DEPARTMENT OF ECONOMICS

FISCAL REFORMS AND GOVERNMENT REVENUE IN BOTSWANA: AN ANALYSIS OF TAX BUOYANCY AND ELASTICITY

A DISSERTATION SUBMITTED TO THE DEPARTMENT OF ECONOMICS IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF ARTS IN ECONOMICS

BY

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APPROVAL

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

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DECLARATION

I hereby declare that this dissertation is my original work and has not been published or submitted for any other degree award to any other university before except for referenced.

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ACRONYMS AND ABBREVIATIONS

GDP   Gross Domestic Product

VAT   Value Added Tax

SACU   Southern African Customs Union

OLS   Ordinary Least Squares

SBI   Sustainable Budget Index

BURS   Botswana Unified Revenue Authority

HTSTD   Historical Time Series Data

PA   Proportional Adjustment

CRS   Constant Rate Structure

DVA   Dummy Variable Approach

DIM   Divisia Index Method

PAYE   Pay As You Earn

BOB   Bank of Botswana

ECM   Error Correction Model

AIS   Accumulated Budget Surplus

CRP   Common Revenue Pool

DTMs   Discretionary Tax Measures

OLS   Ordinary Least Squares

ADF   Augmenting Dickey-Fuller

ABSTRACT

This paper aims at determining the responsiveness of government revenues to fiscal reforms in Botswana tax system. Public finance uses two measures to analyse the efficiency of the tax system in generating government revenues. Tax buoyancy measures total response of tax revenue to change in GDP while tax elasticity measures automatic response of tax revenue to GDP changes less the discretionary tax changes.

The paper addresses the effects of SBI, BURS and introduction of VAT as fiscal reforms aimed at enhancing government revenues. To achieve the main objective, buoyancy and elasticity of the tax system were estimated using ordinary least square (OLS) method on time series data for the period 1980-2014. The Dummy Variable Approach was employed to capture the effects of the fiscal reforms on historical Time Series Data to estimate the elasticity of the Botswana tax system. The study reveals that total tax revenue is neither buoyant nor elastic. The same applies to mining tax revenue, non-mining income tax revenue and customs and excise. Only general sales tax/VAT is buoyant. Further, the estimates of buoyancy are higher than their corresponding elasticities for all the taxes, confirming thereof that most of the growth in revenues has been achieved due to fiscal reforms discussed. Specific objective of the study is to identify the determinant of tax revenue in Botswana. Results from an Ordinary Least Square regression with an error correction term revealed that Gross Domestic Product, Southern African Customs Union Revenues as a ratio of total tax revenue and Non-mining GDP as ratio of GDP significantly determine tax revenue in Botswana.

The study concludes that Botswana has an inelastic tax system and that total revenue cannot increase inevitably as national income grows. Therefore, the fiscal reforms were relevant to increasing government revenue. It is recommended that fiscal reforms should be assessed and improved to enhance government revenue such that the Botswana tax system is buoyant and elastic.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Public sector domestic revenue comprises of tax and non-tax revenues collected by a government. Revenue mobilisation is critical for maintaining public administration which is quite expensive such as the total wage bill. It is also essential for sustainable development and enabling resource provision as trends and patterns of finance and expenditure differ across countries. Most of the developing countries depend on taxes for generating revenue for government expenditure, economic stability, income distribution and financing budget deficits. The Botswana fiscal policy has been successful in avoiding external debt problems and maintaining a stable rate of growth over time through the use of tax revenues. Mupimpila (2005) highlighted that tax revenue contributes a very significant proportion to total government finance in Botswana. The reliance of government revenue on taxes led to the evolving fiscal system with years to catch-up with the development, increasing population and the ever increasing government expenditure on social services. There has been a changing balance in the sources of government revenue since independence which includes moving from grants as main source of government revenue. To increase the tax revenue generated, fiscal reforms have been implemented to keep the government revenue up to date with the government expenditures. Analysis by the World Bank (2010) concluded that in the absence of policy reforms in revenues and expenditures, Botswana's current fiscal position is unlikely to be sustainable over the longer term. This further suggests the need for fiscal reforms to increase government revenue mobilization in Botswana.

Figure 1: Tax Revenue as percentage of GDP
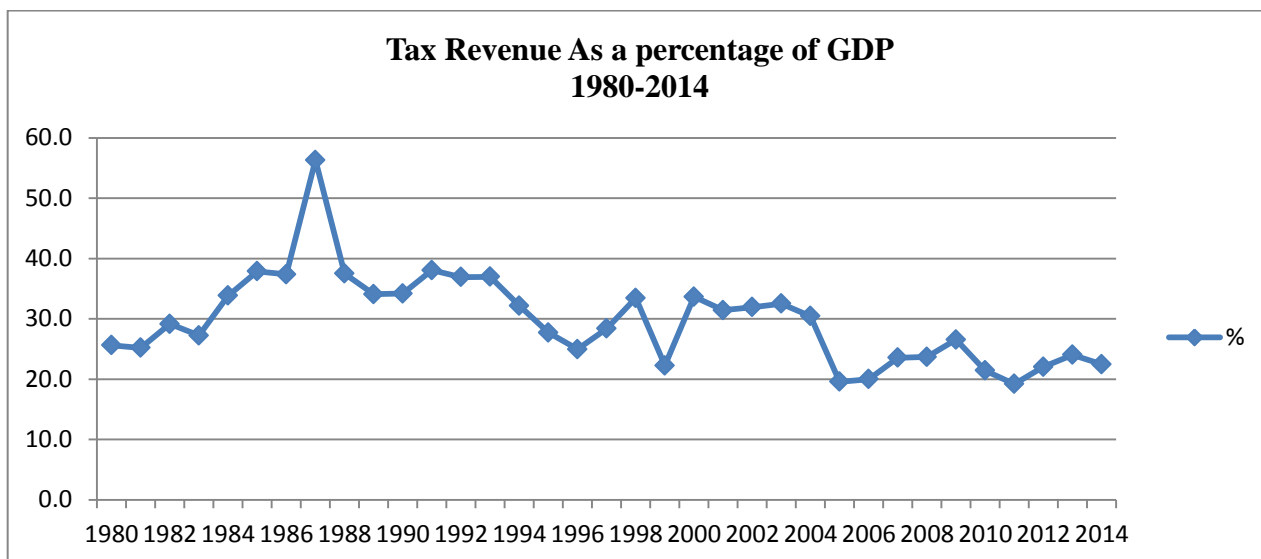
Tax Revenue As a percentage of GDP
1980-2014

Figure 1 shows the trend of Botswana's tax revenue as a percentage of gross domestic product (GDP) from 1980 to 2014. According to Mupimpila (2005), mineral-rich economies have the tendency to rank high in the tax to GDP ratio and Botswana has over time followed this pattern. It is evident that tax revenue contributes a very significant share to the nation income with a gradual increase in percentages from 25% to 37% between the years 1980 to 1987. A sharp increase of 56% was observed in 1988 which could be attributed to the discovery of the minerals in Botswana. Since then to 2014, the percentage share of tax revenue to GDP has been fluctuating between 30% and 25% consistently. Therefore, figure 1 shows the need for fiscal reforms to enhance tax revenue which stimulates government revenue in Botswana.

The mineral boom in Botswana led to increased mineral based revenues which include taxes, royalties and dividends which over the years have consistently averaged about 40 % of total government revenue (Bank of Botswana, 2012). Given that mineral revenues have been the mainstay of Botswana's economy, it was also a great concern to the government to address the challenges that came along with the reliance of the economy on mineral revenue. It is of great importance to recognize the policy changes that may be required in response to these challenges both domestically and internationally. Mupimpila (2005) discusses the challenges in terms of minerals in particular diamonds being exhaustible resources therefore calling for government to address the issue. A report by the World Bank (2010) also argued that the peak of the economic

contribution of minerals appears to have passed and the economic importance of minerals is likely to decline in future. The report further emphasises that the mineral development in Botswana has been the major source of government revenue although its contribution has declined to just below 20 % of GDP, which could be attributed to the fact that minerals are indeed diminishing. In response to this issue, the government adopted aggregate measures to monitor productive investment of mineral revenues to enhance government revenues. Sustainable Budget Index (SBI) and Accumulated Investment Surplus (AIS) were introduced in 1994 to pursue these measures. The World Bank (2010) defines SBI as the ratio of non-investment spending to current revenues. In addition to SBI, AIS require that any unspent revenues should not be used later for recurrent expenditures. In general, the 1994 fiscal reform on SBI and AIS addresses the management of the mineral revenue to be treated as the proceeds of an asset sale to be used to finance investment rather than recurrent spending. The use of mining revenue is of critical importance for sustainable development through investment which in turn leads to increased government revenue. Therefore, the study evaluates the impact of SBI as a fiscal reform on Botswana government revenue through tax buoyancy and tax elasticity analysis.

Figure 2: The Sustainable Budget Index (SBI), 1983-2012
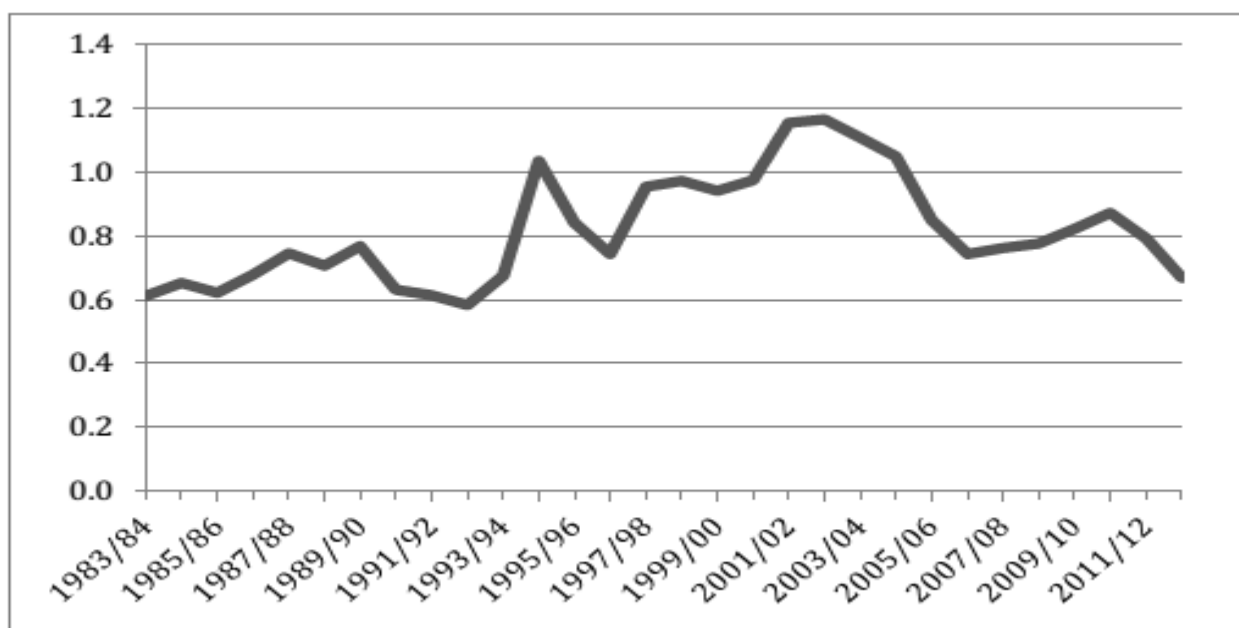
The SBI value is used to address the sustainability of the government budget, an SBI value of unity (1) or less means that current government consumption is sustainable. This implies that mineral revenue is either being saved or spent on public investment and is interpreted as being

sustainable. An SBI value of more than unity (1) means that non-investment spending is being financed in part from non-recurrent revenues hence unsustainable budget.

Figure 2 indicates that SBI has been less than 1 until around 2000 implying that the budget has been sustainable. It later rose above 1 between 2001 and 2005 indicating that part of the recurrent spending was being financed by mineral revenues hence unsustainable budget. The SBI fell below 1 from 2006 to 2012 hence now sustainable government budget.

Most of the developing countries have adopted broadening of the tax base to increase government revenues such as Uganda, Namibia, Lesotho and South Africa. Botswana is no exception as one of its fiscal reforms was the replacement of general sales tax with value added tax (VAT) in 2002 at a standard rate of 10%. VAT was introduced because it is a reasonable system in that the built-in input credit facility ensures that the VAT itself does not become a business expense. Another reason for introducing VAT was that it is much more effective in tax administration term. VAT also provides a more stable and sustainable revenue base for Botswana because a wider range of goods and services are subject to tax. In 2010, the government found the need to further increase government revenues by increasing the VAT tax rate from a standard rate of 10% to 12% which prevails to date. The study therefore analyses the impact of replacing general sales tax with VAT and the increase in VAT rate on government revenue.

An unimpressive tax performance in terms of generating government revenue could be due to a number of reasons including deficiencies in the tax administration and the tax policies. According to Fjeldstad (2003) administrative reforms are gradually emphasized as key elements of tax reforms. This is revealed in the establishment of semi-autonomous revenue authorities in a number of African countries including Malawi, Tanzania, Uganda and Zambia. Botswana government found the need to address this possible hinder to enhanced revenue mobilization by introducing an institutional fiscal reform. The fiscal reform was the establishment of Botswana Unified Revenue Services (BURS) in 2004 as a policy recommendation to efficiently and effectively assess and collect taxes and maximise tax revenue (Botswana Unified Revenue Services, 2006). Before implementation of BURS, the Ministry of Finance was responsible for the operation of the tax system under different departments. The tax system was then managed by the Department of Taxes and Customs and Excise and a division responsible for the administration and execution of laws about the collection of Value Added Tax. BURS was established for sound revenue

management under a single entity and the study assesses the impact of BURS on government revenue.

1.2 Statement of the problem

Fiscal reforms require an analysis to figure out their impact on the government revenue. Maipose and Matsheka (2004) argue that so long as Botswana is highly dependent on mineral revenue, then the economy will also remain vulnerable. Therefore, the government then realised the need to use mineral revenues for investment purposes to minimise the economy's vulnerability. This led to the introduction of SBI fiscal reform to manage and monitor productive investment of mineral revenue to increase government revenue. Botswana replaced sales tax with VAT and further increased the VAT rate to increase government revenues hence the need to assess the impact of these reforms on government revenue. According to the World Bank (1991), reform of the tax structures is generally more effective when accompanied by improvements in tax administration; Botswana adopted this theory and introduced BURS. Since tax system was managed in different departments leading to loopholes in the tax system, BURS was established to improve tax services as well as facilitate more effective administration of revenue laws to increase revenue under a single entity.

For the government that aims at increasing revenue through fiscal reforms, emphasis has to be made on the effectiveness of the reforms in attaining maximum beneficial impact. Therefore there should be ample studies geared towards assessing the performance of these reforms in government revenue generation. However, in Botswana there are limited studies on this discipline. It is therefore imperative that a research be done to establish the buoyancy and elasticity of the tax system to assess government revenue mobilisation capacity of these reforms. The paper therefore addresses the following research questions:

1. What has been the impact of SBI, VAT and BURS on government revenue?
2. What are the effects of SBI, VAT and BURS on the specific individual main taxes?
3. What lessons do the outcomes have for policy makers in Botswana?

1.3 Significance of the study

The fiscal reforms were introduced to improve revenue for the development of Botswana. Studies have been carried out about the Botswana tax system through the analysis of tax buoyancy and tax elasticity with much emphasis on the comparison of the proportional rate at which tax revenue grows towards GDP growth. Studies such as Botlhole (2005) and Mpuchane (2001) generally addressed the issue of reforms but did not go into specific and detailed reforms to assess their

impact on government revenue. This study adds to existing literature by analysing the impact of fiscal reforms on Botswana government revenue. The study focuses on the mineral revenue fiscal reform SBI as minerals are the main driver of the Botswana economy and revenue. VAT covers a wider range of goods and services and was introduced to broaden the tax base hence carries a significant impact on government revenues. The other fiscal reform is the establishment of BURS as an institutional reform responsible for administration of tax collection under a single entity to ensure enhanced revenues. Assessing the impact of these fiscal reforms on government revenue is very significant in examining the relevance and effectiveness of these reforms in enhancing government revenue.

1.4 Objectives of the study
Main objective of the study is to assess the impact of SBI, VAT and BURS as fiscal reforms on government revenue;

Specific objectives of the study:

1. To examine the impact of SBI, VAT and BURS on the buoyancy and elasticity of the tax system in Botswana
2. To identify responsiveness of mining tax revenue to SBI.
3. To identify responsiveness of general sales tax/VAT to VAT fiscal reforms.
4. To identify responsiveness of individual tax handles to BURS.
5. To identify determinants of tax revenue in Botswana
6. To derive policy recommendations

1.5 Organisation of the study
The paper is organized into six main chapters. Chapter 1 gives the motivation and general background of the study. Chapter 2 looks at the overview of Botswana's economy and the tax system and tax reforms. The third chapter makes an assessment of existing literature on tax reforms, both theoretical and empirical. Chapter 4 addresses the research methodology adopted for the study, focusing on the theoretical framework, model specification, data requirements, hypotheses and sources of data. Data analysis and findings are covered in chapter 5. The 6th chapter summarizes and concludes the study with suggested recommendations, policy implications and limitations of the study.

CHAPTER TWO

ECONOMIC HISTORY AND THE TAX SYSTEM OF BOTSWANA

2.0 Introduction

This chapter focuses on the general overview of the Botswana economy giving precise details of the share by GDP of the economy. The chapter further discusses the tax system, tax revenue and tax reforms that have taken place.

2.1 Economic History of Botswana

Botswana was one of the poorest countries in Africa with a per capita gross domestic product (GDP) of about $70 when it gained independence from Britain in 1966. Since then, the country has witnessed good economic growth on the back of fiscal discipline and strong governance with an average economic growth rate of about 9% per year from 1966 to 1999 (KPMG, 2014). The discovery of diamonds in Botswana has been the main driver of the economy moving the country into the rank of upper-middle class income countries. The mineral revenue accounted for 51.3 % of total government revenue in 1985 increasing to 59.3% in the year 2000. At the start of the 21st century, the economy of Botswana stagnated until the early 2010 when it registered for the first time since economic boom a GDP growth of above 6-7% target. Revenue increased by P7.3 billion (17.5 %) in 2013/14 to P49 billion and the increase was mainly due to higher mineral revenue induced by unforeseen diamond sales and further improved by exchange rate gains (Budget Speech, 2014).

Considering Botswana's fiscal operations, the key objective is to maintain macroeconomic stability by running a balanced budget over the medium term (KPMG, 2014). Furthermore, unlike other developing mineral led economies, the economy seems to have avoided the "Dutch Disease"- a phenomenon that renders the non-mining sector uncompetitive and the resource curse (Narayana *et. al,* 2005).

2.2 Structure of GDP growth in Botswana

The most comprehensive gauge of an economy's performance is that of GDP as it provides view of the structure and functioning of the economy. Table 1 shows the distribution of GDP according to the contributing sectors for selected years.

Table 1: Percentage Shares of Economic activities to GDP – selected years 1966-2013/2014

ECONOMIC SECTOR	1966	1985/86	2007/08	2011/2012	2013/14
Agriculture	42.7	5.6	1.8	2.4	1.3
Mining and Quarrying	-	48.9	41.0	32.3	24.2
Manufacturing	5.7	3.9	3.4	4.0	6.5
Water and Electricity	0.6	2.0	2.6	2.8	6.5
Construction	7.8	4.6	3.9	5.7	5.1
Trade, Hotels and Restaurants	9.0	6.3	11.0	12.6	7.7
Transport and Communication	4.3	2.5	3.7	4.4	5.4
Finance and Business Services	20.1	6.4	10.3	10.9	8.8
General Government	9.8	12.8	14.9	16.0	6.0
Social and Personal Services	-	2.5	3.5	4.0	8.0
ADJUSTMENT ITEMS					
Taxes on Imports	-	-	4.1	7.5	5.3
Taxes on Production	-	6.4	24.7	1.4	4.4
Subsidies	-	-	7.8	3.1	3.8

Source: Central Statistics office bulletins, various publications

Table 1 indicates the structural changes in the economy of Botswana since 1966 to 2013/14. From the above table, it is evident that at independence, the agricultural sector was the main contributor of GDP to Botswana's economy. Due to recurring droughts and animal diseases (especially foot and mouth disease) in the country, the agricultural sector moved from being the major contributor of GDP at 42.7 % in 1966 to the least contributor at 1.8 % in 2011/12. At the time of independence, the non-mining sector was non-existent. With the discovery of minerals especially diamonds in the 1970's, the mining and quarrying sector strikingly increased from nothing in 1966 to 48.9 % in 1985/86.

A slight decline in the mining sector's contribution to total GDP was experienced in 2007/08, which is attributed to the global financial crises that led to a decline in demand for diamonds. Even with the decline in the mining sector, the sector still remained the major contributor to GDP accounting for 32.3% of total GDP in 2011/2012. A further decline in the mining sector has been recorded in the period 2013/2014 at a share of 24.2 %, at the same time being the main contributor to GDP. This shows how the mining sector is an important component of GDP.

2.3 The Botswana Tax System

The Botswana tax system consists of a number of indirect taxes and direct taxes at the same time considered to be robust and non-distortionary. Direct taxes are imposed and collected on a specific group of people or organisations, these in Botswana are implied on income tax and

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corporate tax or company income tax. Indirect taxes are collected from someone or organisation other than the person or entity that would normally be responsible for the taxes, examples of these includes VAT, customs and excise duties. The tax system requires filling of the tax returns each tax year. According to Botlhole (2005), government revenue has been dominated by indirect taxes, direct taxes, mineral revenue, taxes on property and taxes on motor vehicle. With so much dependence of the government finance on minerals and customs and excise revenues, this holds a significant risk as minerals are non-renewable hence eventually they may be exhausted. The growth of other sources of revenue such as income and consumption taxes rely on the vigorous economic performance, rate of increase in income and levels of employment (Bank of Botswana, 2014).

Upon independence, the "Income tax Act of Botswana" was enacted in the year 1973 and was the primary tax law of the country aimed at improving the tax structure and collection. The act was also meant to reduce the dependence on foreign aid and customs duties and excise arising from the Customs Union Agreement of 1969.

2.3.1 Main Sources of Tax Revenue

Table 2: Sources of Tax Revenue as a percentage Total tax Revenue– selected years 1980-2014

Tax Revenue Source	1980	1985	1990	1995	2000	2005	2010	2014
Mineral Revenue	41.5	59.9	71.4	64.7	67.3	87.4	45.4	57.6
Customs and Excise	45.5	24.8	15.8	19.5	19.4	32.5	39.6	41.1
Non-Mineral income tax	17.1	13.9	10.9	10.7	7.9	12.9	28.8	17.1
General sales tax/VAT	-	1.0	2.6	6.0	11	21.3	22.7	15.7

Source: Authors' calculations from BoB and BURS reports

Table 2 shows sources of tax revenue for selected years. Before the mineral boom in I980, the customs and excise duties were the main contributors to tax revenue in Botswana at 45.5%. Since discovery of minerals in Botswana, the mineral revenue has over time dominated the tax revenues contributing 59.9% in 1985 and increasing over the years. A significant decline in customs and excise duties and non-mineral income taxes has been recorded from 1985 at 24.8% and 13.9% respectively towards 2000. Contributions by general sales tax/VAT have noticeably been rising from 1% in 1985 to 11% in 2000. Sales tax was replaced with VAT at a tax rate of 10% in 2002 and later tax rate was increased from 10% to 12% in 2010 to broaden the tax base. It is evident

that the reform resulted into significant contribution of VAT to tax revenue as there was a substantial increase in VAT revenue in 2005 and 2010 by 21.3% and 22.7% respectively.

2.4 Taxes and Main Tax Reforms in Botswana

The government of Botswana has pursued a number of tax reforms geared towards enhancing tax revenue. The reforms have been implemented in the form of tax laws, tax administration and broadening of the tax bases. According to the Budget Speech (2013), these reforms are critical to protect the integrity of Botswana's financial system as well as benefit individuals and the public at large. The tax reforms in Botswana yield different revenue impact over the years, hence the need for this study to assess the impact of fiscal reforms on government revenue.

2.4.1 Mineral Tax Revenue

The main components of the mineral revenue include the income tax, royalties paid on minerals production and dividends. Evident from table 2, mineral revenue has been significantly contributing to total revenue. Since minerals do not last forever, the government of Botswana came up with reforms to safeguard economy as mineral production declines. SBI and AIS were introduced in 1994 to monitor the productive investment of mineral revenue. According to Mupimpila (2005), SBI measures the ratio of recurrent expenditures to recurrent revenue while AIS requires that any unspent asset revenues should not be used later for recurrent expenditures. The fiscal reforms where meant to address the challenge that the Botswana economy is heavily dependent on mineral revenue though diamonds are a non-renewable resource implying that in future they will be finished. The fiscal, legal and policy framework for mineral exploration, mining and mineral processing in Botswana is continuously being reviewed. The most notable changes are the amendment of Mines and Minerals Act in 1999 and the Income Tax Act in 2006. The government came up with initiatives to make the mining sector in Botswana competitive hence generate increased revenues. These initiatives include the reduction of fiscal burden on marginally economic mines and the reform of dealings in the Ministry of Minerals Energy and Water Resources (Ministry of Minerals, Energy and Water Resources, 2008).

Figure 3: Mineral revenues as a percentage (%) of Total Revenues and GDP, 1974-2013
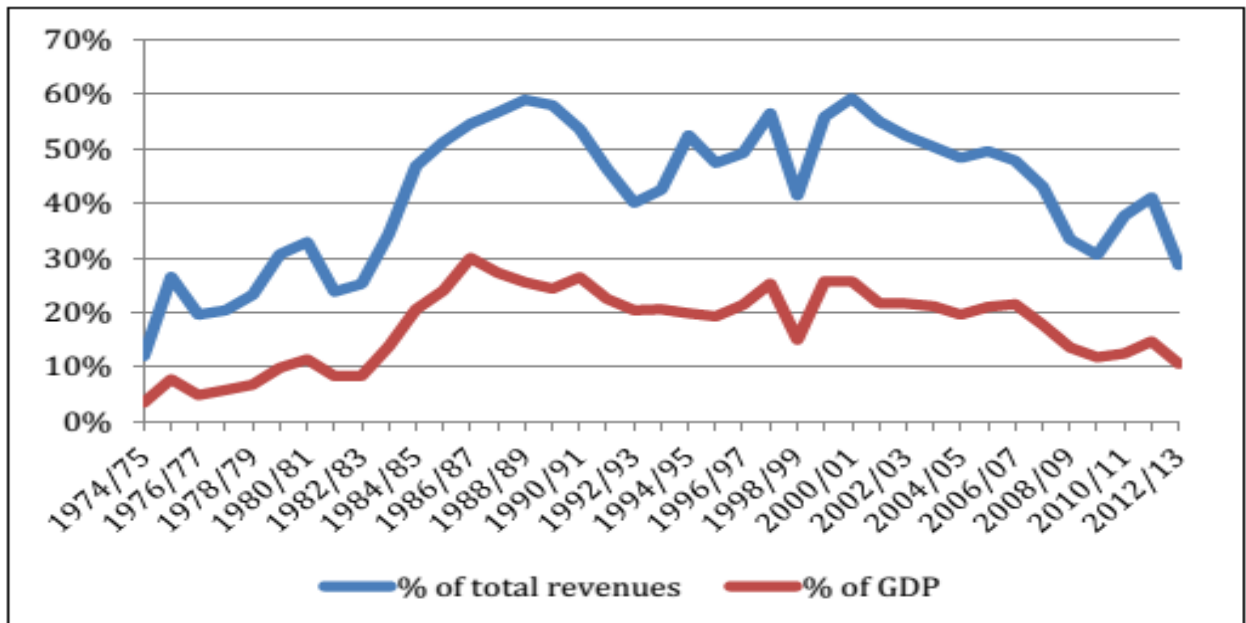
The peak of mineral revenue contribution to total government revenue was 60 % and since then there has been a decline of about 30 % contribution while maintaining to be the main contributor. The highest recorded contribution of mining revenue to GDP was 30 % around the late 1980s which fell to around 10 % in 2012/2013.

2.4.2 Value Added Tax (VAT)

VAT was introduced in Botswana with effect from 1 July 2002 at a standard rate of 10%. It replaced the sales tax system which was at import and manufacture's level as well as on some services. In 2010, VAT rate was increased from 10% to 12% with the aim of broadening the tax base so as to increase government revenue. Further reforms to VAT include zero rated supplies that attract VAT at the rate of 0%. These supplies are stated in the First Schedule to the Value Added Tax Act and include paraffin, petrol, goods and services exported to Botswana and international transport services. Exemption supplies are also included in the Value Added Tax (Exemption) Regulations as read with section 11 of the VAT Act. These supplies are not subject to VAT and are not counted as part of a person's taxable turnover. These include financial, educational and medical services and farming equipment. Registered entities submit return of each tax period and file them with BURS (Budget Speech 2013).

2.4.3 Non-Mineral Income Tax Revenue Reforms

Income taxes have been the main contributors to the tax revenue, particularly the mining income tax. The income tax comprises of mineral income tax and non-mineral income tax. Non-mineral income taxes that have evolved with time are the personal income and company income taxes as a differentiation of the treatment of individuals and companies. The first enactment of the income tax was in 1973 though the Income Tax Act and reforms revolving around this act have been taking place over the years.

In 1994, company income tax was reduced from 30% to 25% which led to a fall in contribution of company tax to total tax revenue from 7.3% in 1990 to 4.6% in 1997 (Botlhole, 2005). In 1995 the top marginal tax rate for individuals was further reduced from 35% to 30% (Mpuchane, 2001). Budget Speech (1997) elaborates on equating personal marginal tax with company tax rate at 25%. Variable rate income tax was introduces in 1998. In 1995, effective company tax rate was reduced from 35% to 25% and later on further reduced to 15% and they prevailed up to 2001 (Mpuchane, 2001). In 1997 tax bands for levying income tax were established and the result was erosion of their value by inflation. To compensate for the loss in purchasing power by inflation, the threshold for income tax payment and the brackets with higher interest rates were increased by 25% to P25 000 and P18 750 respectively in 2001. Mpuchane (2001) further elaborates that the changes in company tax were aimed at improving the competitive position of Botswana.

Pay As You Earn (PAYE) targeting personal income was introduced to broaden the income tax base and was effective in covering the modern sector employees. Despite the effectiveness of PAYE, there are still some problems in covering the PAYE of small businesses in both rural and urban areas as well as that of farmers (Botlhole, 2005). The income tax collections which consist of Assessed tax, Deducted tax, Withholding tax and Capital Transfer tax amounted to P11.308 billion in 2011/12 and accounted for 70.9% of the internal revenue .The major contributor to income tax was assessed tax which accounted for 60.6% followed by deducted tax with 25.3% and finally withholding tax with 13.6%. The individual tax threshold was revised to P36,000.00 per annum implying that tax was imposed on income of P3,000.00 per month as opposed to P2,500.00 (BURS, 2012).

Two tier corporate tax was abolished and replaced with a corporate tax rate of 22% and dividend withholding tax rate of 7.5% in 2010. The threshold for individual taxpayers was increased in 2011 from P30 000 per annum to P36000 per annum.

2.4.4 Customs and Excise Taxes Reforms

Customs and excise taxes are charged on Botswana's imports of goods from sources as well as the value of production of excisable commodities produced and consumed in Botswana. The main source of customs revenue is Southern African Customs Union (SACU) through the collections from a Common Revenue Pool. SACU was formed in 1910 and its other country members included Namibia, Lesotho, Swaziland and South Africa. SACU Member States are required to pay all the collections of customs, excise and additional duties into a Common Revenue Pool (CRP) established by Article 33 of the SACU Agreement. The revenue accrued to Botswana from the pool has been quite significant over years. Botswana was not satisfied with the union then because the agreement was not based on the relationship between customs union receipts and imports level (Botlhole, 2005). This led to the enactment of the new agreement in 1969 with a different basis of calculating the shares of customs and excise. Botswana's higher volume of international trade was demonstrated by a massive increase in its customs receipts. SACU receipts growth rate have been growing at a rapidly diminishing rate since 2006/07 until a decline of 22% was finally recorded in 2010/11, while 2011/12 saw a sharp increase in growth rates to 36% (Botswana Unified Revenue Services, 2012). The reports further state that customs and excise taxes have been referred to as the second largest contributor to total tax revenues after mineral revenues as suggested by Table 2.

2.4.5 Other Taxes

Apart from taxes considered in this study, there are other taxes and tax reforms in Botswana including export duties, taxes on motor vehicle accidents and property.

2.5 Institutional Reform: Botswana Unified Revenue Services

The main institutional reform was with the establishment of BURS which unified the previously two Government Departments of Customs and Excise and Taxes in 2004 to efficiently and effectively assess and collect revenue (Botswana Unified Revenue Services, 2006). This reform followed the theory that reforms of the tax structure are generally more effective when accompanied by improvements in tax administration. Since tax system was managed in different departments leading to loopholes in the tax system, BURS was established to improve tax services as well as facilitate more effective administration of revenue laws to increase revenue under a single entity. BURS is responsible for the assessment and collection of all taxes in Botswana on behalf of the Government and also accounting for the revenue collected on behalf of the government (Botswana Unified Revenue Services, 2009). The key objective with the

implementation of BURS was to enhance government revenue through improved administration. To achieve this objective, different measures of collecting taxes have been used as well as adjustments to the tax legislation to enhance tax performance and eventually revenue.

BURS has been evolving with time and introducing measures to enhance its performance such as installation of X-ray scanners at the border post for detection and interception of undeclared cargo (Botswana Unified Revenue Services, 2012). Electronic Fund Transfer system has been implemented to ease its tax collections but there have been problems since it was introduced due to taxpayers not submitting documents to BURS after making payments at the banks.

Among others, main challenges to BURS include smuggling and non-declaration of imported goods. BURS is challenged to estimate the tax gap to establish the magnitude of non-compliance and develop a revenue estimation model in order to devise appropriate strategies for minimizing the gap (Botswana Unified Revenue Services, 2009). The other challenged that BURS faces is the insufficient tax compliance mostly significant with the case of VAT (Bank of Botswana 2004).

2.6 Conclusion

The above observations show a particular trend of growth in the tax system of Botswana through implementation of fiscal reforms. It is also evident that Botswana economy is still very much reliant on mineral revenue particularly diamond mining.

The government of Botswana has found the need to diversify and find ways to increase government revenue through fiscal reforms and other tax reforms. The government does acknowledge the point that reliance on mineral revenue is risky with the introduction of fiscal reforms aimed at monitoring mineral investments.

<div align="center">**CHAPTER THREE**</div>

<div align="center">**LITERATURE REVIEW**</div>

3.0 Introduction

This chapter addresses an overview of theoretical and empirical literature on tax reforms and revenue productivity. The section also defines the importance of tax buoyancy and elasticity as a measure of tax performance and methods used. Lessons from theoretical and empirical literature are also discussed.

3.1 Theoretical literature review

In Public Finance, two important measures that are used to assess the effectiveness of any tax system in terms of its mobilization capacity are tax buoyancy and elasticity. These tools require separate definition and estimation.

3.1.1 Tax buoyancy

Tax buoyancy measures the total response of tax revenue to change in national income and discretionary change in tax policy over time (Appiah, 2013). The growth in tax revenue in response to GDP growth is decomposed into two; automatic growth in response to GDP and the growth due to discretionary changes. Buoyancy does not adjust for discretionary changes in tax policy hence summarised as the ratio of growth in tax revenue to growth in tax base. Discretionary changes refer to alterations to the tax system that realises an increase in tax revenue from the same tax base. These changes occur in terms of changes in the tax legislation or changes in tax rate on the same tax base. A buoyancy estimate that is greater than one shows that for every 1% increase in GDP, tax revenue increased by more than 1% (Mpuchane, 2001).

The study establishes the impact of tax reforms on tax buoyancy hence a review on how to measure tax buoyancy is important.

The buoyancy of tax can be estimated in two ways:

(1) By calculating the ratio of percentage change in tax revenue to percentage change in GDP.

General estimation of buoyancy of the tax revenue to GDP for any period t can be expressed as:

$$\varepsilon_i^b = \frac{Percentage\ change\ total\ revenue}{Percentage\ change\ in\ GDP} \qquad (3.0.1)$$

$$\varepsilon_i^b = \left(\frac{\Delta T}{\Delta Y}\right) \cdot \frac{Y}{T}$$

ε_i^b – estimates buoyancy of tax revenue to GDP, ΔT measures change in tax revenue while ΔY measures change in GDP.

Estimation of year to year buoyancy of a tax system can be expressed as below:

$$B_t = \left(\frac{T_t - T_{t-1}}{Y_t - Y_{t-1}}\right) \cdot \frac{\dfrac{T_t + T_{t-1}}{2}}{\dfrac{Y_t + Y_{t-1}}{2}}$$

Where:

B_t – Buoyancy of tax revenue to GDP

T_t – Tax revenue in year t

T_{t-1} – Tax revenue in the previous year

Y_t – GDP in year t at current market prices

Y_{t-1} – GDP in the previous year

Entire period estimation of buoyancy of the tax system requires the following model:

$$BB = \frac{G_t}{G_y}$$

Where:

BB – Tax buoyancy for the period

G_t – Compound growth rate of tax revenue (T) over entire period

G_y – Compound growth rate of GDP over the entire period

(2) By a regression of the tax revenue on the tax base after taking the natural logarithm for each of them as according to (Osoro, 1993).

Therefore, buoyancy can be estimated as:

$$TR = \alpha_0 Y^{\alpha_1} u^r \tag{3.0.2}$$

Taking logarithms both sides of the equation, that is logarithm transformation and introducing the error term to derive the buoyancy coefficients yields

$$\log TR = \alpha_0 + \alpha_1 \log Y + u_t \tag{3.0.3}$$

Where:

TR – Total tax revenue

α_1 - Estimate of tax buoyancy

Y – GDP at current prices

u_t – Error term

3.1.2 Tax elasticity

Tax elasticity measures automatic response of tax revenue to GDP changes less the discretionary tax changes (Appiah, 2013). Tax elasticity measures the responsiveness of tax revenue to changes in national income if tax structure could have not been changed. Estimation of elasticity requires correction of revenue series for effects of discretionary changes in the tax policy. For elasticity of the tax system, only automatic growth in tax revenue is considered and changes due to discretionary changes are excluded. An elasticity that is greater than unity implies that tax revenue increases faster than income hence allows financing of expenditures with the tax revenue. Elastic taxes are more desirable for maximising government revenue since they do not require discretionary changes to be efficient in revenue generation (Botlhole, 2005). If the changes in the tax system improve revenue, then buoyancy will be greater than elasticity.

Two methods have conventionally been employed to estimate tax elasticity, namely the historical time-series tax data (HTSTD) adjusted to discretionary tax measures and the unadjusted (HTSTD) with time trends or dummy variables as proxies for discretionary tax measures (Appiah, 2013).

(HTSTD) adjusted to discretionary tax measures attempts to eliminate discretionary tax changes such as the tax legislation and the tax rates from the HTSTD to estimate tax elasticity. To adjust HTSTD to discretionary effects the following methods are used;

1. **The Proportional Adjustment (PA) Method**

The PA method was originally developed by Prest (1962) and has since been used by Osoro (1993). In this method, a series of adjusted tax revenue is first obtained by subtracting from the actual tax revenue in each year the budget estimate of the revenue impact of discretionary changes in that year (KiguruThuku *et al.,* 2014) the impact of discretionary changes is removed to adjust for the revenue impact of discretionary changes. This gives an estimate of the automatic growth in revenue between two successive years. Then the series are converted to the first year's basis by adjusting the year to year changes by the ratio of the tax yield on the basis of the first year rates to the actual tax yield. The model can be estimated as follows:

$$lnT_p = \alpha_p + \beta_p lnY + \varepsilon_p$$

Where:

T_p – p tax

Y – Income (GDP)

β_p – Estimate of income elastic of the p tax

ε_p – Error term

2. The Constant Rate Structure Method

In this approach, the procedure is to apply the current year's rates to the previous year's tax bases and to construct the adjusted tax revenue series that would have been obtained had the same tax structure been applied consistently over time. In order to do this, it is necessary to have a detailed tax-base series for all the individual taxes which at times can be difficult to obtain in most developing countries. However, this method can be used if the number of items is small, the range of tax rates is narrow, and the data can be compiled relatively easily (as in some excise tax cases) (KiguruThuku *et al.,* 2014).

Unadjusted HTSTD with time trends as proxies for discretionary tax measures. The tax elasticities are estimated with introduction of dummy variables through the use of the following methods:

1. Divisia Index method

This method is derived from a weighted sum of growth rate of factor inputs; it is an index of factor inputs for the measurement of technical change. This measure implies that the percentage increase in total productivity caused by technical progress is equal to the percentage increase in output divided by the percentage increase in factor inputs. The suitability of this measure is based on its property of invariance. A change in the Divisia Index therefore gives a measure of the change in total productivity that shifts the production function due to all sorts of factors that are jointly termed as technical change (KiguruThuku *et al.,* 2014).

2. Dummy Variable Method

The method was developed by Singer (Singer, 1968). The dummy variable is used as a proxy for each of the discretionary tax measures (DTMs) to estimate tax elasticity by means of a single equation model of the form:

$$\log RT = \alpha_0 + \alpha_1 \log Y + \sum_{i=1}^{n} \beta_i D_i + e^r$$

Where:

RT – Tax elasticity

β_i – Slope coefficient

Y - GDP

D_i – Dummy variable

e^r - Error term

D_i takes the value 1 for each year with a change in tax policy and the value zero (0) otherwise. Summation takes account for the possibility of multiple tax changes during specified period.

3.2 Empirical Literature Review

3.2.1 International Empirical Literature

A study by Apiah (2013) on tax reforms and revenue mobilization in the mining sector of Ghana found out that the overall tax yield and individual tax categories were inelastic with the exception of company taxes. Time series data over the period 1990 to 2010 was analysed using the dummy variable technique to control for the discretionary tax measures (DTMs) implemented over the period. The overall tax system was not buoyant and inelastic while some of the tax categories were found to be elastic or buoyant than the others. The reforms did not result in an expansion of the tax bases as mining GDP grows resulting to a low elasticity.

Apiah (2013) highlights exemptions granted to new mining companies, tax incentives and duty waivers as the factors that hinder broadening of the tax base. Recommendations from the study emphasize the importance of effective tax administration to improve tax compliance and enhance revenue collection. Further recommendation calls for dynamic and strategic policies to target each tax differently.

Study by Abiola and Asiweh (2012) evaluated the tax administration in Nigeria and its potential to mitigate tax evasion and increase revenue in Nigeria. The study used 121 online survey questionnaires containing 25 relevant questions and descriptive statistics was used for analysis. The study concluded that tax revenue generated had not been impressive. The underperformance of tax revenue was attributed to exposure of the tax administration to the political interference and

lack of effective enforcement strategy. In an attempt to achieve a good tax system to increase revenue, study recommends the importance of designing a good tax administration to implement the policies and tax laws.

Analysing the adequacy of tax revenue and the national budget deficit in Uganda before and after the tax reforms by Lawrence (2011) found that Uganda has inelastic tax system and that total revenue cannot increase automatically as national income grows. To achieve its objective, the study used Ordinary Least Square (OLS) method on time series data for the years 1980 to 2008. To isolate the effects of discretionary policies in the time series data, the proportional adjustment approach was utilised. The findings revealed that excise duties were inelastic to GDP, to their base and the base was inelastic to GDP in both the pre- and post- reform periods. That implied narrow tax net and tax base hence the need to broaden the tax base. Import duties showed higher buoyancy in the post period attributed to reforms undertaken in the period than pre post period. It was also shown that the reforms increased the tax effort indexes as the post reform periods indexes were relatively higher than in the pre-reform period. Income tax yielded better revenues in the post reform period because of the new income tax of 1997. Replacing sales tax with VAT showed to be more revenue enhancing but its base needs broadening because it is inelastic to GDP. Overall conclusion by the study was that Uganda has generally an inelastic tax system and a tax effort which is less than one.

Milwood (2011) wrote a paper with the aim to determine the relationship between GDP and tax revenue growth rates as well as the responsiveness of taxes to fiscal policy in Jamaica. The analysis was done by estimating the buoyancy and elasticity of tax revenues for the period 1998 to 2010 using the Divisia Index (DI) approach to isolate the effects of the discretionary measures. The main finding from the analysis was that although the overall tax system was inelastic due to the elasticity coefficient less than unity, the fiscal reforms had a positive impact on total revenues since buoyancy coefficient (1.11) was greater than elasticity coefficient of (0.97)1. The results showed that discretionary tax measures have had an overall positive impact on growth in total revenue over the period of study. The automatic response of revenue to changes in the tax base was found to be less than unity implying that the ability of the economy to increase revenue on its own remains fairly weak. The study attributed the low elasticity to the various exemptions, tax incentive and waivers that existed over the period. It is worth noting that discretionary measures

have had little impact on general consumption tax revenues as the elasticity coefficient was found to be greater than the buoyancy coefficient. The study therefore concluded that the fiscal reforms established over the period of study increased government revenues.

Ogwapus *et al.,* (2005) researched on tax reforms and domestic revenue mobilization in Uganda by using the proportional adjustment method for the period 1988-2004. The findings revealed that the reforms had a positive impact on direct taxes as tax-to-income elasticity index grew from 0.706 to 2.082 after the reforms whiles direct taxes also moved from 1.037 to 1.306.
Reforms brought a substantial enhancement in the yield of direct taxes, from inelastic yield before major reforms to elastic yield after the reforms. The study concluded that the tax reforms were necessary to the economy but there was room for improvement. The findings also show further improvements can be made towards collection of direct taxes by strengthening the capacity of Uganda Revenue Authority (URA) to register more eligible taxpayers into the tax net.

Muriithi and Moyi (2003) applied the concepts of tax buoyancy and elasticity to analyse the tax reforms in Kenya. The main objective was to determine whether the tax reforms were creating tax policies that made yield of individual taxes responsive to changes in national income. The coverage period for the study was 1973 to 1999 using the proportional adjustment (PA) method to eliminate the discretionary effects from the revenue series. Elasticities and buoyancies were computed for the pre-reform period as well as the post-reform period. Pre-reform period showed that the overall tax system yielded an elasticity of 0.276 against a buoyancy estimate of 1.023. In contrast, the post-reform period recorded a buoyancy and elasticity of 1.661 and 1.495, respectively. These estimates conclude that the reforms seem to have had a bigger impact on the elasticity than on the buoyancy, signifying that the growth in tax revenue during the reform period was accounted for by automatic changes rather than discretionary policy. The results showed that tax reforms increased revenues for both different tax handles and total tax revenue except for VAT. The authors also highlighted the effectiveness of Kenya Revenue Authority in developing tax system with no loopholes and eventually increasing revenue and reducing fiscal imbalances in Kenya.

Milambo (2001) studied the revenue productivity of the Zambian tax structure for the period 1981 - 1999. The study used the Divisia Index method on historical time series data to capture the effects of discretionary tax measures. The results showed elasticity of 1.15 and buoyancy of 2.0

implying that the tax system was elastic and buoyant. These findings indicated that tax reforms have been effective in improving the revenue productivity of the overall system in Zambia. The study used time trends as proxies for discretionary tax measures, therefore the results were not reliable.

Chipeta (1998) evaluated the tax reforms for raising tax yield in Malawi by analysing the tax buoyancy and elasticity of the tax system with emphasis on tax reforms undertaken in the 1980s and early 1990s. The study regressed equations of tax revenue on GDP using dummy variables to capture discretionary tax changes for analysis. The main objective of the study was to test two hypotheses. Firstly, that the yield of the tax system as a whole, of its major components and of individual taxes is not buoyant and it was accepted for the tax system as a whole and for a number of individual taxes. The second hypothesis stated that the yield of the tax system as a whole, of its major components and of individual taxes is not income elastic and was rejected for the tax system as a whole, but accepted for surtax, import duties, company income tax, PAYE tax and excise duties for 1970-1979 data. The second hypothesis was later on accepted for 1980-1993 data. The study found out that the whole tax system was not elastic and the only elastic tax handle was Pay As You Earn (PAYE). The study also showed that few tax handles were buoyant and the whole tax system was not and concluded that the tax reforms were not sufficient to raise tax revenue yield. The recommendation in the study was to broaden the tax base to improve elasticity.

In Ghana, Kusi (1998) studied tax reform and revenue productivity of Ghana for the period 1970 to 1993. The study employed the HTSTD adjusted to DTMs and the HTSTD with time trends or dummy variables as proxies for DTMs. The findings showed a pre-reform buoyancy of 0.72 and elasticity of 0.71 for the period 1970 to 1982. The low overall elasticity was attributed to individual tax elasticities which were less than unity. The period after reform, 1983 to 1993, showed increased buoyancy of 1.29 and elasticity of 1.22. Kusi (1998) also found out that income tax had the lowest elasticity and therefore recommended that authorities should move away from income based taxes in favour of consumption taxation. The study concluded that the reforms had contributed significantly to tax revenue productivity from 1983 to 1993.

Matundu (1995) evaluated the revenue performance of the Namibian tax System. The findings revealed that the Namibian tax system was elastic with elasticity estimate of 1.04 but the study

further recommended discretionary changes to improve the revenue productivity. Income taxes showed to be elastic implying that income taxes grew faster than the tax in GDP. General Sales tax (GST) on goods and services was inelastic and its buoyancy coefficient was above unity, reflecting the significance of the reforms or changes related to general sales tax made by the Namibian government. One of the objectives of the study was to determine Namibia tax effort and Matundu (1995) found the government tax effort for total tax system to be 27.9% with concentrated tax effort in domestic taxes on goods and services. The study recommended that changes in rates of general sales tax could be relied upon to produce more stable revenue.

Osoro (1993) used double log form equation and tax revenue elasticity using the proportional adjustment method to examine the revenue productivity implications of tax reforms in Tanzania for the period 1969-1990. The findings revealed overall tax elasticity of 0.76 implying unproductive tax reforms. Income tax, company tax, sales tax, PAYE and import duties were used for analysis in the study and only company tax had elasticity of greater than one, 1.13. This implies that all other taxes lagged behind GDP except for company tax. The study concluded that reforms in Tanzania had failed to bring out desired revenue improvement.

3.2.2 Domestic Empirical Literature

Botlhole (2005) analysed the determinants of the tax revenue and hence elasticity and buoyancy in Botswana for the period 1982-2001. In measuring the elasticity and buoyancy of the tax system in Botswana using Dummy variable technique, Botlhole (2005) found that Botswana tax system was income elastic and that there was a positive relationship between GDP and tax revenue. The overall tax system indicated to be buoyant (1.982) and elastic (1.56) with respect to GDP. Mineral revenue as well as non-mineral income were also buoyant and elastic except for customs and excise duties which were inelastic with a coefficient below unity (0.740). The results also showed that the openness of the economy, developments in the international economy, trends in regional integration and structural shifts had a significant effect on the tax bases as well as tax elasticities and buoyancies.

Mpuchane (1997) carried out a study to analyse the elasticity of tax system in Botswana for the period of 1980 to 1998 using time series secondary data. Dummy variable technique was used for analysis and the findings revealed that the government of Botswana relies heavily on mineral

revenue and then general sales tax as they were elastic and buoyant. Other taxes were inelastic implying that the government could not depend on them for government revenue. Recommendation from the study given the findings included diversification of government resources to revenue by expanding the tax base. Mpuchane tested the impact of the openness of the Botswana economy on the tax performance and the findings were that the openness does not affect the tax system.

Matsheka (1997) carried out a study on financing of economic growth in Botswana by analysing the buoyancy and elasticity of the tax system for the period of 1973-1995. The study used Divisia Index method for analysis to estimate elasticity and the findings revealed that Botswana tax system was buoyant and elastic indicating that the tax system can withstand the government expenditure without frequent changes to the fiscal legislation. Matsheka (1997) further argues that despite the elastic and buoyant tax system, the government revenue is still dominated by the minerals and customs union proceeds. Recommendation from the study was that the government should control its expenditures to maintain a good fiscal position as it could allow for the development of private sector which in turn diversifies the structure of the government revenue.

In an attempt to study the determinants of tax revenue in Botswana for the period 1976 to 1993, Masaka (1997) used the dummy variable technique to account for discretionary changes. The study found out that the overall tax system was buoyant and elastic and also that some of the tax handles were buoyant and elastic while some were not. Among the buoyant and elastic taxes was the mineral revenue, customs and excise tax and personal income. Masaka (1997) recommends that the authorities should expand the tax base as well as continued revision of the tax policies to reduce dependence on mineral revenue.

Lewis and Mokgethi (1983) undertook a study on elasticity of major components of Botswana government revenue. The study findings revealed that customs revenue was very buoyant with respect to both GDP and imports, which is not always the case in developing countries. They attributed this to the changes in revenue sharing formula of SACU receipts that were introduced in the mid-1970s. The non-mining income was considerably inelastic with respect to the overall GDP, but was elastic with respect to non-mining GDP. All other domestic revenue was slightly inelastic with respect to non-mining GDP and only showed a buoyancy of 0.8 against overall GDP. Overall findings of the study indicated that the non-mining sources of revenue had been

elastic with respect to non-mining GDP. The tax system as a whole was quite elastic with respect to GDP over the period since independence in 1966 and also in the period of the 1970s.

3.3 Summary of Literature review

It is evident from the theoretical and empirical literature that previous studies used different models to estimate tax buoyancy and elasticity and the estimates differ from country to country due to varying circumstances. Most of the empirical studies focused on the effect of tax reforms on the elasticity and buoyancy of the tax system. The literature also shows that not all reforms implemented yield good revenue.

Literature concludes that the most essential way to safeguard an automatic increase in the ratio of government revenues to GDP is to have a tax system with tax elasticity greater than unity. Furthermore, literature emphasizes that if the changes in the tax system such as reforms improve revenue, then buoyancy will be greater than elasticity.

The main interest of those concerned with revenue mobilization must therefore be in the behaviour of the tax system over time. This can be enhanced by establishment of fiscal reforms that generate government revenues. The study extends on existing literature in Botswana and analyses the impact of some identified specific fiscal reforms on government revenue in Botswana. The study also examines the impact of these fiscal reforms on the main tax handles and the overall tax system to assess their capability in generating government revenue in Botswana.

<div align="center">**CHAPTER FOUR**</div>

<div align="center">**RESEARCH METHODOLOGY**</div>

4.0 Introduction

This chapter discusses the theoretical framework and model specification upon which the study is built. It further goes on to elaborate on the dummy variable method used to estimate the elasticity of the tax system. Lastly, this chapter addresses the estimation techniques as well as the hypotheses and sources of data for the study. The study aims at comparing the tax buoyancy and elasticity with the introduction of SBI in 1994, replacement of general sales tax wit VAT in 2002, increasing VAT rate to 12% in 2010 and establishment of BURS in 2004. Dummy variables are introduced to capture the effects of the fiscal reforms.

4.1 Theoretical Framework

Tax elasticity and tax buoyancy measure the responsiveness of tax revenue to changes in income. Literature suggests regression of aggregate tax-base revenue on GDP and introducing dummy variables to capture the effects of discretionary tax measures to estimate tax buoyancy and tax elasticity.

$$\log TR = \alpha_0 + \alpha_1 \log Y + u_t \tag{1}$$

Where:

TR – Total tax revenue

α_1 - Estimate of tax buoyancy

Y – GDP at current prices

u_t – Error term

$$\log RT = \alpha_0 + \alpha_1 \log Y + \sum_{i=1}^{n} \beta_i D_i + e^r \tag{2}$$

RT – Tax elasticity

β_i – Slope coefficient

Y - GDP

D_i – Dummy variable

e^r - Error term

D_i takes the value 1 for each year with a change in tax policy and the value zero (0) otherwise. Summation takes account for the possibility of multiple tax changes during specified period.

Economic theory suggests that tax revenue is influenced by different external and internal factors of the economy other than GDP and discretionary tax measures as stipulated by equations (1) and (2) and hence affect tax buoyancy and elasticity. Lawrence (2011) acknowledges external grands, inflation rate, exchange rates and openness of the economy to influence tax revenue in Uganda. Furthermore, according to Botlhole (2005), SACUR, tax effort, exports and imports as well as GDP are significant determinants of tax revenue in Botswana. Comparing the Osoro (1993) model to the extended model by Botlhole (2005) showed that inclusion of other variables that determine tax revenue improves the results.

This study therefore adopts other variables that influence tax revenue and government revenue in Botswana hence an extension of the Osoro (1993) model with variables from economic theory. Incorporated variables are the ratio of SACUR to total tax revenue, the ratio of non-mining GDP to GDP, the ratio of imports to GDP and lastly the ratio of exports to GDP.

SACU is an external source of tax revenue to its member states including Botswana and therefore revenues from SACU have a significant influence on government revenues as well as tax buoyancy and elasticity. The proportion of SACUR to total tax revenue is used as one of the independent variable for tax revenue to be regressed on. Non-mineral GDP is an internal factor that could alter tax revenues through the structural shifts in the economy which can lead to a change in tax buoyancy and elasticity. The study therefore includes the proportion of non-mining GDP to GDP to capture its effects on tax revenue. In an open economy, some goods and services are imported from abroad and some domestic output exported to be sold abroad. Since Botswana is an open economy, the interaction between domestic trade and foreign trade is associated with an increase in tax revenue. The study incorporates the open economy factor by including the ratio of imports to GDP and lastly the ratio of exports to GDP.

The model for the study therefore postulates the following function:

$$TTR = \text{f} \left\{ GDP; \frac{SACUR}{TTR}, \frac{NMGDP}{GDP}, \frac{X+M}{GDP} \right\}$$

Where:

TTR = total tax revenue, GDP = Gross Domestic Product, SACUR= SACU Revenues, NMGDP= non-mining GDP, X= exports, M= imports

The Botswana government has continuously launched tax reforms in an effort to increase revenue hence keep government revenues up to date with expenditures. The study identifies three possible significant influencers to tax yield of the Botswana government which is analysed through the tax buoyancy and the tax elasticity. Firstly the SBI fiscal reform, mainly because the reform was initiated to manage the use of mineral revenues which have for a long time been the backbone of the Botswana economy. Because of this reason, the mineral revenues require careful investment and spending since they contribute more to tax revenue hence government revenue. The other fiscal reform for analysis of the study is the replacement of sales tax with VAT and the increase in VAT rate. This reform is important because VAT has a broad base and therefore provides more stable revenue. Lastly for analysis is the establishment of BURS as an institutional reform liable for the collection of government taxes to maximise revenue. To capture the effects of SBI, VAT and BURS on government revenue, dummy variables are introduced in the model.

4.2 Model Specification

As discussed in the previous chapter, tax buoyancy and elasticity differ in definition and their estimation techniques also differ.

The buoyancy of a tax system reflects the total response of tax revenue to changes in tax policies over time and is estimated by a regression of the tax revenue on the tax base after taking the natural logarithm for each of them. Botlhole (2005) used this approach in her study to estimate buoyancy. Starting with the aggregate tax revenue function we get:

$$\boldsymbol{TR \ = \ \alpha_0 Y^{\alpha_1} u^r} \tag{3}$$

Incorporating other variables and taking logarithms of the total tax revenue to derive the buoyancy coefficients yields:

$$\boldsymbol{\log TTR \ = \ \alpha_0 + \alpha_1 \log Y + \alpha_2 \frac{SACUR}{TTR} + \alpha_3 \frac{NMGDP}{GDP} + \alpha_4 \frac{X+M}{GDP} + u_t} \tag{4}$$

TTR - Total Tax Revenue

α_1 - Coefficient of tax buoyancy while

GDP – Gross Domestic Product

SACUR – SACU Revenue

NMGDP – Non-Mining GDP

X – Exports

M – Imports

u_t - Error term

The model for estimation of buoyancy of individual taxes with respect to GDP is expressed as follows:

$$\log TR_i = \alpha_0 + \alpha_1 \log Y + \alpha_2 \frac{SACUR}{TTR} + \alpha_3 \frac{NMGDP}{GDP} + \alpha_4 \frac{X+M}{GDP} + U_t \qquad (5)$$

TR_i - Tax revenue of tax i

α_1 - Coefficient of tax buoyancy and measures percentage change in individual taxes due to a change in GDP

Ordinary Least Square is then applied to estimate the parameter α_1, which yield an estimate of tax buoyancy.

4.2.1 Dummy Variable Approach

Estimating the elasticity of the tax system requires isolation of the effects of discretionary changes in tax policy on tax revenue. This study adopts the Dummy variable approach which makes use of unadjusted HTSTD with dummy variables incorporated as proxies for discretionary tax measures. From equation(4), the empirical model employs dummies representing each reform to capture its effects on total tax revenue and respective tax handles to estimate.

SBI DUMMY

To capture the effects of SBI on total tax revenue and mining tax revenue equations (6) and (7) are used respectively.

$$logTTR = \alpha_0 + \alpha_1 logGDP + \alpha_2 \frac{SACUR}{TTR} + \alpha_3 \frac{NMGDP}{GDP} + \alpha_4 \frac{X+M}{GDP} + \alpha_5 D_{1994}$$
$$+ u_t \qquad (6)$$

$$\log MTR = \alpha_0 + \alpha_1 \log Y + \alpha_2 \frac{SACUR}{TTR} + \alpha_3 \frac{NMGDP}{GDP} + \alpha_4 \frac{X+M}{GDP} + \alpha_5 D_{1994}$$
$$+ U_t \qquad (7)$$

TTR- Total Tax Revenue

MTR - Mining tax revenue

α_1 - Estimate of elasticity

D_{1994} - SBI fiscal reform dummy, takes the value 0 from 1980-1993 and the value of 1 from 1994-2014

α_5- SBI coefficient

BURS DUMMY

The empirical model for estimation of elasticity to measure the effects of BURS on total tax revenue and individual tax handles adopts equations (8) and (9):

$$logTTR = \alpha_0 + \alpha_1 logGDP + \alpha_2 \frac{SACUR}{TTR} + \alpha_3 \frac{NMGDP}{GDP} + \alpha_4 \frac{X+M}{GDP} + \alpha_5 D_{2004}$$
$$+ u_t \tag{8}$$

$$log\ TR_i = \alpha_0 + \alpha_1 \log Y + \alpha_2 \frac{SACUR}{TTR} + \alpha_3 \frac{NMGDP}{GDP} + \alpha_4 \frac{X+M}{GDP} + \alpha_5 D_{2004}$$
$$+ U_t \tag{9}$$

TTR - Total Tax Revenue

TR_i - Tax revenue of tax i

α_1 - Estimate of tax elasticity

D_{2004} − BURS fiscal reform dummy, takes the value 0 from 1980-2003 and the value of 1 from 2004-2014

α_5- BURS coefficient

VAT DUMMIES

The model for estimation of elasticity to measure the effects of VAT on total tax revenue and general sales tax/VAT makes use of equations (10) and (11).

$$log\ TTR = \alpha_0 + \alpha_1 \log GDP + \alpha_2 \frac{SACUR}{TTR} + \alpha_3 \frac{NMGDP}{GDP} + \alpha_4 \frac{X+M}{GDP} + \alpha_5 D_{2002} + \alpha_6 D_{2010}$$
$$+ U_t \tag{10}$$

$$log\ GSTVAT = \alpha_0 + \alpha_1 \log Y + \alpha_2 \frac{SACUR}{TTR} + \alpha_3 \frac{NMGDP}{GDP} + \alpha_4 \frac{X+M}{GDP} + \alpha_5 D_{2002}$$
$$+ \alpha_6 D_{2010} + U_t \tag{11}$$

TTR - Total Tax Revenue

$GST/VAT *$ - General sales tax / Vat revenue

α_1 - Estimate of tax elasticity

D_{2002} – Replacement of sales tax by VAT fiscal reform dummy, takes the value 0 from 1980-2001 and the value of 1 from 2002-2014

5- VAT coefficient

D_{2010}- broadening VAT rate fiscal reform dummy, takes the value 0 from1980-2009 and the value of 1 from 2010-2014

α_6 – Broadening VAT rate coefficient

Dummy variables take a value of one (1) for discretionary tax measures or introduction of a fiscal reforms and zero (0) otherwise for the period of study.

4.3 Estimation Techniques

4.3.1 Taxes and proxy bases considered for the study

Estimation of tax buoyancy and elasticity requires a specification of potential proxy or tax base therefore the study considers proxy bases to be reasonable representatives of the component of national wealth in which a particular tax can be assessed. Table 3 indicates taxes, related proxy bases and tax abbreviations for the study.

Table 3: Taxes and Related Proxy Bases

TAX	DEFINITION	PROXY BASE	DEFINITION
Total tax revenue (TTR)	Summation of all individual tax revenues contributions	Gross Domestic Product (GDP)	National income; total value of all goods and services produced
Mining Tax Revenue (MTR)	Total of mining income tax and royalties paid on minerals	Mining GDP (MGDP)	Share of GDP attributable to the Mining sector
Non-mineral Income tax revenue (NMITR)	Direct tax in the form of company and personal income taxes	Exports, imports, manufacturing output (XMM)	Domestic factor incomes from manufacturing and value of imports and exports
Customs and excise duties (CE)	Taxes charged on imports and value of production of commodities	Import duties and export duties (MDXD)	Value of imports and exports
General sales tax (GST)/ VAT	Tax on supply of goods and services	Private final consumption expenditure (PCE)	Value of goods and services consumed

4.3.2 Hypotheses

The following hypotheses are tested in the study:

1. SBI is negatively related to total tax revenue and mining tax revenue.

$$SBI = \frac{Recurent\ Expenditure}{Recurent\ Revenues}$$

   This formula implies that there is a negative relationship between SBI and government revenues. SBI was initiated as a ceiling which must not be breached to monitor the commitment to ensuring that mineral revenues were directed towards investment which could lead to an increase in government revenues. Increase in government revenues will result in a fall in the SBI value which is desirable for a sustainable budget. The study tests the hypothesis that SBI is negatively related to total tax revenues and mining tax revenue. The D_{1994} (SBI) dummy is expected to have a negative (-) sign.

2. Replacing sales tax with VAT enhances government revenue. VAT was introduced to broaden the tax base hence the expectation is that total tax revenue and general sales tax/VAT should increase leading to an increase in government revenues. D_{2002} (introduction of VAT) dummy is expected to have a positive (+) sign.

3. Increasing VAT rate from 10% to 12% is expected to increase total tax revenue and general sales tax/VAT revenues as VAT covers a broad tax net of goods and services. D_{2010} (VAT rate increase) dummy is expected to have a positive (+) sign.

4. BURS improve total tax revenue and individual taxes revenues hence an increase in government revenue.

   Since BURS was introduced to improve tax revenue mobilization as an administrative reform, the expectation is that there should be a positive relationship between tax revenues and implementation of BURS. The D_{2004} (BURS) dummy is expected to be positive (+).

7. The buoyancy estimates of the total tax revenue and individual taxes are expected to be higher than the elasticity estimates.

   The measure of tax elasticity eliminates the effects of the fiscal reforms on tax revenue; therefore the lower elasticity estimates compared to buoyancy estimates point to the positive effect of the fiscal reforms on government revenues.

6. Total tax revenue is positively related to GDP, SACU Revenues, Non-Mining GDP and openness of the economy.

Theoretically, an economic boom is expected to increase revenues hence the hypothesis that total tax revenue is positively related to GDP. The expected GDP sign is positive (+) which is influenced by the increases in GDP over years except for declines in 2000 which can be explained by the external shocks to the economy.

SACU revenues are also expected to have a significant influence on total tax revenue as Botswana is a member of the SACU and receives receipts from the SACU common revenue pool. Therefore SACUR is expected to have a positive (+) sign.

Exports and imports determine the openness of the economy through trade hence influences the total tax revenues as goods are imported and exported in and out of the country bearing taxes. Therefore a positive relationship between exports and imports with total tax revenue is expected.

4.4 Types and sources of data

The study uses time series data collected over the period of 1980 to 2014. Secondary data on tax revenues were obtained from the following sources under period of study:

1. Bank of Botswana Annual reports
2. Botswana Unified Revenue Services Annual reports
3. Central Statistics office reports and bulletins

4.5 Time Series data Characteristics

The time series data for the study is analyzed to ensure its stability and long run relationship between the variables as well as short run disequilibrium. These are performed in line with the following steps:

4.5.1. Descriptive statistics

Normality test is carried out on the variables in their log level form to check if variables are normally distributed. The study uses the The Jarque-Bera value and probability for analysis of the normal distribution of the variables.

4.5.2 Unit root test for stationary

Non-stationarity of a time series data is regarded as a problem in an empirical analysis, so as a short-hand rule, checking if the regression will give a reliable result is to ensure that the data is stationary. The variables may be non-stationary at level, in this case a retest at first difference is carried out and if still not stationary, a second difference test of stationarity is performed.

The number of times a data is differenced gives the order of integration. The unit root test is used to test for the stationarity of the data and this begins by specifying an Augmented Dickey-Fuller test and a regression test is run on each variable against its lagged ones and the lag difference terms of the same.

4.5.3 Cointegration analysis

Non-stationary variables which are not co-integrated lead to nonsensical result with no meaningful economic interpretation, this is called spurious and this means not all variables that share trend can be explained meaningfully in terms of economics. The existence of a co-integrating relationship implies that the regression of the non-stationarity series in their level yields meaningful and not spurious results. However for co-integration to exist, the non-stationarity series must be integrated of the same order. This study utilizes Johnsen Co-integration test to test for a long run relationship among variables.

4.5.4 Error Correction Model

To determine the short run elasticity and buoyancy coefficients of the respective co-integrating regression equation, an over-parameterized ECM version of the relevant equations is used. The error correction term (ECT) is derived, as the lagged residuals value generated from the estimated long-run co-integrating equations.

CHAPTER FIVE

PRESENTATION AND ANALYSIS OF ECONOMETRIC RESULTS

5.0 Introduction

This chapter presents a summary of econometric analysis using Eviews 7.1 econometric software. The data used for analysis is collected from different sources as discussed in the methodology and presented in Appendix 2 hence subject to diagnostic tests. The chapter reports on descriptive statistics, unit root test and cointegration test of the variables. Results from the error correction model are also presented in this chapter. Thereafter, empirical results of ordinary least square (OLS) regression estimates of the tax buoyancy and elasticity models of total tax revenue and of individual main tax taxes are estimated.

5.1 Diagnostic Tests

5.1.1 Descriptive Statistics

Descriptive statistics for the data are carried out on variables in their log level. Logged variables are used to further ensure that the variables will be normally distributed. Table 4 shows the descriptive statistics for the dependent and independent variables. The results indicate that all variables are normally distributed using the Jarque-Bera probability values.

Table 4: Descriptive statistics for variables in log level form

	LCE	LGDP	LGSTVAT	LM	LMDXD	LMGDP	LNMITR
Mean	7.004120	9.62797	5.54787	-0.708637	7.359365	8.419593	6.403773
Median	6.992047	9.86589	5.89271	-0.693948	7.351674	8.824641	6.286557
Maximum	9.562130	11.8668	8.60104	-0.105361	9.532344	10.44032	8.658345
Minimum	4.644391	6.65826	0.00000	-1.108663	2.744704	4.863681	3.737670
Std. Dev	1.513731	1.57826	2.52788	0.248246	1.533126	1.497865	1.452671
Skewness	0.020231	-0.41830	-0.51241	0.342444	-0.736161	-0.781235	-0.002665
Kurtosis	1.878320	2.01242	2.09059	2.535639	3.695338	2.732860	1.958951
Jarque-Bera	1.784720	2.37323	2.65947	0.969996	3.755903	3.559624	1.490240
Probability	0.409688	0.30525	0.26454	0.615698	0.152903	0.168670	0.474677
Sum	238.1401	327.351	188.627	-24.09366	250.2184	286.2662	211.3245
Sum Sq. Dev	75.61558	82.2005	210.877	2.033664	77.56569	74.03879	67.52810
Observations	34	34	34	34	34	34	34

Table 4 continued…

	LPCE	LSACUR	LTTR	LX	LXMM	LMTR	LNMGDP
Mean	8.80219	-1.34176	8.39901	-0.63581	9.66631	7.89431	-0.404705
Median	8.83083	-1.45021	8.59684	-0.68324	9.87157	8.13323	-0.385662
Maximum	11.1396	-0.71335	10.3739	0.01980	12.0723	9.82244	-0.186330
Minimum	6.24066	-1.897120	5.423275	-1.049822	7.124961	4.343805	-0.713350
Std. Dev	1.48846	0.38519	1.44917	0.22540	1.39306	1.56380	0.134097
Skewness	-0.12627	0.25914	-0.63286	0.77849	-0.243365	-0.935981	-0.280598
Kurtosis	1.93075	1.62306	2.37856	3.73390	2.07383	2.96116	2.052891
Jarque-Bera	1.71001	3.06647	2.81666	4.19735	1.55080	4.96648	1.716937
Probability	0.42527	0.21583	0.24455	0.12261	0.46051	0.08347	0.423811
Sum	299.274	-45.6200	285.566	-21.6177	328.654	268.406	-13.75995
Sum Sq. Dev	73.1127	4.89639	69.3038	1.67658	64.0409	80.7011	0.593411
Observations	34	34	34	34	34	34	34

CE- Customs and Excise, GDP- Gross Domestic Product, GSTVAT- General Sales Tax/VAT, M- Imports, MDXD- Import duties + Export Duties, MGDP – Mining GDP, NMITR- Non-Mining Income Tax Revenue, PCE – Private consumption Expenditure, SACUR- SACU Revenue, TTR- Total Tax Revenue, X- Exports, XMM- Exports + Imports + Manufacturing output, MTR- Mining Tax Revenue, NMGDP –Non-Mining GDP

5.1.2 Unit Root Test Results

Unit root test is used to test the stationarity of the data by conducting the Augmented Dickey-Fuller (ADF) tests. The variables are subjected to a regression test and the results are given in Table 5. Unit root test shows that all the variables are not stationary in levels and non-stationary variables which are not cointegrated lead to nonsensical result with no meaningful economic interpretation.

Table 5: Unit root test of variables at levels and first difference

	LEVELS		FIRST DIFFERENCE		STATUS
Variable	ADF statistic	Probability (p-value)	ADF statistic	Probability (p-value)	Order of integration
LTTR	-1.663169	0.7449	-6.378599	0.0000	I(1)*
LGDP	-1.147913	0.9053	-5.75494	0.0002	I(1)*
LSACUR	-1.696104	0.7311	-4.431067	0.0000	I(1)*
LNMGDP	-2.593001	0.2856	-5.955021	0.0001	I(1)*
L(X+M)	-2.788257	0.0705	-6.39103	0.0000	I(1)*
LMTR	-1.435077	0.3819	-5.728311	0.0002	I(1)*
LMGDP	-1.879290	0.6431	-6.483780	0.0000	I(1)*
LNMITR	-2.965516	0.1566	-4.551350	0.0049	I(1)**
LXMM	-2.660835	0.2580	-4.507078	0.0061	I(1)**
LCE	-3.691715	0.0371	-4.968406	0.0017	I(1)**
LMDXD	-3.044300	0.13611	-10.61407	0.0000	I(1)*
LGSTVAT	-1.500343	0.8085	-6.710441	0.0000	I(1)*
LPCE	-2.158195	0.4965	-5.428365	0.0005	I(1)*

Source: author's computations
Notes:

i. **L denotes logarithm and ADF is Augmented Dickey Fuller**
ii. **Mackinnon (1996) one sided p-values are used for the rejection of hypothesis of a unit root.**
iii. **The asterisks *,** and *** indicate significance at 1%, 5% and 10% significance levels respectively**
iv. **I (0) means stationary at levels I (1) means stationary after differencing once.**

Table 5 shows unit root tests of variables at levels and first difference. Using ADF t-statistic and probability value for the rejection of the hypothesis of a unit root, all variables are non-stationary at levels. Either the absolute value of the ADF t-statistic is lower than the critical values or the ADF probability is greater than 0.1 implying that the variables have unit roots. The non-stationarity of variables at levels suggests that there might be a long run relationship between the variables and therefore a cointegration test is needed.

5.1.3 Cointegration Test Results

Cointegration test helps identify the long run equilibrium that may exist in a linear combination of variables. The study employs the Johansen cointegration test to check for the long run equilibrium among variables.

Table 6: Johansen Cointegration Test

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 critical value	Prob.**
None *	0.761849	136.3636	95.75366	0.0000
At most 1 *	0.658146	89.01361	69.81889	0.0007
At most 2 *	0.577677	53.59238	47.85613	0.0131
At most 3	0.384424	25.14690	29.79707	0.1562
At most 4	0.237915	9.135381	15.49471	0.3530
At most 5	0.005119	0.169354	3.841466	0.6807

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The results from table 6, Johansen Cointegration Test show that there are 3 co-integrating equations at 5% significance level which implies that there is a long run relationship among the variables in the model. Therefore, an adjustment process that prevents errors from becoming indefinitely in the long run relationship between the dependent variables and the independent variable is introduced.

5.1.4 Error Correction Model (ECM) Results

Following the cointegration results, an adjustment process which identifies the short run model that leads to the long run equilibrium is derived. This is the estimation of the error correction model which gives the rate at which adjustment is done towards the long run equilibrium model. The model is regressed and the residuals from the regression are lagged once and named the Error Correction Term which is then added to the model as the independent variable.

Table 7: ECM for Total Tax Revenue estimated by OLS based on co-integration results

Dependent Variable: DLTTR			
Method: Least Squares			
Sample Adjusted: 1981 2014			
Variable	Coefficient	t-statistic	Prob.
C	0.042605	0.823140	0.4176
DLGDP	0.688855	2.223367**	0.0348
DLSACUR	-0.393045	-3.346237*	0.0024
DLNMGDP	0.828391	2.226515**	0.0345
DL(X+M)	0.519506	2.058172	0.0465
ECT_1(-1)	-0.523167	-4.312762*	0.0001
R^2=0.682393	Prob (F-statistic)=0.000961		DW stat= 1.936800

The asterisks *, ** and *** indicate significance at 1%, 5% and 10% significance levels respectively

From table 7 the short run Total Tax Revenue equation that leads to long run Total Tax Revenue is as follows:

D(LTTR) = 0.042605 + 0.688855D(LGDP) -0.393045D(LSACUR) +0.828391D(NMGDP) + 0.519506D(LX+M) - 0.523167ECT_1 + U_t

Where:

L- logarithm, TTR- Total Tax Revenue, GDP- Gross Domestic Product, SACUR – SACU Revenues, NMGDP- Non-Mining GDP, X-Exports, M- Imports, ECT- Error Correction Term, U_t –error term.

Table 7 presents the results after running the ECM, the $R^2 = 0.6823$ hence the model explains 68% percent of the variations in the total tax. This R^2 value shows that the model is moderate in determining the total tax revenue function in Botswana. The Durban Watson (DW) statistic of 1.936800 indicates that the regression does not suffer from problems of autocorrelation. The F-statistics probability value of 0.000961 suggests that all the estimated parameters are jointly significantly different from zero.

The negative and significant coefficients of the error correction term lagged one period (ECT_1) implies that there are economic forces that operate to restore the long-run equilibrium path of tax revenue following short-run disturbances. The significant ECT_1 coefficient of -0.523167 implies convergence to the long run at a high speed of 52%. That is, 52% of the previous errors in the total tax revenue are corrected for in the current period, t. From the regression presented in table 7, it is evident that there is a significant relationship between total tax revenue and some of the independent variables. The GDP and the ratio of Non-mining GDP to GDP positively influence total tax revenue at 5% level of significance while the ratio of SACU Revenues to total tax revenue negatively influences total tax revenue at 1% level of significance. The ratio of exports to GDP (X) and the ratio of imports to GDP (M) are not significant determinants of total tax revenue according the model.

Results show a positive coefficient of GDP of 0.688855 which implies that increasing GDP by 1% results in an increase in total tax revenue by 0.67%. This is quite consistent with correlation between taxation and economic activity that on average, when economic activity rise more rapidly, tax revenues also rise more rapidly. The findings are also consistent with results from Botlhole (2005) that there is a positive relationship between tax revenue and GDP. The positive GDP coefficient is also consistent with the study hypothesis and expectation of a positive coefficient on GDP.

The positive coefficient of the ratio of non-mining GDP to GDP (0.828391) indicates that increasing non-mining GDP by 1% leads to 0.83% increase in total tax revenue. This approves the study expectations as well as findings from the previous studies. The results make good economic sense in the case of Botswana as the economy is being diversified to move away from diamonds being the main driver of the economy. Literature suggests that although Botswana's GDP growth slowed down in the previous years, modest overall growth in non-mining activities was observed.

The negative SACUR coefficient denotes a negative relationship between total tax revenue and the ratio of SACUR to total tax revenue. The implication is that an increase in SACUR by 1% results in a decrease in total tax revenue by 0.39%. The results disapprove of the study hypothesis that there is a positive relationship between the two variables. The hypothesis was influenced by the fact that Botswana is a member of the SACU and receives receipts from the SACU common revenue pool hence the expectation that SACU Revenues will have a positive effect on total tax revenue.

Exports and imports determine the openness of the economy, since Botswana is an open economy; the expectation is that the ratio of the sum of exports and imports to GDP (X+M)/GDP should have a positive and significant effect on total tax revenue. The results indicate that the X+M have a positive coefficient. The implication is that an increase in (X+M)/GDP by 1% results in an increase in total tax revenue by 51%. The results approve of the study hypothesis that there is a positive relationship between the two variables.

5.2 Regression models

5.2.1 Tax to GDP buoyancies
Table 8: Buoyancy Regression results of tax with respect to GDP

Tax Equation	Buoyancy	t-statistic	R^2	DW
Total Tax Revenue	0.88	2.22	0.54	1.94
Mining Tax Revenue	0.73	1.59	0.68	1.51
Non-Mining Income Tax revenue	0.64	1.69	0.43	1.23
Customs and Excise	0.41	0.97	0.62	1.88
General sales Tax/VAT	1.40	30.38	0.99	1.92

Table 8 presents the results from the regression estimation and show that none of the taxes is buoyant except for general sales tax/VAT. Buoyancy coefficients below unity (1) imply that tax revenue is not buoyant hence grow at a less proportionate rate to GDP. Total tax revenue indicates a buoyancy coefficient of 0.88 which implies that as GDP increases by 100 %, tax revenue rises by 88%. This result is consistent with a study done by Chipeta (1998) which established the overall buoyancy of Malawi to be 0.95 (less than unity). At the same time, the

results contradict the findings by Botlhole (2005) of a responsive overall tax system with a buoyancy coefficient of 1.98 in Botswana. The finding of 0.88 can be attributed to the low buoyancies of mining tax revenue which is a main component of the total tax system.

Mining revenue is also revealed to have buoyancy coefficient of less than unity (0.73) hence not buoyant. The results are not in line with those found by Botlhole (2005) and Mpuchane (2001) that mining revenue in Botswana was buoyant. The findings could be associated with the fact that Botswana economy is being diversified over years and dependence of the economy on mining is reduced. Also minerals particularly diamonds for the case of Botswana are exhaustible resources hence their production reduces with time.

The non-mining revenue is also not buoyant with buoyancy estimate of 0.64, less than unity. The results are consistent with those by Mpuchane (2001) with buoyancy estimate of 0.85 and contradict those of Botlhole (2005) which suggested buoyant non-mineral revenue.

The slower growth of the non-mining revenue could be attributed to the poor performance of manufacturing and construction. Furthermore, Non-mining activities such as banks, insurance and business sector growth fell for the third consecutive year in 2000/01.

Customs and excise revenue buoyancy estimate is 0.41 hence not buoyant. The results are consistent with those presented by Botlhole (2005) who associates the less than unity (0.74) buoyancy coefficient with the effect of regional integration which promotes free trade. As a result of free trade, tax revenues on exports and imports fall and this is observed through a decline in Botswana receipts from SACU revenue pool.

General sales tax/VAT is the only buoyant tax revenue from the analysis with buoyancy estimate of 1.40 which is greater than unity. This implies that sales tax/VAT grows by 140% when GDP increases by 100%, sales tax/VAT grows faster than GDP. The results are in line with those presented by Mpuchane (2001) with buoyancy estimate of 1.96. The buoyancy of the sales tax/VAT could be attributed to the replacement of sales tax by VAT in 2002 and the later increase in VAT rate in 2010.

5.2.2 Decomposed buoyancy: Tax to Base

Table 9 below gives the Tax-to-Base results. Tax revenues are regressed on their respective tax bases.

Table 9: Buoyancy Regression results of tax with respect to their bases

Tax Equation	Buoyancy	t-statistic	R^2	DW stats
Total Tax Revenue	0.88	2.22	0.55	1.93
Mining Tax Revenue	0.53	3.88	0.69	1.88
Non-Mining Income Tax Revenue	0.10	0.63	0.37	1.51
Customs and Excise	0.16	2.22	0.56	2.28
General sales Tax/VAT	0.42	0.71	0.39	1.57

Table 9 discusses the results of regression on tax bases. The proxy base for total tax revenue is GDP hence yields coefficient of 0.88 which shows overall tax revenue is not buoyant. Mining revenue has a buoyancy estimate of less than 1 (0.53) which indicates that the mining revenue grows at a low rate than its proxy base mining GDP. Buoyancy estimate of non-mining revenue is 0.10 which indicates that when the sum of exports, imports and manufacturing output grows by 100%, non-mining revenue grows at a much lower rate of 10%. Customs and excise as well as sales tax/VAT also showed to have low buoyancy estimates of 0.16 and 0.42 respectively implying a non-proportional growth to their bases. Customs and exercise grows less faster than import duties and exports duties while sales tax/VAT grows at a lower rate than private final consumption editor.

5.3 Tax to GDP Elasticity Estimates

5.3.1 Sustainable Budget Index

Estimation of elasticity estimates introduces the dummy variables to account for the effects of the fiscal reforms applicable to the period of the study. To address the effects of SBI on tax revenues, a dummy variable D_{1994} is added as an independent variable to the regression. The dummy takes the value of 0 for 1980-1993 and value of 1 for 1994-2014. The SBI fiscal reform was specifically meant to address the issues of management of mineral revenue so that they would be

used to finance investment rather than consumption. Therefore the effects of this reform are observed on total tax revenue as well as mineral tax revenue.

Table 10: Elasticity Regression results of tax with respect to GDP and SBI

Tax Equation	Elasticity	t-statistic	R^2	DW	D_{1994}
Total Tax Revenue	0.57	1.88	0.59	2.04	-0.075
Mining Tax Revenue	0.65	1.35	0.69	1.39	-0.047

Table 10 shows that neither overall tax system nor mining tax revenue are elastic with the effects of SBI. Elasticity estimates below unity (1) imply that tax revenue is not elastic hence tax revenue grows less proportional to GDP growth rate. The overall tax system has elasticity estimate of 0.57 and mining revenue is inelastic at 0.65. The inelastic results of the mining tax revenue even with SBI could be attributed to the world recession in 2008 which led to a decrease in the demand for diamond and eventually a decline in their prices as well. This in turn influenced the inelastic results of the overall tax system. Both tax revenues are negatively related to D_{1994} (SBI) as they present negative coefficients of D_{1994}. Although the total tax revenue and mining revenue are inelastic, the negative SBI coefficients or a decline in SBI therefore implies that the mining tax revenues as well as the total tax revenue are increasing.

This is consistent with the hypothesis that SBI is negatively related to total tax revenue and individual taxes revenues derived from the SBI formula. SBI measures the ratio of non-investment spending to current revenues and the rationale behind introduction of SBI was to manage mineral revenue to be used for further investment rather than recurrent spending. Investment is expected to boost different tax revenues through manufacturing, open trade and employment creation, therefore using mineral revenues for investment purposes will enhance total tax revenue and government revenues. The negative SBI coefficients or a decline in SBI therefore implies that tax revenues are increasing. It is therefore worth concluding that SBI was a good fiscal reform to Botswana.

5.3.2 Botswana Unified Revenue Services

To address the effects of BURS on tax revenues, a dummy variable D_{2004} is added as an independent variable to the regression. The dummy takes the value of 0 for 1980-2003 and value of 1 for 2004-2014. Since BURS is responsible for the collection of all tax handles discussed for this study, the effect of BURS are captured on the total tax revenue as well as each tax handle.

Table 11: Regression results of tax with respect to GDP and BURS

Tax Equation	Elasticity	t-statistic	R^2	DW	D_{1994}
Total Tax Revenue	0.67	2.32	0.55	1.85	0.010
Mineral Tax Revenue	0.63	1.41	0.70	1.59	0.015
Non-mineral Income Tax Revenue	0.63	2.22	0.59	1.40	0.063
Customs and Excise	0.34	0.82	0.64	2.07	0.017
General Sales Tax/VAT	0.71	0.93	0.53	1.45	0.022

The overall tax system is inelastic (0.67) as well as all other taxes. Mining revenues, non-mining tax revenue, custom and excise and general sales tax/VAT are inelastic with elasticity estimates 0.63, 0.63, 0.34 and 0.71 respectively. The inelastic tax system and tax handles with establishment of BURS could be attributed to the global financial crises that led to a decline in demand for diamonds. BURS still faces challenges of tax evasion and capturing all potential tax payers especially VAT and non-mineral income tax and these could be the reasons behind its failure to make these taxes and the whole tax system elastic. Customs and excise revenues are more reliant on SACU receipts which are beyond BURS, therefore elasticity of customs and excise tax cannot only be determined by BURS. The establishment of BURS has a positive relationship with all the tax revenues including overall tax system. This is in line with the study hypotheses that BURS improves total tax revenue and individual taxes. The study expectation of a positive relationship between BURS and tax revenues was influenced by the fact that BURS was introduced to improve tax revenue mobilization as an administrative reform. This implies that establishment of BURS has increased total tax revenue and individual tax revenues.

5.3.3 Value Added Tax

VAT replaced sales tax in Botswana in the year 2002. To capture the effects of this reform, D_{2002} is used for assessment. Further improvement on VAT was done by increasing tax rate in 2010; therefore the dummy D_{2010} evaluates the impact of the increase in VAT rate on tax revenue and eventually government revenue. The study captures the specific effects of VAT on total tax revenue and general sales tax/VAT.

Table 12: Regression results of tax with respect to GDP and VAT

Tax Revenue	Elasticity	t-statistic	R^2	DW	D_{2002}	D_{2010}
Total Tax Revenue	0.73	2.33	0.58	1.83	0.04	0.03
General Sales Tax/VAT	0.14	0.93	0.62	1.95	0.10	0.11

From table 12 the total tax revenue and general sales tax/VAT are inelastic with coefficients 0.73 and 0.14 respectively. The inelastic estimates of total tax revenue and VAT could be linked to the numerous exemptions supplies and zero rated supplies that are not subject to VAT. Dummy coefficients are positive as expected which implies that the VAT reforms had a positive impact on total tax revenue and VAT revenues. Although the VAT reform was revenue enhancing, there is still the need to broaden the base and engage more changes because the general sales tax/VAT is inelastic to GDP. These results are consistent with those by Lawrence (2011) in Uganda that even after replacing sales tax with VAT, VAT still remained inelastic to GDP even though the reform had proved to be revenue enhancing.

5.4 Comparisons of tax buoyancy and elasticity

To further assess the overall effects of the fiscal reforms SBI, VAT and BURS, tax to GDP buoyancies are compared to tax to GDP elasticities over the period of study. Difference of buoyancy estimates less elasticity estimates reflects the effect of the reform on tax revenues. Positive difference (diff) implies the reform improved tax yield while a negative difference implies the reform made the tax yield worse off.

Table 13: Overall SBI, VAT and BURS effects on tax revenues

	SBI			BURS			VAT		
TAX	B	E	Diff	B	E	Diff	B	E	Diff
TTR	0.88	0.57	**0.31**	0.88	0.67	**0.21**	0.88	0.73	**0.15**
MTR	0.73	0.63	**0.10**	0.73	0.63	**0.10**			
NMITR				0.64	0.63	**0.01**			
CE				0.41	0.34	**0.07**			
GSTVAT				1.40	0.71	**0.69**	1.40	0.14	**1.26**

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Table 13 shows the estimated values of buoyancy and elasticity (with SBI, VAT and BURS dummy coefficients) with respect to GDP over the study period. The difference is positive for the overall tax system and mineral tax revenue with the SBI fiscal reform. This implies that SBI has improved tax yield in this tax and the overall tax system. For example, for a 1% increase in GDP, SBI mobilized additional 31% revenue to the overall tax system. For mineral tax revenue, SBI generated 10% more revenue for every growth in GDP.

The difference is positive for the overall tax system and individual tax categories with the BURS fiscal reform. This implies that BURS has improved tax yield in these taxes and the overall tax system. For example, for a 1% increase in GDP, BURS mobilized additional 21% revenue to the overall tax system. For the main taxes, SBI generated 10%, 1%, 7% and 69% in mining tax revenue, non-mining income tax revenue, customs and excise and VAT respectively for every growth in GDP.

An analysis on VAT fiscal reform performance can be backed by positive differences between buoyancies and elasticity estimates as indicated in table 13 above. The higher additional revenue generated from total tax revenue could be attributed to the additional 15% generated by VAT reforms to total tax revenue. The most significant effect of VAT is the 126% extra revenues observed in VAT revenues with the reforms.

5.5 Summary

It is evident from the empirical results that the use fiscal reform to raise government revenue is not only relevant to Botswana as other studies have shown the use of such measures in developing economies. The results are consistent with some of the empirical studies discussed such as Muriithi *et al* (2003), Kusi, (1998), Osoro, (1993) and Chipeta (1998). Taxes discussed are not wholly reactive to changes in GDP as all the elasticity estimates are below unity. According to IMF (2006), if the changes in the tax system improve revenue, then buoyancy will be greater than elasticity. Therefore, the fact that buoyancy estimates are higher than elasticity estimates indicate that fiscal reforms are necessary to maintaining a steady source of government revenue. Findings from the study conclude that SBI, VAT and BURS fiscal reforms have indeed improved government revenue. However, the study acknowledges that there is still room for improvement of the tax system to make it buoyant and elastic.

CHAPTER SIX

CONCLUSIONS, POLICY IMPLICATIONS AND RECOMMENDATIONS

6.0 Introduction

This study assessed the impact of SBI, VAT and BURS as fiscal reforms on government revenue; therefore this chapter gives a summary related to the study problem and objectives. The summary basically presents the analysis of buoyancy and elasticity of total tax revenue and of the individual tax revenues for 1980 – 2014. To capture the effects of SBI, VAT and BURS the study used DVA on the OLS regressions. Suggestions in terms of possible policy options and further research are also provided.

6.1 Conclusions

The objectives of the study were to assess the impact of SBI, VAT and BURS as fiscal reforms on government revenue through their effects on tax buoyancy and elasticity on overall tax system and individual tax handles. The study further determines the determinants of tax revenue in Botswana.

From chapter five, it is evident that factors that determine tax revenue in Botswana are GDP, non-mining GDP through the ratio of non-mining GDP to GDP and SACUR through the ratio of SACUR to total tax revenue. According to the findings of the study, openness of the economy as a positive effect on the total revenue generated in Botswana though imports and exports.

On buoyancy, the tax system as a whole did not have a buoyant system. Individual tax categories like mineral revenue tax, non-mining income tax revenue and customs and excise also resulted in a non-buoyant yield except for general sales tax/VAT which was buoyant.

The study hypothesised that SBI will be negatively related to tax revenues and the results confirmed this hypothesis. The results showed that the overall tax system is inelastic but negatively related to SBI. This implies that the tax system is not efficient in mobilising maximum government revenue but at the same time appreciates the implementation of the SBI as it shows that as tax revenue increases SBI value falls which is consistent with a sustainable budget for government revenues. Mineral tax revenue is also not buoyant but negatively related to SBI. Based on these findings, the study therefore concludes that SBI improved government revenue as

a fiscal reform through reinvestment of mineral revenues rather than being used to finance recurrent government expenditures.

It is evident from the previous chapter findings that even with the establishment of BURS the overall tax system remained inelastic as well as the individual tax handles. This implies that the tax revenues growth rates are less proportional to GDP growth rates. Although the tax revenues are inelastic, the findings reveal that BURS is positively related to the overall tax system as well as the main tax handles. This means that establishment of BURS has resulted in an increase in tax revenues. Therefore study concludes that BURS was a necessary fiscal reform to improving the government revenues through administrative duties of collection of taxes.

Replacement of sales tax with VAT left the tax system inelastic implying that tax revenues growth rates are less proportional to GDP growth rates. However, it is evident from the results that there is a positive relationship between introduction of VAT and tax revenue as well as general sales tax/VAT revenue. The positive relationship implies that replacing sales tax with VAT led to an increase in sales tax revenue and total tax revenue. Broadening of VAT rate in 2010 is also consistent with the study expectations even though the tax system remained inelastic as well.

The study further assessed the size of the impact of the fiscal reforms on tax revenues. The results further assured that indeed SBI, VAT and BURS were relevant fiscal reforms to improving the Botswana government revenues. This was done by finding the difference between tax buoyancies and elasticities with respect to each reform. The difference for the overall tax revenue with respect to SBI, VAT and BURS were positive which implies that these reforms mobilised additional government revenues. At the same time, the results of the model can inform tax policy as they indicate that overall discretionary measures have led to increased revenues over the review period.

6.2 Policy Recommendations

Some policy recommendations are derived from the empirical results in this study for the tax performance and government revenue yield. For the tax system to be more revenue enhancing, the yields of individual taxes should be responsive to changes in national income (GDP). The major taxes should be highly elastic and buoyant with respect to national income or proxy bases

for any developing country. This is inconsistent with the findings from the study as the overall tax system was not buoyant and inelastic, none of the tax handles was elastic and only one (sales tax/VAT) was buoyant and therefore calls for proper revision on the fiscal reforms undertaken to improve government revenue. The study has identified that SBI, VAT and BURS have improved government revenue collected but not at a rate proportional to the growth rate of GDP to make the tax revenue elastic. Therefore, policy makers need to find dynamic and strategic policies that will further improve the importance of these reforms on government revenues such that subsequently they improve the tax system and tax handles to be buoyant and elastic.

Effectiveness of these reforms has to be assessed by addressing the challenges that have been encountered with the SBI, VAT and BURS so as to improve their efficiency as they have already proven to be relevant in enhancing government revenue. To improve effectiveness of BURS, the government should combat tax evasion; improve tax laws and inefficiency in revenue administration. The VAT tax exemptions should also be minimised. SBI should be featured more in the budget discussions as this has not been the case, the discussions may guide the effectiveness of SBI on government budget and revenue.

To improve tax buoyancies and elasticities the government should also consider more discretionary tax measures such as broadening tax base and tax net. The tax system should be made as less complicated as possible as this could lead to the exclusion of potential tax payers out of the tax net.

6.3 Limitations of the study
Due to lack of well documented and up to date data, some of the variables desired for the study could not be attained. The unavailability of definite tax bases led to the use of proxies in the estimations.

6.4 Recommendations for future research

- The study only estimated buoyancy and elasticity for the major taxes and not the minor taxes, future research could take this into account and include these small taxes to find their impact on total tax revenue.
- SACU revenues are revealed to be significant determinants of tax revenue; further research could address the effects of the enactment of the new agreement of calculating

the customs and excise shares in 1969 among the SACU members on government revenue.

- The study does not capture important macroeconomic policies such as government expenditures and debts that affect tax revenue hence these policies can be incorporated for future research to analyse their impact on tax revenue.

- The study has identified quite a number of reforms specific to each tax handle but has only addresses the institutional reform (BURS), VAT and SBI regarding mining revenues, therefore further research could be carried on each tax handle specific reform.

APPENDICES

APPENDIX 1: DATA USED FOR ESTIMATION OF THE MODEL (P millions)

Year	TTR	GDP	NMGDP	SACUR	EXPORTS	IMPORTS
1980	224.26	875.50	634.20	102.02	300.70	495.10
1981	226.62	899.90	698.30	104.29	345.80	594.80
1982	227.00	779.20	649.70	104.00	467.50	703.90
1983	279.00	1024.30	737.90	114.00	696.70	805.90
1984	440.07	1302.10	896.20	157.00	857.70	892.90
1985	628.80	1660.70	1042.20	156.00	1385.50	1095.10
1986	835.20	2235.30	1296.80	150.00	1613.70	1331.10
1987	1176.80	2089.80	1580.00	192.00	2126.00	1155.00
1988	1423.60	3795.60	2093.10	234.00	2686.00	2173.00
1989	1989.00	5836.80	2867.50	293.00	3735.30	3018.00
1990	2235.30	6537.10	3641.00	353.00	3319.10	3619.50
1991	2844.10	7475.20	4400.40	478.00	3738.00	3937.70
1992	3091.70	8372.50	5246.60	762.00	3675.00	3970.10
1993	3374.40	9126.00	6083.70	998.00	4270.90	4285.00
1994	3677.20	11434.06	7182.70	822.00	4965.00	4407.30
1995	3632.70	13114.20	8117.000	712.00	5941.50	5307.10
1996	4019.80	16114.90	9403.90	829.00	8141.80	5742.80
1997	5198.50	18327.80	10832.00	896.00	10390.70	8250.20
1998	6767.30	20244.00	12497.50	1186.00	8696.90	9513.10
1999	5639.60	25361.40	14831.00	1261.00	12227.80	10164.40
2000	9937.80	29530.90	16553.70	1931.00	13834.70	10613.10
2001	10077.60	32065.90	18550.80	2188.00	14306.50	10556.90
2002	10984.58	34416.00	24325.700	2198.80	17950.50	13655.60
2003	12087.56	37181.60	27455.80	2500.80	18154.60	13759.70
2004	12800.90	42036.50	31235.00	2745.30	20855.90	17396.40
2005	13067.00	50752.10	34647.00	3226.40	26859.80	18058.80
2006	11822.00	59106.90	40087.80	3929.80	30886.00	20143.70
2007	15814.00	67152.70	47585.00	6610.00	36609.00	27256.30

Year	TTR	GDP	NMGDP	SACUR	X	M
2008	17959.00	75867.10	56077.30	7800.00	34128.00	38139.00
2009	19197.00	72315.80	62252.60	7750.00	25565.60	38116.00
2010	20006.00	93390.00	70521.80	7930.00	37905.00	44532.00
2011	20064.00	104572.20	78731.30	6207.00	52438.00	56264.00
2012	24367.00	110510.60	88461.80	8421.20	54112.00	67456.00
2013	29868.00	124310.70	98238.60	14216.00	76988.00	76893.00
2014	32015.00	142466.10	108254.40	15691.00	88574.00	78664.00

TTR- Total Tax Revenue, GDP- Gross Domestic Product, SACUR- SACU Revenue, NMGDP – Non-Mining GDP, X- Exports, M- Imports

APPENDIX 2: MAJOR TAXES AND PROXY BASES (P millions)

Year	MTR	MGDP	NMITR	XMM	CE	MDXD	GSTVAT	PCE
1980	101.11	241.30	38.45	1592.00	102.02	100.00	0.00	460.3
1981	77.05	201.60	41.55	1319.23	104.29	104.45	1.00	513.2
1982	77.00	129.50	42.00	1242.60	104.00	15.56	2.92	563.2
1983	100.00	286.40	58.00	1581.40	114.00	200.60	7.76	615.1
1984	193.80	405.90	78.90	1832.70	157.00	280.00	5.00	884.8
1985	376.50	618.50	87.20	2568.60	156.00	320.00	6.40	901.8
1986	581.20	938.50	93.60	3071.10	150.00	368.00	13.30	987.4
1987	844.90	1089.70	121.11	3442.90	192.00	490.50	18.40	1116.00
1988	1034.50	1478.50	129.60	5025.90	234.00	557.80	16.80	1682.8
1989	1508.10	2542.10	164.80	6962.70	293.00	699.65	35.00	2732.2
1990	1596.00	2896.10	242.80	7262.70	353.00	812.80	58.50	2750.6
1991	2005.40	3074.80	289.90	8027.60	478.00	919.30	71.60	3197.8
1992	1888.00	3125.90	357.30	8056.60	762.00	1205.10	125.40	3528.00
1993	1866.10	3042.30	369.90	9004.50	998.00	1221.50	137.20	4130.3
1994	2278.07	3932.30	420.50	9879.30	822.00	954.20	169.20	4312.1
1995	2349.40	4144.80	386.90	11864.70	712.00	853.50	219.40	4954.6
1996	2591.40	4800.00	356.90	14611.40	829.00	1140.60	248.40	5608.1
1997	3640.10	6908.30	385.00	19523.60	896.00	1451.10	327.90	6382.1
1998	4681.10	7665.10	537.30	19221.30	1186.00	1674.50	400.50	7335.1
1999	3186.60	6692.90	739.30	23519.90	1261.00	2095.30	548.00	8116.7
2000	6687.30	8389.40	780.20	25687.80	1931.00	2174.70	1092.64	9599.5
2001	8367.80	10085.20	925.30	26207.40	2188.00	2262.40	1287.54	10735.3
2002	6996.00	10090.30	900.56	34690.70	1554.25	2601.40	1480.67	12513.2
2003	7502.70	9725.80	823.52	34035.70	1500.56	3331.00	1215.81	13948.1
2004	8163.00	10801.50	1029.40	40587.10	1553.01	4469.30	1276.60	17022.00
2005	8682.00	16105.10	1283.49	47430.30	3226.48	4605.00	2115.20	19156.6
2006	11045.00	19019.10	2170.59	54152.80	3929.87	5379.00	1987.70	22228.8
2007	13114.00	19567.70	2816.00	67176.10	6610.484	6730.30	2221.00	26095.5

2008	11064.00	19789.80	3452.00	81750.90	6878.00	7711.04	3844.94	32929.6
2009	10182.00	10063.20	4449.00	51394.60	7750.00	9371.90	4648.38	37223.5
2010	9088.00	22868.20	5758.00	57650.10	7931.023	9822.60	4548.00	42692.1
2011	12060.00	25840.90	4039.00	69684.90	6207.00	10320.30	5348.98	48629.1
2012	15823.00	22048.80	4456.86	70675.00	8424.00	10859.50	4633.00	57100.3
2013	12076.00	26072.10	4743.99	161166.1	14216.09	12486.30	5437.33	65878.8
2014	18443.00	34211.70	5468.17	174974.2	13169.53	13798.90	5040.86	68844.2

CE- Customs and Excise, GSTVAT- General Sales Tax/VAT, MDXD- Import duties + Export Duties, MGDP – Mining GDP, NMITR- Non- Mining Income Tax Revenue, PCE – Private consumption Expenditure, TTR- Total Tax Revenue, XMM- Exports + Imports + Manufacturing output, MTR- Mining Tax Revenue.

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