THE RELATIONSHIP BETWEEN PUBLIC EXPENDITURE COMPOSITION AND ECONOMIC GROWTH IN KENYA

DENNIS N. BIRUNDU

D61/63750/2011

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION, UNIVERSITY OF NAIROBI.

NOVEMBER 2013

DECLARATION

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

Signed ……. Date ……

Denis N. Birundu

D61/63750/2011

This project has been submitted for this examination with my approval as University Supervisor.

Signed …… Date ……

Supervisor: Mr. Joseph Baraza

DEDICATION

To my caring father Mr. Hudson Birundu and my caring mother Mrs Teresa Birundu who first sowed the seed of education in me and have been there all the way up to now for both moral and financial support. And to my brothers and sisters for always being there for me.

ACKNOWLEDGEMENT

Firstly, I would like to thank God for granting me good health to complete this masters program in Nairobi University.

Secondly, my heartfelt gratitude goes to my supervisor Mr. Joseph Baraza for his advice, encouragement and understanding throughout this study.

Thirdly, to my parents for ensuring that I was supported in all ways, not only throughout the research process but in my studies.

I would also like to express my sincere gratitude in a special way to my brothers, sisters and cousins for their encouragement.

Finally to my dear friends who offered comfort and intellectual stimulation throughout my studies which made life bearable.

ABSTRACT

Existing studies on the relationship between public expenditure and economic growth have shown conflicting results over time. This means that there is no clear explination for this relationship. Kenya has also experienced an increase or demand of increase of expenditures in various sectors like that education and health due to strikes by workers for an increase in their salaries. This study therefore examined the relationship and dynamic interactions between the composition of government expenditures and economic growth in Kenya. Real Gross Domestic Product (RGDP) was used as a proxy for economic growth in the study. The analytical technique of ordinary least squares and Granger Causality were exploited. The study used secondary data spanning from 1970 to 2012. The findings showed that government expenditure on transport and communication, health and education are positive determinant of economic growth on the other hand government expenditure on agriculture, low and order, defense and general administration have a negative impact on economic growth. The study therefore recommended among others that: there should be effective channeling of public funds to productive activities, which will have a significant impact on economic growth. Eviews was used in the analysis of the data.

TABLE OF CONTENTS

LIST OF TABLES

ABBREVIATIONS

ADF – Argumented Dicky Fuller

EU - European Union.

GDP – Gross Domestic Product.

GFCF – Gross Fixed Capital Formation.

OECD – Organization for Economic Development.

VAR – Vector Auto Regressive.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Governments in developing countries are more often than not faced with expenditure needs that outstrip the resource envelopes, and usually have limited options to raise additional resources domestically. These governments spend an average of 25 percent of GDP on goods and services, a figure that has risen over eight percent in the last fifteen years (World Bank, 1992). The rise of this figure has attracted a lot of attention to the debate on the Composition of public expenditure and its effects on the level of growth.

Government expenditure is expected to be means of reducing the negative impacts of market failure on the economy. However, allocations of public expenditure with lack of consideration for the urgent needs of the country may engender greater distortion in the economy which may be detrimental to growth. Overall, there is a whole range of types of government expenditures that may be growth enhancing. This supports the assertion that the composition of government outlays may be more relevant than the level (Nijkamp and Poot, 2004). Nonetheless, all these government activities must be funded in some way.

Public expenditure is also an important instrument for a government to control the economy. Economists have been well aware of its two-side effects in promoting economic growth. On the one hand, public investment is a factor contributing to capital accumulation. Public expenditures are also used to fill up the holes that are left untouched in a market economy such as public utilities, health care, social security, etc. On the other hand, however, tax, which is the entire financial source for public expenditures, does directly reduce the benefits of taxpayers. As human capital plays the key role in promoting economic growth, a lower benefit of citizens is associated with a lower economic growth rate. Considering the economy as a whole, the question of how to spend public expenditures appropriately has been a difficult task.

1.1.1 Public Expenditure Analysis

The budgetary allocations made during the review period were consistent with national priorities in terms of allocative efficiency. Government expenditure increased significantly from Kshs 379.8 billion in 2004/05 to Kshs 658.1 billion in 2007/08, representing an average annual growth rate of 14.7 per cent over the period. As a percentage of GDP aggregate, government expenditure increased from 28.2 per cent in 2004/05 to 28.5 per cent, 29.5 per cent and 33.5 per cent in 2005/06, 2006/07 and 2007/08 respectively. Aggregate government expenditure was expected to reach Kshs 773 billion in 2008/09.

Recurrent and development expenditure increased from Kshs 339.7 billion and Kshs 40.1 billion in 2004/05 to Kshs 497.6 billion and Kshs 160.5 billion in 2007/08 respectively. This represents an average annual increase of 10 per cent and 41.4 per cent in recurrent and development expenditure respectively. Recurrent government expenditure is expected to reach Kshs 565.6 billion in 2008/09, while the development expenditure forecast is Kshs 207.5 billion. As a proportion of total government expenditure, development
expenditure accounted for 24.4 percent in 2007/08 compared to 10.6 per cent in 2004/05. The shift in expenditure pattern observed is in line with the government objective of refocusing expenditure in favor of development expenditure.

The increased government expenditure financed through domestic borrowing could crowd-out the private sector. Expenditure on domestic debt has increased from Kshs 92. 4 billion in 2004/05 to 112.8 billion in 2007/08, which suggests that the government is increasingly reverting to domestic borrowing to finance budget deficits. In the long-run, this could lead to higher interest rates. Budget execution improved significantly during the review period from 88.1 per cent in 2004/05 to 92.2 per cent in 2007/08, while the development budget registered the greatest improvement, with its absorption capacity rising from 55.8 per cent to 79.6 percent during the same period.

On average, over the period 2004/05-2007/08, a large proportion of development budget (47 per cent) was spent on acquisition of non-financial assets. It was followed by capital grants (19 per cent), use of goods and services (9.8 per cent),

and subsidies, grants and transfers (8.6 per cent). The nominal expenditure on compensation of employees rose from Kshs 116.3 billion in 2004/05 to Kshs 167.6 billion in 2007/08, and was expected to rise further to Kshs 184.8 billion in 2008/09. The larger component of compensation of employees is spent under the recurrent budget. The increased expenditure on compensation of employees is a result of a commitment by the government to improve terms and conditions of service for civil servants and teachers.

Compensation of employees as a percentage of the GDP increased from 8.7 per cent in 2004/05 to 8.9 per cent in 2005/06, before falling to 8.4 per cent in 2006/07. It then increased marginally to 8.6 per cent in 2007/08. The share of compensation of employees in total government expenditure exhibited a similar expenditure trend, increasing marginally from 30.7 per cent in 2004/05 to 31.6 per cent in 2005/06 before declining to 28.8 per cent and 25.8 per cent in 2006/07 and 2007/08 respectively.

1.1.2 Economic Growth in Kenya

In Kenya, the economy experienced a steady growth from year 2002 up to year 2007. Before the General Elections of December 2007, the economy enjoyed a broad expansion touching all sectors of the economy. Real GDP grew by 7.1 per cent in 2007, up from 6.3 per cent in 2006 and 5.1 per cent in 2004. This continued broad-based growth was driven mainly by the agriculture, manufacturing, tourism, construction, and transport and communication sectors. As a result, growth in per capita income rose from minus 1.7 per cent in 2002 to 4.1 per cent in 2007.

The effects of this economic growth trickled down to the grassroot level, and had a significantly positive impact on poverty reduction, which has declined from 57 percent in 2000 to 46 per cent in 2006/07, based on the latest poverty statistics. Following the post-election violence during the early part of 2008, economic activities were disrupted, resulting in stagnation in GDP growth during the first quarter, with tourist arrivals going down by over 50 per cent. Most sectors were hampered by disruption to supply chains and displacement of productive resources.

In year 2008, the agriculture sector contracted by 5.1 per cent, mainly due to the effects of post-election violence, drought and high input prices, especially those of fertilizer. In 2007, the agriculture, manufacturing, wholesale and retail trade and transport and communication sectors, which are the key pillars of the Kenyan economy, accounted for 55.8 per cent of GDP growth. But, as much as other sectors were performing poorly, the wholesale and retail trade sector registered a quick recovery to an estimated growth of about 5 per cent in 2008. The level of Gross Fixed Capital Formation (GFCF) as a percentage of GDP increased from 19.1 per cent in 2006 to 19.4 per cent in 2007 due to the improvement in the enabling environment at the time. This rate of fixed investment stood at 19.4 in 2008. Growth in real investment decelerated from 13.4 per cent in 2007 to 9.7 per cent in 2008.

Money supply, M3, has had significant growth between 2005 and 2007. It recorded an expansion of Kshs 120.3 billion in 2007 up from a change of Kshs 46.3 billion in 2005 and Kshs 93.0 billion in 2006. However, this level declined in 2008 to record Kshs 99.9 billion. Growth in domestic credit accounted for 56.8 per cent of the money supply expansion while increase in net foreign asset contributed 37.8 per cent.

To achieve and sustain a 10 per cent GDP growth rate as envisaged in the *Vision 2030*, the economy will be required to operate at high levels of efficiency and technological progress. This calls for deeper reforms to improve the local business environment, as well as increased investment in physical infrastructure and infrastructure that supports science and technology. The Government should continue to take strong measures aimed at getting the economy on a recovery path.

1.1.3 Public Expenditure and Economic Growth

The explosion of empirical studies on the endogenous models led to the division of public expenditure into productive and consumption items. (Landau, 1983; Aschauer, 1989; Barro's, 1990, 1991) The productive expenditure is assumed to be positively correlated with economic growth while the consumption expenditure is assumed to be negatively related to growth.

Only a few studies attempted to link different types of government spending to economic growth. Landau (1986) concluded that government expenditure of education, defense and capital development had a weak or even no impact on economic growth. Castles and Dowrick (1990) used the shares of disaggregated government spending in health, education and social transfers in GDP to explain economic growth. They found that social transfers and education had a positive effect on growth. Devarajan, Swaroop, and Zou (1996) also used shares as explanatory variables in assessing the impact of different types of government spending on economic growth and they did not find any significant link.

Nowadays the issues on government spending are of special policy relevance, since they are directly related to the impact of government investment on economic growth and poverty reduction in a global scope. In order to achieve the Development Goals, developing countries and the international development community are intensifying their efforts by increasing and redirecting resources in order to achieve development objectives. Thus, the key questions need to be answered include: whether government spending affects economic growth? How should resources be allocated among different sectors such as agriculture, infrastructure, health and education to achieve the stated objectives of economic growth?

1.2 Statement of the Problem

Empirically, existing studies on the relationship between public expenditure and economic growth have shown conflicting results over time. For instance, according to Ram (1986) and Romer (1989) there was a significant and positive relationship between public expenditure and economic growth. In contrast, Landau (1985, 1986), Barro (1990, 1991) found a significant but negative relationship. Levine & Renelt (1992) found the association between public expenditure and economic growth to be insignificant. These conflicting findings highlighted the importance of more research to identify the linkage between the composition of public expenditure and economic growth for developping countries.

In Kenya, Kipkogei (2009) Investigating the relationship between government expenditure composition and particularly education, health, agriculture, transport and communication and economic growth in Kenya using annual data from 1972-2009

found a statistically significant and positive relationship. Mudaki and Masaviru, (2012) found that expenditure on education, economic affairs, transport and communication were significant determinants of economic growth while expenditure on agriculture was found to have a significant though negative impact on economic growth. Outlays on health and defence were all found to be insignificant determinants of economic growth. These conflicting findings highlighted the importance a research to determine the nature of this relationship in Kenya.

Kenya has also experienced numerous strikes from public servants agitating for more pay alongside higher revenue allocations. The Doctor's strike of December 2011 demanding that the government increases the budgetary allocation to the health sector to 15 percent of the national budget, upgrade health facilities and invest in hospital infrastructure. The education sector has also been characterized by striking teachers demanding for more pay and a bigger share of the national budget for investment in education related activities. The Kenya Defence Forces also engaged in a military pursuit of the Al-Shabaab militia in the year 2011 and consequently demanded an even larger share of the national budget.

Nearly all sectors of the Kenyan economy demanded more budgetary allocations in 2011. This brought about the need to examine and determine the effect of sectoral budgetary allocations on the national economy to generate the much needed information critical in decision making and prioritizing expenditure hence the relationship between public expenditure composition and economic growth forms the research gap.

1.3 Objectives of the Study

The objective of this paper was to determine how public spending contributes to economic growth by focusing on both the level and composition of public spending, in connection to the dynamics of GDP per capita growth

1.4 Importance of the Study

Since the purpose of this research study was to determine the link and the extent to which sectoral public expenditure impact the economic growth then information from this research can enable policy makers to come up with resource allocation framework

which will allow public finances to be reallocated away from the unproductive sectors to the productive sectors which will lead to higher economic growth in Kenya. This means that the information can assist in allocating the limited resources optimally.

Wiseman & Peacock (1961) argue that spending increases when governments spend to meet demands made by the population regarding various services. Further during wars, tax rates are increased by the government to generate more funds to meet the increase in defense expenditure; such an increase in revenue therefore gives rise to government expenditure (Peacock & Wiseman, 1961). For instance, in an attempt to finance rising expenditure, government may increase taxes and/or borrowing. Higher income tax discourages individual from working for long hours or even searching for jobs. This in turn reduces income and aggregate demand. In the same vein, higher profit tax tends to increase production costs and reduce investment expenditure as well as profitability of firms.

The information obtained from this research is essential to policy makers since it can assist them when setting tax rates and coming up with fiscal policies in trying to stimulate economic growth in Kenya.

CHAPTER TWO
LITERATURE REVIEW

2.1 Theoretical Review

Prior to the endogenous growth theory as proposed by Barro (1990), no significant relationship was predicted to exist between economic growth and public expenditure. In fact in Solow growth model public expenditure is only related to the equilibrium factor ratios and it is assumed that public investment is not related to long run economic growth in the neoclassical perspective.

Empirically, the relationship between public spending and growth in support of either neoclassical or endogenous models has been difficult to establish for several reasons. A large part of the recent empirical literature on growth has examined the impact on growth of both the level and composition of government expenditures. Overall the evidence on the nature of this relationship is mixed. First of all, not all the public funds that appear in government budgets as having been spent were actually used according to budget allocations; any leakages or deviations from the original budget plan diminish the impact of public spending and distort its relationship with growth.

Second, efficiency constraints affect the share of the public spending flows actually used in creating new capital (physical and human) stocks, which affect growth directly. Thus, by considering the total amounts of public spending financed, without any efficiency considerations, we may anticipate a higher impact on growth than what can be realistically expected.

Third, while some public spending may be, by itself, growth-promoting, the way through which the government chooses to finance it (inflationary financing, distortionary taxes, public debt leading to high interest rates resulting in crowding out of private investment, etc.) may have the opposite influence on growth. Since the two effects are difficult to disentangle, the impact of public spending on growth depends on its source of financing. Yet, many empirical studies fail to include the

implicit financial assumptions, or revenue side of the equation, when testing for the impact of public spending on growth.

Fourth, since not all categories of public spending are expected to have the same growth impact, classifying them according to different criteria may be essential to differentiate those items that are truly "productive" from those whose growth impact is negligible. However, data availability does not always allow for such classification.

Finally, initial country conditions, reflecting the level of country development and living standards (such as life expectancy and/or human capital indexes), influence the effects of different public spending categories on growth. Therefore, omitting initial conditioning variables in the analysis could distort the final results.

Other issues arise from methodological problems associated with separating short-run and long-run effects of public spending on growth, as well as testing for the endogeneity of public spending with respect to growth, and the existence of nonlinearities. There are several theories which explains this relationship. The theories which explain this relationship includes: Wagner's law, Peacock-Wiseman's model, Rustow-Musgrave's model.

2.1.1 Wagner's Law

Wagner's law is a principle named after the German economist Aldolph Wagner (1835-1917). The law predicts that the development of an industrial economy will be accompanied by an increased share of public expenditure in gross national product. Musgrave and Musgrave (1989) opined that as progressive nations industrialize, the share of the public sector in national economy grows continually. The theory states that there is a functional relationship between the growth of an economy, and the growth of the government activities; so that the government sector grows faster than the economy (Musgrave, 1969). Thus, all kinds of government, irrespective of their level of intentions (Peaceful or war), and size, indicate the same tendency of increasing public expenditure.

In other words, Wagner's law states that, as per capita income of an economy grows, the relative size of public expenditure grows, the relative size of public expenditure grows along with it. As the economy grows, there will be increase in the number of urban centres, with the associated social vices such as; crime, which require the intervention of the government, to reduce such activities to the bearest minimum. Large urban centres also require internal security, to maintain law and order. These intervention by the government have cost, leading to increase in public expenditure in the economy.

2.1.2. Peacock-Wiseman's Model

The displacement effect hypothesis expounded by T. Peacock and Jack Wiseman in their well-known 1961 monograph "The Growth of Public Expenditure" in the United Kingdom remains one of the most reliable explanations. According to Peacock and Wiseman's hypothesis, government spending tends to evolve in a step-like pattern, coinciding with social upheavals, notably wars. Jack Wiseman and T.Peacock, hereafter referred to as P-W, adopt a clearly inductive approach to explaining the growth of government expenditure. When P-W observed that expenditure over time appeared to outline a series of plateaus separated by peaks, and that these peaks coincided with periods of war and preparation for war they were led to expound the "displacement effect" hypothesis.

2.1.3 Rostow-Musgrave Model

Rostow and Musgrave, also carried out a research on the growth of public expenditure and concluded that at the early stages of economic development, the rate of growth of public expenditure will be very high, because government provides the basic infrastructural facilities (social overhead). And most of these projects are capital intensive, therefore, the spending of the government will increase steadily. The investment in education, health, roads, electricity, and water supply are necessities that can launch the economy from the traditional stage to the take off stage of economic development making government to spend an increasing amount with time in order to develop an egalitarian society.

2.2 Empirical Review

A study reviewing the empirical evidence of 93 economic journal articles about the impact of fiscal policy on economic growth, Nijkamp and Poot (2004) come to the conclusion that only for public expenditures on infrastructure and education a robust and positive impact on economic growth can be found.

Sanjeev, Benedict, Emanuele and Carlos (2005) assessing whether fiscal consolidation and improvements in the composition of public expenditure have positive repercussions for economic growth in a sample of 39 low-income countries during the 1990s. They found that strong budgetary positions are generally associated with higher economic growth in both the short and long terms. The composition of public outlays also matters: countries where spending is concentrated on wages tend to have lower growth, while those that allocate higher shares to capital and nonwage goods and services enjoy faster output expansion.

The also concluded that initial fiscal conditions have a bearing on the nexus between fiscal deficits and growth.

Colombier (2011) estimated the growth effects of the composition of public expenditure for the Swiss case. One main finding is that public expenditures on transport infrastructure, education and administration foster growth. Carsten concluded that even though a government makes spending cuts, public finances may in fact worsen due to a slowdown of economic growth caused by a reduction of growth-enhancing public expenditures.

Batte and John (2012) examined the interrelationships between public spending composition and Uganda's development goals including economic growth and poverty reduction using dynamic computable general equilibrium model to study these interrelationships. The results demonstrated that public spending composition does indeed influence economic growth and poverty reduction. In particular, improved public sector efficiency coupled with reallocation of public expenditure away from the unproductive sectors such as public administration and security to the productive sectors including agriculture, energy, water, and health leads to higher gross domestic product growth rates and accelerates poverty reduction. A major finding of the study was that investments in agriculture, particularly with a view to

promoting value addition and investing in complementary infrastructure (e.g., roads and affordable energy), contribute to higher economic growth rates and also accelerate the rate of poverty reduction.

Adewara and Oloni (2012) analyzed the relationship between the composition of public expenditure from 1960 to 2000 and economic growth in Nigeria using the vector Autoregressive models (VAR). The finding shows that expenditure on education has failed to enhance economic growth due to the high rate of rent seeking in the country as well as the growing rate of unemployment. They also noted that expenditure on health and agriculture should be encouraged due to their positive contributions to growth. They also suggested that further studies were necessary to identify empirically why public expenditure on water and education are negatively related with growth.

Bingxin, Shenggen and Anuja (2009) examined the impact of the composition of government spending on economic growth in developing countries using dynamic GMM model and a panel data set for 44 developing countries between 1980 and 2004. They found that the various types of government spending have different impact on economic growth. In Africa, human capital spending contributes to economic growth whereas in Asia, capital formation, agriculture and education has strong growth promoting effect. In Latin America, none of government spending items has significant impact on economic growth.

Abu and Usman (2010) investigated the effect of government expenditure on economic growth, by employing a disaggregated analysis. The results revealed that government total capital expenditure, total recurrent expenditures, and government expenditure on education have negative effect on economic growth. On the contrary, rising government expenditure on transport and communication, and health results to an increase in economic growth.

Odeleye (2012) examined the impact of education on economic growth using primary and secondary annual data ranging from 1985 to 2007 in Nigeria. The findings revealed that only recurrent expenditure has significant effects on economic growth as the academic qualifications of teachers also have significant impact on students'

academic performance. He recommended that government should increase its expenditure on education especially, the capital expenditure, while a good salary scheme with other incentives for teachers' motivation should be implemented.

Adeniyi (2013) examined the relationships and dynamic interactions between government capital and recurrent expenditures and economic growth in Nigeria over the period 1961 to 2010. Real Gross Domestic Product (RGDP) was used as a proxy for economic growth in the study. The analytical technique of Vector Error Correction Model and Granger Causality were exploited. He found that the Wagnerian and Rostow-Musgrave hypothesis were applicable to the relationship between the fiscal variables used in this study in Nigeria. He also recommended that there should be effective channeling of public funds to productive activities, which will have a significant impact on economic growth; there should be joint partnership between the government and the private sector in providing essential infrastructural services that will promote economic growth and development, etc.

Loto (2010) investigated the growth effect of government expenditure on economic growth in Nigeria over the period of 1980 to 2008, with a particular focus on sectoral expenditures. Choosing five key sectors (security, health, education, transportation and communication and agriculture). The result showed that in the short-run, expenditure on agriculture was found to be negatively related to economic growth. The impact of education, though also negative was not significant. The impact of expenditure on health was found to be positively related to economic growth. Though expenditures on national security transportation and communication were positively related to economic growth, the impacts were not statistically significant. It is possible that in the long-run, expenditure on education could be positive if brain drain could be checked.

Locally, Mudaki and Masaviru (2012) carried a study investigating the impact of public spending on education, health, economic affairs, defense, agriculture, transport and communication on economic growth with data spanning from 1972 to 2008 in Kenya. Their findings showed that expenditure on education was a highly significant determinant of economic growth while expenditure on economic affairs, transport and communication were also significant albeit weakly. In contrast, expenditure on

agriculture was found to have a significant though negative impact on economic growth. Outlays on health and defence were all found to be insignificant determinants of economic growth.

Nyamwange (2012) examined the effects of per capita gross domestic product (GDP per capita) on public healthcare expenditure (PHCE) in Kenya. The study attempted to determine the properties of healthcare in Kenya, and found that healthcare in Kenya is a necessary good and has an elasticity of 0.024% to GDP per capita. This is to mean that for every 1% increase in GDP per capita, PHCE should increase by 0.024%.

Amanja and Morrissey (2005) investigated the relationship between various measures of fiscal policy on growth in Kenya on annual data for the period 1964 – 2002 and by categorising government expenditure into productive and unproductive and tax revenue into distortionary and non-distortionary, they found out that unproductive expenditure and non-distortionary tax revenue to be neutral to growth as predicted by economic theory and that productive expenditure has strong adverse effect on growth whilst there was no evidence of distortionary effects on growth of distortionary taxes.

Kipkogei (2009) Investigated the relationship between government expenditure composition and particularly education, health, agriculture, transport and communication and economic growth in Kenya using annual data from 1972-2009. He found a statistically significant relationship. His study concluded that average government expenditure and potential output are linked by a long-run relationship such that government spending grows almost in proportion with potential output.

Kalunde (2010) Analyzed the relationship between government expenditure and GDP growth using annual data for Kenya from 1963-2008, she conducted a multivariate time series analysis which showed 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 and that government size has a positive influence on GDP only in the short run but this effect becomes negative in the long run.

2.3 Conclusion

This chapter has covered past studies as well as theoretical frameworks on the relationship between public expenditure composition and economic growth with an aim of understanding the relationship and gaps in the earlier studies. From the theoretical review the theories disagrees when explaining the relationship between government expenditure and economic growth. It can also be seen that there are other factors determining this link apart from the amount allocated to a specific expenditure.

From the empirical review it can be concluded that different components of public expenditure affects economic growth differently. The results of different scholars also differ across countries which means that there are specific country factors which affects the relationship between government expenditure composition and economic growth. In the empirical literature, results are also equally mixed. From the evidence above its clear that neither theory nor empirics provide clear-cut answers on how the composition of government expenditures affects economic growth.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

The study aimed at investigating the relationship between composition of public expenditure on the economic growth in Kenya. This section deals with the research design which was used to conduct the study, population of the study, data collection methods and analysis.

3.2 Research Design

Descriptive research design was used in carrying out this research study. The purpose of descriptive design is description of the state of affairs as it exists at the present. Since in my research I was interested in finding out the relationship between government expenditure composition and economic growth then descriptive research design fitted the purpose.

3.3 Data and Data Collection Instruments

The data set on public expenditures and GDP was obtained from the Kenyan Statistical Abstracts and Economic Surveys published annually by the Central Bureau of Statistics and the Central Government. These annual publications have established themselves as reliable sources of data for the Kenyan Economy. Annual data since 1970 to 2012 was used in this research study.

3.4 Data Analysis

An empirical analysis of the relationship between economic growth, components of government expenditure and other macroeconomic variables requires appropriate estimation techniques for both the long run and short run analysis.

3.4.1 Conceptual Model

From the literature review above, the level of government expenditure and composition of government expenditure are important determinants of economic growth. Thus, the model adopted in the study expressed economic growth (RGDP) as a function of various levels and components of government expenditure that include,

Expenditure on Defense (EXPDEF), Expenditure on Health (EXPH), Expenditure on Education (EXPE), Expenditure on Transport & Communication (EXPTRPT), Expenditure on Agriculture (EXPAGRI), Expenditure on law and order (EXPLO) and general administration (EXPGADM). This is shown below.

RGDP = F (EXPDEF, EXPH, EXPE, EXPTRPT, EXPAGRI, EXPLO, EXPGADM)

3.4.2 Analytical Model

The model used by Loto (2011) to estimate the impact of public expenditure on economic growth for Nigeria was adopted in this study. I adopted this model because Loto used it to carry out exactly a similar study in Nigeria.

$$RGDPt = ß_0 + ß_1 EXPEDt + ß_2 EXPHt + ß_3 EXPDEFt + ß_4 EXPAGRI + ß_5 EXPTRPT + ß_6 EXPLOt + ß_7 EXPGADM + \varepsilon t$$

In the log linear form the model becomes.

$$\ln RGDPt = Lnß_0 + ß_1 \ln EXPEDt + ß_2 \ln EXPHt + ß_3 \ln EXPDEFt + ß_4 \ln EXPAGRI + ß_5 \ln EXPTRPT + ß_6 \ln EXPLOt + ß_7 \ln EXPGADMt + \varepsilon t$$

Where:

RGDP- Real Gross Domestic Product

EXPDEF-Expenditure on Defense

EXPH- Expenditure on Health

EXPE- Expenditure on Education

EXPTRPT-Expenditure on Transport & Communication

EXPAGRI-Expenditure on Agriculture

EXPLO-Expenditure on Law and Order

EXPGADM-Expenditure on General Administration

3.4.3 Test for Integration

Due to the time-series data of the variables in consideration, the variables was tested for unit root in order to determine the existence of unit root in the data and clarify the stationary status of the data. For this purpose, Argumented Dicky Fuller unit root test was carried out. In the Argumented Dicky Fuller, the null hypothesis of non stationary is tested by the t-statistic with critical value. By rejecting the null hypothesis based on this calculation, it is suggested that the series is stationary. The unit root test was done to avoid the problem of spurious and inconsistence

regression results. A spurious regression has a high R^2 and its t-statistic shows as significant; however, this result doesn't bring any economic meaning.

The Ordinary least square was used to estimate the coefficients of the variables in the model. OLS regression test is to explain the behavior of the dependent variable by changes in the independent variables. OLS is a method used to estimate the relationship between the variables. The time series data in the regression was used to carry out data testing. The granger Causality Test was also conducted.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter deals with data presentation, interpretation and analysis. It shows the discussions and results from the data collected.

4.2 Presentation and Interpretation of Results

An empirical analysis of the relationship between economic growth, components of government expenditure requires appropriate estimation techniques for both the long run and short run analysis.

This study used the Ordinary Least Squares (OLS) to analyze the data in order to find out the relationship between economic growth and the components of government expenditure. Prior to the regression analysis and granger causality test, unit root test was conducted to eliminate the generation of spurious regression results. The result of stationarity (unit root) test is shown below.

Table 1; Results of stationarity (unit root) test

Variable	ADF-Statistic	Critical values	Order of integration
Log(rgdp)	-7.716835	1% =-2.6211 5% =-1.9492 10% =-1.6201	Stationary at 1st difference
Log(exped)	-8.435065	1% =-2.6211 5% =-1.9492 10% =-1.6201	Stationary at 1st difference
Log(exph)	-8.604190	1% =-2.6211 5% =-1.9492 10% =-1.6201	Stationary at 1st difference
Log(expdef)	-8.106868	1% = -2.6211 5% = -1.9492 10% = -1.6201	Stationary at 1st difference
Log(expagri)	-3.801831	1% = -2.6227 5% = -1.9495 10% = -1.6202	Stationary at 1st difference
Log(exptrpt)	-6.547341	1% = -2.6227 5% = -1.9495 10% = -1.6202	Stationary at 1st difference
Log(explo)	-7.249820	1% = -2.6227 5% = -1.9495 10% =-1.6202	Stationary at 1st difference
Log(expgadm)	-7.808162	1% = -2.6211 5% = -1.9492 10% = -1.6201	Stationary at 1st difference

The unit root test results showed that all the variables were not stationary at level but they became stationary at 1st difference.

4.3 Regression model estimation Results.

The regression model was estimated after unit root test was conducted to determine how the sectorial government expenditure affects economic growth and the following results were found after estimating the regression equation.

Table 2; OLS Regression model estimation results

Variable	Coefficient	Std error	t-statistic	Probability
C	0.001176	0.014896	-0.078921	0.9376
DLog(exped(-1))	0.865627	0.127947	6.765517	0.0000
DLog(exph(-1))	0.125506	0.121321	1.034494	0.4558
DLog(expdef(-1))	-0.016257	0.021749	-0.754889	0.3087
DLog(expagri(-2))	-0.016257	0.032210	-0.504717	0.6172
DLog(exptrpt(-2))	0.004322	0.019692	0.219477	0.8277
DLog(explo(-2))	-0.006239	0.017074	-0.365375	0.7172
DLog(expgadm(-2))	-0.011511	0.027701	-0.415531	0.6805

R^2 = 0.991496 AIC = -1. 825889 SC = -1.488113

Adjusted R^2 = 0.989635 DW = 2.024456 F- stat = 532.9694

4.3.1 Discussions of the Regression results

The estimation results reveal that the independent variables jointly account for approximately 99.14% changes in economic growth. The Durbin Watson statistic is used to test the existence of serial correlation between the variables. Durbin Watson statistic is equal to 2.024456, this implies the absence of serial correlation. This is because when the DW is 2 then it shows the absence of serial correlation. The adjusted R^2 of 0.989635 shows that 98.96% of changes in Kenya's GDP is explained by the variation in the explanatory variables (the model).

The findings showed that government expenditure on health and education were highly significant and positive determinant of economic growth. Government expenditure on transport and communication were positive but insignificant determinants of economic growth. On the other hand government expenditure on defense, agriculture, general administration and law and order were negative determinants of economic growth.

A unit percentage increase in expenditure on education will increase economic growth by 0.866%. This means that the money allocated for education may have been efficiently utilized in the sector. Similarly 1percentage increase in health leads to 0.13% increase in economic growth. This can be due to the fact that an increase in government expenditure on health raises the health status and productivity of the people, thereby promoting economic growth. Also 1% increase in government expenditure on transport and communication will increase economic growth by 0.004%. This may have been due to the reason that higher government expenditure on transport and communication creates an enabling environment for businesses to strive through reduced cost of production.

A unit percentage increase in government expenditure on general administration decreases economic growth by 0.012% also a unit percentage increase in government expenditure on defense would decrease economic growth by 0.016%. unit percentage increase on government expenditure on agriculture would negatively affect economic growth by 0.016%. Similarly a unit percentage increase in law and order would decrease economic growth by 0.006%. This can be explained by the fact that the aim of government expenditure on law and order and defense is to ensure safety and also to protect its citizens from other external forces. A negative impact of agricultural expenditure on economic growth can be due to mismanagement and diversion of public funds by government officials.

4.4 Granger Causality Results

The Granger causality test shows that variable which granger cause another variable. The null hypothesis is rejected when the probability value is less than 5%.

Table 3; Granger Causality results

Null Hypothesis:	Obs	F-Statistic	Probability
DLOG(RGDP(-1)) does not Granger Cause DLOG(EXPED(-1))	39	5.82794	0.00666
DLOG(EXPED(-1)) does not Granger Cause DLOG(RGDP(-1))		6.95307	0.00294
DLOG(RGDP(-1)) does not Granger Cause DLOG(EXPH(-1))	39	7.32497	0.00226
DLOG(EXPH(-1)) does not Granger Cause DLOG(RGDP(-1))		8.29014	0.00117
DLOG(RGDP(-1)) does not Granger Cause DLOG(EXPDEF(-1))	31	2.34414	0.09763
DLOG(EXPDEF(-1)) does not Granger Cause DLOG(RGDP(-1))		4.98230	0.00907
DLOG(RGDP(-1)) does not Granger Cause DLOG(EXPTRPT(-2))	36	3.29656	0.02530
DLOG(EXPTRPT(-2)) does not Granger Cause DLOG(RGDP(-1))		0.42889	0.78646
DLOG(RGDP(-1)) does not Granger Cause DLOG(EXPGADM(-2))	30	7.36678	0.00304
DLOG(EXPGADM(-2)) does not Granger Cause DLOG(RGDP(-1))		2.07556	0.14343
DLOG(EXPAGRI(-2)) does not Granger Cause DLOG(RGDP(-1))	29	2.21373	0.17044
DLOG(RGDP(-1)) does not Granger Cause DLOG(EXPAGRI(-2))		14.3171	0.00195
DLOG(EXPLO(-2)) does not Granger Cause DLOG(RGDP(-1))	28	3.77473	0.15062
DLOG(RGDP(-1)) does not Granger Cause DLOG(EXPLO(-2))		43.5540	0.00497

From the granger causality results it can be shown that government expenditure in education and economic growth granger causes each other. That is government expenditure in education causes gdp and at the same time gdp causes the expenditure in education. On the other hand government expenditure on defense causes the economic growth. It can also be seen that economic growth causes government expenditure on transport and communication, general administration, agriculture and low and order.

4.5 Summary

This chapter entails unit root test of the data of various variables under the study, the regression model estimation and finally the granger causality results. From the stationarity test all the variables were stationary at first difference.

It was also found that various government expenditures affects economic growth differently. Government expenditure on education, health and transport and communication were found to have a positive impact on economic growth. On the contrary government expenditure on defense, low and order, agriculture and general administration were found to negatively affect economic growth. Granger causality test was also carried out. In the granger causality test the null hypothesis is rejected when the probability value is less than 5%.

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

5.1 Introduction

This chapter includes the summary, conclusion, recommendations, limitations and suggestion for further studies.

5.2 Summary

This study was guided by the research objectives which were aimed at finding the relationship between government expenditure composition and economic growth in Kenya. The study uses the ordinary least squares to estimate the regression model to determine this relationship. The research findings pointed out that each component of government expenditure under study affects economic growth in a different way from the other.

The estimation results reveal that the independent variables jointly account for approximately 99.15 percentage changes in economic growth. The Durbin Watson statistic is used to test the existence of serial correlation between the variables. Durbin Watson statistic is equal to 2.024 which implies the absence of serial correlation. This is because the closer the DW value is closer to two, the better the evidence of the absence of serial correlation. The adjusted R^2 of 0.989635 shows that only 98.96% of changes in Kenya's GDP is explained by the variation in the explanatory variables (the model).

The findings showed that government expenditure on health and education is significant and positive determinant of economic growth on the other hand government expenditure on transport and communication have a positive but insignificant impact on economic growth. Government expenditure on defense, agriculture, low and order and general administration impact economic growth negatively.

A unit percentage increase in government expenditure on health will increase real gross domestic product by about 0.125%. Expenditure on agriculture on the other

hand was found to be a negative determinant of economic growth which did not conform to the apriori expectation of a positive linkage between agriculture and economic growth. The findings showed that a unit percentage increase in expenditure on agriculture would reduce real gross domestic product by about 0.016%.

A unit percentage increase in government expenditure on defense reduces economic growth by 0.016%. A unit percentage increase in government expenditure on transport and communication would increase economic growth by 0.004%. Also a unit percentage increase of government expenditure on education would positively affect economic growth by 0.87%. An increase in government expenditure on general administration by unit percentage would result to a decline in economic growth by 0.012%. Similarly a unit percentage increase in government expenditure on low and order would have a negative impact on economic growth by 0.006%. In the granger causality test the null hypothesis is rejected when the probability value is below 5%

5.3 Conclusions

Based on the findings of the study it is apparent that government spending on Education had a positive and statistically significant relationship with Gross Domestic Product (GDP). This implies that government spending on Education does significantly increase the output level of GDP. Government expenditure on Health also shows a positive impact on GDP. This implies that government expenditure on Health increases the productive ability of the labor force and increases the number of man hour workers invest in gainful production activities which translate into increase in the output level of GDP.

Government expenditure on Transportation significantly affects the output level of GDP positively. As such, an increase in Government expenditure on Transportation and communication will increase the output level of GDP. This suggests that government expenditure on transport does stimulate growth in the production and manufacturing sectors of the economy. This can be explained by the fact that good transport infrastructures reduces the transportation costs and time reducing the production costs favoring the business environment hence stimulating economic growth.

Government expenditure on Agriculture negatively and insignificantly impact on GDP. This means that, a rise in Government expenditure on Agriculture will reduce economic growth though insignificantly despite these findings we know that Increased outlays on agriculture should guarantee national food security. This finding could have been caused by an inefficient agricultural sector majorly focused on crop farming and not extensively mechanized. Despite this finding and on the basis of economic rationale more resources should be channeled to the agricultural sector to make it more productive.

The results also shows that government expenditure on defense, low and order and general administration negatively and insignificantly affects the GDP hence retards the economic growth. This can be explained by the fact that expenditure on this sectors are aimed at ensuring safety, security and smooth government operations rather than economic returns.

The study therefore concludes that the government sectoral expenditure affects GDP and the changes in government sectoral expenditure is important in explaining some changes in GDP. This implies that the value of public money spent can be maximized by government sectoral spending if the funds are properly channeled to target objectives of government that would best impact on the growth of output level (productivity and investment) in the economy.

In summary and from the findings of this paper it becomes increasingly important to explore further what portfolio of government outlays are ideal for growth to support resource constrained governments on optimal resource allocation and prioritization of expenditure.

5.4 Limitations of the Study

The main challenge in my study was that of finance since the exercise required a lot of money to carry it out this is because it involved a lot of miscellaneous expenses like printing and travelling during data collection. Regardless of those drawback I was able to carry out the study and completed it in time.

5.5 Recommendations for Further Studies

This study examines the properties of the time series and estimate the regression using ordinary least squares this means an analysis of the extent of cointegration between the variables and investigating the long run and short run relationships between the variables can be carried out in another study.

The results of this paper emphasise that the composition of government expenditure is crucial for economic growth furthermore the study has not exhausted all components of government expenditure and how they affect economic growth this creates another avenue for further studies. Further since this study emphasises that the composition of government expenditure is crucial for economic growth, political challenges such as the demographic burden and climatic change makes it increasingly important to explore further what portfolio of government outlays is optimal in growth and welfare terms.

REFERENCES

Abu, N., and Abdullahi, U. (2010). Government expenditure and economic growth in Nigeria, 1970-2008: A Disaggregated Analysis. *Business and Economics Journal,* 2010: BEJ-4

Adeniyi, S. (2013). Government spending and economic growth: evidence from Nigeria. Federal University Wukari, Taraba State, Nigeria.

Adewara, O., and Oloni, E. F. (2012). Composition of public expenditure and economic growth in Nigeria. *Journal of Emerging Trends in Economics and Management Sciences, 3*(4), 403-407.

Afonso, A. (2005). Public Sector Efficiency: an international comparison. Public Choice 123, 321-347.

Amanja, D., and Morrisey, O. (2005). Fiscal Policy and Economic Growth in Kenya. Centre for Research in Economic Development and International Trade, University of Nottingham.

Andrea Z., and Serena, L. (2008). Increasing Public Expenditures: Wagner's Law in OECD Countries. Center for Financial Studies.

Anuja, S., Shenggen, F., and Bingxin, Y. (2009). Does Composition of government spending matter to economic growth? Paper for presentation at the International Association of Agricultural Economists Conference, Beijing, China, 16-22.

Aschauer, A. (1989). Is public expenditure productive? *Journal of Monetary Economics* 23, 177-200.

Barro, J. (1990). Government Spending in a Simple Model of Endogenous Growth. *Journal of Political Economy, 98*(5), 103-125.

Barro, J. (1991). “Economic Growth in a Cross Section of Countries”, *Quarterly Journal of Economics, 106*(2), 407-444.

Batte, E., and John, M. (2012). Public Spending Composition in Uganda and its Implications for Growth and Poverty Reduction. Public Finance Review.

Batte, E., and John, M. (2010). Public Spending Composition and Public Sector Efficiency: Implications for Growth and Poverty Reduction in Uganda. Economic Policy Research Center.

Benedict, C., Carlos, M., Emanuele, B., and Sanjeev, G. (2005). Fiscal policy, expenditure composition, and growth in low-income countries. *Journal of International Money and Finance*, 24, 441-463.

Blanca, M. (2008). Assessing the impact of public spending on growth: An Empirical Analysis for Seven Fast Growing Countries. Policy Research Working Pp 4663.

Colombier, C. (2011). Does the composition of public expenditure affect economic growth? Evidence from the Swiss case, Applied Economics Letters, 18(16), 1583-1589.

Chiung-Ju, H. (2006). Government expenditures in China and Taiwan: Do they follow Wagner’s law? *Journal of Economics and Development, 32*(2).

Devaragan, S., Swaroop V., Zou, H. (1996). “The Composition of Public expenditure and Economic Growth. *Journal of Monetary Economics,* 37, 313-344.

Ergun, D., and Tuck, C. (2006). Government expenditure and national income: Causality Tests for Five South East Asian Countries. *International Business & Economic Research Journal, 5*(10).

Gustavo, A. (2010). Tax-mix, public spending composition and growth. *Journal of Economics,* 99, 29–51.

Hafeez, U., Imtiaz, A., and Masood, S. (2007). Testing Wagner's Law for Pakistan: 1972-2004. Pakistan Economic and Social Review, 45(2), 155-166.

Ibrahem, M. (2012). The Impact of government expenditures on economic growth in Jordan. *Interdisciplinary Journal of Contemporary Research in Business, 4* (6).

Kalunde, H. (2010). Government expenditure and economic growth in Kenya:1963-2008, Published msters research projet, University of Nairobi.

Kipkogei, M. (2009). The relationship between Public expenditure composition and economic growth in Kenya: 1972-2009. Published masters research project, University of Nairobi.

Landau, L. (1983). Government Expenditure and Economic Growth: A Cross Country Study. *Southern Economic Journal, 3*(49), 783 – 792.

Landau, L. (1985). Government Expenditure and Economic Growth in the Developed Countries, 1952 – 1976, 3(47), 459 – 477.

Leonardo, M., and David, B. (2011). The quality of public expenditure and its influence on economic growth: evidences from the State of Rio Grande do Sul (RS), IBI – The Institute of Brazilian Issues.

Levine, R., and Renelt, D. (1992). A Sensitivity Analysis of Cross-Country Growth Regressions, American Economic Review, 82 (4), 942 – 963.

Loto, M. A. (2011). Impact of government sectoral expenditure on economic growth. *Journal of Economics and International Finance, 3*(11), 646-652.

Manh, V., and Terukazu, S. (2005). The Effects of FDI and public expenditure on economic Growth. From Theoretical Model to Empirical Evidence. Graduate School of International Cooperation Studies, Kobe University.

Mudaki, J and Masaviru, W. (2012). Does The Composition of public expenditure matter to economic growth for Kenya? *Journal of Economics and Sustainable Development, 3*(3), 2222-2855.

Musgrave, R.A. (1969). Fiscal System, New Haven: Yale University Press.

Mwafaq, M. (2011). Government Expenditure and Economic Growth in Jordan: 2011 International Conference on Economics and Finance Research IPEDR vol.4 (2011) © (2011) IACSIT Press, Singapore.

Nijkamp, P., and Poot, J. (2004). Meta-analysis of the Effect of Fiscal Policies on Long-run Growth. *European Journal of Political Economy,* 20, 91-124.

Nyamwange, M. (2012). Economic Growth and Public Healthcare Expenditure in Kenya (1982 - 2012). Published research paper, University of Nairobi.

Odeloye, T. (2012). Education and Economic Growth in Nigeria: A Comparative Analytical Approach. *European Journal of Globalization and Development Research, 6*(1).

Peacock, T., and Wiseman, J. (1961). The Growth of Public Expenditure in the United Kingdom, Princeton: Princeton University Press.

Pierre, R., and Kyriakos, C. (2006). The Allocation of public expenditure and economic Growth, Economics Discussion Paper EDP-0608.

Ram, R. (1986). Government Size and Economic Growth: A New Framework and Some Evidence from Cross-Section and Time-Series Data. American Economic Review, 76, 191-203.

Romer, P.M. (1989). .Increasing Returns and Long-Run Growth. *Journal of Political Economy, 94*(5), 1002-1037.

Willi, S., Alfred, G., Bobo, D., Armon, R., and Anand, R. (2007). Fiscal Policy, public expenditure composition, and growth: Theory and Empirics. Policy Research Working Paper 4405.

World bank. (1992). World development report. The world bank, Washington DC.

APPENDIX 1: RESEARCH DATA

A. Kenya's Gross Domestic Product and Government Expenditures in nominal terms (1970-2012) in K£ '000'.

Year	Gross Domestic product (GDP)	Defence (DEF)	Agriculture (AGRI)	Transport and Communication (TRPT)	Education (ED)	Health (H)	Low and Order (LO)	General Administration (GADM)
1970	575260	5690	10940	12790	17540	7940	11960	7300
1971	643000	6470	11380	18720	27580	10110	13420	8000
1972	715490	9290	14350	24230	33680	12220	16980	10660
1973	838060	11950	14220	29090	40380	12770	15760	12060
1974	1029460	14260	19170	32910	46120	14430	18080	12960
1975	1168700	19010	28450	13360	61740	20350	20940	15060
1976	1429080	20590	33010	15190	71830	23920	24330	18700
1977	1859880	42910	43060	18120	80820	29560	23680	36240
1978	2058190	79400	54910	31510	94500	36900	34260	53210
1979	2276600	105660	64770	41930	109110	43120	35530	57110
1980	2625580	111840	67580	9160	137040	54470	39590	79700
1981	3038580	89740	108880	9120	174790	65250	58440	96380
1982	3399460	131140	103780	12570	197670	71130	61820	96710
1983	3825950	137750	105710	11880	206430	69700	41030	86540
1984	4046100	140030	93790	11470	220070	73290	62940	84120
1985	4993280	111510	140490	11790	259510	79790	67460	122470
1986	5843190	127340	148150	13520	329690	92710	81120	102500
1987	6560800	166770	234430	15830	396500	110270	96120	195130
1988	7559710	244320	147600	13600	456800	117930	119550	157270
1989	8642970	201050	174880	12650	533080	138990	145740	212460
1990	9939400	269260	168870	19190	564930	144330	162300	290400
1991	11315620	295490	195930	30040	686950	172910	184610	322280
1992	13223650	232380	212000	10770	722220	190020	198610	325420
1993	16680640	270310	330900	26570	854790	232250	231610	432880
1994	20035020	342790	463500	6690	1069650	327060	289770	510260
1995	23263600	314860	376610	105300	1413780	350780	383780	973690

1996	26436975	451950	386530	196310	1590670	455730	407190	887620
1997	31161755	523590	348140	109990	1674150	528390	480500	1182660
1998	34545499	509110	388740	40700	2311315	644195	588245	1195435
1999	37173930	533570	474710	42050	2401110	502495	578325	1350650
2000	48391900	521365	405770	50215	2386840	459430	654430	1394645
2001	51295600	710140	413480	39185	2480565	781470	799060	1696235
2002	51938200	813270	433825	38455	2779825	759425	973080	2055725
2003	57089000	880150	468400	40240	3256740	767555	1060415	2182420
2004	63685800	11698540	610332	1031697	3906932	765219	1233603	22360185
2005	70791150	1048963	513309	675363	4236316	815445	1521230	29299491
2006	81129550	1280432	496014	941095	4801372	1148190	1990208	2709410
2007	91675550	1256145	707081	1562545	5461945	1375884	2089546	2634867
2008	105379450	1862056	837149	2161186	6371208	1373967	2564235	5714221
2009	118349200	2059161	1193838	2897748	7221958	1609059	3030825	3739756
2010	127686650	2683194	1636944	2916475	7966996	1867671	2997293	5257452
2011	152443350	2719209	2078590	4301887	9492289	2395529	3719387	6087468
2012	172005750	3120147	2819040	4706682	9565224	2755326	4041219	6772461

Source; Kenya Annual economic surveys

B. Kenya's Gross Domestic Product and Government Expenditures in real terms (1970-2012) in K£ '000'.

Year	Gross Domestic Product (GDP)	Defence (DEF)	Agriculture (AGRI)	Transport and Communication (TRPT)	Education (ED)	Health (H)	Law and Order (LO)	General Administraion (GADM)
1970	380765	3766	7241	8465	11610	5255	7916	4832
1971	707171	7115	12516	20588	30332	11119	819523	8798
1972	5995949	77852	120256	203052	282245	102406	142296	89333
1973	833115	11879	14136	28918	40142	12695	15667	11989
1974	650413	9009	12112	20793	29139	9117	11423	8188
1975	1000875	16280	24365	11442	52874	17428	17933	12897
1976	766273	11040	17700	8145	38515	12826	13046	10027
1977	1115928	25746	25836	10872	48492	17736	14208	21744
1978	6775973	261401	180775	103737	311113	121482	112792	175178

1979	4093099	18996	116450	75386	196169	77525	63879	102678
1980	2787841	118752	71756	9726	145509	57836	42037	84625
1981	2839857	83871	101759	8524	163359	60983	54618	90077
1982	2974188	114734	90797	10997	172941	62232	54086	84612
1983	3276544	117969	90530	10174	176787	59691	35138	74113
1984	4026274	139344	93330	11414	218992	72931	62632	83708
1985	6092800	136065	171426	14386	316654	97360	82315	149438
1986	6802642	148249	172476	15740	383825	107933	94440	119331
1987	12319870	313161	440213	29726	744548	207065	180494	366415
1988	11866477	383509	231688	21348	716772	185115	187658	246867
1989	8970538	208670	181508	13129	553284	144258	151264	220512
1990	9472248	256605	160933	18288	538378	137546	154672	276751
1991	9157731	239140	158566	24311	555949	139936	149405	260821
1992	7094488	124672	113738	5778	387471	101946	106356	174588
1993	6582181	106664	130573	10485	337300	91646	91393	170814
1994	11936865	204234	276153	3986	637297	194862	172645	304013
1995	21023315	284539	340342	95160	1277633	317000	346822	879924
1996	6384529	109146	93347	47409	384147	110059	98336	214360
1997	27621780	464110	308591	97495	1483967	468365	425915	1048310
1998	50546974	744930	568804	59552	3381916	942586	860720	1749160
1999	89960911	1291239	1148798	101761	5810686	1216038	1399547	3268573
2000	80708011	869533	676743	83749	3980772	766237	1091458	2325989
2001	331299700	4586510	2670502	253080	16020977	5047202	5160809	14095378
2002	566292582	8867245	4730081	419283	30308988	8280163	10609686	18494389
2003	93369060	1439485	766068	65813	5326398	1255336	1734309	3362138
2004	90573945	16637664	868014	1467279	5556438	1088294	1754430	31800655
2005	146495206	2170724	1062242	1397596	8766632	1687482	3148033	60632367
2006	105606335	1666738	645661	1225023	6249946	1494599	2590653	3526839
2007	165703557	2270482	1278049	2824300	9872466	2486910	3776854	4762522
2008	80889266	1429314	642596	1658926	4890539	1054657	1968308	4386236
2009	129734393	2257252	1308685	3176511	7916710	1763850	3322390	4099521
2010	657228725	13810936	8425678	15011680	41007722	9613276	15427666	27061156
2011	127427396	2272987	1737493	3595947	7934604	2002423	3109036	5088515
2012	172005750	3120147	2819040	4706682	9565224	2755326	4041219	6772461

C. The Implicit GDP deflator used to convert nominal terms to real terms

Year	GDP Deflator (%)	Year	GDP Deflator
1970	15.32	1992	18.90
1971	9.22	1993	25.70
1972	1.21	1994	17.02
1973	10.20	1995	11.22
1974	16.05	1996	41.99
1975	11.84	1997	11.44
1976	18.91	1998	6.93
1977	16.90	1999	4.19
1978	3.08	2000	6.08
1979	5.64	2001	1.57
1980	9.55	2002	0.93
1981	10.85	2003	6.20
1982	11.59	2004	7.13
1983	11.84	2005	4.90
1984	10.19	2006	7.79
1985	8.31	2007	5.61
1986	8.71	2008	13.21
1987	5.40	2009	9.25
1988	6.46	2010	1.97
1989	9.77	2011	12.13
1990	10.62	2012	10.14
1991	12.53		

Source; The World bank, The World Development Indicators**.**

APPENDIX II: THE SIMULATIONS

A. CONVERTING DATA FROM KSHS TO K£.

The GDP and Government Expenditure data from 1996 to 2012 were given in Kenyan shillings this made it necessary for this data to be converted to Kenyan pounds. To convert this data into pounds it required that it must divided by Ksh. 20. This is because Ksh. 20 is equivalent to 1 Kenyan pound and the formula below was applied.

$$\frac{\text{Annual data in Kshs.}}{\text{20 shillings}} = \text{Annual data in K£.}$$

B. ADJUSTING THE DATA FOR INFLATION

After conversion of the data into Kenyan pounds, then it was necessary to Adjust this data for inflation before using this data in the analysis. This is changing this data from nominal terms to real terms that is to remove the effects of inflation. In doing this the implicit GDP deflator was preferred and used as compared to consumer price index(cpi) because GDP deflator is a measure of the level of prices of all new, domestically produced, final goods and services in the economy while the CPI measures changes in the price level of consumer goods and services purchased by households. In doing this the last year in the data (2012) was used as the base year hence the GDP deflator 10.14% was used as the base GDP deflator in inflating the data. To produce a real terms series, divide each value in the series by the given deflator for that (current)year, and then multiply by the deflator for the year that you wish to be the base year. The following formula was used.

$$\frac{\text{(Base year GDP deflator) current year value}}{\text{Current year GDP deflator}} = \text{Real value}$$

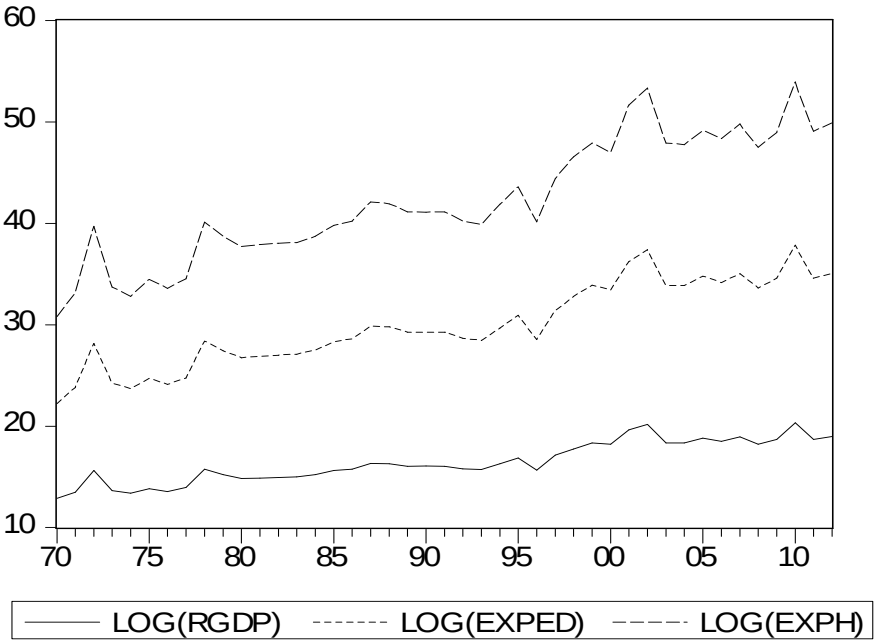
For example to produce real GDP values for 1999 then you take the GDP value for 1999 divide it by the 1999 GDP deflator and multiply it by GDP deflator for 2012(base year).

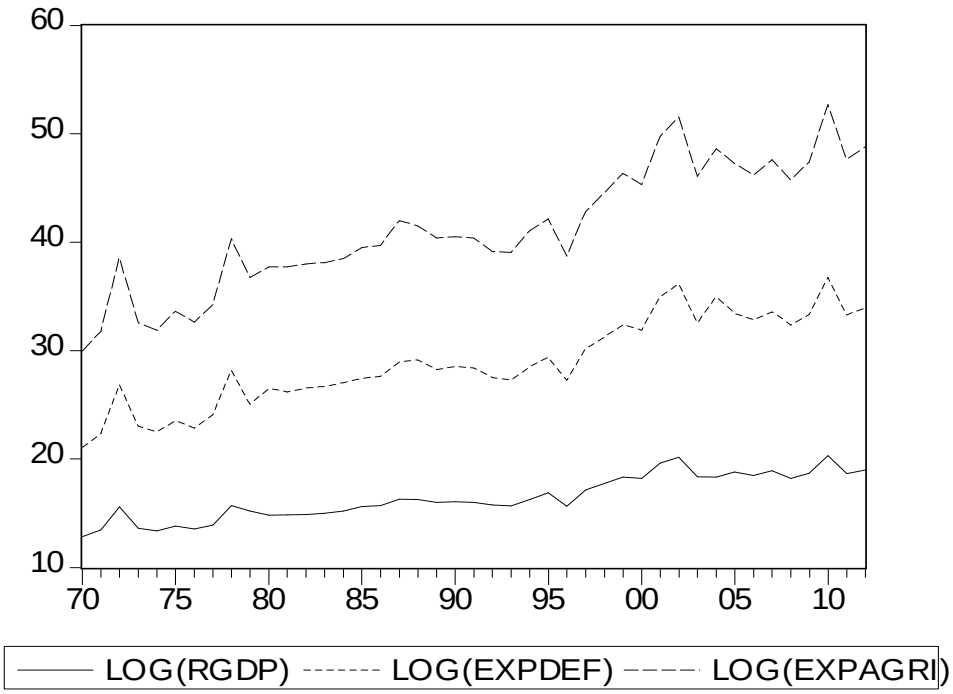
From the values above formula then we have;

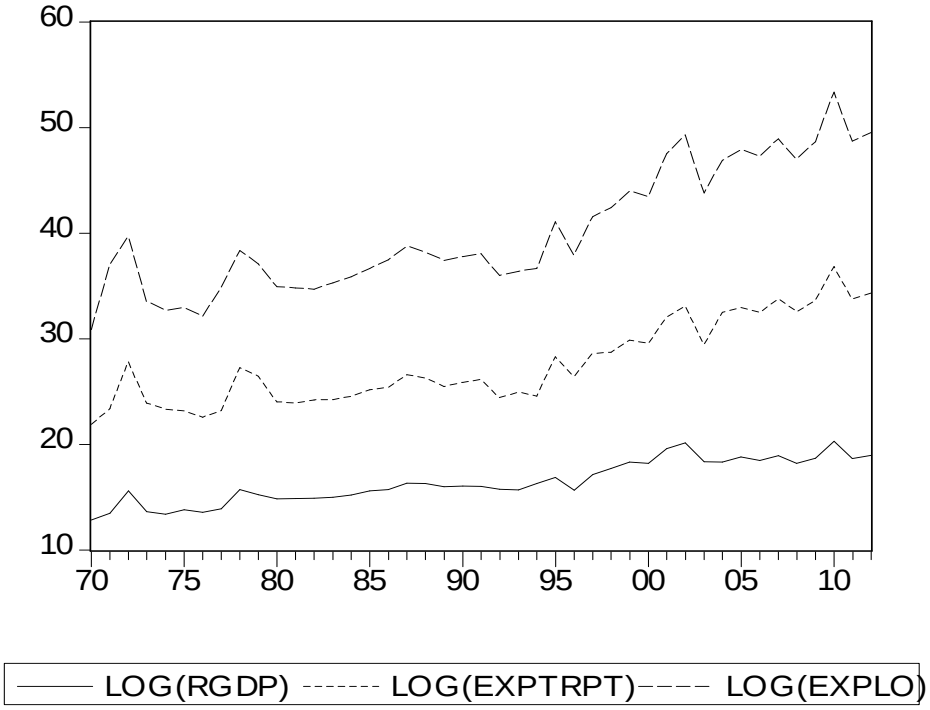
(37173930/4.19)10.14 = 89960911

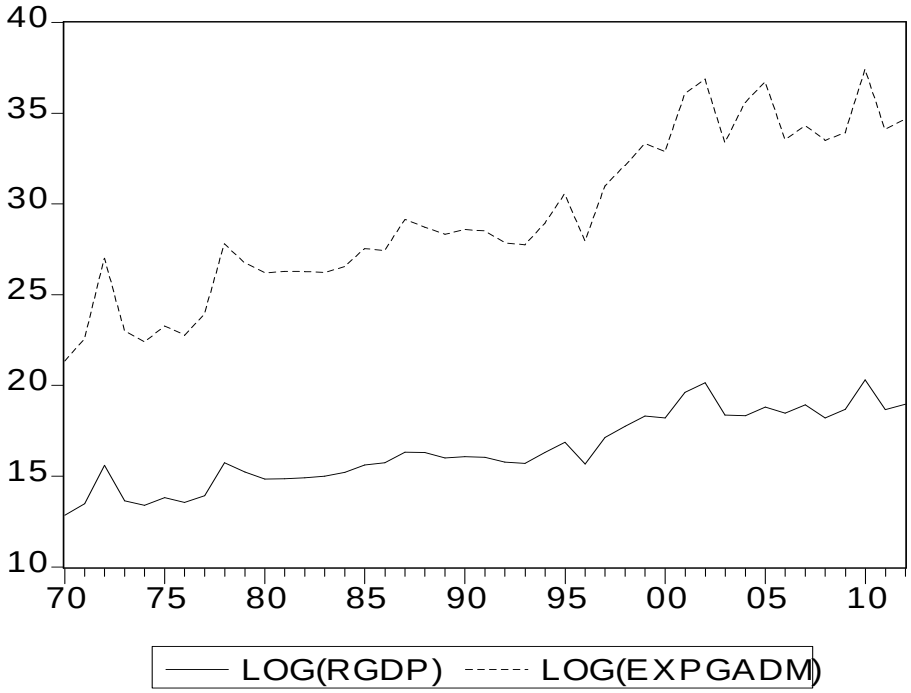
APPENDIX III: SERIES PLOTS

Plots of Series of Real GDP and Real Government Expenditures (in natural logarithm).




60
50
40
30
20
10
70
75
80
85
90
95
00
05
10
LOG(RGDP)
LOG(EXPDEF)
LOG(EXPAGRI)


60
50
40
30
20
10
70
75
80
85
90
95
00
05
10
LOG(RGDP)
LOG(EXPTRPT)
LOG(EXPLO)


40
35
30
25
20
15
10
70
75
80
85
90
95
00
05
10
LOG(RGDP)
LOG(EXPGADM)