# GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH IN KENYA:1963-2008

BY

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A Research Project Submitted to the School of Economics in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Arts in Economics of the University of Nairobi.

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## DECLARATION

This research is my own original work and has not been presented for a degree award in any other university.

Signed.....Date 28/10/10.....

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This research has been submitted to the School of Economics, University of Nairobi with our approval as university supervisors;

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Signature.....Date 28/10/10.....

Dr. Odhiambo Sule

## DEDICATION

This work is dedicated to my entire family for the support that they have accorded me during my studies.

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Lastly, I am wholly responsible for this entire paper and all what is contained in it. Any shortfalls are entirely my responsibility.

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## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| ADF | Augmented Dickey-Fuller |
| ADL | Autoregressive Distributed Lag |
| AIC | Akaike's Information Criterion |
| ASALs | Arid and Semi Arid Lands |
| CLRM | Classical Linear Regression Model |
| ECM | Error Correction Mechanism |
| ERS | Economic Recovery Strategy |
| FEVD | Forecast Error Variance Decomposition |
| GDP | Gross Domestic Product |
| GMM | General Method of Moments |
| GNP | Gross National Product |
| IRF | Impulse Response Function |
| JB | Jarque-Bera statistic |
| LDCs | Less Developed Countries |
| MTEF | Medium Term Expenditure Framework |
| OECD | Organization for Economic Cooperation and Development |
| OLS | Ordinary Least Squares |
| PFMR | Public Financial Management Reforms |
| PPP | Private Public Partnerships |
| SBIC | Schwartz Bayesian Information Criteria |
| UK | United Kingdom |
| VAR | Vector Autoregressive |

## OPERATIONAL DEFINITION OF TERMS

**Government expenditure:** This is synonymous with public expenditure and it includes government final consumption, government investment and transfer payments.

**Development expenditure:** The allocation of the government's fiscal budget to the development vote /capital account for the financing of development programmes.

**Recurrent expenditure**: This is the allocation of funds from the government's fiscal budget to the recurrent vote to finance day to day government operations. This includes government administrative services, and consolidated fund services, debt financing as well as operations and maintenance of government programmes.

**Public goods:** All those goods and services that are non-rival in nature and whose enjoyment by one person does not necessarily diminish that of another.

**Public sector** this is the portion of the economy whose activities both economic and noneconomic are under the control and direction of the state.

**Baumol's Disease**: the inherent nature of public goods which renders productivity advances in the public sector very difficult, thereby leading to an increase in the relative prices of its output.

# ABSTRACT

The question of whether or not public expenditure stimulates growth has dominated theoretical and empirical debate. One viewpoint corresponding to Keynesians is that government involvement in economic activity is vital for growth, but this view is opposed by monetarists who hold that government operations are inherently bureaucratic and inefficient and therefore stifle rather than promote growth. Wagnerian propositions on the matter indicate that as income increases, inevitably, government activity expands as well. In the empirical literature, results are equally mixed.

The aim of this paper is motivated by the need to examine the case for Kenya by analyzing the relationship between government expenditure and GDP growth. Historical annual data for Kenya from 1963-2008 obtained from published government documents mainly the annual economic surveys and statistical abstracts were utilized. A multivariate time series analysis was conducted with emphasis on the shape of impulse response functions under VAR and causal patterns established using Granger causality tests were adopted to show how government expenditure and inevitably size of government interact with GDP growth. The results of the analysis show that even though GDP level in one period determines its own level in future periods; government expenditure actually influences GDP in the medium and long term. Similarly, government size has a positive influence on GDP only in the short run but this effect becomes negative in the long run. Thus government must continue to spend more in productive areas to ensure economic growth.


Key terms: Government expenditure, Gross Domestic Product, granger causality.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Economics of Government Spending

Governments use discretionary fiscal policy measures to influence the direction of the economy through changes in the level and composition of government expenditure and funding. They contribute to the economy by delivering on various principal functions including; efficient allocation of resources, fair distribution of incomes and stabilization of economic activity, regulation of markets, and harmonization of social conflicts. The classical economist Adam Smith discussed the duties of government as protection against external aggressors, maintenance of order at home, and erecting those public institutions and works which though they may be in the highest degree advantageous to a great society, could never repay the expense to any individual.

In general, the government functions can be achieved either via the effects of fiscal stabilizers, discretionary fiscal adjustments, or through a combination of both. Proponents of discretionary adjustments where government intervenes in economic activity maintain that such intervention can spur long term growth. Opponents on the other hand hold the view that government operations are inherently bureaucratic and inefficient and therefore stifle, rather than promote growth.

Economists classify government expenditure into three main categories. First is government final consumption expenditure which refers to government acquisition of goods and services for current use. Second, is government investment which refers to government acquisition of goods and services intended to create future benefits such as infrastructure investment or funding of research. Such acquisition of goods and services is made through own production by the government using government employment, fixed assets and through purchases of goods and services from market producers. Thirdly are the transfer payments where central governments transfer money to the general government and welfare for the poor as well as Social Security payments for the elderly. As Branson (1989) contents, governments' budgets

which detail the above expenditures are a fairly close measure of governments' impact on the economy.

The theory of public finance shows that government expenditure can be designed and operated as an effective tool for improving the performance of the economic system. The study of functional finance has led to realizations that the market mechanism can lead to undesirable results strengthening the case for public sector role at least to correct the market failures. Thus the roles of private and the public sectors are seen to be complementary since in the absence of the government sector, private sector may hardly make a contribution towards production and development.

While a central question may be whether government expenditure increases the long run steady state growth, the general situation is that, government expenditure diverts economic resources into channels determined by the government in accordance with national objectives and public policy. As a consequence, the scale and direction of government expenditure may affect the pattern and levels of consumption of the community, volume of production, allocation of resources, distribution of incomes, levels of prices and employment.

The nature and impact of government expenditure on growth depends on the form that it takes too. Researchers in this area concede that government expenditure on investments and productive activities contribute positively to growth while government consumption expenditure is growth retarding. Similarly, government expenditure can have either direct or indirect effect on the growth of an economy. A direct effect occurs when expenditure results in accumulation of capital stock in the economy while an indirect effect relates to increasing marginal productivity of the supplied factors of production.

Government spending as a fiscal policy stance is also supported by the expectations view. This view suggests that reductions in government spending can be expansionary due to their effects on private sector expectations about taxation. Secondly, the labor market view stresses the effect of the fiscal adjustments that result from reducing government spending, especially transfers and the government wage bill, rather than increasing taxes. They induce

a moderation in the wage claims by unions, stimulating employment, capital accumulation, and hence economic growth.

The theory of interest group activity in public choice as well posits a relationship between the influence of special interest groups and the size of government. Larger governments introduce inefficiency that can be expected to lessen the positive influence of the public goods provided. The Government of Kenya which is a coalition government formed of many parties has a large cabinet and an ever growing expenditure portfolio. Thus one can assume there are definite interest groups within the system, which may give rise to the aforesaid inefficiency in government expenditure.

Both Keynesians and monetarists emphasize the importance of government expenditure management. In Keynesian macroeconomics, many kinds of public expenditures contribute positively to economic growth, through multiplier effects on aggregate demand. At the same time, government consumption may crowd out private investment dampening the economic stimulus in the short run and reducing capital accumulation in the long run. The monetarists on the other hand argue that since increases in money supply would cause inflation, this growth in money supply has to be controlled hence the need to control government expenditure.

## 1.2 Government Expenditure in Kenya

Government expenditure has a major role to play in determining the level of economic growth in an economy. This is because any expenditure policies that the government makes reveal its objectives and priorities (Republic of Kenya, 2003).

According to the Republic of Kenya (2003), the national budget is the main instrument through which government of Kenya's transactions are planned and carried out. The budget which focuses on the Government's priority areas and set programmes is reviewed annually. In general, the aims of this prioritization are economic growth, increased wealth and employment opportunities, equitable distribution of the national resources and reduced poverty. The budget outlines sectoral measures as well as expenditure and tax measures that are implemented during each financial year (Republic of Kenya, 2008).

The government's main expenditure strategy has been restructuring of overall expenditure by redirecting resources to sectors that are deemed to promote faster economic growth (Maingi, 2010). To study Kenya's expenditure strategy, it is important to note first that fiscal policy has been enshrined in long-term policies such as *Sessional paper No.10 of 1965* (Republic of Kenya, 1965), the *Sessional Paper No.1 of 1986* (Republic of Kenya, 1996), and five-year National Development plans that guide planning and investment (Republic of Kenya, 2007). From the year 2003 the government adopted the *Economic Recovery Strategy* (ERS) (Republic of Kenya, 2003) and currently the Vision 2030 as the blue print for development (Republic of Kenya, 2007).

In many types of national economies, increases in the public expenditure ratio to national income may be inevitable. This may be due to an expanding dependent population, or public sector output being relatively more costly than production in the private sector or even a greater use of bureaucratic methods. For instance, in 1966 the Kenyan government set a rule to restrain its expenditure, specifically recurrent expenditure to 7 percent of its total expenditure per annum (Republic of Kenya, 1967). This became infeasible as all development projects carried implications for recurrent expenditures and hence the limit was removed.

In the plan period 1974-1978, the government targeted to increase development expenditure by 9 percent in order to expand output. These increases were to be made in selected sectors including Agriculture, manufacturing forestry and electricity generation (Republic of Kenya, 1974). The government's emphasis on helping the working poor ensured that its activities had an important influence over the economy. Through its fiscal measures, the government influenced the general level of demand; it was a large employer and a substantial purchaser of goods and services. Thus it could foster private investment and influence its regional distribution (Republic of Kenya, 1975).

In the following consecutive plan periods from 1979-1983 through to 1997-2001, the government continued to rationalize its expenditure with more resources channeled to development and recurrent non-wage expenditure. Spending on rural infrastructure was enhanced in roads, power generation, water supplies and polytechnics as well as extension

services in agriculture (Republic of Kenya, 1986). Similarly, to improve efficiency and productivity of government expenditure, funding was mainly directed towards operation and maintenance of existing projects as opposed to new ones. New projects were only funded if they were considered productive and of very high priority (Republic of Kenya, 1986).

In 1988. recurrent expenditure rose due to high debt obligations, double intakes at public universities, the Fourth All Africa Games and general elections. This reflected an expansion of public expenditure due to increasing demand for public services (Republic of Kenya, 1988). In 1990, the government froze recruitment into the civil service for the lower cadre staff in job groups A to G and also banned the filling of posts that had been vacant for at least six months (Republic of Kenya, 1994). In 1993, the Public Service Reform Programme was implemented where civil servants were retrenched in a bid to reduce the government's wage bill. However, despite this decline in wage employment, there was an increase in the government's wage bill due to upward adjustments in salaries and allowances of staff (Republic of Kenya, 1995).

Budget resources were similarly reallocated to the core functions of government including administration, provision of broad-based education and health services as well as investment in economic infrastructure and environmental protection as the key areas (Republic of Kenya, 1994). To redress the effects of structural adjustment programs which had adversely affected the poor, investment priority of the government shifted to maximize the productivity of services that benefit the poor( Pro-poor initiatives). There was thus increased expenditure in social services like retirement benefits, food rations to refugees, assistance to drought stricken areas and construction of water supplies in Arid and Semi Arid Lands (ASALs) (Republic of Kenya, 1995). In an attempt to reduce and eventually eliminate the budget deficit, the government set expenditure ceilings on all ministerial recurrent expenditures (Republic of Kenya, 1996).

In 2000, the government's recurrent expenditure continued to rise due to enhanced allowances for civil servants and salary awards for teachers as well as increased spending on health and education sectors (Republic of Kenya, 2000).

There was a persistently increasing trend in the level of domestic debt and the budget deficit even though the government's fiscal target had been to achieve a balanced budget (Republic of Kenya, 2000).The Kenya government responded to this deficit situation consistently by freezing ministerial spending below the approved levels of the annual budget. Yearly government budget estimates show that development expenditures were usually adjusted downwards to accommodate falls in revenue and increased recurrent payments of operations and maintenance (Republic of Kenya, 2000).

Through internal reviews of the performance of the budget process the government realized that its public expenditure management was inconsistent with the objectives of achieving high and sustained growth of the economy necessary for reducing the levels of poverty. The poor performance of the public sector in itself was a constraint to the growth prospects of the private sector and thus to overall economic growth (Republic of Kenya, 2001). The composition of government expenditure was found to be inappropriate and inefficient. It was this review that emphasized the need to have a comprehensive reform of the public expenditure management spanning from budget formulation to budget implementation. The Medium Term Expenditure Framework (MTEF) was thus adopted to guide the efficient and effective use of government resources and reduce the share of government expenditure in the gross domestic product (GDP). The main objective of the MTEF procedure was to ensure that returns from government expenditure could be maximized (Republic of Kenya, 2001).

In general, the government's main expenditure strategy has been to restructure the overall expenditure to direct more resources to activities that promote faster economic growth in both physical infrastructure like roads, electricity, water and telecommunications as well as economic infrastructure such as trade and manufacturing. To achieve this goal, various policy reforms were implemented to rationalize government expenditure with more resources being channeled to development and recurrent non-wage operating and maintenance expenditure in order to stimulate economic growth (Republic of Kenya, 2002).

In 2002, after a major change in the government regime, reforms in the fiscal, monetary and tax administration were implemented with a commitment to further restructure government

expenditure. This was aimed at diverting resources away from consumption to development in order to improve allocative efficiency of the available resources. The strategy to be adopted under the ERS was to enhance the role of the private sector in wealth creation via the Private Public Partnerships programme (PPP) in order to increase the overall level of economic activity (Republic of Kenya. 2003).

In 2005 Public Financial Management Reforms (PFMR) were undertaken to strengthen public financial management systems in a bid to enhance transparency, accountability and responsiveness to public expenditure policy priorities. The ultimate vision of the programme was to improve provision of essential public services and also to ensure economic growth, poverty reduction and good governance (Republic of Kenya, 2008).

## 1.3 Government Expenditure Trends and Economic growth in Kenya

The public sector in Kenya contributes to economic growth through the provision of government services such as education, health and administration as well as financing of productive sectors of agriculture, manufacturing, transport, trade and communication (Republic of Kenya, 1979).

Both the GDP and government expenditure in aggregate have increased steadily over the years as seen in Figure 1.1 below.

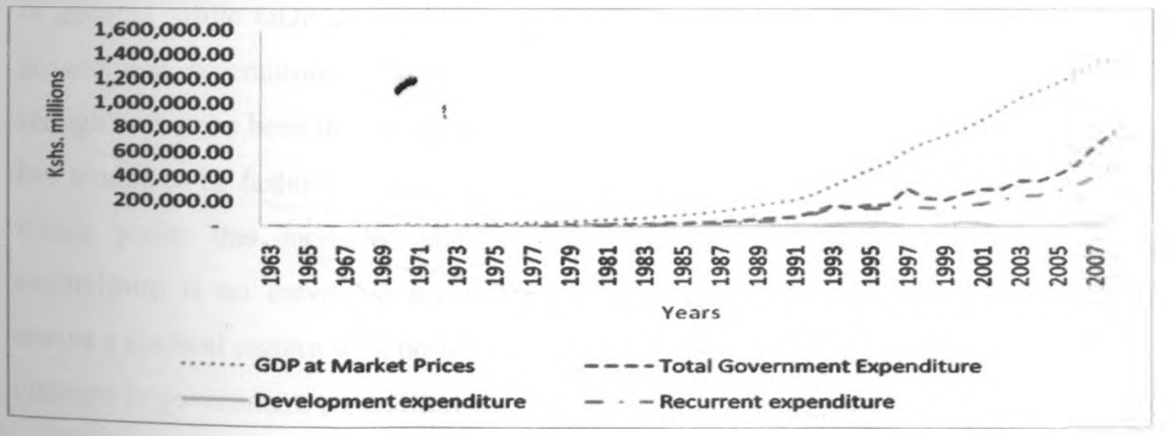



**Figure 1.1: Trends in GDP and Government expenditure in Kenya for the period 1963-2008.**

**Source of data:** Republic of Kenya Economic surveys (various issues from 1964-2010)

Figure 1.1shows that both the aggregate GDP and government expenditure (total and recurrent expenditure (RE)) have trended positively throughout the period under study. Except for development expenditure (DE), all the series have a characteristically positive and increasing trend over time.

However, their rates of growth show erratic and oscillating trends as shown in Figure 1.2.

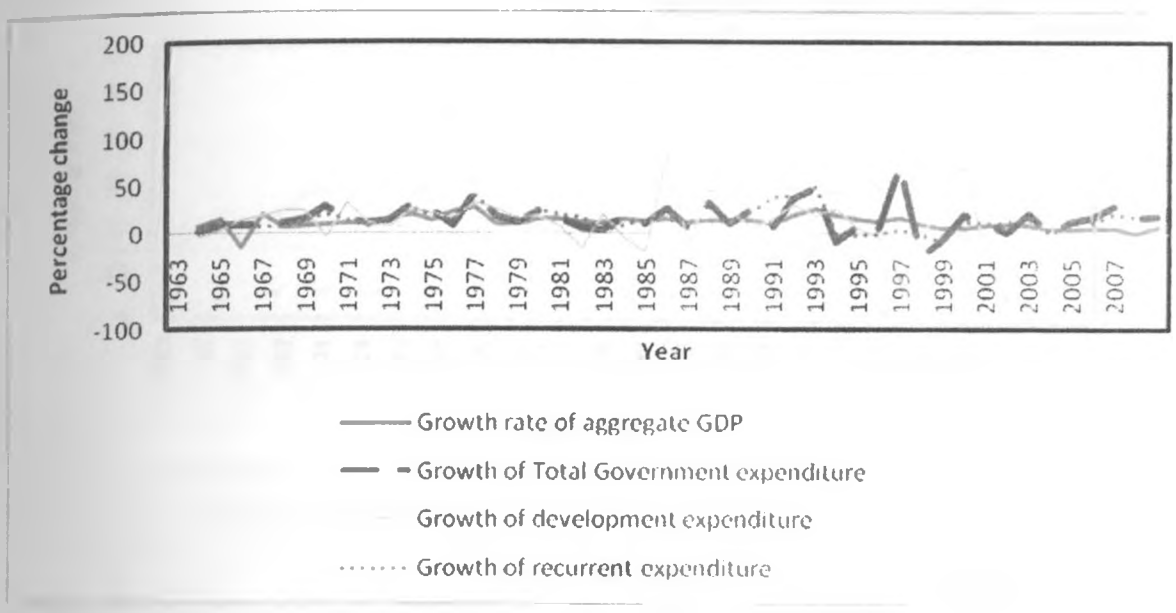



**Figure 1.2: Trends in GDP growth and Government expenditure growth in Kenya from 1963-2008.**

**Source of data:** Republic of Kenya Economic surveys (various issues from 1964-2010)

In general, while GDP grew on average by 8.1% per annum over the whole period, total government expenditure grew by an average of 19.19% per annum. This shows that even though both have been increasing over time, the average increase in government expenditure has tended to be faster than that of GDP. This trend may be consistent with Wagner's Law which posits that increased state activity and the corresponding increase in public expenditure is an inevitable accompaniment of economic growth. However, figure 1.2 shows a cyclical pattern with no indication of the direction of responsiveness of GDP to the changes in government expenditure or vice versa. Similarly, this situation poses the question of where the government obtains finances for its expenditure as national output is not expanding fast enough to cater for the fast increasing government expenditure.

When the government expenditure is considered as a ratio of GDP (relative government size), the following pattern of growth in figure 1.3 is discernible as shown. The analysis may be used to show how the expenditure allocation contributes to growth of the economy in order to highlight the priority areas for Kenya's expenditure policy. To explain the growth in total government expenditure, more insight in the form of a breakdown into the two main classifications of development and recurrent expenditure for Kenya seems relevant.

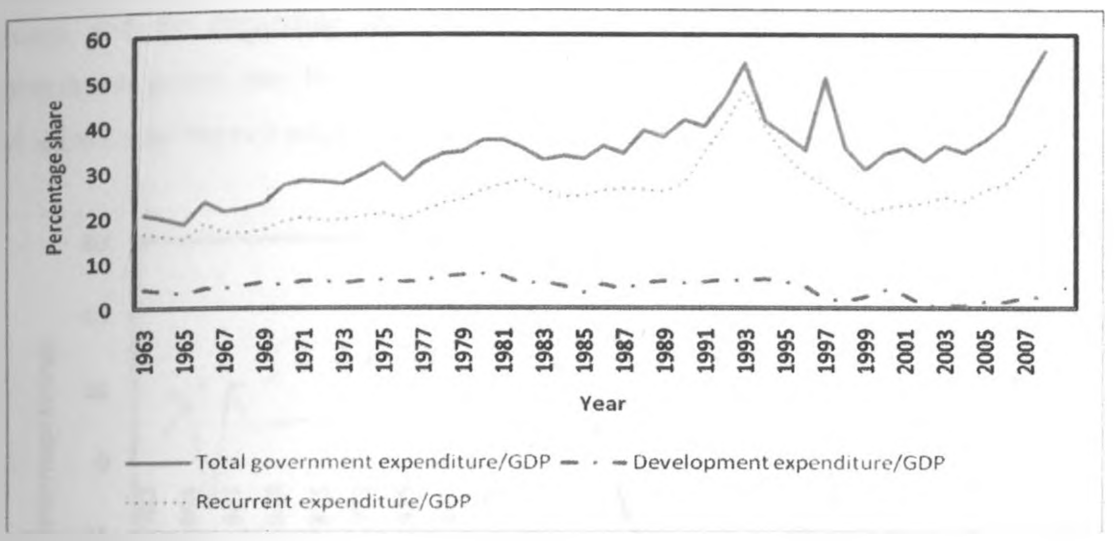



**Figure 1.3: The share to GDP of Government expenditure in Kenya for the period 1963-2008.**

**Source of data:** Republic of Kenya Economic surveys (various issues from 1964-2010)

The ratio of total government expenditure and that of recurrent expenditure to GDP have consistently grown in a similar pattern. The depicted trends seem to imply that the size of government (ratio of total government expenditure to GDP) is closely related to the share of recurrent government expenditure in GDP. From the trend graph in figure 1.3, the same may not be said of the share of government spending that goes to development expenditure. This is expected since all programmes financed through development expenditure carry implications for recurrent expenditure in terms of operations and maintenance, and administration costs (Republic of Kenya, 1979). The minimal level of development expenditure should pose concern for planners since this is the funding expected to provide necessary infrastructure which serves as essential inputs into the production process. With lower development expenditure then there may result bottlenecks in such infrastructure like power, telecommunications, education and health which then hampers growth.

Growth of the size of government, herein measured as the ratio of government expenditure to GDP also follows a trend not fully consistent with the growth in GDP. This implies that as GDP increases, the share of it that goes to public spending increases faster. In the theory of clubs and with problems of majority voting, Tullock (1959) proposes a theory of interest group activity that posits a direct relationship between the influence of special interest groups and the expanding size of government. Thus, the rate at which the size of government grows may have certain implications on how fast the economy grows. Figure 1.4 shows how the two rates of growth compare for Kenyan data.

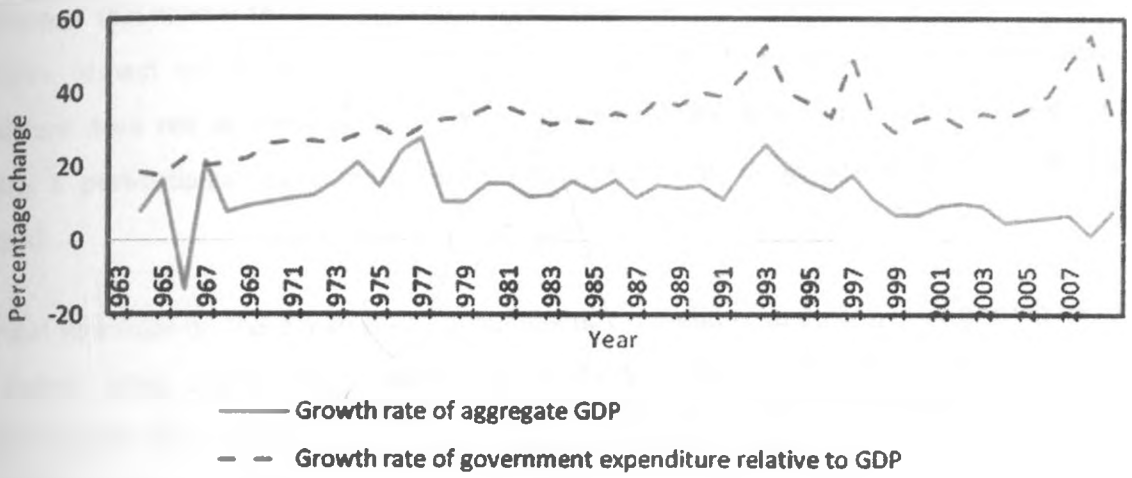



**Figure 1.4: The growth rate of GDP and the rate of growth of size of government**

**Source of data:** Republic of Kenya Economic surveys (various issues from 1964-2010)

Considering that the Government of Kenya has only grown over time with no tendency to reduce, the efficiency of government expenditure may be estimated by comparing the interactions of the two trends in figure 1.4. An understanding of the magnitude of this relationship in Kenya could prove useful in the analysis and formulation of expenditure policies.

There is no consistent trend of either positive or negative growth in GDP as government expenditure expands. Thus a study to establish the existing relationship between the government's expenditure and GDP for Kenya may be informative to fiscal analysts. In this study, Wagner's law is considered for the case of Kenya, to test whether or not the data for

1963-2008 supports the theory that government expenditures are endogenous to growth. In general, one may not be able to tell whether or not the government's objective of achieving economic growth through government expenditure is actually attained.

## 1.4 Statement of the Problem

Economic theory has shown how government spending may either be beneficial or detrimental to economic growth. In Keynesian macroeconomics, many kinds of public expenditures even of recurrent nature, can contribute positively to economic growth, through multiplier effects on aggregate demand which increases consumption. Therefore, the supporters of this school believe that lower taxes and bigger government consumption have a positive impact on the economy (Keynes, 1936). The Kenyan data on government expenditure does not necessarily agree nor conflict with Keynes's propositions since the economy's performance has continuously fluctuated even as government expenditures increased.

Empirical literature on the dynamics of government expenditure and economic growth have been mainly cross country regressions: Landau (1983, 1985, 1986), Ram (1986), Barro (1990), Easterly and Rebelo (1993), Devarajan *et al* (1996) and Moreno-Dodson (2008). These studies often disregard country specific factors including the specific allocations of public resources particular to each country. Time series studies have also been done including Singh and Sahni (1984), Henrekson and Lybeck (1988), Grossman (1988), Gwartney *et al.*, (1998) and Kweka and Morrissey (2000). All these studies have produced mixed results and thus inconclusive evidence on the relationship between government spending and economic growth. When the association between total government expenditure and economic growth is considered, some find a positive influence (Ram, 1986) while others find a negative effect (Landau, 1983, 1985, 1986; Grier and Tullock, 1989; Barro, 1990; and Gwartney, *et al.*, 1998). Yet other studies find that the effect may be marginal (Hsieh and Lai, 1994) or fragile but strong enough to accelerate growth (Levine and Renelt, 1992).

Despite this uncertainty, general theory suggests that government expenditure influences economic growth (Keynes, 1936; Solow, 1956; Musgrave and Musgrave, 1989) on the one hand and that on the other, a growing economy causes government expenditure to expand as

in Wagner's law. The Kenyan data as presented in figure1.1- 1.4 does not show a clear pattern in which economic growth has trended with expanding government expenditure.

The purpose of this study therefore is to analyze the relationship between government expenditure and economic growth in Kenya for the purpose of confirming compliance with either Wagner's law or Keynesian postulates. It fills a research gap in the area by establishing the direction of causality of government spending and GDP something that has not been addressed by previous researches for Kenya. It also updates the available literature to the most current data available for the year 2008.

## 1.5 The Research Questions

i. What is the relationship between government expenditure and GDP in Kenya?
ii. What is the effect of government expenditure on GDP?
iii. What are the policy implications of the findings from the study?

## 1.6 The Research Objectives

The general objective of this study was to analyze the effects of government expenditure on economic growth in Kenya. Specifically, the study sought to;

i. Establish the relationship between government expenditure and GDP in Kenya.
ii. Analyze the effects of government expenditure on economic growth.
iii. Draw policy implications from the findings of the study.

## 1.7 Significance of the study

A correct perspective on government expenditure, its growth, pattern and direction of its increase, effects on the economy, and trends are issues which are central to the understanding of Public financial administration. The increasing level of government expenditure in Kenya even alongside various structural and policy changes provides the motivation for this analysis. The study attempts to provide an up to date empirical analysis of government expenditure as it relates to the national output. Establishing the effects and causality would guide policy makers in identifying the growth attributable to government expenditure and to target appropriate levels of government expenditure relative to the country's produced output. Such measures can lead to effective and efficient public

expenditure policy where higher productivity is achieved at reduced burden to the citizens and future budgets.

Thus there is a need for a study to establish how government expenditure relates to economic growth over time so as to better inform policy makers on the design of public expenditure policies. The relationship between government expenditure and economic growth could guide the budget process to ensure more efficient and effective government spending for growth. Similarly, an insight into the magnitude of the effect of large and increasing government size could prove useful in the analysis and formulation of expenditure policies, prioritization of programmes and structure of financing decisions in Kenya.

The results of the study are expected to provide empirical evidence which may pave way for further research in the area especially using disaggregated sectoral data as only aggregate government expenditures are considered in this study.

## 1.8 Scope of the Study

This study is based on Kenya's national data for the period running from 1963-2008. The study focuses on fiscal policy effects on economic growth where government expenditure is singled out as the variable to be analyzed. The analysis is concerned with the aggregate expenditures only and does not address the means of financing. The period is chosen since it is characterized by a single governance structure as well as substantial growth in government expenditure and cyclical growth in the GDP.

## 1.9 Organization of the study

The structure of the study is as follows: the first chapter provides a background to the study and relevant information about Kenya's economic growth and government expenditure during the period under review. The second chapter presents a review of both theoretical and empirical literature on the study topic. Chapter three discuses the theoretical and empirical methodology and details the estimation procedures as well as data analysis. Results of the analysis are presented in chapter four while chapter five is dedicated to conclusions and recommendations for policy and further research.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter presents theoretical and empirical literature in government expenditure as an engine of economic growth. The first section exposes the theoretical foundations as well as representations of theoretical models of government expenditure and economic growth. The second section highlights the works of others on the subject while the final section gives an overview of the literature reviewed.

## 2.2 Theoretical Literature

Various public expenditure theories have been put forward in economics to explain how government expenditure relates to economic growth. These are discussed as follows;

### 2.2.1 Monetarist Theory

Monetary policy does not, at least on the surface, imply as much government intervention in the economy as other measures. Friedman (1977) argued that the high rates of inflation were due to rapid increases in money supply. Thus, the key to good policy was to control the supply of money. The primary way in which the Government controls the supply of money is through open-market operations; that is the purchase and sale of government bonds. As a result, the government may increase its level of spending by reducing money in circulation and thus increasing money at its disposal.

In general, monetarists disliked big governments and tended to trust free markets as they believed that government spending and as a consequence fiscal policy was not helpful in bringing about economic growth. Big governments meant high expenditure and thus increased inflationary pressure which would be a disincentive to savings and investment. Where fiscal policy could be beneficial, monetary policy could do a better job. Excessive government spending only interfered in the workings of free markets and could lead to bloated bureaucracies, unnecessary social programmes and large deficits (Mitchell, 2005)

### 2.2.2 Keynesian Theory

The Keynesian theory proposes a counter-cyclical policy where governments may respond to recessions by increasing expenditures (Mitchell, 2005). Keynes (1936) argued that government spending particularly increases in government spending boosted growth by injecting purchasing power into the economy. According to Keynes, government could reverse economic downturns by borrowing money from the private sector and then returning the money to the private sector through various spending programmes.

This financing concept did not necessarily mean that government should be big but rather, that government spending especially deficit spending could provide short-term stimulus to help end a recession or depression. The Keynesians argued that policymakers should be prepared to reduce government spending once the economy recovered in order to prevent inflation, which they believed would result from too much economic growth (Mitchell, 2005).

Keynesian theory argued that private sector decisions sometimes led to inefficient macroeconomic outcomes. Thus Keynesian economics advocated a mixed economy predominantly private sector, but with a large role of government and public sector. This implies that government expenditure as a fiscal policy instrument was instrumental in influencing the operations of an economy. This is based on a central conclusion of Keynesian economics that in some situations, there was no strong automatic mechanism to move output and employment towards full employment levels (Keynes, 1936).

As such, if the government increased its expenditure for instance by increasing government purchases, this would lead to an even bigger increase in income due to the government purchases multiplier. This Keynesian proposition may be illustrated by denoting change in government purchases by $\Delta G$ and the corresponding change in national income as $\Delta Y$. Thus, the multiplier for government purchases is given by $\Delta G/\Delta Y$: where $\Delta Y > \Delta G$. The Keynesian cross implies that the government purchases multiplier is larger than 1 because, according to the Keynesian consumption function; $C = C(Y - T)$.....2.1

Higher income causes higher consumption. When an increase in government purchases raises income, it also raises consumption, which further raises income, which further raises consumption, and so on. Therefore, in this model, an increase in government purchases causes a greater increase in income (Mankiw, 2000).

### 2.2.3 Wagner's Organic State Theory

Wagner's Law is a demand side argument which suggests that as incomes rise, the demand for government services increase more than in proportion, primarily because of the technological requirements of industrialization and the urbanization that accompanies it. It posits that increased state activity and the corresponding increase in government expenditure is an inevitable accompaniment of economic growth. The Law assumes that causality is from national income to government expenditure as the economy grows; there is an inherent tendency for the activities of government to increase both intensively and extensively (Bhatia, 2008).

On another hand, supply side factors suggest that the unit cost of government relative to private production increases over time. This is based on the conclusion by Baumol (1967), that productivity growth is slower in services than in non-services because of different rates of technological change.

Three main reasons for the increased government involvement were identified under Wagner's law. First, industrialization and modernization would lead to a substitution of public for private activity. Second, Wagner predicted that the growth in real income would facilitate a relative expansion of expenditures on certain income-elastic demands, like culture, education and the redistribution of income. Finally, economic development and changes in technology required government to take over the management of natural monopolies in order to enhance economic efficiency. Thus the state grew like an organism reflecting changes in the society and economy while making decisions on behalf of and to the benefit of its citizens. The situation in Kenya may not be very different from the one idealized by Wagner. Increasing urbanization, demand for social services (education and health) plus expanding demand for public services due to population growth can be attributed to growth of government expenditure and thus the size of government.

### 2.2.4 Musgrave - Rostows Theory

Musgrave and Musgrave (1984) emphasized growing complementarities between public and private consumption of capital goods. Thus, with an increase in per capita income, demand for public services rises with a corresponding growth in public expenditure (Bhatia, 2008).

Musgrave - Rostows theory asserts that government expenditure is a prerequisite for economic development, its level being directly related to the stage of development of that country. In the early stages of economic growth and development, public investment as a proportion of the total investment in the economy is found to be high. Then public sector provides social and economic infrastructure necessary to boost the economy into middle stages of economic growth and development. During the middle stages, government investments complement private investment which has already been facilitated by governments' provision of the infrastructural overheads. Finally, when the economy reaches the stage of mass consumption, the government initiates and implements welfare programs where income redistribution policies increase the government expenditure relative to national output even further (Musgrave and Musgrave, 1984).

The theory assumes that the government plays the major role in development by investing in growth promoting programmes yet this may not always be the case. Such a systematic government involvement is not evident from the Kenyan data reviewed. In fact, the level of government expenditure relative to GDP as well as the development expenditure proportion of government expenditure are seen to decline *(see figures 1.1and 1.2 in chapter one)*.

### 2.2.5 Peacock and Wiseman's political Constraint Model

The Peacock and Wiseman thesis, acclaimed as the Displacement Hypothesis, suggested that government expenditures displayed a roughly stepwise growth. These steps coincided with large-scale social disturbances like major wars or tribal clashes, natural calamities and famine as in the case for Kenya. Such disturbances shift public revenues and expenditures to new higher levels. As a supply side argument, this reflects Say's law of government spending which implies that government expenditure is driven by the availability of revenue. Usually after the disturbance is over, new ideas of tolerable tax levels emerge, and a new plateau of expenditure may be reached (Peacock and Wiseman, 1961).

The displacement effect is a pioneering public choice explanation of the post- war growth of governments, developed by Peacock and Wiseman (1961) from their analysis of U.K. government spending. The Peacock and Wise- man's model (P-W) is based on a contrast between bureaucrats and taxpayers on the size and composition of public budgets: although governments have plans to expand public sector size, these plans are constrained by the electors' willingness to finance higher levels of government spending.

Social disturbances create a need for increased public expenditure which may not be met by the existing public revenue. Initially, without such shocks the existing revenue constraint would be restraining any expansion in government expenditure. But now under changed requirements after the disturbance, such constraints give way. Thus pubic expenditure rises and makes the inadequacy of the present revenue clear to all. This leads to the displacement effect, where the government moves from the old level of expenditure and financing to a higher one. Public expenditure and revenue get stabilized at a new higher level until another shock occurs to cause a displacement effect (Bhatia, 2008).

The main shortcoming of this theory is that it emphasizes the recurrence of abnormal situations which necessitate jumps in government expenditure and revenue a case which is not always applicable (Bhatia, 2008). A look at the data for Kenya reveals that government expenditure has tended to increase to higher levels where it has then been retained at least for a few consecutive periods. These periods have coincided with the general elections of 1987, 1992, 1997, 2002 and 2007; the tribal clashes of the early 1990's as well as financing of major national events like the 4th All Africa Games hosted in Kenya in 1988. However, in other occasions the government's expenditure has gone up in the absence of any disturbances precluding explanation by this theory.

### 2.2.6 Crowding Out Theory

This theory postulates that government intervention leads to private activity being reduced, that is, crowded out. The first form of crowding out is the direct displacement where the public sector produces output using resources that could otherwise have been used by private production and thus constrain economic growth (Trotman, 1997) as cited in Maingi,

(2010). The displacement effect here occurs directly since the public sector uses tax revenues to buy resources that would have been used by the private sector.

Government spending displaces private-sector activity. Every shilling that the government spends necessarily means one less shilling in the productive sector of the economy. This dampens growth since economic forces guide the allocation of resources in the private sector, whereas political forces dominate when politicians and bureaucrats decide how money is spent. Some government spending, such as maintaining a well functioning legal system can have a high rate-of-return. In general, however, governments do not use resources efficiently, resulting in less economic output (Mitchell, 2005).

The other form of crowding out is the indirect effect that occurs when government expenditure, taxation and government borrowing cause disincentives to productive effort, that is, to work, to save and to invest (Trotman, 1997). The disincentive to invest in other productive resources occurs due to high interest rates or inflation because of government borrowing. Similarly, the sale of government debt to finance government expenditure and borrowing could lead to a rise in interest rates which indirectly crowd out private investment. This would happen if either the increased public sector borrowing leads to higher interest rates of the private sector investment is highly interest-elastic that it results in the fall in private investment. This theory is applicable to Kenya where the private sector contributes a large proportion of the economy's domestic product (Republic of Kenya, 2009).

### 2.2.7 Neoclassical Growth theories

Economic growth is the steady process by which the productive capacity of the economy is increased over time to bring about rising levels of national output and income (Todaro and Smith 2009). The neoclassical growth theory emphasizes the importance of investments in growth. One feature of this model, which has been exploited seriously as an empirical hypothesis is the convergence property which derives from the diminishing returns to capital. Economies that have less capital per worker relative to their long run level tend to have higher rates of return and thus higher growth rates (Barro 1996).

The convergence is conditional because the long run levels of capital and output per worker are determined by the propensity to save, the growth rate of population, and technological change. The rate of technological progress and the growth rate of population are both entirely exogenous variables that come from outside of the model.

Without technological change, growth in output occurs only because the amounts of capital (savings and investments) and labor (population) changes. The production function is

$Y = F(K, L)$.....2.2

The source of long-run growth in the early neoclassical models of Solow (1956) and Swan (1956) was exogenous technical change where fiscal policy had little effect on the rate of capital accumulation or the long-run rate of growth. When capital is broadened from physical goods to include human capital in the forms of education, experience, and health in the presence of technology, the production function becomes

$Y = AF(K, L)$.....2.3

Where A, is the level of technology or efficiency of capital or labor

Thus, according to the Solow model, technological progress growing at an exogenous rate explains the sustained growth of output per worker when an economy is in steady state (Solow, 1956). The model does not explain technological progress leaving its determinants open (Mankiw, 2000)

Barro (1996) acknowledges that in the absence of continuing improvements in technology, per capita growth must eventually cease. Thus with technology, growth in output occurs due to changes in capital ($\Delta K$) and labor ($\Delta L$) as well as changes in the factor productivity ($\Delta A$) from improved efficiency of the raw inputs. Technological progress causes balanced growth.

As a result, growth is accounted for in the following equation.

$\Delta Y/Y = \alpha\Delta K/K + (1 - \alpha)\,\Delta L/L + \Delta A/A$.....2.4

Where $\Delta A/A$ is total factor productivity, which is closely related to the efficiency of labor in the Solow model. It represents the change in output that cannot be explained by changes in inputs.

However, Mankiw (2000) notes that as in the case of growth in the Asian Tigers, once the growth in labor, capital, and human capital is accounted for, little of the growth in output was left to explain. None of the four countries experienced unusually rapid growth in total factor productivity. Indeed, although these countries' rapid growth has been truly impressive, it is easy to explain using the tools of basic neoclassical growth theory.

Factors, such as education, health and government regulation, can affect total factor productivity. For example, if higher government spending raises the quality of education, health and is invested in machinery, then workers may become more productive and output may rise, which implies higher total factor productivity.

### 2.2.8 Endogenous growth theories

Endogenous growth theory rejects Solow model's assumption of exogenous technical progress and seeks to explain where it comes from. The theory of endogenous growth attempts to makes growth an endogenous variable through incorporating human capital and innovation capacity. In contrast to the older neoclassical growth theory, endogenous growth theory argues that policy measures can have an impact on the long-run growth rate of an economy. To explain long term growth, the new growth theories provide a framework for analyzing endogenous growth, where persistent national output is determined by the system governing the production process rather than by forces outside that system(Smith and Todaro, 2009)

By defining capital in the production function more broadly to include knowledge, endogenous growth theory assumes constant rather than diminishing returns to capital. Therefore, output (Y) depends on the capital stock (K) and a constant measuring the amount of output produced for each unit of capital (A).

$Y = AK$.....2.5

In this endogenous growth model, saving and investment can lead to persistent growth.

Barro (1996) observed that the initial new research in endogenous growth including Romer (1989) and Rebelo (1991) built on the work of Arrow (1962). Their models included spillovers of knowledge with the presence of constant or increasing returns in the factors

that can be accumulated (Romer 1989; Rebelo 1991). They showed that growth may go on indefinitely because the returns to investment in broad capital including human capital do not necessarily diminish as economies develop. As long as there is no tendency to run out of ideas, then growth rates can remain positive in the long run. The rate of growth and the underlying amount of inventive activity however, tend not to be Pareto optimal because of distortions in the creation of the new goods and methods of production (Barro, 1996).

Endogenous growth models incorporate channels through which fiscal policy can affect long-run growth (Barro 1990, Barro & Sala-I-Martin 1992). In these frameworks, the long-term growth rate depends on governmental actions, such as, maintenance of law and order, provision of infrastructure services, protection of intellectual property rights, and regulations of international trade, financial markets, and other aspects of the economy. The government therefore has great potential for good or ill through its influence on the long-term rate of growth (Barro, 1996).

## 2.3 Empirical literature

Landau (1983) used panel data for 27 Less Developed Countries to investigate the relationship between government expenditure components and economic growth using Ordinary Least Squares (OLS). Government expenditure was broadly categorized as either as productive or consumption expenditure. The findings were that productive expenditure had a positive effect on economic growth while consumption expenditure had a negative impact on economic growth.

An attempt by Singh and Sahni (1984) to investigate whether the growth in government expenditure caused or was caused by the growth in national income led to various conclusions. The analyses were carried out for both the aggregate and disaggregate levels using causal models on annual data relating to India for the period 1950-81. The Granger method was applied to determine the directions and patterns of causality between national income and total as well as various components of government expenditure.

The findings were that; first, government expenditure and national income had a feedback causal mechanism. This suggested that the causality between national income and

government expenditure was neither Wagnerian (National income granger causes government expenditure) nor Keynesian (government expenditure granger causes national income) and that the estimates reported in the studies based on either view would be both biased and inconsistent. Secondly, the growth in aggregate government expenditure reciprocated the growth in national income somewhat quicker than did national income to the growth in government expenditure. This only suggested the behavioral nature of government expenditure on the one hand, and the effect of institutional and infrastructural rigidities, on the other. Thirdly, similar to the aggregate analysis, the growth in government expenditure by functions, namely, administration, social and development, and defense served both as cause and effect of growth in national income. It was, therefore, concluded that both the Keynesian and the Wagnerian predilections prevailed together.

Thus, the general conclusion was that government expenditure and national income were to be treated as jointly dependent variables in studies both in public finance and macro econometric models and that any study purporting to analyze the growth of government expenditure (aggregate or by function) and its role in the economy must necessarily discern the underlying causative process before carrying out an empirical investigation. This conclusion motivates the methodology of the current study where in order to analyze the relationship between government spending and economic performance; the underlying causative process is be established first.

Landau (1985) used panel data for 104 countries including 96 developing countries to analyze the effects of government expenditure on economic growth. Using current and infrastructural expenditures as the variables of analysis, the study found that a big government as measured by the share of consumption expenditure reduced per capita growth. The general conclusion of the study was that total government expenditure tended to dampen economic growth.

In an extension of the 1985 study, Landau (1986) used 65 countries where government expenditure was related to growth in per capita income estimated by a Generalized Least Squares (GLS) method. The independent variables included demographic features of government expenditure like human and physical capital and government spending itself

was disaggregated into education, defense and transfers. The findings reaffirmed those of Landau (1983).

Ram (1986) studied the impact of government size on growth of aggregate output using a two-sector production function conceptual framework and utilizing the compiled Summers-Heston data for 115 countries. The focus of the study was three-fold; obtain the direction of the overall effect of government size on growth, the marginal externality parameter and the inter-sectoral productivity differential. In the analysis, the private sector and the non-government sector constituted the whole economy. The main result was that that government size had a positive effect on economic performance and growth. The study also inferred from the cross-sectional evidence that relative factor productivity was higher in government sector than in the rest of the economy. Time series evidence suggested that the positive effect of government was typically stronger at lower income levels.

In another study by Conte and Darrat (1988), a Granger causality approach was used to test whether there had been a causal relationship between public sector growth and real economic growth rates for the Organization of Economically developed Countries (OECD) countries. They laid special emphasis on feedback effects from economic growth to government growth which resulted from macroeconomic policy. They found that government growth had mixed effects on economic growth rates, positive for some and negative for others. However, for the majority of the OECD countries, there was no discernible impact of government growth on the rate of real economic growth.

Grossman (1988) examined the issue of a non-linear relationship between growth in government and overall growth in the economy. The analysis was based on the fact that government contributed to total economic output in various ways. The provision of Pigouvian public goods enhanced the productivity of the private sector inputs increasing total output.

However, the public decision-making process could result in an inefficient quantity of public goods. The likelihood of this outcome increased with the size of government. Further negative effects were created by the revenue raising and spending mechanisms of

government, and the increasing diversion of resources into rent-seeking activities. The magnitude of these effects was likely to increase with the relative size of government. These were all reflective of the theory of interest groups (Tullock, 1959) and the theory of government bureaucracy (Niskanen, 1971). A simultaneous equations model that incorporated these different influences was developed and tested using time-series data for the United States. The estimates indicated that the non-linear model is the better for explaining the growth of total economic output. This dimension provides motivation for the study where the effect of size of the government on economic growth is analyzed. The ratio of government expenditure to GDP is used as the measure for government size.

Henrekson and Lybeck (1988) identified a number of variables potentially important for the explanation of the growth of government. Each variable was either classified to pertain to the supply or demand side. In the empirical estimations a disequilibrium maximum likelihood method was employed to account for the fact that the market for public goods could be expected to clear in each period. The results of their regressions relating government expenditures to GDP, pointed to the importance of fiscal illusion, notably resulting from an underbalanced budget, and bureaucratic pressure for a larger public sector as the two most important determinants behind the observed growth. A high demand for income redistribution was also found to be an important factor, especially behind the growth of transfers. Furthermore, Baumol's Disease in combination with low price elasticity of demand seemed to contribute strongly to the growth of government consumption. Finally, there was a tendency for coalition governments to let the public sector grow faster than a one-party government. The current study proposes a similar analysis to show how government expenditure in Kenya affects the economic performance.

Barro (1990) discovered a negative relationship between the size of government and economic growth. On examining an endogenous growth model, this study suggested a possible relationship between the share of government spending in GDP and the growth rate of per capita GDP. The key feature of Barro's (1990) growth model was the presence of constant returns to capital that broadly included private capital and public services. Hence, to the extent that public services were considered inputs to production; a possible linkage arose between the size of government and economic growth.

Levine and Renelt (1990), however, showed that this negative correlation becomes insignificant for some econometric specifications so that these variables enter as suggested by theory. Barro (1991) found that the ratio of government consumption expenditures less defense and education expenditures to GDP was negatively correlated with growth but that the coefficients of the ratio of government expenditures to growth depended on the specific econometric specification employed.

In a study of public expenditure and national income causality, Ahsan, Kwan and Sahni (1992) used tests of Granger causality in both bivariate and trivariate systems. The techniques employed included de-trending of the data, temporal aggregation and the choice of potentially omitted variables. They found that much diversity persisted in the pattern of causality and its underlying processes among different countries in the sample of G-7 countries studied.

Lindauer and Valenchik (1992) found that there is a general tendency for governments to grow as explained by the following approaches; cost accounting, demand side arguments, supply side factors, and development theory. They concluded that models of development emphasized the extent of market failure in developing countries and thus the need for more government. Programmes such as the critical minimum effort, the big push, balanced growth, redistribution with growth, and basic needs all suggested more, rather than less government expenditure. Similarly, owing to the requirements of aid for public sector rather than private sector counterparts, and the demonstration of successful capitalist and socialist countries with large and growing state sectors, the growth of government in developing nations was supported, if not inspired by industrial countries.

Barro and Sala-I-Martin (1992) whose studies were based on endogenous growth models distinguished between productive and unproductive expenditures. Expenditures were categorized as productive if they were included as arguments in private production functions and unproductive if they were not. This categorization implied that productive expenditures had a direct effect upon the rate of economic growth but unproductive expenditures had an indirect or no effect. However, they concluded that the issue of which expenditure items

should be categorized as productive or unproductive was debatable and may be difficult to define a priori.

Levine and Renelt (1992) made the following conclusions about the relationship of aggregate fiscal policy variables and growth. The endogenous growth literature had created a new class of models in which fiscal policy could have long-run steady-state growth effects. Governments could accelerate growth by providing essential public goods, and well designed taxes and subsidies could be used to close the gap between private and social costs. On the other hand, government funds may be spent on activities for which there is not a clear role for the government thus may hamper growth.

Easterly and Rebelo (1993) used cross section data on a hundred countries including both advanced and less developed countries for the period 1970-1988. They found that government investment and consumption had a negative effect on growth. At the same time, they found that government consumption and investment in infrastructure had a positive impact on private investment.

Hansson and Henrekson (1994) attempted to answer the question: Does government spending have a positive or negative effect on economic growth? They provided what they referred to as a new framework for testing the effect of government spending on growth and productivity growth in the private sector. Their framework was based on a production function approach of disaggregated data, where account was taken of a potential catching-up effect as per Abramovitz (1986). They focused on productivity in the private sector and used disaggregated data. The robust conclusions were that government transfers, consumption and total outlays had consistently negative effects, while educational expenditure had a positive effect and government investment had no effect on private productivity growth. The impact was also found to work solely through total factor productivity and not via the marginal productivity of labor and capital and the measured effect seemed to differ between developed and developing countries.

As noted by Hsieh and Lai (1994), the relationship between growth rate of output and the share of government spending bore upon the role of government in economic growth. If

changes in the share of government spending could affect the output growth rate, the size of government could be a potentially important factor in explaining the observed disparity in long-term growth rates among different countries. Building on Barro's (1990) endogenous growth model, Hsieh *et al.,* (1994) suggested a possible relationship between the share of government spending in GDP and the growth rate of real per capita GDP. They employed a multivariate time series analysis with particular attention to the causal pattern based on the historical data for a group of seven countries. Their general finding was that there was no evidence of causality, but government expenditure had a marginal effect on growth. For most countries under study, public spending was found to contribute at best a small proportion to the growth of an economy.

Devarajan, Swaroop and Zou, (1996) used a cross section study of forty three Less Developed Countries (LDCs) to investigate the relationship between public expenditure and economic growth for the period 1970-1990. The method of estimation was OLS. They used government consumption, investment and other functional categories of government expenditures as variables. They divided government expenditure into productive and unproductive categories to show that a country can improve its economic performance by changing the mix between the two depending on their respective contributions to economic growth. This categorization was dynamically relevant as it focused on the impact of expenditure on savings and investments and hence capital accumulation. Findings of the study were that government consumption had positive effect on growth and government investment had negative effect on growth in LDCs but for advanced countries government investment showed a positive impact on growth.

The effects of government spending on economic growth were also analyzed *inter alia* by Barro (1997) who found a significantly negative effect on growth from the ratio of government consumption to GDP (measured exclusive of spending on education and defense) with the estimated coefficient of -0.136. The study concluded that a greater volume of nonproductive government spending and the associated taxation reduces the growth rate. In this sense, big government was bad for growth.

Tanzi and Zee (1997) found that while government expenditure may displace private sector output (the crowding-out effect), it may also improve private sector productivity (the externality or public good effect). Its total social return must, therefore, be interpreted as the sum of both of these effects. The net impact on aggregate output of the crowding-out effect of government expenditure clearly depended on the relative marginal productivities of the public and private sectors. Thus without externalities, public production tended to be less efficient than private production. Hence on account of this effect alone, the higher the level of government expenditure, the greater the inefficiency and the lower the level of output.

The study on the size and functions of government and economic growth by Gwartney, Lawson and Holcombe (1998) in the US economy made the general conclusion that excessively large government reduced economic growth. Regressing government expenditure as a share of GDP on the real growth rate of GDP for several OECD countries they found that all the evidence pointed in the same direction. More rapid growth was possible, but the relative size of government must be reduced if the growth potential was to be realized.

Kweka and Morrissey (2000) used co integration techniques to investigate evidence on Government spending and Economic Growth for Tanzania. They found that increased productive expenditure (physical investment) had a negative impact on growth. Consumption expenditure related positively to growth, and in particular was associated with increased private consumption. Expenditure on human capital investment was insignificant. They believed that in poor countries such as Tanzania, where "expenditure levels were low, public spending was more likely to be beneficial for growth" (Folster and Henrekson, 1999, 342). Some of the empirical evidence as summarized in their paper suggested the rarity of time series analysis, and that they mainly addressed causality between government spending and growth. For example Ghali (1998) using data for 10 OECD countries, found evidence that government size (measured as government consumption spending) granger-caused growth in most countries. Chan and Gustafson (1991) found that government expenditure had a positive impact on private consumption in the United Kingdom (UK).

Loizides and Vamvoukas (2005) examined if the relative size of government measured as the share of total expenditure in Gross National Product (GNP) could be determined to Granger cause the rate of economic growth, or if the rate of economic growth could be determined to Granger cause the relative size of government. They used data on Greece, UK and Ireland. The study employed co integration analysis, error correction modeling and multivariate causality tests. First a bivariate error correction model (ECM) within a Granger causality framework was used where unemployment and inflation were added separately as explanatory variables, creating a simple trivariate analysis for each of the two variables. The combined analysis of bivariate and trivariate tests offered a rich menu of possible causal patterns where first; government size granger caused economic growth in all countries of the sample in the short run and in the long run for Ireland and the UK and; second, economic growth Granger caused increases in the relative size of government in Greece, and when inflation was included, the same was observed in the UK.

M'Amaja and Morrissey (2005) investigated the effects of fiscal policy on economic growth in Kenya basing their study on endogenous growth theory. They used Autoregressive distributed lag (ADL) model to estimate a cobb-douglas type production function in which government's provision of goods and services was an input. They found that fiscal policy mattered for growth and that productive consumption and public investment contributed to growth of real per capita in Kenya. Consumption expenditure had a strong negative effect on growth (Barro, 1990) while public investment had positive effect as it was complimentary to private investment. This suggested that composition of Government expenditure categories needed to be re-examined and reorganized so that they contribute to economic growth.

Moreno-Dodson (2008) carried out an empirical analysis of how public spending contributes to growth on a sample of seven fast growing developing countries using panel data. They focused on both the level and composition of government spending, in connection with the dynamics of GDP per capita growth. They attempted to answer two specific questions: first, what are the policy conditions under which government spending contributes positively to growth? And second, what are the government spending components that have a stronger and longer-lasting impact on growth? The rate of growth of GDP per capita was the dependent variable and the ratios of fiscal variables to GDP the key explanatory variables,

controlling for other non-fiscal, growth-promoting determinants i.e. the inflation rate and the ratio of private sector investment to GDP. Three econometric methods were used (OLS, seemingly unrelated regressions (SURE), and GMM) and the respective results were found to be similar. In general, total government spending had an economically and statistically significant positive effect on the GDP per capita growth rate. The statistical significance of the results increased when the lagged value of GDP per capita growth was added, which may indicate that government spending was exerting a positive influence on growth and not vice versa.

This result emphasized the fact that the analysis of the relationship between government expenditure and economic growth is not simply between the two aggregate variables. The effects of revenue on expenditure as well as other macroeconomic variables must be controlled for as they operate in a system. This is an area of research that may not be addressed in the current study as it is beyond the scope and focuses only on the expenditure side of national income. The research to be undertaken attempts to establish a robust relationship between government spending and growth in Kenya where government spending has been growing while the rate of growth of the economy has been fluctuating during the last four decades.

Liu, Hsu and Younis (2008) employed granger causality test on US federal government data, from 1947 to 2002. They used aggregate data as well as disaggregate data with the sub-categories of five federal expenditures, including: national defense, human resources expenditure, physical resources expenditure, net interest payment, and other expenditure. The results of their study suggested that total federal government expenditure was more consistent with Keynesian's theory while there were diversified causal relationships among the five sub-categories of federal expenditure. The policy recommendation generated from this paper was that the US federal government should invest more public resources in human resources expenditure under the assumption that economic growth is the utmost important item on the government agenda.

Njuguna (2009) analyzed the effects of government expenditure on economic growth using Kenya's data for 1963-2006. OLS estimation technique was used to analyze the trends and

composition of government expenditure and the contribution of such expenditure components to economic growth. The results showed that government spending in the productive sectors like agriculture, health and infrastructure improved the investment environment for the private sector and hence growth. The study assumes a Keynesian relationship between government expenditure and economic growth. The current study instead of making the same assumption, seeks to establish the existing relationship before analyzing the effects of government expenditure on growth.

## 2.4 Overview of the literature

The theoretical literature has generally postulated the relationship between government expenditure and economic growth albeit with differences. The most prominent theories of government expenditure, which especially relate to the Kenyan data are the Keynesian theories and the contrasting Wagner's theory. Wagnerian supporters relegate public expenditure policy to redundancy while Keynesian followers advocate an active government intervention and public expenditure policy to stabilize economies.

The empirical literature has emphasized the significant statistical relationship between government expenditure and economic growth of a country. However, it is also evident that most of the analyses have been done for developed countries where the relationship between government expenditure and GDP is found to be Wagnerian, Keynesian or at times bidirectional. Similar results have been obtained by using cross sectional studies for both developed and developing countries.

Studies on the subject for developing countries and especially Kenya are rare. For instance, the studies by Kweka and Morrissey (2000) for Tanzania and M'Amaja and Morrissey (2005) for Kenya are both based on the Keynesian assumption that government spending influences economic growth. Similarly, the study by Njuguna (2009) analyzing the effects of government expenditure on economic growth appears to be based on the same assumption for the case of Kenya. Notably, this may not always be the case and this is a gap that this research aims to fill.

The literature reviewed has also shown that various methods including OLS, SURE and GMM are valid for estimation of the relationship at hand, with causality tests cutting across them. It follows that to estimate the relationship between government expenditure and economic growth for Kenya, the direction of causality must be established. The For instance, does the growth of the economy lead to an increasing government budget? Or is it the level of government spending that influences how the economy grows. Similarly, it may be that there is no significant relationship between the two as some empirical studies like Hsieh and Lai (1994) have shown for the case of the group of seven countries.

This study adds to the existing literature by testing the relationship between government expenditure and economic growth for the case of Kenya. Also, by using the ratio of government expenditure to GDP as a proxy for the size of government, the study attempts to introduce efficiency of government expenditure as a determinant of economic growth.

# CHAPTER THREE

# METHODODLOGY

## 3.1 Introduction

This chapter presents the research design, theoretical framework and model to be employed in analyzing the relationship between government expenditure and economic growth in Kenya. This research is quantitative in nature and attempts to establish the relationship between government expenditure and long term economic growth in Kenya. Annual data for 1963-2008 is used in the analysis for the variables government expenditure: total, development and recurrent; Gross Domestic Product (GDP); and government size (X). Their dynamic relationship is analyzed by estimating a Vector Autoregressive (VAR) model.

## 3.2 The Model

Neoclassical growth theory shows that growth in output comes from the accumulation of capital and thus investment. To the extent that public services are considered an input into production, a linkage arises between the size of government and economic growth. Thus, Barro (1990) showed that government expenditure enters the production function of the private sector as an input. This line of thought corresponds to Ram (1986) where growth in output is determined by gross investment and government consumption expenditure ratios to GDP in addition to the growth of labor force. This growth equation may be presented as follows:

$$\frac{\Delta Y}{Y} = \alpha\frac{I}{Y} + \beta\frac{\Delta L}{L} + \gamma\frac{\Delta G}{Y} \quad \ldots\ldots 3.1$$

As based on the following production function: $Y = AK_t^{\alpha}L_t^{\beta}G_t^{\gamma}$ (Ram, 1986)

Where; Y is National output as measured in terms of GDP and ΔY/Y the growth rate of GDP the proxy for economic growth, I/Y is the ratio of gross investment to output in the economy where I is assumed to be the change in capital accumulation (ΔK), ΔL/L is the rate of growth of the labor force and ΔG/Y represents the rate of growth of government size. α, β

and $\gamma$ are the parameters of the model where $\alpha$ and $\beta$ are positive while $\gamma$ is negative a priori (Grossman, 1988). $\alpha$ and $\beta$ are the marginal products of capital and labor respectively from the nongovernment sector while $\gamma$ captures the overall effect of government size on output.

The equation 3.1 forms the basis of our model specification where there is an implicitly assumed linear relationship between government expenditure and GDP, such that government expenditure (G) influences GDP

GDP = f (G).....3.2

This implies that for the two categories of government expenditure, a similar linear relation can be stipulated such that

GDP = f (RE, DE).....3.3

Where RE represents recurrent expenditure and DE is development expenditure.

There are diverse explanations for the substantial growth in the size of government expenditure and its effect on long run economic growth or vice versa. Public finance studies are directed towards identifying the principle causes of public sector growth. Wagner's law is one of the earliest theories that emphasize economic growth as the fundamental determinant of public sector growth thus government expenditure can be treated as an outcome or endogenous factor of economic growth.

PE = f (GDP).....3.4

On the other hand, the Keynesian school of thought puts emphasis on the role of government in economic growth. Here, the general flow of government services has significant effects on economic growth. Government expenditure is thus viewed as an exogenous factor that can be used as an instrument to stimulate growth (Keynes, 1936).

GDP = f (PE).....3.5

Where PE is government expenditure

These two completely opposite arguments reflect the viewpoints over the issue of what is the causal relation between economic growth and government expenditure. Thus causality tests on the models above are needed to establish the direction of causation. Knowledge of the true nature of the causative process helps to determine the robustness of the above relationships when estimated with important policy implications (Singh and Sahni, 1984). If

the causality were Wagnerian, government expenditure plays a passive role, while if Keynesian, it acquires the status of an important policy variable.

Following the methodology employed by Liu, Hsu and Younis (2008), the regression models below may be specified for estimation; First, GDP (in Kshs. Millions) is the dependent variable and total government expenditure the independent variable (in Kshs. Millions); Second is the relationship between GDP and the two categories of government expenditure where, GDP is the dependent variable (in Kshs. Millions) and development and recurrent expenditure (DE & RE) are the independent variables (in Kshs. Millions);

$$Y_t = \beta_0 + \beta_1 G_t + \varepsilon_t \qquad \textbf{3.6}$$

And

$$Y_t = \alpha_0 + \alpha_1 (DE)_t + \alpha_2 (RE)_t + u_t \qquad \textbf{3.7}$$

where, Y represents GDP, G government expenditure ; the $\beta$ 's and $\alpha's$ are the coefficients to be estimated where $\beta_1, \alpha_1$ and $\alpha_2$ represent the marginal impact of Government expenditure on GDP, t represents the number of observations and $\varepsilon$ & $u$ are the stochastic error terms that captures the unspecified random events that affect GDP.

The size of government (X) is measured as the ratio of total government expenditure to GDP (G/Y) influences GDP (Loizides and Vamvoukas (2005) and Barro (1990). Similarly, Tanzi and Zee (1997) suggested that the size of government should be measured as the share of government spending in GDP. Thus when GDP growth rate (g) is the dependent variable growth of government size (ΔX) is the independent variable.

$$g_t = \gamma_0 + \gamma_1 \Delta X_t + \mu_t \qquad \textbf{3.8}$$

$\mu$ represents the usual stochastic error term with zero mean and constant variance while Δ represents a change so that $\Delta X_t$ is the change in government size.

**Justification of the model**

A linear model is chosen for simplicity and also in order to facilitate direct interpretation of the causality analysis. Theoretically a positive relationship is expected between GDP and government expenditure while a negative one is expected with respect to government size.

## 3.3 Definition and measurement of Variables

Gross Domestic Product (Y) is the measured economic output in Kshs. Millions per year.

Growth rate of GDP (g) in percentage changes per annum or $\Delta Y/Y$.

Total government expenditure (G) measured in Kshs. millions per year.

Size of government (X) measured as the ratio of government expenditure to GDP.

Recurrent expenditure (RE) measured in Kshs. millions per year.

Development expenditure (DE) measured in Kshs. millions per year.

## 3.4 Specification tests

Pre-estimation tests are conducted in order to ascertain the statistical and time series properties of variables so that our estimated model is consistent with the theoretical assumptions of the classical linear regression model (CLRM). These tests include descriptive summary statistics, testing for the normality and correlation of time series.

Summary statistics are shown to ascertain the spread of the data points while the normality and autocorrelation tests are done to ascertain that the data are consistent with the CLRM normality assumption

The normality test is conducted by comparing the skewness and kurtosis of the variable thus computing the Jarque-Bera (JB) statistic. Skewness measures the asymmetry of the distribution of the series around its mean while Kurtosis measures the peakedness or flatness of the distribution of the series. For a normal distribution, the skewness value is zero while the kurtosis value is three. The Jarque-Bera statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. The JB normality test is conducted on the null hypothesis that the variable is normally distributed.

The LM test is used to test for autocorrelation and the optimal lag length that produces the most data congruent model is selected by minimizing the AIC and SBIC.

## 3.5 Time series properties of data

These include graphical/trend analysis, tests for stationary, and determination of the order of integration as well as testing for cointegrating relations among the time series.

Empirical work based on time series data assumes that the underlying time series are stationary. Spurious results from a regression may arise if time series data exhibit strong trends, so that the high $R^2$ observed is due to the presence of the trend, not to the true relationship between the variables.

A series is said to be (weakly or covariance) stationary if the mean and autocovariances of the series do not depend on time. Any series that is not stationary is said to be nonstationary. A difference stationary series is said to be integrated and is denoted as I (*d*) where *d* is the order of integration. The order of integration is the number of unit roots contained in the series, or the number of differencing operations it takes to make the series stationary. For the random walk, there is one unit root, so it is an I(1) series. Hence, a stationary series is I(0).
To determine whether a series is stationary or non-stationary, the unit root test developed by Dickey and Fuller (1979) is used. Due to the dynamic nature of the time series, the Augmented Dickey-Fuller (ADF) test is used based on the estimate of the following regression:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \, \Delta Y_{t-i} + \varepsilon_t \quad \text{.....3.9}$$

where $\varepsilon_t$ is a pure white noise error term. The Akaike's information criterion (AIC) and Schwartz information criteria (SIC) is used to determine the lag order (m) of each variable such that the error term in (3.9) is serially uncorrelated. The ADF tests the null hypothesis that $\delta = 0$ ; that is, there is a unit root and the series is non stationary. The alternative hypothesis $\delta < 0$; that is the time series is stationary. Where a series is found to have a unit root, then it is differenced to make it stationary.

A test for cointegration is done to determine whether the non-stationary series are cointegrated or not. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exists, the non-stationary time series are said to be cointegrated. The stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship among the variables.

Thus to determine if Government expenditure, GDP and government size are co-integrated, VAR-based cointegration tests were performed using the methodology developed in

Johansen (1991, 1995). An unrestricted VAR model as advocated by Sims (1980) to estimate dynamic relationships among jointly endogenous variables without a priori restrictions on structural relationships or exogeneity is used.

If the VAR is specified as follows;

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + Bx_t + \varepsilon_t \quad \text{.....3.10}$$

Where: $\Pi = \sum_{i=1}^{p} A_i - \mathrm{I}, \quad \Gamma_i = -\sum_{j=i+1}^{p} A_j$

A is simply a vector of endogenous variables in the model and I the identity matrix.

Granger's representation theorem asserts that if the coefficient matrix $\Pi$ has reduced rank $r<k$, then there exist $k*r$ matrices $\alpha$ and $\beta$ each with rank $r$ such that $\Pi = \alpha\beta'$ and $\beta' y_t$ is I (0). $r$ is the number of cointegrating relations (the cointegrating rank) and each column of $\beta$ is the cointegrated vector. Johansen's method was used to estimate the $\Pi$ matrix from an unrestricted VAR and to test whether the restrictions implied by the reduced rank of $\Pi$ could be rejected. If a cointegrating relationship were ascertained between the variables, then a vector error correction (VEC) mechanism would have been estimated to give the long term relationship. However, no cointegrating relationship was established by the cointegration test, thus a reduced form VAR was estimated.

### 3.6 Model Estimation

The growth model in 3.1 enables us to relate GDP (Y) to government expenditure (G). The relationship between government expenditure is estimated as a VAR since from a priori theoretical assumptions, there is interdependence and hence simultaneity bias among GDP and government expenditure variables. Similarly, the size of government expenditure is correlated to the two variables since it's the ratio of government expenditure to GDP. This in reference to the opposing Wagnerian and Keynesian postulations on the theory of public expenditure suggests that the variables are potentially endogenous, making the choice of VAR model inevitable.

### 3.6.1 Granger Causality

In order to answer the objective questions of the study, the direction of causality between government expenditure and GDP is established as their dynamic and long term relationship is analyzed.

Thus, to analyze the effect of government expenditure on GDP, a general VAR of the following form was estimated;

$$y_t = A_1 y_{t-1} + \ldots.. + y_{t-p} + Bx_t + \varepsilon_t \quad \ldots\ldots 3.11$$

Where $y_t$ is a vector of non-stationary I(1) variables including Y,G and X; $x_t$ is a $d$-vector of deterministic variables, and $\varepsilon_t$ is a vector of innovations (i.e. the stochastic error terms also called the impulses/shocks). The appropriate lag length $p$ is selected by minimizing the AIC and SBIC.

First, to identify the patterns and direction of causality it was ensured that the model accounted for the effect of both the permanent and random displacement factors like price changes. Thus, GDP and government expenditures (G, DE & RE) were considered in real terms. The nominal values of these variables were deflated by the gdp deflator.

Following Granger (1969), the general causal model may be written as

$$Y_t = a_0 + b_0 G_t + \sum_{i=1}^{m} b_i G_{t-i} + \sum_{i=1}^{n} a_i Y_{t-i} + u_t \quad \ldots\ldots 3.12A$$

And

$$G_t = c_0 + d_0 Y_t + \sum_{i=1}^{n} c_i G_{t-i} + \sum_{j=1}^{m} d_j Y_{t-j} + v_t \quad \ldots\ldots 3.12B$$

Where $u_t$ and $v_t$ are mutually uncorrelated white noise series.

Four cases may be distinguished as follows;

First, there could be unidirectional causality from G to Y if $b_0$ & $b_i \neq 0$ and $d_0$ & $d_i = 0$;

Second, there is unidirectional causality from Y to G if $d_0$ & $d_i \neq 0$ while $b_0$ & $b_i = 0$;

Third, there is feedback, or bilateral causality when the sets of G and Y coefficients are statistically significantly different from zero in both regressions; and finally, there is

independence when the sets of G and Y coefficients are not statistically significantly different from zero in both regressions.

### 3.6.2 Impulse Response Function (IRF)

Impulse response function tracks the impact of a shock of any variable on others in the system. The impulse response functions are used to produce the time path of the dependent variables in the VAR, to shocks emanating from all the explanatory variables. If the system of equations is stable any shock should decline to zero while an unstable system would produce an explosive time path.

### 3.6.3 Forecast Error Variance Decomposition (FEVD)

Variance decomposition is an alternative method to the impulse response functions for examining the effects of shocks to the dependent variables. This technique is used to determine how much of the forecast error variance for any variable in the system, is explained by innovations to each explanatory variable, over a series of time horizons. Usually own series shocks explain most of the error variance, although the shock will also affect other variables in the system.

## 3.7 Diagnostic Tests

These include residual tests for autocorrelation and normality. The Lagrange multiplier (LM) test was used to report the multivariate LM test statistics for residual serial correlation up to the specified order. Similarly the normality test on the residuals reports the multivariate extensions of the JB residual normality test, which compares the third and fourth moments of the residuals to those from the normal distribution. The autoregressive roots of the VAR were also be checked to ensure that the VAR met the stability condition.

## 3.8 Data Sources

The research utilizes published data from Kenya's official government documents for the period 1963-2008. The data on government expenditures and GDP is obtained mainly from economic surveys, statistical abstracts and other published and unpublished economic reports. Other data which consist of ratios was calculated directly based on the obtained national data and where necessary sourced from established databases such as of the World

Bank and international financial statistics. A data sheet consisting of a list of the variables studied for the period from1963-2008 was used as the collection guide/instrument.

### 3.8 Data refinement

Data on government spending were available only for fiscal years, so they were converted into annual data by taking averages. To convert data into real values, the most recent GDP deflator (index 2000=100) was used. Once analysis commenced, descriptive statistics were generated to provide a preview of the data in order to handle any notable characteristics.

### 3.9 Data Analysis

The study addresses two main objectives. The first one involves establishing the causal relationship between government expenditure and GDP. This is done mainly by Granger causality testing for all the variables including both recurrent and development expenditures. Estimation of a VAR model based on the equation 3.1 enables an analysis of the effect government expenditure has on economic growth.

# CHAPTER FOUR

## EMPIRICAL FINDINGS

### 4.1 Introduction

This chapter presents the data analysis and empirical findings of the study. The discussions on the nature of the relationship between government expenditure and the GDP are presented. The analysis of the effect of government expenditure on GDP is presented with discussions of the empirical results of model estimation. All the econometric results and findings are reported and interpreted with reference to economic theory as well as reviewed literature.

### 4.2 Descriptive Data Analysis

This section shows the pattern and statistical characteristics of the time series variables used in the study. Table 4.1 summarizes the overall statistical characteristics of the variables.

**Table 4.1: Summary statistics**

| | Development Expenditure | Recurrent Expenditure | Total Government Expenditure | GDP | Government size |
|---|---|---|---|---|---|
| Mean | 264595.4 | 1639843 | 2251988 | 6118353 | 34.38165 |
| Median | 240238.7 | 1641644 | 2322617 | 6553047 | 34.22452 |
| Maximum | 543363.5 | 3884920 | 4749772 | 9700987 | 56.5987 |
| Minimum | 54787.54 | 296532.7 | 367488 | 1854580 | 18.67502 |
| Std. Dev. | 141361.4 | 920881.3 | 1221110 | 2500222 | 8.26408 |
| Skewness | 0.34735 | 0.322552 | 0.089217 | -0.24749 | 0.531499 |
| Kurtosis | 2.054527 | 2.352033 | 1.97464 | 1.75583 | 3.590824 |
| Jarque-Bera | 2.58099 | 1.567538 | 2.031002 | 3.361794 | 2.773195 |
| Probability | 0.275135 | 0.456681 | 0.362221 | 0.186207 | 0.249924 |

*, ** rejects null of normality at 5% and 1% level

For all the variables, the means are close to their medians implying that their average values truly tend towards the center of the individual series. This is mainly explained by the fact that all the values have been growing over time from a minimum to a maximum amount as is consistent with theory. The standard deviation (std. dev.) is a measure of dispersion or

spread in the series and this tells us how low the minimum values and how high the maximum values are from the mean or average.

Normality test results are given in Table 4.1 where the test statistic measures whether the series are normally distributed. All the variables except GDP which is negatively skewed are slightly positively skewed. X is leptokurtic (peaked relative to normal) while the other variables are platykurtic (flat relative to normal).

### 4.3 Time Series Properties of Data

These include investigation of characteristic trends in variable series, establishment of the order of integration of the variables as well as the dynamic relationship of the time series.

Graphical analysis in time series is an important tool in learning the behavior of variables in quite a straight forward way. The graphical presentation of the variables in the estimable model is shown in Figure A1 in Appendix A. The line graphs show that all the variables have characteristic trends generally increasing over the years with episodes of declines in between. There was a sharp decrease in GDP in 1996-1997 which corresponded to a fall in the all government expenditures and the government size. This could be attributed to the uncertainty in the build up towards the second multiparty elections in 1997 coupled with loss of donor confidence which led to suspension of most financial aid in the same year. A graphical representation of the gdp deflator used to convert the nominal values into real values has been included to illustrate the effect it has had on the variables.

Stationarity of the time series was established before the analyses commenced as all causality literature assumes stationarity. The formal method to test the stationarity of a series is the unit root test. The augmented Dickey-Fuller (ADF) test statistic is employed in the assumption that the data generation processes could follow a higher order autoregressive (AR) process such that included higher order lagged terms of the dependent variable whiten the error term. The non-parametric test for unit roots by Phillips and Perron (1988) based on the Phillips (1987) Z-test which involves transforming the test statistic to remove autocorrelation in the model is used to confirm rejection or non-rejection of the null

hypothesis of unit roots in the series. Mackinnon's (1991) tables provide the cumulative distribution of the ADF and PP test statistics.

The results of the unit root tests are shown in the appendix in Tables A1 and A2. Both a constant and trend are included since the true populations of the variables are assumed to have non-zero mean and their graphical presentations as in Figure A5 portray a trend. The interpretation of the unit root results follows a standard Newman-Pearson framework where generally the tests are left tail. Therefore, given the null of non-stationarity i.e. presence of unit roots, the computed statistic must fall in the left of the critical values at either the 10%, 5% and 1% levels of precision for the series to be stationary. All the variables are found to be I(1) processes at levels but I(0) at first difference.

The order of integration was also established before estimation of the long term relationship between the variables. A linear trend was allowed in the cointegration vectors as it was assumed that there is some long-run linear growth in all the variables. Thus the cointegration space includes time as a trend stationary variable to take account of unknown exogenous growth. The Trace test was used, assuming a restricted linear deterministic trend in the cointegration relation and using three lags in differences. The trace statistic tests the null hypothesis of $r$ cointegrating relations against the alternative of $k$ cointegrating relations, where $k$ is the number of endogenous variables, for $r = 0, 1, \ldots, k-1$. The test reveals that there is no cointegrating relation among the variables for GDP, government expenditure and government size. Since the trace statistic is lower than the 5% critical value at each of the corresponding three hypotheses, the null of $r$ cointegrating equations is rejected. The results of the cointegration test for the three variables are shown in Table 4.2;

**Table 4.2: Unrestricted Cointegration Rank Test (Trace)**

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None | 0.478442 | 41.55013 | 42.91525 | 0.0681 |
| At most 1 | 0.219426 | 14.2109 | 25.87211 | 0.6402 |
| At most 2 | 0.086643 | 3.806401 | 12.51798 | 0.7699 |

Trace test indicates no cointegration at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

## 4.4 Diagnostic Tests

These generally constitute residual tests for autocorrelation and normality. Stability of the VAR also ensures that the estimated model is valid and can be used for forecasting and inference.

The VAR Residual Portmanteau Tests for Autocorrelations where the null hypothesis is no residual autocorrelations up to lag *h* (where h=10) confirms that there is no serial correlation in the residuals. The Q-statistics are all significant for lags 4-10. Similarly, the VAR Residual Serial Correlation LM Test shows there is no auto correlation of the residuals up to the twelfth lag. Thus the model is assumed to be correctly specified. The results are summarized in Table A3 in appendix A.

The VAR residual normality test (JB) statistic does not reject the null of multivariate normal residuals at any level of precision. The residuals are normally distributed for all the equations individually and for the entire model jointly. Normality of the residuals means that the estimations are useful for a statistical assessment of the validity of the regression model. The normality test results are reported in Table A4 in appendix A.

The estimated VAR is stable (stationary) if all roots have modulus less than one and lie inside the unit circle. If the VAR is not stable, certain results (such as impulse response standard errors) are not valid. Stability of the VAR model is essential in determining the predictive powers of the model. All the roots have modulus less than one and lie inside the unit circle evidence that the model is stable. Results from the Stability test are reported in Table A5 in appendix A.

## 4.5 The relationship between government expenditure and GDP

The first objective of this study was to establish the nature of the relationship between government expenditure and GDP. Even before estimation, a bird's eye view of the basic characteristics of the variables as provided by Figure 1.2 in chapter one shows that government expenditure grows much faster than GDP. The temporal linkages among GDP, government expenditure and size of government were examined using Granger's (1969) test for causality. The VAR Granger/ block exogeneity test which tests for the exclusion of all

lags of $x_{it}$ from the equation for $x_{jt}$ for i≠j was used. The optimal lag of the estimated VAR was used for the exclusion tests. The statistics are provided together with their p-values which are the marginal significance level at which the null of no causal effect of the corresponding variable on another one may be rejected. The results of the causality tests are summarized in Table 4.3.

**Table 4.3 Summary statistics of Granger-causality tests**

| VAR Granger Causality/Block Exogeneity Wald Tests | | | |
|---|---|---|---|
| Excluded | Chi-sq | df | Prob. |
| Dependent variable: GDP | | | |
| Government Expenditure | 25.58615 | 3 | 0* |
| Government Size | 14.14427 | 3 | 0.0027* |
| All | 30.58604 | 6 | 0* |
| Dependent variable: Government Expenditure | | | |
| GDP | 12.65467 | 3 | 0.0054* |
| Government Size | 0.362742 | 3 | 0.9478 |
| All | 28.48471 | 6 | 0.0001* |
| Dependent variable: Government Size | | | |
| GDP | 10.98195 | 3 | 0.0118** |
| Government Expenditure | 4.314544 | 3 | 0.2294 |
| All | 26.7793 | 6 | 0.0002* |

*and ** indicate 1% and 5% statistical significance level

According to Table 4.3, there is bidirectional causality between government expenditure and GDP and similarly between GDP and government size as expected. This relationship is confirmed by the equations for government expenditure and government size where exogeneity of GDP is rejected at 1% and 5% levels respectively. This finding confirms those made by Singh and Sahni (1984) who concluded that the variables should be treated as jointly dependent in public finance and macro econometric models.

In addition to the block exogeneity test which was based on the parsimonious VAR estimated at three lags, pair wise granger causality tests were also carried out at lag one as per the Shwartz Bayesian Information Criterion (SBIC) and three lags by the Akaike Information Criterion (AIC). This was necessary in order to include the two variables for development and recurrent expenditures which had not been included in the estimated VAR model. Results of the pair wise causality tests are shown in Table A11 in appendix A.

The results further confirm the bidirectional causality between real GDP and Government expenditures. Thus, the data does not support either Keynesian or Wagnerian postulates. This feedback relationship becomes more pronounced in the third lag where the null of Granger non causality is rejected both ways at the 1%. At the first lag, causality seems to be more evident from GDP to government expenditure as the test rejects the null of Granger non causality at the 1% level while the null of non causality from government expenditure to GDP is not rejected even at 5% level.

There is evidence of granger causality only from GDP to government size both at one and three lags. This relationship is more emphasized at lag 3 where the null is rejected at 1% precision level. Between government size and government expenditures, there is evidence of a feedback relationship at both lag levels. This means that the more the government spends then the larger it grows in size and also that as the government grows, it spends even more. This is consistent with the theory of interest groups activity (Tullock, 1959) and expenditure maximizing bureaucrats who cause increase in the size of government and consequently the amount spent by the government (Niskanen, 1971).

Recurrent expenditure mimics total government expenditure in relation to GDP. At one lag there is one way relationship from GDP to recurrent expenditure while at three lags, there is evidence of feedback relationship. This may be explained by the fact that the effect of recurrent expenditure which is usually utility enhancing (e.g. salaries of government workers) is not immediate. However, there is some evidence that recurrent expenditure may granger cause government size in the short run but the impact does not last into the third lag.

There is total independence between development expenditure and GDP, total government and development expenditures as well as between development and recurrent expenditures. This implies that, development expenditure is not related to either the level of income or the expenditure of the government. Ideally, the level of development expenditure is expected to be directly related to that of recurrent expenditure. This is because the amount spent on recurrent expenditures should reflect how much development activity is going on as the recurrent expenditure is mainly incurred to administer and pay for the operations and maintenance of development activities in the country.

## 4.6 The effect of government expenditure on GDP

The dynamic relationships among the real GDP, the total government expenditures and size of government are examined using VAR analysis. An unrestricted VAR was chosen for estimation as all variables were considered potentially endogenous. The optimal lag length for the model is determined in order to remove autocorrelation in residuals making them white noise. The lag order selection by various criteria is shown in Table A6 in appendix A. Thus, based on the AIC, the VAR model is estimated with three lags.

Given that each equation in the VAR contains the same regressors, the system can be efficiently estimated by OLS. However, due to the over parameterization of the VAR estimates, standard procedure is followed where results based on impulse response functions and forecast error variance decompositions are reported. They are both traced out as the effects of innovations in the vector moving average representation of the VAR. Because of the complicated dynamics in the VAR, these statistics are considered more informative than the estimated VAR regression coefficients or $R^2$s, which typically go unreported (Stock and Watson, 2001). The VAR estimates are reported in Table A7 in the appendix.

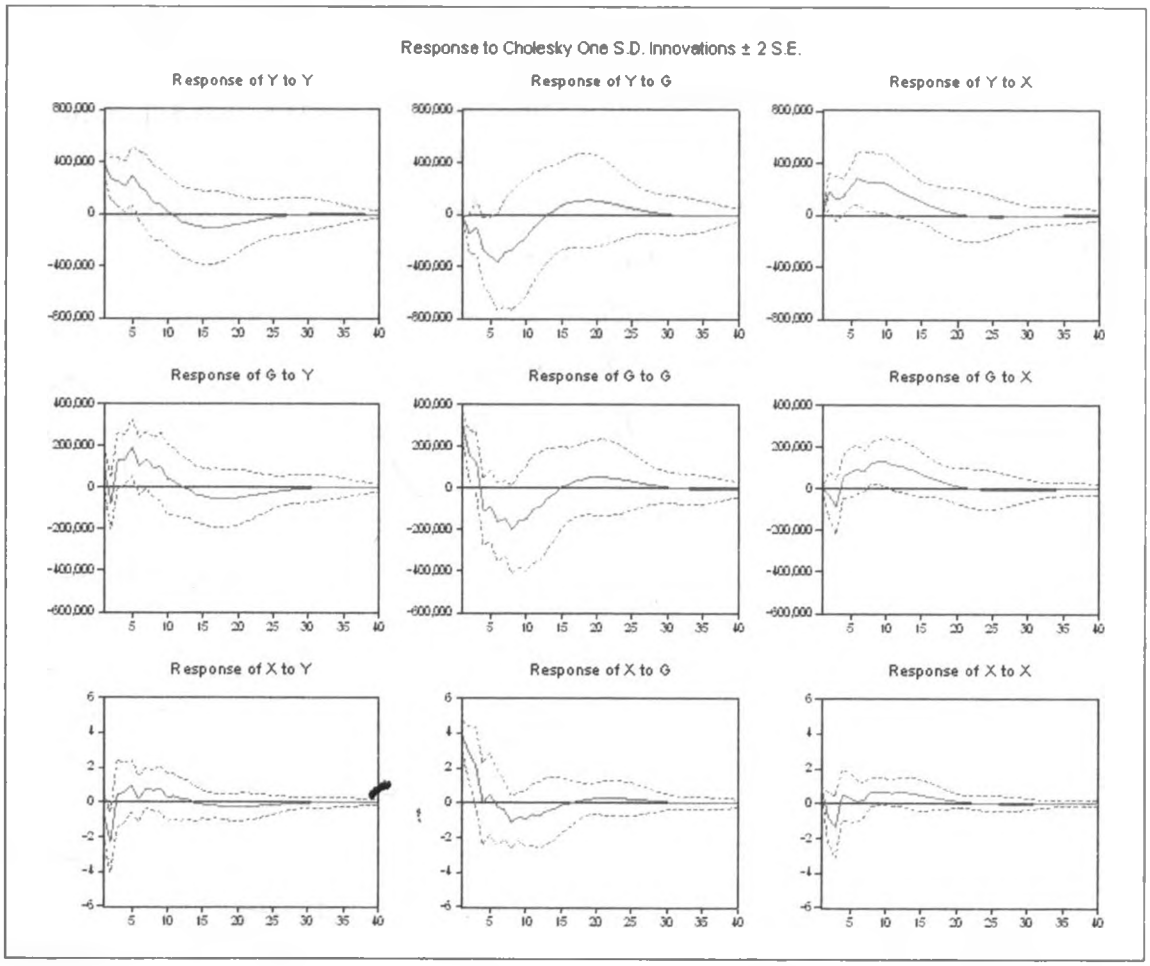
### 4.6.1 The Impulse Response Analysis

An IRF describes the responses of the system over time to a unit shock in any one of the system variables, as represented by one standard deviation innovation in that variable.
A graphical representation of the IRF based on an estimated VAR system, with variables ordered as GDP, Government expenditure and government size is shown in figure 4.1. In addition, the impulse response tables are shown in appendix A Tables A8, A9 and A10.

Looking at the impulse response graphs, the first question that may be answered is how GDP responds to shocks in government expenditure. In the short term, (up to about five periods), government expenditure seems to reduce GDP. However, in the long run this effect becomes positive first rising above equilibrium and later stabilizing after about thirty lags. Shocks in the size of government only have positive effect on GDP in the short run where it rises before falling back to equilibrium after about twenty periods.

The effect of GDP shocks on government expenditure oscillates between positive and negative in the short run before converging on the equilibrium after about thirty periods. A similar path is followed by shocks from government size with equilibrium being attained faster at twenty lags. Shocks from GDP on government size are positive throughout with relatively small deviations from equilibrium. Government expenditure reduces government size especially in the short run with equilibrium settling after only around fifteen periods.

**Figure 4.1: The impulse response functions**




The statistical graphics are based on a three variable VAR system of GDP (Y), total government expenditure (G) and Government size (X).

In general, the shapes of the irf show that GDP responds to changes in total government expenditure positively in the long run while government size only has a short run positive effect on GDP which quickly turns negative. This finding may be supported by previous research findings of among others Henrekson and Lybeck (1988), Levine and Renelt (1992)

and Devarajan *et. al.*,(1996). These studies found that depending on whether government spending was productive or not; and in the presence of externalities, Tanzi and Zee, (1997) and Grossman (1988) the effect of government spending on GDP may be negative or positive.

Similarly, shocks of GDP cause government expenditure to fluctuate before settling into equilibrium in about the same time. The size of government is highly sensitive to government shocks as it falls drastically when government expenditure changes.

### 4.6.2 Forecast Error Variance Decomposition Interpretation

Variance decompositions give the multi-step-ahead forecast error variances divided into different percentages attributed to individual innovations of the variables in the system. The main interest is the proportions of the forecast error variance of GDP explained by shocks in government expenditure and government size. Tables 4.4, 4.5 and 4.6 presents the FEVD results for ten forecast periods based on the estimated VAR system. The variables' ordering was retained as GDP, government expenditure and government size for consistency.

Table 4.4 reports the magnitude of movements in GDP explained by itself, government expenditure and government size;

**Table 4.4: Variance Decomposition of GDP**

| | **Percentage of variation explained by:** | | |
|---|---|---|---|
| Period | GDP | Government Expenditure | Government Size |
| 1 | 100 (∞)* | 0 (0) | 0 (0) |
| 2 | 79.7483 (-7.73962)* | 7.74756 (-1.08526) | 12.50413 (-1.46231) |
| 3 | 77.71831 (-6.68424)* | 8.259303 (-0.947) | 14.02238 (-1.51644) |
| 4 | 65.26015 (-4.79618)* | 20.49466 (-1.56572) | 14.24519 (-1.54915) |
| 5 | 56.22009 (-3.83341)* | 27.64501 (-1.86818) | 16.1349 (-1.72137) |
| 6 | 46.26785 (-3.03722)* | 33.50316 (-2.05309)* | 20.22899 (-1.82148) |
| 7 | 41.72274 (-2.65752)* | 35.3083 (-2.03372)* | 22.96896 (-1.88019) |
| 8 | 37.68437 (-2.40975)* | 36.96946 (-2.03232)* | 25.34617 (-1.949) |
| 9 | 35.10694 (-2.23537)* | 37.25502 (-2.00243)* | 27.63805 (-2.03417)* |
| 10 | 33.02498 (-2.1421)* | 37.01459 (-1.95966)* | 29.96042 (-2.12625)* |

*the t statistic is statistically significant at the 5% level at least; () t-statistic in parentheses

Analysis of Table 4.3 reveals that GDP explains a significantly large portion of the movements in itself in all time periods accounting for, on average, about 57.28 per cent of the variations during the entire time period. Government expenditure is statistically significant in explaining, on average, 36.01 per cent of the variations in GDP in the long run (during the last five time periods). Similarly, government size statistically significantly explains the movements in GDP accounting for about 28.80 per cent only during the last two periods.

Table 4.5 reports the magnitude of movements in government expenditure explained by itself, GDP and government size.

**Table 4.5: Variance Decomposition of Government Expenditure**

| | Percentage of variation explained by: | | |
|---|---|---|---|
| Period | GDP | Government Expenditure | Government Size |
| 1 | 10.89928 (-1.21263) | 89.10072 (-9.91317)* | 0 (0) |
| 2 | 12.54554 (-1.52154) | 87.01415 (-10.1288)* | 0.440314 (-0.12438) |
| 3 | 19.62906 (-1.87734) | 75.99989 (-6.59138)* | 4.371054 (-0.71659) |
| 4 | 25.13268 (-2.51842)* | 69.54374 (-6.32383)* | 5.323582 (-0.83845) |
| 5 | 34.69371 (-3.11851)* | 58.42093 (-5.08048)* | 6.885359 (-1.06816) |
| 6 | 33.05061 (-3.08305)* | 58.07687 (-5.06412)* | 8.872518 (-1.17176) |
| 7 | 33.92262 (-2.96055)* | 56.20878 (-4.71859)* | 9.868604 (-1.27226) |
| 8 | 30.93824 (-2.8068)* | 56.71813 (-4.71837)* | 12.34363 (-1.43988) |
| 9 | 29.78719 (-2.54222)* | 55.53595 (-4.41564)* | 14.67687 (-1.62065) |
| 10 | 27.77729 (-2.44333)* | 55.21846 (-4.2817)* | 17.00424 (-1.74097) |

*the t-statistic is statistically significant at the 5% level at least; () t-statistic in parentheses

From Table 4.5 GDP is statistically significant in explaining, on average, 30.76 per cent of the variations in Government expenditure during the last seven time periods. Government size has no statistically significant power in explaining the movements in Government expenditure in any time period.

Table 4.6 reports the magnitude of movements in government size explained by itself, GDP and government expenditure. It reveals that Government size explains only about 23% per cent of the variations in itself in the first, third and eighth time periods; however, in all other

time periods, its impact is statistically insignificant. Even though GDP has no statistically significant power in explaining the changes in Government size, government expenditure explains a significantly large portion of the of size government accounting for, on average, about 74.18 per cent of the variations during the entire time period.

**Table 4.6: Variance Decomposition of Government size**

| | Percentage of variations explained by: | | |
|---|---|---|---|
| Period | GDP | Government Expenditure | Government Size |
| 1 | 2.428687 (-0.45243) | 92.5907 (-17.2899)* | 4.980616 (-3.20486)* |
| 2 | 1862615 (-1.61173) | 76.6661 (-6.83025)* | 4.707748 (-1.06907) |
| 3 | 15.93184 (-1.65901) | 75.24715 (-6.75432)* | 8.821012 (-1.23957) |
| 4 | 16.53158 (-1.70304) | 74.05576 (-6.50656)* | 9.412655 (-1.28296) |
| 5 | 18.34047 (-1.82191) | 72.26503 (-6.11835)* | 9.394502 (-1.23193) |
| 6 | 18.37181 (-1.80663) | 72.2028 (-5.9995)* | 9.425393 (-1.19781)* |
| 7 | 19.6596 (-1.86536) | 71.0338 (-5.79381)* | 9.306601 (-1.16426) |
| 8 | 19.76408 (-1.88664) | 70.27873 (-5.70648)* | 9.95719 (-1.1956)* |
| 9 | 20.42038 (-1.84348) | 68.92018 (-5.42021)* | 10.65944 (-1.25493) |
| 10 | 20.00928 (-1.8115) | 68.54015 (-5.32868)* | 11.45057 (-1.31086) |

*the t-statistic is statistically significant at the 5% level at least; () t-statistic in parentheses

The FEVDs confirm findings of Ram (1986), Barro (1990), Gwartney *et. al.*, (1998) and Loizides and Vamvoukas (2005) that government size may explain variations in GDP. This effect is found to be in the long run, meaning that the effect of larger or smaller expenditure relative to GDP is only felt in the economy many periods after it happens. This if explained in relation to Niskanen (1971) theory of bureaucracy and Tullock (1959) theory of interest groups means that the effect of interest group activity and also bureaucrats' expenditure maximization respectively take a long time to manifest or clear as the case may be.

The same analysis shows that total government expenditures and government size influence GDP greatly especially from the medium to long term respectively. These findings correspond to those of among others, Landau (1983, 1985 &1986), Conte and Darrat (1988), Kweka and Morrissey (2000). The fact that the effect of government expenditure is not reflected in the GDP immediately may be due to the nature of public investments in long term development projects like infrastructure, research and human capital.

# CHAPTER FIVE

## SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

### 5.1 Introduction

This chapter provides a summary of the study, conclusions derived there of and possible policy recommendations. A section highlighting some suggested areas of further research is included at the end of the chapter.

### 5.2 Summary

Utilizing annual national accounts data for Kenya, this paper has examined and analyzed the relationship between government spending and GDP. The aim of the analysis was to find out the effects of government spending on GDP as well as establish the causal relationship between them. Data for the analysis was gathered from economic surveys published by the Republic of Kenya for the years from 1963-2008. The data obtained in nominal values were converted to real values by using a gdp deflator with the year 2000 as the base year. The estimation method employed to estimate the relationship was VAR analysis with Granger causality testing cutting across. The following paragraphs summarize the main findings on the two study objectives.

The Granger causality tests provide evidence of feedback causal relationships between GDP and Government expenditure during the medium to long term. Similarly, the impulse responses show that although in the short term government expenditure seems to reduce GDP, this effect turns positive in the log run. This implies that while the level of GDP (national income) may influence how much is spent by the government, the amount of government expenditure eventually feeds back into the creation of output. The results yield a position consistent with both Wagner's law and Keynesian propositions. According to Wagner, economic growth where the incomes are rising is inevitably accompanied by increased state activity and hence correspondingly increased government expenditures. Similarly Keynesians postulate that when the government spends a larger amount in productive expenditure, this raises the productivity levels of the country leading to even higher output due to increased aggregate demand.

Evidence from both the impulse responses and variance decompositions suggests that government expenditure influences GDP but with a time lag so that its effect is felt from the medium to the long term. The effect from government expenditure changes fluctuates between positive and negative before settling to equilibrium.

The bidirectional relationship is also established for GDP and recurrent expenditures. The level of GDP has bearing upon how much may be spent on the government's recurrent vote and recurrent expenditure is found to Granger cause GDP.

Development expenditure is independent of the level of GDP and recurrent expenditure does seem to affect how much is spent on development. Development expenditure has no influence on recurrent expenditure too. This is unexpected and may not be explained by the fact that development expenditure carries implications for recurrent expenditures in terms of administration and operations and maintenance expenses. The high recurrent expenditure not explained by development expenditure may be attributed to higher allowances and salaries paid to government employees and constitutional offices. Similarly, the low levels of development expenditure may be due to the fact that any reduction in government expenditure usually affects development vote where development expenditure is repeatedly adjusted downwards to accommodate falls in revenue and increased recurrent payments (Republic of Kenya, 2000). This situation is unsustainable in the long run as there will be no expansion of output and thus no further income generation for growth of the economy.

There is granger bi-causality between GDP and government size but the variance decompositions show that only GDP can explain government size and not the other way around. However, this may be an issue of statistical significance and not a lack of a causal relationship. There is evidence that the government size positively affects GDP at least in the short run but in the medium term this effect may be negative. This means that the theory of related inefficiencies in government due to increased interest group activities and bureaucracy does apply in the case for Kenya. This confirms theoretical propositions and previous researches in the area that the size of government may influence the rate at which national output grows indirectly through expenditures of the government. Barro (1990) also found that the share of government spending in GDP may have a positive or negative effect

on the growth rate of GDP depending on the prevailing size of government and nature of expenditures. In general the larger the size of government the more is the government's total expenditure.

## 5.3 Conclusion

This study has attempted to unravel the nature of the relationship between GDP and government expenditures by examining the dynamic interactions among the real GDP, total government expenditure and the size of government. The empirical results imply that government expenditure influences GDP and that their relationship is essentially of a feedback causal nature in the long term. This finding may partly explain the tendency of government expenditures and hence the size of government to increase as the levels of GDP rise. Thus, more government expenditure boosts economic growth in the long run but this effect may be watered down by the effects of an increasing government size. Consistent evidence is also found that the effect of total government expenditure which is generally mimicked by recurrent expenditures is negative in the short run but positive in the long run. There is however no evidence that development expenditure can influence GDP for the Kenyan data used. Overall, government expenditures and size of government have marginal effects on GDP which are sustained in the medium to long term.

## 5.4 Recommendations

Government expenditure is undoubtedly significant for growth and therefore must be well planned and utilized. The government needs to ensure that more development expenditure is allocated especially for productive investments such as capital equipment and infrastructure which enhance production of output; investments in technological development, health, education and social infrastructure. This way, the economy can expand its output base and enhance growth broth in the short and long term. This research has shown that the effect of government expenditure on GDP is marginally positive and only in the long term when development expenditure is not prioritized.

Recurrent expenditure needs to be justified by and should be based on the amount the government spends on development. This is because development projects form the basis for

output generation and hence economic growth and prosperity. The amount of development activity engaged in by the economy should indicate how much is required to administer, operate and maintain it. Otherwise, recurrent expenditure that does not support execution of development is ideally unnecessary.

The government must control its size too as it directly influences the amount of government expenditure which in turn affects the level of output and therefore economic performance. This research showed that government size only increases GDP in the short term but further increases cause it to start declining. A optimal government size is achievable by more privatization of government activities and promotion of private sector activity which may enhance output productivity and production without increasing government expenditure size.

## 5.5 Areas for Further Research

An area of research mostly untouched in available literature is the effect of government transfers to run government owned institutions and parastatals. These constitute a large portion of the fiscal budget and it would be enlightening to show relatively how much value it adds to government funding of development.

An analysis to show the effect of expenditures classified as productive vis-a-vis nonproductive on GDP and its growth would illustrate the optimal spending patterns for the government.

Another related area of research would be an analysis to show who is involved in determination of government expenditure prioritization and how this influences the economic performance.

Finally, a research into the sources of financing for the government's budget would be a useful follow up on this research. This is because it has been shown that government expenditure has been growing faster than the GDP yet development expenditure has not contributed to the growth. Thus, if there is no adequate expenditure on development to expand the output base, where is the national income generated from?

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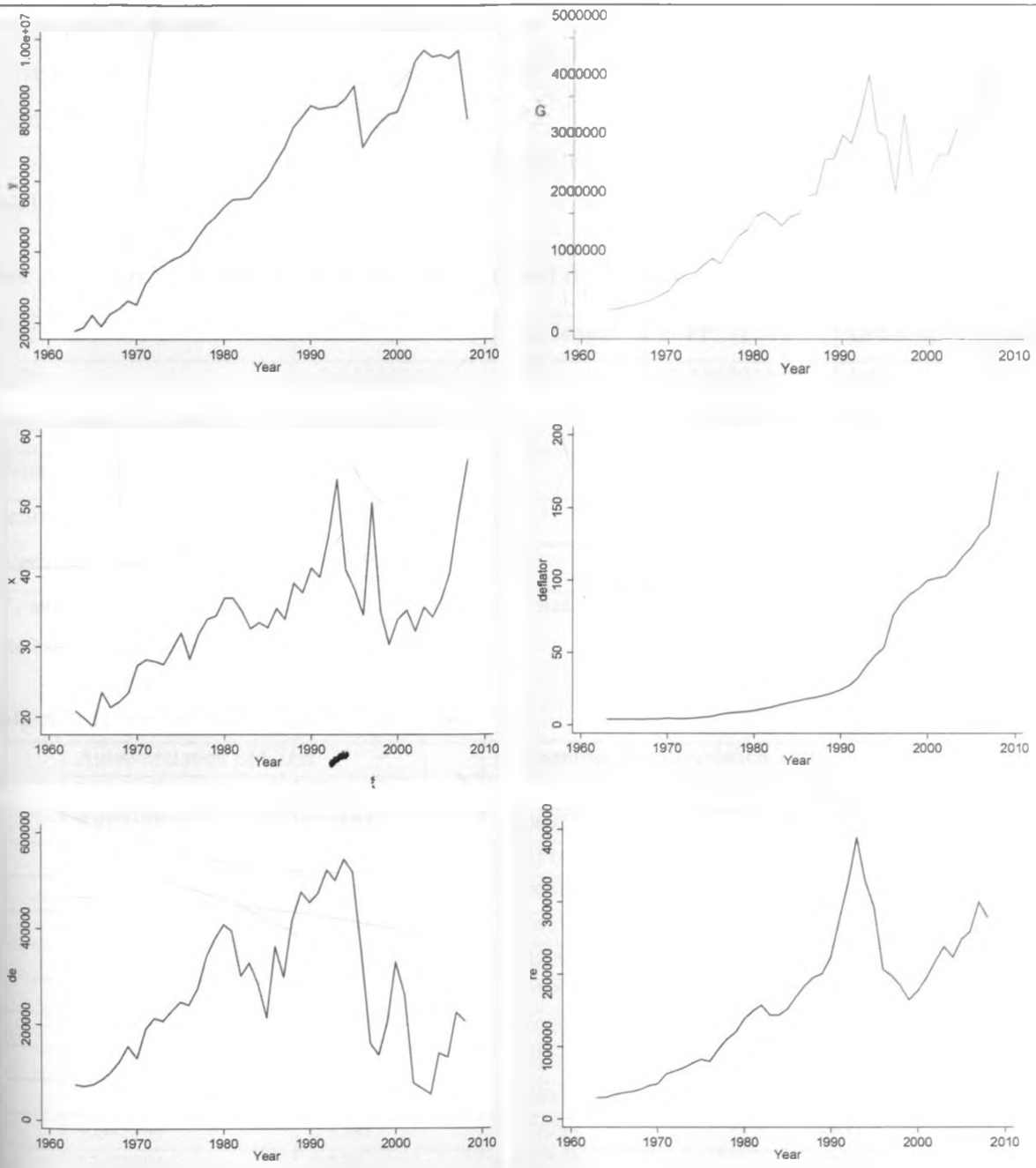
# APPENDIX A

## Figure A1: Data Trend Graphs




**Source:** Data from Republic of Kenya, *Economic Survey*, various issues, 1963-2009

**Table A1: Unit root tests for the variables at levels**

| Series | t-ADF | Lags(SIC) | z- PP | Order of Integration (p≠0) |
|---|---|---|---|---|
| GDP | -1.007114 | 0 | -0.965858 | I(p) |
| Total Government expenditure | -3.172165 | 0 | -3.028176 | I(p) |
| Development Expenditure | -1.75264 | 0 | -1.737064 | I(p) |
| Recurrent Expenditure | -3.413989* | 2 | -2.203530 | I(p) |
| Government size | 2.944118 | 0 | -2.909877 | I(p) |

*, **, shows rejection of the null at 5% and 1% confidence levels respectively, otherwise the null is not rejected.

**Table A2: Unit root tests for the variables in first difference.**

| Series | t-ADF | Lag length | z- PP | Order of Integration |
|---|---|---|---|---|
| ΔGDP | -5.445003*** | 0 | -5.445003*** | I(1) |
| ΔGovernment Expenditure | -9.467888*** | 0 | -9.587893*** | I(1) |
| ΔDevelopment Expenditure | -5.662706*** | 0 | -5.709684*** | I(1) |
| ΔRecurrent Expenditure | -4.447557*** | 2 | -4.180498** | I(1) |
| Δgovernment size | -7.949367*** | 0 | -8.117006*** | I(1) |

*, **, shows rejection of the null at 5% and 1% confidence levels respectively, otherwise the null is not rejected and Δ stands for the first difference.

**Table A3: Residual Autocorrelation Tests**

| Lags | Autocorrelation LM Test | | Portmanteau Autocorrelation Test | |
|---|---|---|---|---|
| | LM-Stat | Prob | Q-Stat | Prob. |
| 1 | 8.461119 | 0.4884 | 2.106735 | NA* |
| 2 | 10.56316 | 0.3068 | 6.331118 | NA* |
| 3 | 9.994928 | 0.3509 | 11.94378 | NA* |
| 4 | 7.918914 | 0.5423 | 17.34774 | 0.0435 |
| 5 | 8.378586 | 0.4965 | 22.88297 | 0.1951 |
| 6 | 3.671198 | 0.9317 | 25.23728 | 0.5612 |
| 7 | 3.290627 | 0.9516 | 28.10902 | 0.8233 |
| 8 | 4.182041 | 0.899 | 31.75301 | 0.932 |
| 9 | 16.11712 | 0.0645 | 44.24112 | 0.8257 |
| 10 | 9.082767 | 0.4297 | 50.91237 | 0.8631 |
| 11 | 17.92806 | 0.036 | 60.83313 | 0.8231 |
| 12 | 11.31745 | 0.2546 | 67.11924 | 0.8658 |

* Means test is valid only for lags larger than the VAR lag order

**Table A4: Residual Normality Test**

| Component | Skewness | Prob. | Kurtosis | Prob. | Jarque-Bera | Prob. |
|---|---|---|---|---|---|---|
| 1 | -0.57206 | 0.1257 | 2.692523 | 0.6807 | 2.51467 | 0.2844 |
| 2 | 0.110255 | 0.7679 | 2.433281 | 0.4481 | 0.66255 | 0.718 |
| 3 | -0.47312 | 0.2053 | 2.184831 | 0.2752 | 2.794739 | 0.2472 |
| Joint | | 0.2575 | | 0.5859 | 5.971958 | 0.4263 |

**Table A5: VAR Stability Test**

| Root | Modulus |
|---|---|
| 0.847848 - 0.180791i | 0.866909 |
| 0.847848 + 0.180791i | 0.866909 |
| 0.848915 | 0.848915 |
| -0.797694 | 0.797694 |
| 0.075013 - 0.735013i | 0.73883 |
| 0.075013 + 0.735013i | 0.73883 |
| -0.240092 - 0.507851i | 0.561745 |
| -0.240092 + 0.507851i | 0.561745 |
| 0.494364 | 0.494364 |

**Table A6: Optimal lag length of the VAR**

| Lag | Log-Likelihood | Likelihood Ratio | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | -1397.69 | NA | 3.95E+24 | 65.14853 | 65.2714 | 65.19384 |
| 1 | -1280.37 | 212.816 | 2.56E+22 | 60.11031 | 60.60181* | 60.29156* |
| 2 | -1268.48 | 19.91843* | 2.26E+22 | 59.97563 | 60.83575 | 60.29281 |
| 3 | -1257.84 | 16.3313 | 2.13e+22* | 59.89934* | 61.12809 | 60.35247 |

*indicates the lag order selected by the criterion, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Shwartz information criterion, HQ: Hannan-Qiunn information criterion.

**Table A7: VAR estimates**

| Standard errors in ( ) & t-statistics in [ ] | | | |
|---|---|---|---|
| | GDP (Y) | Government Expenditure (G) | Government Size (X) |
| Y(-1) | 1.894601 (0.39557)<br>[ 4.78950] | -0.484467 (0.33017)<br>[-1.46733] | -1.30E-05 (4.2E-06)<br>[-3.12476] |
| Y(-2) | -0.950722 (0.56076)<br>[-1.69543] | 0.740030 (0.46804)<br>[ 1.58113] | 1.49E-05 (5.9E-06)<br>[ 2.52264] |

| | | | |
|---|---|---|---|
| Y(-3) | 0.698284 (0.44226)<br>[ 1.57890] | 0.121392 (0.36914)<br>[ 0.32885] | -9.30E-07 (4.7E-06)<br>[-0.19928] |
| G(-1) | -3.123485 (0.96042)<br>[-3.25221] | 0.880596 (0.80162)<br>[ 1.09851] | 2.05E-05 (1.0E-05)<br>[ 2.02464] |
| G(-2) | 2.320243 (1.28672)<br>[ 1.80323] | -0.124786 (1.07397)<br>[-0.11619] | -1.48E-05 (1.4E-05)<br>[-1.08936] |
| G(-3) | -1.109713 (1.03442)<br>[-1.07279] | -0.658291 (0.86339)<br>[-0.76245] | -6.38E-06 (1.1E-05)<br>[-0.58406] |
| X(-1) | 204903.8 (73154.2)<br>[ 2.80098] | -26962.94 (61058.9)<br>[-0.44159] | -0.864075 (0.77210)<br>[-1.11913] |
| X(-2) | -153071.7 (94866.6)<br>[-1.61355] | 6802.106 (79181.3)<br>[ 0.08591] | 0.984975 (1.00126)<br>[ 0.98374] |
| X(-3) | 30476.41 (76395.9)<br>[ 0.39893] | 26095.91 (63764.6)<br>[ 0.40925] | 0.443799 (0.80631)<br>[ 0.55041] |
| C | -2313756. (796786.)<br>[-2.90386] | -332449.5 (665046.)<br>[-0.49989] | 12.21815 (8.40956)<br>[ 1.45289] |
| R-squared | 0.979533 | 0.941349 | 0.783261 |
| Adj. R-squared | 0.973952 | 0.925354 | 0.724150 |
| Sum sq. resids | 4.91E+12 | 3.42E+12 | 547.2204 |
| S.E. equation | 385827.1 | 322034.4 | 4.072154 |
| F-statistic | 175.4866 | 58.85030 | 13.25074 |
| Log likelihood | -608.4387 | -600.6673 | -115.7029 |
| Akaike AIC | 28.76459 | 28.40313 | 5.846645 |
| Schwarz SC | 29.17417 | 28.81271 | 6.256226 |
| Mean dependent | 6308453. | 2338597. | 35.08568 |
| S.D. dependent | 2390571. | 1178685. | 7.753320 |

| | |
|---|---|
| Determinant resid covariance (d of adj.) | 1.14E+22 |
| Determinant resid covariance | 5.13E+21 |
| Log likelihood | -1257.836 |
| Akaike information criterion | 59.89934 |
| Schwarz criterion | 61.12809 |

**Table A.8: Impulse Response of GDP**

| | To shock emanating from: | | |
|---|---|---|---|
| Period | GDP | Government Expenditure | Government Size |
| 1 | 385827.1 (-8.42232)* | 0 (0) | 0 (0) |
| 2 | 268875 (-2.88121)* | -146579 (1.800507) | 186215.5 (-2.46133)* |
| 3 | 252455.3 (-2.20593)* | -93757.9 (0.800768) | 129326.3 (-1.33962) |
| 4 | 214714.2 (-1.66159) | -271424 (1.831159) | 144390.2 (-1.64747) |
| 5 | 298878 (-1.9634)* | -320526 (1.707867) | 219954.3 (-2.17802)* |
| 6 | 218573.6 (-1.14517) | -363690 (1.511771) | 289875.8 (-2.18167)* |
| 7 | 169161.5 (-0.75957) | -285294 (0.979006) | 262275 (-1.70802) |
| 8 | 89784.58 (-0.35782) | -273586 (0.77643) | 257018.9 (-1.46852) |
| 9 | 76323.39 (-0.26734) | -215970 (0.525687) | 249928.3 (-1.26834) |
| 10 | 20322.63 (-0.06036) | -175796 (0.366366) | 248236.8 (-1.082) |

*the t statistic is statistically significant at the 5% level at least; () t-statistic in parentheses

**Table A.9: Impulse Response of Government Expenditure**

| | To Shock emanating from: | | |
|---|---|---|---|
| Period | GDP | Government Expenditure | Government Size |
| 1 | 106316.6 (-2.03592)* | 303978.5 (-8.69451)* | 0 (0) |
| 2 | -76187.3 (1.102099) | 162031 (-2.48598)* | -24503.8 (0.406854) |
| 3 | 132689.6 (-1.65533) | 125498.6 (-1.47859) | -84438.3 (1.176056) |
| 4 | 134667.2 (-1.70251) | -108771 (1.09624) | 58858.04 (-1.08699) |
| 5 | 195475 (-2.15109)* | -84252.1 (0.743023) | 82929.75 (-76292.8) |
| 6 | 103119.3 (-1.01072) | -159250 (1.238991) | 96062.53 (-1.2054) |
| 7 | 135545.8 (-1.19782) | -142300 (1.074892) | 87345.25 (-1.10887) |
| 8 | 98208.18 (-0.73919) | -197102 (1.304265) | 129701.9 (-1.5015) |
| 9 | 101720.6 (-0.62367) | -152750 (0.916007) | 131371.2 (-1.36423) |
| 10 | 42663.23 (-0.20845) | -144610 (0.737448) | 133576.5 (1.15265) |

*the t statistic is statistically significant at the 5% level at least; () the t-statistic in parentheses

**Table A.10: Impulse Response of Government Size**

| | To shock emanating from | | |
|---|---|---|---|
| Period | GDP | Government Expenditure | Government Size |
| 1 | -0.63461 (0.941969) | 3.918392 (-8.28938)* | 0.908795 (-8.86456)* |
| 2 | -2.30319 (2.365477)* | 2.852768 (-3.30622)* | -0.78527 (1.029305) |
| 3 | 0.481277 (-0.41567) | 2.135074 (-1.67066) | -1.35858 (1.341703) |
| 4 | 0.568169 (-0.52322) | -0.02107 (0.014372) | 0.526363 (-0.59023) |
| 5 | 0.965429 (-0.87917) | 0.542635 (-0.33096) | 0.345807 (-0.37705) |
| 6 | 0.184078 (-0.16638) | -0.24586 (0.140742) | 0.152296 (-0.16425) |
| 7 | 0.82078 (-0.70515) | -0.37899 (0.21221) | 0.17983 (-0.19601) |
| 8 | 0.688764 (-0.52726) | -1.1109 (0.57488) | 0.692334 (-0.74067) |
| 9 | 0.79865 (-0.51985) | -0.79893 (0.372367) | 0.696688 (-0.70235) |
| 10 | 0.310402 (-0.16656) | -0.88537 (0.359424) | 0.712877 (-0.63742) |

*the t statistic is statistically significant at the 5% level at least; () the t-statistic in parentheses

**Table A11: Granger causality results**

| Pair wise Granger Causality Tests; Sample: 1963 2008 | | | | |
|---|---|---|---|---|
| | Lags: 1 | | Lags: 3 | |
| Null Hypothesis: | F-Statistic | Probability | F-Statistic | Probability |
| | | | | |
| G does not Granger Cause Y | 3.75018 | 0.05955 | 4.18505 | 0.0122 |
| Y does not Granger Cause G | 12.043 | 0.00122** | 10.115 | 5.70E-05** |
| | | | | |
| X does not Granger Cause Y | 0.26396 | 0.6101 | 1.02411 | 0.39341 |
| Y does not Granger Cause X | 6.8432 | 0.01231* | 7.22445 | 0.00065** |
| | | | | |
| RE does not Granger Cause Y | 1.73526 | 0.19488 | 3.2978 | 0.03123 |
| Y does not Granger Cause RE | 4.74331 | 0.03508* | 8.38284 | 0.00023** |
| | | | | |
| DE does not Granger Cause Y | 0.00026 | 0.98726 | 0.40287 | 0.7518 |
| Y does not Granger Cause DE | 0.01487 | 0.90353 | 0.47796 | 0.69962 |
| | | | | |
| X does not Granger Cause G | 5.40293 | 0.02501* | 4.16081 | 0.01251* |
| G does not Granger Cause X | 6.0777 | 0.01786* | 4.31013 | 0.01071* |
| | | | | |
| RE does not Granger Cause G | 0.30875 | 0.5814 | 2.83585 | 0.0517* |
| G does not Granger Cause RE | 2.65349 | 0.1108 | 4.87111 | 0.00605** |
| | | | | |
| DE does not Granger Cause G | 0.00046 | 0.98297 | 2.11029 | 0.11603 |
| G does not Granger Cause DE | 0.00156 | 0.96872 | 0.7125 | 0.55094 |
| | | | | |
| RE does not Granger Cause X | 6.27403 | 0.01622* | 1.89335 | 0.14817 |
| X does not Granger Cause RE | 0.04167 | 0.83923 | 0.12751 | 0.94317 |
| | | | | |
| DE does not Granger Cause X | 0.55158 | 0.46181 | 1.39614 | 0.25973 |
| X does not Granger Cause DE | 0.2911 | 0.59237 | 0.6498 | 0.58824 |
| | | | | |
| DE does not Granger Cause RE | 0.00879 | 0.92573 | 0.30625 | 0.82069 |
| RE does not Granger Cause DE | 0.01581 | 0.90055 | 2.28531 | 0.09532 |

*, ** The null is rejected at 5% and 1% level respectively

# APPENDIX B

## Table B1: Data Collection Guide

| | Nominal values | | | | | Deflated (Real values) | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | GDP at Market Prices | Total Government Expenditure | Recurrent Expenditure | Development Expenditure | GDP deflator Kshs. 2000=100 | GDP | Total Government Expenditure | Recurrent Expenditure | Development Expenditure |
| 1963 | | | | | | | | | |
| 1964 | | | | | | | | | |
| 1965 | | | | | | | | | |
| 1966 | | | | | | | | | |
| 1967 | | | | | | | | | |
| 1968 | | | | | | | | | |
| 1969 | | | | | | | | | |
| 1970 | | | | | | | | | |
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| 2007 | | | | | | | | | |
| 2008 | | | | | | | | | |