy measures the responsiveness of tax revenue to changes in national income without adjusting for discretionary changes in tax policy. The response of tax revenue to GDP is divided into two components; automatic and discretionary. Automatic response refers to tax revenue changes as a result of changes in GDP. The latter refers to changes in tax revenue due to discretionary changes in tax policy, and it is called tax elasticity. A buoyancy estimate that is greater than one shows that for every one percent increase in GDP, tax revenue increased by more than one percent.

The traditional way to estimate the buoyancy of a particular tax, k, is with the following model as proposed by Osoro (1993).

$$T_k = e^{\alpha k} Y^{\beta k} e^{\mathcal{E}} \quad \text{..... (3.1)}$$

Where T = tax revenue

k = tax revenue type

Y = income (GDP)

α = constant term

β = buoyancy coefficient

e = base of natural log

The log transformation of equation 3.2 becomes:

$$logT_k = \alpha_k + \beta_k logY + \mathcal{E} \quad \text{..... (3.2)}$$

3.1.2 Tax elasticity

Tax elasticity measures tax revenue's responsiveness to changes in national income, adjusting to the changes in tax policy. There are many determinants that affect the tax policy, such as changes in tax rates, the introduction of new taxes, abolition of other taxes, and tax administration efficiency. Tax revenue is adjusted to eliminate the effects of these factors other than GDP.

Two approaches exist to measure the elasticity of tax revenue. The first one is historical time-series tax data (HTSTD) adjusted for discretionary changes. The second approach is HTSTD using time trends or dummy variables as proxies for discretionary changes. Different estimation techniques have been employed to estimate tax elasticity under these two approaches. These techniques are proportional adjustment and constant rate structure methods under HTSTD adjusted

for discretionary changes**. T**he Divisia index and dummy variable approach fall under HTSTD that use proxies for discretionary changes.

Proportional Adjustment method

The proportional adjustment method was initially established by Prest (1962). The method involves obtaining the actual data on tax revenue on a particular year from Budget speeches and government reports Tax revenue is then adjusted by subtracting the estimate of the impact of discretionary changes of that year. The proportional adjustment method adjusts a revenue series according to a particular year's tax structure, assuming that the tax structure is maintained throughout the period under review. Osoro (1993) used this method to estimate the revenue productivity tax system in Tanzania for the period 1969 to 1990. The model is estimated as follows:

$$lnT_k = \alpha_k + \beta_k lnY + \mathcal{E} \quad (3.3)$$

Where T = tax revenue

k = tax revenue type

Y = income (GDP)

α = constant term

β = elasticity of kth tax revenue to changes in income, Y.

e = base of natural log

Constant rate structure (CRS) method

The constant rate structure method requires the generation of tax revenue series for a given reference year and estimates of the tax base for subsequent years. It uses disaggregated information

on the growth and distribution of the reported tax bases. If such disaggregated data is available, it is easier to construct a constant rate-base series representing hypothetical yields. This method assumes that the system remains unchanged during the period under review. CRS controls for discretionary tax changes due to tax rates and ignores the changes that come from administrative efficiency (Ehdaie, 1990).

Divisia Index

Divisia index introduces a proxy for discretionary tax changes. The index measures the changes in tax revenue as a result of discretionary tax changes, just as output changes due to changes in inputs. It is derived from the tax yield function which is similar to a production function. Tax yield function and its properties need to be clearly defined. Divisia index is defined as a percentage change in total tax yield divided by the percentage change in total tax yield adjusted to an increase in the bases. This method is more applicable when the revenue effects of discretionary changes are not known, and it uses time trends as proxies.

Dummy variable approach

Singer (1968) introduced the dummy variable method to estimate the elasticity of tax revenue. The dummy variables are used to account for discretionary changes, unusual circumstances, and events that might affect tax revenue collection. The model becomes as follows:

$$lnT_t = \alpha + \sum_{i=1}^{N} \delta_i D_i + \beta lnY_t + \varepsilon_t \quad \text{..... (3.4)}$$

Where T_t = tax revenue

Di is the dummy variable taking the value of 1 for the years in which there were discretionary policy changes and 0 otherwise.

The summation accounts for the possibility of multiple changes in the study period

N = total number of dummies representing unusual circumstances.

β = income elasticity of tax revenue

3.2 Empirical Literature Review

Economic theory suggests that there are other exogenous factors that affect tax revenue in a country. Various studies have been carried out to determine the various components that play a role in tax revenue collections. Ayenew (2016) empirically examined tax revenue determinants in Ethiopia for the period 1975 to 2013, using Johansen's maximum likelihood cointegration approach. The study concluded that GDP per capita, foreign aid and industrial sector value-added positively affect tax revenue. On the other hand, inflation exhibited a negative influence. The short-run dynamics indicated that GDP per capita and inflation have a negative effect on tax revenue, while the industrial sector has a positive one.

The study by Koatsa and Nchake (2017) examined the revenue productivity of the Lesotho tax system. Their analysis used the concepts of buoyancy and elasticity using the data for the OLS and period 1992 to 2015. The results indicated that VAT and income taxes are elastic to changes in GDP. Their findings also revealed that tax revenue in Lesotho grows due to an increase in income and not due to government effort in tax collection. This is because the tax reforms thus far seem to be motivated towards equity and not the efficiency objective of the tax system. When the dummy variable approach was used, the tax system reforms were found to have no impact on tax elasticity.

In an attempt to establish the determinants of Value Added Tax (VAT) revenue in Kenya, Wawire (2017) performed a regression of VAT revenues on different regressors. The author

specifically added the tax system's nature, institutional, demographic and structural features of the economy as the variables that have been omitted in literature when studying the VAT determinants in Kenya. The study followed Samuelson's (1955) fundamental general equilibrium analysis as the theoretical framework. The research discovered that VAT revenue positively responds to changes in total GDP, the volume of trade, imports, and reforms.

In relation to Tanzania, Simbachawene (2018) examined the determinants of tax revenue using the time series data for the period 1999 to 2016. The model included structural, economic, institutional and financing factors. The results showed that mining share, loan, manufacturing, construction, transportation, services, rule of law, regulatory quality and control of corruption have positive effect on tax revenue. FDI was found to have a negative effect because Tanzania, like most developing countries, tend to set lower tax or tax exemption for foreign investors in order to attract FDI.

Tax burden is the portion of tax revenues within a period to the GDP of that time period. Atsan (2017) estimated tax burden and tax capacity of Turkey for the period 1984 to 2012 using the multiple linear regression model. The analysis concluded that the actual tax burden was slightly lower than the estimated tax burden in Turkey. The factors of tax capacity were examined for the period. It was found that foreign trade influenced the tax capacity positively, while the agricultural value added had negative effect on tax capacity.

Rasheed (2006) used the econometric model estimation to analyse tax buoyancy in Pakistan using annual data for the period 1980 to 2004. The results of the analysis revealed that tax revenue is not affected by investment, narrow money, broad money, inflation and public debt. The growth in money supply, the volume of trade and GDP were found to be significant in affecting tax revenue.

Tax revenue needs to be disaggregated so as to capture effects on different tax categories. Bayu (2015) estimated the short run and long run buoyancies of tax revenue categories in Ethiopia using annual data from 1974 to 2010. The types were direct, domestic indirect, foreign trade and gross tax revenues. The determinants of total tax revenue were established in the study. The buoyancy results indicated that direct and indirect tax revenues are not responsive to changes in income in both the short run and the long run. Foreign trade tax revenue was non-buoyant in the short run but it was buoyant in the long run. The analysis of the determinants of gross tax revenue pointed out that the service sector, imports, and budget deficits positively affect tax revenue while ODA negatively affects tax revenue.

Some studies used panel analysis to examine the determinants of tax revenue. Gupta (2007) undertook a study to investigate determinants of tax revenue performance in developing countries. The analysis used a panel dataset for 105 developing countries over 25 years. The results indicated GDP per capita, trade openness and share of agriculture to GDP have a significant effect on tax revenue.

Using the multivariate panel cointegration analysis, Terefe and Teera (2018) empirically examined the key determinants of tax revenue in East African countries. They used the data for the period 1992 to 2015. The study results indicated that per capita GDP, foreign aid, trade openness, share of agriculture, share of industry and share of services have a positive contribution to tax revenue over the study period. On the other hand, urbanisation, official exchange rate and rate of inflation harm the tax revenue to GDP ratio of the region.

Boukbech *et al*. (2018) studied the tax revenue determinants in 29 lower-middle-income countries over the period 2001 to 2014. They estimated two models, the first model studied determinants of tax capacity and the second one the tax effort determinants. Their analysis

established that per capita GDP and value-added agriculture are positively correlated with tax capacity. Inflation and public spending were found to have a positive impact on tax effort while public aid received and foreign aid have a negative effect.

Another analysis that disaggregated tax revenue into its components is done by Feger (2014). The study established that tax revenue determinants affect the individual tax revenue components in different ways. Using the dynamic panel system Generalized Method of Moments (GMM) framework, the author used the data from 1990 to 2008 for 43 sub-Sahara African countries to make the analysis. The results showed that GDP per capita only had a significant impact on income profits and capital gain (IPCG) taxes. The agricultural sector had no impact on international trade taxes, harms IPCG and goods and services tax. The existence of larger manufacturing enterprises is associated with higher total taxes. However, the relationship with IPCG taxes was negative and significant, while there was no meaningful relationship with trade taxes and taxes on goods and services.

Fifteen Southern African Development Community (SADC) countries were analysed for tax revenue determinants by Ade *et al.* (2018) for the period 1990 to 2010. They applied the least squares dummy variables fixed effects and the feasible generalized least squares methods for the analysis. They introduced value-added and corporate income tax harmonization variables. These variables together with FDI inflows were found to be significant in determining tax revenue in the region.

Taking into consideration the role of trade liberalization, Zarra-Nezhad *et al*. (2016) studied tax revenue determinants using gross country analysis for the period 1990 to 2012. The study included 83 countries. They performed the Generalized Method of Moments regression and the results revealed that trade liberalization has a significant positive effect on tax revenue. Other

significant factors were GDP growth rate, the share of agriculture on GDP, exchange rate, urbanization, and democracy.

Coulibaly and Gandhi (2018) used stochastic frontier analysis to assess whether sub-Saharan Africa's low tax revenues are due to low tax capacity or inefficiencies in tax administration. The study used time-varying panel data with observable heterogeneity for 51 SSA countries. Just like previous literature, their findings showed that GDP per capita, trade and inflation significantly affect tax revenue. Natural resource rents indicator and the estimate of informal sector have adverse effect on tax revenue and higher levels of corruption and lower levels of democratic accountability negatively affect tax effort.

West African Monetary Agency (2011) provided empirical evidence of tax revenue determinants for Economic Community of West African States (ECOWAS) for the period 2000 to 2010. The analysis included other five countries that are not ECOWAS member states. The results showed that level of literacy positively affects all tax revenue categories, while financial deepening positively determines indirect trade taxes. Agriculture harms direct and indirect taxes, per capita GDP, trade openness have a positive effect on trade taxes. The study used stochastic frontiers for the analysis.

The study by Modica *et al*. (2018) analysed domestic revenue mobilisation for 80 countries from Africa, Asia and Latin America & Caribbean using the data from 1990 to 2015. The analysis was made using the Global Revenue Statistics Database (GRSD). GRSD was constructed using the data from four revenue statistics publications; Revenue Statistics in Africa, Revenue Statistics in Asian and Pacific countries and Revenue Statistics in Latin America & Caribbean. The paper focused on making comparisons of the tax structures across countries. Taxes on goods and services were the largest source of tax revenue for 46 countries, including most African and LAC countries.

Value-added tax was found to be a vital component of this revenue in 37 countries. In 19 of these countries, the share of CIT in tax revenues was higher than the share of PIT. The correlation analysis was made and it confirmed that higher GDP per capita, personal income tax and social security contributions are positively correlated with higher levels of taxation, while VAT and corporate income tax had negative correlation

Langford and Ohlenburg (2015) analyzed tax capacity and tax effort for the panel of 85 non-resource-rich countries for 27 years. Tax capacity is defined as the maximum amount of tax revenue a country could raise depending on its prevailing characteristics and tax effort is explained as extent to which actual tax revenue reaches estimated capacity. The stochastic frontier analysis was used with data from ICTD Government Revenue Dataset. The findings showed that manufacturing share, education, trade and age dependency ratio are important positive determinants of tax capacity while inflation was found to have a negative effect. Corruption, democratic accountability, and law and order are found to be significant determinants of tax effort.

By using both static and dynamic panel data analysis, Castro and Camarillo (2014) examined determinants of tax revenue in 34 Organization of Economic Corporation and Development (OECD) countries. The results indicated that GDP per capita, the industrial sector, and civil liberties have positive impact on the tax revenue, while agriculture and foreign direct investment (FDI) in gross fixed capital formation have a negative impact.

3.3 Summary of Literature review

It is shown from theoretical and empirical literature that previous studies used different techniques to estimate buoyancy and elasticity of tax revenue. Tax elasticity greater than one is preferable because it shows that the system is productive.

Empirical studies focused on the effect of economic variables on tax buoyancy and elasticity. Different variables were chosen to make analysis for different countries and the results show that GDP is still the main driver for tax revenue.

Revenue mobilisation is affected by the behaviour of tax system overtime which can be enhanced by the establishment of fiscal reforms. The study contributes to the existing literature for Lesotho by examining the effect of LRA as a fiscal reform on tax revenue categories. Tax revenue as a dependent variable is disaggregated into two major categories being VAT and IPCG taxes. This study further analyses the influence of the sectors of the economy and external sources of funding on tax revenue sources.

CHAPTER FOUR

METHODOLOGY

4.0 Introduction

This chapter provides a synthesis of the ideas presented in the theoretical model and the empirical model. The purpose of this chapter is to specify the model for the analysis of determinants of tax revenue in Lesotho. The study uses the dummy variable approach to capture the establishment of LRA in 2003. It later presents the priori expectations of the empirical results and also the estimation techniques.

4.1 Theoretical Model Specification

The classical theory of taxes is derived from the basic model that assumes that income is the principal determinant of taxes. The theoretical framework of the model follows the dummy variable approach to tax elasticity by Singer (1968). This method is applicable because it captures the changes in administration of the tax system. Tax elasticity is defined as the responsiveness of tax revenue to changes in income, taking into account the discretionary tax policy changes. The dummy variable approach uses unadjusted HTSTD and dummy variables are used as proxies for discretionary changes in tax policy. The tax elasticity model is specified as:

$$lnT_t = \alpha + \beta lnY_t + \varepsilon_t \quad \text{..... (4.1)}$$

Where: T = total tax revenue

Y = income (GDP)

α = constant term

β = elasticity of tax revenue

Singer (1968) introduced dummy variables to account for discretionary changes, unusual circumstances and events that might affect the collection of tax revenue. The model becomes the following:

$$lnT_t = \alpha + \sum_{i=1}^{N} \delta_i D_i + \beta lnY_t + \varepsilon_t \quad \text{(4.2)}$$

Where T_t = tax revenue

Di is the dummy variable taking the value of 1 for the years in which there were discretionary policy changes and 0 otherwise.

N = total number of dummies representing unusual circumstances.

β = income elasticity of tax revenue

4.2 Empirical Model Specification

The dummy variable approach model does not incorporate the characteristics of the economy that have effect on the tax system. The empirical model extends that of Osoro (993) with variables from literature. These factors include sectors of the economy and other external sources that have influence on tax revenue. For the purpose of this study, the following variables are included in the model; GDP per capita, agriculture and services sectors, official development assistance and remittances.

Agricultural sector in Lesotho consists of small farmers who practice subsistence farming. The service sector is vast and most of the services offered are public. ODA is an external source of finance which can either be payable or not. Lesotho is the remittance recipient country mainly from South Africa where most of its citizens are working. It is vital to evaluate effect of these factors on tax revenue.

The following econometric model is be estimated:

$$Tax_{kt} = \beta_{k0} + \beta_{k1}GDPPC_t + \beta_{k2}AGRIC_t + \beta_{k3}SERV_t + \beta_{k4}REMIT_t + \beta_{k5}ODA_t + \beta_{k6}LRA + \varepsilon_t \quad (4.3)$$

Where:

K denotes tax revenue categories; VAT, IPCG tax and total tax revenue.

Tax is the tax revenue as a percentage of GDP

GDPPC is GDP per capita (% of GDP)

AGRIC is the agriculture value added (% of GDP)

SERV is the service sector value added (% of GDP)

REMIT is the remittance inflow (% of GDP)

ODA is Net ODA received (% of GNI)

LRA is a dummy variable which takes the value of 1 from 2003 to 2017 and 0 otherwise

ε_t is the error term that captures all other variables that affect the ratio of tax to GDP but are not included in the model.

4.3 Variable Definitions and their Expected Signs

Gross Domestic Product per capita

GDP per capita is considered as a proxy for the level of development of a country. An increase in GDP per capita means an increase in the tax base. When the level of development is high, it means that the standard of living is improved the country's capability to collect tax revenue also rises (Chelliah, 1971), it is expected to have a positive sign on tax revenue. Increasing per

capita GDP also means higher income available for consumption and capital investment and, therefore a positive effect on VAT and IPCG tax revenues.

Agriculture

It represents the agricultural sector in the economy. Agricultural sector in developing countries consists of a large number of small farmers who practice subsistence farming or sell their products in the informal sector. Many countries do not tax this sector since it is highly informal and costly to assess (Ferger, 2014). Agriculture is expected to have a negative effect on all tax revenue components under investigation.

Service sector

The service sector in most developing countries is a bit formal and easy to assess. The variable captures the actual effect of the increase in the value-added in the service sector to GDP on tax revenue collection. The growth of service sector widens the tax base (Bayu, 2015). It is expected to positively affect the total tax revenue, VAT and IPCG taxes.

Remittances

The inflow of remittances increases the income of the recipient households. Income is usually used for the consumption of goods and services. The increase in remittances is expected to have a positive effect on VAT. Most families in developing countries that rely on remittances do not engage in paid employment. This behaviour harms personal income tax, the negative sign is expected on the effect of remittances on IPCG tax because personal income tax is a component

of IPCG tax. But if remittances are used for investment purposes, there is a potential increase in income tax revenue and consequently, a positive sign on IPCG taxes.

Official Development Assistance

The variable captures the effect of dependence on foreign assistance on domestic revenue mobilisation through tax. Countries may hardly exert effort in tax collection when they know that they can turn to donors for funding. Foreign aid serves as a disincentive to raise domestic revenues, ODA is therefore anticipated to have a negative effect on tax revenue (Boukbech *et al.*, 2018). On the contrary, if the aid comes in the form of loans, the government raises tax revenue in order to repay the loan and therefore a positive effect of ODA on tax revenue (Terefe and Teera, 2018).

LRA

The coefficient of LRA is expected to be positive for all tax revenue categories. LRA was established to improve efficiency of the tax system and to improve equity in tax revenue collection. LRA takes the value of 1 from 2003 to 2017 and the value of 0 from 1982 to 2002.

Table 4. 2 Variables, Measurements and Expected signs

Variable	Measurement	Direction of effect on dependent variables			Data source
		Total tax	VAT	IPCG	ICTD
GDPPC	GDP per capita (% of GDP) Measures the level of development	+	+	+	WDI
AGRIC	Agriculture value added (% of GDP)	-	-	-	WDI
SERV	Services value added (% of GDP)	+	+	+	WDI
REMIT	Remittance inflow (% of GDP)	+/-	+	+ /-	WDI
ODA	Official Development Assistance (% of GDP)	+/-	+/-	+/-	WDI
LRA	Dummy variable which takes 1 for 2003-2017 and 0 otherwise	+	+	+	

4.4 Data Sources

The study employs secondary annual data from the World Development Indicators (WDI) of World Bank for macroeconomic variables over the period 1982 to 2017. The VAT and IPCG tax revenue data is being taken from International Centre for Tax and Development (ICTD) Government Revenue Dataset. The choice of the study period is informed by data availability.

4.5 Empirical Model and Estimation Techniques

For examining the determinants of tax revenue, the empirical model used in the study is the autoregressive distributed lag (ARDL) model. Notably, the study uses the ARDL bounds testing approach to investigate existence of cointegration among model variables. As proposed by Pesaran et al. (1996), ARDL bounds testing method has some advantages over other cointegration test approaches. ARDL includes both endogenous and exogenous variables. It is applicable when

variables are stationary at levels or are integrated of order one or combination of both. The cointegrating vectors are identified when ARDL is used. If one cointegrating vector is identified, the ARDL model is robust and gives efficient results. ARDL is also more efficient for the small sample size.

The first stage ARDL procedure is to establish the existence of a long-run relationship. When a long-run relationship has been recognized, long-run relationship coefficients and unrestricted error correction regressions are estimated for model.

Specification of the unrestricted ARDL model

$$\Delta TAX_{kt} = \psi + \sum_{i=1}^{q} \beta_{k0}\, \Delta Tax_{kt-i} + \sum_{i=1}^{q} \beta_{k1}\, \Delta GDPPC_{t-i} + \sum_{i=1}^{q} \beta_{k2}\, \Delta AGRIC_{t-i} + \sum_{i=1}^{q} \beta_{k3}\, \Delta SERV_{t-i} + \sum_{i=1}^{q} \beta_{k4}\, \Delta REMIT_{t-i} + \sum_{i=1}^{q} \beta_{k5}\, \Delta ODA_{t-i} + \theta_{k0} TAX_{kt-1} + \theta_{k1} GDPPC_{t-1} + \theta_{k2} AGRIC_{t-1} + \theta_{k3} SERV_{t-1} + \theta_{k4} REMIT_{t-1} + \theta_{k5} ODA_{t-1} + \lambda_1 LRA + \varepsilon_t \quad \ldots\ldots (4.4)$$

Where

- q is the optimal lag lengths
- $\beta s\ and\ \theta s$ are short-run and long-run coefficients, respectively
- k denotes tax revenue categories; VAT, IPCG tax and total tax revenue.

The hypotheses that the long-run coefficients are equal to zero are tested using the F test and are compared with Narayan (2004) critical values. If the F statistic falls above the upper bound, then cointegration exists but if it falls below the lower bound, cointegration does not exist and only short-run ARDL model is being estimated.

If there is cointegration, the long run results are estimated from the following equation:

$$TAX_{kt} = \sum_{i=1}^{P} \gamma_{ki}\, TAX_{kt-i} + \sum_{i=1}^{q} \theta_{ki}\, GDPPC_{t-i} + \sum_{i=1}^{q} \delta_{ki}\, AGRIC_{t-i} + \sum_{i=1}^{q} \phi_{ki}\, SERV_{t-i} + \sum_{i=1}^{q} \Psi_{ki}\, REMIT_{t-i} + \sum_{i=1}^{q} \rho_{ki}\, ODA_{t-i} + \varepsilon_t \quad \ldots\ldots\ldots\ldots \quad (4.5)$$

In the long run, there are no lags on the variables, tax revenue coefficients are taken to the left-hand side as presented by equation 4.6.

$$TAX_{kt}(1 - \sum_{i=1}^{P} \gamma_{ki}) = \quad (\sum_{i=1}^{q} \theta_{ki})GDPPC_t + (\sum_{i=1}^{q} \delta_{ki})AGRIC_t + (\sum_{i=1}^{q} \phi_{ki})SERV_t + (\sum_{i=1}^{q} \Psi_{ki})REMIT_t + (\sum_{i=1}^{q} \rho_{ki})ODA_t + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.6)$$

The final step is to estimate long-run coefficients by solving equation 4.6. The resulting equation 4.7 gives the long-run coefficients. They represent the equilibrium effects of the independent variables on the dependent variable.

$$TAX_{kt} = \frac{(\sum_{i=0}^{q} \theta_{ki})}{(1-\sum_{i=1}^{P} \gamma_{ki})} GDPPC_t + \frac{(\sum_{i=0}^{q} \delta_{ki})}{(1-\sum_{i=1}^{P} \gamma_{ki})} AGRIC_t + \frac{(\sum_{i=0}^{q} \phi_{ki})}{(1-\sum_{i=1}^{P} \gamma_{ki})} SERV_t + \frac{(\sum_{i=0}^{q} \Psi_{ki})}{(1-\sum_{i=1}^{P} \gamma_{ki})} REMIT_t + \frac{(\sum_{i=0}^{q} \rho_{ki})}{(1-\sum_{i=1}^{P} \gamma_{ki})} ODA_t + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.7)$$

Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC) are used to determine the appropriate optimum lag length of the model.

4.6 Unit root test

Stationarity is not a necessary condition for ARDL but this study carries out a unit root test to make sure that the variables are not integrated of order 2. The requirement for ARDL is that the variables under study should be either stationary at levels or after first difference, if there is an I(2)

variable, ARDL is no longer applicable. Augmented Dickey-Fuller (ADF) and Philips-Pherron tests for stationarity are employed to analyse the behaviour of the series.

4.7 Conclusion

This chapter outlines the theoretical and empirical models for the analysis of tax revenue determinants. Dummy variable approach is extended to incorporate other variables that influence tax revenue. Among the independent variables, GDP per capita, services and LRA are expected to positively affect all the tax revenue categories under review. Other variables are expected to have altering effects. The ARDL bounds test for cointegration is the appropriate method due to its advantages over Johansen and Engle & Granger cointegration tests.

CHAPTER FIVE

RESULTS

5.0 Introduction

This chapter presents the empirical econometric analysis of the determinants of tax revenue in Lesotho using the data for the period 1982-2017. Three models are run for the analysis. Tax, VAT and IPCG are the dependent variables while GDP per capita, agriculture, services, remittances and ODA are the independent variables. The descriptive statistics, stationarity and cointegration analysis are discussed. Finally the diagnostic tests and ARDL results are presented and interpreted. All the variables are in percentage of GDP.

There is a reason as to why tax revenue is disaggregated. Tax revenue determinants cannot be generalised across tax revenue components as they affect individual tax sources in different ways. In this connection, findings from the separate analysis of components provide insight into the nature of the tax structure.

5.1 Descriptive Statistics

Table 5.1 presents the descriptive statistics. All the variables have 36 observations. It is observed that remittances have the greatest variation as compared to other variables.

Table 5. 1 Descriptive statistics of the variables

Variable	Observations	Mean	Median	Std deviation	Minimum	Maximum	Skewness
TAX	36	36.02296	33.930	7.538641	25.58741	56.91614	0.994458
VAT	36	5.452851	6.0867	1.572402	0.351748	7.261732	-1.121926
IPCG	36	7.567507	7.3800	2.673397	3.411685	11.58074	-0.239532
GDPPC	36	2.74436	2.6700	2.30519	- 3.04406	6.728415	-0.343240
AGRIC	36	8.678837	7.5071	3.848363	4.842765	16.66436	0.969437
SERV	36	55.28386	54.630	4.730388	47.45328	64.77348	0.484618
REMIT	36	47.65302	40.984	25.5239	14.84883	99.78586	0.639156
ODA	36	8.59960	7.9874	4.5071	2.64995	18.37597	0.417559

Source: Author's computations

5.2 Stationarity and Cointegration analysis

5.2.1 Stationarity test

Stationarity is not a necessary condition for ARDL model, in this case, the presence of unit root is tested in order to make sure that the variables are integrated of either order zero or one but not two. The unit root test was performed following Dickey and Fuller (1979) and Phillips and Perron (1988).

Table 5. 2 Unit root tests results

Variable	Augmented Dickey-Fuller (ADF)		Phillips-Perron	
	Levels	**First Difference**	**Levels**	**First Difference**
	t-statistic	t-statistic	t-statistic	t-statistic
TAX	-2.549839	-6.311971***	-2.594901	-6.407023***
VAT	-3.724768***	-6.564566***	-3.678430***	-6.564566***
IPCG	-1.152640	-6.165645***	-1.067947	-6.852270***
GDPPC	-4.386260***	-10.85881***	-4.481646***	-11.97305***
AGRIC	-2.830250***	-7.543047***	-2.856542***	-7.495703***
SERV	-2.098744	-7.027317***	-2.083479	-6.996031***
REMIT	-3.177268 **	-5.955551***	-2.999464***	-8.359210 ***
ODA	-1.535788	-6.372961***	-1.364156	-6.783176***

Source: Author's computations

Note: *** = Significant at 1%, ** = Significant at 5%, * = Significant at 10%.

Table 5.2. above shows the results of the unit root tests using both Augmented Dickey-Fuller and Phillips-Perron tests. These two tests have shown similar results. Value Added Tax, GDP per capita, agriculture and remittances are stationary at levels. Total tax revenue, tax on IPCG, services and ODA are integrated of order one because they became stationary after first differencing.

5.2.2 Cointegration analysis

ARDL bounds test for cointegration

Hypotheses

H_0: There is no cointegration

H_1: There is cointegration

The study employs ARDL approach developed by Pesaran *et al*. (1996, 2001). The existence of the long-run relationship between the variables is tested by computing the F-statistic which is then compared to the critical values. Under the null hypothesis of no cointegration, the decision rule for the F test is to reject the null if F statistic is greater than upper bound critical values at all conventional levels. When F statistic is lower than the lower bounds critical values, the null hypothesis cannot be rejected. When the F statistic falls between the lower and upper bounds, the test is inconclusive. The critical values are obtained from Narayan (2004) tables which were reformulated so that they are applicable for small sample size of between thirty and eighty observations.

The bounds test for cointegration results are presented in Table 5.3 below. In the case of model 1, the F statistic of 8.047734 is greater than the upper bound values at 5% significance level, so the null hypothesis is rejected, therefore there is cointegration.

Table 5. 3 F-statistics for cointegration relationship

	Critical value bounds of the F statistic						
	10%		**5%**		**1%**		
Model	Lower	Upper	Lower	Upper	Lower	Upper	F Statistic
1	2.331	3.417	2.804	4.013	3.9	5.419	8.047734
2	2.331	3.417	2.804	4.013	3.9	5.419	4.262918
3	2.12	3.23	2.45	3.61	3.15	4.43	5.865380

Source: The critical values for the bounds are from Narayan (2004)

Model 2 which is the IPCG tax equation, showed that there is cointegration because the value of the F statistic, 4.262918, is significant at five percent. This value is greater than the upper bounds values for both ten percent and five percent critical levels as presented in the table above. Model 3 which is the VAT equation showed the presence of cointegration because the value of the F statistic 5.865, is greater than the upper bounds values at in all conventional levels.

All three models show that there exists a long relationship among the variables. As a result, the unrestricted error correction models are estimated to capture long run and short-run dynamics among the variables.

5.3 Lag length selection

Before running the models, the lag length selection was carried out using Akaike Information Criterion (AIC). AIC determines the relative information value of the model using the maximum likelihood estimate and the number of parameters (independent variables) in the model. The results of the lag length selection criteria are represented in Appendix B. The optimum lag length is two, one and one for tax revenue, IPCG tax and VAT models respectively.

5.4 Models diagnostic tests

The diagnostic tests were carried out for all three models and the results are presented in table5.4. The models are diagnosed for serial correlation, heteroscedasticity, normality and stability. Serial correlation in time series means that the error term in the current period is correlated with errors in the previous periods. It affects the efficiency of the estimators. In case of model estimation using the conventional OLS method, when there is positive serial correlation, there will be smaller standard errors and this will lead to larger t-statistics. The result of this is the rejection of the null hypothesis when it should not be rejected.

The Lagrange Multiplier (LM) test for higher order autocorrelation proposed by Breusch (1978) and Godfrey (1978) is performed. The null hypothesis is that there is no serial correlation. The results in table 5.4 show that for all the three models, the probability of the LM test is insignificant meaning there is no serial correlation.

Another vital diagnosis of time series models is heteroscedasticity. Heteroscedasticity means that the variance of the residuals is not constant. Ordinary Least Squares (OLS) assumes the variance of residuals to be homoscedastic or constant across the plot. The violation of this assumption leads to inefficient estimators and the model coefficients will be statistically significant when they are actually not significant. Breusch-Pagan-Godfrey test for heteroscedasticity is conducted and under the null hypothesis of homoscedasticity. According to the results, all the models do not suffer from heteroscedasticity.

Table 5. 4 Diagnostic tests

Models	**Serial correlation**	**Heteroskedasticity**	**Normality**
	LM test (Prob F)	Breusch-Pagan-Godfrey (Prob F)	Jarque-Bera (Prob)
1	0.6677	0.3609	0.4285
2	0.6703	0.1051	0.8532
3	0.6602	0.1770	0.6193

Source: Author's computations

The normality test using the Jarque-Bera statistic is performed and the results show that the errors are normally distributed. The null hypothesis is that errors are normally distributed, looking at the probabilities in Table 5.4, the null hypothesis cannot be rejected for all the three models.

Lastly, the test for stability of parameters is conducted using cumulative sum (CUSUM) of squares test. This test was developed by Brown *et al*. (1975) to assess the stability of coefficients in the model. If a breakpoint is found, then the specification chosen throughout the period is rejected. The CUSUM of squares test results are graphically presented in appendix B by Figures 5 (a), 5 (b) and 5 (c). CUSUM of squares recursive residuals plots show that the models' coefficients are stable over time as they lie within the 5% significance level.

The models have passed the diagnostic tests and therefore the empirical results are interpreted.

All the variables under investigation are transformed into percentage of GDP and therefore the interpretations are percentage points changes.

5.5 Model 1: Total tax revenue is the dependent variable

Table 5.5 presents the results of short-run and long-run coefficients of the estimated model. The R-squared which is the coefficient of determination is 0.82. This means that about 82 percent of the variation in tax revenue in Lesotho is jointly explained and accounted for by the independent variables in the estimated ARDL (2, 1, 0, 0, 0, 0) model. After adjusting for degrees of freedom, the adjusted R-squared is 0.75, which means that about 75 percent of the variation in tax revenue is explained by the explanatory variables. This implies that the ARDL model has satisfactory goodness of fit. The F-test is used to determine the overall statistical significance of a regression model, it shows that the overall regression is statistically significant at 1 percent level.

Table 5. 5 Dependent Variable: TOTAL TAX REVENUE

Selected Model: ARDL(2, 1, 0, 0, 0, 0) **SHORT-RUN MODEL**				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(TAX(-1))	0.389149	0.104783	3.713839	0.0011
D(GDPPC)	0.272202	0.131010	2.077727	0.0486
LRA	5.626358	0.812746	6.922652	0.0000
CointEq(-1)*	-0.982667	0.117102	-8.391524	0.0000

LONG-RUN MODEL RESULTS				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GDPPC	1.289100	0.394716	3.265896	0.0033
AGRIC	0.343831	0.381903	0.900310	0.3769
SERV	0.611850	0.153429	3.987827	0.0005
REMIT	0.045425	0.021463	2.116443	0.0449
ODA	-0.658369	0.266887	-2.466846	0.0212
C	-10.451376	7.293522	-1.432967	0.1648
R-squared	0.821272		Adjusted R-squared	0.754248
F-statistic	12.25355		Prob(F-statistic)	0.000001

Source: Author's computations

The long-run coefficients are estimated using the following equation and they represent the equilibrium effects of the independent variables on the dependent variable.

$$TAX_{kt} = \frac{(\sum_{i=1}^{q}\theta_{ki})}{(1-\sum_{i=1}^{P}\gamma_{ki})}GDPPC_t + \frac{(\sum_{i=1}^{q}\delta_{ki})}{(1-\sum_{i=1}^{P}\gamma_{ki})}AGRIC_t + \frac{(\sum_{i=1}^{q}\phi_{ki})}{(1-\sum_{i=1}^{P}\gamma_{ki})}SERV_t + \frac{(\sum_{i=1}^{q}\Psi_{ki})}{(1-\sum_{i=1}^{P}\gamma_{ki})}REMIT_t + \frac{(\sum_{i=1}^{q}\rho_{ki})}{(1-\sum_{i=1}^{P}\gamma_{ki})}ODA_t + \varepsilon_t \quad \text{..... (5.1)}$$

The above results in table 5.5 show that the coefficient of the error correction term is negative and significant at 1%. This coefficient indicates the speed of adjustment to equilibrium, therefore about 98.3 percent of the disequilibrium in the previous year is adjusted for in the current year. The short-run results show that tax revenue in the last year is significant at 1 percent in positively affecting the current year's value of tax revenue. An increase in previous year's tax revenue by one percentage point leads to the rise in current year's tax revenue by 0.39 percentage points, holding other factors constant. The GDP per capita also positively determines tax revenue at 5 percent significance level. Tax revenue rises by 0.27 percentage points as a result of a one percentage point increase in GDP per capita holding other variables constant. Lesotho Revenue Authority (LRA) which was established in 2003 has a significant positive effect on total tax revenue collection at 1 percent. LRA increased the tax revenue collection by 5.6 percentage points. The authority improved the administration and efficiency in revenue collection. Share of agriculture value added, share of services value added, remittances and ODA have no effect on tax revenue in the short run.

In the long run, GDP per capita positively determines total tax revenue at 1% significance level. A 1 percentage point increase in GDP per capita leads to 1.29 percentage points increase in tax revenue holding other factors constant. The results are as expected and are consistent with the findings by Ayenew (2016) and Terefe and Teera (2018). The GDP per capita is considered to be

a proxy for the level of development of a country. An increase in GDP per capita means an increase in the tax base. A higher level of development goes together with a higher capacity to pay and collect taxes, (Chelliah, 1971).

The services value-added as a percentage of GDP significantly and positively determine tax revenue at one percent significance level. A rise by one percentage point in services is associated with increase in tax revenue by 0.6 percentage points. The service sector is a vibrant sector of the economy and it is easier to tax because it is formal. Bayu (2015), Simbachawene (2018) and Terefe and Teera (2018) found similar results in Ethiopia, Tanzania and other East African countries respectively.

Personal remittances inflow positively influence tax revenue holding other factors constant. When the remittances rise by one percentage point, tax revenue also rises by 0.045 percentage points. Remittances increase the household welfare of the recipient countries which leads to greater tax base.

ODA has a significant negative effect on tax revenue in Lesotho over the study period. Tax revenue falls by 0.66 percentage points as a result of increase in ODA by one percentage point. As it was expected, the foreign aid discourages countries from exerting effort in tax collection (Boukbech, 2018). This happens when the aid comes in the form of grants rather than loans.

5.6 Model 2: IPCG is the dependent variable.

In this model, the variables showed a high level of multicollinearity. The variance inflation factors (VIF) are used to test for multicollinearity. Agriculture had a VIF of 14 which is greater than 10. The rule of thumb is that the VIF greater than 10 is unacceptable and action should be taken. The variable was dropped based on literature, it is not practical to collect direct taxes from

this sector in developing countries because of its informal nature. The VIF results are presented in appendix C.

Table 5.6 represents the empirical results for the short run and long-run model when IPCG tax is the dependent variable. The selected model is ARDL (1, 1, 0, 0, 0). The R-squared is 0.95 and it implies that about 95 percent of the variation in IPCG tax revenue is accounted for by the independent variables. The adjusted R-squared that is modified for the degrees of freedom is 0.939 which means that about 93.9 percent of the deviations in IPCG are accounted for by the independent variables in the model. The ARDL model has a reasonable goodness of fit. The F test is used to investigate the joint significance of variables in the model, the probability of the F statistic is significant at 1% which means jointly the explanatory variables affect the dependent variable.

The first part of the results in Table 5.6 is the short-run results. The results below show speed of adjustment is negative and statistically significant at 1%, therefore 49.5 percent of the disequilibrium in the previous year is adjusted for in the current year. Per capita GDP positively affect IPCG tax revenue, such that a one percentage point increase is associated with 0.1 percentage points rise in IPCG taxes. LRA significantly affects IPCG tax revenue at 1 percent holding other factors constant. The existence of LRA increases IPCG tax revenues by 0.6 percentage points in the short run.

Table 5. 6 Dependent Variable: IPCG

Selected Model: ARDL(1, 1, 0, 0, 0)				
SHORT-RUN COEFFICIENTS				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(GDPPC)	0.097577	0.038076	2.562709	0.0163
LRA	0.604345	0.188761	3.201641	0.0035
CointEq(-1)*	-0.494742	0.107695	-4.593902	0.0001

LONG RUN COEFFICIENTS				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GDPPC	0.419671	0.215810	1.944629	0.0623
SERV	0.069869	0.088895	0.785974	0.4387
REMIT	-0.046834	0.018207	-2.572253	0.0159
ODA	-0.232357	0.123710	-1.878232	0.0712
C	6.405890	4.383143	1.461483	0.1554
R-squared	0.951232	F-Statistic		75.23494
Adjusted R-squared	0.938589	Prob (F-Statistic)		0.000000

Source: Author's computations

In the long run, value-added in services does not affect IPCG taxes. The reason for this could be the element of tax evasion when it comes to direct taxes. Chaudhry and Munir (2010)

showed that direct tax ratios in developing countries are lower than indirect taxes and there exists a sizable tax evasion.

GDP per capita determine IPCG tax revenue at 10% level of significance, in the long run, an increase in GDP per capita by one percentage point raises IPCG tax revenue by 0.4 percentage points. Higher income per capita is considered to be a proxy for the level of development of a country. An increase in GDP per capita means an increase in taxable income, consequently an increase in direct tax revenue. A higher level of development goes together with a higher capacity to pay and collect taxes, (Chelliah, 1971). The results are consistent with the findings by Ayenew (2016) and Terefe and Teera (2018).

Remittances negatively affect the IPCG tax revenue at five percent level of significance. These direct taxes decline by 0.04 percentage points in collection as a result of a one percentage point increase in remittance inflow. In Lesotho, the remittance recipient households spend the money received in preparing the young workers to migrate. What is meant is that remittances are used to pay for education and then workers migrate mainly to South Africa for better job opportunities. They do not invest in businesses at home. Chami et al. (2018) referred to this as a remittance trap because the high inflow of remittances harms the economy. The migration of workers hurt the domestic taxable income and as a result, IPCG tax revenues decline.

ODA has a significant negative effect on IPCG tax revenue in Lesotho over the study period. IPCG tax revenue falls by 0.23 percentage points as a result of increase in ODA by one percentage point. As it was expected, the foreign aid discourages countries from exerting effort in tax collection (Boukbech *et al.*, 2018). This happens when the aid comes in the form of grants rather than loans.

5.7 Model 3: VAT is the dependent variable

Table 5.7 represents the empirical results for the short-run and long-run model when VAT is the dependent variable. The selected model is ARDL (1, 0, 0, 0, 0, 1). The R-squared is 0.837 and it implies that about 83.7 percent of the variation in VAT revenue is accounted for by the independent variables. The adjusted R-squared that is modified for the degrees of freedom is 0.786 which means that about 78.6 percent of VAT's deviations are accounted for by the model's independent variables. The ARDL model has the reasonable goodness of fit. The F test is used to investigate the joint significance of variables in the model, the probability of the F statistic is significant at 1% which means jointly the explanatory variables affect the dependent variable.

The results below show speed of adjustment is negative and statistically significant at 1%, therefore 47.1 percent of the disequilibrium in the previous year is adjusted for in the current year. The short-run results reveal that higher agriculture value-added and LRA are positively correlated with VAT. VAT collection rises by 0.24 percent due to 1 percent increase in agriculture. On the other hand, services value added (%of GDP) and remittances affect VAT negatively, a rise in services value added (%of GDP) and remittances by 1 percent reduce VAT by 0.07 percent and 0.01 percent respectively. Other independent variables, per capita GDP and ODA have statistically insignificant effect in the short-run.

Table 5. 7 Dependent Variable: VAT

Selected Model: ARDL (1, 0, 0, 0, 0, 1)				
SHORT-RUN COEFFICIENTS				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(GDPPC)	0.021156	0.051509	0.410733	0.6846
D(AGRIC)	0.244718	0.099616	2.456614	0.0210
D(SERV)	-0.074939	0.041871	-1.789768	0.0851
D(REMIT)	-0.010540	0.005850	-1.801618	0.0832
D(ODA)	0.024358	0.060765	0.400851	0.6918
D(LRA)	1.352418	0.383268	3.528652	0.0016
CointEq(-1)	-0.471304	0.103741	-4.543066	0.0001

LONG-RUN COEFFICIENTS				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPPC	0.044889	0.109647	0.409395	0.6856
AGRIC	0.519237	0.272800	1.903362	0.0681
SERV	-0.159003	0.088919	-1.788188	0.0854
REMIT	-0.022364	0.013445	-1.663322	0.1083
ODA	0.276437	0.124510	2.220205	0.0353
LRA	2.869527	0.835726	3.433574	0.0020
C	8.429285	4.042454	2.085190	0.0470
R-squared	0.83666	Adjusted R-squared		0.786405
F-statistic	16.64751	Prob (F-statistic)		0.000000

Source: Author's computations

GDP per capita and remittances have no significant effect in determining VAT revenue in Lesotho for the period under investigation in the long run.

Agriculture value added (% of GDP) positively affects VAT revenue at 10 percent significance level, a 1 percent increase is associated with 0.52 percent increase in VAT collection. The agricultural output that is subjected to VAT has remarkable effect on VAT revenue over the study period. This result is consistent with findings by Terefe and Teera (2018) when studying East African Countries and Boukbech (2018) who studied the Middle-Income countries. The reason for positive effect of agriculture on VAT revenue is through revenue generation effect. As discovered by Jing et.al. (2006), high agricultural productivity raises agricultural output which increases tax revenues. This finding contradicts the results by Feger (2014) who used a panel of Sub-Saharan African countries and found agriculture to have a negative effect on general sales tax.

Service value added (% of GDP) affects VAT negatively at 10 percent level of significance. VAT revenue decreases by 0.16 percent due to a 1 percent increase in service value added (% of GDP). The reason is that most services are exempted from VAT, for example, educational and medical services. These services are widely used and constitute a more significant part of the sector. Bayu (2015) results are contradictory to this finding.

ODA positively affects VAT revenue at 10 percent significance. The coefficient means that a 1 percent increase in ODA (% of GNI) leads to a rise in VAT revenue (% of GDP) by 0.28 percent. The result corresponds with the fact that government spends the aid on consumption of goods and services which are subjected to VAT. Therefore VAT collection rises. The findings are consistent with Terefe and Teera (2018) results but do not go inline with what was found by Boukbech *et a*l. (2018).

The establishment of LRA has a positive influence on VAT, it raises VAT revenue by 2.87 percent in the long run. The magnitude is high which shows that VAT revenue is very responsive to the formation of the authority.

5.8 Chapter summary

This chapter empirically analysed the determinants of tax revenue, VAT and IPCG tax revenue using ARDL bounds approach. All the variables were tested for the presence of unit root, after first difference, the variables became stationary. The stationarity results made ARDL bounds test more applicable because there is no variable integrated of order two. The ARDL bounds test was conducted and all the three models showed the existence of long-run relationships. The long run and short-run models were estimated. The diagnostic tests were performed in the models, the residuals are normally distributed, homoscedastic and not serially correlated. Lastly the short-run and long-run coefficients were interpreted as per model.

CHAPTER SIX

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The purpose of this study is to investigate the determinants of tax revenue mobilisation in Lesotho using the annual data from 1982 to 2017. Tax revenue is divided into its two components namely; VAT and IPCG taxes. Tax revenue determinants cannot be generalised across tax revenue components as they affect individual tax sources in different ways. In this connection, findings from the separate analysis of components provide insight into the nature of the tax structure. The ARDL model is used for these analyses. The results show that the total tax revenue in Lesotho is positively affected by per capita GDP, agricultural and services sectors, remittance inflows, and revenue authority. Official development assistance determines tax revenue negatively.

When analyzing the determinants of direct taxes represented by IPCG taxes, it was found that only per capita GDP has a positive effect in the long run. Remittances and ODA have negative long-run effect. In the short run, LRA and GDP per capita have a significant positive effect on IPCG tax revenue.

The findings show that services hinder the VAT revenue while agriculture and ODA boost it in the long run. The short-run dynamics reveal that VAT revenue is affected positively by share of agricultural value-added and negatively affected by share of services value-added and remittances

It can be noted that the formation of the Lesotho Revenue Authority has improved the collection for all tax revenue components under investigation.

6. 2 Recommendations

From these findings, it is recommended that Lesotho should enhance economic growth so that per capita income will improve. Economic growth can be improved by encouraging domestic investment. Increase in GDP per capita broadens the tax base and therefore collection of tax revenue increases. Potential IPCG tax revenue will be achieved with the higher level of economic growth.

Policies that attract ODA can be imposed if the aim is to increase indirect tax revenues. The government should also improve the agricultural sector so that its output becomes taxable, as a result, increase in higher VAT revenue can be achieved through modernization and transformation of this sector. VAT generates revenue with limited administrative costs because it is embedded within the price of goods and services. However, reliance on the indirect taxes is harmful because they are aggressive. The improvement of the tax base is imperative to eliminate the country's dependence on SACU receipts as a major source of government revenue.

6.3 Limitations and areas for future research

This study does not include all the factors that affect tax revenue. The institutional variables which are core in determining tax revenue are also excluded because of data unavailability. These variables are but not limited to, bribery, political stability, governance and corruption index, they determine administrative capacity required to collect direct taxes. The institutional variables need to be included for further investigation. The study period (36 years) is also limited, a more extended period is worthwhile for research.

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APPENDICES

Appendix A: Lag length selection criteria

Model 1

Endogenous variable: TAX Exogenous variables: C GDPPC AGRIC SERV REMIT ODA LRA						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-79.49352	NA*	11.14170	5.242032	5.559473*	5.348841
1	-78.21359	1.939293	10.99056	5.225066	5.587856	5.347134
2	-76.47859	2.523631	10.55717*	5.180521*	5.588659	5.317847*
3	-76.20427	0.382393	11.09250	5.224501	5.677988	5.377086

* indicates lag order selected by the criterion

Model 2

Endogenous variable: IPCG Exogenous variables: C GDPPC SERV REMIT ODA LRA						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-32.03312	NA	0.627700	2.365643	2.683084	2.472453
1	-26.46138	8.442032*	0.477371*	2.088568*	2.451358*	2.210636*
2	-26.21895	0.352614	0.501961	2.134482	2.542620	2.271808
3	-25.93284	0.398822	0.527037	2.177748	2.631235	2.330333

* indicates lag order selected by the criterion

Model 3

Endogenous variable: VAT Exogenous variables: C GDPPC AGRIC SERV REMIT ODA LRA						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-40.13286	NA	0.942343	2.772521	3.086772	2.879689
1	-29.16541	16.77374*	0.525875*	2.186201*	2.545344*	2.308679*
2	-29.08074	0.124515	0.557150	2.240044	2.644080	2.377832

* indicates lag order selected by the criterion

Appendix B: Test for Model stability

Figure 5: Cumulative sum (CUSUM) of recursive residuals plots

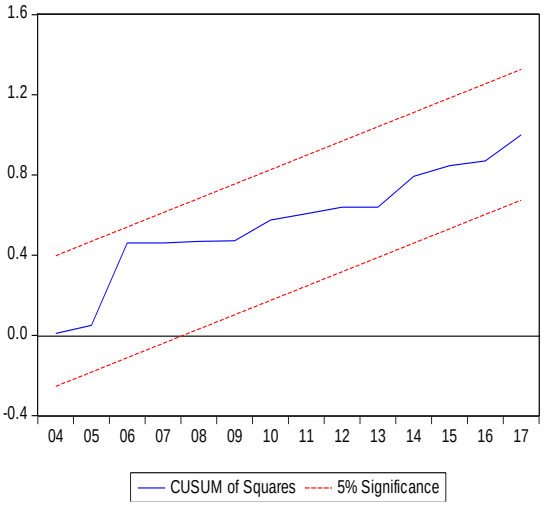

Figure 5(a)

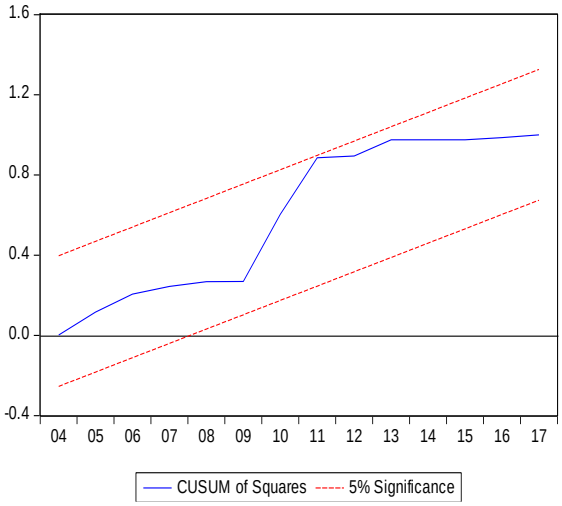

Figure 5(b)

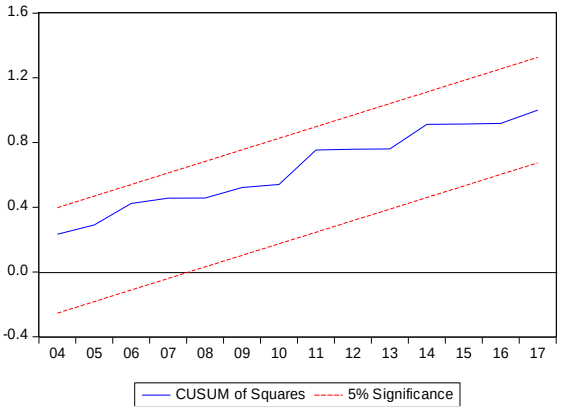

Figure 5(c)

Source: Author's computations

Appendix C: Variance inflation factors

The IPCG model including all the variables

Variable	Coefficient variance	Uncentered VIF	Centered VIF
IPCG(-1)	0.021044	129.0189	14.26505
GDPPC	0.002993	3.762360	1.530768
AGRIC	0.009866	80.60516	12.36159
SERV	0.001695	500.3103	3.275441
REMIT	0.000193	50.56430	10.69405
ODA	0.002111	18.67302	4.021101
LRA	0.197869	8.213594	4.693482
C	5.881756	569.6899	N/A

The IPCG model excluding agriculture

Variable	Coefficient variance	Uncentered VIF	Centered VIF
IPCG(-1)	0.024697	127.8015	14.13044
GDPPC	0.002855	3.028968	1.232377
GDPPC(-1)	0.004290	4.487600	1.518297
SERV	0.001756	437.5518	2.864573
REMIT	0.000162	35.71453	7.553415
ODA	0.003182	23.75850	5.116222
LRA	0.237040	8.305057	4.745747
C	7.077734	578.6187	NA