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BRIDGING FISCAL DEFICITS: AN ANALYSIS OF REVENUE PRODUCTIVITY OF THE KENYAN TAX SYSTEM

BY

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DECLARATION

This project is my own original work and has never been presented for a degree award to any college or university

Signature .... Date 24/09/2009..........

Daniel Mburu Njenga

This research project has been submitted with our approval as the university supervisors

Signature .... Date 15/10/09..........

Mr. Moses Muriithi

Signature .... Date 15 Oct. 2009.

Mr. John G. Kamau

DEDICATION

This work is dedicated to my family. To my son Leon Mburu Njenga, may this be an inspiration to pursue all that you want. Of special mention I would also like to dedicate this to my brother Anthony Ngugi Njenga without whom this project would not have been undertaken and my mother Mrs. Mary Wambui Ngugi for her material, emotional and spiritual support. May you always be blessed.

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ACRONYMS

GDP – Gross Domestic Product

PAYE – Pay As You Earn

VAT – Value Added Tax

TMP – Tax Modernization Programme

ADF – Augmented Dickey Fuller

OLS – Ordinary Least Squares

RESET – Regression Specification Error Test

ABSTRACT

This study focused on the problem of bridging fiscal deficits by carrying out an analysis of the revenue productivity of the Kenyan tax system. It used time series data on Kenya for the period between 1964 and 2002. A theoretical model was developed based on Total Tax Revenue and on each tax source namely: Import duty, Other indirect taxes, Income tax, Excise duty, and Sales tax/Value added tax.

The Augmented Dickey Fuller test was used to test for stationarity of the variables in focus. The variables were found to be integrated of order one. Cointegration tests were carried out using the Engel Granger Two-step Procedure. The variables were found to be cointegrated implying existence of long-run relationships. Error correction models were specified using Ordinary Least Squares. These models were subjected to various diagnostic tests.

The study applied the concepts of elasticity and buoyancy to determine whether the tax system was productive in meeting the revenue needs of the country and bridging the chronic deficits in the country. Elasticities and buoyancies were computed for the total tax system and the various tax base sources. The Kenyan tax system was found to be productive with Total Revenue having a buoyancy that was greater than unit. All the other tax sources, except Excise Duties, were found to be productive with a buoyancy that was greater than unity. The current revenue profile of the nation was found to be sustainable to ensure optimal level of expenditure that facilitates formulation of fiscal policies that overcome the deficit. Lastly, Income tax was found to be the most productive component of the tax structure.

CHAPTER 1

INTRODUCTION

1.1. Background

Macroeconomic performance of a country is determined by the effectiveness of fiscal policy in economic management. According to Siegel (1979), the magnitude of government surplus or deficit is the single most important statistic measuring the impact of government fiscal policy on an economy. Governments use taxation, spending and borrowing to achieve desired levels of economic activity and to reallocate resources within the society to ensure equity, growth and welfare development within the economy. As such, fiscal deficit has been a prominent feature of public sector financing globally.

Ariyo (1993) explains the occurrence of this mode of financing being partly influenced by the desire of various governments to respond positively to the increasing demands of the citizenry, and the need to enhance accelerated economic growth and development. In a large number of Developing countries, this form of public financing is most prevalent since provision of the bulk of basic needs is entirely left to the government due to high levels of crippling poverty experienced. Of concern to economists is the increasing magnitudes of these deficits and their implication to formulation and implementation of macroeconomic management proposals. Buiter (1983) points out that the fiscal deficit must be sustainable.

As a result, increasing tax revenue and reducing expenditure are the most important fiscal challenges facing any government (Lipumba and Mbelle, 1990).

Increasing taxes is in most cases politically unpopular and tends to worsen unemployment and lower output production. On the other hand cutting expenditure is detrimental to development and also unpopular with voters. A balanced budget may not be able to meet the necessary expenditure to spur economic growth leading to a stagnant economic growth rate and development. hence the dilemma faced by governments is to make a choice between; one, economic growth accompanied by deficit with attached inflation problems, and two, measures to reduce the deficit that will slow economic growth and particularly harm low income groups.

In this regard, in a rapidly changing global economy, most of these countries are faced with the daunting task of trying to contain budget deficits that have in most cases continued to rise. Zee (1988) proposes three ways to achieve this: One. determination of the optimal tax rate for a given level of expenditure; two, determination of the optimal expenditure level for a given tax rate; and three, simultaneous determination of both the optimal level of expenditure and the tax rate. In the face of dwindling global finances and reduced borrowing instruments, there has been a greater demand for adoption of the first option that requires optimization of revenues derived from taxes for a given level of expenditure. This involves the determination of a sustainable level of revenue as a basis for finding a sustainable revenue profile

In Kenya, this is a major preoccupation of the government that has over the years continually experienced large persistent budget deficits. As shown by studies by Fischer and Easterly (1990), Easterly and Schmidt-Hebbel (1993), persistent fiscal deficit results in specific negative macroeconomic imbalance depending on how it is financed. Printing money leads to inflation problems in the economy. Domestic borrowing leads to high interest rates causing a credit squeeze and the crowding out of private investment and consumption. External borrowing leads to a current account deficit and the appreciation of the real exchange rate, or an external debt crisis if debt is too high, while running down of foreign reserves leads to a balance of payment crisis. Given these negative impacts, large persistent budget deficits pose a real threat to macroeconomic stability and therefore to economic growth and development.

Various approaches have been suggested to tackle this problem; namely reduction in expenditure, increase in revenue or adoption of both approaches. An accurate estimation of the optimal level of expenditure requires information on the productivity of the tax system. It is from projected revenue that annual expenditure proposals are made, hence the need to accurately predict this revenue to ensure an appropriate framework for deficit management is made. Njoroge (1993) carried out an assessment of productivity of the Kenyan tax system. She evaluated elasticity using the proportional adjustment method and buoyancy for the period 1972 to 1991. This study improves on Njoroge (1993) in the following respects. First, the study carries out an analysis of deficit financing and updates the analysis via covering the period 1963 to 2007. Secondly, this study captures the impact of fundamental changes that have occurred within the macroeconomic management framework introduced since 1993 especially with the setting up of the Kenya Revenue Authority in 1995 as the principle agent for tax collection. In this regard this study seeks to analyze how productive the tax system in Kenya is in the face of various reforms that have been undertaken. This will assist in formulation of appropriate expenditure programs that will ensure persistent unsustainable fiscal deficits are avoided.

1.2. Kenya fiscal performance

The Kenyan economy has had varied experiences since independence. From 1964 to 1967, Kenya enjoyed growth in GDP that averaged about 6.5 percent per year. Inflation rate was low with foreign reserves growing steadily. This growth momentum was slowed by the first oil crises of 1972 that lowered GDP growth rate to below 4 percent, but this was reversed by the coffee boom of 1976 and 1977 that accelerated growth rate to an average of 8.2 percent (GOK, 1994). As shown in table 1.1 below, during this period, from 1967 to 1980 the Kenyan government was able to raise enough revenue to finance its operations thereby incurring no fiscal deficit.

Table 1.1: Budgetary Revenues and Expenditures in Kenya

BUDGETARY REVENUES AND EXPENDITURES IN KENYA (Kshs Millions)			
YEAR	CURRENT REVENUE	CURRENT EXPENDITURE	FISCAL DEFICIT
1964/65	49.53	56.915	-7.385
1965/66	56.355	63.267	-6.912
1966/67	65.996	68.529	-2.533
1967/68	77.09	72.843	4.247
1968/69	84.716	77.509	7.207
1969/70	97.973	89.413	8.56
1970/71	124.012	110.434	13.578
1971/72	141.628	128.67	12.958
1972/73	148.997	139.578	9.419
1973/74	190.07	163.726	26.344
1974/75	226.646	207.377	19.269
1975/76	269.171	246.77	22.401
1976/77	320.556	285.079	35.477
1977/78	172.164	400.111	72.053
1978/79	510.637	475.104	35.533
1979/80	610.98	546.35	64.63
1980/81	701.523	685.082	16.441
1981/82	763.1	825.8	-62.7
1982/83	825.5	967.5	-142
1983/84	920.91	984.58	-63.67
1984/85	1016.89	1091.32	-74.43
1985/86	1205.55	1250.82	-45.27
1986/87	1386.67	1517.21	-130.54

1987/88	1614.31	1731 02	-116 71
1988/89	1887 39	1967 24	-79 85
1989/90	2049 96	2210 21	-160 25
1990/91	2420 63	2722.96	-302 33
1991/92	2852 04	2814 54	37 5
1992/93	3454 71	3884 17	-429 46
1993/94	1008	1296	-288
1994/95	1224	1315	-91
1995/96	1251	1352	-101
1996/97	1455 03	1385 34	69 68
1997/97	1661.04	1666 91	-5.87
1998/99	1798.37	1655.25	143 12
1999/00	1845 13	1547.55	297 58
2000/01	1925 05	1765 29	159 75

Sources: *Statistical Abstracts, Economic Surveys*

In 1976 the government pursued an expansionary fiscal policy by undertaking large development projects including education, social service, agriculture and security needs leading to a widening gap between revenues and expenditures. From 1981 to 1997, expenditures exceeded revenues resulting in persistent fiscal deficits in the economy. This can be attributed to a series of both internal and external shocks that impacted negatively on the economy. Severe drought between 1983 and 1984 worsened the situation further affecting agriculture negatively leading to an average growth rate of about 2.5 percent per annum. The deficit GDP ratio rose from 4.5 percent in 1988 to a high of 11.3 percent in 1993. It fell to a low of 1.5 percent in 1996.

GDP growth rate continued to slide in the 1990s falling to -0.2 percent in 2000. From the year 2002 with the implementation of the economic recovery strategy, the economy experienced increased economic growth rates but increased government spending continued to result in deficits. In the financial year 2006/2007, the countries deficit target was 3.4% of Gross Domestic Product (GDP) in an economy that expanded by 6.1%, and the following financial year, 2007/2008 the country experienced a 109.8

billion shillings deficit (Mwaura, 2008). In the financial year 2008/2009, internal strife and external price shocks resulted in low economic growth rate of less than 3.5% and increased fiscal expenditure where the government proposed a 760 billion shillings budget of which only 467.9 billion shillings was to be raised from taxes, leaving a substantial deficit equivalent to 5.3% of Gross Domestic Product (Wahome, 2009). Within the year, government ordinary revenues amounted to 216.7 billion shillings against a target of 221.8 billion resulting in a 5.1 billion shillings revenue shortfall by December. Overall expenditures issued to line ministries for recurrent and development expenditures during the period amounted to 262.9 billion shillings against a target of 309.9 billion shillings implying a substantial deficit in the budget (Anyanzwa, 2009).

Given this background the government focus has been to reduce the deficit via mobilizing greater resources internally via the tax system. Increasingly, it has been recognized that sustained economic growth is possible only within a sound macroeconomic framework in which fiscal policy plays a key role. The consequences of persistent deficit financing, gives importance to adoption of sound fiscal policy that will ensure achievement of macroeconomic stability.

1.3. Statement of the Problem

As put forth by Easterly and Schmidt-Hebbel (1993) there is strong evidence that chronic fiscal deficits have negative impacts over the medium term. Money financing of the deficit leads to higher inflation, while debt financing leads to higher real interest rates or increased repression of financial markets, resulting with fiscal gains experiencing increasingly unfavorable terms. Given the foregoing background, Kenya has experienced persistent deficits since the late 1980s caused by increased government spending thus formulation and implementation of fiscal policies must recognize the implications of these persistent deficits on the economy and ways to deal with them. Several options have been suggested to address this.

One option open to the government is implementing expenditure reducing programmes. This approach is not easy to implement, since it tends to negatively affect the general welfare of the population; a majority of whom are poor, and hence heavily reliant on government for meeting of their basic needs. Reduction in expenditure will imply cutting down on provision of vital services that take up the biggest chunk of public expenditure that includes education, health care, and social amenities such as proper housing, sanitation, and clean water; and increase unemployment since the government is the largest employer in the country. Also, the electioneering process and the threat of political backlash from the electorate makes the political elite resistant to effecting such expenditure reductions.

Another option would be to increase borrowing. Increased internal borrowing would result in crowding out of private investment a key driver of economic growth, as the government competes for the meager savings, thus have a detrimental effect on the economy. Increased external borrowing will increase indebtedness of the country that currently stands at about 900 billion shillings leading to a debt crisis. Also, over the last decade, foreign aid contribution by the developed economies has been on the decline. Of the total Aid available in the global economy, less than 1 percent was given to African governments. Due to the global recession, the Kenyan government had to shelve plans to issue a 33.6 billion shillings Eurobond resulting in a financing gap of about 25 billion shillings in the current financial year (Reuters, 2009). This decline in foreign funding has recently been propelled by a global recession caused by the financial meltdown of the worlds leading economies.

This has therefore shifted focus to the last option, where the government has been forced to heavily rely on tax revenues to run its expenditure programs and plug its' deficits to mitigate the perpetual fiscal imbalances. This can be attributed to the fact that, an assessment of the budgetary process in Kenya shows that annual expenditure proposals are always anchored on projected revenues; hence the accuracy of revenue projection is a necessary condition for devising an appropriate framework for fiscal deficit management in the country. Therefore the problem faced by policy makers in Kenya is to find ways of bridging these growing deficits using the tax system, since it is the basis of raising revenue.

This study therefore appraises the productivity of the Kenyan tax system so as to assess the countries sustainable level of revenue that ensures an optimal level of expenditure that facilitates the formulation of fiscal policies to overcome the deficit in the long-run. In this regard, the study seeks to review the Kenyan tax system and evaluate its Productivity the face of undertaken reforms.

1.4. Research questions

i) Is the Kenyan tax system productive in meeting revenue needs of the country?
ii) If so, which components of the tax structure are most productive?
iii) Is the level of revenue sustainable to ensure optimal level of expenditure that facilitates formulation of fiscal policies that overcome the deficit?

iv) What policy recommendations can be drawn from the results obtained?

1.5. Objectives of the Study

The primary objective of the study is to assess the productivity of the overall Kenyan tax system and on individual tax handles. Specifically the objectives are

i) To establish the data property before further analysis

ii) To evaluate the productivity of the Kenyan tax system in meeting revenue needs of the country as a whole and by each tax base

iii) To evaluate what components of the tax structure are most productive

iv) To evaluate whether the level of revenue is sustainable to ensure optimal level of expenditure that facilitates formulation of fiscal policies that overcome the deficit

v) To make policy recommendations that will contribute to a sustainable revenue profile that will reduce deficits

1.6. Justification of the Study

Over the years, due to high levels of poverty, low savings and investment rates, developing countries have continuously been forced to increase their public sector expenditure substantially so as to promote rapid economic growth and development. However these countries have experienced both internal and external price shocks that have greatly impacted negatively on their ability to raise revenues to meet their budgetary needs. A world wide economic recession, deteriorating terms of trade and dwindling foreign lending have translated into major fiscal crises for these developing nations. Of major concern are the burgeoning fiscal deficits that negatively affect these economies inhibiting their ability to increase economic growth and development.

As a response to this, most governments have placed sharp focus on their countries tax system to generate higher revenues; a key objective of the tax system. In this regard, this study evaluates the productivity of the Kenyan tax system so as to give a better understanding on the structure of taxation that will determine a sustainable level of revenue as a basis for designing a sustainable deficit profile. This will help in identifying a sustainable revenue profile for the country, and determine appropriate modifications to the existing tax structure and tax rates, that will ensure the design of a tax system that responds adequately to the revenue needs of the government, hence reduce or eliminate the persistent fiscal deficits.

1.7. Scope and Organization of the Study

The study will limit its scope to evaluating the productivity of the Kenyan tax system. This will entail use of elasticity estimation and assessment of buoyancy of the tax system as a whole and of the various tax sources for the period covered in the study. This is necessitated by lack of resources to undertake simultaneous study on expenditure reducing measures and revenue generating measures of reducing deficit financing and the inability to manage the wide area covered by this topic. The rest of the study will be organized as follows; chapter two represents literature review, chapter three represents theoretical framework and methodology, chapter four represents empirical findings, and chapter five contains the summary, conclusions, policy implications and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Literature

In most Developing countries, governments have found it difficult to balance their budgets due to burgeoning public expenditure, brought about by strong political pressure to provide vital services to the population, and the need to spur rapid economic development that ensures equitable redistribution of wealth to the majority of the poor citizenry. Of late, there has been a call for the implementation of interventionist programmes targeted at reducing high levels of poverty in these countries, and enhance rapid economic growth that will meet the millennium development goals.

This need to meet the ever increasing demands of the populace, coupled with inadequacy of revenue base to cope with the targeted level of economic activities has propelled most governments to engage in deficit financing. This places greater importance on good fiscal policy management. As proposed by Easterly and Schmidt-Hebbel (1993) fiscal deficits and growth are self reinforcing. This is because good fiscal management preserves access to foreign lending and avoids the crowding out of foreign investment, while growth stabilizes the budget and improves the fiscal position.

Chelliah (1969) defines fiscal policy as a course of action where the government uses its expenditure and revenue programmes to produce desired effects and avoid undesired effects on the national income, production and employment. Good fiscal policy management therefore, entails maintaining a sustainable budget deficit. This calls for either reducing government expenditures or raising revenues. Reduction of expenditure in most cases is not easy to implement since it negatively affects the general welfare of the citizenry and is not politically convenient (Muthuva, 1997). As put forth by Khan (1973), the tax system therefore becomes important for mobilizing the increments in national income for investment as it provides one of the major sources of revenue for financing expenditure by the state. The determination of a sustainable level of revenue as a basis for finding a sustainable level of deficit requires measurement of the productivity of the tax system.

A look at economic apriori provides that evaluation of the productivity of a tax system entails measuring buoyancy and elasticity. Mansfield (1972) defines buoyancy as the ability of the tax structure to generate proportionately higher revenues both through discretionary measures and revenue growth than is automatically generated through economic activities, while elasticity as the ability of the tax system to generate proportionately higher revenues through revenue growth which is automatically generated through economic activities.

Buoyancy therefore refers to both discretionary and automatic changes. It is total response of the tax system due to both changes in national income and the deliberate decision of the government to raise the tax rates, improve tax administration, and change the tax code among others. Automatic increases are a result of economic growth while discretionary increases are a result of changes in tax regulations that include; changes in enforcement procedures, base definition, and tax rates. Hence, it measures the performance of both tax policy and administration over time. It looks at both the soundness of the tax bases and the effectiveness of tax changes in terms of revenue collection.

Tax elasticity on the other hand, measures only the built in responsiveness of tax revenue. It refers to automatic change in tax revenue for a given tax base in response to economic growth or an increase in income, hence provides a quantitative measure of the effectiveness of tax policy in terms of stimulating public resources. Its coefficient gives an indication whether tax revenues rise at the same pace as national income.

Asher (1989) notes that, the common measures of productivity are; buoyancy and elasticity. This is because two factors can cause tax revenue to rise: the legislation or rate of tax can be changed to raise more revenue from the same base, or the base on which the tax is imposed may grow. The growth of tax in response to GDP can therefore be decomposed into two components: the automatic growth as the base on which the tax is charged grows in response to GDP, and the growth resulting from discretionary changes in tax rates and legislation. The combined effect of the two is known as the buoyancy of a tax. A buoyancy coefficient of 1.5 would imply that for every 1 percent increase in GDP, revenue from the tax had on average grown by 1.5 percent. The effect of automatic growth alone, abstracting from discretionary changes, is known as the elasticity of a tax. Accordingly, an elasticity coefficient of 1.5 would imply that for every 1 percent increase in GDP, revenue from tax would have grown by 1.5 percent if the legislation and rate of tax had remained unchanged.

2.2. Empirical Literature

Choudry (1975) using the constant rate structure estimated the elasticity of assessed personal income in Malaysia from the period 1961 to 1970. The study established that the observed differences between buoyancies and elasticities of actual and assessed income tax imply deficiencies in their growth rate.

Chipeta (1998) evaluated the effects of tax reforms on tax yields in Malawi for the period 1970 to 1994. The results indicated buoyancy of 0.95 and an elasticity of 0.6. It also found out that only PAYE is tax elastic and the whole tax system is not. The study concluded that the tax bases had grown less rapidly than GDP and therefore in the context of Malawi relying on increasing tax rates, extending existing taxes to new activities and introducing new taxes is not sufficient for raising buoyancy of the tax system.

Khan (1973) carried out a study to estimate the responsiveness of tax yields to increases in national income using the dummy variable method in Pakistan. The study found out that only some of the dummy variables had statistically significant coefficients. This implied that only some of the tax reforms had an appreciable effect on the buoyancy while the others were either minor. Also buoyancy figures were found to be lower than elasticity estimates except for income tax and customs duty, implying that reforms had dampened the responsiveness of the tax system. The study concluded that these results were consistent with tax policy for the period.

Bryne (1983) measured the built in responsiveness of major taxes in Zambia using the proportional adjustment method over the sample period of 1966 to 1977. The study established that income taxes and domestic taxes were elastic but import duties were found to be inelastic. This result was attributed to growth of the industrial and service sector and on government policy of import substitution. Domestic goods and services were found to have high buoyancy which was attributed to faster than proportional growth of indirect taxes with respect to private consumption.

Kusi (1998) evaluated the revenue productivity of Ghana's overall tax system and of individual taxes on the basis of estimates of tax buoyancies and elasticities for the period 1983 to 1993. The study found that all individual taxes except cocoa export tax and excise tax showed buoyancy and elasticities of more than unity during the reform period, thus causing the overall tax system to have a buoyancy and elasticity of more than unity each. It concluded that tax reform succeeded in improving the revenue generation, enhancing the efficiency of tax administration and improving equity the tax system.

Kwasa (1980) in a study on patterns of changes in tax structure and revenue in developing countries: a case study of Zambia used the proportional method over the sample period of 1964 to 1971. The study found out that all the taxes taken together had experienced an increase of 11.2% as compared to an increase of 12.8% in primary Gross Domestic Product.

Ariyo (1997) carried out a study on the productivity of the Nigerian Tax system for the period 1970 to 1990. Slope dummy equations were used for the oil boom and Structural Adjustment Programmes. It was found that on the overall, productivity level was satisfactory. The study further established that there were low elasticity indexes for many of the tax sources, relative to their respective tax bases. This indicated wide variations in the level of tax revenue by source which was attributed to laxity in administration of non-oil tax sources during the oil boom periods. Five out of the ten equations measured (50%) showed elasticity indexes of less than 0.3 while eight out of ten (80%) showed elasticity indexes of less than 0.5. Also all the indexes were found to be statistically significant at the 95% confidence level. The results implied that there was a lag in the collection of remittances of tax proceeds into government coffers. The study asserted that there was need to improve the tax information system to enhance evaluation of its performance and facilitate adequate macroeconomic planning and implementation.

Osoro (1993) tested for Revenue productivity of tax system in Tanzania for the period 1979 to 1989. The study estimated buoyancy using the double log form and tax revenue elasticity using the proportional adjustment method. It established that total taxes exhibited a buoyancy coefficient of 1.034 which exceeded the elasticity coefficient of 0.799. Income tax also exhibited a buoyancy coefficient that exceeded the elasticity coefficient. This suggested that discretionary changes were responsible for income tax revenue over the period. Other results found were that buoyancy and elasticity coefficients for company tax remained the same, sales tax had higher buoyancy than elasticity. the difference between buoyancy and elasticity for PAYE was zero, and import tax exhibited the highest difference in magnitude between buoyancy and elasticity. The study concluded that the tax reforms in Tanzania had failed to raise tax revenues. These results were attributed to the government granting numerous tax exemptions and poor tax administration.

In relation to Kenya. Adari (1997) focused on the introduction of value added tax (VAT) in Kenya that replaced sales tax in 1990. The study analyzed the structure, administration and performance of VAT. It found out that the estimated buoyancy and elasticity coefficients were less than unity implying a low response of revenue from VAT to changes in GDP. This suggested the presence of laxity and deficiencies in VAT administration.

Ole (1975) carried a study on the income elasticity of tax structure in Kenya for the period 1962/63 to 1972/73. Tax revenue was regressed on income without adjusting for unusual observations. The results showed that the tax structure was not buoyant. The tax structure was also found to be income inelastic at 0.81 during the period under evaluation. This implied that the tax structure could not be relied upon to finance rapidly growing government expenditures. This inelasticity was attributed to indirect tax that was inelastic at 0.63. The study recommended that the system required urgent reforms to improve its productivity. The results also implied that the country would require foreign assistance to close the budget deficit.

Muriithi and Moyi (2003) applied the concept of tax buoyancy and elasticity to determine whether tax reforms in Kenya achieved the objective of creating tax policies that made yield of individual taxes responsive to changes in national income. They used the double log equation to estimate the responsive changes in national income. They found that reforms had a positive impact on overall tax structure and on the individual tax bases. The study concluded that despite the positive impact, the reforms failed to make VAT responsive to changes in income although it was predominant in the tax structure.

Wawire (2000) used total GDP to estimate buoyancy and income-elasticity of Kenya's tax system. Tax revenues from various sources were regressed on their tax bases. Based on empirical evidence, the study concluded that the tax system had failed to raise necessary revenues.

In a study on the revenue productivity of the Kenyan tax system for the period 1972/73 to 1990/91, Njoroge (1993) used the proportional adjustment approach to adjust for discretionary changes in tax revenue. The study found out that overall buoyancy and elasticity of the tax system were quite low. Buoyancy was found to be greater than elasticity at 1.19 implying that the tax system was quite buoyant. Elasticity was found to be low at 0.67 implying that without discretionary changes the tax system will not be able to meet the required revenue target. Import taxes were found to have a low tax to base elasticity over the period 1972 to1981 but this improved slightly over the period 1982 to 1991. This was attributed to a reduction in tax rates in inputs in the industrial process and exemptions given for some of the intermediate goods. The study concluded that from a revenue point of view, the tax system did not meet its target, hence required constant review as the structure of the economy changes.

2.3. Overview of Literature

A look at the literature review presented above points out some criticisms and shortfalls that have been noted on the various studies mentioned. To begin with, it must be noted that Adari (1997), carried out the estimation of buoyancy and elasticity coefficients in total disregard of the time series properties of the data, and did not take care of unusual observations in the data. Due to this, the results that the scholar found were not reliable for planning purposes.

In the study by Muriithi and Moyi (2003), it can be noted that VAT had been in existence for about eleven years and subjecting it alone in a regression model did not make statistical sense. There was need to separate the effect of average monetary GDP and average total GDP on tax revenue, and also use average figures instead of the annual ones used in the study since the tax revenue figures are on fiscal year basis that starts on 1st July while GDP figures are on calendar year that starts on 1st January.

In the study carried out by Wawire (2000), several shortcomings were noted. First, the study never considered other important determinants of tax revenue, for example, unusual circumstances that could have affected tax revenue productivity. Second, it never disaggregated tax revenue data by source hence it was difficult to say which taxes and bases contributed more to the exchequer. Third, it never took into account the time series properties of the data. Njoroge (1993), also did not take into account the time properties of the data implying that the results that were derived could not be relied upon for planning purposes.

In regard to the above shortcomings this study took into account the time series properties of the data by carrying out a stationarity test. The variables were found to be stationary and of the same order. A cointergration test was carried out to test for long-term properties of the data leading to formation of error correction models. Further, comprehensive diagnostic tests were undertaken that a majority of the other studies did not undertake. The study will also take into account unusual circumstances that could have affected tax revenue productivity such as implementation of the Tax modernization Programme. This was done by use of the dummy variable method to take into account this unusual circumstance.

CHAPTER THREE

THEORETICAL FRAMEWORK AND METHODOLOGY

3.1. Introduction

This study as discussed in earlier chapters, appraises the productivity of the Kenyan tax system, so as to assess the countries sustainable level of revenue that ensures an optimal level of expenditure, and facilitate the formulation of fiscal policies to overcome the deficit in the long-run. This chapter focuses on theoretical framework and methodology. A model is implicitly specified that has been adjusted to fit the Kenyan situation.

3.2. Buoyancy and elasticity

Growth in tax revenue in response to GDP growth can be decomposed into two components: automatic growth in response to GDP and the growth resulting from discretionary changes in tax rates and legislation. Therefore, the buoyancy of a tax system reflects the total response of tax revenue to changes in national income as well as effects for discretionary changes in tax policies over time (Jayasundera, 1991). Elasticity on the other hand, measures the responsiveness of tax revenue changes in national income if the tax structure would have remained unchanged. To estimate the elasticity of the tax system, revenue series have to be corrected for effects of discretionary changes in tax policy.

3.2.1. Buoyancy

Generally, the buoyancy of a tax system can be expressed by the following equation:

$$\varepsilon_t^b = \frac{\text{Percentage change in tax revenue}}{\text{Percentage change in GDP}}$$

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

where

ε_t^b = Buoyancy of tax revenue to GDP

Δ = Change

T = Tax revenue

Y = GDP

In this study, buoyancy will be estimated by the use of a simple double log function as follows:

$$Log\ TR = log\ \alpha + \beta\ logY + \upsilon$$

Where

β= Tax buoyancy

3.2.2. Elasticity

The elasticity of tax revenue will also be estimated using the double log equation as follows:

$$Log\ TR^* = log\ \alpha + \beta\ logY + \upsilon$$

Where

TR^* = Adjusted total tax revenue

β = Elasticity of the tax system

Several techniques have been suggested in adjusting the tax revenue to discretionary changes. These are discussed in section 3.3 below. This study adopted the use of the dummy variable technique as presented in the next section.

3.3. Measures of productivity

As noted in literature review, two measures are normally considered in evaluating the productivity of a tax system: namely elasticity and buoyancy. The former measures the change in tax revenue attributable to changes in income. The latter refers to changes in tax revenue due to not only changes in income but also other discretionary changes in tax policy. Various techniques that are discussed below have been used to derive buoyancy and elasticity that include: the proportional adjustment method, the divisia index method, the constant rate structure and the dummy variable method.

a) The proportional adjustment method

This method was suggested by Sahota (1961) and Prest (1962) and used by Omuruyi (1983), Osoro (1993), and Ariyo (1997). It involves isolating the data on discretionary revenue changes based on data provided by the government. Time series data is first adjusted to a preceding year base. This is carried out by subtracting the budget estimate of the impact of discretionary measures implemented in a given year from the actual tax revenue collected that year (Njoroge, 1993). The resulting data reflects only what the collections would have been if the base year structure had been used in force throughout the sample period (Osoro, 1993)

Ariyo (1997) proposes several shortcomings attributed to this method. To start with, data on revenue receipts directly and strictly attributable to discretionary changes in tax policy are not available. This is because it relies on budget estimates for discretionary effects of tax revenue which tends to differ substantially from the actual tax revenue. Two, the approach tends to be highly aggregative compared to other methods. Lastly, according to Chipeta (1998), the approach assumes that the discretionary changes are as progressive as the underlying tax structure, hence it is contingent on the assumption that the discretionary changes are more or less progressive than the tax structure they modify.

b) The divisia index method

This method is widely used in measuring technical change. It was discovered via an appreciation that the characteristic of the effects of discretionary tax measures and tax yield are similar to the effects of technical change on total productivity (Njoroge, 1993). In this, the discretionary tax measure produce changes in tax yield over and above those caused by automatic growth in the tax bases as technical changes induce changes in productivity over and above those that can be accounted for by increase in factor inputs. At an aggregate level, it is assumed that there is a stable relationship between aggregate tax yield and bases just as in factor inputs and outputs. Thus a technical change is assumed to induce a shift in the production function because a given technology is altered such that a discretionary tax measure does the same to an aggregate tax function since it alters the tax system (Njoroge, 1993).

The method introduces a proxy for discretionary tax measure where it uses time trends as proxies for discretionary changes. The index measures the technical change.

which is taken as the effects of discretionary changes in tax yields. The index is derived from the estimated tax function analogous to the production function. The tax function must be well defined, continuously differentiable and homogenous of degree one. Solow (1957) showed that under certain circumstances the divisia index is an appropriate index of factor inputs where the weights are the factor share in total output. As put forth by Choudry (1975) in practice this method can undermine/overstate the positive/negative revenue effects of such measures. If the discretionary measures produce very large effects this method does not produce satisfactory results.

c) The constant Rate structure

This method involves collecting statistics in actual tax receipts and data on monetary value of the legal tax bases and corresponding revenues. This requires the use of income bracket data, commodity rates and disaggregated information on the growth and distribution of the reported bases. Choudry (1975) notes that if such disaggregated data is available. it would be possible to construct a constant rate base series that would represent hypothetical yields under a system assumed to remain unchanged during the period under review. This is carried out as follows

$T_{ip}(t)$ = Assessed personal income tax (or whichever tax one is dealing with) thus

$T_p(t) = \sum_{i=1}^{n}$, where $T_p(t)$ is the aggregate assessed personal income tax in the period (t)

and

$Y(t) = \sum_{i=1}^{k} Y_i(t)$, where $Y(t)$ is the aggregate assessed income in the same year.

Then the average effective rate of taxation for the i^{th} income group in the reference year is

$t_i(r) = \frac{T_{ip}(r)}{Y_i(r)}$, so that

$T_p(r) = \sum_{i=1}^{k} t_i(r) Y_i(r)$, thus the simulated personal income tax in the t^{th} year is

$T_p(t) = \sum_{i=1}^{k} t(r) Y_i(t), t = 1.........n$.

The constant rate structure therefore only incorporates the discretionary changes in statutory tax rate and ignores those changes that could arise due to administrative efficiency as shown by last equation above. Also information particularly on distribution of tax bases by rate categories is not readily available consequently the adjusted data involve measurement errors, which in turn create specification bias in the estimation of elasticity.

Choudry (1979) criticizes the use of this method on the ground that it becomes inefficient where a tax has many progressive elements and where the tax bases grow at the same rate. This is because where the tax system has many progressive elements, the method does not guarantee that the tax elasticity will be larger (smaller) than the buoyancy even when discretionary changes produce an overall negative (positive) revenue effect. Where the tax bases grow at the same rate, there is the possibility that the elasticity estimate fails to detect the effect of discretionary changes. Furthermore, this method requires highly disaggregated data and detailed tax base series for all individual taxes and this could be difficult to obtain, besides getting the same tax base over time.

d) The dummy variable method

Singer (1968) proposes that any reform should be considered as an exogenous factor thus each should be represented by a dummy variable. Khan (1973), Singer (1968), Chand and Wolf (1974), and Artus (1974) use the dummy variable as a proxy of each discretionary tax measure undertaken during the period under review. Elasticity of the tax system is then calculated by fitting the data on the function

$T = \alpha + \beta Y + \sum d_i D_i$ which when transformed into log linear form becomes

$\log T = \alpha + \beta \log Y + d_1 D_1 + \dots\dots\dots + d_n D_i$

Where D= n number of dummy variables

β = the elasticity coefficient

Estimation of elasticity by this method is not precise and reliable due to the problem of multicollinearity caused by including more than one dummy variable in the tax function.

3.4. Estimation procedure

Following the above discussion in evaluating the productivity of a tax system, the following method was adopted to derive buoyancy and elasticity which requires modifications to the underlying data.

Osoro (1993) indicates buoyancy can be measured using the following equation:

$$TR = \alpha Y^{\beta} e_r \qquad (1)$$

Where TR is total tax revenue, Y is the GDP at current prices, α and β are parameters to be estimated. and e_r is the error term. A double log transformation of equation 1 enables us to derive the buoyancy coefficient represented as follows

$$\log TR = \log\alpha + \beta\log Y + e_r \qquad (2)$$

Since the equation is in double log form, it provides an estimate of tax buoyancy where β is the estimated tax buoyancy. This is because it measures in percentage terms the change in total tax revenue due to a change in GDP and the effect of discretionary changes in tax policy (Ariyo, 1997). To estimate tax elasticity modification to equation 2 has to be undertaken to account for discretionary changes in tax policy. Historical tax revenue series will have to be adjusted so as to eliminate the effects on tax revenue of all other factors other than GDP.

As discussed previously in literature review one of the methods of carrying out this modification has been suggested by Singer (1968) of the use of the dummy variable technique where a dummy variable is introduced into the double log equation 2 for each year in which there was an exogenous tax policy change. The revised model takes the form

$$\log T_R = \log\beta_0 + \beta_1\log Y_i + \sum\beta_{2i}D_i + e_r \qquad (3)$$

Where the dummy variable (simple or mixed) is proxy for the i^{th} DTM taken during the period under review, D_i, takes on the value (1) for each year in which there is an exogenous change in tax policy, and a value (0) before the discretionary change. T_R is the tax revenue, Y_i is the tax base (or GDP in aggregate level), and β_1 measures the elasticity. The summation accounts for the possibility of multiple changes during the period. This approach was adopted in this study to estimate the tax elasticity.

3.5. Research design

Due to the large number of reforms undertaken over the years within the Kenyan tax system and the difficulty of distinguishing between minor and major reforms, only significant events undertaken within the reform process will be isolated to account for discretionary changes in the tax system. A time series analysis will be performed to assess the relationship between Gross Domestic Product and the aggregate tax based revenue yield as well as by each tax source. This will provide an index of the buoyancy of the whole tax system and for each tax source.

3.6. Model Specification

The model to be used in this study to estimate tax buoyancy and tax revenue elasticity will be modeled using equation 2 and 3 as given in the theoretical model above. It is adopted from the works of Ariyo (1997) and adjusted as shown below to fit the Kenyan situation. The following basic equations will be analyzed:

$$\log TR = a_0 + a_1 \log GDP \quad (4)$$

$$\log IMD = b_0 + b_1 \log GDP \quad (5)$$

$$\log OIT = c_1 + c_2 \log GDP \quad (6)$$

$$\log IT = d_0 + d_1 \log GDP \quad (7)$$

$$\log ED = e_0 + e_1 \log GDP \qquad (8)$$

$$\log VAT = f_0 + f_1 \log GDP \qquad (9)$$

Where TR = Total tax revenue

GDP = Gross Domestic Product

IMD = Import Duties

OIT = Other Indirect Taxes

ED = Excise Duties

IT = Income tax

VAT = Value Added Tax/ Sales Tax

The coefficients of the results for equation 4 to 9 are the buoyancies (elasticity) coefficients given that the effects of tax reforms on revenues are not yet considered.

A slope dummy variable was introduced into equation 3 above to account for; changes undertaken in the tax system, that is, major reform carried out in the tax system with the implementation of Tax Modernization program in the late 1980s that included the creation of Kenya Revenue Authority (KRA) in 1995 as the principal agent for tax collection. This was done because as put forth by Koutsoyiannis (1976) and others, over long periods of time or under unusual circumstances, not only do the intercepts (functions) change but also their slopes may change. Using the total tax revenue (equation 4) as an example, we use the slope dummy variable equation as follows

$$\log TR = a_0 + a_1 \log GDP + a_2 D_1 + a_3 D_2 \qquad (10)$$

Where D_1 = Intercept (shift) dummy

D_2 = Slope dummy given by the equation ($D_2 = D_1 * \log GDP$)

This function will be applied to the administrative change variable for all equations

As proposed by Ariyo (1997), additional modification is carried on the dummy based model above. Introduction of a one year lag in GDP is made due to the argument that new policy guidelines contained in a budget speech may not be implemented until relevant circulars are issued. The one year lag is added to equation 10 to capture the potential effects on tax revenue due to implementation time lag. The revised model takes the form

$$\log TR = a_0 + a_1 \log GDP + a_2 \log GDP_{t-1} + a_3 D_1 + a_4 D_2 \qquad (11)$$

In this analysis therefore, the following equations were used to represent final equations for non-dummy based scenarios and the dummy based scenarios, which appears to be consistent with logarithmic autoregressive model suggested by Pindyck and Rubinfield (1981).

$$\log TR = a_0 + a_1 \log GDP + a_2 \log GDP_{t-1} \qquad (12)$$

$$\log TR = a_0 + a_1 \log GDP + a_2 \log GDP_{t-1} + a_3 D_1 + a_4 D_2 \qquad (13)$$

3.7. Data used in the study

The data used in this study will be mainly secondary data derived from various sources including the Kenya Bureau of Statistics, Central Bank of Kenya Statistical Abstract. Government of Kenya Economic Surveys, and Government Documents. Other sources of data will include the International Financial Statistics, the World Bank and the International Monetary fund. The study will mainly deal with published data.

3.8. Data refinement and analysis

Due to the nature of the time series data, the study involved testing for data sationarity. This test ensured that the results derived were not spurious so as not to affect policy formulation. A stochastic process is said to be stationary if its mean and variance are constant over time, and the value of covariance between two time periods depends only on the distance between the two periods, not on the actual time at which the covariance is computed (Gujarati. 1995:714). This means that if a time series variable is stationary, its mean variance and auto-covariance remain the same, no matter at what time it is measured (Gujarati, *et al* 1995). To test for stationarity, the study used the Augmented Dickey Fuller test. This test involved testing for unit root.

To give an exposition of the unit root test, let's consider a model of the following nature:

$Y_t = Y_{t-1} + \upsilon$ 3.1

Where Y_t assumes any new variable-which in this study were the variables log TR, log IMD, log OIT, log IT, log ED and Log VAT- is the stochastic error term that follows the classical assumptions, namely, it has zero mean, constant variance, and is non auto-correlated (Gujarati, *et al* 1995). If the coefficient of Y_{t-1} is in fact equal to 1, the problem faced is known as the unit root problem, that is, a non-stationary situation. Therefore, if a regression of the following nature is run:

$$Y_t = \alpha Y_{t-1} + \upsilon \text{ .... } 3.2$$

and α is found to be equal to one, then it can be said that the stochastic variable has a unit root. Thus the unit root test aims to test whether $\alpha = 1$. Equation 3:1 is often expressed in an alternative form

$$\Delta Y_t = \rho Y_{t-1} + \upsilon \text{ .... } 3.3$$

where $\rho = \alpha - 1$ and Δ is the difference operator (Gujarati, *et al* 1995). This therefore means that if $\alpha = 1$, then $\rho = 1 - 1 = 0$. Therefore in the same instance of equation 3.1 the unit root test involves testing whether $\rho = 0$. To find out if the variable Y_t is stationary, the study run a regression of the form of equation 3.2 using Ordinary Least Squares (OLS), and tested if α is statistically equal to 1. Under the null hypothesis $\alpha = 1$, the conventional computed t statistic is known as the tau statistic (τ), which is also known as the Dickey Fuller Test. If the computed absolute value of the τ statistic exceed the Dickey Fuller absolute critical τ values, then the hypothesis that the given time series variable is stationary is rejected and the alternative hypothesis of non-stationary time series is accepted (Gujarati, *et al* 1995).

The variables were found to be non-stationary and integrated of the same order, thus the model was tested for coitegration. This ensured that any valuable long-term information was not lost (Gujarati, *et al* 1995). This involved estimating the long-run equilibrium relationship of the model, then finding the residuals of the error term (υ_t) of the estimated equation and then testing for existence of a unit root; that is, testing for the integration of the errors. If the residuals are stationary (that is $\rho = 0$), then the variables are cointegrated.

The residuals in the study were found to be stationary implying cointegration. Cointegration implies that the economic fundamentals in the model have a long-run relationship (Gujarati, *et al* 1995). This meant that an error correction model was to be estimated. This was the model that included differenced variables and the lagged error called the Error Correction Mechanism. The Error Correction Model involved the use of the OLS to estimate the cointegrating relationship between the variables. Then the study used the lagged residual from this estimation as the right hand side variable in the equation derived (Gujarati. *el al*1995).

The models were also subjected to various diagnostic checks as follows:

a) White Heteroskedasticity test. This test is for the general model misspecification and is applicable only to the residual of the OLS model. In this test, the aim was to test the null hypothesis that coefficients of the variables in the regression were all zero; that is, errors were homoskedastic and independent of regressors.

b) Histogram-normality test. This tests whether the errors are normally distributed or not. Thus the null hypothesis in this case was skewness = 0, and Kurtosis = 3. The test used the Jacqure-Bera statistic under the null hypothesis of normality. A significant Jacqure-Bera statistic implied to non-normality of the time series, which was a problem in the models derived.

c) Serial correlation (LM) test/ Breusch-Godfrey test. If the derived model had a higher order serial correlation, that is greater than order one, the model was subjected to this test. In this case, the order ρ was specified which was thought to be determining the disturbance. The null hypothesis to be tested was that coefficients of the lagged residuals were zero, that is, they were not auto-correlated. Thus the null hypothesis was that there was no autocorrelation.

d) Ramsey RESET tests. This test sought to find out whether the model had vital variables. The test therefore was concerned with looking for specification error that included some of the following; omitted variables of inclusion of wrong variables in the model, incorrect functional form of the model, and correlation between explanatory variables and residuals. The tests used an F-statistic, which used a null hypothesis that the coefficients on the forecast vectors were all zero. A significant F-statistic implied that the model was not well specified.

e) Recursive estimates. This showed how the coefficients had moved towards estimated coefficients. The test assessed the coefficients represented by the + or – standard band. If the line did not cross the band, then it was concluded that the coefficient were stable overtime. If the line crossed the band, then it was concluded that the coefficients were not stable.

f) Chow Break-point teat. This test was run to investigate the stability between two periods perhaps after an introduction of a policy in a specific selected year. To see whether the coefficients changed significantly, that is, whether there was to be some coefficients derived on introduction of the policy, assess the probability value of the F-statistic. If the statistic was significant as conventional levels, the null hypothesis was accepted that states that there was stability of coefficients between periods. If the statistic was significant then the null hypothesis was rejected and the alternative hypothesis that the coefficients were not stable between periods was accepted.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1. Introduction

This chapter deals with empirical findings of the study and their interpretation. The estimated equations are as specified in chapter three.

4.2. Stationarity analysis of Macroeonomic variables

Stationarity test was carried out on the variables of the estimated equations using the ADF test and the results given in table 4.1 below

Table 4.1: Stationarity test result

Variables	Form	ADF Test Statistic	Critical Values 1%	5%	10%	Decision Rule
log TR	Lag Difference 1, intercept, and 1st difference	-4.801375	-3.6228	-2.9446	-2.6105	Stationary
log IMD	Lag Difference 1, intercept, and 1st difference	-4.423894	-3.6228	-2.9446	-2.6105	Stationary
log OIT	Lag Difference 1, intercept, and 1st difference	-5.373486	-3.6228	-2.9446	-2.6105	
log IT	Lag	-4.439496	-3.6228	-2.9446	-2.6105	Stationary

	Difference 1, intercept, and 1st difference					
log ED	Lag Difference 1, intercept, and 1st difference	-4.107135	-3.6228	-2.9446	-2.6105	Stationary
log VAT	Lag Difference 1, intercept, and 1st difference	-4.149973	-3.6228	-2.9446	-2.6105	Stationary

From table 4.1 above, all the variables were found non stationary in their levels implying that they exhibited a unit root. With a first difference, all the variables become stationary. This is shown by the excess negativity reached on all the variables, that is, their calculated absolute values tended to be higher than the conventional tabulated critical values. All variables were stationary at 1%, 5%, and 10% critical levels. Since all the variables were found to be stationary at first difference, they were deemed to be integrated of order one I(1). As such, since all the variables were integrated, and integrated of the same order, the cointegration test was carried out as below.

4.3. Cointegration test results

The Engel Granger two-step procedure was used. The equations in use for cointegration test are estimated for each variable as follows;

$$\text{Log TR} = -2.621912 + 2.665620 \log GDP - 1.554146 \log GDP_{t-1}$$

$$\text{Log IMD} = -2.572165 + 1.636098 \log GDP - 0.705786 \log GDP_{t-1}$$

$$\text{Log OIT} = -4.370494 + 2.284362 \log GDP - 1.362825 \log GDP_{t-1}$$

$$\text{Log IT} = -3.393438 + 2.862169 \log GDP - 1.783578 \log GDP_{t-1}$$

$$\text{Log ED} = -4.691422 + 0.926309 \log GDP - 0.218744 \log GDP_{t-1}$$

$$\text{Log VAT} = -4.646166 + 2.457984 \log GDP - 1.258563 \log GDP_{t-1}$$

Cointegration involves calculating the errors of the above equations and then subjecting this errors to the dickey fuller test for a unit root. The results are given in table 4.2 below

Table 4.2: Unit root test results on the residuals of above equations

Residual	Form	ADF Test Statistic	Critical Values			Decision Rule
			1%	5%	10%	
$\upsilon^{\log TR}$	1st difference, level, lag difference 1	-3.148855	-2.6280	-1.9504	-1.6206	Stationary
$\upsilon^{\log IMD}$	1st difference, level, lag difference 1	-2.899015	-2.6280	.-1.9504	-1.6206	Stationary
$\upsilon^{\log OIT}$	1st difference, level, lag	-3.001406	-2.6280	-1.9504	-1.6206	Stationary

	difference 1					
$\upsilon^{\log IT}$	1st difference, level, lag difference 1	-3.097578	-2.6280	-1.9504	-1.6206	Stationary
$\upsilon^{\log ED}$	Lag difference 1, intercept, and 1st difference	-4.311216	-3.6289	-2.9472	-2.6118	Stationary
$\upsilon^{\log VAT}$	Lag difference 1, none, and 1st difference	-5.531915	-2.6300	-1.9507	-1.6208	Stationary

From the results above, it was seen that the ADF absolute values exhibited excess negativity compared to the absolute values of the conventional critical bands. This implied that the regression residuals were stationary of order one, hence the variables were found to be cointegrated. As such the error correction equations were estimated for each of the above equations. It is these equations that were subjected to diagnostic checks as shown as follows

Table 4.3: Error correction equation for log tr (differenced)

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.092839	0.133138	0.697312	0.4905
D(LOGGDP)	1.568192	0.469094	3.343021	0.0021
LOGGDP(-1)	-0.018480	0.014578	-1.267681	0.2138
ECM(-1)	-0.393593	0.143629	-2.740351	0.0098
R-squared	0.314654	F-statistic		5.050292
Durbin-Watson stat	2.072103	Prob(F-statistic)		0.005460

The results showed that in the short-run, (adjusted for long-run variation by the error correction term), about 31% of the variation was explained by the model. The F-statistic showed that the variables in the error correction term were jointly significant.

Table 4.4: Diagnostic test results of above equation

Test Name	Test Statistic	Probability
Serial Correlation LM test	Observed R-Squared 2.684671	0.261235
Histogram Normality test	Jarque Bera statistic 26.67471	0.000002
White Heteroskedasticity	Observed R-squared 11.81269	0.066280
Chow break-point test	F-statistic 0.984913	0.431202
Ramsey RESET	F-statistic 7.621533	0.022131

The obs*R-squared probability was 0.26. This was greater than 0.01, 0.05, and 0.1 critical values. This implied that the equation was insignificant at the 1%, 5%, and 10% confidence levels. Thus the null hypothesis of no autocorrelation of order 2 could not be rejected. The alternative hypothesis of autocorrelation was rejected and the null hypothesis of no autocorrelation was accepted. In the histogram normality test the probability value of Jacque Bera statistic was assessed. The probability of the statistic was 0.000002. Comparing this with the critical values of 0.01, 0.05, and 0.1 it was found that it was less than the critical values implying that it was significant at the 1%, 5% and

10% conventional levels. The study thus rejected the null hypothesis of normal distribution of residuals and accepted the alternative hypothesis that the residuals were not normally distributed.

In the White Heteroskedasticity test. the probability was 0.066. This was greater than 0.01 and 0.05 critical values but less than 0.1 critical value. This implied that the equation is insignificant at the 1% and 5% conventional levels but significant at the 10% conventional level. The null hypothesis of homoskedasticity or constant variance was thus not rejected at 1% and 5% confidence levels implying the alternative hypothesis of heteroskedasticity or dynamic variance was rejected.

Assessing the probability value of the F-statistic in the Chow break-point test, it was found that to be 0.4312. This was well above 0.01, 0.05 and 0.1 critical values. This implied that the coefficients were insignificant at the 1%, 5%, and 10% conventional levels. The study thus could not reject the null hypothesis of stability of coefficients between the periods. The alternative hypothesis was thus rejected and the null hypothesis adopted. From the Ramsey RESET test, the probability value of the F-statistic was 0.04 at lag two. This was greater than 0.01, but less than 0.05 and 0.1 critical values. This was interpreted to imply that the probability was insignificant at the 1% conventional level. but was significant at the 5% and the 10% conventional levels. The study concluded by taking the 1% conventional level, implying that F-statistic was insignificant hence could not reject the null hypothesis of well specified. The alternative hypothesis of not well specified was consequently rejected and the null hypothesis was accepted of a well specified model.

Table 4.5: Error correction equation for log imd (differenced)

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.027839	0.186695	0 149114	0.8824
D(LOGGDP)	1.604316	0.614982	2.608720	0.0136
LOGGDP(-1)	-0.015211	0.021051	-0 722581	0.4750
ECM(-1)	-0 447696	0.164949	-2.714144	0.0105
R-squared	0 316255	F-statistic		5 087871
Durbin-Watson stat	1.798419	Prob(F-statistic)		0.005265

The probability of the F-statistic implied that the variables in the model tended to be significant at 1% and 5% confidence levels. Durbin-Watson statistic was also found to be greater than the R-squared statistic implying that the result was not spurious hence could be used for analysis. 31% of the variation was explained by the model.

Table 4.6: Diagnostic test results of above equation

Test Name	Test Statistic	Probability
Serial Correlation LM test	Observed R-Squared 0.647313	0.723499
Histogram Normality test	Jarque Bera statistic 1.758145	0.415168
White Heteroskedasticity	Observed R-squared 11.73372	0.068180
Chow break-point test	F-statistic 20.73329	0.110128
Ramsey RESET	F-statistic 3.590480	0.039580

Looking at the table above, in the Serial Correlation LM test the probability of the observed r-squared was 0.723499. This was greater than 1%, 5% and 10% critical values implying that it was insignificant at those confidence levels. As such the study could not reject the null hypothesis of no autocorrelation. The Histogram normality test was also insignificant at all confidence levels thus the null hypothesis of normality of the residuals could not be rejected implying the alternative hypothesis on non-normality of residuals was rejected.

In the White Heteroskedasticity test the probability value was 0.068 which was found to be greater than 0.05 critical value. It was thus concluded that it was insignificant at the 5% confidence level implying that the null hypothesis of homoskedasticity was not rejected. The probability value of the Chow break-point test was found to be insignificant at all confidence levels. The null hypothesis of stability of coefficients between periods was not rejected. Consequently, the null hypothesis of instability of coefficients between periods was rejected and the null hypothesis was adopted by the study. Lastly, the F-statistic in the Ramsey RESET test showed a probability of 0.039. This was found to be insignificant at the 1% confidence level but significant at the other levels. The study could not reject the null hypothesis of well specification at the 1% confidence level implying that the alternative hypothesis of not well specified was consequently rejected.

Table 4.7: Error correction equation for log oit (differenced)

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	0.243165	0.310186	0.783932	0.4387
D(LOGGDP)	1.050373	1.030900	1.018889	0.3157
LOGGDP(-1)	-0.031834	0.034658	-0.918538	0.3650
ECM(-1)	-0.386491	0.142383	-2.714446	0.0105
R-squared	0.214042	F-statistic		2.995664
Durbin-Watson stat	2.072183	Prob(F-statistic)		0.044695

The probability value of the F-statistic showed that the variables in the model were significant at the 1% and 5% confidence levels. The Durbin-Watson statistic was found to be greater than the observed R-squared implying that the model is not spurious and thus could be used for analysis. 21% of the variation was explained by the model.

Table 4.8: Diagnostic test results of above equation

Test Name	Test Statistic	Probability
Serial Correlation LM test	Observed R-Squared 1.590138	0.451550
Histogram Normality test	Jarque Bera statistic 0.222789	3.003056
White Heteroskedasticity	Observed R-squared 2.731290	0.841738
Chow break-point test	F-statistic 1.242321	0.315018
Ramsey RESET	F-statistic 0.107911	0.898043

An analysis of the above model presented the following results. The observed R-squared in the Serial correlation LM test was found to be insignificant at all confidence levels. The null hypothesis of no autocorrelation was thus not rejected. In the histogram normality test, the probability value of the Jarque-Bera statistic was found to be insignificant at all confidence levels. This implied that the null hypothesis of normality of residuals was not rejected. The probability of the Observed R-squared in the White test was greater than 0.01, 0.05 and 0.1 critical values hence it was concluded that the null hypothesis of homoskedasticity could not be rejected by the study.

Looking at the probability of the F-statistic in the Chow break point test, the test result was found to be insignificant at all confidence levels implying the null hypothesis of stability between two periods was not rejected by the study. Lastly, evaluating the probability value of the F-statistic in the Ramsey RESET test, it was found to be insignificant at all confidence levels implying that the null hypothesis of well specified was not rejected by the study. Consequently the alternative hypothesis of not well specified was rejected by the study.

Table 4.9: Error correction equation for log it (differenced)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047056	0.141808	0.331826	0.7421
D(LOGGDP)	1 866924	0 494832	3.772842	0.0006
LOGGDP(-1)	-0.017895	0 015670	-1 141975	0.2617
ECM(-1)	-0 454844	0 141311	-3 218733	0.0029
R-squared	0.369839	F-statistic		6 455844
Durbin-Watson stat	2.133182	Prob(F-statistic)		0.001464

The result showed that about 36% of the variation was explained by the model. The probability of the F-statistic was found to be significant at all confidence levels implying that the variables in the model were significant.

Table 4.10: Diagnostic test results of above equation

Test Name	Test Statistic	Probability
Serial Correlation LM test	Observed R-Squared 0.463767	0.793039
Histogram Normality test	Jarque Bera statistic 145.8006	0.000000
White Heteroskedasticity	Observed R-squared 3.308131	0.769279
Chow break-point test	F-statistic 0.331759	0.854313
Ramsey RESET	F-statistic 1.718637	0.105957

In this test result, the observed R-squared in the serial correlation LM test was found to be insignificant at all confidence levels. The null hypothesis of no autocorrelation was thus not rejected implying that the alternative hypothesis of autocorrelation was rejected. In the Histogram normality test, the Jarque-Bera statistic showed significance at all confidence levels. The null hypothesis of normality of the residuals was thus rejected and the alternative hypothesis of non-normality was accepted.

The White test had a probability result that tended to be insignificant at all confidence levels. The null hypothesis of homoskedasticity was thus not rejected. The probability of the F-statistic in the Chow break-point test tended to be insignificant at all confidence levels implying that the null hypothesis of stability of coefficients between periods was not rejected. Lastly, the probability of the F-statistic in the Ramsey RESET test was found to be insignificant at the 10% confidence level hence the null hypothesis of well specified was not rejected.

Table 4.11: Error correction equation for log ed (differenced)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.035051	0.162309	0.215951	0.8304
D(LOGGDP)	1.011852	0.538565	1.878792	0.0691
LOGGDP(-1)	-0.001865	0.018225	-0.102310	0.9191
ECM(-1)	-0.170496	0.096716	-1.762858	0.0872
R-squared	0.173926	F-statistic		2.315994
Durbin-Watson stat	1.694331	Prob(F-statistic)		0.093767

In the result above the variables in the model were found to be significant at the 10% confidence level. Only 17% of variation was explained by the model.

Table 4.12: Diagnostic test results of above equation

Test Name	Test Statistic	Probability
Serial Correlation LM test	Observed R-Squared 1.158030	0.560450
Histogram Normality test	Jarque Bera statistic 6.576242	0.037324
White Heteroskedasticity	Observed R-squared 5.822757	0.443335
Chow break-point test	F-statistic 0.197285	0.937785
Ramsey RESET	F-statistic 1.324512	0.280562

In the serial correlation LM test reported above, the probability value of the observed R-squared was found to be insignificant at the 1%, 5% and 10% critical levels. This implied that the null hypothesis of no autocorrelation could not be rejected and the alternative hypothesis of autocorrelation was rejected. The Histogram normality test had a probability result that tended to be insignificant at the 1% confidence level. As such, the null hypothesis that the residuals had normal distribution was not rejected implying that the alternative hypothesis of non-normality of the residuals was rejected.

The white test had a probability result that was insignificant at 1%, 5%, and 10% confidence levels. The study could not reject the null hypothesis of homoskedasticity implying that the alternative hypothesis of heteroskedasticity was rejected. The Chow break-point test had insignificant probability at all critical levels. The study therefore concluded that the null hypothesis of stability of coefficients between periods could not be rejected implying that the alternative hypothesis of instability was rejected. Lastly the probability in the Ramsey RESET test was found to be insignificant at all critical levels, hence the null hypothesis of well specified was not rejected by the study.

Table 4.13: Error correction equation for log VAT (differenced)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.265295	0.339979	3.721686	0.0009
D(LOGGDP)	0.408420	0.874644	0.466956	0.6443
LOGGDP(-1)	-0.126298	0.032955	-3.832464	0.0007
ECM(-1)	-0.735099	0.067258	-10.92955	0.0000
R-squared	0.864745	F-statistic		57.54116
Durbin-Watson stat	1.606063	Prob(F-statistic)		0.000000

From the results above the probalility value of the F-statistic was found to be significant at all the conventional levels. This implied that the variables in the model were found to be significant. Looking at the R-squared, it was found that 86% of the variation in the model was explained by the variables. The Durbin-Watson statistic was also found to be greater than the R-squared implying that the model results are not spurious suggesting that the model could be used for forecasting.

Table 4.14: Diagnostic test results of above equation

Test Name	Test Statistic	Probability
Serial Correlation LM test	Observed R-Squared 1.361468	0.506245
Histogram Normality test	Jarque Bera statistic 0.595272	0.742571
White Heteroskedasticity	Observed R-squared 8.060465	0.197063
Chow break-point test	F-statistic 2.036416	0.122803
Ramsey RESET test	F-statistic 3.429394	0.023335

Observing the reported results above. the probability of the Observed R-squared in the Serial Correlation LM test was found to be 0.506. This is greater than all the critical values of 0.01, 0.05 and 0.1 implying that the model is insignificant at all confidence levels. As such the null hypothesis of no autocorrelation was not rejected. Consequently, the alternative hypothesis of autocorrelation was rejected. The Histogram Normality test reported an insignificant probability at all confidence levels. The null hypothesis of normality of the residuals could thus not be rejected by the study resulting in the rejection of the alternative hypothesis of non-normality of the residuals.

In the White test, the probability value of the Observed R-squared was found to be insignificant at all confidence levels. The null hypothesis of homoskedasticity was not rejected leading to rejection of the alternative hypothesis of heteroskedasticity. The Chow break-point test was found to have a probability that was insignificant at all conventional levels. This led not rejecting the null hypothesis of stability of coefficients between periods and the rejection of the alternative hypothesis of instability between periods. Lastly the probability value of the F-statistic in the Ramsey RESET test was reported as 0.0233. This is greater than 0.01 critical value but lower than 0.05 and 0.1 critical values, implying that the statistic was found to be insignificant at the 1% confidence level but significant at the other confidence levels. The study therefore could not reject the null hypothesis of well specified at the 1% confidence level consequently rejecting the alternative hypothesis of not well specified.

4.4. Regression results

Table 4.13 shows the derived buoyancy coefficients for the overall tax system and the various major taxes over the period1964-2002. They were obtained from regression results 4 to 9 adjusted to fit the regression equation result 12 presented in chapter three section 3.6. The F values are significant at 1% confidence level across the board. The adjusted coefficient of determination (R^2) shows the Regressions in this table are good fits of the data, where the explanatory variables adequately explain the pattern of behavior of each dependent variable for all the equations. From the results, only Excise Duty exhibits a low buoyancy index of 0.926. The rest of the taxes exhibit high indexes that are greater than unity relative to their respective proxy tax bases suggesting that as national GDP changes, tax revenue changes by a larger proportion as a result of both built-in elasticity and discretionary changes.

TABLE 4.15: Estimates of Tax buoyancies in Kenya

Dependent Variable	Constant	Log GDP (Buoyancy coefficient)	Log GDP (1 lag)	F-statistics	Adjusted R^2	DW
Total Tax Revenue (log TR)	-2.62191 (0.16151)	2.665620 (0.54057)	- 1.554146 (0.54366)	1794**	0.98979	1.09
Import Duties (log IMD)	-2.57217 (0.20142)	1.636098 (0.67423)	-0.705786 (0.67808)	800**	0.97738	0.96
Other Indirect Taxes (log OIT)	-4.37049 (0.36250)	2.284362 (1.21328)	-1.362825 (1.22022)	245**	0.92957	0.85
Income Tax (log IT)	-3.39344 (0.16846)	2.862169 (0.56383)	-1.783578 (0.56705)	1560**	0.98827	1.13
Excise Duties (log ED)	-4.69142 (0.26430)	0.926309 (0.88461)	0.218744 (0.88966)	696**	0.97406	0.34
Value Added Tax/Sales Tax (log VAT)	-4.64617 (0.76081)	2.457984 (2.00155)	-1.258563 (1.98660)	129**	0.89545	0.94

** Significant at 1%
No in parenthesis are Standard Errors

The tax system as a whole exhibits a buoyancy of 2.66, implying that for every 10% increase in national income, total tax revenue rose by 26.67%. Income tax had an elasticity index of 2.86 which is greater than that exhibited by the Total Tax Revenue at 2.667, implying that it tends to increase its relative contribution more over the study period. The lagged values of the explanatory variable showed diminished results with elasticity coefficients uniformly lower than those of their current values. This implies that there is little effect of policy lags on tax yield in Kenya.

Elasticities of the major taxes and of the whole tax system for the period 1964-2002 are shown in Table 4.14 below. They were obtained from regression result 4 to 9 adjusted to fit the regression equation result 13 presented in section 3.6 in chapter three.

The table adjusts for the effect of implementation of the Tax Modernization Programme (TMP) on the productivity of these revenue sources, using a dummy variable function.

Table 4.16: Elasticities of Major Taxes and of the Total Tax System

x	Intercept	Elasticity Coeff.	Elasticity Coeff. lagged variable	Shift of Intercept (Intercept D_1)	Shift of Elasticity Coeff. (slope D_2)	F-statistic	R^2	DW	SER
g TR)	-3.707** (0.32802)	2.30228** (0.48423)	-1.01967* (0.49834)	1.42621* (0.56421)	-0.202** (0.06851)	1192.5	0.993	1.13	0.152
g D)	-3.363** (0.45692)	1.43947* (0.67451)	0.38386^{ns} (0.69417)	0.61068^{ns} (0.78592)	-0.1047^{ns} (0.09544)	426.31	0.981	0.99	0.212
g OIT)	-6.102** (0.68840)	1.22395^{ns} (1.01620)	-0.03118^{ns} (1.04582)	5.2885** (1.18405)	-0.624** (0.14378)	190.87	0.959	1.18	0.319
g IT)	-3.725** (0.39341)	2.840** (0.58075)	-1.708** (0.59767)	-0.1195^{ns} (0.67667)	-0.0064^{ns} (0.08217)	782.25	0.990	1.18	0.182
g ED)	-3.651** (0.43750)	1.7532* (0.64583)	-0.77046^{ns} (0.66465)	-4.367** (0.75250)	.0.494** (0.09138)	703.21	0.988	0.79	0.203
g T)	-10.72** (1.77458)	3.49961* (1.68114)	-1.47541^{ns} (1.64021)	8.0982** (2.10657)	-1.041** (0.26659)	99.287	0.939	1.39	0.427

** Significant at 1%
* Significant at 5%
ns - Not significant at all confidence levels
No in parenthesis are standard errors

The results showed that there was a significant positive upward shift at 95% and 99% confidence levels in the intercept of Total Revenue (log TR), Other Indirect Taxes (log OIT), Excise Duty(log ED), and Sales tax/Value Added Tax (log VAT). This showed that there was a positive interactive effect of Tax modernization programme on these revenues. Import Duty (log IMD) and Income Tax (log IT) exhibited no significant shift in their intercept. In regards to the slope, log TR, log ED and log VAT exhibited a change in their coefficients that was significant at 95% and 99% confidence levels. Of these. log ED was the only variable that exhibited a positive but lower change in its slope coefficient. The rest exhibited a negative change in coefficients.

The Total Tax Revenue and all individual taxes were found to be income elastic but with a positive change in the intercepts. An overall elasticity of 2.30 implied that the government received an increasing share of raising GDP in tax revenues. Specifically, this meant that the tax system yielded a 2.30% change in tax revenue resulting from economic activity alone, for every 1% change in GDP. Growth in GDP thus spurred a more than proportionate automatic increase in tax revenue. This elasticity of the tax system can be attributed to the elastic individual taxes as exhibited in the table.

The difference of coefficients between slope D_2 and elasticity shows that total revenue (log TR) recorded a decrease in slope (elasticity) of -2.504 to GDP, while the intercept shifted or increased by 5.133 to GDP. The positive increase of the intercept suggests that there was more autonomous revenue benefit on the tax system. The decrease in the slope of 2.5% relative to GDP meant that a 1% change in GDP caused Total Revenue to respond by a 2.5% decrease in revenue from income. This implies the slope of Total Revenue become less elastic, consequently, indicating that the increase in revenue raising in Kenya was due more to expansion in the base (GDP) than increase in rates of the tax in question.

This behavior is replicated by the rest of the variables (except Excise Duty) where Import Duty, Other Indirect Taxes, Income Tax, and Sales Tax/VAT recorded a decrease in the slope of -1.544, -1.847, -2.896, and -4.541 respectively, while their intercept increased by 3.974, 11.390, 3.605, and 18.82 respectively. Excise duty exhibited both a decrease in intercept and slope.

Other indirect taxes exhibited the lowest elasticity of 1.22 that was found to be insignificant at all the conventional levels. This may be as a result of inefficiency in tax administration or the presence of an underground economy implying a high incidence of counterfeit goods in the local market. For all the major taxes, changes in tax revenue were systematically correlated with changes in GDP and in discretionary tax changes as indicated by high values of adjusted (R^2) of over 0.900

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND POLICY IMPLICATIONS

5.1. Summary and conclusions

This study has analyzed the productivity of the Kenyan tax system over the period 1964-2002. Chapter one gave an introduction and the problem that this study focused on. Chapter two gave the literature review underpinning this study. This section also gave various empirical studies carried out by various scholars that were relevant to this analysis. Chapter three exhibited the methodology used in carrying out the study and gave the model specifications that were analyzed. Chapter four gave the empirical findings while chapter five is the conclusions of this study and recommended policy actions.

In the context of this study's objectives, on objective one the data property of the study showed that the data were stationary of order one and exhibited long-run relationships, thus the error correction models were reported implying that the results reported were found not to be spurious and thus can be used for forecasting. On objective two, the Kenyan tax system was found to be productive with Total Revenue and most of the other tax sources having a buoyancy that was greater than unity. However, in assessing the elasticities of the Total Tax system and the various tax sources, it was found that a higher proportion of the taxes are as a result of an expansion in GDP base due to economic growth rather than increases in tax rates. This implies that the growth in GDP caused a more than proportionate automatic increase in revenue. This suggests that the growth in tax revenue was accounted for automatic changes rather than discretionary policy. Intuitively, this finding is expected in the sense that the central objective of a tax modernization is to raise the automatic response of the tax system to changes in GDP.

On objective three, comparing the tax buoyancies of the various taxes it was found that income tax was most productive component of the tax structure followed by Sales tax/ Value Added Tax. This can be attributed to the fact that it is difficult to evade and avoid paying these taxes since they are remitted at source. The current revenue profile of the nation was found to be sustainable to ensure optimal level of expenditure that facilitates formulation of fiscal policies that overcome the deficit. The buoyancy of the overall tax system for the same period was greater than unity, suggesting that as GDP changes, tax revenue changes by a larger proportion. This suggests that ineffective use rather than raising of revenue is the major bane of fiscal policy management in Kenya.

5.2. Policy implications

On the last objective. this study makes the following policy recommendations. The government should ensure implementation of better monitoring and transparency of operations in tax administration that include abolishing activities such as granting of duty waivers for public sector projects and few privileged individuals in the society. This will result in significant increase in total government revenue. Regular tax audit by qualified personnel should be enhanced to ensure compliance and proper record keeping for tax purposes.

To stem out corruption and collusion and to increase efficiency in tax collection, tax administrators salaries and terms of service should be adequately increased to boost morale, better training and development of skills should be offered while penalties for the vices should be greatly enhance to act as a deterrence measure. Taxpayers should also be educated in tax compliance matters so as to lower their cost of interpreting tax laws thus discouraging tax evasion.

There is also need to streamline and improve the quality of tax information system that hinders a comprehensive appraisal of the performance of the tax system in Kenya. Absence of reliable and adequate tax related information negatively affects the accuracy of fiscal reforms resulting in counterproductive policies being adopted. So as to address the fiscal deficit issue, the government should also privatize those economic activities that can be carried out more efficiently by the private sector thus reducing leakages in revenue collection. This will ensure prudent management of resources and lowering of expenditures by government.

Given the present state of the economy, a meaningful solution to the chronic problem of fiscal deficit requires a combination of more efficient tax administration and significant reduction in government expenditure. This study recommends a reduction in public waste expenditure evidenced by the large number of abandoned projects all over the country via streamlining and prioritizing implementation of public sector projects. This will require due cost analysis to be undertaken before any project is implemented.

5.3. Limitations and Areas for further Research

The study did not consider other important determinants of tax revenue of tax revenue that could have affected tax revenue productivity due to non availability of data, for example company income tax requires accurate data on company profits and significant reduction in tax evasion, hence further research is required to update this information.

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Appendix 1: Raw Data

YEAR	DIRECT TAX	INDIRECT TAXES		
	Income Tax	Import Duty	Excise Duty	Sales Tax/VAT
1964/65	13.461	15.892	6.243	0
1965/66	15.887	17.196	6.299	0
1966/67	18.786	20.077	8.474	0
1967/68	22.968	19.952	10.498	0
1968/69	23.611	21.83	11.793	0
1969/70	29.204	24.35	13.152	0
1970/71	37.783	28.721	15.268	0
1971/72	45.038	31.504	16.205	0
1972/73	50.202	26.993	16.838	2.703
1973/74	56.239	39.772	20.847	31.99
1974/75	76.567	42.112	22.673	46.863
1975/76	89.836	49.181	20.63	59.274
1976/77	107.465	52.859	28.22	65.422
1977/78	142.335	104.197	38.472	92.763
1978/79	151.072	101.274	49.023	99.769
1979/80	171.85	102.482	59.453	154.907
1980/81	197.584	145.97	60.24	179.388
1981/82	199.674	183.712	63.964	194.795
1982/83	231.225	165.292	73.953	195.875
1983/84	251.147	171.219	79.219	304.5
1984/85	300.968	152.179	78.78	222.77
1985/86	197.584	145.97	60.24	179.388
1986/87	385.736	246.71	106.27	397.52
1987/88	454.479	273.686	123.056	519.957
1988/89	512.025	300.278	137.446	588.287
1989/90	599.153	347.968	149.358	640.345
1990/91	731.084	334.68	185.164	757.071
1991/92	851.393	255.939	340.46	927.77
1992/93	998.525	459.15	418.355	1107.136
1993/94	1838.365	739.639	556.267	1449.717
1994/95	2175.292	929.914	966.613	1226.693
1995/96	2404.116	1058.784	1130.592	1420.186

OTHER INDIRECT TAXES

Business & Trading Licences	Licences & Fees Under Traffic Act	Other Taxes, Licences & Duties	Total Taxes	GDP at facor cost in current prices
0.011	0.84	0.73	37.177	328.60
0 008	0 977	0 852	41.219	332 06
0.008	1.313	0.706	49.364	381.11
0.198	1.399	0.834	55.849	405.81
0.269	1.526	0.86	59.889	412.90
0.26	1.096	1.276	69.338	476.33
0.345	1 697	1.249	85 063	518 94
0.329	2 643	4.966	100 685	575 04
0.356	2.936	8.266	108 294	648.52
0.683	2.973	2 863	155 367	724 85
0.819	2.766	4.667	196.467	895 30
0 909	2 861	5.452	228 143	1028 02
1.032	3.323	7.005	265.326	1262.85
1.047	3 636	8.377	390.827	1620.21
1.261	3 803	10 05	416 252	1788 41
2.016	5.743	9 862	506 313	1979 62
1.799	6.504	13.304	604.789	2235.37
2.255	5.917	19.096	669 413	2597 23
2 219	7.797	21 947	698.308	2944.62
3 697	7.613	19.359	836 754	3316.63
2.693	8.12	28.732	794 242	3851 78
1 799	6 504	13 304	604 789	4374.62
6 309	12 336	51.964	1206 845	5083 98
5 488	13 19	46 997	1436 853	5612.51
8 689	16 615	54 58	1617 92	6480 62
9 046	16.615	67.423	1829 908	7387 81
10.245	16 093	77 483	2111 82	8377 78
13 568	16 313	70 283	2475 726	9540 33
11 281	16.256	59.788	3070 491	10986 00
11 007	19.534	88.907	4703 436	13509 10
18 829	21 299	66 896	5405 536	16303 99
17 474	22 971	83 15	6137 273	19455 51

1996/97	2418.751	1129.703	1184.361	1492.504	10.608
1997/98	2778.895	1228.353	1419.081	1723.406	7.017
1998/99	2761.745	1422.196	1436.658	1960.238	5.984
1999/00	2665.85	1430.258	1424.653	2047.21	4.532
2000/01	2671.446	1440.187	1415.899	2511.045	4.315
2001/02	2793.097	1079.183	1603.846	2543.584	5.007
2002/03	3337.214	921.811	1784.206	2806.762	5.582

35.934	79.615	6351.476	20703.80
41.64	82.219	7280.611	26813.21
41.728	147.66	7776.209	29826.96
78.128	197.656	7848.287	31952.81
52.499	110.194	8205.585	34271.81
44.27	54.76	8123.747	38501.38
57.25	69.238	8982.063	42545.50

Appendix 2: Aggregated data

YEAR	DIRECT TAX	INDIRECT TAXES					
	Income Tax	Import Duty	Excise Duty	Sales Tax/VAT	Other Taxes, Licences & Duties	Total Taxes	GDP at facor cost in current prices
1964/65	13 461	15 892	6 243	0	1.581	37.177	328.60
1965/66	15.887	17.196	6.299	0	1.873	41.255	332.06
1966/67	18.786	20.077	8.474	0	2.027	49.364	381 11
1967/68	22 968	19.952	10.498	0	2.431	55.849	405 81
1968/69	23 611	21.83	11.793	0	2.655	59.889	412 90
1969/70	29 204	24 35	13.152	0	2 632	69 338	476 33
1970/71	37.783	28.721	15 268	0	3.291	85.063	518 94
1971/72	45 038	31.504	16 205	0	7.938	100.685	575 04
1972/73	50.202	26.993	16.838	2.703	11.558	108 294	648 52
1973/74	56 239	39.772	20 847	31 99	6.519	155 367	724 85
1974/75	76 567	42.112	22.673	46 863	8.252	196.467	895.30
1975/76	89 836	49.181	20.63	59 274	9.222	228.143	1028 02
1976/77	107 465	52.859	28 22	65.422	11.36	265.326	1262 85
1977/78	142 335	104.197	38 472	92.763	13 06	390.827	1620.21
1978/79	151 072	101.274	49.023	99.769	15.144	416.282	1788 41
1979/80	171.85	102.482	59.453	154.907	17.621	506.313	1979 62
1980/81	197 584	145.97	60.24	179.388	21.607	604.789	2235 37
1981/82	199 674	183.712	63.964	194.795	27.268	669.413	2597.23
1982/83	231 225	165.292	73 953	195.875	31 963	698.308	2944 62
1983/84	251.147	171.219	79.219	304.5	30.669	836.754	3316 63
1984/85	300 968	152.179	78.78	222.77	39.545	794.242	3851.78
1985/86	197 584	145.97	60.24	179.388	21.607	604.789	4374 62
1986/87	385 736	246.71	106.27	397.52	70.609	1206.845	5083 98
1987/88	454 479	273 686	123 056	519.957	65.675	1436.853	5612.51
1988/89	512.025	300.278	137 446	588.287	79.884	1617.92	6480 62
1989/90	599.153	347.968	149.358	640 345	93.084	1829.908	7387 81
1990/91	731.084	334.68	185.164	757.071	103 821	2111.82	8377.78
1991/92	851.393	255.939	340.46	927.77	100.164	2475.726	9540.33
1992/93	998 525	459.15	418.355	1107.136	87.325	3070.491	10986 00
1993/94	1838.365	739.639	556.267	1449.717	119.448	4703.436	13509 10
1994/95	2175 292	929 914	966 613	1226 693	107 024	5405.536	16303 99
1995/96	2404.116	1058.784	1130.592	1420.186	123.595	6137.273	19455 51
1996/97	2418.751	1129.703	1184.361	1492.504	126.157	6351.476	20703.80
1997/98	2778 895	1228 353	1419.081	1723.406	130.876	7280.611	26813.21
1998/99	2761.745	1422.196	1436.658	1960.238	195 372	7776.209	29826 96
1999/00	2665.85	1430 258	1424.653	2047.21	280.316	7848.287	31952.81
2000/01	2671 446	1440.187	1415.899	2511.045	167.008	8205 585	34271.81
2001/02	2793.097	1079.183	1603.846	2543.584	104.037	8123.747	38501.38
2002/03	3337.214	921.811	1784.206	2806.762	132.07	8982.063	42545.50

OTHER INDIRECT TAXES HAVE BEEN AGGREGATED I.E THE 3 COLUMS FROM BUSS TRADING