RESPONSIVENESS OF AUTOMOBILE IMPORT TAXES TO GOVERNMENT REVENUE: A CASE STUDY OF KENYA (1990-2014)

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X50/80182/2012

A Research Project Submitted to the School of Economic, University of Nairobi in Partial Fulfilment of Requirements for the Degree of Masters of Arts in Economics

August, 2016

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DECLARATION

I, the undersigned declare that this research project is my original work and has not been presented to any other university or educational institution other than the University of Nairobi for academic credit.

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This research project has been submitted with my approval as the appointed University Supervisor:

Signed…………………………………….. Date……………………………………..

JASPER OKELO

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DEDICATION

My greatest gratitude goes to my Family for the great support they gave me and to my

Supervisor Mr. Jasper Okelo for the exceptional guidance he accorded to me. I am

grateful to the school of Economics, University of Nairobi for providing the necessary

infrastructure and thanks to the lecturers for great knowledge they shared.

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ACRONYMS AND ABBREVIATIONS

CPI   Consumer Price Index

DTM   Discretionary Tax Measures

GDP   Gross Domestic Product

KNBS   Kenya National Bureau of Statistics

KRA   Kenya Revenue Authority

OECD   Organization for Economic Co-operation and Development

PAM   Proportional Adjustment Method

VAT   Value Added Tax

ABSTRACT

The purpose of this study was to analyze the responsiveness of automobile import taxes to government revenue. The main objective was pursued in line with the following specific objectives to determine the automobile import tax buoyancy and tax elasticity, to establish whether there is a long-run relationship between automobile import tax revenue and total government revenue and to provide policy recommendations based on the study findings. The study used secondary data for a time series of 1990 to 2014. The study findings indicated that there was co integration among the long run variables. Results indicated that there was growth of automobiles being imported and this generally implies that there was an increase in the national revenue being contributed to from the automobile taxes. From the regression results total tax buoyancy was statistically significant at 1% level. Similarly, it was showed that national income was statistically influenced by total tax revenue buoyancy in Kenya. The study concludes that the significance of buoyancy of tax revenue in Kenya may be as a result of relevant reforms undertaken over period since 1990. The size of government budget surplus and/or deficit has persistently been one of probable most critical statistic for evaluating the effectiveness and outcome of government fiscal policies in an economy. Also one of the major sources of government revenue (tax) has not produced adequate income to finance Kenya's expenditures thereby contributing to continuous deficits in the budget. Based on the study results, it may be conclusive to argue for tax buoyancy in Kenyan tax system. The impact of tax revenue may manifest more on the sectors it is channeled to as well as judiciousness of its application given the significant effect it exhibits to national income. Given the long run relationship established between total tax revenue and government revenue this study suggests for a need to re-evaluate tax policies implemented over the years to adjust for the kind of response to national income while enhancing tax collection.

CHAPTER ONE
INTRODUCTION

1.1   Background

Government income refers to the returns expected by a government to fund its processes and development projects. It is an imperative device for the monetary strategy of the administration as it aids government spending (Organization for Economic Co-operation and Development, 2008). Governments should execute different roles within the field of political, societal and financial actions to capitalize on communal and financial benefit. Consecutively toward execution of these obligations and tasks the government needs huge sum of resources. These reserves are referred to as communal income. Public income and returns consist of excise, revenue from executive actions similar to fines, fees, gifts and grants. Government income can be categorized into two kinds including: tax and non-tax revenue (Illyas and Siddiqi, 2010). Levies are essentially the supply of communal income. Taxes are obligatory imbursements to government with no expectation of straight benefits and returns by the tax payer.

The Kenyan government has launched various guidelines intended at sustaining the attainment of vision 2030 for a vibrant infrastructure so as to recuperate its place as an fiscal enormous in East and Central Africa. The importation of automobiles in Kenya usually involves various activities but not limited to making arrangements for customs declaration and clearance, transportation, cargo space, indemnity, financing, ordinary certifications, scrutiny, harbor discharge, security among others. In this way import taxes are generated. With the government's move to adopt modern and flexible

custom procedures aimed at ensuring ease of post consent certification and hazard investigation that willpower ensures smooth deal and thus minimize revenue loss resulting from delayed clearance of imports at the port of Mombasa. However, to achieve this government should improve its infrastructure and it is expected that such a move would lead to an increment in government revenue.

Kenya has experienced so much congestion on the roads (Traffic jams)in recent years due to increased importation of automobiles. The Kenyan government has tried to solve this problem by building more roads (like bypasses) and widening existing roads thus allocating too much budget on infrastructure. The source of this government revenue used in budget allocation is mainly taxation and the main way in which automobiles contribute to government revenue is through import tax. It is for this reason that the study seeks to analyze the responsiveness of automobile import taxes and government revenue.

If tax generated from the automobile import are further channeled to developing these infrastructures they then contribute to a balance of resources; in the sense that the amount of tax from automobile importation goes to the construction of structures and facilities for use by the same automobiles. This therefore implies that there is a relationship between the tax from automobile importations and the cost incurred in developing the infrastructure. The implication of this is that if the proportion of government revenue from the automobile taxes can be established than this would serve as a rationale for revenue allocation to infrastructural development during the budget allocations.

Kenya basically is a net importer country; the value of commodity it imports far exceeds the value of commodity it exports. Table 1.1 below shows that the proportion of Kenyan imports over time (2010-2014) has been on an increase. As illustrated the total value of imports in 2010 stood at Kshs. 947,206 million while in 2011 the value increased to Kshs. 1,300,749 million representing a 27.18% increase in imports. The value of imports for 2012 stood at Kshs. 1,374,587 million representing a 5.37% increase from that of 2011. The value in 2013 was Kshs. 1,413,316 million representing a 2.74% increase from that of 2012. Overall there was an increase in value of imports by 32.98% from 2010 to 2013. In particular the import of road vehicles in 2010 stood at Kshs. 55, 812 while the imports in 2011 was at Kshs. 62, 870, 2012 was at Kshs. 73,768 and that of 2013 was at Kshs. 83,330 million. The contribution of road vehicles import to the total value of imports in 2010 was 5.89%, in 2011 it was 4.83%, in 2012 it was 5.34% and finally the contribution of road vehicles to total imports in 2013 was 5.90%. The contributions of road vehicles importation to the total value of imports has been significantly huge as indicated in Tables 1.1.

Imports in Kenya are mainly transported via road and it sums up to roughly 75 percent of the whole travel, while railing makes up the remaining 24 percent. The mode of transport is influenced by the delivery time, the nature of the cargo, the cost and the delivery point. The capacity building of roads and railways therefore to a higher degree is influenced by imports and this is why the government imposes an infrastructure levy on all imports outside East Africa to cover the costs of these infrastructures from the former railway development levy.

Table 1.1: Imports by Principal Commodity, 2010 – 2014 (Ksh Millions)

IMPORTS	2010	2011	2012	2013	2014
Crude Petroleum.....	72598	124,042	68,086	41,037	-
Petroleum Products	122004	199,120	237,557	252,673	292,643
Animal/vegetable fats and oils	38956	59,133	54,876	48,371	50,044
Medicinal & Pharmaceuticals Products	27879	39,681	41,307	40,114	52,088
Chemical Fertilizers	14186	23,045	20,184	27,957	19,331
Plastics in primary & non-primary forms	35995	49,296	47,650	55,182	60,217
Iron and Steel	43558	62,087	56,667	80,749	75,526
Industrial Machinery	158721	177,174	194,666	231,440	256,672
Road Motor Vehicles	55812	62,870	73,768	83,330	101,792
All other Commodities..... ..	377496	496,601	579,826	552,463	710,007
GRAND TOTAL	**947206**	**1,293,049**	**1,374,587**	**1,413,316**	**1,618,321**

Source: Kenya Facts and Figures (KNBS, 2014& 2015)

The Table 1.2 further presents information on automobiles in Kenya according to the Kenya revenue authority statistics on automobile registration. The statistics presented in the table indicates that the number of registered vehicles in total in 2010 stood at 196,456 in 2011 it was at 205,841 meaning that the automobile numbers in the country had increased by 4.77% while the number in 2012 was at 173,044 translating to 15.93% decline in the total number of registered vehicles from 2011. This is further an indication of a decline in the importation of automobiles in the country in 2012, however, the total number of vehicles registered in 2013 stood at 222,178 representing a 28.39% increase from that of 2012.

Table 1.2: Total number of Registered Automobiles , 2010 – 2014

Type of Vehicle/Motor Cycle	2010	2011	2012	2013	Number 2014*
Saloon Cars	16,165	11,026	12,985	16,343	15,902
Station Wagons	37,553	31,199	39,862	48,662	53,542
Panel Vans, Pick -ups, etc	6,975	7,442	7,945	9,819	12,568
Lorries/Trucks	4,924	5,247	7,821	9,570	10,681
Buses and Coaches	1,264	1,662	1,638	2,062	2,210
Mini Buses/Matatu	3,600	451	78	235	213
Trailers.	2,379	2,556	3,761	3,973	2,925
Wheeled Tractors	1,161	1,179	1,386	1,902	2,032
Other vehicles	3,648	2,724	1,753	1,451	2,533
Total Motor Vehicle	77,669	63,486	77,229	94,017	102,606

Motor and Auto Cycles	117,266	140,215	93,970	125,058	111,124
Three Wheelers	1521	2,140	1,845	3,103	4,327
Total Motor Cycles	118,787	142,355	95,815	128,161	115,451
Total Units Registered	**196,456**	**205,841**	**173,044**	**222,178**	**218,057**

Source: Kenya Revenue Authority/National Transport and Safety Authority

Governments equally in developed and developing countries gather levies to finance community services. Marina et al. (2002) argued that, "excise duty is simply recognized sensible method for gathering resources in sequence to fund public expenses for good quality and services consumed by every citizen". Tax returns matured as a percentage of Gross Domestic Product from roughly 10 percent in the 1960s to about 20 percent by the early 1980s (Karingi et al. 2004). During the years instantly following the beginning of the TMP returns steadily raised, getting to 24.6 percent of GDP 1995-1996, behind which they alleviated to approximately 23 percent in anticipation of the ending of the decade (KRA 2005 Annual Revenue Performance Report). In 1999-2000 returns declined below 20 percent of GDP, and this drastic fell persistently until they achieved a low of 17.8 percent of GDP in 2001-2002. **Ever since subsequently there has been a slight rise to 20 percent of Gross Domestic Product in 2004-2005. This evolution is illustrated in Figure 1.1.***(This is just an overview illustration of tax revenue as a percentage of GDP over the years)*

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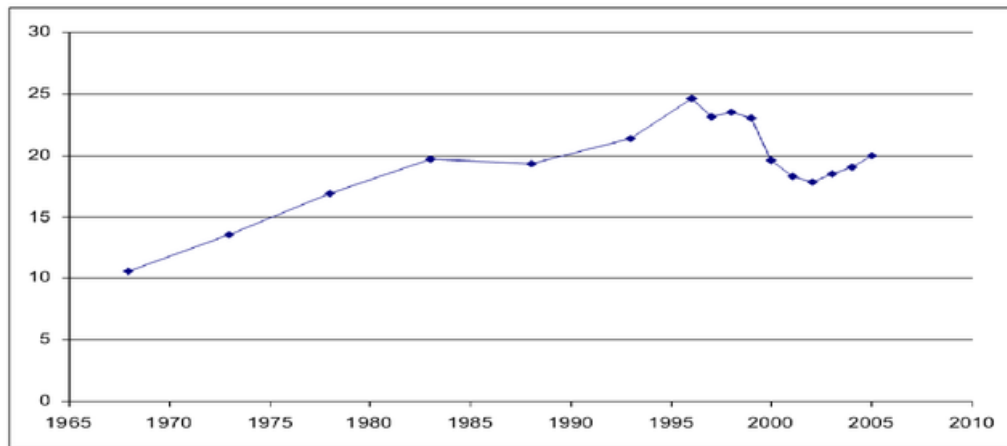
Source: Karingi et al. (2004a)
Figure 1:1   Tax Revunue (1968-2010) as a percentage of GDP

1.2   Statement of the Problem

Usually, the full amount of tax income of the government regularly depends on the volume of the tax base, the levels of tax rates accepted in the tax scheme, governmental effectiveness, and the conformity rate. The excise duties launched must be suitable and adequate to fund the disbursement of the government at the end of the day. In additional remarks, returns ought to rise with state income, and the total tax structure must develop to boost the income capitulated over time (Jenkins, Kuo & Shukla, 2000).

Samwel and Isaac (2012) conducted a study on elasticity and buoyancy of Kenya's tax components and Kenya's tax systems and found out that a declining percentage of incremental revenue was transmitted to the government in the form of taxes, meaning that the tax structure was less buoyant, it was also found that lessening amount of incremental returns was transmitted to the government in the form of tax income thus

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implying that the tax structures in Kenya were inelastic over the study period. Mawia and Nzomoi (2013) conducted an empirical investigation of tax buoyancy in Kenya their findings concluded that the entire excise duty was buoyant, whilst the personal duties were not buoyant apart from the excise duty which was buoyant with reverence to the base. Further empirical evidence conducted by Mburu (2011) responsiveness of tax revenue to changes in national income in Kenya indicated that the tax revenue was neither buoyant nor income-elastic. Based on the review of the studies above it is evident that empirical investigation have mostly focused on the general taxes in the economy with little attention be drawn on the responsiveness of import taxes to changes in government revenue. It is against this background that the study seeks to investigate the responsiveness of automobile import taxes to changes in government revenue in Kenya.

1.3   Objectives of the study

1.3.1   General Objective

The general objective of the study was to analyze the responsiveness of automobile import taxes to government revenue.

1.3.2   Specific Objectives

The specific objectives of the study were;

i.   To determine the automobile import tax buoyancy and tax elasticity.

ii.   To establish whether there is a long-run relationship between automobile import tax revenue and total government revenue.

iii.   To provide policy recommendations based on the study findings

1.4 Research Questions

i. What is the automobile import tax buoyancy and tax elasticity?

ii. Does a long-run relationship between import duty tax revenue and total government revenue exist?

1.5 Significance of the Study

To academicians, this study contributes greatly as an addition to the existing literature on Kenya's Tax structure and reforms. Also, this study will stimulate more research in taxation and in particular the rest of the specific taxes in Kenya. This study can help policy makers take appropriate options for revenue mobilization. In particular, the government and policy makers can get additional information that could be useful in policy formulation and implementation particularly in the area of automobile import taxes in Kenya so as to improve the tax contribution to revenue productivity as well as aid in decision making in infrastructural projects to engage in.

1.6 Organization of the Study

The study comprised of five chapters. Chapter one gives the introduction which includes; Background of the study, statement of the problem, objectives of the study, research questions, significance of the study and organization of the study. Chapter two presents the overview of the tax system in Kenya, the theoretical and empirical literature for analyzing tax elasticity and buoyancy Chapter three gives the theoretical framework and model formulation as well as the methodology that was adopted in the study. Chapter four presents the study findings and the discussion while chapter five entails the study conclusions and policy recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.1   Introduction

This chapter presents the theoretical and the empirical evidence of the literature review. It gives views on tax buoyancy and tax elasticity in Kenya.

2.2   Theoretical Framework

When there is economic growth and tax revenue increases faster than GDP, then under such a scenario the tax is considered to be elastic. Sometimes there is growth in

tax revenue which is owed to escalation in the tax base and increase in tax rate. The two factors must be considered separately so as to get a clear picture of the tax revenue generation (Osoro, 1993).

2.2.1 Tax Elasticity

Elasticity of tax is the ratio of growth rate of tax revenue net of discretionary change in tax rates to the growth rate of tax base(Milambo, 2001).Many other scholars have defined tax elasticity. An estimation of discretionary changes in tax policy is not easy so as to measure the increment in the tax income. Expansion in income tax returns in response to GDP growth has to be moldered into two constituents: Routine expansion in reference to GDP and the enlargement out coming from flexible transformations in tax rates and legislation when holding GDP constant. Elasticity computes the receptiveness of income tax returns to alterations in countrywide revenue if the tax system remains unchanged. To approximate flexibility of every tariff system, returns sequences ought to be approved for the consequences of unrestricted alterations in tax policy.

Tsegaye (1993) says that a high elasticity may simply reflect the progressiveness of the tax structure, showing positive ratios of tax revenues to increases in income. A high elasticity (that is greater than unity) implies that the tax revenue increases faster than the income. This means if the tax is meant to maximize revenue, the government could rely on more elastic taxes which do not require frequent discretionary changes. It is therefore essential that the tax elasticity be equal to or exceeds unity to maximize revenue.

2.2.2 Tax Buoyancy

According to Osoro (1993) buoyancy of tax is the ratio of growth in tax income over growth in tax base. Buoyancy of tax measures the responsiveness of tax revenue to changes in income without controlling for the discretionary changes in tax policy. The discretionary changes are the changes which result in more tax revenue from the same tax base. The sources of such changes are changes in tax legislation or changes in the tax rate.

2.3 Empirical Literature

In consideration of data series of 1975/76-1984/85, Chowdhury et al. (1988) did a study on buoyancy and elasticity of main tax categories in Bangladesh. He employed regression method and expressed equations in the log linear form. It as well employed comparative adjustment method for estimation of elasticity for the assorted tax constituents. He found out that the rate of buoyancy was superior to harmony of all main tax heads apart from taxes from domestic services and goods and its constituent excise duty (which was almost unitary at 0.99). Maximum worth of buoyancy (1.11) rests on importation taxes and the minimum (0.90) to duties with domestic services and goods. A mean buoyancy of 1.03 for entire tax scheme indicated that in cse chronological outline of optional adjusts is replicated across the future, thus for one percent change in growth of GDP would lead to a so much insignificant expansion of tax income. All main taxes of Bangladesh tax system except the sales tax on import were established to be inelastic in relation to public returns. Conversely, all the tax bases were relatively elastic in relation with nationwide revenue. Therefore, a so

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much low yield in tax to the base elasticity of all taxes form the primary ground for low elasticity of income of Bangladesh tax structure.

Using total GDP, Wawire (2000) estimated the buoyancy of tax and elasticity of income of tax system in Kenya. Tax returns from different sources were regressed on their tax bases. The study found the tax system unsuccessful in raising the necessary revenues. The drawbacks of this study however were, it didn't consider other critical determinants of income from tax, for instance the abnormal situations that could have affected the productivity of tax revenue. Also the study did not separate tax revenue data by source thus it was hard to determine the tax base that bestowed more to the exchequer. Finally, it didn't contemplate on the time series considerations of the data used.

Mukarram (2001) demonstrated the elasticity and buoyancy of Pakistan's paramount taxes for years 1981 to 2001. The Chain Indexing Technique was employed in taking out causes of optional changes. Findings revealed that approximations of elasticity and buoyancy were high for direct taxes then seconded by sales taxes. Nevertheless, in consideration of comparative inflexibility of customs and excise duties, total tax elasticity emerged low. Additionally, elevated buoyancy coefficients juxtaposed to correlating coefficients of elasticity for total taxes, confirmed that most of the revenue enlargement was affordable as a result of increased tax rates and widened tax bases as a substitute to automatic growth.

Muriithi and Moyi (2003) analyzed effectiveness of Kenya's tax composition in the form of the tax reforms focusing on pre and post reform period. In the study, they

assessed the elasticity and buoyancy of individual taxes and overall tax structure. Their findings suggested that tax improvements have a positive impact on the total tax system and on individual tax handles though the effect of the reforms is not always uniform. Improvements had a bigger effect on direct taxes than on indirect taxes, implying that revenue leakage was a big problem for indirect taxes still.

Bilquees (2004) evaluated Pakistan's tax system on buoyancy and elasticity between years 1974-75 and 2003-04. He employed Divisia Index strategy for getting rid of impacts of optional changes as necessitated to approximate the built-inelasticity. It concluded that whole tax income elasticity in regards to total GDP base was less than unity. Sales tax was acknowledged mainly as a possible basis to improve in general the whole revenue. Sales tax with regards to manufacturing and imports also reimbursed the deficit of income resulting from lowering of tariff and excise duties. The income tax coefficient comprehensive of withholding tax, was found high while without withholding the tax coefficient turns low. Buoyancy coefficients revealed that revenue reforms didn't induce notable growth in revenue in Pakistan.

Skeete et al (2004) centered on performance of the Barbados's fiscal system between years 1977 to 1999. Primarily, Engle Granger technique was adopted for observing Co-integration across variables. Followed by, Error Correction Models (ECM) for approximating all of the buoyancy and elasticity values. For evaluation of tax elasticity, Prest's (1962) technique of netting out discretionary changes from annual tax revenue series was used. It concluded that elasticity of the tax regime was more receptive to transformations in gross domestic product in short run than that of the

long run. In addition, optional changes to the tax system were more robust as buoyancies were generally prominent than elasticity coefficients.

Kieleko (2006) evaluated tax revenue productivity in Kenya for the period 1973–2003. The productivity was measured through buoyancy and elasticity. The coefficients were measured through log regression of the taxes to the Gross Domestic Product. The analysis of this study was carried out using the Proportional Adjustment Method (PAM) in capturing the effects of tax reforms on discretionary tax measures and tax productivity. The results showed that there had been a considerable improvement of the tax revenue productivity and that the reforms made in this period had significant effect on the responsiveness of the tax system.

2.4   Summary of Literature

Most of the empirical studies reviewed above have examined the tax elasticity and buoyancy of various tax components in various country contexts, for instance Chowdhury et al. (1988) examined the elasticity and buoyancy of crucial tax categories in Bangladesh, Wawire (2000) estimated and income-elasticity buoyancy of tax system in Kenya; Mukarram (2001) demonstrated income elasticity of tax and tax buoyancy of paramount taxes in Pakistan between years 1981-2001; Muriithi and Moyi (2003) analyzed Kenya's tax productivity in the scope of tax reforms focusing on pre and post reform period; Bilquees (2004) scrutinized elasticity and buoyancy of Pakistan system of tax between years 1974-75 and 2003-04; Skeete et al (2004) on the other hand lay his empasis on the outcomes of the Barbados's fiscal system between years 1977 to 1999; Kieleko (2006) evaluated tax revenue productivity in Kenya for

the period 1973–2003. The focus of the study was the tax elasticity and buoyancy of automobile import tax revenue.

CHAPTER THREE
RESEARCH METHODOLOGY

3.0   Introduction

This chapter presents a description of the research design that was adopted in the study, the model specification for tax buoyancy and tax elasticity, definition and measurement of variables, data sources and type and the data analysis and estimation procedure that were adopted in the study.

3.1   Research Design

Research design is an arrangement that directs the research in the procedure of gathering, analyzing and interpreting observations. In essence, the research design is the researcher's plan for the techniques and tools employed to collect information and to assess it, so as to respond to research questions of this study (Eriksson & Kovalainen, 2008). The study therefore adopted a causal relationship research design as explained in Cooper and Schindler (2006).

3.2   Model Specification/Conceptual Framework

A number of studies have looked at the theoretical linkage between tax and revenue productivity (Osoro, 1991, 1993; OECD, 2010; Rao, 1992; Wildford and Wilford, 1978a; Muriithi and Moyi, 2003 among others). Asher (1989) observed that there are two concepts which are used to measure tax productivity namely elasticity and buoyancy. The relative make up of tax income has connotations for returns enlargement and constancy if it is believed taxes mainly mobilized to fund government expenses, both recurrent and capital. High income output is typically

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believed as one of the specification for a good tax structure in third world countries. This efficiency is conventionally calculated through thoughts of tax elasticity and tax buoyancy.

3.2.1 Tax Buoyancy Model Specification

Following the works of Ole (1975), Wilford and Wilford (1978a and 1978b), Rao (1979), Omoruyi (1983), Asher (1989), Osoro (1993; 1995), Ariyo (1997), Wawire (2000), Muriithi and Moyi, (2003), Wawire (2003; 2006); the basic estimation procedure for tax buoyancy can be specified in equation (3.1) in the Cobb-Douglas function of the form;

$$T = e^{\alpha} Y^{\beta} e^{\beta} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{Eq.}$$
(3.1)

Where:

T = tax revenue,

Y = income (GDP),

α = constant term,

e = natural number,

β = buoyancy coefficient.

This model used in this study is specified by taking the double logarithm transformation of equation (3.1) which yields the buoyancy coefficient of β_k as shown below;

$$\ln T_k = \alpha_k + \beta_k \ln Y + \mu_k \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$
Eq. (3.2)

Where, T_k = revenue from the Kth tax, β_k = buoyancy coefficient, α_k = constant term, Y = income (GDP), and μ_k = error term.

3.2.2   Tax Elasticity Model Specification

The elasticity concept generally assumes the below functional relationship:

$$\ln RT = \beta_0 + \beta_1 \ln TB + \varepsilon \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{Eq. (3.3)}$$

Where;

β_1 Represents the tax elasticity of import duty,

RT represents the rate adjusted tax series of import duty tax,

TB represents the tax base of automobile import tax (GDP)

ε represents the residual of regression model.

In practice, assorted methods are accessible for eliminating the effects of discretionary changes. To obtain the rate adjusted tax series of the import duty the study will use Exponential Smoothing Method approach to attend to enormous policy changes to

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remove effects of Discretionary Tax Measures (DTM) on historical Time Series Data. This technique will involve the alteration of tax output series through smoothening variations signifying that the tax incomes that would have been obtained in each year have rates applicable in the reference year and prevail over the period.

3.3 Definition and Measurement of Variables

The variables of the model are; real GDP (Y) and total automobile tax revenue variables. Table 1 below shows the variables, their symbols and how they were measured.

Table 3.1:   Definition and Measurement of Variables

Variable	Definition and Measurement
Automobile Import Tax Revenue (T)	This is the summation of all automobile import tax revenues measured in Kenya shillings -All automobile import taxes include summation of: • Import duty • Excise duty • VAT • Import declaration fee • Railway development levy
Gross Domestic Product (Y)	This is the value of services and goods produced in a country over a time frame of one year regardless of whether they were produced by foreigners or residents. It will be measured in Kenya shillings.

3.4   Data Source and Type

The study used time series data of automobile import taxes, total revenue and their bases, GDP deflator and consumer price index for period 1990-2014 was collected from published economic reports; Kenya National Bureau of Statistics economic surveys, the World Bank development indicators report and statistical data from the Kenya Revenue Authority. Both independent and dependent variables are converted to real variables, measured in constant (2005) Kenya shillings.

3.5   Estimation Procedure and Data Analysis

The time series data for GDP and its related variables are also converted from their nominal values to their real values by dividing nominal values with the GDP deflator using 2005 as the base year. This deflator is chosen because it is the most comprehensive price index for GDP and it correctly measures inflation since it amounts to weighted average of changes in all prices in the economy (Wawire, 2006).

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The tax revenues are converted to their real values by dividing their nominal values with the consumer price index (CPI). The CPI is used because it falls on the expenditure side of the GDP equation.

Before subjecting data into regression analysis, variables were described. This includes showing the trends of various variables both in nominal and in real terms. Also the trend of contribution of each tax to revenue was described.

Johansen Co-integration method is used to determine the long run relationship across the variables. This study applied import duty tax revenue model for estimating buoyancy and elasticity as indicated in equation 3.2 and 3.3 above.

The parameters were estimated using Ordinary Least Square (OLS) method by use of Stata statistical package. Since the study used time series data, a number of tests were conducted. First the test for normality tests which was carried out by using the Kurtosis, Skewness tests and Jarque-Bera tests.

In addition, stationarity test was done using Augmented Dickey-Fuller tests which were complemented by Phillips Perron test. The presence of unit root at levels prompted for the use of the first or second difference of the data.

Other tests that were conducted are the test for autocorrelation and Heteroskedasticity of errors. These tests are meant to verify that the data are normally distributed, stationary and have no mutual correlation among the independent variables and thereafter use it in regressions without fear of getting the spurious regression results.

3.6   Expected Output

The study expects the tax elasticity and tax buoyancy to have positive coefficients and also the magnitude of the beta coefficients to be greater than unity thus implying that taxes are elastic.

CHAPTER FOUR
RESULTS AND DISCUSSIONS

4.1 Introduction

The chapter presents study outcome in terms of descriptive statistics using tables and trend analysis of various variables conducted using figures. Similarly, regression results for elasticities and buoyancies are provided based on the research objectives. The relationship between automobile import tax revenue and total government revenue is presented. Finally, discussions are done based on the estimation.

4.2 Descriptive Statistics

The study analysed the averages, standard deviation, minimum and maximum regarding to the study variables. Also, skewness and kurtosis are considered. Variables under consideration include; Gross Domestic Product (GDP), import tax revenue, excise tax, value added tax and consumer price index (CPI). From table 4.1, GDP was 1058214 on average with the minimum being 195540 and maximum was 3305859 over the entire period of study.

The import duty as a percentage of GDP was 3.48% on average with a variation of 1.39%. Over the entire period, import duty ranged between the minimum of 1.45% and the maximum of 6.57%. Excise duty as a percentage of GDP was on average 5.93% with higher variation compared to import duty of 3.88%. The minimum and maximum reported was 3.12% and 16.32% respectively.

On the other hand, VAT as percentage of GDP was approximately 7.55% on average with a lower variation of 2.45% compared to variation of excise duty but slightly

higher compared to variation of import duty. The minimum and maximum VAT reported over the entire period was 4.96% and 13.8% respectively. Finally, the consumer price index was on average reported to be 65.97 units with the minimum being 11.4 units and maximum being 146.84 units. More other details are as shown in table 4.1 below.

Table 4.1: summary statistics of GDP and Tax revenues

Variable	Observations	Mean	Std. Dev.	Min	Max
GDP	25	1058214	681219.5	195540	3305859
Import duty	25	3.475022	1.386746	1.448799	6.568988
Excise duty	25	5.926295	3.875737	3.126663	16.32209
VAT	25	7.547662	2.453692	4.958583	13.79655
CPI	25	65.9724	39.96909	11.4	146.84

Further the study considered skewness and kurtosis. The kurtosis statistic shows that all variables are platykurtic. This means their distributions are flatter than those from a normal distribution, with a wider peak and the probability for extreme values is lower than that of a normal distribution with the values having a wider spread around the mean. As a measure of asymmetry of the distribution of the series around its mean, the statistic for skewness shows that all the variables are positively skewed, meaning that their distributions have long right tails.

Table 4.2: Skewness and Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	Skewness	Kurtosis	(Joint) Prob>chi2
GDP	25	0.0078	0.0116	1.250743	5.687841	0.0047
Import duty	25	0.3163	0.7723	0.4186818	2.456216	0.5563
Excise duty	25	0.0005	0.0488	1.781305	4.619296	0.0021
VAT	25	0.0204	0.5513	1.054677	3.033826	0.0646
CPI	25	0.1695	0.4997	0.5841276	2.267241	0.2734

4.3 Trend analysis

The study further conducted graphical analysis to show how tax revenues have been moving over the stipulated time period. Tax revenues as a percent of GDP exhibited a fluctuating trend over the study period. From figure 4.1 below, all tax revenues declined with an increasing rate from the start of study period for about four years to the year 1995. Then a gradual downward trend was witnessed for about a decade which went all the way to the year 2007, which may be attributed to a shift from taxes from international trade towards taxes from domestic services and goods as well as embracing various economic integration blocks (e.g. East Africa Community-EAC). These blocks either lowered or eliminated tariffs to the bare minimum hence decline in respective taxes.

However, the next phase till almost the end of the study period experienced increased revenue which may be associated with better foreign policies regarding trade designed and good business environment as a result of constitution promulgation and other political reforms in the country. This trend unfortunately never lasts as the last year experienced a sharp downward trend in all tax revenues.
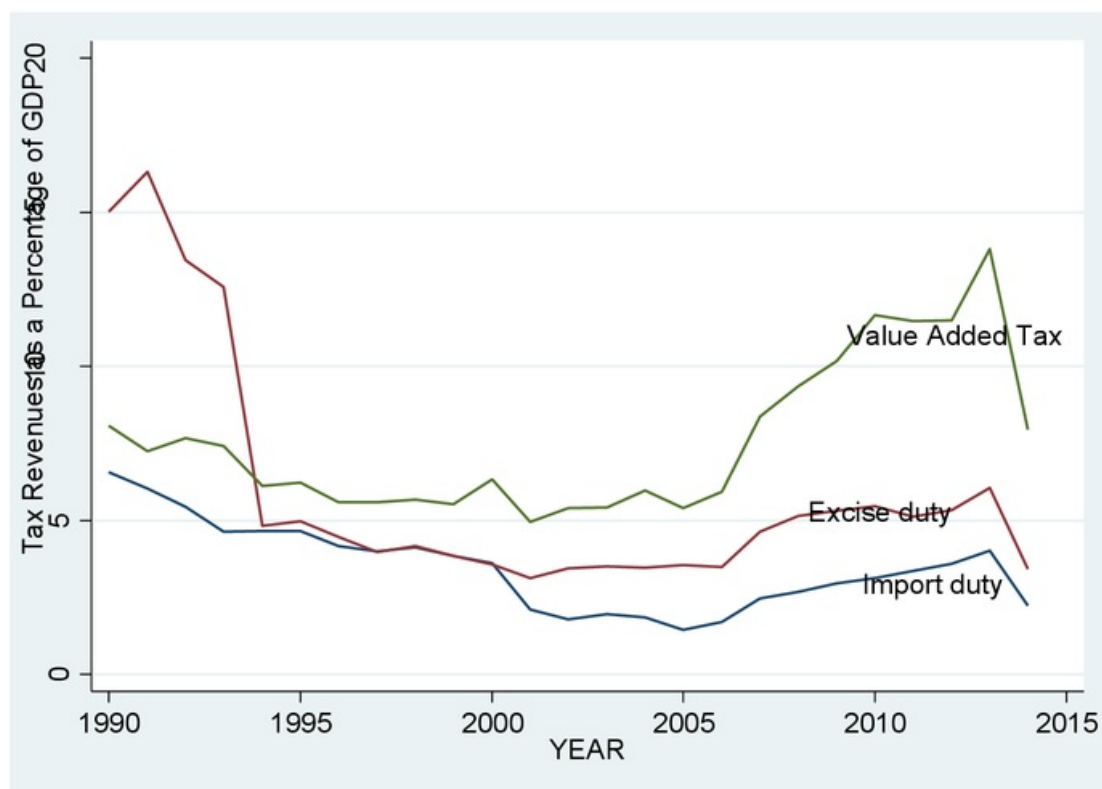

Figure 4.1: Moving Average Tax Revenues (1990-2014)

4.4 Correlation analysis

The correlation coefficients are used to describe the relationship between various pairs of variables. Correlation coefficients greater than zero indicate a positive

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relationship while coefficients less than zero indicate an inverse relationship. From the correlation matrix, GDP is negatively correlated to import duty and excise duty but positively correlated with VAT. Import duty is positively correlated with both excise duty and VAT. Finally, VAT is also positively correlated with excise duty. The correlation coefficients for these pairwise comparisons are as presented in Table 4.3.

Table 4.3: Correlation Matrix

Variables	GDP	Import	Excise duty	VAT
GDP	1.0000			
Import duty	-0.6666	1.0000		
Excise duty	-0.5162	0.7812	1.0000	
VAT	0.3794	0.1370	0.1785	1.0000

As can be observed from the correlation matrix, all pairs are less than the threshold of 0.7 implying absence of multicollinearity which may lead to spurious regressions due to perfect predictions/collinearity.

4.5 Unit roots tests

The Ordinary Least Squares (OLS) requires time series variables to be stationary. The properties of stationary time series variables are constant over the analysis time and have very low tendency to change. If regression proceeds in the presence of non-stationary variables, the results may end up being spurious. The Augmented Dickey

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Unit Root Tests was used to determine if variables are non-stationary. The test results are as presented in Table 4.4;

Table 4.4: **Unit root test**

Variable	P value ($\alpha=0.05$)	P value after First difference ($\alpha=0.05$)
GDP	0.0351	-
Import duty	0.1873	0.0346
Excise duty	0.1102	0.0001
VAT	0.5108	0.0002

Source: Author's computation

From Table 4.4 above, it was revealed that GDP was only stationary without any differencing while all other tax revenue components exhibited stationarity after first differences which led to the following model;

$$GDP_t = \beta_0 + \beta_1 Dimd_t + \beta_2 Dexd_t + \beta_3 Dvat_t +$$
$$\varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .2$$

$\beta's$'s are the coefficients to be estimated

The above model is now stationary implying it can be estimated after identifying the order of cointegration of the variables. However, it should be noted that if two or more variables are integrated of the same order and their differences differences have no clear tendency to increase or decrease then this will suggest that their differences are stationary. Table 4.4 above shows all tax revenue components are integrated of the same order which implies that cointegration test can be conducted to establish the relationship. However, the study first established the buoyancy and tax elasticity of import duty.

4.6 Establishing buoyancy of automobile import duty in Kenya

To determine the import buoyancy, the study adopts the description of Oketch and Mburu (2011) who asserts that the base is taken to be GDP, although other bases are possible such as imports as the base for tariffs. The revenue could refer to total tax revenue, or to revenue from any given tax. Since the study had only tax revenues and GDP, Haughton (1998) recommends calculation of the growth of tax revenue and of the base (GDP), between the end years and use these to calculate buoyancy. However, the result may be too sensitive to the end years. This study chose a time difference of five years as expected change in tax revenues and total income (see also figure 4.1 for time gaps of suspected changes among variables).Table 4.5 provides the regression results in terms of p-values, the difference, and t-ratios for tax buoyancy.

Table 4.5: Coefficients of Tax Buoyancy

Type of Tax	Coefficient	t-statistics	P value
Import tax	0.5947566	7.58	0.000
Excise tax	0.7530073	13.71	0.0000
VAT	0.7563296	15.19	0.0000
Total Tax Revenue	0.7377341	14.38	0.000

From the above table, the buoyancy of the whole tax system was approximately 0.74 with a corresponding p-value of 0.000.The results clearly show that automobile import buoyancy was significant and statistically different from 1 at 1% level of significance. Considering the other taxes, i.e. import tax, excise tax and VAT which had buoyancy of 0.5948, 0.753 and 0.7563 respectively with corresponding p value of 0.000 for all of them.

Table 4.6-4.10 shows the coefficients of tax buoyancy and whether they have any effects on income tax. Note that D1 represents first difference. Also, the models were robust hence taking care of heteroscedasticity and autocorrelation.

Table 4.6 Model on Tax buoyancy and National Income

National income	Robust regression					
	Coefficients	Std. Err.	t	P>t	[95% Conf.	Interval]
Import buoyancy						
D1.	-3.97342	3.749483	-1.06	0.312	-12.22598	4.279136
Excise buoyancy						
D1.	0.5035472	0.8255165	0.61	0.554	-1.313402	2.320497
VAT buoyancy						
D1.	0.8856107	1.154269	0.77	0.459	-1.654917	3.426139
Constant	-0.3656457	0.0747492	-4.89	0.000	-0.5301675	-0.2011239
Linear regression Number of obs = 15 F(3, 11) = 6.14 Prob > F = 0.0104 R-squared = 0.2688 Root MSE = 0.25349						

In this model, the study found that the coefficients of buoyancy of all components of tax revenue were statistically insignificant at all levels. However, the overall model was significant since the p value was 0.0158 implying the tax components were statistically significant in explaining national income.

Table 4.7: Model on tax elasticity and national income

National income	Robust Regression					
	Coefficients	Std. Err.	t	P>t	[95% Conf.	Interval]
Import elasticity						
D1.	15.44361	5.791065	2.67	0.014	3.400434	27.48679
Excise elasticity						
D1.	7.19844	0.8463513	8.51	0.000	5.438356	8.958524
Constant	-0.1629633	0.0359931	-4.53	0.000	-0.2378151	-0.0881114
Linear regression Number of observations = 24 F(2, 21) = 42.63 Prob > F = 0.0000						

R-squared	=	0.5353
Root MSE	=	0.1726

The tax elasticity model revealed an overall significance with all of its tax components being statistically significant at 1% level of significance. However, VAT elasticity was dropped due to collinearity after applying robust. The result shows import elasticity significantly increasing base to national income by 15.44% holding other factors constant while excise duty increased base national income by 7.2% holding other factors constant. The model shows that the two tax components explained approximately 53.53% of the national income while the rest proportion was attributed to other factors not considered in the model.

Table 4.8: Model of buoyancy of Total tax revenue and national income

National Income	Robust Regression					
	Coefficient	Std. Err.	t	P>t	[95% Conf.	Interval]
Total Revenue Buoyancy	-863.6028	284.0629	-3.04	0.007	-1460.397	-266.8088
Constant	-0.3053476	0.0561368	-5.44	0.000	-0.4232867	-0.1874085

Linear regression
Number of   observation = 20
F(1,   18)   =9.24
Prob > F   =   0.0007
R-squared   =   0.0942
Root MSE   =   0.23546

The findings in the table above give the relationship between total tax buoyancy and national income. The model was significant and it fitted the data since the overall p value was 0.0007 which was less than 5% level. However, only 9.42% of national income was explained by total revenue buoyancy which is expected since other variables or factors were not considered. From the results, national income was

significantly lowered by total tax buoyancy whereby a unit change in total tax buoyancy led to 863.6% decline in national income.

Table 4.9: Model of elasticity of total revenue and national income

National income	Robust Regression					
	Coefficients	Std. Err.	t	P>t	[95% Conf.	Interval]
Total Revenue Elasticity	354.8921	910.2414	0.39	0.700	-1528.086	2237.87
Constant	-0.2278687	0.06313	-3.61	0.001	-0.3584631	-0.0972742

Linear Regression
Number of   observation   =25
F(1,   23)   =   0.15
Prob > F   =   0.7002
R-squared   =   0.0035
Root MSE   =   0.24584

Finally, this model was not fit as the overall p value was insignificant (0.7002) implying that total revenue elasticity was not appropriate in explaining the national income. Similarly, the corresponding p value for elasticity was also insignificant.

4.7: Co integration Analysis

The study conducted Engel granger test for co integration to establish the nature of the relationship of automobile import duty and national income. The null hypothesis of there being no co integration was rejected at 5% significance level. This is because the form of the lags of the residuals and the first differences of the first lags was found to be significant at 5% level implying failure to accept the null hypotheses. This means that the alternative hypothesis is adopted implying that presence of a long run relationship between automobile import duty and national income.The results of cointegration are as indicated in Table 4.10,

Table 4.10: Engel granger test of cointegration

Residuals	Coefficients	Std. Err.	t	P>t	[95% Conf.	Interval]
L1.	3.542968	0.705351	5.02	0.002	1.875078	5.210858
LD.	-1.217454	0.8837366	-1.38	0.211	-3.307159	0.872251
Constant	-1.93753	0.5409252	-3.58	0.009	-3.216614	-0.6584448
Number of Observation = 23						

```
F( 2,   20) =   825.35
Prob > F    =   0.0000
R-squared   =   0.9880
Adj R-squared =  0.9868
Root MSE    =   69471
```

4.8: Discussion of the Study Findings

Considering the total tax revenue (table 4.5), where the overall tax system had a buoyancy of 0.7377 which implies that the tax system yields a 0.7377% change in tax revenue. This could be attributed to both automatic and discretionary policy changes i.e. for every 1% change in economic growth (GDP). According to Oketch and Mburu (2011), this lead to a reducing proportion of incremental income which is transferred to government in the form of taxes, suggesting that the tax system is less buoyant. Further estimation results indicated import, excise and VAT tax had buoyancies which were statistically significant different from one. This means that these tax components were buoyant and did yield a respective percentage changes in their tax revenue as a result of both automatic changes and discretionary policy, for every 1 % change in GDP. Note however that all these major tax components despite being statistically different from 1, they exhibited buoyancy indices below unity, an aspect which reflected inflexibility of individual taxes in real terms.

The study also exhibited a long run association between tax buoyancy and national income as indicated in table 4.10. Following the estimation results on total tax buoyancy and elasticity, in the long run, it is evident that tax buoyancy has a significant effect on national income. The study findings indicate buoyancy of total tax revenue as statistically significant factor which influences national income. This

study concurs with the findings of Wawire (2000) who evaluated the Kenya's tax system. This study concludes that the tax system fails to raise necessary revenues.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS
5.1 Introduction

This chapter summarizes the findings of the study in relation to the objectives, literature review and main variables of the study. It later makes conclusions based on the responsiveness of automobile import taxes to government revenue. Policy recommendations are thereafter made as a way of filling the gaps.

5.2 Summary and conclusions of the study

Kenya basically is a net importer country where the value of commodity it imports far exceeds the value of commodity it exports. From the available statistics, the total number of registered vehicles in 2010 stood at 196,456 in 2011 it was at 205,841 meaning that the automobile numbers in the country had increased by 4.77% while the number in 2012 was at 173,044 translating to 15.93% decline in the total number of registered vehicles from 2011. This was seen as an indication of a decline in the importation of automobiles in the country in 2012, however, the total number of vehicles registered in 2013 stood at 222,178 representing a 28.39% increase from that of 2012 which contributed invaluably to the GDP. On the other hand, the total tax revenue of the government invariably depends on size of the tax base, levels of tax rates adopted within the tax system, administrative efficiency, and compliance rate.

Literature reviewed especially on tax buoyancy in Kenya reveals that the total tax was buoyant, while individual taxes were not buoyant with respect to their base. Other studies on responsiveness of tax revenue to changes in national income in Kenya conclude that the tax revenue is neither income-elastic nor buoyant. Amidst the

inconclusiveness, this study was conducted with the main objective of establishing the responsiveness of automobile import taxes to government revenue. Specifically, it examined the automobile tax buoyancy and elasticity in Kenya and establishes the nature of the relationship exhibited between total tax revenue and national income. The objectives were tested at 1%, 5% and 10% level of significance. Necessary tests were carried out to validate the regression models adopted. The study employed the robust linear regression in estimating the buoyancy as well as log linear model and used Ordinary Least Squares (OLS) as an estimation technique.

From the regression results total tax buoyancy was statistically significant at 1% level. Similarly, it was showed that national income was statistically influenced by total tax revenue buoyancy in Kenya. The study concludes that the significance of buoyancy of tax revenue in Kenya may be as a result of relevant reforms undertaken over period since 1990.

5.3 Policy Recommendations

The size of government budget surplus and/or deficit has persistently been one of probable most critical statistic that measures impact of government fiscal policy in any economy. Also major source of government revenue which is tax has failed to generate adequate revenue to finance the expenditures thereby continuously contributing to budget deficits. Based on the study results, it may be conclusive to argue for tax buoyancy in Kenyan tax system. The impact of tax revenue may manifest more on the sectors it is channelled to as well as judiciousness of its application given the significant effect it exhibits to national income. Given the long

run relationship established between total tax revenue and government revenue this study suggests there reasons to re-evaluate the tax policy measures implemented over past years to adjust for the kind of response to national income while intensifying tax collection measures. The nature of reforms that may be considered, need to have a positive influence on economic growth rather than discouraging overall development.

5.4 Limitations of the Study and Areas of Further Research

The study concentrated mainly on the automobile industry and left other sectors which are also very significant in determining the economic growth. Future studies need to consider these areas and establish buoyancy of tax revenue. Also, the study was limited to available data which was sourced from multiple sources, there is need to have the same study considering a longer time period to increase degrees of freedom and consequent more accurate projections and inferences. Finally, factors considered critical in moderating the relationship between total revenue and national income were not considered hence suspected biased estimates. This implies more studies need to incorporate these aspects. Better models need to be adopted such as panel data which are more dynamic with considerations of some specific sectors at the same time for robust results.

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