EFFECT OF PUBLIC EXPENDITURE ON ECONOMIC GROWTH IN KENYA: 1963-2015

BY

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MASTERS OF SCIENCE (FINANCE AND ECONOMICS)

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SEPTEMBER, 2017

DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this paper contains no material written or published by other people except where due reference is made and author duly acknowledged.

Sign _____ **KCA/05/10943**

Date _____

I do hereby confirm that I have examined the master's dissertation of

Julia W. Muguro

And have certified that all the revisions that the dissertation panel and examiners recommended have been adequately addressed.

Sign _____ Date _____

Dr. Christine Nanjala

Dissertation Supervisor

ABSTRACT

This study sought to examine the effect of public expenditure on economic growth in Kenya between 1963 and 2015. To establish which specific components of government expenditure, have significant effects on economic growth. Public expenditure was disintegrated into two major components; development and recurrent expenditure. The dependent variable was economic growth expressed as real GDP while the independent variables were the expenditure components. The study used secondary data extracted from Economic Surveys, Statistical Abstracts published by the Kenya National bureau of Statistics, Kenya Institute of Public Policy Research and Analysis and the Ministry of Devolution and Planning. The study applied Vector Auto Regression estimation technique using annual time series data for the period 1963 to 2008 to evaluate the effect of government expenditure on economic growth. The study used a Distributed Lag Model with lagged explanatory variables to explain the relationship between economic growth and public expenditure. The ARDL was used to test the causal link between public expenditure and economic growth in Kenya during the period. The long run regression results showed that the effect of public expenditure components on economic growth was non-significant. The study recommended that the government encourage programs that foster increased public investment for increased economic growth.

Keywords: **Public expenditure, Recurrent expenditure, Development infrastructure, Economic growth**

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ACRONYMS AND ABBREVIATIONS

AIC	Akaike Information Criterion
DE	Development Expenditure
EAC	East African Community
FPE	Free Primary Education
GDP	Gross Domestic Product
GRE	Government Recurrent Expenditure
LR	Likelihood Ratio
NARC	National Rainbow Coalition
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PVAR	Panel Vector Auto Regression
RE	Recurrent Expenditure
SAPs	Structural Adjustment Programmes
SOE	State Owned Enterprises
TPE	Total Public Expenditure
VECM	Vector Error Correction Model

OPERATIONAL DEFINITION OF TERMS

Public Expenditure- Spending made by the government of a country on collective needs and wants such as pension, provision, infrastructure among others.

Recurrent Expenditure: All payments other than for capital assets, including on goods and services, (wages and salaries, employer contributions), interest payments, subsidies and transfers.

Development Infrastructure: Payments for acquisition of fixed capital assets, stock, land or intangible assets which would be based on development agenda. A good example would be building of schools, hospitals or roads.

Economic Growth: an increase in the amount of goods and services produced per head of the population over a period of time

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Public expenditure can be defined as the expenses incurred by a government for its own maintenance, the society, the economy and assisting other countries (Bhatia, 2004). The expenditure is composed of current expenditure and capital expenditure. Public expenditure is classified according to the function for which it is intended. In Kenya, government expenditure may be sub divided into two categories based on the purpose namely development and recurrent expenditure (Wanjiku, 2013)

Recurrent expenditure includes the general expenditure on wages and salaries, public debt repayment and welfare services. It may affect the people's willingness and ability to invest, work and save. Development expenditure involves expenditure which is less discretionary and is made on new activities which are yet to be completed (Maingi, 2010). It includes expenditures on capital goods such as roads, railways and communication systems which directly and indirectly contribute to economic growth by stimulating increased investment by the private sector. It is incurred by the government to provide public goods and services and to service public debts. Economic growth represents the expansion of a country's potential GDP or output. According to Kneller (1999), economic growth refers to an increase in the productive capacity of an economy which increases the ability of an economy to produce additional quantities of goods and services. Economic growth reflects the standard of living in a country.

Public expenditure is important for an economy to run efficiently. The importance of government expenditure is because some goods may not be provided at all or may not be supplied adequately in a free market economy. A large portion of government expenditure is

allocated to merit goods such as health, education, security and infrastructure (M'Amanja and Morrissey, 2005). The government may also incur public expenditure as part of its discretionary fiscal policy. This may include expenditures to minimize the effects of negative externalities, provision of subsidies, stimulation of aggregate demand and economic activities (Mosoti, 2014).

The relationship between public expenditure and economic growth in Kenya is an important subject of analysis. Existing literature shows that government expenditure has a multiplier effect on the economy. However the method of financing public expenditure has been a subject of discussion. If borrowing is the main source of funds for financing government expenditure, private investment is likely to be crowded out which may stifle economic growth (Muraya, 2013). Kenya has over the years registered an upward trend in public expenditure matched by an unequal growth in revenues resulting in budget deficits. The causes of this growth are notably: high population, growth of public debt, inflation and corruption (Ndungu' 1995).

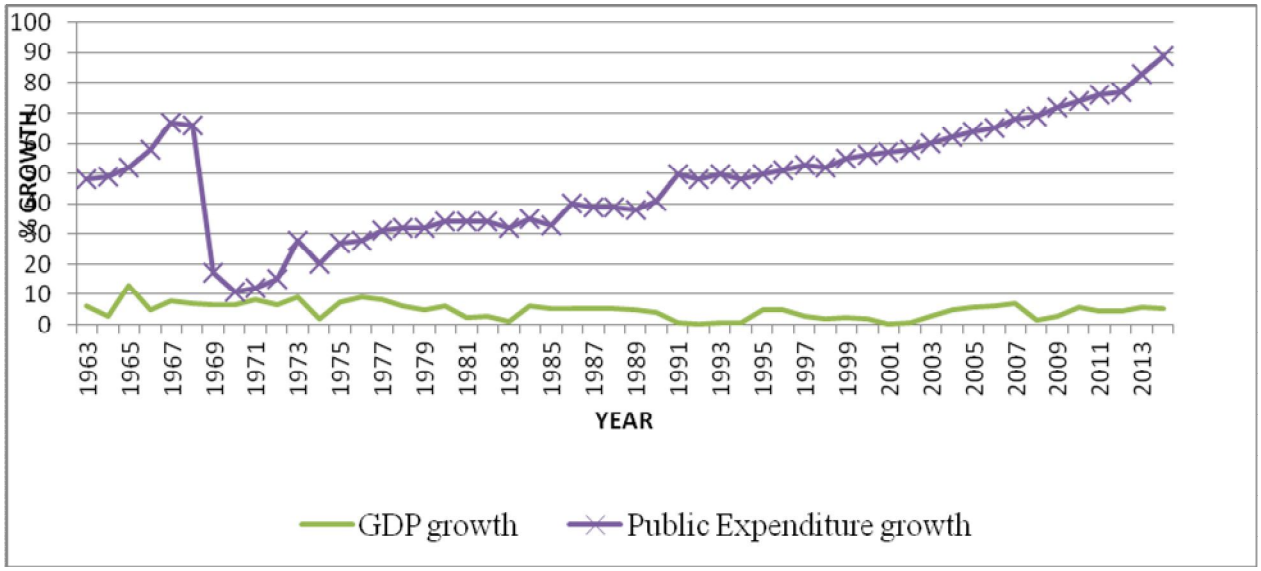
Economic growth is important for businesses to grow and prosper. It translates to growth in the output of an economy as a whole. Growth is measured as the change in the GDP of a country over one year. To allow for comparisons overtime, the figure is adjusted to allow for inflation. Real economic growth leads to major progress in living standards, expansion of existing markets and opening new ones. The real economic growth of one country relative to another is an important indicator of business opportunities (Wagner, 2007).The analysis of whether public spending positively influences economic growth is still a subject of discussion. However expenditure on productive activities like infrastructure and development of human capital can enhance the growth of an economy. If government expenditure is mainly on consumption, then it will likely affect economic growth negatively (Maingi, 2010).

Expenditure on education and health sectors leads to improvement and accumulation of human capital which is more efficient and productive thus leading to economic growth (Wanjiku, 2013). Expenditures on sectors like infrastructure directly contribute to economic growth. Government expenditure on defense, public order and security and general administration can also lead to economic growth by creating a favorable environment for investment and allowing sectors like tourism to thrive (Barro and Salah I Martin, 1992).

1.1.1 Overview of Public expenditure growth in Kenya: 1963-2015

Public expenditure in Kenya has been steadily increasing over the years. However, the growth in expenditure has not been proportionate to growth in revenue. This has led to persistent budget deficits forcing the government to resort to borrowing in order to implement its budgetary targets. The increase in government borrowing has further contributed to expansion of the public debt (Ndungu, 1995).

FIGURE 1 Trend of Public Expenditure and GDP Growth in Kenya from 1963-2013



Source: Author (2016) from KNBS data

An analysis of government expenditure immediately after independence showed that public expenditure increased by 67% from 1963 to 1967. However between 1967 and 1971, there was a decrease of 12% in the public expenditure growth (Maingi, 2010). The period between 1973 and 1979 experienced high levels of inflation in addition to the collapse of the East African Community (EAC) in 1977. The collapse led to formation of semi autonomous state corporations which caused an increase in public expenditure (Wawire, 2006).

Between 1980 and 1986, the government expenditure increased by 108% from 17.800 million in 1980 to 36.835 million shillings in 1985 (Mosoti, 2014). The years 1984 and 1985 recorded high levels of inflation and increased government expenditure in development projects. This was mainly caused by drought which was experienced during the period (Republic of Kenya, 1985). During the same period, the public debt increased by 27.090 million from 1980 to 1984.

In the 1990s Structural Adjustment Programmes (SAPs) were introduced by international lending institutions. SAPs were aimed at improving austerity in government expenditure, restructuring of state owned enterprises to improve their efficiency and productivity and reduce fiscal burden on the government, efficient use of public resources, removal of price controls and initiation of reforms in the civil service.

Between 1991 and 1994, the country experienced high levels of inflation. This was caused by increased money supply in the economy due to multi-party elections in 1992, devaluation of the Kenya shilling and reduction in price controls (Republic of Kenya, 1994). During the same period, the government introduced a reform program with the aim of reducing the number of employees in the public sector which was seen as a fiscal burden on the government (Republic of Kenya, 2003).

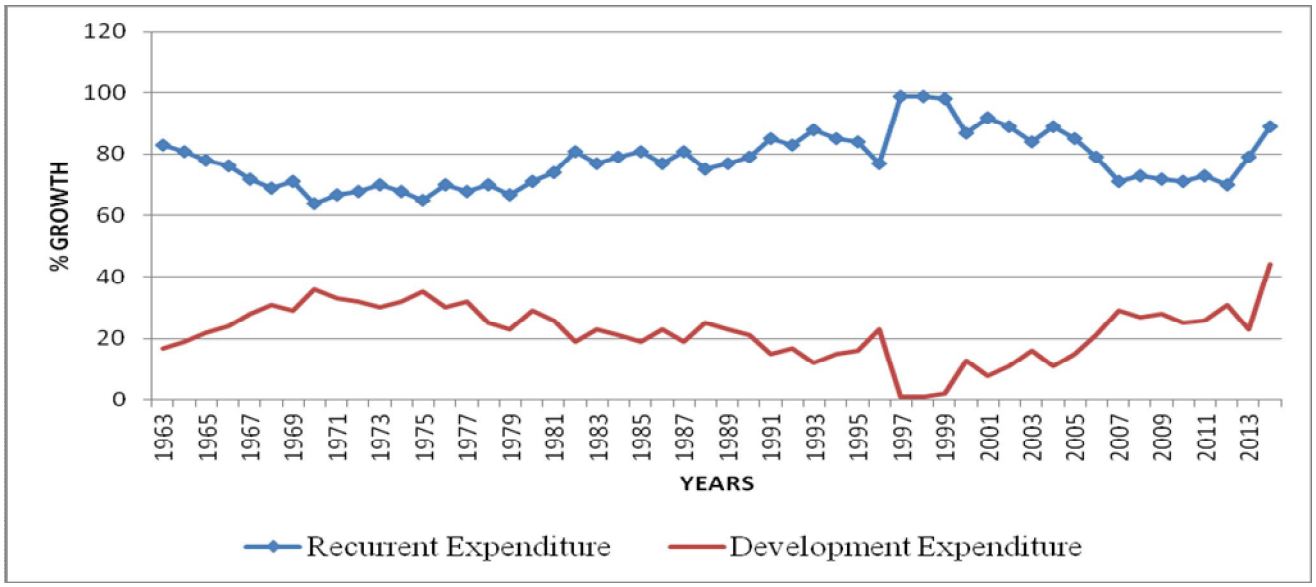
From 2002 to 2003, the public expenditure increased by 14.6%. The growth was caused by formation of NARC government which introduced new policies with an ambitious development agenda alongside the expansion of government departments and ministries. There was an increase in development expenditure as a result of the increase in infrastructure budget. The introduction of Free Primary Education (FPE) also led to an increase in government expenditure (Maingi, 2010).

The formation of Grand Coalition Government in 2008 led to expansion of government ministries resulting to sharp increase in government expenditure between 2008 and 2012.The high cost of fuel, weakening of the Kenya shilling and an inflation rate of 19% in 2011 also led to growth in government expenditure in 2012(Republic of Kenya, 2012).In 2012, the public expenditure exceeded one trillion Kenya shillings. This was likely to have been caused by high levels of public debt, increase in expenditure on salaries in the public sector, inefficiency,

corruption in the public sector and increase in infrastructure expenditure. In 2013, the increase in public expenditure was attributed to introduction of devolved system of governments and allocation of funds to new projects by the newly elected government.

Between 2014 and 2015, public expenditure exceeded two trillion shillings. This was because of increased budgetary allocations to county governments and increased spending on major infrastructure projects like the Standard Gauge Railway. Despite the massive growth in public expenditure accompanied by introduction of reforms and austerity measures, GDP growth rate has been fluctuating over the period. The growth has generally been cyclical. This makes it important to investigate the relationship between public expenditure and economic growth in Kenya.

Figure 2: Capital and Recurrent Expenditure Growth in Kenya.



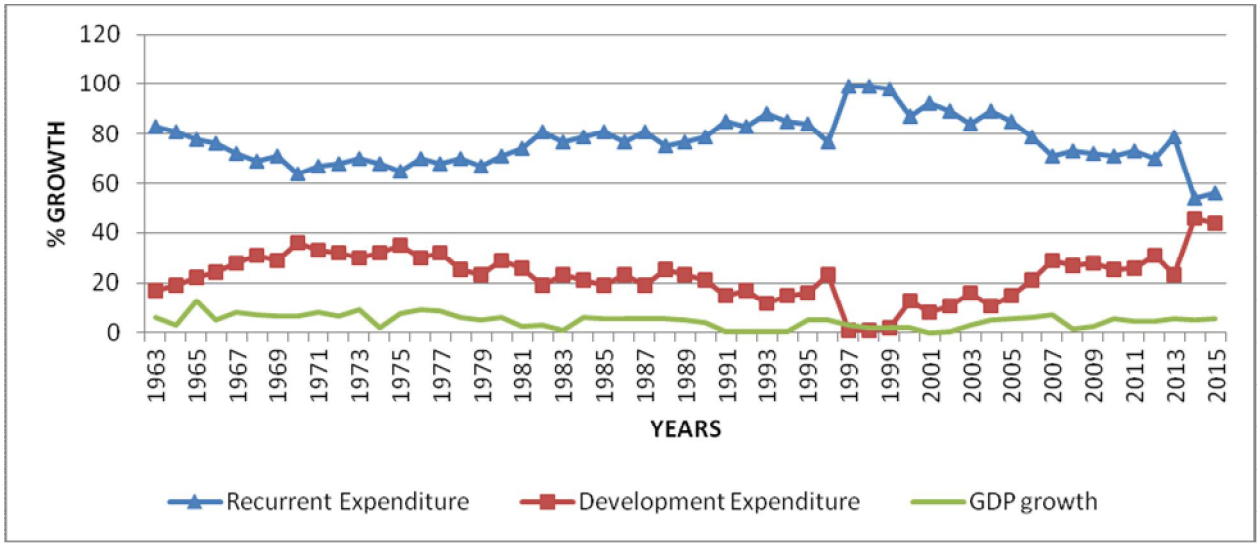
Source: Author (2016) from KNBS data

As shown in Figure 2, there has been a wide disparity between recurrent expenditure and capital expenditure. The steady growth in recurrent expenditure can be attributed to increase in the size of government, growth of the public-sector wage bill due to pressure from trade unions

and an increase in public debt over the years (Muraya, 2013). Development expenditure experienced a steady growth from 1963 to 1970. This was due to high budgetary allocations for establishment of state owned enterprises (SOEs) which were expected to stimulate economic growth. However, 1970 to 2000 showed a mixed trend in the growth of development expenditure.

The growth in development expenditure between the periods 1973-1970 and 2002-2015 corresponded with positive economic growth. This could be interpreted to mean that an increase in development expenditure stimulates economic growth. Both recurrent and development expenditure have registered an upward growth from 2013 to 2015. This is due to increased allocations to the devolved system of governments, growth of the public debt and major infrastructure projects initiated by the government.

Figure 3: Trends of Development and Recurrent expenditure compared to GDP growth in Kenya.



Source: Author (2016)

In Figure 3, there seemed to be no direct relationship between the two components of public expenditure and economic growth in Kenya for the period 1963-2015. However, the graph could

not exhaustively be used to explain the relationship between public expenditure and economic growth. This is because the graph did not capture short term changes relationships between the variables.

1.2 Statement of the problem

Kenya registered a steady growth in public expenditure since independence in 1963. However, the main concern among policy makers has been the implication of the large expenditure on economic growth (Ndonga, 2013). While public expenditure growth had been steady, economic growth showed mixed trends. The economic growth in Kenya has been fluctuating between 1963 and 2015 (World Bank, 2016). In 2015, real GDP growth for Kenya was 5.7%. This was a decrease from 2013 which was at 6.1%. Though Kenya real GDP growth fluctuated substantially in recent years, it tended to increase through 2015.

The effect of public expenditure on economic growth has produced conflicting results. Nijkamp and Poot (2012) conducted a meta-analysis of past empirical studies of public expenditure and growth and found that in a sample of 41 studies, 29% indicated a negative relationship between public expenditure and economic growth, 17% a positive one, and 54% an inconclusive relationship. Barro (2014) was among the first to formally endogenize government spending in a growth model and to analyze the relationship between size of government expenditure and rates of growth and saving. He concluded that an increase in resources devoted to non-productive (but possibly utility enhancing) government services is associated with low economic growth. The study by Kweka and Morrissey (2000) on the relationship between government spending and economic growth in Tanzania produced mixed results. These studies mainly focused on the effects of public expenditure components (Health, Education, Security and Infrastructure) on economic growth.

An investigation by Munge (2005) on the relationship between public expenditure and economic growth in Kenya showed that there was no causal relationship between public expenditure and economic growth. This study differs with the current study in that it was based on VAR model while the current study is based on the VECM model of analysis. Maingi (2010) used time series data to investigate the relationship between public expenditure and economic growth in Kenya. Maingi based his study on the period between 1963-2008 while the current study was based on the period 1963-2015. The study applied VAR with current study based on VECM model.

The study by Simiyu (2015) on the relationship between public expenditure and economic growth in Kenya showed that there was no causal relationship between public expenditure and economic growth. The study was based on public expenditure elements of Health, Education, Military and Infrastructure in Kenya with the current study based on recurrent and development elements of government expenditure. The studies did not separate public expenditure into recurrent and development expenditures to explain the relationship between economic growth and such components of public expenditure. Based on the methodologies adopted it is not clear how public expenditure affects economic growth. This study thus adopts a different approach by using the two main components of public expenditure to explain the relationship and causal link between public expenditure and economic growth in Kenya. The results of the study will help explain which of the two components has an effect on public expenditure.

1.3 Research Objectives

The main objective of the study was to investigate the relationship between public expenditure and economic growth in Kenya for the period 1963 to 2015. The specific objectives will be:

i. To investigate the effect of recurrent expenditure on economic growth in Kenya.
ii. To investigate the effect of development expenditure on economic growth in Kenya.
iii. To investigate the causal link between economic growth and public expenditure in Kenya.

1.4 Research Hypothesis

H_{o1} – There is no effect of recurrent expenditure on economic growth in Kenya.

H_{o2} – There is no effect of development expenditure on economic growth in Kenya.

H_{o3} – There is no causal link between economic growth and public expenditure in Kenya.

1.5 Justification of the study

The results of this study may help to guide policy makers in designing fiscal strategies aimed at achieving the objectives of enhanced economic growth in the country. The study recommendations can also be used to stimulate policy review and discussion on the distribution of public expenditure among its components. This may lead to a review of sectoral budgetary allocations. The study will also serve as a preliminary guidance for further scrutiny of the subject.

1.6 Scope of the study

The study considered the period 1963-2015. This was due to the growth of public expenditure in Kenya. Though economic growth is influenced by both fiscal and monetary policies alongside

other factors, this study mainly focused on fiscal policy whose key components are government revenue and government expenditure.

1.7 Limitations of the study

The study had limitations associated with the period covered and the overall modeling approach and specification of the model. The results of the study were limited to the period covered by the study and was not generalized to other periods of time.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the theoretical and empirical reviews. Section 2.1 discussed the foundations of the Keynesian and Wagner's theories by explaining their relevance to this study. Section 2.2 reviewed the Neoclassical and endogenous economic growth theories. Section 2.3 presented an empirical review of previous studies. Section 2.4 presented an overview of literature so as to identify the research gap which the study aimed to address.

2.2 Theoretical Review

According to Branson (2002), the theory of economic growth explains the long run trend of an economy. Both developed and developing countries have experienced substantial growth of their public expenditures which have had different impacts on their levels of economic growth. This study reviewed Wagner's and Keynesian theories on the relationship between public expenditure and economic growth.

2.2.1 Wagner's Theory

Wagner was among the first group of economists to model and explain the relationship between public expenditure and national income. Wagner's law was based on an empirical analysis of the economies of industrialized countries. Wagner's view was influenced by the assumption that there is a close relationship between the growth of public expenditure and output. According to Wagner, there is a relationship between increase in government spending and increase in per capita income. As income increases, the demand for government services also increases hence economic growth was a result of government expenditure (Wagner, 2007).

Wagner was of the view that a country's industrialization and modernization will increase its public expenditure on social welfare services. The population would substitute public goods for private goods as a result of high elasticity of income. The main shortcoming of earlier studies done on Wagner's law was the wrong assumption that time series data is used to view variables as non stationary at all levels. A study thus generates a high value of R^2 yet there is no significant relationship between the variables under study which eventually results in spurious regression (Bagdigen and Cetintas, 2004).

Wagner postulated that increased government expenditure leads to an improvement in per capita income. The results of the study was used to assess if the increased public expenditure translated to per capita income growth.

2.2.2 Keynesian Theory

According to Keynes (1936), public expenditure was viewed as the main determinant of economic growth. He proposed a policy to address cyclical changes in the economy in which the government can respond to economic recessions by increasing its public expenditure (Tily, 2009). Fiscal policy instruments were viewed as useful tools of achieving short term economic stability and long run growth rate. According to Bagdigen and Cetintas (2004), Keynes argued that the government can improve economic performance by borrowing money from the private sector and spending it on various development projects.

Keynes advocated for government spending to create employment opportunities, increased profitability and investment through multiplier effects. He believed that full employment equilibrium was an exception and that inflation can only arise after the achievement of full employment. Keynesian theory postulated that that an expansion of government expenditure leads to economic growth.

According to Keynes, an increase in government expenditure enhances economic growth by improving the purchasing power in an economy. The increase in aggregate demand would increase the GDP, per capita income, profits of firms and there will be an increased demand for more workers to produce more goods and services leading to employment opportunities. Keynes explained that a government could reverse economic downturns by borrowing money and injecting it back to the economy through various expenditure programmes. He applied the "pump priming concept" which provided short term stimulus to address problems of recession or depression (Carling, 2012).

Public expenditure on education, infrastructure, security and health is expected to augment aggregate demand. By spending on such expenditure components, the government injects money into the economy. Public expenditure has a multiplier effect which stimulates economic growth.

Keynesian theory was relevant to this study because it advocated for increased for increased government expenditure to create employment opportunities, increase profitability and investment. Kenya's economy currently faces challenges of high employment levels despite growth in public expenditure.

2.2.3 Endogenous Growth Theory

The theory was proposed by Paul Romer and Robert Lucas (1990). While neoclassical growth theory explains that technological progress defined as the Solow residual is the main determinant of economic growth, endogenous growth model states that the main determinants of economic growth are treated as endogenous variables that can be verified.

The model is based on the reason that the source of growth of the independent variables can be tracked down by decomposing the exogenous variables in the neoclassical growth theory

which become endogenous variables in the endogenous growth theory. The model further implies that the government can enhance economic growth in the long run by influencing factors in the model; investments in capital, research and development and education. However, the government can also influence economic growth negatively (Carling, 2012).

The study was based on endogenous growth model in which public investment in roads, ports, sanitation and schools complement private investment and contribute to economic growth (Barro, 1990). He predicted the effects of public capital on economic growth. The model assumed that public expenditure is mainly financed by taxes. Barro (1990) further emphasized the importance of government policy formulation and implementation in the economic growth process.

He categorized public expenditures as either productive or unproductive. The composition of public expenditure therefore became an important determinant of economic growth as opposed to the level of public expenditure. It therefore follows that economic growth was expressed as a function of government expenditure.

This theory was relevant to this study because increased investment in roads, ports and other infrastructures reduces the cost of doing business which contributes to expansion of economic activities. Government policy formulation and implementation is also important in influencing economic growth.

2.3 Empirical Review

This section reviewed relevant literature on studies on the relationship between public expenditure and economic growth.

Gisore et al (2014) estimated the effect of government expenditure on economic growth in East Africa using a disaggregated model. The main aim of the study was to empirically investigate the effect of public expenditure on economic growth in East Africa. The study focused on the disaggregated expenditure for the period 1980-2010.

The study sought to establish expenditures that have effects on growth using balanced panel fixed effects model. The study findings showed that expenditures on health and defense were positive and statistically significant effect on growth. Education and agriculture expenditures were found to have insignificant effects on growth. The study recommended an increase in defense and health budgets to promote economic growth.

Ndonga (2013) assessed the effects of public spending on economic growth in Kenya. The study focused on the sectors; health, infrastructure, security and education for the period 2007 to 2012. The results of the study showed that there was a significant influence of government spending on education, infrastructure, health and defense. Education improves capacity and productivity of labor; infrastructure reduces the cost of doing business and enhances efficiency in service delivery. Security and health are all crucial in economic growth.

Wawire et al (2014) assessed the impact of government expenditure on private investment in Kenya. The study was aimed at finding the repercussions of government expenditure on private investment in Kenya. The study adopted the VAR model technique using time series data for the period 1963-2012. The results showed that both capital and recurrent expenditure enhanced private investment. Public expenditure reforms were found to be deterrent to private investment activities. The study concluded that there was need to reallocate funds towards projects valuable to the private sector and reduce those that crowd it out. The study recommended that the government should undertake fiscal reforms in areas that promote private investment.

2.3.1 Development expenditure

Nyamwange (2012) estimated economic growth and public healthcare expenditure in Kenya (1982-2012). The study examined the effect of per capita gross domestic product (GDP Per Capita) on public health care expenditure in Kenya. The study used time series data. It employed OLS regression and checks for co integration on long term relationship between on public health care expenditure, GDP per capita, tests of granger causality, unit root presence and stationarity. The study found that health care is a necessary good in Kenya and had an elasticity of 0.024% to GDP per capita. This meant that for every 1% increase in GDP per capita, public healthcare expenditure should increase by 0.024%. The study recommended the adoption of suitable strategies in health care financing since the sector was facing underfunding and an increased demand for quality and availability of health care services that are equitable and affordable to a growing population.

Muthui et al (2013) investigated the impact of public expenditure on economic growth in Kenya. The objective of the study was to investigate the impact of government expenditure components on economic growth in Kenya 1964-2011 using time series data. The study conducted stationarity test, causality test and co integration test before using the vector error correction model to estimate the data. The study showed that though public expenditure on education had a positive relationship with economic growth, it did not contribute to any significant change to growth. Improved investments on education will lead to higher economic growth. Improved health will lead to higher labor productivity. The study recommended that the government should initiate privatization programmes for increased investment and provision of public utilities.

Kweka and Morrissey (2000) analyzed the relationship between government spending and economic growth in Tanzania, 1965-1996. The main objective of the study was to investigate the impact of public expenditure on economic growth using time series data. A simple growth model was formulated using Ram (1986) where total government expenditure was disaggregated into expenditure on (physical) investment, consumption spending and human capital investment. Increased productive expenditure (physical investment) appeared to have a negative impact on growth. Expenditure on capital investment was insignificant on regression because any effects would have very many long lags. The results confirmed that public investments in Tanzania had not been productive but countered the widely held view that government consumption spending is growth reducing. Evidence was also found that aid appeared to have had a positive impact on growth.

Kwendo and Muturi (2015) analyzed the effect of public expenditure on economic growth in Kenya, Tanzania, Uganda, Rwanda and Burundi. The specific objective of the study was to investigate the effect of public expenditure components of consumption, health, defense and agriculture. Using panel data for 1995-2010, the study applied the Hausman test and verified results using the fixed effects model. The results showed that agriculture and defense had a negative impact on economic growth while health and consumption expenditure had positive impact on economic growth.

Adewara and Funlayo (2013) analyzed the relationship between the composition of public expenditure and economic growth in Nigeria. Government expenditure was expected to be the means of reducing the negative impact of market failure on the economy. The study analyzed the relationship between public expenditure compositions from 1960-2008 on economic growth using the Vector Autoregressive model (VAR). The findings showed that expenditure on

education had failed to enhance economic growth due to high rate of rent seeking in the country as well as the growth rate of unemployment. It recommended increases in health and agriculture expenditures due to positive contribution on economic growth and further recommended for empirical testing of expenditure on water and education due to negative relation with economic growth.

Gemmel et al (2012) did a study on the topic "Does the composition of Government Expenditure affect economic growth." The study examined the impacts of changes in total public expenditure and shares of various expenditure categories on growth for a sample of OECD countries for the period 1970-2010. The study took account of the method of financing public expenditure and possible endogenous relationships. The results provided evidence that reallocation of total spending towards infrastructure and education would be positive for long term growth.

Mohammed (2012) investigated the impact of public expenditures on economic growth using time series data in Jordan for the period 1990-2010. Dickey Fuller and Phillips Peron unit root tests were used to examine integration order of the variables while Johansen co integration test was used to test the relationship between the variables. The results of the study showed that development expenditure had a positive impact on GDP growth which was compatible with Keynesian theory.

2.3.2 Recurrent expenditure

Oguso (2017) did a study on Growth Effects of Public Recurrent Expenditure in Kenya. The study makes use of sector level macro panel data from fiscal year 1999 to 2015, with a cross-sectional unit of seven sectors. The Hausman test and Random effects results, the presence of panel cointegration in addition to the fact that the variables included in the model are integrated

of different orders led to use of a panel ARDL (Autoregresessive Distributed Lag) model. Specifically, the Pooled Mean Group (PMG) estimator is employed in the analysis. Results: The findings show that an increase in share of public recurrent costs in sectoral GDP has an insignificant negative effect on sectoral growth in the short run but a significant negative effect in the long run. The results also show that an increase in share of sectoral development expenditure has a positive but insignificant effect in the short run but a significant growth effect in the long run.

Mohsen et al (2013) examined the causal relationship between government recurrent expenditure (GRE) and GDP for Iran in the period 1970-2010. Gregory (1996) co integration technique which allows for presence of potential structural breaks in data was used to empirically examine the long run relationship between the variables. The results suggested a long run relationship between the variables. Granger causality test indicated strong unidirectional effects from GDP to GRE. There was evidence that total recurrent expenditure promotes long term economic growth. The paper confirmed that there was instantaneous as well as unidirectional causal link running from GDP to GRE. The paper recommended proper management of recurrent expenditure to accelerate economic growth.

2.3.3 Causal relationship

Maingi (2010) studied the impact of public expenditure on economic growth in Kenya. The study applied Vector Autoregressive technique using time series data for the period 1963-2008 to evaluate the impact of government expenditure on economic growth. Johansen co integration tests revealed a long run relationship between GDP growth rate and selected components of public expenditure. The study concluded that the composition of government expenditure and public expenditure reforms affect economic growth.

Simiyu (2015) did a study to explain the relationship between public expenditure and economic growth in Kenya using Vector Error Correction Model (VECM). The study used time series data for the period 1963-2012. Short run and long run relationship between public expenditures and economic growth in Kenya were estimated using Johansen co integration test and Vector Error Correction Model. The results of the study suggested that components of public expenditure and economic growth both move towards a long run equilibrium with an adjustment speed of 3.6% after short run fluctuations in the equilibrium. The results also showed no causal relationship between public expenditure and economic growth in Kenya. There was however an existence of a unidirectional causation between military and health expenditure. The study recommended reduction /transfer of part of the military budget to the health sector.

Gangal and Gupta (2013) studied the relationship between public expenditure and economic growth in India for the period 1998-2012. The study used annual data of total public expenditure (TPE) and Gross Domestic Product (GDP). Augmented Dickey Fuller unit root test, cointegration test and Granger Causality tests technique were applied. The study revealed that there was linear stationarity in both variables that indicated long term equilibrium and there was positive impact of TPE on economic growth. There was a unidirectional relationship from TPE to GDP found by granger causality test. There was a positive impact of shocks from TPE to GDP.

Seok (2014) assessed the effect of public expenditure on inclusive growth in Asia. The paper assessed the role of fiscal policy on both equity and growth and whether it was possible to use public expenditure to improve equity without reducing economic growth. A cross country panel vector auto regression (PVAR) using world development indicators showed that public spending influenced growth positively as expected while effects on distribution were not significant.

Public health and public education expenditures appeared to reduce income inequalities significantly in the Asian Development Bank members. This implied that public expenditure policies were effective in initiating inclusive growth in developing economies than in advanced ones.

Lahirushan and Gunasekara (2015) analyzed the impact of government expenditure on economic growth of Asian countries. The study also investigated if long run equilibrium relationship existed between public expenditure and economic growth. The countries included in the study were; Singapore, Malaysia, Thailand, South Korea, Japan China, Sri Lanka, India and Bhutan with 44 observations in each country from 1970-2013. The study used the random effects panel OLS model. The results of the study showed that there was positive impact of government expenditure on GDP in the region. It also found that government expenditure and economic growth indicate a long run relationship in the Asian countries. The study concluded that there was a unidirectional causality from economic growth to government expenditure and government expenditure to economic growth in Asian countries and that government expenditure plays an important role in economic growth.

M'Amanja and Morrissey (2005) assessed fiscal policy and economic growth in Kenya. The study used time series data for the period 1964-2002. By categorizing government expenditure into productive and unproductive tax revenue into distortionary and non-distortionary, it was found that unproductive expenditure and non-distortionary tax revenue were neutral to growth as predicted by economic theory. Development expenditure had a strong adverse effect on growth and there was no evidence of distortionary effects on growth of distortionary taxes. Government investment was found to be beneficial to growth in the long run. The study recommended proper

formulation of expenditure and tax policies to ensure unproductive expenditures are curtailed while equally boosting public investment.

2.4 Conceptual framework

The main focus of the study was to investigate the relationship between economic growth and public expenditure in Kenya. The independent variables were the development and recurrent expenditure components while economic growth in terms of GDP growth was the dependent variable. Given that this is a descriptive study, the study applied a distributed lag model with lagged explanatory variables to test for the relationship between economic growth and the public expenditure components. The Granger Causality model was used to test the causal link between economic growth and public expenditure in Kenya.

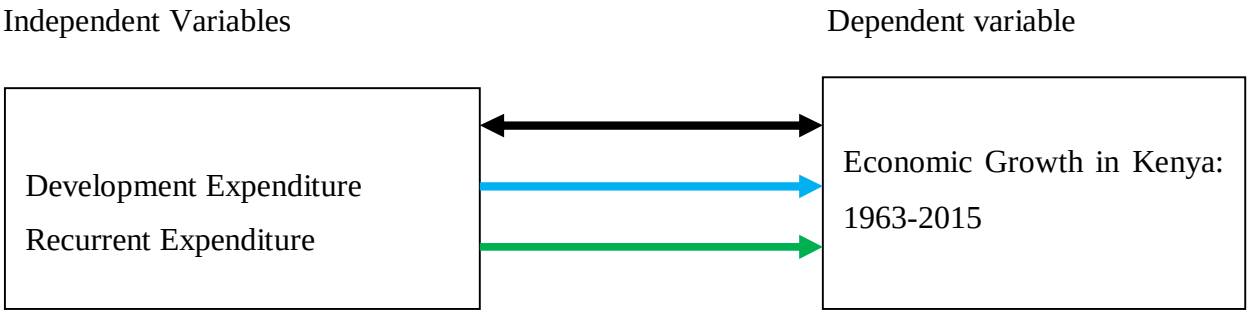


Figure 4: Conceptual Framework

Source: Author (2017)

Table 1: Operationalization of the variables

Name of Variable	Measurement of Variable	Formula
Dependent Variable		
Real GDP (Economic Growth) (GDP_t)	GDP growth in the current year divided GDP growth in the previous year	$GDPGROWTH = \frac{CGDP_{t+1}}{CGDP_t}$
Independent Variables		
Development Expenditure (DE_t)	Total Government Development Expenditure in a calendar year.	The share of Development Expenditure as a fraction of the total GDP to time t. $Expshare_t = \frac{Expenditure_t}{GDP_t}$
Recurrent Expenditure (RE_t)	Total Government Recurrent expenditure in a calendar year.	The share of Recurrent Expenditure as a fraction of the total GDP to time t. $Expshare_t = \frac{Expenditure_t}{GDP_t}$

Source: Author (2017)

2.5 Summary of literature review

The theoretical review showed that Wagner's theory was mainly based on the demand side of the economy which makes it only partially applicable to the Kenyan economy. Keynesian theory did not take into account the inflationary effects of increased government spending in the economy. The endogenous growth theory addressed the shortcomings of most of the previous growth theories. By modeling the process of economic growth, the impact of government expenditure can be assessed in the economy and forecasts made about its effects on economic growth. The theory thus explains the vital role of the government in influencing economic growth. This study therefore adopted endogenous growth theory to explain the relationship between public expenditure and economic growth in Kenya. The study has reviewed various empirical studies relating to economic growth and public expenditure. The literature was based on the objectives of the study. The empirical review presented studies across different countries that have used different estimation techniques, different time periods and different techniques of variable measurement which have generated different results.

2.6 Research gap

While Maingi (2010) and Ndonga (2013) showed that public expenditure affects economic growth, Simiyu (2015) explained that there was no causal relationship between public expenditure and economic growth. The study by Muthui et al (2013) presented mixed results on the relationship between public expenditure and economic growth. None of the previous studies has analyzed the relationship between public expenditure components (recurrent and development expenditure) and economic growth in Kenya. This is the gap that this study aimed to fill.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter describes the theoretical framework, model specification, methods of estimation, and sources of data for the study.

3.2 Research Design

A research design is a scheme outline or plan that is used to generate answers to research problems (Orodho, 2003). It can also be defined as a general plan or strategy for conducting a research study to examine specific testable research questions of interest (Lavrakas, 2008). This study adopted a longitudinal research design. This is because it allowed relationship between the variables to be assessed at intervals to assess their effects on economic growth. The study used non-experimental design due to the inability to alter or manipulate the predictor variable (public expenditure).

3.3 Target population

A population is an entire group of individuals, events, or objects having common characteristics that conform to desired specifications (Mugenda & Mugenda, 2003). The study targeted economic growth, and public expenditure in Kenya between 1963 – 2015.

3.4 Data Collection

The study used secondary data extracted from Economic Surveys, Statistical Abstracts published by the Kenya National bureau of Statistics, Kenya Institute of Public Policy Research and Analysis and the Ministry of Devolution and Planning. Secondary data was preferred in this study because it was readily available, cheaper and easily accessible. The data was from previous publications which could only be sourced from secondary sources. This data will include public

expenditure (recurrent expenditure, development expenditure) and economic growth based on real GDP.

For purposes of estimation, yearly time series secondary data covering the period 1963 – 2015 was used in the study. The study covered 1963 – 2015 period since this period was characterized by substantial growth in government expenditure, and because it was the longest period where time series data was available in post-colonial Kenya.

3.4.1 Testing for Stationarity

This was done to confirm if the data is stationary because non-stationary data can lead to spurious regression. Tests for stationarity and non-stationarity were done using the Augmented Dickey Fuller Test. As opposed to Dickey Fuller Test, this test included lagged changes of the independent variable as a regressor. A unit root test was done to determine if variables in the regression are either stationary or non-stationary (Kwiatkowski et al., 1992). Where the variables were non-stationary at all levels, test for stationarity was done at first differences. If they were stationary, then the variables were stationary of order one I (1).

3.4.2 Test for Endogeneity

This was done to find out if Endogeneity existed in the model estimation. The study used the Instrumental Variable approach. The instrument had to be correlated with the explanatory variable but not the error term and should not affect the dependent variable directly.

3.4.3 Vector Error Correction Modeling

A vector error correction model (VECM) is a modeling technique which adds error correction features to a multifactor model such as a vector autoregression model. After the Johansen cointegration test is performed, next is to fit the appropriate time series model. If

cointegration has been established between the variables, then this implies that there exists a long run relationship between variables. Hence, the VECM is applied in order to determine the short run relationships of cointegrated variables. On the other hand, if there exist no cointegration, then the VECM is reduced to Vector autoregressive (VAR) model, and the Granger Casuality tests will be used to determine casual links between variables.

3.5 Data Analysis

This study applied descriptive data analysis technique because it provided simple summaries about the variables and observations made about their behavior. This was based on mean, standard deviation, frequencies and percentages. Since the study adopted longitudinal research design, time series data was used. Time series data was collected over sequence of data points over a continuous time interval. The continuity in the data set allowed easy analysis of the behavior of the variables over the period.

An econometric model was developed and estimated. The study expressed economic growth in terms of Gross Domestic Product (GDP) while the growth rate of GDP was used as the dependent variable. The explanatory variables for the model was recurrent expenditure and development expenditure which are the disaggregated components of public expenditure.

3.6 Model Specification

The study used a Distributed Lag Model with lagged explanatory variables which included lagged values of dependent variables to test for the relationship between economic growth and public expenditure components. The model is called distributed lag model because the influence of the explanatory variable on the dependent variable is distributed over a number of past values of x. The general form of the distributed lag model was defined as;

$$EG_t = \beta_0 + \beta_1 RE_t + \beta_2 RE_{t-1} + ... + \beta_q RE_{t-q} + \mu_t \quad (1)$$

$$EG_t = \beta_0 + \beta_1 RE_t + \beta_2 RE_{t-1} + ... + \beta_q RE_{t-q} + \mu_t \quad (1)$$

Where EG_t is the Economic Growth at time t

RE is the Recurrent Expenditure

μ_t is the error term

q is the maximum lag

For the development expenditure component

$$EG_t = \beta_0 + \beta_1 DE_t + \beta_2 DE_{t-1} + ... + \beta_q DE_{t-q} + \mu_t \quad (2)$$

Where EG_t is the economic growth at time t

DE is development expenditure

μ_t is the error term

q is the maximum lag

Lagged values of the variable are important explanatory variables in most economic relationships because economic behavior in any one period is also determined by pattern and behavior of previous values. The study used Likelihood Ratio (LR) test to select the appropriate lag length. This ensured that the residuals did not have significant autocorrelation because autocorrelation would lead to inconsistent least square estimates. The LR test was complemented with Akaike Information Criterion (AIC). The criteria for selecting lag length would ensure selection of the smallest lag order without much loss in the degrees of freedom.

Overall output model is:

$EG_t = \beta_0 + DE_t + RE_t$----------(3)

3.6.1 Model Estimation and Interpretation

This section was divided into 4 sub-sections: Sub-section one examined the unit roots and stationarity for time series data by using the Augmented Dickey-Fuller (1979) and Phillips and Perron (1988) tests and reports its results. The Johnsen modeling was estimated for co-integration test and to investigate the short-run dynamics of the model with the information of the co-integration relationship.

After model specification, an appropriate lag length was chosen. Data was then tested for stationarity and if stationarity was confirmed, model parameters would be estimated using OLS. A regression model with current and past values (lags) of the exogenous variable would be estimated. Macroeconomic time series data are usually non-stationary and OLS regressions between them may give spurious results. The data was tested for stationarity before applying OLS regression. According Granger (1988), a variable may be non-stationary but a linear combination of variables may be stationary.

All data would be cleaned and all nominal data converted to real data to ensure easy analysis. Nominal average GDP would be converted to real average GDP because nominal values do not reflect the exact changes in production and the changes in income caused by inflation. Data on government expenditure would be converted into calendar years since economic growth rate figures are in calendar years (Wawire, 2006).

To achieve the objectives of the study, the model would be estimated followed by the interpretation of empirical findings. This would help to establish and explain the relationship

between economic growth and public expenditure in Kenya. Data analysis would be done using STATA software Version 13.

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the findings based on the analyzed data. Specifically, it includes descriptive statistics, correlation analysis, co-integration, diagnostic tests, robustness, post estimation and modeling.

4.2 Descriptive Statistics

Table 4.2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min.	Max.
RGDP	53	1.709682	1.855256	.0572761	9.961977
DE	53	9.051226	12.97938	.3333333	80
RE	53	51.14953	131.2781	6	920

Note: RGDP=Real Gross Domestic Product, DE=Development Expenditure, RE=Recurrent Expenditure

The descriptive statistics presented in table 4.2 show that economic growth as measured by real GDP has a mean of 1.7097. Development expenditure has a mean of 9.0512 and recurrent expenditure has a mean of 51.1495. The standard deviation shows that there is a high variability in the data especially in recurrent expenditure. Within the period, the lowest value of RGDP was 0.057 with a maximum of 9.96. Development expenditure reflected a low of 0.33 and a high of 80 while recurrent expenditure showed a low of 6 and a high of 920. This shows that despite the public expenditure varying within the period, recurrent expenditure varied more compared to the development expenditure.

4.3 Correlation matrix

Table 4.3: Correlation Matrix

Variables	RGDP	DE	RE
RGDP	1.0000	-	-
DE	-0.3044* 0.0267	1.0000	
RE	-0.3557* 0.0090	0.4882* 0.0002	1.0000
Note: RGDP=Real Gross Domestic Product, DE=Development Expenditure, RE=Recurrent Expenditure			

Table 4.3 shows the results on correlation of the variables. The table shows that development expenditure has a negative relationship with economic growth as measured by real GDP as shown by -0.3044. Further recurrent expenditure displays a negative relationship as shown by -0.3557. The factors are significant as the pvalues is less than 0.05.

4.4 Stationarity test

The data series were tested for stationarity using the Augmented Dicky Fuller (ADF) and Phillips-Perron (PP) tests. The reasons why the two tests are required are: The ADF procedure attempts to retain the validity of the tests based on white-noise errors in the regression model by ensuring that the errors are indeed white-noise. On the other hand, (PP) procedure corrects for serial correlation through a non-parametric correction to the standard statistic (Stock, 1994). PP test acts to modify the statistics after the estimation in order to take into account the effect that auto correlated errors have on the results. The results are presented in table 4.4.

Table 4.4: Unit root test

Variables	Unit Root Test			
	ADF Test		PP test	
	t-statistic	Critical value (5%)	t-statistic	Critical value (5%)

Real GDP	-4.285**	-2.933	-7.448	-3.498
Development Expenditure	-4.103**	-2.933	-5.149	-3.498
Recurrent Expenditure	-3.320**	-2.933	-5.698	-4.146
* denotes rejection of the hypothesis at 5% (1%) significant level				

The results of unit roots tests showed that real GDP, recurrent expenditure and development expenditure were stationary and integrated of order I (3). This suggested that there was a long-run relationship between public expenditure and GDP growth as measured by real GDP (Engle & Granger, 1987). Furthermore, most results and the t-statistics for constant and trend were very close and sometimes the same for the PP. This shows that PP test is more consistent and powerful in testing for stationarity as compared to the ADF.

Table 4.5: Optimal lag length

Sample: 1971-2015		Number of obs = 45		
Lag	P	AIC	HQIC	SBIC
1	0.0000	-	-	22.987*
3	0.0000	22.4918*	22.4918*	-
Note: *Indicates Significant				

Table 4.5 shows the findings on the optimal lag length. The findings show that AIC and HQIC give the optimal lag length at lag 3. They have the smallest and significant value. AIC gives efficient estimates and is more superior to other methods. Lag 3 is chosen as the optimal lag.

Johansen test was then carried out to investigate whether there was more than a single cointegration relationship between economic growth and the government expenditure. The results of the Johansen tests of variables are reported in Table 4.6.

4.5 Co-integration

4.5.1 ARDL

Autoregressive distributed-lag models (ARDL model, *hereon*) are widely employed in the analysis of long-run relations when the data generating process underlying the time series is integrated of order one (i.e. *I(1)*). Recently, the application of ARDL model procedure to difference- stationary series has been evolving.

The model as shown by table 4.6 shows that there is a long-run relationship between expenditure (DE, RE) and RGDP. This is shown by the pvalue of 0.004 which is below 0.05. Further, a unit increase in development expenditure will result to 0.1451 unit increase in the RGDP, while a unit increase in recurrent expenditure will decrease the economic growth by 0. 007 units.

Table 4.6: ARDL

Source	SS	df	MS		Number of obs =	52
					F(3, 48) =	7.27
Model	55.8751438	3	18.6250479		Prob > F =	0.0004
Residual	123.052536	48	2.56359451		R-squared =	0.3123
					Adj R-squared =	0.2693
Total	178.92768	51	3.50838588		Root MSE =	1.6011

RGDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RGDP						
L1.	.0600563	.1223091	0.49	0.626	-.1858626	.3059752
DE						
L1.	.1451137	.0466753	3.11	0.003	.0512668	.2389606
RE						
L1.	-.0073281	.0045828	-1.60	0.116	-.0165424	.0018862
_cons	.6659337	.4008667	1.66	0.103	-.1400628	1.47193

4.5.2 Johnsen test

Table 4.7: Johnsen test

Johansen tests for cointegration

Trend: constant — Number of obs = 50
Sample: 1966 - 2015 — Lags = 3

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value	1% critical value
0	21	-554.06756		83.1211	29.68	35.65
1	26	-526.92995	0.66227	28.8459	15.41	20.04
2	29	-515.98062	0.35466	6.9472	3.76	6.65
3	30	-512.50702	0.12972			

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value	1% critical value
0	21	-554.06756		54.2752	20.97	25.52
1	26	-526.92995	0.66227	21.8987	14.07	18.63
2	29	-515.98062	0.35466	6.9472	3.76	6.65
3	30	-512.50702	0.12972			

In the Johansen procedure, the likelihood ratio (LR) test is used to test the significance of estimates of Eigen values. Table 4.7 shows that 2 co-integrating equation at lag 3 and 5% significance level. The trace statistic is greater than the critical values at 5% significance level. This meant that the variables had a long-run relationship, which could not necessarily hold in the short-run (Enders, 1995). The cointegration tests results revealed that the variables in their level form had a long-run relationship and hence the model estimation could be conducted in VAR at levels (Enders, 1995).

4.5.3 VECM

After the Johansen cointegration test is performed, next is to fit the appropriate time series model. From Johansen and ARDL cointegration has been established between the variables. This implies that there exists a long run relationship between variables. Hence, the VECM was applied in order to determine the short run relationships of cointegrated variables. The findings show that there is short run relationship in that the dependents variable (RGDP) displays a pvalue of below 0.05. The short run equation from table 4.8 is:

RGDP=-1.52259+0.03997DE-0.011297RE

The study rejects the null hypothesis of no causality indicating that a temporal change in categories of government expenditure leads to permanent change in economic growth rate.

Table 4.8: VECM

Vector error-correction model

Sample: 1965 - 2015	No. of obs	=	51
	AIC	=	22.39163
Log likelihood = -553.9864	HQIC	=	22.63769
Det(Sigma_ml) = 546520.5	SBIC	=	23.03557

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_RGDP	5	1.49657	0.7254	121.5095	0.0000
D_DE	5	15.2132	0.1204	6.298613	0.2782
D_RE	5	154.25	0.2178	12.80827	0.0252

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_RGDP						
_ce1 L1.	-1.055606	.1716386	-6.15	0.000	-1.392012	-.719201
RGDP LD.	.0583056	.1015796	0.57	0.566	-.1407868	.257398
DE LD.	.1432196	.0469216	3.05	0.002	.051255	.2351842
RE LD.	-.0173369	.0037564	-4.62	0.000	-.0246993	-.0099746
_cons	-.0404177	.2096413	-0.19	0.847	-.451307	.3704717
D_DE						
_ce1 L1.	2.076118	1.744764	1.19	0.234	-1.343557	5.495793
RGDP LD.	-.8067156	1.032591	-0.78	0.435	-2.830557	1.217126
DE LD.	.0184367	.4769737	0.04	0.969	-.9164145	.953288
RE LD.	-.0153104	.0381847	-0.40	0.688	-.0901512	.0595303
_cons	.0922314	2.131074	0.04	0.965	-4.084597	4.26906

D_RE						
_ce1						
L1.	33.57931	17.69054	1.90	0.058	-1.093515	68.25214
RGDP						
LD.	-11.91503	10.46967	-1.14	0.255	-32.4352	8.605138
DE						
LD.	6.168161	4.83614	1.28	0.202	-3.310498	15.64682
RE						
LD.	-.6897072	.3871635	-1.78	0.075	-1.448534	.0691192
_cons	-.006973	21.60742	-0.00	1.000	-42.35675	42.3428

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	2	29.79876	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
RGDP	1	.	.	.	.	.
DE	.0399655	.0363061	1.10	0.271	-.0311931	.1111241
RE	-.0112968	.0036567	-3.09	0.002	-.0184637	-.0041299
_cons	-1.522588	.	.	.	.	.

4.5.4 Impulse Response Function

After fitting a VECM, the irf commands will be used to obtain impulse–response functions (IRFs). Table 4.9 below shows the impulse response functions using 10 as the forecast horizon.

Table 4.9: Impulse response functions

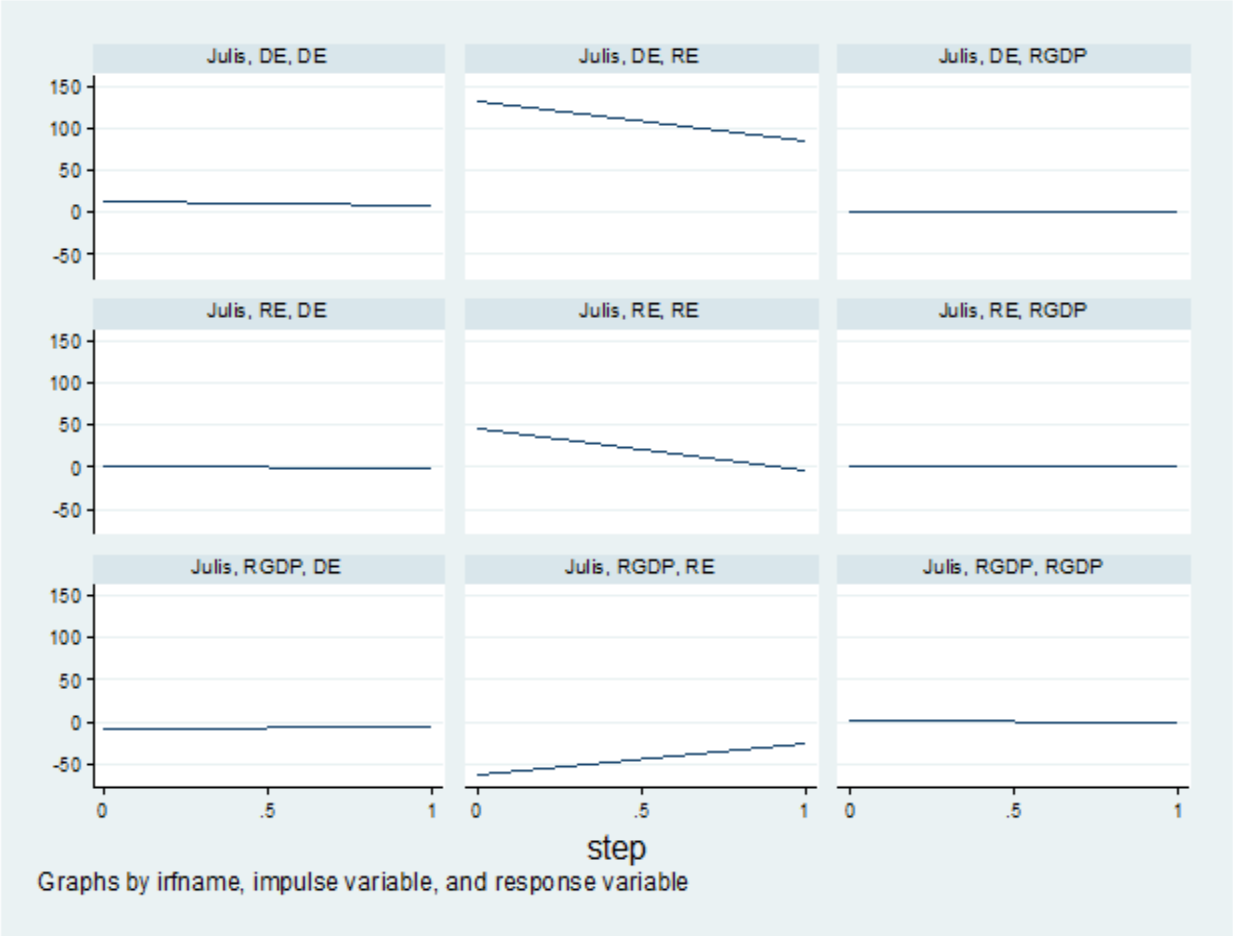
```
. irf table irf, irf(Julis)

                                Results from Julis
```

step	(1) irf	(2) irf	(3) irf	(4) irf	(5) irf	(6) irf	(7) irf	(8) irf	(9) irf
0	1	0	0	0	1	0	0	0	1
1	.002699	1.2694	21.6643	.101032	1.10141	7.51017	-.005412	-.038764	-.069046

```
(1) irfname = Julis, impulse = RGDP, and response = RGDP
(2) irfname = Julis, impulse = RGDP, and response = DE
(3) irfname = Julis, impulse = RGDP, and response = RE
(4) irfname = Julis, impulse = DE, and response = RGDP
(5) irfname = Julis, impulse = DE, and response = DE
(6) irfname = Julis, impulse = DE, and response = RE
(7) irfname = Julis, impulse = RE, and response = RGDP
(8) irfname = Julis, impulse = RE, and response = DE
(9) irfname = Julis, impulse = RE, and response = RE
```

Figure 4.5 below indicates findings on Orthogonalized Impulse Response Functions. The figure shows that effect of DE on itself is insignificant and there is presence of negative transitory shocks at between 3 and 4 and 8 and 9 with the other periods having permanent shocks. Effect of DE on RE shows that there are significant and permanent negative transitory shocks within the period of 0-10. Effect of DE on RGDP shows insignificant permanent shocks within the period from 0-10. The effect of RE on itself shows a transitory shock between 5 and 6. The effect of RE on DE displays significant negative transitory shocks within the period. Effect of RE on RGDP is insignificant and permanent shocks within the period 0-10. The effect of RGDP on itself displays a transitory shock at 5. RGDP effect on DE indicates significant positive transitory shocks within the period. The effect on RE shows a transitory negative shock between 5 and 6.

Figure 4.5: Orthogonalized Impulse Response Functions



4.6 Diagnostic tests

4.6.2 Normality of Residuals

The normality of residual is tested using the Jarque bera test. The calculated Jarque-Bera statistics and corresponding p-values were used to test the null hypotheses that the residuals are multivariate normal. The p-values (joint) are smaller than the .01 level of significance suggesting the null hypothesis of normal distribution can be rejected. However, this may not have serious implication because Jarque-Bera test statistics for individual series had p-values greater than 0.01 suggesting that the null hypothesis of normal distribution cannot be rejected. The study assumes that the data is normal. The findings are shown by table 4.10.

Table 4.10: Jarque bera test

```
Jarque-Bera normality test:    186 Chi(2)  4.1e-41
Jarque-Bera test for Ho: normality:
```

4.6.3 Autocorrelation Test

The Breusch-Godfrey LM test for autocorrelation was used. The findings in table 4.11 show that the pvalue is more than 0.05. Hence, the null hypothesis of no autocorrelation at lag order was accepted.

Table 4.11: Breusch-Godfrey LM test

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.125	1	0.7236
3	1.192	3	0.7550

H0: no serial correlation

4.6.4 Predicted values of co-integrating equation

The study sought to establish the predicted values of co-integrating equation. The findings are presented in table 4.12 and figure 4.6.

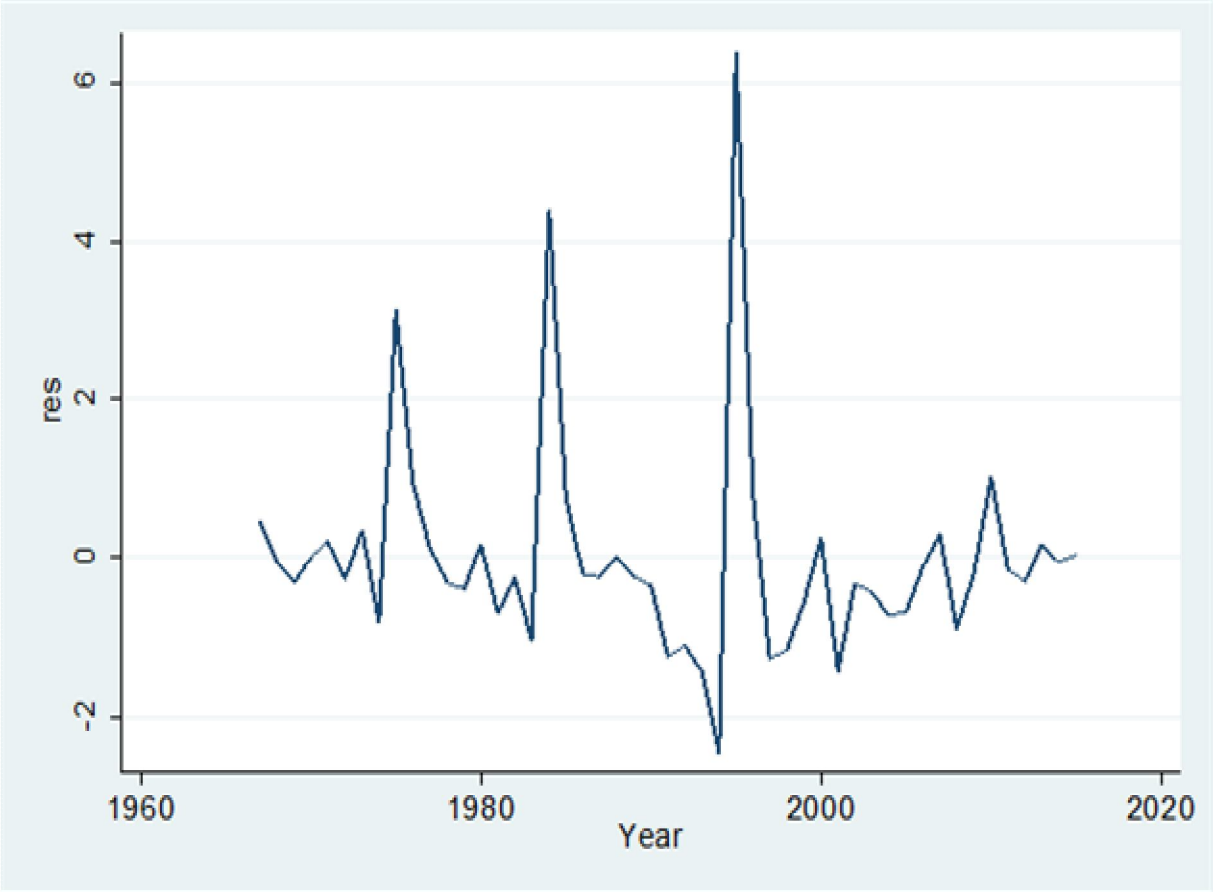
Table 4.12: Predicted values of co-integrating equation

	RGDP	yhat	res
1.	1.942029	.	.
2.	.51492537	.	.
3.	4.7729469	.	.
4.	.42510121	.	.
5.	1.9428571	1.477037	.4658197
6.	.98651961	1.047983	-.0614631
7.	.97701863	1.290725	-.3137061
8.	1.3090909	1.297139	.0119522
9.	1.4160839	1.20208	.2140035
10.	.89163237	1.158324	-.266692
11.	1.6615385	1.307537	.3540016
12.	.27407407	1.085536	-.811462
13.	4.7128378	1.572138	3.1407
14.	1.3193548	.3746047	.9447501
15.	1.3624015	1.217665	.1447363
16.	.849332	1.165484	-.3161517
17.	.92675025	1.3164	-.38965
18.	1.502052	1.325832	.1762201
19.	.47308237	1.171845	-.6987625
20.	1.2802139	1.533432	-.2532179
21.	.39699248	1.423422	-1.02643
22.	6.2415825	1.853407	4.388175
23.	1.0229827	.2635419	.7594408
24.	1.2386927	1.438934	-.2002415
25.	1.0627395	1.303312	-.2405727

26.	1.3582695	1.330359	.0279106
27.	1.0024208	1.245166	−.2427453
28.	1.006681	1.347681	−.3410002
29.	.13528982	1.372501	−1.237211
30.	1.1146715	2.220103	−1.105432
31.	1.8182736	3.235949	−1.417675
32.	1.0219829	3.474928	−2.452945
33.	9.9619772	3.581783	6.380194
34.	1.1065431	.3074158	.7991272
35.	.43160146	1.695073	−1.263471
36.	.51296279	1.667763	−1.1548
37.	1.2173497	1.766379	−.5490295
38.	1.9599411	1.699539	.2604021
39.	.05727612	1.477839	−1.420563
40.	4.9511401	5.272379	−.3212393
41.	7.4026316	7.826589	−.423957
42.	1.7178279	2.432375	−.714547
43.	1.2962905	1.978502	−.6822112
44.	1.2772989	1.387765	−.1104664
45.	1.581771	1.273669	.3081015
46.	.25958556	1.148291	−.8887054
47.	1.4262579	1.633322	−.2070646
48.	2.4919496	1.478731	1.013218
49.	.90083964	1.045992	−.1451519
50.	1.1115803	1.403668	−.2920874
51.	1.5129728	1.336581	.1763921
52.	1.1482352	1.20442	−.056185
53.	1.3267124	1.287021	.0396916

Figure 6 shows a plot on the predicted values of co-integrating equation. The graph shows that the model is good and has the characteristics of a stationary series. After the tests, the model is fitted into the data.

Figure 4.6: Predicted values of co-integrating equation



4.7 Model fitting

The regression models are shown by table 4.13. The table shows results on the general relationship between variables.

Table 4.13: Regression models

```
. regress RGDP L.RGDP L.DE L.RE , vce(robust)

Linear regression                               Number of obs =      52
                                                F(  3,    48) =    8.74
                                                Prob > F      =  0.0001
                                                R-squared     =  0.3123
                                                Root MSE      =  1.6011
```

RGDP	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
RGDP						
L1.	.0600563	.1111596	0.54	0.592	-.163445	.2835576
DE						
L1.	.1451137	.0906748	1.60	0.116	-.0372002	.3274276
RE						
L1.	-.0073281	.0072693	-1.01	0.318	-.0219441	.0072879
_cons	.6659337	.4023492	1.66	0.104	-.1430437	1.474911

```
. regress RGDP L.RGDP L(1/4).RE , vce(robust)

Linear regression                               Number of obs =      49
                                                F(  5,    43) =   15.90
                                                Prob > F      =  0.0000
                                                R-squared     =  0.4305
                                                Root MSE      =  1.4848
```

RGDP	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
RGDP						
L1.	-.2932273	.1700042	-1.72	0.092	-.6360734	.0496188
RE						
L1.	.0037033	.0006488	5.71	0.000	.0023949	.0050117
L2.	.0076911	.0015053	5.11	0.000	.0046555	.0107267
L3.	.001807	.002033	0.89	0.379	-.0022929	.0059069
L4.	.0004665	.0011061	0.42	0.675	-.0017643	.0026972
_cons	1.44401	.2952334	4.89	0.000	.8486154	2.039405

```
. regress RGDP L.RGDP L(1/4).DE, vce(robust)

Linear regression                               Number of obs =      49
                                                F(  5,    43) =    3.87
                                                Prob > F      =  0.0056
                                                R-squared     =  0.4551
                                                Root MSE      =  1.4524
```

RGDP	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
RGDP						
L1.	-.3112006	.2084175	-1.49	0.143	-.7315146	.1091133
DE						
L1.	.0488854	.0153012	3.19	0.003	.0180276	.0797432
L2.	.0644931	.0334622	1.93	0.061	-.0029899	.1319761
L3.	.0261974	.0281888	0.93	0.358	-.0306507	.0830455
L4.	.0116733	.0151671	0.77	0.446	-.0189141	.0422607
_cons	.8048657	.223609	3.60	0.001	.3539152	1.255816

The ECM was represented by equations as fitted below:

Equation 1 was presented as follows;

$$EG_t = \beta_0 + \beta_1 RE_t + \beta_2 RE_{t-1} + ... + \beta_q RE_{t-q} + \mu_t \quad (1)$$

The equation is fitted for the coefficients and ECT as:

$EGt = 1.44401 + 0.0037RE_t + 0.0077RE_{t-1} + 0.0018RE_{t-2} + 0.0004RE_{t-3}$

Holding the recurrent expenditure constant within the three years, the economic growth would be at 1.44401. A unit change in recurrent expenditure would lead to increase in economic growth by 0.0037 within the period, 0.0077 in the first year, 0.0018 in the second year and 0.0004 in the third year.

The second equation was presented as:

$$EG_t = \beta_0 + \beta_1 DE_t + \beta_2 DE_{t-1} + ... + \beta_q DE_{t-q} + \mu_t \quad (2)$$

$EG_t = 0.8049 + 0.0489DE_t + 0.0645DE_{t-1} + 0.0262DE_{t-2} + 0.0117DE_{t-3}$

Holding development expenditure constant within the first three years, the economic growth would be at 0.8049. A unit change in development expenditure would lead to increase in economic growth by an average of 0.0037, 0.0645 in the first year, 0.0262 in the second year and 0.0117 in the third year.

Overall output model is:

$EG_t = \beta_0 + DE_t + RE_t$ (3)

$EG_t = 0.6659 + 0.1451DE_t - 0.0073RE_t$

From the overall model, the equation shows that holding development and recurrent expenditure constant within the period, the economic growth would stand at 0.6659. If development expenditure changes by a unit within the period, economic growth increase by 0.1451 while a unit change in average recurrent expenditure would decrease economic growth by 0.0073.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions and recommendations based on the objectives of the study.

5.2 Summary

The rapid growth in government expenditure in Kenya has caused concern among policy makers on the implication of such growth, especially to the whole economy in general, and the private sector in particular. Studies have noted that the allocation of financial resources through various policies is neither reflected in the government priorities nor adequately promoted growth

in the past. Over the three decades, government expenditure in the country grew at a faster rate than the growth rate of GDP.

Given this fiscal scenario, an explanation of this requires studying the impact of government expenditure on economic growth. The specific objectives of the study were to: to investigate the effect of recurrent expenditure on economic growth in Kenya, to investigate the effect of development expenditure on economic growth in Kenya and to investigate the causal link between economic growth and public expenditure in Kenya.

Stationary tests for the variables showed that there was stationarity. The long run regression results showed that the effect of public expenditure components on economic growth was very minimal. The results further indicated that all the independent variables recurrent expenditure and development expenditures were positively related to economic growth but non-significant. Some of the study results differed from the expected results based on previous theoretical models. It was expected that recurrent expenditure will have no significant impact on economic growth while capital expenditure was expected to have a significant impact on economic growth.

5.2.1 Recurrent Expenditure

The first objective of the study was to investigate the effect of recurrent expenditure on economic growth in Kenya. The ARDL results shows that there exists a long-run relationship between GDP growth rate and recurrent expenditure components. However, the effect disappears after the period of 2 years with accumulative effect of 10%. while an insignificant negative effect is displayed by recurrent expenditure. The findings support Wagner (1959) hypothesis that indicated that increased government activity and the corresponding increase in government expenditure is an inevitable result of economic growth due to: increased friction in society causing greater demand for government services; society growing richer therefore requiring the

government to provide quality goods and services; and the demand for such goods and services being highly income elastic. The findings relate to the Wagner's theory that states that there exists a relationship between government spending and national income.

5.2.2 Development expenditure

The second objective was to examine the effects of development expenditure on economic growth. The results showed that development expenditure had negative impact on the economic growth. The impulse response function shows that there is a significant positive effect of development expenditure on real GDP. The VECM model show that there exists a relationship between development expenditure and economic growth (GDP). The effect disappears after the first year with a cumulative effect of 4.9%. The findings concur with those of M'Amanja and Morrissey (2005) who indicated that development expenditure had a strong adverse effect on economic growth. The findings support the Keynesian Theory which indicates that public expenditure is the main determinant of economic growth. It also supports the endogenous growth theory which postulates that investment in development projects by the government influence economic growth positively.

5.2.3 Causal Relationship

The third objective was to analyse the effect of causal relationship between government expenditure and economic growth. From Johansen test output, there is co-integration in the relationships between government expenditure variables and real GDP. From ARDL results the study establishes that there is a long run relationship between recurrent and development expenditure and economic growth reflected in real GDP. The VECM model yielded and impulse response functions revealed a short run effect of government expenditure on real GDP which is important in explaining changes in economic growth. The findings support those of Muthui et al

(2013) who noted that public expenditure on education had a positive relationship with economic growth This relates to the Wagners theory which assumes that there is a close relationship between the growth of public expenditure and output. Finally, the study found that a shock in government expenditure is unlikely to lead to a shock in economic growth instantaneously, but rather the effect was gradual and even out after a short period.

5.3 Conclusions

On the basis of the empirical results, the study concludes that there is a long run relationship between recurrent and development expenditure and economic growth. In the short run development expenditure has positive impact on economic growth, whereas, recurrent expenditure has negative impact on economic growth. There is a short run effect of government expenditure on GDP which is important in explaining changes in economic growth

The study concludes that a bi-directional causality exists between components of government expenditure and economic growth. This indicated that there was feedback effect between components of government expenditure and economic growth. The effect of public expenditure on economic growth is gradual not instantaneous.

5.4 Recommendations

In order to ensure optimal expenditure and increased growth, the following recommendations based on each element of expenditure and its effect on economic growth are given. The recommendations are based on the findings of the study.

The findings indicate that there is a negative correlation between recurrent expenditure and economic growth. However, the effect is weak showing that recurrent expenditure is not a major factor affecting economic growth. The study recommends that the government through policy

makers like CBK. The government should design policies aimed at attracting and improving the efficiency and viability of the public investments. This will spur economic and help achieve the goals of Vision 2030. Policies should be initiated to channel resources to productive sectors of the economy that positively influence economic growth.

The government should allocate more funds for development. This is because the study found that development expenditure contributes positively to the economic growth. The government should allocate more resources to areas of physical infrastructural development in order to stimulate economic growth as envisaged in the vision 2030. Furthermore, high government expenditure on transportation and communication and energy create an enabling environment for business to thrive through reduced cost of production.

In order to reduce the rate of growth of recurrent expenditure, the government should streamline its civil service to the minimum by freezing recruitments and increasing wage in line with the economic growth. This is because the study found that expenditure downsizing and outsourcing has a positive effect on economic growth. The government should also adopt the advanced technologies in its service delivery in order to cut down the size of civil service. This is because reduced civil service helps in the diversion of resources from unproductive expenditure on wages and salaries, to a more productive expenditure in form of infrastructure and education. This is would affect economic growth by 1 percent annually.

5.5 Recommendations for future research

The study recommends a study on other factors affecting economic growth apart from the expenditure. Another research recommended is a study on the moderating effect of inflation on the relationship between public expenditure and economic growth.

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APPENDICES

Appendix I: Tables of Output

Table 1

Variable	Obs	Mean	Std. Dev.	Min	Max
RGDP	53	1.709682	1.855256	.0572761	9.961977
DE	53	9.051226	12.97938	.3333333	80
RE	53	51.14953	131.2781	6	920

Table 2

	RGDP	DE	RE
RGDP	1.0000		
DE	−0.3044*	1.0000	
	0.0267		
RE	−0.3557*	0.4882*	1.0000
	0.0090	0.0002	

Table 3

```
. dfuller RGDP, lags(3)

Augmented Dickey-Fuller test for unit root         Number of obs   =        49

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -4.285           -3.587            -2.933           -2.601
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0005


Augmented Dickey-Fuller test for unit root         Number of obs   =        49

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -4.103           -3.587            -2.933           -2.601
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0010

Augmented Dickey-Fuller test for unit root         Number of obs   =        49

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -3.320           -3.587            -2.933           -2.601
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0140
```

Table 4

RGDP

```
. pperron RGDP, trend

Phillips-Perron test for unit root                  Number of obs   =        52
                                                    Newey-West lags =         3

                                    ---------- Interpolated Dickey-Fuller ----------
                   Test             1% Critical       5% Critical      10% Critical
                 Statistic             Value             Value            Value
------------------------------------------------------------------------------
 Z(rho)          -51.235             -25.768           -19.836          -16.828
 Z(t)             -7.448              -4.146            -3.498           -3.179
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

DE

```
. pperron DE, trend

Phillips-Perron test for unit root                  Number of obs   =        52
                                                    Newey-West lags =         3

                                    ---------- Interpolated Dickey-Fuller ----------
                   Test             1% Critical       5% Critical      10% Critical
                 Statistic             Value             Value            Value
------------------------------------------------------------------------------
 Z(rho)          -35.652             -25.768           -19.836          -16.828
 Z(t)             -5.149              -4.146            -3.498           -3.179
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0001
```

RE

```
. pperron RE, trend

Phillips-Perron test for unit root                  Number of obs   =        52
                                                    Newey-West lags =         3

                                    ---------- Interpolated Dickey-Fuller ----------
                   Test             1% Critical       5% Critical      10% Critical
                 Statistic             Value             Value            Value
------------------------------------------------------------------------------
 Z(rho)          -41.091             -25.768           -19.836          -16.828
 Z(t)             -5.698              -4.146            -3.498           -3.179
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Table 4

Selection-order criteria
Sample: 1971 - 2015 Number of obs = 45

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-515.887				2.1e+06	23.0616	23.1065	23.1821
1	-494.367	43.04	9	0.000	1.2e+06	22.5052	22.6848	22.987*
2	-482.048	24.638	9	0.003	1.0e+06	22.3577	22.672	23.2008
3	-465.963	32.17	9	0.000	768181*	22.0428*	22.4918*	23.2472
4	-458.295	15.336	9	0.082	838322	22.102	22.6857	23.6678
5	-453.123	10.343	9	0.323	1.0e+06	22.2721	22.9906	24.1993
6	-440.717	24.813	9	0.003	961405	22.1208	22.9739	24.4092
7	-432.174	17.085*	9	0.047	1.1e+06	22.1411	23.1289	24.7909
8	-425.188	13.974	9	0.123	1.4e+06	22.2306	23.3531	25.2417

Endogenous: RGDP DE RE
Exogenous: _cons

table 5

Source	SS	df	MS		
Model	5.64437232	1	5.64437232	Number of obs	= 53
Residual	173.338331	51	3.3987908	F(1, 51)	= 1.66
				Prob > F	= 0.2033
				R-squared	= 0.0315
				Adj R-squared	= 0.0125
Total	178.982703	52	3.44197506	Root MSE	= 1.8436

RGDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
DE	-.0253835	.0196973	-1.29	0.203	-.0649275	.0141604
_cons	1.939435	.3096991	6.26	0.000	1.317688	2.561181

. regress RGDP RE

Source	SS	df	MS		
Model	2.87137749	1	2.87137749	Number of obs	= 53
Residual	176.111326	51	3.45316325	F(1, 51)	= 0.83
				Prob > F	= 0.3661
				R-squared	= 0.0160
				Adj R-squared	= -0.0033
Total	178.982703	52	3.44197506	Root MSE	= 1.8583

RGDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
RE	-.00179	.001963	-0.91	0.366	-.0057308	.0021508
_cons	1.80124	.2742904	6.57	0.000	1.250579	2.351901

```
. regress RGDP L.RGDP L.DE L.RE , vce(robust)

Linear regression                               Number of obs =      52
                                                F(  3,    48) =    8.74
                                                Prob > F      =  0.0001
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```

RGDP	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
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_cons	.6659337	.4023492	1.66	0.104	-.1430437	1.474911

```
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Linear regression                               Number of obs =      49
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```

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L2.	.0644931	.0334622	1.93	0.061	-.0029899	.1319761
L3.	.0261974	.0281888	0.93	0.358	-.0306507	.0830455
L4.	.0116733	.0151671	0.77	0.446	-.0189141	.0422607
_cons	.8048657	.223609	3.60	0.001	.3539152	1.255816

```
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```

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L2.	.0076911	.0015053	5.11	0.000	.0046555	.0107267
L3.	.001807	.002033	0.89	0.379	-.0022929	.0059069
L4.	.0004665	.0011061	0.42	0.675	-.0017643	.0026972
_cons	1.44401	.2952334	4.89	0.000	.8486154	2.039405

table

	RGDP	yhat	res
1.	1.942029	.	.
2.	.51492537	.	.
3.	4.7729469	.	.
4.	.42510121	.	.
5.	1.9428571	1.477037	.4658197
6.	.98651961	1.047983	-.0614631
7.	.97701863	1.290725	-.3137061
8.	1.3090909	1.297139	.0119522
9.	1.4160839	1.20208	.2140035
10.	.89163237	1.158324	-.266692

11.	1.6615385	1.307537	.3540016
12.	.27407407	1.085536	−.811462
13.	4.7128378	1.572138	3.1407
14.	1.3193548	.3746047	.9447501
15.	1.3624015	1.217665	.1447363
16.	.849332	1.165484	−.3161517
17.	.92675025	1.3164	−.38965
18.	1.502052	1.325832	.1762201
19.	.47308237	1.171845	−.6987625
20.	1.2802139	1.533432	−.2532179
21.	.39699248	1.423422	−1.02643
22.	6.2415825	1.853407	4.388175
23.	1.0229827	.2635419	.7594408
24.	1.2386927	1.438934	−.2002415
25.	1.0627395	1.303312	−.2405727

26.	1.3582695	1.330359	.0279106
27.	1.0024208	1.245166	−.2427453
28.	1.006681	1.347681	−.3410002
29.	.13528982	1.372501	−1.237211
30.	1.1146715	2.220103	−1.105432
31.	1.8182736	3.235949	−1.417675
32.	1.0219829	3.474928	−2.452945
33.	9.9619772	3.581783	6.380194
34.	1.1065431	.3074158	.7991272
35.	.43160146	1.695073	−1.263471
36.	.51296279	1.667763	−1.1548
37.	1.2173497	1.766379	−.5490295
38.	1.9599411	1.699539	.2604021
39.	.05727612	1.477839	−1.420563
40.	4.9511401	5.272379	−.3212393

41.	7.4026316	7.826589	−.423957
42.	1.7178279	2.432375	−.714547
43.	1.2962905	1.978502	−.6822112
44.	1.2772989	1.387765	−.1104664
45.	1.581771	1.273669	.3081015
46.	.25958556	1.148291	−.8887054
47.	1.4262579	1.633322	−.2070646
48.	2.4919496	1.478731	1.013218
49.	.90083964	1.045992	−.1451519
50.	1.1115803	1.403668	−.2920874
51.	1.5129728	1.336581	.1763921
52.	1.1482352	1.20442	−.056185
53.	1.3267124	1.287021	.0396916

table 6

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_RGDP						
_ce1						
L1.	-1.450709	.2127187	-6.82	0.000	-1.86763	-1.033788
RGDP						
LD.	.4689273	.1436145	3.27	0.001	.187448	.7504065
L2D.	.0591548	.0798734	0.74	0.459	-.0973943	.2157038
DE						
LD.	.0250853	.0433374	0.58	0.563	-.0598544	.110025
L2D.	-.1920685	.0464109	-4.14	0.000	-.2830322	-.1011047
RE						
LD.	-.0084065	.0033651	-2.50	0.012	-.0150019	-.001811
L2D.	.014251	.004018	3.55	0.000	.0063757	.0221262
_cons	-.1007571	.1676662	-0.60	0.548	-.4293768	.2278626

Table 7

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	2	53.90227	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
RGDP	1	.	.	.	.	.
DE	-.0364669	.0246106	-1.48	0.138	-.0847028	.011769
RE	-.0043915	.0024821	-1.77	0.077	-.0092563	.0004732
_cons	-1.184128	.	.	.	.	.

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_RGDP						
_ce1						
L1.	-1.450709	.2127187	-6.82	0.000	-1.86763	-1.033788
RGDP						
LD.	.4689273	.1436145	3.27	0.001	.187448	.7504065
L2D.	.0591548	.0798734	0.74	0.459	-.0973943	.2157038
DE						
LD.	.0250853	.0433374	0.58	0.563	-.0598544	.110025
L2D.	-.1920685	.0464109	-4.14	0.000	-.2830322	-.1011047
RE						
LD.	-.0084065	.0033651	-2.50	0.012	-.0150019	-.001811
L2D.	.014251	.004018	3.55	0.000	.0063757	.0221262
_cons	-.1007571	.1676662	-0.60	0.548	-.4293768	.2278626
D_DE						
_ce1						
L1.	2.805734	2.761942	1.02	0.310	-2.607573	8.21904
RGDP						
LD.	-1.946732	1.864692	-1.04	0.296	-5.601461	1.707997
L2D.	-.9692763	1.037077	-0.93	0.350	-3.001911	1.063358
DE						
LD.	.3267313	.5626929	0.58	0.561	-.7761266	1.429589
L2D.	.441458	.6025998	0.73	0.464	-.739616	1.622532
RE						
LD.	-.0470462	.0436922	-1.08	0.282	-.1326814	.038589
L2D.	-.0491464	.0521703	-0.94	0.346	-.1513983	.0531055
_cons	.1504661	2.176979	0.07	0.945	-4.116335	4.417267

D_RE						
	_ce1					
	L1.	34.20556	27.85986	1.23	0.220	-20.39877	88.8099
	RGDP					
	LD.	-22.82571	18.80925	-1.21	0.225	-59.69117	14.03975
	L2D.	-10.33053	10.46106	-0.99	0.323	-30.83383	10.17277
	DE					
	LD.	9.288195	5.675916	1.64	0.102	-1.836396	20.41279
	L2D.	5.842518	6.078459	0.96	0.336	-6.071043	17.75608
	RE					
	LD.	-1.089767	.440726	-2.47	0.013	-1.953574	-.2259597
	L2D.	-.6628583	.5262447	-1.26	0.208	-1.694279	.3685624
	_cons	-.0166153	21.95932	-0.00	0.999	-43.05608	43.02285