THE EFFECTS OF TAX REFORMS ON CUSTOMS TAX PRODUCTIVITY IN KENYA

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Declaration

This research project is my original work and has never been presented for award of any degree in any university.

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This research project has been submitted with my approval as the university supervisor.

Signature……. Date…….

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Dedication

To my wife, Jane and my children Dan, Daisy and Emmanuel for their love, support and words of encouragement throughout my study period.

Acknowledgement

I thank the Almighty God for enabling to successfully complete this research paper. I am sincerely grateful to my supervisor, Dr. B.O. Ongeri for his valuable professional advice, and support that has enabled me to reach this far. I also appreciate the entire staff of School of Economics for their support in one way or the other. Lastly, I thank my colleagues for their comments that were helpful.

List of Acronyms

ADF:	Augmented Dickey Fuller
CIF	Cost Insurance and Freight
COMESA	Common Market for Eastern and Southern Africa
CSD	Customs Services Department
GDP	Gross Domestic Product
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KRA	Kenya Revenue Authority
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
PAM	Proportionate Adjustment Method
RADDeX	Revenue Authorities Digital Data Exchange
RARMP	Revenue Administration Reform and Modernization Program
TMP	Tax Modernization Program
VAT	Value Added Tax
WCO	World Customs Organization
WTO	World Trade Organization

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Abstract

This study was based on customs taxation in Kenya and its response to customs tax reforms. Also, the response of customs tax revenue to economic growth was assessed. The study empirical analysis in order to assess the effects of tax reforms and effects of economic growth on customs tax productivity in Kenya. The first objective was to examine the effect of tax reforms on customs tax revenue in Kenya. The second objective was to evaluate the response of customs tax revenue to economic growth in Kenya. Time series data ranging from 1991 to 2015 was be used in the study. A double log linear model, with customs tax revenue as the dependent variable and GDP, one-year lag in GDP and dummy variable for RARMP tax reforms as independent variables, were used in the analysis. Before estimation of the model, unit root testing and consequently, tests for cointegration were carried out. An error correction model was thereafter adopted in estimation because the variables were found to be cointegrated. The analysis results indicated that the RARMP was insignificant in influencing the custom tax revenues in the country. In addition, logarithm of GDP and its one-year lag were insignificant in influencing the custom tax revenues.

The study results reveal that GDP was significant in influencing the total tax revenue but the RARMP was insignificant in influencing the total tax revenue. The policies recommended were; the improvement in custom tax administration in the country, review of RARMP reforms and review of custom tax base.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

A civilized country requires its national government to collect taxes for reasons such as; financing of development activities, to cater for expenses that aim to maintain free and fair society, to monitor the economy by operationalizing fiscal measures, and to change positively the economic behavior of its citizens by checking on their consumption behaviors. The power by the national government to collect revenue from citizens should always be in line with how other countries exercise their powers in tax collection from taxpayers and respect the taxpayer's rights. This poses a challenge in ensuring there is a balance in treating foreign and local taxpayers with justice fairness and equity while asserting jurisdiction as the taxing authority.

A comprehensive tax administration should identify situations when the country is in surplus and should aim at ensuring that there is minimal or no loss of its own productivity. Collection of tax should be such that it facilitates the growth of the economy as a whole. The tax system should be neutral in regard to its effect on the behavior of economic agents, although in reality it's hard to achieve a neutral aspect. Tax policy implementation is always constrained by practicability and feasibility of administrative aspects. The feasibility of a taxation policy is when its implementation does not incur a bigger cost than what it will earn in revenue. Further, a tax structure should ensure there is equity in treatment of individuals who are approximately in a similar situation. In addition, the tax system should ensure there is difference in treatment

of individuals who are in situations that are not similar. Finally, tax should be collected at the most convenient time and manner to the tax payer. In addition, every tax should have least burden to the taxpayers at the same time being optimal to the public treasury.

1.1.1 Customs Taxation Reforms in Kenya

A number of reforms have been done to the customs taxes in Kenya. These reforms can be divided into two categories. The first category are the reforms that fall under Tax Modernization program (TMP) while the second category fall under Revenue Administration Reform and Modernization Program (RARMP). TMP was mainly in the form of restrictions on duty exemptions, exports stimulation, restructuring of the structure of tariff, and reinforcement of customs duty administration. Largely, the main objective of these reforms was encouragement of a free market atmosphere in order to increase foreign direct investment level. According to KRA (2008), the top tariff rate during the period ranging from 1987 to 1998 was systematically lowered from 170% to 25%. Also, the rate bands were lowered from 24 percent to 5 percent (inclusive of duty free). The simple average rate declined by 24 percent due to the aforementioned changes (from 40 percent to 16 percent).

Prior to 1991, there was wide scope in exemption system. As a result of this, a number of measures were instituted under TMP between 1991 and 1995 so as to narrow the scope of exemption of goods. This included reducing the range of exempt goods, abolishment of discretionary exemptions, taxing parastatal imports, and removing agricultural commodity aid exemptions (with exception of goods for supporting refugees or in national disaster cases. The NGOs were also targeted by the reforms in 1994 to 1998

period. For instance, there was imposition of restrictions on exemptions to the NGOs, especially the introduction of bonding of imports of projects funded majorly by donors as well as initiation of reconciliation on completion of projects. Also, there was requirement that NGOs should register for income tax purposes in order to be considered for exemption.

The reforms during this period were undertaken so as to increase exports from the country. For instance, there was introduction of exemption from VAT and duty on raw materials imports (both direct and indirect) to be used for production of exports and duty-free commodities for local market. In addition, the imports for projects funded by donors were also exempted from VAT and import duty. There was also exemption of exports from bonded manufacturing. However, if there was sale of the commodities in the local market, the prevailing rates and 2.5% surcharge would apply. Other notable programs for encouraging exports included; export compensation in 1974 to 1993 period, financial liberalization, and complete liberalization of imports. There was abolishment of export compensation in 1993 in order to save government revenue as well as reducing the misuse of this incentive by some manufacturers. In addition, there was abolishment of export duties in order to facilitate growth of exports. Export licensing was also removed in order to reduce inconveniences and delays that were associated with this system of taxation. These reforms meant that tax administration had to be reinforced. In this respect, selective examination, investigation and intelligence functions were re-introduced. Selective examination was meant to increase the speed at which the goods were released.

The main role of the Customs Service Department is import duty collection and accounting for VAT on imports. From the perspective of administration of revenue, most transactions involving customs and excise duty are based on entry. Taxpayers dealing with KRA for purposes of these taxes had to fill a number of paper documents that depended on the type of transaction. Specifically, 19 documents had to be filled for several transactions. As a consequence, there was a lot of duplication and time wastage due to document preparation. In order solve this problem, and achieve quality as required by international best practice, several recommendations were made. Some countries had solved the problem of much paperwork by introducing a single entry document, popularly known as C63. It was vital that KRA commenced implementing Customs Single Entry Document (SED) in 1999. The main objective in implementing SED was to ease international trade by reducing documentation. The SED put into account all the sections in entries for customs and enabled the capturing of all required information. Specifically, the declaration by the agent/exporter/importer was required. In addition, depending on the transaction, the exporter/importer/declaring agent had to make sure the details filled were correct. Therefore, cost and time was saved by adopting SED as the requirement for buying different documents for different transactions ceased.

The second category of reforms (RARMP) started in 2003. According to a report on tax administration by KRA (2008), customs relied heavily on a division that was known Customs Preventive Services (CPS) in the past. This division was central to its operations but due to various constraints, it did not receive the resources it required. The unit had a complex organization structure, which also comprised a specialized division known as

Mombasa Anti-Smuggling Team (MAST) that was responsible for the rummaging of ships. The reforms initiatives under RARMP were aimed at enhancing border checks and strengthening enforcement capacity at the airports, border crossing points and other international gateways. The initiatives entailed re-branding the border control functions from the current 'Customs Preventive Service' to 'Customs Border Control Services (CBCS), increasing its border control staff by recruiting university graduates and acquiring various modern tools for compliance and enforcement management. So far 360 Customs Boarder Control Officers have been recruited and trained (KRA 2010). The primary role of Customs Services Department is collection of taxes related to international trade, although enabling genuine trade, preventing entry of illegal goods and preventing export of restricted goods are its other responsibilities.

Specifically, the RARMP reforms included the introduction of the Simba system in 2005. This system replaced BOFFIN system that was manual and hence had a lot of paperwork. The Simba system is based on web and hence it facilitates online clearance of cargo thereby shortening the cargo clearance time. The other set of reforms under RARMP includes; Security Bond Management centralization in Nairobi and replacement of the long room (manual system that was semi-automated) with Document Processing Centre (DPC) which facilitated operations on 24-hour basis. This shortened the transaction processing time. In addition, there was introduction of the online pre-clearance of cargo under the Orbus system which was also web-based. Also, there was introduction of Cargo Management Information Systems (CAMIS) which accounts for un-declared cargo intended for Container Freight Stations (CFS) and Inland Container Depots for clearance.

In addition to CAMIS, an equivalent system of accounting for wet cargo (fuel and oil) was introduced.

The other important reforms falling under RARMP includes; non-intrusive methods of cargo verification by use of X-ray scanners and use of sniffer dogs (K9). There was also introduction of online monitoring of cargo by use of the Electronic Cargo Tracking System which tracks and monitors cargo from port and all the way to the destination neighboring countries. In addition, communication between the East Africa Region was improved by the introduction of Revenue through the Revenue Authorities' Digital Data Exchange (RADDEx).

1.1.2 Customs revenue performance and reforms

A central pillar of a reliable customs administration is a stable automated IT system that can facilitate rapid cargo clearance and electronic exchange of data within the trading community. Recommendations in various IMF consultancy reports by the fiscal advisory division had repeatedly cited the lack of a customs system as a major impediment to trade. According to a 2008 report by KRA, the Simba 2005 system has been at the center of customs modernization in Kenya and has facilitated the automation of about 90% of operations at customs, thereby doing away with the requirement for tax payers to physically visit KRA due to the web based characteristics of the system. As a result, over the recent years a lot of gains have been realized with customs revenue rising from KShs. 96 billion in financial year 2003/04 to KShs. 331 billion in 2013/2014 financial year (see appendix I for the customs service revenue performance from 2004 to 2014). From appendix I, the revenue performance of the CSD has continually grown since 2003.

1.2 Statement of the problem

According to KRA (2010), crucial tax reforms in Kenya commenced in 1986. The reforms were necessitated by low tax to GDP ratio in the country. Specifically, the tax to GDP ratio was relatively low especially in comparison with countries with the same tax and economic organizations. In addition, the actual revenue from taxes was lower than budgeted revenue thereby forcing the country to depend on donors.

The main objective of Customs Tax reforms is liberalization of the market thereby attracting foreign direct investment. As a result, there has been a reduction in the rates that customs authority charge on different types of transactions. Since the formation of KRA, the collection of tax revenue has grown continuously. In addition, administration of taxes has been strengthened. However, the tax revenue has continued to fall below target. This has resulted to an increase in government borrowing thereby impacting negatively on economic growth. The Kenyan budget has continued to increase and hence there is need to establish whether tax reforms have been important in increasing tax revenues. In addition, it is important to establish whether custom tax revenues have been increasing as the economy grows.

Some studies that have focused on response of tax revenues to GDP growth have established a positive and significant causal relationship between GDP and revenues from tax (Wawire, 2003, Muriithi and Moyi, 2003). However, these studies have not addressed the response of specific tax revenues (specifically customs taxes) to tax reforms and economic growth. There is need to disaggregate tax in order to identify the effectiveness of tax reforms on individual taxes. In addition, disaggregation can help in identifying the

taxes that are lagging in terms of responsiveness to economic growth. An efficient tax system is a viable solution for lowering the public debt in the country. Therefore, the main question in this study is whether customs tax revenue in Kenya has been significantly responding to customs tax reforms and economic growth.

1.3 Research Questions

This study tried to answer two research questions, mainly;

i) Have the custom tax reforms been significant in increasing customs tax productivity in Kenya?

ii) Has the customs tax revenue been responsive to GDP growth in Kenya?

1.4 Objectives of the Study

The general objective of this study was to evaluate effects of customs tax reforms on customs productivity in Kenya.

The specific objectives were:

i) Determine of the effect of Gross Domestic Product on customs tax productivity in Kenya.

ii) Determine the effect of reforms on customs tax productivity in Kenya.

iii) Analyze the effect of the Gross Domestic Product and tax reforms on customs tax productivity

iv) Draw policy recommendations based on the research findings.

1.5 Significance of the Study

The is important as it examines the customs tax revenues in terms of productivity response to tax reforms and Gross Domestic Product (GDP) over the time (1983 to 2015).

The study will therefore benefit policy makers and researchers as it will bring out critical aspects of customs tax revenues in relation to the overall tax reforms and changes in Gross Domestic product in Kenya. The study shall also add value to the existing literature.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter comprises the review of theoretical and empirical literature related to taxes and economic growth. In particular, section 2.2 will be a review of theories that focus on the taxes and national income. Alternatively, section 2.3 comprises the review of empirical literature related to taxes and economic growth. Finally, a summary of the literature review has been provided in section 2.4.

2.2 Theoretical Review

2.2.1Tax productivity

The determination of tax productivity is based on the concept of buoyancy of tax and elasticity. Basically, income elasticity measures the variation in tax revenue associated with income change, while tax revenue buoyancy measures the change in tax revenue due to combination of income change and discretionary tax policy changes (Muriithi and Moyi, 2003). Tax productivity assessment is vital because it enables the examination of the sensitivity of tax to various economic factors. In addition, tax productivity influences equity and efficiency within the tax system (Amin 2000). Income elasticity and tax revenue buoyancy are the main factors that are considered when assessing tax productivity in the economy (Asher, 1989; Osoro 1991). Therefore, tax revenue buoyancy assesses the impact of both the income changes and discretionary tax policy changes on tax revenue. Several ways for derivation of these measures as well as the

necessary adjustments have been provided by Prest (1962) and Singer (1968). In addition, some researchers have adopted these measures. For instance Osoro (1991) provides the following set up of equations for measuring buoyancy.

$$TR = aY^{b} e_r$$

Where;

TR is aggregate tax revenue, *a* is a constant, *Y* is GDP at current prices, and e_r is the stochastic disturbance term. By taking a double log in the above equation, a linear equation is generated as shown below.

$$\log TR = log\ a + b\ log\ Y + e_r$$

In the above linear equation, sign *b* represents tax buoyancy estimate. It measures the percentage change in aggregate tax revenue due to percentage change in GDP. In addition, the impact of discretionary tax policy changes on aggregate tax policy is captured by the coefficient *b*. So as to separate the effect of discretionary tax policy change from GDP impact, a number of methods have been proposed. These methods are discussed as follows:

2.2.2 Dummy variable technique

This technique was proposed by Singer (1968). Singer (1968) uses dummy variable to capture the effects of exogenous change in tax policy. The author uses dummy variable so as to capture the impacts of discretionary tax policy change on tax revenue. The dummy variable in this case takes the value of 1 for each year discretionary tax policy

change occurs and zero otherwise. Model 2.1 below shows the representation by Singer (1968):

$$\ln T_t = \ln \alpha + \beta_1 \ln Y_t + \sum \theta_1 D_i + \varepsilon_i \quad \text{.....2.1}$$

The summation ($\sum \theta_1 D_i$) takes into account the likelihood of several changes in tax policy over period of study. However, Ariyo (1997) modified the model by adding a lag of one year in GDP. According to Ariyo (1997), the budgetary guidelines on policy are in most cases not implemented in the current financial year but the subsequent year. The one-year lag in income (GDP) captures the probable impact of time lag in implementation on tax revenues. The coefficient of the lagged GDP is more significant if there are lags in administrative processes or delay in remittances.

The major drawback of this method is the probability of multicolinearity due to several dummy variables. In addition, it is impossible to use this method if there are frequent changes in tax policy.

2.2.3 Proportional adjustment method

This method was proposed by Sahota (1961) and Prest (1962) and a detailed description was later done by Mansfield (1972). In addition, the method was adopted by Ariyo (1997). In this method, the impact of the discretionary measures is removed from the tax revenue by using the data availed by the government. The data that remains after adjustment represents only what could have been collected if the rates and tax base remained the same throughout the period under review (Osoro, 1993). Ideally, PAM involves three steps. The first step involves subtraction of the effects of discretionary change in tax policies on the actual tax revenue. The effect of discretionary change of

taxes can be obtained from the budgetary estimates. The second step involves adjusting the series for the impact of discretionary tax changes on future tax revenue. The data that has been adjusted is then used in estimation as shown below.

$$\ln T_k = \ln \alpha + \beta_1 \ln Y_k + \varepsilon_k \quad \text{.....2.2}$$

Where β_1 is the income elasticity of the K^{th} tax

Ariyo (1997) cited several disadvantages of PAM. First, the data on tax revenue that can be accurately attributed to change in discretionary tax policy is unavailable. This method relies on the estimates of budget for the impact of the discretionary tax policy on tax revenue. In addition, there is the assumption that the changes in discretionary policies on tax are progressive as the existing tax structure (Leuthold and N'Guessan, 1986, Chipeta, 1998).

2.2.4 Constant rate structure

This method is based on simulation of series of tax revenues based on the tax rate that is effective for a particular base year and tax base estimates for the successive years. The tax base in the reference year is multiplied by the successive tax base values and the summation of the products is done. The resulting data is then used in the regression so as to get elasticity. The major limitation with this method is that it is cumbersome especially when the range of items is wide (Omondi *et al*., 2014). This implies that this method becomes impossible when applied to a broad range of tax instruments within a country and thus not widely used.

2.2.5 Divisia index approach

In this method, a proxy is used to measure the effect of discretionary policy on tax revenue. The impact of discretionary change on tax yields is measured by this index. The derivation of this function is from the tax function that has been estimated. This tax function is comparable to the production function. This method is best applicable in case there is unavailability of information about the impact of discretionary measures on tax revenue. Divisia index approach uses time trends to represent changes in discretionary policies. According to Choudhry (1979), the use of time trends to proxy discretionary tax measures leads to bias; thereby leading to possibility of underestimation or overestimation of the tax revenues that have been adjusted.

2.3 Empirical Review

Osoro (1993) assessed the implications of tax reforms on productivity of tax revenue in Tanzania. The author adopted a double log equation to estimate the buoyancy of tax. Also, the author adopted proportional adjustment method to estimate elasticity of tax revenue. According to the author, the proportional adjustment method was the most appropriate because a number of reforms /discretionary changes had been introduced thereby making it impossible to use the dummy variable. The results of the analysis in that study indicated that tax reforms had been insignificant in enhancing productivity of revenue in Tanzania. The author attributed this to a high rate of exemptions and poor administration of tax.

A study about Nigerian tax system productivity was carried out by Ariyo (1997). The author used dummy variables to represent structural adjustment programs and oil boom.

The author estimated tax elasticity and buoyancy of tax. The analysis results indicated that the productivity of revenue was satisfactory. However, the productivity of revenue varied after disaggregation of tax revenue. The author attributed this to the laxity in non-oil tax administration during the period of oil boom. According to the author the oil boom led to negative impact on the production of other commodities due to Dutch disease.

Adari's (1997) studied about the performance of VAT in Kenya. The study assessed the structure, performance and administrative processes of VAT. The analysis results indicated that the coefficients in both the elasticity and buoyancy regressions were less than unity thereby suggesting that VAT responded slowly to variation in GDP. According to the author, this was as a result of poor administration of VAT in the country. The study by Adari (1997) however did not account for properties of time series and also unusual occurrences; thereby limiting the reliability for purposes of policy.

Chipeta (1998) assessed the impact the tax reforms had on revenue in Malawi during 1970 to 1994. The author used tax revenue as dependent variable while GDP was independent variable in regression analysis. The author used two sets of equations in estimation. The first regression had the aggregate tax revenue adjusted for changes in discretionary measures on tax as the dependent variable. In addition, disaggregation of tax revenue was done in the second set of regression, with inclusion of dummy variables so as to capture the influence of discretionary tax policy on revenues. The results from that study indicated that few taxes were buoyant. However, the total system of tax was not buoyant. In addition, the author found that GDP had grown rapidly than the bases of tax, and hence the individual taxes and the total system of tax were not buoyant. In addition, the total system of tax and individual taxes were inelastic to changes in GDP

In a study about Ghana's tax reforms and productivity of revenue between 1970 and 1993, Kusi (1998) found a buoyancy of 0.72 in the period before reforms and the elasticity was 0.71. The value of buoyancy after the reforms increased to 1.29 while the elasticity value increased to 1.22. Basing on these results, the author concluded that elasticity and buoyancy of the aggregate taxes as well as individual taxes had increased significantly after 1983 to 1993 reforms, implying that the reforms positively influenced revenue productivity. Specifically, the buoyancy and elasticity of aggregate taxes after the reforms was more than one, thereby suggesting positive impact of reforms on revenue productivity. For buoyancy of individual taxes, only excise duty and export duty for cocoa had values of less than one. The author also found that the buoyancy of aggregate taxes, import tax, sales tax and income tax was greater than the respective elasticity, hence suggesting that the reforms had played an important role in enhancing revenue productivity. The implication for this study is that tax revenues are more sustainable when taxes respond to growth in the economy than raising tax rates.

In order to verify whether specific taxes respond to changes in GDP, Muriithi and Moyi (2003), used elasticity and buoyancy concepts. The analysis results indicated that tax reforms positively influenced the overall system of tax and also individual taxes. However, the authors found that the impact of reforms on VAT was insignificant.

Wawire (2000) estimated elasticity and tax buoyancy of the Kenyan tax system. The author ran a regression with total tax revenue as independent variable while the dependent variable was various tax bases. The empirical results indicated that the system of tax in the country had failed to collect sufficient revenue from various taxes. However, the study was not adequate because the author did not disaggregate tax revenue and hence

it was not possible to establish which taxes were more productive. In addition, the study did not take account of unusual occurrences or the time series characteristics of the dataset.

In a study about effect of tax structures on economic growth, Arnold (2008) assessed the link between economic growth and tax structures. Specifically, the author used panel data framework with tax structure indicators for 21 OECD countries. The author also took into account human and physical capital. The analysis results indicated that income taxes tend to have less positive effects on economic growth than consumption and property taxes. The author further found that taxes on property (more so immovable property) tend to be most effective in enhancing economic growth. After taxes on property, consumption taxes and personal income taxes tend to be second best and third best respectively in enhancing economic growth. According to the author, corporation taxes are least desirable in influencing GDP per capita. These findings suggest that a partial shift to recurrent property taxes and consumption taxes is desirable especially when the policy reforms are neutral in the perspective of tax revenue source. In addition, the shift to taxes on property and consumption taxes would be appropriate in case the main objective of the policy reforms is revenue growth. In addition, income taxes (particularly corporate taxes) are least desirable for such a policy shift. Anold (2008) also argues that personal income tax progressivity and economic growth tend to have a negative relationship.

Using Samuelson's (1955) propositions on general equilibrium analysis, Wawire (2011) assessed the factors influencing VAT revenue in Kenya. The author derived the public good demand function from a utility maximization function that had been constrained. In addition, the author took revenues from tax as income of the households, thereby

enabling the author to estimate public goods Engel curves. The results from analysis indicated that the elasticity for VAT was more than one. The author also found that VAT responded with considerable lags to variation in the factors that influence it, especially international trade. In addition, the author found that VAT was sensitive to unusual occurrences.

2.4 Overview of the Literature

A good tax system should be productive in terms of revenue generation. This implies that the system should be sustainable in order to avoid negative impacts in the economy. Studies such as Osoro (1993), Ariyo (1997) and Arnold (2011) have shown that reforms on tax administration and policy reforms impacts positively on the entire structure of tax. In addition, tax reforms enable revenue from tax to respond to GDP changes. Kusi (1998) argues that sustainability in taxation is enhanced when the tax revenue responds to growth in the economy. According to the author, this is preferable than increasing tax rates. An increase in tax rates can lead to negative impacts on economic growth.

Wawire (2011) highlighted that there is need for stabilizing the system of VAT in order to increase the rate of growth in VAT revenues as the economy grows. On the other hand, Chipeta (1998) argued that Malawi's GDP had grown at a lower rate than the tax bases. The author highlighted the need for improving tax buoyancy by changing taxation basis from specific to ad valorem. The author also stressed the importance of reducing indirect taxes such as taxes on intermediate goods and capital taxes in order to stimulate investments. Majority of studies have found that taxes are more sustainable when they respond to changes in economic growth.

The studies reviewed have some limitations. For instance, Wawire (2011) investigated only the determinants of the value added tax. His study failed to cover other forms of Tax collected by the government and also did not cover other forms of customs tax given that VAT is one of them. From this study, he also concluded revenues from VAT are sensitive to unusual occurrences, without specifying them. In addition, the author did not recommend ways of dealing with the unusual circumstances. In his study, Arnold (2008) only investigated whether tax systems affect overall growth in economy from OECD countries panel. As at 2011, there were 40 OECD partner countries and thus the study did not include all the countries and thus the findings of the study cannot be generalized across all economies of the world.

Murithi and Moyi (2003) while evaluating tax reforms and revenue mobilization in Kenya established that regardless of the positive effects of VAT reforms, there was no response by VAT to changes in national income. However, the authors did not suggest what reforms could be adopted in order to make VAT responsive to income changes.

Kusi (1998), Chipeta (1998) and Ariyo (1997) based their studies on the tax reforms period from 1970-1994 and the studies were concentrated in the West African countries, specifically Ghana, Nigeria and Malawi in Southern Africa. These studies however did not investigate the same in either central or eastern Africa. The study also cannot be used to evaluate the present day effect of the tax reforms in those countries since other reforms have been undertaken over the years and productivity in the countries has also changed and thus there is need for a study to be conducted on recent years.

Most of the reviewed literature has either been done on tax in general with only a few studies touching on customs taxes. The studies above also fail to show the relationship between customs taxes and GDP growth. This therefore calls for a study that is focused on investigation of the impact of reforms on customs taxes in the country and the effect on economic growth.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents both the theoretical framework and the empirical model specification adopted for the study. The variables that have been used in the study are defined. The data, the sources and the methods used for analysis have been discussed in this chapter.

3.1 Research Design

This study aimed at establishing the effects of customs tax revenues productivity on GDP growth rate in Kenya (1991-2015). The research design that was adopted in this study was explanatory and descriptive in nature. Specifically, explanatory design is important because a causal relationship between the explained variable and explanatory variables is established. Descriptive analysis involved assessment of the characteristics of the variables in terms of mean, median, standard deviation, kurtosis, and skewness. Descriptive analysis is important because it enables the researcher to adopt the appropriate analysis methods.

3.2 Theoretical Framework

The efficiency of the tax structure is assessed by application of the elasticity and buoyancy theories. Examining efficiency of tax is vital as it facilitates assessment of the tax system responsiveness to discretionary changes (Amin, 2000). In particular, the income elasticity of a tax can be divided into two constituents, i.e. base to income

elasticity and tax-to base elasticity. This implies that tax elasticity is basically the product of the change in tax due to change in base and change in tax due to change in income. In simpler terms, the tax elasticity is the product of base elasticity of tax and income elasticity of tax. The usefulness of breaking down is to allow for identification of either revenue growth that is fast or lagging and to highlight the component that brings such lag a growth.

Rather than presenting the total income elasticity of tax revenue in aggregated models, it is appropriate to view the total elasticity of tax as sum of weighted average of separate taxes in the economy. This is because different taxes respond differently to income changes. The implication for this is assessment of the elasticity of the individual taxes as the first step in assessment of the entire tax elasticity. In equation form, Mansfield (1972) provides the following guideline:

Income elasticity of aggregate tax revenue

$$E_T tY = \frac{\Delta T_t}{\Delta Y} * \frac{Y}{T_t} \quad \text{.....3.1}$$

Income elasticity of kth individual tax

$$E_T kY = \frac{\Delta T_k}{\Delta Y} * \frac{Y}{T_k} \quad \text{.....3.2}$$

Base elasticity of kth individual tax

$$E_{T_K B_K} = \frac{\Delta T_k}{\Delta B_K} * \frac{B_K}{T_k} \quad \text{.....3.3}$$

Income elasticity of kth individual tax base

$$E_{B_{K^Y}} = \frac{\Delta B_k}{\Delta Y} * \frac{Y}{B_k} \quad \text{.....3.4}$$

T_t in the above set of equation is overall tax revenue while T_k is the k^{th} tax revenue. Y represents national income/ GDP while B_k is k^{th} tax base. Sign Δ represents a distinct change in the variable related with it.

In case of n taxes, it follows that:

$$E_T tY = \frac{T_1}{T_t}\left(\frac{\Delta T_t}{\Delta Y} * \frac{Y}{T_1}\right) + \ldots\ldots\ldots + \frac{T_k}{T_t}\left(\frac{\Delta T_k}{\Delta Y} * \frac{Y}{T_K}\right) + \ldots\ldots\ldots + \frac{T_n}{T_t}\left(\frac{\Delta T_n}{\Delta Y} * \frac{Y}{T_n}\right) \quad \text{.....3.5}$$

Equation 3.5 shows that the income elasticity of aggregate tax revenue is equivalent to the total weighted average of individual tax elasticities.

The individual tax elasticity may be divided into two, i.e. base elasticity of tax and income elasticity of base:

$$E_T kY = \left(\frac{\Delta T_k}{\Delta B_K} * \frac{B_K}{T_k}\right)\left(\frac{\Delta B_k}{\Delta Y} * \frac{Y}{B_k}\right) \quad \text{.....3.6}$$

Substituting equation 3.6 into 3.5

$$E_T tY = \frac{T_1}{T_t}\left(\left(\frac{\Delta T_1}{\Delta B_1} * \frac{B_1}{T_1}\right)\left(\frac{\Delta B_1}{\Delta Y} * \frac{Y}{B_1}\right)\right) + \ldots.. + \frac{T_k}{T_t}\left(\left(\frac{\Delta T_k}{\Delta B_K} * \frac{B_K}{T_k}\right)\left(\frac{\Delta B_k}{\Delta Y} * \frac{Y}{B_k}\right)\right) + \ldots\ldots\ldots + \frac{T_n}{T_t}\left(\left(\frac{\Delta T_n}{\Delta B_n} * \frac{B_n}{T_n}\right)\left(\frac{\Delta B_n}{\Delta Y} * \frac{Y}{B_n}\right)\right) \quad \text{.....3.7}$$

Equation 3.7 indicates that the income elasticity of aggregate revenue in case of n taxes is influenced by the product of base elasticity of tax and income elasticity of tax for each type of tax, weighted by the significance of each tax in the entire system of tax.

3.3 Specification of the Model

A general multiplicative form of the tax elasticity concept can be presented as follows:

$T_t = \propto Y_t^{\beta} \varepsilon$……3.8

Where:

T_t= aggregate tax revenue

Y= current real GDP/income

$\propto$= constant β= parameters to be estimated

ε=white noise/stochastic disturbance term

Model 3.8 should be linearized in order to estimate it using OLS. In this respect, the model 3.8 can be linearized by use of double log. In addition, a subscript k is introduced to represent particular revenue source from tax. The equation that follows after taking double log in model 3.8 is as shown below.

$\ln T_t = ln \propto + \beta_t \ln Y_t + . \varepsilon_t$……3.9

Where:

T_t= total tax revenue

β_t = estimable buoyancy parameter coefficient

Ariyo (1997) suggested a modification of the equation by introducing a one year GDP lag. The reason was that the implementation of the new guidelines on policy contained in

budget speech may not be realized at that specific year they are made. The one-year lag captures the likely impact of the time lag in implementation of these policies on tax revenues.

$$\ln T_t = \ln \alpha + \beta_1 \ln Y_t + \beta_2 \ln Y_{t-1} + \varepsilon_i \quad \text{.....3.10}$$

Where:

T_t = Total customs tax revenue

Y_t= current real GDP

Y_{t-1}= the previous year's real GDP

$\beta_1 \; and \; \beta_2$= buoyancy coefficients for current and previous years respectively.

To estimate the buoyancies of individual tax heads a superscript k is introduced to represent a particular tax source.

$$\ln T_t^k = \ln \alpha + \beta_1^k \ln Y_t + \beta_2^k \ln Y_{t-1} + \varepsilon_i \quad \text{.....3.11}$$

Where:

T_t^k= total tax revenue from K^{th} source

Y_t = current real GDP

Y_{t-1}= the previous year's real income (GDP)

$\beta_1^k and\ \beta_2^k$ are buoyancy coefficients k[th] source for current and previous years respectively

The approach mentioned above does not take into account the special features of the tax system as well as demographic and institutional dynamics that determine the economic trends. Taking note of the fact that revenues from taxes could vary with time because of variation in independent variables, re-specification and re-parameterization of the above set of equations is done and adjustment for changes in discretionary measures and unusual occurrences should be done using techniques such as proportionate adjustment technique.

A different method for estimation of elasticity is the use of dummy variables. This method was advanced by Singer (1968). Dummy variable technique comprises dummy variables use to proxy vital discretionary tax rates changes and changes in structures of tax each year an occurrence of such policy takes place. This method is employed in case there are limitations on the use of other data cleaning methods discussed in chapter two. For example, it would be difficult to get the estimated effects of discretionary measures on tax revenue mainly because of data unavailability. In this case, the dummy variable method becomes useful. The Singer Method includes use of dummy variables to proxy crucial changes in discretionary policy on tax each year such a shift in policy occurs. Due to unavailability of data on the impact of discretionary custom tax measures on custom tax revenue, the study adopted Singer (1968) dummy variable technique as shown by Model 3.12 below:

$$\ln T_t = \ln \alpha + \beta_1 \ln Y_t + \beta_2 \ln Y_{t-1} + \beta_3 RARMP + \varepsilon_i \quad \text{.....3.12}$$

Where,

α = Constant in the model;

$\beta_{1,}\beta_2$ = regression coefficient (elasticity);

β_3 = Coefficient for RARMP reforms (discretionary change coefficient)

$RARMP$ = represents the reforms

t= time

lnT= natural logarithm of customs tax revenue

lnY_t= is current year natural logarithm of GDP

lnY_{t-1}= previous year's natural logarithm of (GDP)

ε_i = error term/stochastic disturbance term

3.4 Estimation Procedure

Equation 3.12 was estimated by use of OLS method. The equation above indicates that the GDP, one-year lag in GDP, and customs tax reforms (as indicated by dummy variable) positively influence the customs tax revenue. The error term captures the effect of other variables not in the model 3.13. Unit root testing was first carried out in order to establish whether the time series variables were stationary. Differencing and cointegration analysis were done afterwards on the non-stationary variables. Unit root testing and cointegration analysis have been discussed in detail in the section below.

3.4.1 Unit Root Testing

Use of non-stationary variables in regression analysis is problematic. This is because when variables that are not stationary are used in regression, spurious results are generated. Non-stationarity implies that fluctuation by time series values does not occur with a mean that is constant or with a constant variance. In most cases, spurious regression generates a high R^2 irrespective of the strength of relationship between dependent variable and independent variables. In addition, the typical t-ratios do not have the usual t-distribution. Therefore, unit root testing was done so as to verify whether the variables used were stationary. Augmented Dickey Fuller Test (ADF) and Phillips-Perron Test were used to test for a unit root in the variables. Differencing was carried out on non-stationary variables.

3.4.2 Cointegration Test

When the usual OLS is applied to variables that have been differenced, information about long-run relationship is lost. Therefore, a method to prevent this loss of information should be developed. Specifically, co-integration analysis corrects for this problem. In case the independent variables and dependent variables have one order of integration/ I(1) series, but the residuals from OLS are stationary, the variables are considered to be co-integrated. Cointegration can be tested by use of Engle and Granger two step approach. In case the variables are cointegrated, an error correction model can be used. Specifically, cointegration implies that there is an error correction mechanism with the description of short-run dynamics or adjustment of variables to equilibrium.

3.5 Definition of variables

Customs tax

This is the tax that is imposed on international trade. Specifically, this tax includes; import duty, excise duty on imports, VAT on imports, and import declaration fee (IDF). This variable was expressed in Kenya shillings adjusted for inflation.

Gross Domestic Product (GDP)

This is the value of all goods and services produced in a country in a particular time period (monthly, quarterly, annual, etc.). This variable was expected to have a positive relationship with the tax revenue, because an increase in GDP is expected to increase the demand for imported goods and services, thereby increasing the tax revenue. In order to factor out inflation, real GDP will be used. This variable was expressed in constant Kenya shillings.

The Table below is a summary of the variables that were used in the model, their definition, measurement and expected sign.

Table 3.1 Table of variables

Variable	Definition and Measurement	Expected sign
Customs Tax Revenue (T)	This is tax that is imposed on internationally traded goods.	
Current period GDP (GDP_t)	This is the value of all goods and services produced in a country in a particular time period. This variable will be measured in constant Kenya shillings	Positive
Previous period GDP (GDP_{t-1})	This is GDP in the previous period.	Positive

3.5 Sources and type of Data

Time series data was used in the analysis. The data ranged from 1991 to 2015. The total customs tax revenue was obtained from KRA while the data for real GDP was obtained from economic survey (various issues) and statistical abstract (various issues) of KNBS. In addition, the data was compared with the data from world development indicators data for Kenya by the World Bank.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter comprises data analysis, results and discussion. Specifically, descriptive statistics, unit root tests, cointegration analysis and regression analysis has been carried out and detailed discussion of the results provided. Section 4.2 comprises descriptive statistics while section 4.3 consists of stationarity tests. Cointegration analysis has been carried out in section 4.4 while the regression analysis is in section 4.5.

4.2 Descriptive Statistics

In order to understand the general characteristics of the dataset, seven descriptive statistics were computed. The descriptive statistics calculated includes; mean, median, standard deviation, skewness, kurtosis, minimum and maximum. Table 4.1 below summarizes the descriptive statistics.

Table 4. 1 Descriptive Statistics

	lnGDP	lnctax
Mean	27.89416	23.87514
Median	27.75481	23.91841
Standard deviation	0.9579	0.9235359
Skewness	-0.3513704	-0.0939978
Kurtosis	2.070297	2.211943
Minimum	26.13594	22.12047
Maximum	29.45949	25.32485

Where:

lnGDP = Natural logarithm of GDP lnctax= Natural logarithm of custom tax

Table 4.1 above summarizes descriptive statistics for logarithm of custom tax and logarithm of GDP. The mean and the median of logarithm of GDP was 27.89416 and 27.75481 respectively. The two values are almost equal, implying that this variable is close to normal distribution. Similarly, the mean and the median of the logarithm of custom tax were almost equal. The mean of this variable was 23.87514 while the median was 23.91841, with the difference between the median and the mean being only 0.04327. This implies that the logarithm of custom tax is close to a normal distribution because the mean and the median of this variable are almost equal.

The standard deviation of the logarithm of GDP was 0.9579 while the standard deviation for the logarithm of customs was 0.9235359. By looking at the two values, it is evident that the values in the dataset for the two variables are not widely spread out from the

mean. The skewness for logarithm of GDP was -0.3513704 while the skewness for the logarithm of the custom tax was -0.0939978. This indicates that the two variables are skewed to the left relative to normal distribution. However, the two values lie within the acceptable skewness range of -2 to 2 for normal distribution. The kurtosis value of the two variables also falls into the acceptable range of -3 to 3 for normal distribution. Kurtosis is a measure of the peak sharpness of a frequency distribution curve.

The minimum and the maximum of the logarithm of GDP was 26.13594 and 29.45949 respectively. Similarly, the minimum and maximum of the logarithm of custom tax was 22.12047 and 25.32485 respectively. By looking at the minimum and maximum values of the two variables, it is evident that there is no extreme value/outlier in the two datasets.

4.3 Unit Root Test

Use of non-stationary variables in OLS regression analysis is problematic. This is because when variables that are not stationary are used in regression, spurious results are generated. Non-stationarity implies that fluctuation by time series values does not occur with a mean that is constant or with a constant variance. This means that the variance and the mean of the time series fluctuate with time in case the variables are not stationary. In most cases, spurious regression generates a high R^2 irrespective of the strength of relationship between dependent variable and independent variables. In addition, the typical t-ratios do not have the usual t-distribution. Therefore, data that is not stationary should be differenced before estimation. The number the data is differenced until it becomes stationary determines the order of integration. Therefore, unit root testing was carried out so as to determine whether the variables used were stationary. Augmented

Dickey Fuller Test (ADF) and Phillips Perron Test were used to test for unit root in the variables. Table 4.2a below shows the results of Phillips-Perron unit root test.

Table 4. 2: Phillips-Perron Test for Unit Root (Levels)

Variable	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
lnGDP	-0.528	-17.200	-12.500	-10.200
LaglnGDP	-0.582	-17.200	-12.500	-10.200
Lnctax	-2.220	-17.200	-12.500	-10.200

Table 4.2a above summarizes Phillips-Perron unit root tests results. At levels, all the variables are not stationary because the absolute value of the test statistic for all variables is less than the absolute critical values at 1%, 5% and 10% levels of significance. Therefore, for all the three variables, the null hypothesis of a unit root cannot be rejected at all significance levels. This implies that the variables should be differenced and the same procedure for testing for unit root repeated. Table 4.2b below summarizes Phillips Perron test for the first difference of the three variables.

Table 4. 3: Phillips-Perron Test for Unit Root (First Difference)

Variable	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
lnGDP	-17.501	-17.200	-12.500	-10.200
LaglnGDP	-17.600	-17.200	-12.500	-10.200
Lnctax	-24.538	-17.200	-12.500	-10.200

From the above Phillips-Perron unit root test, it is evident that all the three variables become stationary after differencing once. Therefore, all the variables are integrated of order one (contains one unit root). In this respect, the variables should be differenced before estimation.

4.4 Cointegration Analysis

When the usual OLS is applied to variables that have been differenced, information about long-run relationship is lost. Therefore, a method to prevent this loss of information should be developed. Specifically, co-integration analysis corrects for this problem. Two or more series are said to be cointegrated if they move together through time. In case the independent variables and dependent variables have one order of integration/ I(1) series, but the residuals from OLS are stationary, the variables are considered to be co-integrated. Cointegration can be tested by use of Engle and Granger two step approach. The first step involves regressing I(1) dependent variable on I(1) independent variables (cointegrating regression). The second step involves testing the residuals generated in first step for unit root. If the residuals are stationary, then the variables are cointegrated. In case the variables are cointegrated, an error correction model can be used. Specifically, cointegration implies that there is an error correction mechanism with the description of short-run dynamics or adjustment of variables to equilibrium. Table 4.4 below shows the long-run regression/cointegrating regression.

Table 4. 4: Long-run Relationship (Cointegrating Regression)

Dependent Variable: lnctax

Sample: 1991-2015

Number of Observations=24

Variable	Coefficient	Std. Error	t-Stat.	Prob.
lnGDP	0.3826656	1.044789	0.37	0.718
LaglnGDP	0.517978	1.026715	0.50	0.619
Constant	-1.184186	2.477004	-0.48	0.638
R-squared	0.8407	Total Sum of Squares		18.4782754
F-Statistic	55.43	Adjusted R-squared		0.8256
Prob.>F	0.0000	Residual Sum of Squares		2.94276051
Durbin Watson Statistic	1.817128	Mean Dependent Variable		23.87514

Table 4.4 above summarizes the regression results for the long-run model (cointegrating regression). The overall slope of the model is significant at 5% and 1% level of significance. This is because the probability of F-statistic is 0.0000 which is greater than 0.05 and 0.01 (5% and 1% significance levels respectively). From the regression results above, neither GDP nor its one-year lag is significant in influencing custom tax in the long-run. However, this regression has non-stationary variables and hence its importance is limited to the testing for cointegration so as to estimate the short-run model.

Table 4. 5: Augmented Dickey Fuller Unit Root Test for the Residuals of Cointegrating Regression

ADF Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Number of Lags
-4.064	-3.750	-3.000	-2.630	1

Number of lags chosen based on Schwert criterion

Table 4.5 above shows the ADF unit root test for the residuals of the cointegrating regression. The results indicate that the variables used are cointegrated because the absolute value of the ADF test statistic is greater than the absolute critical values at all levels of confidence (1%, 5% and 10%). In this respect, an error correction model will be used to estimate the short-run dynamics.

4.5 Error Correction Model (ECM)

The cointegrating regression shown above explains only the long-run relationship of the variables. However, a good time series model should describe both the long-run and short-run relationship. In this respect, an error correction model describes the short-run relationship between the first differences of the variables, with the inclusion of error correction term that shows the speed of adjustment towards equilibrium when there is shock. Specifically, the ECM describes the interaction between dependent and independent variables in the short-run, with consistency with the long-run relationship taken into account. The error correction model results have been summarized in Table 4.4 below.

Table 4. 6: Error Correction Model Regression Results

Dependent Variable: D. lnctax

Sample: 1991-2015

Number of Observations: 23

Variable	Coefficient	Standard Error	t-stat	Prob.
DlnGDP	.087317	1.097354	0.08	0.937
DLaglnGDP	1.516592	1.091998	1.39	0.182
ECT	-.8881489	0.2423859	-3.66	0.002
RARMP	0.0525451	0.1739051	0.30	0.766
Constant	-0.131185	0.2191272	-0.60	0.557
R-Squared	0.5027	Total Sum of Squares		5.54517569
Adjusted R-Squared	0.3922	Residual Sum of Squares		2.7573998
F Statistic	4.55	Durbin Watson Statistic		1.872806
Prob.(F Statistic)	0.0103	Mean (Dependent Variable)		0.1180205

Letter D means that the variables have been differenced once

ECT is the error correction term (ε_{t-1})

From the regression results above, there is no autocorrelation. This is because the Durbin Watson Statistic of 1.872806 falls into the acceptable range of 1.5 to 2.5. Therefore, there is no autocorrelation in the model. Autocorrelation occurs when the error terms are correlated with previous period error terms. Autocorrelation affects hypothesis testing because of incorrect standard errors. Also, heteroscedasticity also is not a problem in this model. The probability of the chi-square value in the Breusch-Pagan test was 0.0993 and hence the null hypothesis of constant variance could not be rejected at 1% and 5% level of significance (see appendix II for the Breusch-Pagan test). Heteroscedasticity occurs

when the variance of the error term increases as the values of explanatory variable increases.

From the above ECM estimates, it is clear that the log of GDP and its one-year lag have not been significant in influencing the custom tax revenue in Kenya over the study period. The absolute value of the t-statistic for both coefficients was less than 1.96 (5% significance level) and 2.57 (at 1% level of significance). However, the signs of the two variables are consistent with theoretical expectations. The coefficient for logarithm of GDP and the one-year lag in logarithm of GDP were 0.087317 and 1.516592 respectively. The two coefficients are interpreted as elasticity, because the dummy variable for the Revenue Administration Reform and Modernization Program (RARMP) that started in 2004 has been included in the model (dummy variable technique). The coefficient for RARMP reforms was not significant thereby implying that the reforms have not been significant in increasing custom tax revenue.

As expected the coefficient for the ECT was negative and statistically significant at 1% and 5% levels of significance. This is because the absolute value of the t-statistic of this coefficient was greater than 1.96 (at 5% level of significance) and 2.57 (at 1% level of significance). The coefficient of ECT was -0.8881489. This coefficient represents the rate of adjustment of the revenue from customs to equilibrium following a shock.

For comparison purposes, an error correction model for the aggregate tax revenue has been provided in appendix III. Unlike the custom tax revenue, the aggregate tax revenue was found to be responsive to change in GDP. The coefficient for the log of GDP was found to be approximately 0.661 and the t-statistic was 2.46, thereby indicating that the

variable was significant at 5% level of significance. The coefficient for the ECT in this model was -1.046561 and was significant at 5% and 1% levels of significance. Therefore, it can be concluded that unlike the custom tax revenue, the aggregate tax revenue has been responding positively and significantly to the changes in GDP, with elasticity of 0.661. This implies that a one percent increase in GDP would lead to an increase of 0.661 percent in aggregate tax revenue. Similar to the custom tax revenue, the RARMP reforms were also found to be insignificant in influencing the total tax revenue.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1 Introduction

This chapter comprises summary, conclusion and policy implications. Specifically, the summary in section 5.2 comprises an overview of the entire study. On the other hand, the conclusion based on the research findings has been provided in section 5.3 while policy implication in relation to the research findings has been provided in section 5.4.

5.2 Summary

The main objective of this study was to establish the responsiveness of custom tax revenue to economic growth and RARMP reforms. A multiplicative model with the custom tax revenue as dependent variable and GDP and one year GDP lag as independent variables was used. The model was linearized by double log so as to be estimated by OLS. A dummy variable to represent RARMP reforms was introduced so as to isolate the effects of discretionary tax policy from the GDP effects. Unit root test for the variables was then carried out by use of Phillips-Perron unit root test, with the results indicating that the variables had one-unit root. Thereafter, cointegration analysis was carried out and the results indicated that the variables were cointegrated. Consequently, an error correction model was adopted.

The regression results indicated that GDP and one-year lag in GDP were insignificant in influencing the custom tax revenue, although the signs of coefficients for both variables were positive as expected. Although the sign of the coefficient for RARMP was positive

as expected, the variable was found to be insignificant in influencing custom tax revenue. The regression results with the logarithm of total tax revenue as the dependent variable indicated that the logarithm of GDP had positive and significant impact on total tax revenue. However, the RARMP reform was not significant in influencing the total tax revenue.

5.3 Conclusions

From the research findings it is evident that the RARMP reforms that were introduced in 2004 have not been significant in increasing the productivity of custom tax in Kenya. In addition, custom tax has not been responsive to income changes in Kenya.

The study established further that the overall tax system is responsive to income changes. However, the responsiveness is only in the current period income, with a one-year income lag being insignificant. Similar to the custom tax revenue, the total tax revenue has been unresponsive to RARMP reforms. The results of the study corroborate the findings by Wang'ombe (1999) who found that the general tax system was buoyant and elastic.

The income elasticity of the total tax system also has been less than unity. This implies that a one unit change in income would lead to a less than one-unit increase in the aggregate tax revenue.

5.4 Policy Implications

The policy implications in relation to the research findings are important to the formulation of relevant tax policies. In general, a well-functioning tax system should be

put into place so as to increase tax revenue collection. For example, the tax system should be able to tap the gains from economic growth.

There have been widespread reports of tax evasion especially in customs services department of KRA. This has a led to shortfalls in revenue targets by KRA. Improving the administration of custom tax could be a viable solution for increasing the productivity of custom tax in Kenya. Specifically, efficient administration of customs tax should aim at improvement of compliance, improvement of collection of revenue, and prevention of evasion of tax.

Generally, a good tax system should be responsive to economic growth. This means that as the economy grows, tax revenue should also grow. This is because tax revenue is a function of national income/GDP. In this respect, an effective tax administration should ensure that tax base increases following an increase in income. Consequently, an increase in tax base should result to an increase in tax revenue. This is sustainable than increasing the tax rates. It is worth noting that an increase in tax rate increases the burden to the taxpayers. Therefore, a good tax system should be self-sustaining. This is important because when the tax system is self-sustaining, economic growth would lead to an increase in the tax revenue.

Also, the government needs to review the custom tax base so as to increase the tax revenue. It should be noted that when the tax base is narrow, even the increase in income/GDP would have little impact on tax revenue. Therefore an increase in income should lead to an increase in tax base. In addition, the tax base should be elastic to

income in order for the increment in income to lead to a significant increase in tax revenue.

The tax reforms also should be developed and implemented separately. This is because different taxes are unique in respect to administration, response to economic growth and other factors.

5.5 Limitations of the Study

The study had some limitations. First, the custom data was only available for the period starting from 1991. KRA was also formed in 1995 and therefore the data for previous period was unavailable. In this respect, the study findings are specific to the period reviewed.

Next is that it was not possible to establish the impact of discretionary tax policy on tax revenue because of the unavailability of the budgetary estimates of the same for all the years under the study. This necessitated the use of dummy variable technique.

Also, the findings of the study are subject to the reliability of the data from the secondary sources.

References

Adari M (1997). Value added tax in Kenya. Unpublished MA research paper, University of Nairobi.

Ariyo A (1997). *Productivity of the Nigerian Tax System*, Research paper No 67. Nairobi, Kenya: African Economic Research Consortium.

Barro, R. J. (1992). Human Capital and Economic Growth. In: Federal Reserve Bank of Kansas City, Policies for Long-Run Economic Growth. pp. 199-216.

Bassanini, A., and Scarpetta, S. (2001). Does Human Capital Matter for Growth in OECD Countries? Evidence from Pooled Mean-Group Estimates. *OECD Working Paper Series*, 33, 9-56.

Caucatt, E., Imrohoroglu, S., and Kumar, K. (2003). Growth and welfare analysis of tax progressivity in a hetergeneous-agent model. *Review of Economic Dynamics*, 6, 546-577.

Chipeta C (1998), *Tax Reform and Tax Yield in Malawi*, Research Paper No. 81, Nairobi, Kenya: African Econometric Research Consortium.

Emran, S.M., & Stiglitz, J.E. (2005). *On selective indirect tax reform in developing countries.* Stanford, CA: Stanford University.

Engle, R.F., & Granger, C.W.J. (1987). Cointegration and error correction: Representation, estimation and testing, *Econometrica,* 55, 251-27

Garner, C.A. (2005). *Consumption Taxes: Macroeconomic effects and policy issues*, Kansas, KS: Federal Reserve Bank of Kansas City.

Gujarati, D. (1995), *Basic Econometrics*, 3rd ed., New York, NY: McGraw-Hill Press.

Heckman, J., Lochner, J.L, and Taber, C. (1998). Tax policy and human-capital formation. *The American Economic Review*, 88(2), 293-297.

Hueting, R. (2011): The future of the environmentally sustainable national income. *Ökologisches Wirtschaften*, 4/2011, 30-35

Kariba, L.W (2011). An analysis of tax reform policies and tax revenues in Kenya. Unpublished MBA Paper, University of Nairobi.

Karingi, S.N., Wanjala, B., Kamau, A., Nyakang'o, E., Mwangi, A., Muhoro M, Nyamunga, J. (2004). Fiscal architecture and revenue capacity in Kenya, Nairobi, Kenya: KIPPRA,

KIPPRA. (2004). Tax reform experience and the reform agenda for Kenya, Nairobi, Kenya, KIPPRA.

Kiringai. J., Njuguna, N., and Karingi, S. (2002). *Tobacco excise tax in Kenya: An appraisal*, Discussion Paper No. 21, Nairobi, Kenya: KIPPRA

KRA (2004). *Staff quarterly newsletter*, Edition No.22, Nairobi, Kenya: KRA.

KRA (2010). *Revenue administration reforms in Kenya: Experience and lessons*, 1st edition, Nairobi, Kenya: KRA.

Kusi, N. K. (1998). *Tax Reform and Revenue Productivity in Ghana.* Nairobi, Kenya: AERC.

Lee, Y., and Gordon, R. (2005). Tax structure and economic growth. *Journal of Public Economics*, 89, 1027-1043.

Milambo, M. (2001). Elasticity and buoyancy of the Zambia tax system. Unpublished MA Paper, University of Nairobi.

Morrisset, J., and Izquierdo, A. (1993). *Effects of tax reform on Argentina's revenues*. Washington, D.C.: World Bank.

Muriithi M, Moyi, E. (2003). *Tax reforms and revenue mobilization in Kenya*, Nairobi, Kenya: African Economic Research Consortium.

Musgrave, R. (1987). Tax reform in developing countries, In D. Newberry and N. Stern eds., *The Theory of taxation for developing countries*, Oxford, UK: Oxford University Press.

Mutua J.M. (2012). *A citizen's handbook on taxation in Kenya*; Nairobi, Kenya: Institute of Economic Affairs.

Osoro, N.E. (1993). *Revenue productivity implications of tax reform in Tanzania.* Nairobi, Kenya: African Economic Research Consortium.

Padavano, F. and E. Galli. (2007). Tax rate and economic growth in OECD countries, *Economic Inquiry*, 39, 44-57.

Samuelson, P.A, & William D. N. (2004). *Economics*, New York, NY: McGraw-Hill.

Tax Justice Network Africa. (2011). Addressing inequality in Africa through taxation. Nairobi, Kenya: Tax Justice Network -Africa.

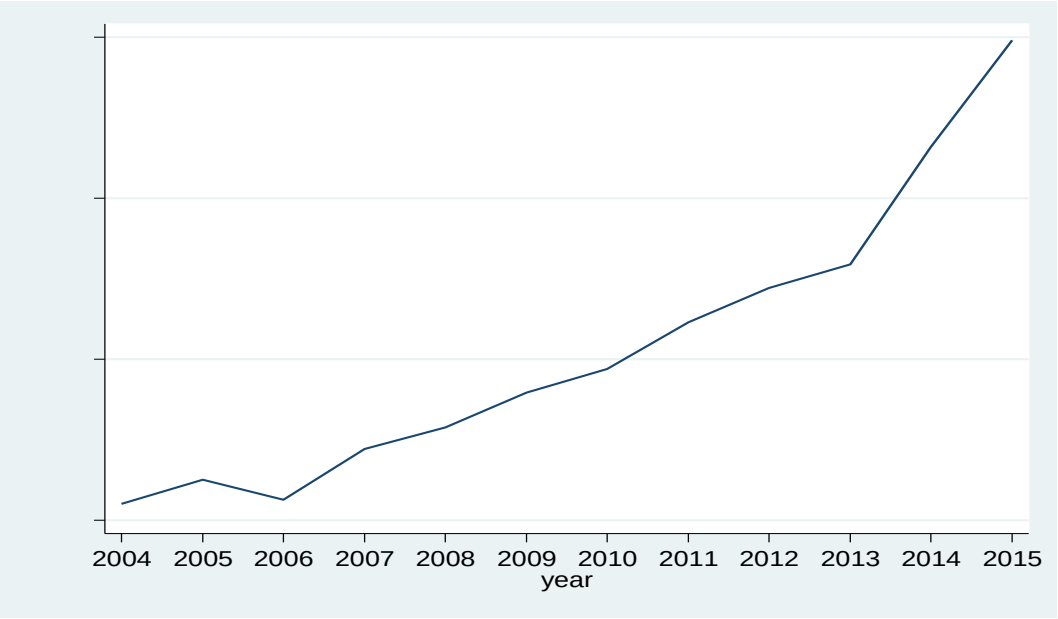
Wawire N.H.W. (2011). Determinants of value added tax revenue in Kenya. A paper presented at the *CSAE Conference* held from 20th to 22nd March 2011 at St Catherine's College.

Wilford, S.D., & Wilford, W.T. (1978a). Estimates of revenue elasticity and buoyancy in Central America: 1955- 1974. In J.F.J Toye (Ed.), *Taxation and Economic Development* (pp. 83-100). London: Frank Cass & Co. Ltd.

Zeng, J., & Heng D. (2003). *Allocation of tax revenue and growth effects of taxation.* 21 Lower Kent Ridge Road, Singapore: National University of Singapore.

APPENDICES

Appendix I: Custom revenue trend



Source: Authors computation from KRA data

Appendix II: Breusch-Pagan Test for Heteroscedasticity

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of D.logcust

         chi2(1)      =     2.72
         Prob > chi2  =   0.0993
```

Appendix III: Regression Results for Aggregate Tax Revenue

```
. reg D.logttax D.loggdp D.Lgdp dum L.u
```

Source	SS	df	MS		
Model	.096129653	4	.024032413	Number of obs	= 23
Residual	.100431667	18	.005579537	F(4, 18)	= 4.31
				Prob > F	= 0.0128
Total	.19656132	22	.008934605	R-squared	= 0.4891
				Adj R-squared	= 0.3755
				Root MSE	= .0747

D.logttax	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
loggdp						
D1.	.6605627	.2687839	2.46	0.024	.0958687	1.225257
Lgdp						
D1.	.1992269	.2124334	0.94	0.361	-.2470791	.6455329
dum	.0226087	.0312635	0.72	0.479	-.0430734	.0882908
u						
L1.	-1.046561	.2864927	-3.65	0.002	-1.64846	-.4446625
_cons	-.0001007	.0449853	-0.00	0.998	-.0946114	.09441