THE IMPACT OF GOVERNMENT EXPENDITURE ON ECONOMIC GROWTH IN KENYA: 1963-2008

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DECLARATION

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

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I would like to dedicate this research to my dear wife Ann Wanja and children; Joy Wangui and Samuel Maingi.

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OPERATIONAL DEFINITIONS OF TERMS

Causality: Is the ability of past values of one variable to predict another variable.

Cointegration: Existence of a long-run economic relationship between variables.

Crowding out: Is a fall in either private consumption or investment as a result of a rise in interest rates attributed to increase in government expenditure.

Development expenditure: Refers to expenditure, which creates wealth in the future or indirectly by increasing the efficiency of private enterprise, such as education and good highways.

Economic growth: Refer to an increase in a country's output of goods and services, measured by changes in real Gross Domestic Product.

Gross domestic product: It is the total value of all goods and services produced over a given time period (usually a year) excluding net property income from abroad.

Productive government expenditure: It is the expenditure that increases the productive potential of the economy. It involves addition to the capital stock and production of tangible assets

Government expenditure: Refers to the amount spent on goods and services, public debt servicing, and on capital investment by the government.

Unproductive government expenditure: Is the expenditure in the nature of consumption. This includes expenditure on administration, defense, justice, law and order and maintenance of state.

Recurrent government expenditure: Refers to expenditure that does not create wealth in the future and is less discretionary and is made on ongoing programmes or activities. It constitutes of wages and salaries, administration, transfers payment, debt repayment and welfare services.

Vector autoregressive: Is a forecasting technique in economics that does not distinguish between endogenous and exogenous variables but is concerned with the path through time of a vector of variables.

ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dicky-Fuller
ADL	Auto Regressive Distributed Lag
ECT	Error Correction Term
ECM	Error Correction Model
ERC	Economic Recovery Strategy
GDP	Gross Domestic Product
GNP	Gross National Product
GMM	General Methods Moments
GLS	Generalized Least Squares
IMF	International Monetary Fund
MME	Modified M-Estimator
OLS	Ordinary Least Squares
OECD	Organization for Economic Cooperation and Development
PDL	Polynomial Distributed Lag
PP	Phillips Perron
SAP	Structural Adjustment Programme
VAR	Vector Auto-Regressive

ABSTRACT

The rapid growth in government expenditure in Kenya has caused concern among policy makers on the implication of such growth. 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: investigate the relationship between the components of government expenditure and economic growth; examine the effects of components of government expenditure on GDP growth rate; and analyze the effects of government expenditure reforms on economic growth. The data used were government expenditure components that included expenditure on government investment, physical infrastructure, education, health care, public debt servicing, economic affairs, general administration and services, defense, public order and national security, and government consumption. Sources of data were Kenya government documents and international financial publications. The study applied Vector Auto Regression estimation technique using annual time series data for the period 1963 to 2008 to evaluate the impact of government expenditure on economic growth. The Johansen cointegration tests revealed a long-run relationship between GDP growth rate and the selected components of government expenditure. Further, the Granger- Causality test indicated bi-directional causality between GDP growth rate and components of government expenditure. The results of impulse response functions and variance decomposition revealed that government expenditure on investment, physical infrastructure, education, health care, public debt servicing, economic affairs, general administration and services, defense, public order and national security and government consumption had effect on economic growth. Furthermore, the study established that expenditure reforms that include budget rationalization, expenditure downsizing, privatization and governance affect economic growth. The study concludes that the composition of government expenditure and public expenditure reforms matter for economic growth.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The relationship between economic growth and government expenditure is an important subject of analysis (Barro, 1990; Easterly and Robelo, 1993; Barro and Sala-i- Martin, 1992; and 1995). A central question is whether or not government expenditure increases the long run steady state growth rate of the economy. The general view is that government expenditure, notably on physical infrastructure and human capital, can be growth-enhancing although the source of financing of such expenditures can be growth-retarding (Landau, 1983; Devarajan, 1993; Cashin, 1995; Kneller, 1999). The growth retardation is experienced because of disincentive effects associated with taxation (Musgrave and Musgrave, 1989). Government expenditure may directly or indirectly increase total output through its interaction with the private sector. Lin (1994) examined some of the ways in which government expenditure can increase growth. These included the provision of public goods and infrastructure, social services and targeted intervention such as export subsidies.

The nature of the impact of government expenditure on growth depends on its form. According to Barro (1990), expenditure on investment and productive activities including state-owned production should contribute positively to growth, whereas government consumption expenditure is expected to be growth-retarding. However, in empirical studies, it is sometimes difficult to

determine which particular items of public expenditure should be categorized as investment and which as consumption.

Several analytical and empirical studies have focused on the traditional and new channels through which different types of government expenditure can affect growth (King and Robelo, 1990; Barro, 1990; Barro and Sala-i-Martin, 1992; and 1995; Bleaney *et al.*, 2001). A direct effect relates to an increase in the economy's capital stock (physical or human) reflecting higher flows of government funds, especially when they are complementary to those privately financed. Government expenditure on education and health, for example, contribute to an increase in the stock of human capital. Similarly, to the extent that they trigger an accumulation of physical capital, most government expenditure on infrastructure falls in the category of having a direct impact on growth (Barro and Sala-I-Martin, 1992).

In addition, government expenditure can also contribute indirectly to economic growth by increasing the marginal productivity of both government and private supplied factors of production. Government expenditure on research and development, for example, provides higher productivity in the interaction between physical and human capital factors. Similarly, other components of government expenditure related to enforcement of property rights and maintenance of public order can exert a positive indirect effect on growth by contributing to better use of existing capital and labour assets (Trotman, 1997). In countries where crime and violence are endemic,

increased government expenditure on security can lead to lower production costs by reducing the need to protect employees and physical assets, hence increasing worker productivity and stimulating private physical investments.

There is growing evidence that suggest that in developing countries, externalities associated with infrastructure expenditure may be important in enhancing growth (Landau, 1985). Indeed, it has been found that infrastructure may have an impact on human capital as well. According to Age'nor and Moreno (2007), government expenditure on infrastructure affects growth not only through its direct impact on investment and the productivity of factors in the private sector, but also through health and education outcomes. Government expenditure that facilitates access to clean water and sanitation helps to improve health and thereby labour productivity. These expenditures can be in the form of provision of electricity, which is essential for the functioning of hospitals and the delivery of health services, and better transportation networks, which contribute to easier access to health care, particularly in rural areas. In addition, there is evidence of direct linkages between infrastructure and education. Education allows for more training and greater access to learning technologies. Enrollment rates and the quality of education tend to improve with better transportation networks, particularly in rural areas. Greater access to sanitation and clean water in schools tend to raise attendance rates (Stiglitz, 1989).

There are two traditional approaches used to analyze the effects of government expenditure on growth. One is the Monetarist approach and the other is the Keynesian approach. Proponents of the Monetarist approach led by Milton Friedman argued that sustained money growth in excess of the growth of output produces inflation (Branson, 1989). The proponents re-evaluated the quantity theory of money and argued that to reduce inflation, the growth in the money supply needs to be controlled and thus the need to control or reduce government expenditure (Brunner and Meltzer, 1992). Proponents of this school of thought further argued that in examining the effects of disaggregated government expenditure on investment using fixed and random effect methods, tax financed government expenditure crowds out private investment (Ahmed, 1999). This is because when government expenditure is tax-financed, any extra expenditure calls for more taxation. A higher tax burden reduces the disposable income for individuals, which results to a reduction in consumption, lower savings and hence lower investment. On the other hand, higher tax burden on corporations and businesses result to decreased profits and thus reduces expansion and development aspects. If the government decides to borrow from money or capital market to finance its expenditure, it has a future obligation to repay the loan and its interest, which places a burden on the future generation, hence reducing their resource envelop. These factors result to crowding out of private investment in the course of funding government expenditure (Ahmed, 1999).

It is also important to note that in a market economy, the basic rule for growth-promoting public sector is that its activities should complement rather than compete with those of the private sector (Stiglitz, 1989).Thus, an important role for the government is to provide certain investments in human capital (particularly in primary education, and public health care) and in physical infrastructure. Certain level of expenditure on the legal system, public order and civil administration is necessary to ensure a stable environment in which increased economic growth is promoted (Mackenzie *et al.*, 1997).

The other approach is the Keynesian. The proponents of this approach argued that markets would not automatically lead to full-employment equilibrium, but in fact the economy could settle in equilibrium at any level of non-full employment income. When this happens, the economy would need prodding to spur growth. This means active intervention by government to manage the level of demand, thus encouraging government expenditure. An increase in government expenditure would mean an imbalance between demand and supply of goods and services. Aggregate demand will be greater than aggregate supply. As a result of the extra aggregate demand, firms would employ more people. This would mean more income in the economy, some of which would be spent and some saved or paid in taxes. The extra expenditure on goods and services would prompt the firms in the economy to produce more, which leads to even more employment and therefore even more income and ultimate growth in the economy (Keynes, 1936).

Thus, the traditional Keynesian macroeconomics of growth maintains that many kinds of government expenditure, especially on recurrent nature, contribute to economic growth. A high level of public consumption is likely to increase employment, profitability and investment via the multiplier effect on the aggregate demand. Government expenditure raises aggregate demand, leading to an increased output, depending on the size and effectiveness of expenditure multiplier (Branson, 1989). The theory develops a rationale for government provision of goods and services based on the failure of markets to provide public goods, internalize externalities and cover costs when there are significant economies of scale (Stiglitz, 1989). This theory, therefore, is pro-government expenditure, which conflicts with the arguments of the proponents of the monetarist school of thought.

The new approach through which government expenditure affects economic growth is endogenous. This approach highlights the fact that if productivity is to increase, the labour force must continuously be provided with more resources. Resources in this case include physical capital, human capital and knowledge capital (technology). Therefore, growth is driven by accumulation of the factors of production while accumulation in turn is the result of investment in the private sector. This implies that the only way a government can affect economic growth, at least in the long-run, is via its impact on investment in capital, education and research and development. The approach makes improved education (and indeed any kind of training or research that

adds to human knowledge in any country) the key to achieving economic growth (Folster and Henrokson, 1997).

1.2 Trends and Composition of Government Expenditure

In order to explain the growth in the overall government expenditure, it is helpful to consider its breakdown by expenditure categories. The expenditure can be broadly classified in terms of purpose as recurrent and development expenditure. Recurrent expenditure refers to expenditure of recurrent expenses that are less discretionary and are made on ongoing programmes or activities. It constitutes of wages and salaries, administration, transfers payment, debt repayment and welfare services. Recurrent expenditure may affect economic growth through its effects on people's ability and willingness to work, save and invest. Development expenditure refers to expenditure that is generally more discretionary and is made on new programmes and activities that are yet to reach their final desired state of completion. It constitutes of investment in such schemes as construction of railways, roadways and communication systems, irrigation and power projects, which raise economic growth both directly and indirectly through encouragement of further private investment (Ag'enor, 2007).

Figure 1.1 shows the proportion of recurrent and development expenditure of the total government expenditure during the last four decades.

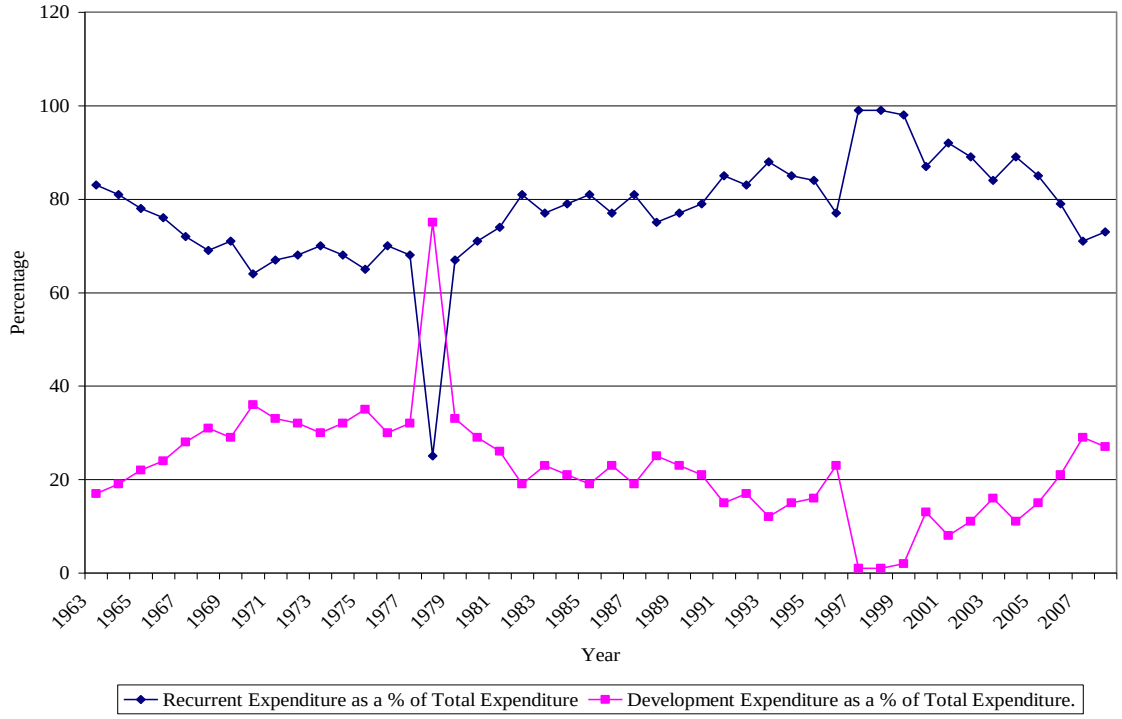

Figure 1.1: Trend of recurrent and development expenditure as a percentage of total expenditure (1963-2008)
Source of data: Republic of Kenya *Economic Survey* and *Statistical Abstract* for various years

Figure 1.1 reveals that development expenditure has been lower than the recurrent expenditure in most of the years since independence. During the initial years of independence, the movements of recurrent and development expenditure were converging and these were the years Kenya recorded an impressive economic growth. During the initial period of independence, there was an upward trend in development expenditure, reaching 36 percent of total government expenditure in 1970 compared to 17 percent in 1963 (see appendix I table A1). This increase was attributed to increase in the construction costs (Republic of Kenya, 2003). During this period, the country was rebuilding and large amounts of money were spent on infrastructure and

services. There was huge expenditure on electricity, roads, telecommunications and airport expansion. A lot of money was also spent on resettlement, nationalization and agricultural development.

The proportion of development expenditure remained, on average 32 percent of total expenditure from 1972-1979, but began to decline thereafter and stagnated at about 19 percent of total government expenditure between 1982 - 1996. A sharp decrease to less than 5 percent between 1999 and 2002 was witnessed. The declining trend in development expenditure over this period may have been attributed to austerity measures imposed on the government by the Bretton Woods institutions-either in form of World Bank's Structural Adjustment Programmes (SAPs) or through International Monetary Fund (IMF's) stabilization programmes. Since most recurrent expenditure is of fixed nature (salaries and wages, interest on public debt and constitutional offices), the only leeway the government had in the wake of these austerity measures was its development budget (M'Amanja and Morrissey, 2005). Thus, most of the expenditure cuts had been affected through reductions in development expenditure, which in turn could have contributed to the declining trend of overall government expenditure, especially in the 1990s. This was a worrying trend because development expenditure was expected to provide the necessary infrastructure for private sector investment and growth, and therefore low budgetary allocation on this item meant that these services had been under-provided.

Development expenditure showed an upward trend between 2003 and 2008. This was because of increased infrastructural expenditure in areas of roads, telecommunication, health and education, rehabilitation of airport in Nairobi, Mombasa and Kisumu.

Recurrent expenditure showed a declining trend from about 80 percent of total expenditure in 1963, to about 67 percent in 1971. This is because most expenditure in education and health were in the hands of the local authorities. From 1979 there was an upward trend in recurrent expenditure up to 88 percent of expenditure in 1993, which later dropped to 77 percent of government expenditure in 1996. This could be attributed to drought of 1980, compensation to Uganda government for the assets it lost to Kenya due to collapse of East African Community, increased expenditure on education since responsibility was transferred from local authority to central government. Education expenditure also increased due to expansion of educational physical facilities, expanded curricular and increased demand for teachers wage bill as a result of implementation of 8-4-4 system of education. The proportion of recurrent expenditure reached over 90 percent between 1997-2000, due to large expenditure incurred to finance the general election of 1997 and higher salary rewards to teachers and civil servants. Thereafter it declined, reaching below 71 percent in 2007. The decline was as a result of government refocusing its expenditure in favour of development, operations, maintenance and reduction of wage related expenditures.

The government expenditure can further be classified into various subcategories as follows: general administration services, health care, education and training, defense, economic affairs, infrastructure, public debts repayments and others.

Figure 1.2 indicates the paths of expenditures in selected subcategories of government expenditure during the study period, expressed as a percentage of total government expenditure. This breakdown into categories is helpful in understanding the composition of the long-run increase in government expenditure.

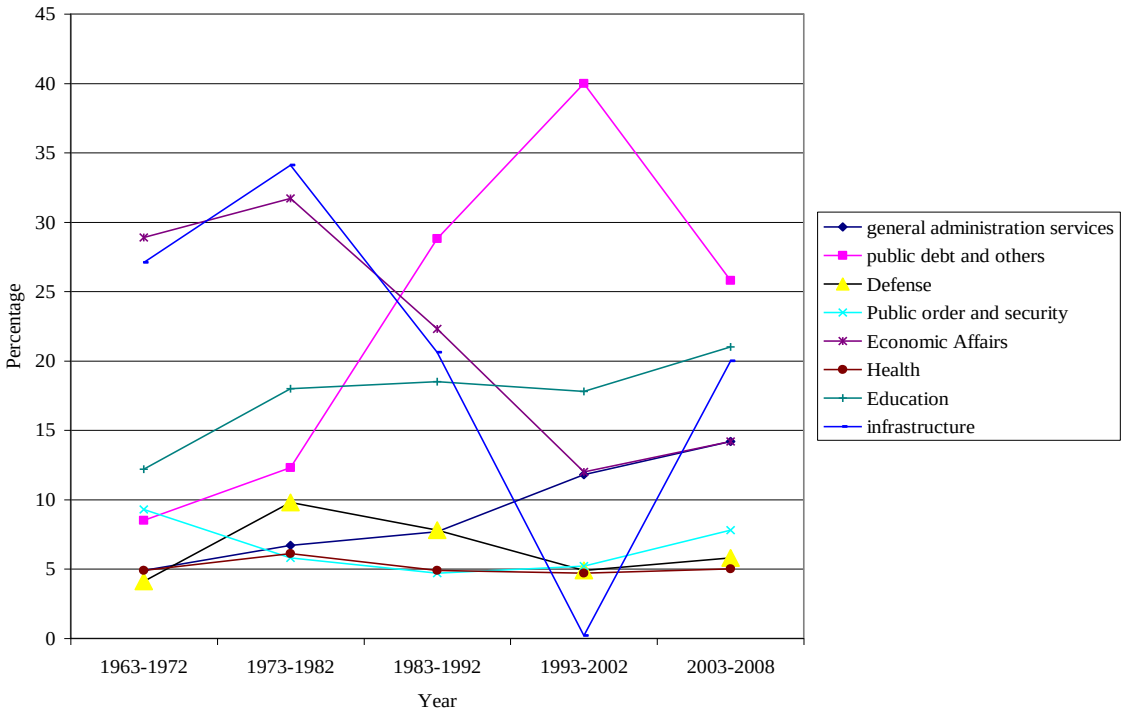

Figure 1.2: Trends in Government expenditure by sectors
Source of data: Republic of Kenya *Economic Survey* and *Statistical Abstract* for various years

It is interesting to note that between 1963 and1982, virtually all components indicated an upward trend except public order and security expenditure. This is because of the increased cost of rehabilitating the Kenyan economy. From 1974 – 2002, there was marked increase in expenditure on such items as public debts and general administration. This could be attributed to excessive domestic borrowing in response to foreign aid freeze in 1991, and the first multiparty election of 1992, which was associated with high expenditure. Decline was witnessed in items such as health care, economic affairs, defense, infrastructure and public order and security, whereas that of education expenditure remained constant. Between 2002 and 2008, there was a drastic increase in all public expenditures except on public debts. This was as a result of: increase in wages of civil servants and teachers; expenditure on subsidies, grant and transfers; expenditure on acquisition of non-financial assets; expenditure on physical infrastructure; expenditure on two general elections (2002 and 2007) and the 2005 referendum; and expenditure on social sectors of education and health.

From the foregoing trends, the determination of government expenditure may include factors such as fiscal stance and reforms such as downsizing and outsourcing, privatization, budget rationalization, political, social and economic factors. The Structural Adjustment Program (SAP) on macroeconomic variables introduced in the country in 1980s also heavily influenced government expenditure in Kenya.

1.3 Government Expenditure and Economic Growth in Kenya

Trend in government expenditure growth and GDP in Kenya over the period of study is shown in figure 1.3.

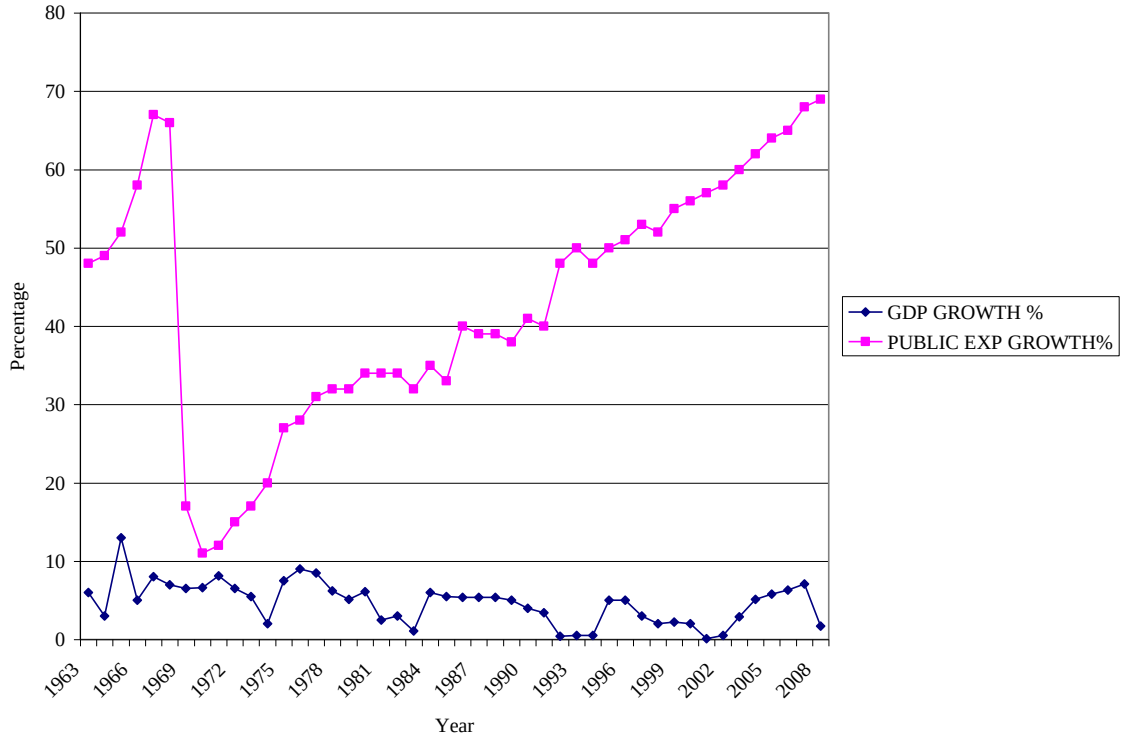

Figure 1.3: Trends in GDP growth and government expenditure growth over the period 1963-2008
Source of Data: Republic of Kenya *Economic Survey* and *Statistical Abstract* for various years

Figure 1.3 shows that the trend in government expenditure growth increased steadily from 48 percent to 67 percent between 1963 and 1967, before declining drastically to 12 percent in 1971 (see appendix I table A1). Thereafter, the growth in public expenditure increased gradually up to 69 percent in 2008. During the same period, the rate of growth of the GDP was cyclical, depicting no clear pattern and responsiveness to the changes in government expenditure. Despite widespread fiscal stringency, average

increase in government expenditure has tended to grow faster than that of GDP. The economic growth in Kenya can be categorized in four periods. The first period is between 1963 and 1972, when economic performance was impressive. The growth of GDP averaged 6.7 percent and compared favorably with some of the newly industrialized countries of East Asia (M'Amanja and Morrissey, 2005). This remarkable performance was attributed to increased development expenditure in areas of infrastructure such as roads, railways, electricity and also due to the expansion of recurrent expenditure on vital services such as education, health and housing.

The expansion in expenditure became more apparent beginning in early 1970s. The increases were generally due to the expansion of recurrent expenditure on vital services such as education, health and the need to maintain the real value of other services on account of rising inflationary pressure. Recurrent expenditure increased from a low Kenya pound 109 million in 1972/73 to 3505 million in 1992/93 (Republic of Kenya, 2004). Notable expenditure jumps were occasioned by several factors: the 1973 and 1979 oil-crises, which led to increased inflation; the break of the East African Community which necessitated the setting up of independent corporations; the 1980 and 1984 drought that required massive food imports plus increased expenditure on internal security; and the coffee boom of 1976/77 (Wawire, 2006; Njuguna, 2009a). Overall, the 1980s witnessed rapidly expanding government expenditure. Among projects that benefited from increased outlays were the Moi Sports Complex that was built for the fourth all African games in 1987,

the construction of Moi University at Eldoret, the Turkwell Hydro power station and the massive expansion of facilities at the public universities on account of the implementation of the 8-4-4 education system (Republic of Kenya, 2007). This marked an era of slow and persistent economic growth decline, with GDP growth rate falling from annual growth rate of 6.7 percent from 1963 to 1973 to 0.5 percent in 2002. This represent the second period of economic growth in Kenya

The third period is experienced when there was a turnaround in the economic performance during the period 2003-2008, when the economic growth increased from 2.9 percent in 2003 to 7.1 percent in 2007. This was attributed to proper allocation of resources to areas that were critical to economic growth such as infrastructure and social sectors including education, health, economic affairs, defense, public order and national security (Republic of Kenya, 2009).

During this period, government expenditure for both recurrent and development increased substantially. This was as a result of increased wages and salaries due to the government commitment to improve the terms and working conditions of public servants. The main contributors of the rapid expansion of expenditure were the introduction of free primary education in 2002/03, the shortfall of about 10 billion in foreign financed development spending, financing of referendum for constitution, expenditure on general election in 2007, change of government structure into a coalition government, introduction of subsidized secondary education, resettlement of victims of post

election violence, compensatory government expenditure due to international financial crisis, infrastructural development, large ministerial expenditure because of the bloated cabinet and general expenditure on the coalition government. Other major expenditure components included public debt servicing, use of goods and services, subsidies and grant and acquisition of non-financial assets (Republic of Kenya, 2008). Finally, the fourth period is when there was a sudden fall in GDP growth rate in 2008. However, government expenditure growth dropped slightly.

1.4 Government Expenditure Reforms in Kenya

Since independence, various government expenditure reforms have been implemented. The reasons for the reforms were to raise and sustain the economic growth rate of the country. The public sector contributes to GDP growth rate through provision of government services such as education, health and administration, and productive activities in areas of agriculture, manufacturing, transport and communication and trade (Republic of Kenya, 1979). The government plays a leading role in determining the pattern of economic growth through public sector reforms, which determine directly how much of the country's resources to divert to its own use, and how those resources should be allocated in order to increase economic growth. The contribution of each sector to the growth rate of GDP in Kenya has been affected by the government expenditure reforms that have been undertaken by the government. The main government expenditure strategy has been restructuring overall expenditure by directing more resources to activities that

promote faster economic growth. To achieve this goal, various policy reforms have been implemented, which include: rationalizing government expenditure, with more resources being channeled to development and recurrent non-wage operating and maintenance expenditure in order to stimulate economic growth (Republic of Kenya, 2002).

In the plan period 1974-1978, the policy target was to increase development expenditure by 9 percent in order to expand output. Total capital formation was expanded three times that of the preceding five years. These investments were in agriculture, forestry, manufacturing, electricity and government capital formation. In terms of allocation, priority was given to rapidly expanding education programme and economic and social services, while growth in expenditure on administration, new buildings and main trunk roads was restricted (Republic of Kenya, 1974).

During the planning periods 1979 -1983, 1984-1988, 1989-1993 and 1997-2001, the government undertook rationalization of government expenditure, with more resources being channeled to development and recurrent non-wage operating and maintenance expenditure in order to stimulate economic growth (Republic of Kenya, 1997).

Sessional Paper No 1 of 1986 on Economic Management for Renewed Growth contained the Structural Adjustment Programmes suggested by World Bank and International Monetary Fund (Republic of Kenya, 1986). The central

thrust of the policies was to rely on market forces to mobilize resources for economic growth and development, with the role of government increasingly confined to providing an effective regulatory framework and essential public infrastructure and social services. The changes in allocation of budget resources were implemented by government. The government spent proportionately more on immediately productive services. It also increased its outlay on infrastructure to promote smaller towns and rural centers to improve overhead facilities, including roads, power and water supplies. In agriculture, more money was channeled to research, extension services including tea and coffee planting programmes and other projects to raise agricultural production. The government spending on polytechnics and credit programmes to assist small scale industries in both rural and urban areas were also increased. These expenditures received the first allocation in the budgets that followed (Republic of Kenya, 1986). As a result, the share of formal education, health and other basic needs expenditure was reduced (Republic of Kenya, 1986).

The other major change in budget allocation involved a concerted effort to make all government outlays more efficient and productive through budget rationalization (Republic of Kenya, 1986). To achieve rationalization, the following measures were taken: projects with potentially high productivity were identified and their completion was advanced with an infusion of funds; projects with low potential benefits were identified and postponed or cancelled to free up funds for projects with higher returns; resources were shifted toward operation and maintenance expenditure of existing public facilities and away

from investments in new projects; and new development projects were to be funded only if they were productive investment with very high priority (Republic of Kenya, 1986). The general approach then was that available resources for development budget were concentrated on few projects to shorten the construction or implementation period. At the same time, recurrent allocations were diverted to improve the utilization of existing capacity in order to raise productivity of public investments. The goal was to ensure that all government investments became productive as soon as possible through a programme of budget rationalization (Republic of Kenya, 1986).

In order to reduce the rate of growth of expenditure on salaries and allowances, several measures were adopted in 1990, which included the freezing of recruitments into job groups A to G and the ban on filling of posts that were vacant for more than six months (Republic of Kenya, 1994).

Sessional Paper No 1 of 1994 on Recovery and Sustainable Development articulated various expenditure policies (Republic of Kenya, 1994). There was a re-allocation of budget resources towards the core functions of government. These included maintenance of law and order, the administration of justice, the provision of broad-based education and health services, the provision of economic infrastructure and the protection of the environment. To spur economic growth, the development expenditure and recurrent non-wage operating and maintenance expenditure were increased as a share of GDP. The budget rationalization measures aimed at maximizing the productivity of

public expenditure. In particular, objective technical and economic criteria were to be applied to project selection, with priority given to projects in the areas of health, education, infrastructure and environment (Republic of Kenya, 1994).

In the plan period 2002-2008, Kenya's fiscal strategy aimed at increasing the level of economic activity by enhancing the role of private sector as the leading sector in wealth creation. The objectives were: to sustain reduction in the level of government expenditure as a percentage of GDP; to change the composition of government expenditure to focus more on efficient public investment and operations and maintenance in the long-run; and to strengthen the budgeting process. This was to be achieved by rationalizing allocations to recurrent expenditure, especially on wages, interest payments and transfer, while allowing development expenditure to grow (Republic of Kenya, 2002).

There has been increased development expenditure, especially that targeting government investment in core social expenditure in education and health. The expenditure strategy adopted in the Economic Recovery Strategy (ERS) document was to restructure overall expenditure by gradually reducing the level of recurrent expenditure. This was aimed at facilitating a rapid increase in development expenditure within a sustainable macroeconomic framework (Republic of Kenya, 2004).

In the Vision 2030, the government is targeting an economic growth rate of over 10 percent by 2030 (Republic of Kenya, 2007). To achieve this, the government has proposed the control of government expenditure to ensure that it does not lead to crowding out of private investments. The key element of the fiscal strategy includes containing growth of total expenditures while creating fiscal space through expenditure rationalization to shift resources from non-priority to priority areas, including expenditure on the flagship projects that are critical to achieving Vision 2030 (Republic of Kenya, 2007). In this context, the wage bill is expected to decline gradually to 6 percent, suggesting the need for civil service reforms that would facilitate higher remuneration for smaller and more efficient civil service. The increasing requirements for operation and maintenance for the expanded infrastructure has been catered for. The share of development expenditure in total outlays is to be increased from 18 percent in 2007 to 38 percent in 2012 and thereafter. Most of the increase in development expenditure is to benefit the priority sectors such as the infrastructure (expansion of road networks, energy and water supply capacities, and information and technology), agricultural sector and social sectors such as health and education. The country is to scale-up resources towards the above sectors in order to ensure efficiency and effectiveness in their use and management (Republic of Kenya, 2007).

Given the trends in the government expenditure and GDP growth rate, the government expenditure reforms that have taken place so far, and the aspirations of the vision 2030, it is important that a study on the effects of

government expenditure and government expenditure reforms on economic growth be carried out. This will unearth the necessary government expenditure reforms that are still needed in order to achieve the Vision 2030.

1.5 The Statement of the Problem

The causes of much of the variations in economic growth over time are not well understood. In particular, the effect of government expenditure on economic growth has not been explored exhaustively. Several studies have attempted to investigate the channels through which different types of government expenditure can affect growth (Landau, 1983; Diamond, 1984; Barro, 1990; Davarajan *et al*. 1993; Kweka, 1995; Colombier, 2000; Njuguna, 2009a). From these studies, the effects of government expenditure on economic growth appear to be inconclusive. Despite this uncertainty, theory suggests that government expenditure has a positive effect on economic growth (Keynes, 1936; Solow-Swan, 1956; Musgrave and Musgrave, 1989; Barro, 1990; Barro and Salai-i-Martin, 1992, and 1995).

In Kenya, economic growth has been fluctuating despite the government expenditure increasing over time. The Kenyan government spends substantial amounts of money annually on physical infrastructure, education, health care, economic services, public order and national security, defense and general administration. From theory, when there is an increase in government expenditure in these sectors, it is expected that the economy will exhibit a positive economic growth, but this does not seem to happen in the case of

Kenya (See figure 1.3). This could be due to non growth-enhancing expenditures that crowd-out outlays that are meant to boost economic growth (Colomber, 2000). Therefore, the issue of which government expenditure can foster permanent movements in economic growth becomes important.

The Kenyan government has undertaken various budgetary rationalization and reforms aimed at curbing unproductive government expenditure, which has been rising over the years. Government expenditure has also been restructured to enhance economic growth by increasing development expenditures, especially those targeting public investments, such as those on education and health. However, despite the reforms, economic growth has not kept pace with government expenditure growth. Therefore, there is need to investigate the impact of government expenditure and its reform on economic growth. In particular, understanding the impact of the different components of government expenditure and reforms on economic growth is crucial to policy makers.

1.6 Research Questions

The study sought answers to the following questions

(i) What is the relationship between the components of government expenditure and economic growth in Kenya?

(ii) What are the effects of the components of government expenditure on economic growth?

(iii) What is the effect of government expenditure reforms on economic growth?

(iv) What are the policy implications of the study findings?

1.7 Objectives of the Study

The main objective of this study was to analyze the impact of government expenditure on economic growth in Kenya for the period 1963 to 2008. The specific objectives were:

(i) To investigate the relationship between the components of government expenditure and economic growth in Kenya.

(ii) To examine the effects of the components of government expenditure on economic growth.

(iii) To analyze the effects of government expenditure reforms on economic growth.

(iv) To draw policy implications from the findings.

1.8 The Significance of the Study

Due to substantial policy and structural changes that have taken place in the Kenyan economy over the period 1963-2008, this study attempts to provide an empirical analysis of the impact of government expenditure on economic growth. More specifically, the impact of the various components of government expenditure on economic growth is analyzed. This is important to policy makers because it enables them to identify the inherent drive of the expenditure growth and consequently be able to effectively target the relevant expenditure components for any fiscal action in line with both medium and long term growth objectives of the country.

Equally, since most adjustment programmes stress the need to reduce government expenditure or undertake expenditure switching, this study contributes to policy discussion on which expenditure to maintain and how expenditure switching is likely to affect economic growth in Kenya. The study further enhances the understanding of the short term and long term effects of the government expenditure reforms undertaken by the government.

Furthermore, the study makes a contribution to both theoretical and empirical literature on the effect of government expenditure and reforms on economic growth, thereby paving the way for further research.

1.9 Scope, limitation and organization of the Study

The study was limited to the period 1963 to 2008, since this period was characterized by substantial growth in government expenditure, and because time series data was only available for this period of time. Economic growth can be affected by both fiscal and monetary policies, but this research only looked at the fiscal policy. The fiscal policy constitutes government expenditure and government revenue. The research, however, concentrated on the central government expenditure in terms of the level, composition and reforms, and its effect on economic growth, without addressing the means of financing. Government expenditure was disaggregated into various components in terms of investment and consumption expenditure.

The thesis is organized in five chapters. Chapter one introduces the study and its objectives. Chapter two presents the theoretical and empirical literature together with the theoretical frame work. Chapter three focuses on research design and methodology. Empirical results are presented and discussed in chapter four while summary, conclusions and policy implication are presented in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, both theoretical and empirical literature on government expenditure and economic growth is reviewed. The first section reviews the theory and exposes the theoretical foundations that underlie the effects of government expenditure on economic growth. The theoretical representations of the models are described. The second section reviews studies carried out on the subject, and the final section deals with the critic of the literature.

2.2 Theoretical Literature

There are several theories advanced on government expenditure. The following is a brief discussion on each one of them.

2.2.1 Wagner's Organic State Theory

The German economist Adolf Wagner (1835-1917) advanced a law of rising public expenditure by analyzing trends in the growth of public expenditure and in the size of public sector in many countries of the world. This theory is primarily concerned with the explanation of the growth of the share of GNP taken up by the public sector. This theory, popularly known as Wagner's law, states that as per capita income grows, the relative size of the public sector will grow also. This is because the state would need to expand administration and law and order services; increased concern for distributional issues; and a greater need to control private monopolies and other forms of market failures.

Thus, the state grows like an organism reflecting changes in the society and economy and making decisions on behalf (and to the benefit) of its citizens (Brown *et al.* 1996).

The flaw in Wagner's theory is that it does not contain a well articulated theory of public choice. The law assumes the problems of public choice by employing an organic theory of the state. Thus the state is assumed to behave as if it were an individual existing and making decision independently of the members of society. Expansion of public sector also cannot be explained in the absence of industrialization, and finally, the law concentrates upon a demand side explanation of government expenditure growth without considering the supply side explanations. In many ways, Wagner's law provides a good explanation of public sector growth. Its main limitation is that it concentrates solely on the demand for public sector services. What must determine the level is some interaction between demand and supply.

2.2.2 Peacock and Wiseman's Political Constraint Model

Analysis of the time path pattern of public expenditure by Peacock and Wiseman (1890-1935) established the displacement effect. This model is based upon a political theory of government expenditure determination, namely that governments like to spend more money; that citizens do not like to pay more taxes; and that governments need to pay attention to the wishes of their citizens. The model assumes that there is some tolerable level of taxation that acts as a constraint on government behaviour. As the economy (and thus

income) grows, tax revenue at constant rate would rise, thereby enabling government expenditure to grow in line with GNP (Peacock and Wiseman, 1961).

During period of social upheaval such as war, famine or some large-scale social disaster, the gradual upward trend in government expenditure would be distorted (displaced upward). In order to finance the increase in government expenditure, the government may be forced to raise taxation level, a policy which would be regarded as acceptable to the electorate during period of crises. This is called the displacement effect (Peacock and Wiseman, 1961). Besides, there is also the inspection effect. This arises from people's keener awareness of social problems during the period of upheaval. The government, therefore, expands its scope of services to improve these conditions, since people's perception of tolerable levels of taxation does not return to its former level, the government is able to finance these higher levels of expenditure originating in the expanded scope of government and debt charges. The net result of these two effects is occasional short- term jumps in government expenditure within a rising long-term trend (Peacock and Wiseman, 1961).

The theory is very relevant to the Kenyan situation because the economy has experienced so many displacements in terms of tribal clashes, famine, and revenue boom like coffee boom of 1976/77. In all these, the government expenditure increased drastically without it falling in the subsequent periods (Republic of Kenya, 2003). The theory is not comprehensive since there are

other periods where the government expenditure has gone up and yet there were no war or famine.

The flaw in Peacock and Wiseman's political constraint model is that if the situation after crises is not explored, the growth in government expenditure may change. It is also important to note that government finances its expenditure from internal and external borrowing, aid, income from sale of goods and services produced by government agencies and also from abroad. Thus taxation is not the only form of financing government expenditure (Brown *et al*., 1996). The theory has also been criticized for giving insufficient weight to political influences on the level of public expenditure. Moreover, the theory does not isolate all relevant causes at work. Furthermore, the critics of this theory are based on answer to the question: What happens to expenditure in the post war period?. There is no long-run displacement effect in the case where civilian public expenditure in the post war period return to their original growth path or in the case where there is only a temporally increase in post war civilian public expenditure until the old trend line is reached. There is evidence that after deferred civilian public expenditure has taken place following the war, public outlays return to the pre-war level (Brunkhead and Miner, 1979).

2.2.3 Keynesian Theory

This theory is based on Keynes (1936). Keynesian economics promoted a mixed economy in which both the state and the private sector were considered

to play an important role. Keynesian economics sought to provide solutions to what economists believed to be the failure of laissez-faire economic liberalism, which advocated that markets and the private sector operated best without state intervention (Trotman, 1997).

In Keynesian theory, macroeconomic trends could overwhelm the micro-level behavior of individuals. The theory is based on the assumptions of: The economy is operating in the short-run, wages and prices are fixed, money market is not important, taxation is in form of lump-sum taxes only and planned consumption and planned saving are both related to income. Keynes asserted the importance of aggregate demand for goods as the driving factor of the economy, especially in periods of downturn. The theory argued that government policies could be used to promote demand at a macro level and to fight high unemployment and deflation (Branson, 1989). Keynes believed that the government was responsible for helping to pull a country out of a depression. If the government increased its expenditure, then the citizens were encouraged to spend more because more money was in circulation. People would start to invest more, and the economy would go back to normal. If the change in government purchases is denoted by ∂G and the corresponding impact on output by ∂Y, then the net impact of an increase in government expenditure on output (Y) is given as:

$$\partial Y = \left[\frac{1}{1-b}\right]\partial \mathrm{G} \qquad (2.1)$$

Where: b stands for the marginal propensity to consume. So an increase in government purchases causes a large increase in output and vice versa. A central conclusion of Keynesian economics was that there was no strong automatic tendency for output and employment to move towards full employment levels (Keynes, 1936).

The flaws of Keynes theory are: The theory tended to give rise to the phenomenon known as 'stop-go'. That is, in periods of high unemployment, the government would expand aggregate demand. This would reduce the unemployment but at the same time tend to create inflationary pressure so that eventually the government would have to reduce aggregate demand again. Thus, all 'go' period tended to be followed by 'stop' period and it became difficult to achieve long term economic growth. A second limitation of the Keynesian model is that it fails to take adequately into account the problem of inflation. Third, it tends to understate the influence of money on the real variables in the economy. A change in the money supply, only affects national income through its effects on the rate of interest.

2.2.4 Monetarist Theory

This theory stresses the primary importance of money supply in determining nominal GDP and the price level (Ahmed, 1999). Friedman (1956) argued convincingly that the high rates of inflation were due to rapid increases in the money supply. The key to good policy was therefore to control the supply of money. The foundations of the model were: There is a close relationship

between the changes in the money supply and changes in national income in the long-run, without government interference the economy will tend towards its 'natural' rate of unemployment, velocity of circulation of money is predictable, money changes will only affect real national income indirectly and the economy is in equilibrium at full employment

Monetarists disliked big government and tended to trust free markets. They did not like government expenditure and believed that fiscal policy was not helpful in bringing about economic growth. Where it could be beneficial, monetary policy could do better. Excessive government expenditure only interferes in the workings of free markets and could lead to bloated bureaucracies, unnecessary social programmes and large deficits (Cullison, 1993). The short comings of the model include the following. First, the monetary theory does not offer a complete explanation of the complex phenomenon of changes in the making of which the non-monetary factors also significantly matter.

2.2.5 Crowding Out Theory

This theory as developed by Bacon and Eltis (1970) states that government intervention leads to reduction in private investment activities and this is known as 'crowding out'. The assumptions on the model are: The income generated in the market would equal the value of output; there is no non-market (government) sector in the economy, taxes form the channels of resources from market sector to non-market (government) activity. There are

two forms of crowding out. The first form is the direct crowding out, whereby public sector production uses resources that could otherwise be used by the private sector (Trotman, 1997). If the public sector replaces the private sector, it is expected to constrain economic growth. This displacement effect occurs directly as the public sector use tax revenues to buy resources that would otherwise be used by the private sector.

The second form is the indirect crowding-out which occurs when government expenditure, taxation and government borrowing cause disincentives to productive effort, namely to work, to save and to invest (Trotman 1997). Disincentives to invest occur when borrowing lead to higher interest rates or inflation. The sale of government debt in order to finance public sector borrowing could lead to a rise in interest rates, which indirectly crowds out private investment. This would happen if either the increased public sector borrowing leads to higher interest rates or the private sector investment is highly interest-elastic that it results in the fall in private investment. The limitations of this model include: The theory neglects the importance of public sector services as inputs to the private sector especially education which is important in increasing the skills of the work force, and there are, of course , several other determinants of interest rates in the economy in addition to public sector

The theory is very applicable in Kenya since there is a coexistence of both public and private sectors in the economy. The proportion of private sector

depends on the portion of the public sector. If public sector is to increase its productive investment, then private sector will be crowded out (Bailey, 2002).

2.2.6 Musgrave-Rostow's Theory

This theory takes government expenditure as a prerequisite of economic development, its level being directly related to the stage of development that a country has reached. In the early stage of economic growth and development, public investment as a proportion of the total investment of the economy is found to be high. The public sector provides social infrastructure overheads such as roads, transport infrastructure, sanitation services, law and order, health, education and other investments in human capital, which are all necessary to gear up the economy for takeoff into the middle stages of economic and social development (Musgrave and Musgrave, 1989).

In the middle stages of growth, the government continues to supply investment goods, but this time public investment is complementary to the growth in private investment. During the two stages of development, markets failures exist, which can frustrate the push towards maturity, hence increase in government involvement in order to deal with these market failures. In the mass consumption stage, income maintenance programmes and policies designed to redistribute welfare grows significantly relative to other items of government expenditure, and also relative to GNP (Musgrave and Musgrave, 1989).

The theory ignores the productive expenditure of the public sector and assumes that government plays the major role in development, which may not be the case always (Brown *et al*., 1996).

2.2.7 Neo-Classical Theory of Growth

Most ideas concerning economic growth starts from the aggregate production function where factors of production determine the national output. According to the Neo-classical theories as advanced by Solow-Swan (1956), growth comes about in three ways if land is held fixed: increase in the labour supply; increase in the capital stock; and increase in productivity. Increasing labour supply generate a larger output. Real output rises if more people take part in a country's production, that is through immigration, or if people who are not a part of labour force begin working. Capital increase can be divided into two parts; increase in physical and human capital. Physical capital increases output because it enhances the production of labour and provides valuable services directly. A productive increase can for instance take place when there is investment in equipment like computers and machinery which can for example reduce labour hours.

Human capital promotes economic growth because people with skills are more productive than those without them. Investment in human capital is made through university studies and on the job training. Productivity increases explain the increase in output that can be explained by the input increases (labour and capital). This is called the productivity of input and can be

affected by a number of factors: By either financing or supplying directly the investments that the private sector would not supply in adequate quantities because of various market failure in certain kind of infrastructure projects and basic education and health expenditure, which could directly boost private sector productivity; by efficiently supplying certain basic public services that were necessary to provide basic conditions for entrepreneur activity and long term investment; and by financing its own activities in the manner that minimizes distortions to private sector savings and investment decision and to economic activities more generally (Burda and Wyplosz, 2001). Within this framework, government expenditure could in principle impact growth by affecting capital and/or labour as well as the generation and/or assimilation of technological progress reflected in total factor productivity (TFP). However, since it is assumed in the model that the long-run growth rate is driven by the population growth and the rate of technical progress, which is considered to be exogenous, the effect of government expenditure on growth through production factors is considered to be only transitional.

The theory has some short comings which include the following. First, it provides an inadequate explanation of economic growth. Second, the theory does not give clear understanding of differences among nations-why some are rich and some remain poor and why some grew rapidly while others stagnate.

2.2.8 Endogenous Growth Theory

The chief inventors of endogenous growth theory are Paul Romer and Robert Lucas (1990). This theory highlights the fact that if productivity is to increase, the labour force must continuously be provided with more resources. Resources in this case include physical capital, human capital and knowledge capital (technology). Therefore, growth is driven by accumulation of the factors of production while accumulation in turn is the result of investment in the private sector. This implies that the only way a government can affect economic growth, at least in the long-run, is via its impact on investment in capital, education and research and development. The approach makes improved education (and indeed any kind of training or research that adds to human knowledge in any country) the key to achieving economic growth.

Faster economic growth is associated with a higher rate of investment by the private or government sector, a lower share in GDP of government consumption spending, higher school enrollment rates, and greater political stability. Unlike neo-classical growth theory, technical change is no longer based to chance, but can be fostered and promoted by appropriate policies. Moreover, as the foundation for innovation and entrepreneurship are secured, the probability of further technical change and associated economic growth occurring, rise significantly. Technical change is no longer regarded as unexplainable and due to chance as in neo-classical theory, but in endogenous theories becomes itself a variable which can be influenced by policy decisions and should now be included within production functions, alongside the

conventional inputs of labour and capital. Government policies can affect economic growth rates by taxing consumption, subsidizing investment and research, and shifting resources from government consumption to government investment.

Reduction of growth in this models occurs when government expenditure deter investment by creating tax wedges beyond what is necessary to finance investments or taking away the incentives to save and accumulate capital (Folster and Henrokson, 1997).

2.2.9 Summary of theoretical literature

In summary, Wagner's organic state theory can only be applicable in Kenya to a limited extent for it only looks at the demand side of the economy. Peacock and Wiseman's theory assumes that there is some tolerable level of taxation that acts as a constraint on government expenditure and behavior. On the other hand, Keynesian theory fails to account for the inflation in the economy resulting from the increased government expenditure, monetarist theory is against government intervention in the economy, crowding out theory show that government intervention leads to reduction in private investment activities which adversely affect economic growth, Musgrave-Rostow theory is limited by the fact that it ignores the productive expenditure of the public sector and assumes that government plays the major role in development, which may not be the case always. Neo-classical theory modeled growth through exogenous technical progress. By definition when technical progress is exogenous, it

cannot be affected by policy. This theory is also based on decreasing returns to capital.

The development of endogenous growth theory has overcome these limitations by explicitly modeling the process through which growth is generated. This allows the effects of government expenditure to be traced through the economy and predictions made about its effect on economic growth. This model provides a positive role for government in the growth process. The theory highlights that if productivity is to increase, the labour force and capital should be provided with more resources. Therefore, endogenous theory of growth seemed to be the most relevant in Kenya and was the one adopted in this study.

2.3 Empirical Literature

There are several empirical literature that have been conducted on the effect of government expenditure on economic growth. These studies have looked at aggregate and disaggregated levels. The following is a brief discussion on each one of them.

Landau (1983) used panel data of 27 Less Developed Countries (LDCs) to investigate the relationship between government expenditure components and economic growth. The methodology used by the study was Ordinary Least Squares (OLS). The variable used was government expenditure, which was broadly categorized as productive and consumption expenditure.

The model used by the study was given as:

$$\frac{\Delta Y}{Y} = \alpha\left(\frac{I}{Y}\right) + \beta\left(\frac{\Delta L}{L}\right) + \left(\frac{G}{Y}\right) \quad \text{.....(2.2)}$$

where Y was the GDP, I was productive government expenditure, G was the consumption government expenditure, α was the marginal productivity of capital in nongovernmental sector, β was elasticity of the nongovernmental output with respect to labour and L was labour input. Landau's model, measured the size of the government by the ratio of government expenditure to GDP.

The results were that consumption expenditure had a negative impact on economic growth, while productive expenditure had a positive effect on economic growth. In particular, the study found the following results: First, public investment on transport and communication was positively associated with economic growth. This finding was supported by the result of Canning and Fay (1995) on infrastructure and growth, which revealed a strong relationship between the physical stock of roads and growth. Secondly, general investment was positively correlated with growth. Finally, public enterprises investment was negatively correlated with private investment. The strength of the finding is that it offers moderate support for the view that infrastructure investment foster growth, but that public investment in general does not. The weakness of the study was that it did not conduct causality tests. The use of OLS was not backed by any economic theory.

Koori (1984) studied the existence and nature of the crowding effect in Kenya using Ordinary Least Squares and found that phenomenon growth in domestic deficit financing of government expenditure crowded out private borrowing. The study used the time-series data. Particularly the study pointed that the pattern of public sector investment expenditure completely crowded out the private investment in the manufacturing industry, electricity and water sectors. The study considered only one side of the government expenditure that is public investment. It did not consider public consumption. The main weakness of the study was failure to test for long-run relationship between the variables using cointegration analysis.

Landau (1985) using cross-section data for 104 countries, including 96 developing countries used panel data to analyze the effect of government expenditure on economic growth. The variables used were current expenditure and infrastructural expenditure. The study found that the big government measured by the share of expenditure in consumption reduced growth of per capita income. This method could not be used to separate short-run and long-run effects on government expenditure. The study concluded that total government expenditure, current expenditure and infrastructure had a dampening effect on growth.

Landau (1986) extended the earlier study using sixty five countries and related growth in per capita income to several set of independent variables that included; human and physical capital, structure of production, historical and

political factors, resources, population and geo-climate, a measure of international economic conditions, and a three year lagged averages of the share of the government spending in GDP, which was disaggregated into education, defense, and transfer payments. By disaggregating government expenditure while holding other determinants of economic growth constant, it was found that government consumption had a negative and statistically significant influence on growth, whereas the influence of spending on education was positive but statistically insignificant. The results also showed that the influence of military expenditure net of the effect of taxation to finance it was essentially zero, as was the effect of transfers. Thus the earlier findings were re-affirmed (Landau, 1983). The methodology used was Generalized Least Squares (GLS), which may not be appropriate for time-series data in the present study.

Ram (1986) investigated the government size and economic growth using a cross-section and time-series data. The variables used were private investment, government expenditure and labour force growth rate.

$$\frac{dY}{Y} = \alpha \frac{I}{Y} + \beta \frac{dL_D}{L} + \lambda \frac{dG}{Y} \quad \text{.....(2.3)}$$

where $(\frac{dY}{Y})$ is the a measure of economic growth, $(\frac{I}{Y})$ is the ratio of gross investment to GDP, $(\frac{dL_D}{Y})$ is the growth of labour force, and $(\frac{Cg}{Y})$ is the ratio of government consumption to GDP.

The methodology used by the study was Ordinary Least Squares (OLS). The study noted that a large government size was likely to be detrimental to efficiency and economic growth because: government operations were often conducted inefficiently; the regulatory process imposed excessive burdens and costs on economic system; and many government's fiscal and monetary policies tended to distort economic incentives and lower the productivity of the system. At the same time, the study highlighted that a large government size was likely to be a more powerful engine of economic development. This is due to various reasons such as: role of the government in harmonizing conflicts between private and social interests; prevention of exploitation of the country by foreigners; and securing an increase in productive investment and a socially optimal direction for growth and development.

The study is relevant to the Kenyan case since in a developing economy, both the level and composition of government expenditure are important. The model was based on a mixed economy where both public and private sectors coexist, which is the case in Kenya. However, the results of the study may be unreliable because they are subject to an endogeneity bias, resulting from the failure to account for the endogenous nature of some of the explanatory variables. The specification bias may also have resulted from the fact that the growth regress takes the relationship between the explanatory variables and growth to be linear, whereas in fact it is nonlinear. Furthermore, the researcher could not conduct causality and cointegration tests.

Diamond (1989) studied government expenditure and economic growth using a sample of 42 developing countries in Asia and Africa. The study used panel data. The variables were education, health and capital expenditure. The study found that social expenditure (expenditure in education and health) exhibited a significant growth in the short-run, while infrastructure on capital expenditure had a negative effect on growth. Diamond attributed this negative relationship to the long gestation period before such expenditure could be productive. By using cross-section data the study may be suspect due to the fact that the countries pooled differed markedly in their economic structures. The current study will use time-series data.

Grier and Tullock (1989) used a panel data of 113 countries for the period 1951 to 1980. The variable used was government consumption. The finding was that government consumption had significant negative effect on economic growth, but positive effect for the Asian sub sample. The study did not disaggregate government consumption to find out the effects of each component on economic growth. The current study will consider disaggregated components of government consumption. The study will also consider public investment in addition for it to be more informative.

Romer (1990) used cross-section data of 112 countries from 1960 to 1985. The variables used were government expenditure, government consumption, government investment and human capital. The study found a significant and negative correlation between government consumption and economic growth,

but a positive effect and significant relation between government investment and human capital. The methodology used was GLS based on panel data. The study suffers from the heterogeneity of the underlying data set. Countries differ from each other in many respects such as in their political, economic system, culture, histories, demographics, resources and locality. As a result, it has so far proved quite difficult to empirically show a robust long-term correlation between government variables and economic growth. To avoid parameter heterogeneity, time-series study should be carried out.

Barro (1990) investigated the relationship between public finance and endogenous growth. The model used in the study to estimate economic growth based on government expenditure was given as:

$$\gamma = \lambda(1-\tau)(1-\alpha)A^{\frac{1}{(1-\alpha)}}\left(\frac{g}{y}\right)^{\frac{\alpha}{(1-\alpha)}} - u \quad \text{.....(2.3)}$$

where λ and u were parameters in the assumed utility function, τ was the tax rate, g was productive government expenditure, γ was long-run growth rate, A was the productivity factor, y was GDP and α was the elasticity.

The study found that the growth rate of real per capita GDP was positively related to initial human capital while consumption to real GDP had a negative association with growth and investment. The argument was that public consumption had no direct effect on private sector productivity but it however lowered savings and growth through its distortional effects on taxation and

government expenditure programmes. In later works, Barro (1991) found that on the overall, government expenditure had a negative impact on growth.

A more general issue of how fiscal policy affects economic growth was considered by Barro (1991), Dowrick (1993) and De la Fuente (1997). In particular, the relationship of growth to the composition and level of public sector spending was investigated. The results of the studies showed that if public spending (measured as the share of total government expenditure in GDP increased, growth of output was reduced. An increase in government spending of 5 percent of GDP reduced growth by 0.66 percent. The shortcoming of the studies include: First, government spending may just be a proxy for the entire set of government non-price interventions-including, for example, employment legislation, health and safety rules and product standards. It may be that these are not expenditures that actually reduce growth. Second, since the share of public spending in GDP is closely correlated to the average tax rate, it is not clear which hypothesis was being tested.

Devarajan *et al*. (1993) used a simple analytical model and cross-section data of 14 OECD 1980 to 1990 to investigate the effect of government expenditure on economic growth. The variables used were functional types of government expenditure such as health, education, transport and defense. The study indicated how a change in the mix of government expenditure in favor of productive activities could lead to higher steady state growth rate of the

economy. However, the empirical implementation of the model yielded surprising results. All the components of productive expenditure such as capital transport and communication, health and education had either negative or statistically insignificant coefficients, implying that there was no relationship between government expenditure and economic growth. The only growth category that was associated with higher economic growth was recurrent expenditure. The study also found that some expenditure within the health education, such as preventive care had a positive coefficient. The reason for such outcome of the result is that recurrent expenditure on variables used by the researcher provides the conducive environment within which private sector operates.

Easterly and Robelo (1993) used cross-section data of 100 advanced countries and less developed countries for the period 1970 to 1988. The variables used were government surplus, government investment, government consumption and other types of government expenditure and taxes and human capital. The findings were that government investment had a negative impact on growth; government consumption had a negative impact on economic growth, but a positive impact on private investment; and Spending on infrastructure had a positive impact on private investment.

Lin (1994) used panel data for 62 countries for advanced and less developed countries for the period 1960 to 1985. The methodology employed by the study was General Methods Moments (GMM). The variables used were public

investment, government expenditure growth rates and the growth rate of labour force. The results of the study were mixed. Government consumption was insignificant in advanced countries but passively significant in less developed countries.

Hanson and Henreknon (1994) used cross-section data for 43 less developed countries for the period 1970 to 1990. The method of estimation employed by the study was General Methods Moments (GMM).The variables used were government expenditure in total government consumption, government investment, education, transfers and social security. The study found that transfers and total government expenditure had negative effect on economic growth. Education spending had a positive effect, while effect of government investment was insignificant.

Moshi and Kilindo (1994) while focusing on the impact of public policy on private investment in Tanzania, established that there was a direct empirical link between public and private capital formation. The study found that public investment crowded out private capital formation. In particular, they established that there was a positive complementality between infrastructural investment by government and private investment. The method of estimation used was OLS, which assumes linearity of variables and does not produce good estimates in the case of insufficient theory linking the variables. The methodology used was not appropriate because of non-linearity of economic variables.

Kweka (1995) investigated the impact of government expenditure on economic performance in Tanzania from 1964 to 1995. The model used was given as:

$$\frac{\partial Y}{Y} = \frac{I_p}{Y} + \frac{I_G}{Y} + \frac{\partial l}{L} + \left[\partial G + \frac{\partial K}{1}\right]\left(\frac{\partial G}{G}\right)\left(\frac{G}{Y}\right) \quad \text{.....(2.4)}$$

where Y was the GDP, Ip was the private investment, IG was the government investment, L was labour input, K was the capital input and G was the government expenditure. The estimation technique used by the study was Auto-regressive Distributed Lag (ADL), which is recommended for estimating a single equation. The research used time-series data of Tanzania for a period of 1965 to 1996.The study found that the economy responded differently to various types of government expenditure. Recurrent expenditure, for example, had contributed more to growth than development expenditure. In terms of sectoral expenditure, health, defense and other services had a positive contribution. Expenditure on general and economic services was less productive, while private investment had a higher response to expenditure on health, education and other services. The response was negative on defense, general administration and economic services. The weaknesses of the study were that the time-series data was relatively short and the quantity of the data was less than ideal. The methodology used is restrictive since it can only be used for a single equation. Furthermore, the study did not test for causality.

Cashin (1995) developed an endogenous growth model of the influence of public investment, public transfer and distortionary taxation on the rate of economic growth. The research was carried out for 23 developed countries between 1971 and 1988. The study was based on a time-series cross-sectional framework. The study considered a model with infinitely –lived agents endowed with perfect foresight, which allowed for productive government spending in which both the growths of private and public capacity were endogenously determined. In the model, the government levied two constant marginal taxes on the final goods sector to fund its provision of public capital and transfer payments.

The study assumed that a given population of identical-economical agents maximized a constant inter-temporal elasticity of substitution utility function of the form:

$U = \int_0^{\infty} u[c(t)]e^{-\rho t}\, dt$ .....(2.5)

where c was consumption per person and ρ was the constant subjective rate of time preference. The growth model estimated by Cashin (1995) was

$$\rho + \delta y = (1 - T_1 - T_2) A^{\frac{1}{(1-\alpha-\beta)}} y^{\frac{-\alpha}{(1-\alpha\beta)}} T_1^{\alpha(1-\alpha-\beta)} T_2^{\frac{\beta}{(1-\alpha-\beta)}} \quad \text{..... (2.6)}$$

where A was a parameter that represented the level of technology, β was the output elasticity, T_1 was marginal tax rate used for the provision of public capital and on output, T_2 was the tax used for transfer, y was the implicit growth rate of GDP and ρ was the constant subjective rate of time preference.

Given that $T_1 = \frac{G}{Y} = IGOV; T_2 = \frac{T}{Y} = SOCSEC$ and $(1 - T_1 - T_2) = (1 - CURREV)$

where IGOV was the ratio of public investment to (GDP), SOCSEC was the ratio of transfer to GDP, and CURREV was a measure of the ratio of current tax revenue to GDP.

The estimating technique used by the researcher was Ordinary Least Squares based on the panel data. This method assumed linearity of variables, which might not be the case. The method cannot be used to separate short-run and long-run effects of government expenditure on economic growth. The research provided additional information by including the financing side of the public sector. It also tested the Granger-causality between government expenditure and national income.

The study found that increased government expenditure on those items that entered private production functions as inputs enhanced economic growth. Examples of such productive expenditures included public investment and intergenerational transfer payments, both of which generated positive growth. However, the size of government was limited by the need to fund such government expenditure by the levying of distortionary taxes, which reduced the marginal return to private capital and so dampened economic growth. A clear implication of the theoretical and empirical work presented by the research was that there was significant trade-off involved in considering the

various contribution of government to economic growth of countries. The study could have generated more information had it included other variables such as defense, health, national security and economic affairs, which could affect economic growth.

Devarajan *et al.* (1996) used the cross-section data for 43 less developed countries for the period 1970 to 1990 to investigate the relationship between public expenditure and economic growth. The variables used were government consumption, government investment and functional categories of public expenditure. The study found that government consumption had positive effect on economic growth, government investment had a negative effect in less developed countries but the results were reversed in the case of advanced countries. The study divided expenditure into productive and unproductive categories, taking into account the levels and mixes of both resources absorbed and output produced by different programmes. The usefulness of productive and unproductive classification for growth was apparent in a dynamic context because it focused on the impact of expenditure on savings and investment and hence capital accumulation.

There were three dimensions of this impact. First, government expenditure needed to be financed and therefore reduced resources for private savings. Second, to the extent that it improved productivity, it stimulated private savings. The combined impacts of these effects on private savings suggest that the relationship between the levels of government expenditure and growth was

typically not monotonic. The methodology used was Ordinary Least Squares (OLS). This was a basic panel data regression that could not separate the short-run and long –run effect of government expenditure and growth. The study did not consider the causality of variables. However, the current research will use the Vector-Auto Regressive (VAR) model to establish the interaction and causality of government expenditure and economic growth. Cointegration analysis will be used to establish the long-run relationship between government expenditure and economic growth.

Kocherlakota and Yi (1997) analyzed how public capital and taxes affected economic growth in the United States and the United Kingdom in the period 1891 to 1991, and from 1831 to 1991, respectively. It was found that public capital boosted economic growth and taxes hindered economic growth as was predicted in endogenous growth theory. The research only took into account physical capital variable. By focusing primarily on the impact of total public capital expenditure on economic growth, the study largely disregarded the differences in the impact of the various components of public capital such as human capital. By not considering the human capital, the study was not comprehensive, since economic growth is brought about by accumulation of both physical and human capital. The methodology used was Ordinary Least Squares (OLS). This method assumed linearity, which might not have been present.

Singh and Weber (1997) did a study on the composition of government expenditure and economic growth. The variables used were infrastructure, justice, defense, education and agriculture expenditure. The study analyzed Swiss time-series data from 1950 to 1994. The estimation technique used by the research was polynomial distributed lag model. The research found that outlays for transport, infrastructure, justice and defense were growth enhancing. Agricultural expenditure as a whole needed further examination, and education expenditure evidence was mixed. This was because of complex relationship between education expenditure and economic growth. The results emphasized that the composition of government expenditure was crucial for the economic growth. The weakness of this study is that due to short period, the estimation technique used may lead to a considerable loss of the degrees of freedom.

Kneller *et al*. (1999) used panel data of 22 OECD countries for the period 1970 to 1995. The variables used were government investment, government consumption, other types of government expenditure and taxes. The method employed to estimate the effect of government expenditure on economic growth was General Methods Moments (GMM). The results were that government investment enhanced economic growth while government consumption did not.

Ghali (1999) did a study on the effect of government expenditure on economic growth. The study used time-series data for OECD countries from 1970 to

1995. The variables were government investment, exports and imports. The results were that government expenditure Granger-causes growth directly for most of the countries. The study only considered the Granger- Causality test but not the effects of government expenditure on economic growth.

Tanninen (1999) used panel data of 52 countries for the period 1970-92. The method of estimation employed by the study was General Methods Moments (GMM). The variables used were investment, categories of government expenditure and income inequality. The study found that government expenditure and consumption had negative impact on economic growth, public spending on public goods was growth retarding for large government expenditure but not for small government expenditure, while social security spending was positively related to economic growth.

Njuguna (1999b) used time-series data for the ASEAN countries from 1960-1995. The variables used in the study were budget deficit exchange rate and the balance of current account. The study used the technique of ordinary –least squares to investigate how budget deficit, exchange rate and current account position can affect economic growth of a country. The results were that repeated violation of the budget ceilings set by the government leads to increased budget deficit over the period. If a country is incurring huge budget deficit, the public debt increases continuously. The growing debt puts upward pressure on interest rates, leading to financial crowding out. The rising interest rate also prompts appreciation of the nominal exchange rate, as more

foreign currency would be available because of foreigner's demand for domestic assets. The appreciation of the exchange rate makes exports expensive and imports cheap, thereby worsening the current account position. This translates to reduction in the national income.

The weaknesses of the study include the following. The study only looked at the overall budget utilization but did not look at the allocation of the government resources. Furthermore, the study was based on neo-classical growth theory which assumes the diminishing returns of inputs and does not incorporate any component of government expenditure. Finally, the study did not conduct cointegration test to ensure that results are not spurious and Granger–Causality test for direction of variables

Dunne and Nikoloidou (1999) used the time-series data on Greece for the period 1960 to 1996. The variables used were military expenditure, defense and government consumption. The study employed the Ordinary Least Squares and conducted stationarity tests and cointegration analysis. The results were that military/defense expenditure had a negative effect on economic growth, and government consumption did not affect growth. The study used OLS, which does not produce good estimates in the case of insufficient theory linking the variables.

Muhlistal (2000) in the study on the relationship between government expenditure and economic growth in Turkey found no co-integration between

GDP and government expenditure. This means that there was no long-run relationship between government expenditure and GDP. On the basis of the Granger Causality Tests, the research also found that growth of government expenditure had no effect on economic growth. The methodology used was that of OLS based on the time-series data. This model is not appropriate since it assumed linearity of variables which may not be the case as far as government expenditure variables are concerned.

Colombier (2000) did a study on the composition of government expenditure and its affect on economic growth using time-series data for Switzerland. The variables used were social welfare, health care, education, transport infrastructure, agriculture, water and sewer systems, justice and defense and general government expenditure. The estimation method was the modified m-estimator (MME), where m stands for generalized maximum likelihood estimator. The results provided strong evidence that government outlays on transport infrastructure, justice and defense were vital for output growth. In contrast, health care expenditure appeared to hamper growth. There was also evidence that education boosted economic growth. This model can not be used to indicate the impulse effect of the government expenditure components on economic growth.

M'Amanja and Morrisey (2005) investigated the effects of fiscal policy on economic growth in Kenya. The study used endogenous growth theory based on the production function

$y = Ak1-\alpha g\alpha$----------(2.7)

where y was the per capita output, k was the per capita private capital, A was the production technology, and g was the government provided goods and services. The study employed a Cobb-Douglas-type production function, with government provided goods and services (g) as an input to show the positive effect of productive government spending and the adverse effects associated with distortionary taxes.

The technique used to estimate the equation was autoregressive distributed lag (ADL). The equation was estimated using time-series data. The study found that fiscal policy mattered for economic growth. Productive consumption and public investment had a role in determining growth of real per capita income in Kenya. Productive consumption seemed to have a strong negative effect on growth, suggesting that composition of this expenditure category needed to be re-examined with a view to re-organize it so that it contributes to economic growth. On the other hand, the study suggested that boosting public investment could enhance its complementarity role to private investment and hence enhance growth.

The lesson learned from this study is that government should increase its own investment in areas that are beneficial to the private sector and reduce those that compete with or crowd it out. The research also concluded that any austerity measures aimed at reducing government expenditure should not be achieved by budgetary cuts on development budget as is often the case in

Kenya, for this reduced public investment. Consistent with theoretical prediction, unproductive consumption expenditure and distortionary taxes had neutral effects on growth. The study suffers from misspecification because taxes were used and yet they represent the financing of government expenditure. The study was very aggregative since all government expenditures were grouped into productive and unproductive, of which it is not possible to know which is productive or unproductive before estimation. The study used non fiscal variables such as private investment, school enrolment and foreign aid in form of grants. The study would have been more informative had it included variables such as government expenditure on education and health, which was included in the present study.

Njuguna (2009a) studied the government expenditure and economic growth in Kenya using time series data for the period 1963 to 2006. The study investigated how levels of real capital expenditure on health, education, agriculture, defense, general administration economic and social services and other expenditure affect economic growth of the country. In investigating the crowding in and out effect of the private sector by government expenditure, the study adopted a simple correlation analysis based on the argument that government expenditure on various programmes does affect private individuals decisions. The model used was:

$$ZI_t = g(E_t)$$

where $E = I_{Br} + W_{gr} + D_{Br} + \gamma_{gr}$ ----------(2.8)

Z_{it} was real private investment level at time t, I_{Br} was public capital expenditure, W_{gr} was real government wage bill, D_{Br} was real debt service, E_t was real total government expenditure, and γ_{gr} was real operations and maintenance of the government. The results of the study showed that there was need for the government to prioritize expenditure allocations in the productive sectors of the economy, for example, agriculture, health, infrastructure and education and streamline others.

The strength of the study is that it disaggregated the total government expenditure into sectors. This is important because various sectors of the economy have different contributions unlike the study by M'Amanja and Morrisey (2005), which aggregated the total government expenditure in productive and unproductive expenditure. The weakness of the study includes the failure to test for causality and show the impulse response of government expenditure on economic growth. The current research tested for causality and using Vector-Auto Regression approach, it also shows the impulse responses of government expenditure on economic growth.

2.4 Overview of Literature

It is evident from the foregoing empirical literature that most studies were cross-sectional and specific country studies were rare. This meant that their general conclusions could not be useful for policy decision in individual countries because of diversity of their experiences and policies taken.

The current study has attempted to overcome the shortcomings of generalization by analyzing the impact of components of government expenditure and reforms on economic growth of Kenya.

Majority of the studies reviewed used Ordinary Least Square method to estimate the relationship between government expenditure and economic growth. Such an econometric approach is inadequate in accounting for complexity of relationship between macroeconomic variables. Estimation of structural equations without even testing for causality may not be plausible given that majority of the macroeconomic variables could not have a direct theoretical relationship. Failure to test for cointegration between the variables could result to spurious results.

To overcome these shortfalls, this study tested the time series data used for the presence of unit roots, cointegration analysis were performed from which inferences on the long-run relationships between the variables were derived. Granger-causality tests between the components of government expenditure and economic growth was conducted before finally using the Vector Autoregressions (VAR) to generate the impulse response functions to account for the effects of various components of government expenditure and reforms on economic growth. The VAR methodology was preferred to methodologies used by other studies because of the weak theoretical link between the variables

Previous studies on Kenya mostly focused on public policy in general, where government expenditure was divided into productive and unproductive (M'amanja and Morrissey, 2005) and crowding-out effect of public expenditure as examined by Koori (1984) and Njuguna (2009a).

Overall, the reviewed literature has provided evidence that government expenditures on physical infrastructure, education and health care are growth enhancing. Also some evidence has been found that expenditure typically not characterized as productive such as certain kinds of social benefits and justice and defense could as well be conducive to economic growth. This study has considered additional components of government expenditures that previous studies omitted. This includes economic affairs, general administration and services, public debt servicing, public order and national security, and government expenditure reforms.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter presents the empirical model adopted for the study. The variables used in the study are defined. The data, the data sources and the methods used in data analysis are explained.

3.2 Research Design

This study aimed at establishing the effects of government expenditure on economic growth in Kenya. Quantitative data were used in the study to answer the research questions posed in chapter one. The study used data for the period 1963 to 2008 for the components of government expenditure, namely: government investment, physical infrastructure, government consumption, public debt servicing, general administration and services, defense, public order and national security, education and training, health care and economic affairs. The VAR model was used for estimation after undergoing time-series property tests.

3.3 Theoretical Framework

This study used a modified version of Ram (1986) model based on endogenous growth theory. The model was chosen because it captured most of the government expenditure variables, which could easily be disaggregated into various sectors. In addition, the model showed clearly how the expenditure by government exercised an externality effect on output in the

other sector (private). Furthermore, the model was able to show the intersectoral productivity differentials of the government expenditure. The endogenous growth theory formed a basis for empirical models of government expenditure and growth. This is because growth could arise when capital and labour are augmented by additional government input in the production function. This input provides the link between government expenditure and economic growth. The model was derived from private sector output (*D)* and public sector output (*G)*, with capital (*K*) and labour (*L*) allocated between both sectors such that $K = K_D + K_G$ and $L = L_D + L_G$. To capture externalities associated with the public sector, *G* entered the production function of the private sector *D*:

$$D = D(K_D, L_D, G) \quad \text{(3.1)}$$

$$G = G(K_G, L_G) \quad \text{(3.2)}$$

.

Assuming a constant productivity differential between labour in both sectors:

$$\frac{G_L}{D_L} = \frac{G_K}{D_K} = (1+\delta) \quad \text{(3.3)}$$

where $\delta > 0$ implies lower productivity in the public sector (the reverse would be the case if $\delta < 0$) and $\delta \neq 0$

Totally differentiating (3.1) and (3.2), given that national income $Y = D + G$, gives

$$dY = D_K dK_D + G_K dK_G + D_L dL_D + G_L dL_G + D_G dG \quad \text{(3.4)}$$

where D_K and G_K were marginal products of factor *K* in sector *D* and *G* respectively.

Similarly, D_L and G_L were marginal product of factor *L*. Further, $D_{G\ was}$ the marginal externality effect of public on private sector. From (3.3):

$$G_L = (1+\delta)D_L \text{ ……..……(3.5)}$$

Substituting (3.5) into (3.4) and rearranging:

$$dY = D_K dK_D + G_K dK_G + D_L dL_D + D_L dL_G + \delta D_L dL_G + D_G dG$$

$$dY = D_K dK_D + G_K dK_G + D_L (dL_D + dL_G) + \delta D_L dL_G + D_G dG \text{ ……..……(3.6)}$$

Using (3.5) then:

$$dG = G_K dK_G + (1+\delta)D_L dL_G$$

This implied:

$$\frac{dG}{(1+\delta)} - \frac{G_K}{(1+\delta)} dK_G = D_L dL_G \text{ ……..……(3.7)}$$

Substituting (3.7) into (3.6) and collecting terms:

$$dY = D_K dK_D + G_K dK_G + D_L (dL_D + dL_G) + \delta\left[\frac{dG}{(1+\delta)} - \frac{G_K}{(1+\delta)} dK_G\right] + D_G dG$$

$$dY = D_K dK_D + G_K dK_G + D_L dL_D + D_L dL_G + \delta\left[\frac{dG}{(1+\delta)} - \frac{G_K dK_G}{(1+\delta)}\right] + D_G dG$$

$$dY = D_K dK_D + D_L dL_D + G_K dK_G + \left[\frac{dG}{(1+\delta)} - \frac{G_K dK_G}{(1+\delta)}\right] + \delta\left[\frac{dG}{(1+\delta)} - \frac{G_K dK_G}{(1+\delta)}\right] + D_G dG$$

$$dY = D_K dK_D + D_L dL_D + G_K dK_G + (1+\delta)\left[\frac{dG}{(1+\delta)} - \frac{G_K dK_G}{(1+\delta)}\right] + D_G dG$$

$$dY = D_K dK_D + D_L dL_D + G_K dK_G + dG - G_K dK_G + D_G dG$$

$$dY = D_K dK_D + D_L dL_D + (1+D_G)dG \text{.....(3.8)}$$

Assume the existence of a linear relationship between the marginal products of labour in each sector and the average output per unit of labour in the economy, that is $D_L = \left(\frac{Y}{L}\right)$

Letting $dK_D = I$ (gross investment), and substituting it into (3.8), then dividing through by *Y* gave:

$$\frac{dY}{Y} = \frac{D_K I}{Y} + \frac{D_L dL_D}{Y} + \frac{(1+D_G)dG}{Y}$$

$$D_L = \frac{Y}{L}$$

$$\frac{dY}{Y} = D_K \frac{I}{Y} + \frac{\frac{Y}{L}dL_D}{Y} + \frac{(1+D_G)dG}{Y}$$

$$\frac{dY}{Y} = D_K \frac{I}{Y} + \frac{dL_D}{L} + \frac{(1+D_G)dG}{Y} \quad \text{.....(3.9)}$$

However, assuming that $D_K = \alpha$, $(1+D_G) = \lambda$ and including a coefficient for $\frac{dL_D}{Y}$ variable, the equation (3.9) became:

$$\frac{dY}{Y} = \alpha \frac{I}{Y} + \beta \frac{dL_D}{L} + \lambda \frac{dG}{Y} \quad \text{.....(3.10)}$$

where equation (3.10) corresponded to Ram (1986) equation. Thus, equation (3.10) formed the basic model for regression estimation. The theoretical framework presented above predicts that economic growth ($\frac{dY}{Y}$) responds to the ratio of gross investment (I) to GDP, growth of labour force $\frac{dL_D}{Y}$ and the

ratio of government consumption to GDP ($\frac{Cg}{Y}$). The mechanisms through which government expenditure may affect economic growth are as follows. First, government investment in infrastructure is believed to have a direct effect on economic growth through increasing the economy's capital stock. The second channel is the externality effect of government spending that alters economic growth indirectly by raising the marginal productivity of privately supplied factors of production through expenditure on education, health and other services, which contribute to the accumulation of human capital. The third channel is government expenditure on goods and services that increases the aggregate demand in the economy. The fourth channel is intersectoral productivity differentials which makes some sectors to be more productive than others (Ag'enor, 2007).

3.4 The Empirical Model and Estimation Technique

In order to estimate the growth effects of the composition of government expenditure and take care of the intersectoral productivity differentials, equation (3.10) was modified by disaggregating investment into government investment and physical infrastructural. There was no time-series data on $\frac{dL_D}{Y}$. Therefore, the study used human capital development. This is because it captured the changing quality and stock of the labour force, and as such, was preferred to $\frac{dL_D}{Y}$. Government expenditure on education and health contribute to accumulation of human capital development. There were core

functions of the government that could improve economic efficiency and thereby improve economic growth. These were protective and provision of a limited set of collective goods. The protective function included establishment of rule of law and property rights as exemplified by public order and national security. This helped to reduce the risks of criminal offences and social unrest so that safe and stable institutional environment for economic activities could be created. The involvement in producing goods for collective consumption included defense and general administration and services.

Government is also involved in direct production of goods and services in the economy. Further borrowing that was required to finance growing government expenditure could affect economic growth as well. To capture these influences, the study added expenditure on economic affairs and services, and the public debt servicing variables to Rams equation (3.10). The modified Rams model became:

$$\frac{dY}{Y} = \alpha_0 \frac{I}{Y} + \alpha_1 \frac{PI}{Y} + \alpha_2 \frac{ED}{Y} + \alpha_3 \frac{HT}{Y} + \alpha_4 \frac{PD}{Y} + \alpha_5 \frac{EA}{Y} + \alpha_6 \frac{GA}{Y} + \alpha_7 \frac{DE}{Y} + \alpha_8 \frac{NS}{Y} + \alpha_9 \frac{Cg}{Y} \quad \text{.....(3.11)}$$

where: I is the government investment, PI is the physical infrastructure expenditure, ED is education expenditure, HT is health expenditure, PD is the debt servicing expenditure, EA is expenditure on economic affairs, GA is general administration and services expenditure, DE is the defense expenditure

and NS is expenditure on the national security and public order by the government.

To capture the effects of government expenditure reforms on economic growth, a vector of dummy variables D_j was added to the above specification so that:

$$\frac{dY}{Y} = \alpha_0 \frac{I}{Y} + \alpha_1 \frac{PI}{Y} + \alpha_2 \frac{ED}{Y} + \alpha_3 \frac{HT}{Y} + \alpha_4 \frac{PD}{Y} + \alpha_5 \frac{EA}{Y} + \alpha_6 \frac{GA}{Y}$$
$$+ \alpha_7 \frac{DE}{Y} + \alpha_8 \frac{NS}{Y} + \alpha_9 \frac{Cg}{Y} + \alpha_{10} D_j \quad \text{.....(3.12)}$$

where D_j are dummy variables representing j = 1, 2, 3…N government expenditure reforms.

Due to insufficient theories linking the above variables, the growth rate of GDP was not functionally explained by the explanatory variables on the right hand side of equation (3.12). Growth effects of government expenditure components could also emerge rather gradually overtime because they are complementary to private investments. These prompted the use of (VAR) method. This was because VAR model is a theory-free method used for the estimation of economic relationships (Sims, 1980 and Kosimbei, 2009).

VAR captured the evolution and the interdependence between multiple time-series, generalizing the univariate Auto Regressive (AR) models (Stock and Watson, 2001). All the variables in a VAR were treated symmetrically by

including an equation explaining evolution of each variable based on its own lags and the lags of all the other variables in the model. The VAR model was preferred because all variables in the model were endogenous and each variable were expressed as a linear function of its own lagged values and the lagged values of all other variables in the system (Cheng and Lai, 1997). VAR was also used to test for causality between two or more variables.

Three different types of VAR models exist: The reduced form VAR, the recursive VAR and the structural VAR. The recursive and structural VAR had the same form at the level of matrix equations. The reduced VAR overrun the need for structural modeling by modeling every endogenous variable in the system as a function of the lagged values of itself and of all the endogenous variables in the system (Engle and Granger, 1987). The reduced form and the recursive VAR models were statistical models that utilized no economic structure beyond the choice of variables. The compact form of a VAR is represented as:

$$X_t = A_0 + A_1 X_{t-1} + A_2 X_{t-2} + ... + A_p X_{t-p} + e_t \quad \text{..... (3.13)}$$

where A_0 is n x 1 vector of constant terms, A_1, A_2, ……., A_p are n x n matrices of coefficients, X_t is n x 1 vector of the endogenous variables and e is a vector of serially uncorrelated error terms that have a mean of zero and a covariance of matrix ϕ.

The use of structural VAR was justified because of the possibility to stimulate the response over time of any variable in a set to either an own disturbance or

a disturbance to any other variable in a system of equations (Stock and Watson, 2001). A structural VAR was used to examine the relationships among a set of economic variables, and analyze the dynamic impact of random disturbances on the system of variables in this study. In the framework, each variable irrespective of whether it was measured at levels or first differences was treated systematically. Hence, all variables in the system contained the same set of regressors (McCoy, 1997). There were no exogenous variables and no identifying restrictions. The only role for economic theory was to specify the variables to be included. The structural VAR, therefore, estimated the structural coefficients by imposing contemporaneous structural restrictions based on the economic theory.

From equation (3.12), a system of reduced form structural VAR to test for the impact of government expenditure on economic growth was estimated. In this type of VAR model, each variable was regressed on a constant variable Cij, p lags of itself, p lags of each of the other variables and the disturbance term et. The choice of the lag length (p) was determined using the Akaike (AIC) and the Schwarz Information Criterion (SIC). There was a preference for longer lag lengths because they captured the dynamics of the system being modeled. However, they reduced the degrees of freedom and increased data requirements. This called for tradeoff between having sufficient number of lags and a sufficient number of parameters to estimate or need for more data.

The estimated coefficients of the VAR were meaningless because they lacked the theoretical underpinning (Enders, 1995). However, the coefficients of VAR were used in the derivation of impulse responses and to forecast variance decomposition. Impulse response analysis linked the current value of the error term to the future values of the variables included in the VAR or equivalently, the current and past values of the variables included in the VAR. The forecast error decomposition measured how important the error in the jth equation was for explaining unexpected movements in the ith variable (Enders, 1995).

3.5 Definition and Measurements of Variables

GDP growth rate ($\frac{dY}{Y}$): Is the average annual growth rate of real GDP. It was measured by change in GDP at constant prices as share of GDP.

Government investment expenditure (I): is the payment for acquiring land, buildings and other non financial assets to be used for more than one year in the process of production, including transfers for capital assets. It was measured as the total capital expenditure including gross fixed capital formation and capital transfer as a ratio of GDP.

Physical infrastructure expenditure (PI): It is the government expenditure on capital overheads. It was measured as development expenditure on transportation, communication, electricity and waterways as a ratio of GDP.

Education expenditure (ED): Consists of all capital and current expenditure made by the central government for pre-primary through tertiary

education. It was used as proxy for human capital development that affects the labour force. It was measured as the total expenditure on education (current and capital) as a ratio of GDP.

Health expenditure (HT): It consists of all expenditure made by the central government for hospitals, clinics, and public health affairs and services for medical, dental and paramedical practitioners; for medication, medical equipment and appliances; for applied research and experimental development. It was used as a proxy for human capital development that affects the labour force. It was measured as the total health expenditure (current and capital) as a ratio of GDP.

Public debt servicing (PD): It is the interest payments made by the central government for the use of all borrowed money both domestic and external. It was measured as the total interest payment for both domestic and external debts as a ratio of GDP.

Economic affairs expenditure (EA): It consists of all expenditure associated with the regulation and operation of business for economic development, redressing regional imbalances and creating employment opportunities. It was measured as the total expenditure on economic services (current and capital) as a ratio of GDP.

General administration and services expenditure (GA): It is the government expenditure in the office of the President, which includes administration police, provincial administration and criminal investigation department. It was measured as the total expenditure on

general administration and services for both current and capital as a ratio of GDP.

Defense Expenditure (DE): This is the administration, supervision and operation of military defense affairs and forces: land sea, air and space defense force; administration, operation and support of civil defense forces. It was measured as the total defense expenditure (current and capital) as a ratio of GDP.

Public order and national security expenditure (NS): It represents the administration, management, supervision and operation of judicial services including the high court, the court of appeal, magistrate and Kadhi courts. It was measured as the total expenditure on public order and security for both current and capital as a ratio of GDP.

Government consumption expenditure (Cg): It is the current expenditure on purchases of goods and services at all levels of government. It encompasses purchases of materials, office supplies, fuel and lighting, travel services and payment of rent. It was measured by the recurrent government expenditure on labour costs and other goods and services as a ratio of GDP.

Budget rationalization (D1): It is the re-allocation of government expenditure from less productive to more productive projects of the government. It was equal to one during the years of budget rationalization and zero otherwise.

Expenditure downsizing and outsourcing (D2): It is the reduction in cost as a result of reducing the number of civil servants. It was a dummy

variable that assumed the value of one in the years 1991, 1993, 1994 and 2002 when Kenyan government implemented the golden handshake and comprehensive civil service reforms, and zero otherwise.

Privatization (D3): Is the sale of government enterprises to private individuals or companies. It was a dummy variable that assumed the value of one in 1991 onwards when the government started to carry out a comprehensive parastatal privatization and restructuring programme, and zero otherwise.

Governance (D4): It is the electoral and political processes. It was a dummy variable that assumed the value of one in 1992 when Kenya had the first multiparty election, in 2002 when there was a change in government, and in 2007 when coalition government was put into place, and zero otherwise.

3.6 Data Source, Collection, Cleaning and Refinement

The research used secondary data for the period 1963 to 2008 to analyze the effects of government expenditure on GDP growth rate. Data for the study was collected through analysis of documents. Before data collection was done, identification of the data sources and design of suitable data template was done. Caution was taken to ensure consistency in the source of data for all the variables. More than one source of data for a given variable was only allowed if the original source did not have data for the entire series. Under such

circumstances, any differences in definition and measurement was noted and corrected accordingly.

Data on GDP growth rate and the components of government expenditure were obtained from government official documents such as Republic of Kenya's Statistical Abstracts, Economic Surveys, Development Plans, Budget Speeches, Sessional Papers, Central Bank of Kenya publications, Finance Bills, Economic Reports both published and Unpublished, and other sources, including the International Financial Statistics, the World Tables, the Government Financial Statistics and the World Development Reports.

All the data collected from the various sources were entered in the data sheet and cleaned appropriately. All nominal variables were converted to real values measured in constant (2000) Kenya shillings. The year 2000 was chosen as the base year because most macroeconomic variables showed normal performance during this year. Furthermore, apart from being a more recent year, it was a year during which few changes were experienced in the economy (Kosimbei, 2009). The time-series data for average GDP was converted from nominal values to its real values by dividing nominal values with the GDP deflator using 2000 as the base year. The deflator was chosen because it is the most comprehensive price index for GDP (Branson, 1989 and Wawire, 2006). Furthermore, it measures inflation correctly, since it is a weighted average of the changes in all prices of newly produced goods in the economy. Hence, "it has the advantage of incorporating all the newly produced goods in the

economy and allows for changes in composition of output" (Wawire, 2006: 50)

The reason for the conversion of nominal average GDP to real average GDP was that the nominal average figures did not reflect changes in production and income caused by inflation that leads to prices rising when the quantities are falling. Furthermore, the real values were measures of aggregate production that eliminated the effects of inflation and showed what happened to economic activities apart from the movement in prices.

Data for government spending was converted into calendar years because economic growth was in calendar year. Some adjustments were done to convert time-series data from fiscal years to calendar years by taking simple averages. Data on nominal spending were converted from their nominal values to their real values by dividing nominal values with the consumer price index (CPI) using 2000 as base year. The CPI was used because it falls on the expenditure side of the GDP equation. Furthermore, CPI is more of a cost-of-living index (Wawire, 2006).

The reason for the conversion of nominal expenditure to real expenditure was that nominal values did not indicate actual changes in expenditure. Real values removed the effect of changes in the value of money so that the expenditure figures were not calculated in terms of inflationary prices. Furthermore, real values indicate real improvement or deterioration (Trotman, 1997).

3.7 Time -Series Properties

3.7.1 Stationarity of Data

The first step involved testing for stationarity of the series. This is a standard procedure performed to ensure that the series have a constant mean and variance, so that the resultant regression results would be meaningful (Tsay, 2001). Otherwise, if stationarity of the series is present and not checked, the presence of trend in the data series would mean that the regression results are spurious.

Two main methods for testing stationarity or the presence of unit roots that were applied are the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests (Perron, 1989). 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. Therefore, PP test is desirable because it does not require estimation of additional parameters that would require additional data and also may not exhaust degrees of freedom.

The basic equation used in the PP test remains the same as the one used in the ADF test. The ADF tests the null hypothesis that $/\rho/ = 0$ against an alternative that $/\rho/ < 0$ in the autoregressive equations:

(i) ADF without intercept and trend

$$\Delta y_t = \rho y_{t-1} + \sum_{i=1}^{k} \delta_i \Delta y_{t-1} + u_t \quad \text{.....(3.14)}$$

(ii) ADF with an intercept but no trend

$$\Delta y_t = \alpha + \rho y_{t-1} + \sum_{i=1}^{k} \delta_i \Delta y_{t-1} + u_t \quad \text{.....(3.15)}$$

(iii) ADF with both the intercept and trend

$$\Delta y_t = \alpha + \beta_t + \rho y_{t-1} + \sum_{i=1}^{k} \delta_i \Delta y_{t-1} + u_t \quad \text{.....(3.16)}$$

In this study, both ADF and PP techniques were used to test for the presence of unit roots.

3.7.2 Cointegration

The use of cointegration technique allowed the study to capture the equilibrium relationship between non-stationary series within a stationary model, following Adam (1998), and Johnston and Dinardo (1997). Furthermore, it avoided both spurious and inconsistent regression problems, which would have otherwise occurred with the regression of non-stationary data series. It also permitted the combination of the long-run and short-run information in the same model and overcame the problems of losing information that could have occurred from attempts to address non-stationary series through differencing (Adam, 1998). Cointegration technique made it

possible to capture the information of non-stationary series without sacrificing the statistical validity of the estimated equation (Stock and Watson, 1988).

Two main tests for cointegration, namely Johansen cointegration test and the Granger two step methods were used. Johansen's methodology, which was expressed as a VAR of order p is given by:

$$y_t = u + A_1 y_{t-1} + ... + A_p y_{t-p} + \varepsilon \quad (3.17)$$

where y_t is an n x 1 vector of innovations. This VAR can be re-written as

$$\Delta y_t = u + \Pi y_{t-1} + \sum_{i=1}^{\rho-1} \Gamma_i \Delta y_{t-1} + \varepsilon_t \quad (3.18)$$

where

$\Pi = \sum A_i - I$ and

$$\Gamma_i = -\sum_{j=i+1}^{p} A_j \quad (3.19)$$

If the coefficient matrix Π reduced rank r < n, then there exist n x r matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta' y_t$ is stationary. r is the number of cointegrating relationships. The elements of α are known as the adjustment parameters in the vector correction model, and each column of β is a cointegrating vector. It has been shown that for a given r, the maximum likelihood estimator of β defined the combination of y_{t-1} that yielded the r largest canonical correlations of Δy_t with y_{t-1} after correcting for lagged differences and deterministic variables (Johansen, 1995). Johansen proposed

two different likelihood ratio tests of the significance of these canonical correlations and thereby the reduced rank of the Π matrix. The trace test and maximum Eigen value test are shown in equation (3.19) and (3.20), respectively.

$$J_{trace} = -T\sum_{i=r+1}^{n} In\left(1-\lambda^{'}\right) \quad \text{.....(3.20)}$$

$$J_{\max} = -TIn\left(1-\lambda^{'}\right) \quad \text{.....(3.21)}$$

where T is the sample size and $\lambda^{'}$ is the i^{th} largest canonical correlation. The trace test tested the null hypothesis of r cointegrating vectors against the alternative hypothesis of n cointegrating vectors. The maximum Eigen value test, on the other hand, tested the null hypothesis of r contegrating vectors against the alternative hypothesis of r+1 cointegrating vectors.

The residual based cointegration test introduced by Engle and Granger, (1996) by analogy of equation (3.21) involves testing the significance of the coefficient in the Ordinary Least Squares (OLS) regression of:

$$\Delta u = \rho u_t + \varepsilon_t \quad \text{.....(3.22)}$$

where u_i is the residual. The test postulates that if the residuals from the OLS estimation of the non-stationary variables are stationary, then the series are cointegrated. If the residuals exhibits a stationary trend, it implies that the Error Correction Model (ECM) be done on the variables at their first difference. However, the long-run characteristics of the data will be lost.

Therefore, the study used the Johansen cointegraion method to test for the long-run relationship between the variables and not ECM.

3.7.3 Granger Causality Test

Granger causality was used to determine whether one time series was useful in forecasting another (Enders, 1995). The VAR equations were used to perform Granger causality tests. The F-statistics tested the null hypothesis that the coefficients on lagged values of a variable are zero in the equation of the other variable against the alternative hypothesis that the coefficients on lagged values of a variable are not zero in the equation of the other variable. The null hypothesis is rejected when F-statistics is greater than the p-value.

3.8 Data Analysis

The study addressed four objectives. The first objective was to investigate the relationship between government expenditure and economic growth. This was done by use of multivariate cointegration analysis. Johansen's (1988) cointegration and Granger causality tests were conducted. The second objective involved examining the effects of government expenditure on economic growth. This was done by the estimation of the Vector Autoregression model of the suitable form of equation (3.13) and the subsequent use of Impulse Responses and Variance Decomposition Analysis. The third objective of analyzing the effects of government expenditure reforms on economic growth was achieved by including fiscal reforms variables as explanatory variables in the estimating equation.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1 Introduction

This chapter presents the findings of the study. First, the relationship between economic growth and components of government expenditure, namely government investment, expenditure on physical infrastructure, expenditure on health care, expenditure on education, public consumption, general administration and services, defense, public debt, economic affairs, public order and national security is explained. Second, the effects of the components of government expenditure on economic growth are estimated. Finally, the chapter explains the impact of budget rationalization, downsizing, outsourcing, privatization policies and governance on economic growth.

4.2 Government Expenditure and Economic Growth

The first objective of this study was to investigate the relationship between the components of government expenditure and economic growth. The study was expected to establish whether there was a short run or long run relationship between government expenditures on investment, physical infrastructure, education, health, public debt, national security, economic affairs, general administration, public consumption, defense and economic growth.

4.2.1 Findings of stationarity tests

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 4.1.

Table 4.1: Unit roots tests results

Variables			Unit Root Test			
			ADF test		PP test	
			t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)
GDP Growth Rate	Levels	Constant	-3.93**	-2.89	-4.81**	-2.89
		Constant and Trend	-3.95*	-3.46	-4.81**	-3.45
Ratio of Government Investment Expenditure to GDP	Levels	Constant	-3.45*	-2.89	-4.48**	-2.89
		Constant and Trend	-3.65*	-3.46	-4.57**	-3.45
Ratio of Physical infrastructure Expenditure to GDP	Levels	Constant	-2.75	-2.89	-3.84**	-2.89
		Constant and Trend	-3.28	-3.46	-4.16**	-3.45
Ratio of Education Expenditure to GDP	Levels	Constant	-3.54**	-2.89	-4.63**	-2.89
		Constant and Trend	-3.50*	-3.46	-4.62**	-3.45
Ratio of Health Care Expenditure to GDP	Levels	Constant	-3.70**	-2.89	-4.66**	-2.89
		Constant and Trend	-3.67	-3.46	-4.63**	-3.45
Ratio of Public debt Servicing Expenditure to GDP	Levels	Constant	-3.28*	-2.89	-4.43**	-2.89
		Constant and Trend	-3.35	-3.46	-4.49**	-3.45
Ratio of Economic Affairs Expenditure to GDP	Levels	Constant	-3.38*	-2.89	-4.51**	-2.89
		Constant and Trend	-3.68*	-3.46	-4.68**	-3.45
Ratio of General administration and Services Expenditure to GDP	Levels	Constant	-3.54**	-2.89	-4.60**	-2.89
		Constant and Trend	-3.69*	-3.46	-4.70**	-3.45
Ratio of Defense Expenditure to GDP	Levels	Constant	-3.26*	-2.89	-4.43**	-2.89
		Constant and Trend	-3.30	-3.46	-4.42**	-3.45
Ratio of Public Order and National Security Expenditure to GDP	Levels	Constant	-3.28*	-2.89	-4.49**	-2.89
		Constant and Trend	-3.42	-3.46	-4.58**	-3.45
Ratio of Government consumption Expenditure to GDP	Levels	Constant	-3.43*	-2.89	-4.61**	-2.89
		Constant and Trend	-3.41	-3.46	-4.59**	-3.45
*(**) denotes rejection of the hypothesis at 5% (1%) significant level						

Source: Constructed from the Study Data

The results of unit roots tests showed that GDP growth rate, ratio of government expenditure on investment to GDP, ratio of physical infrastructure to GDP, ratio of education expenditure to GDP, ratio of health care expenditure to GDP, ratio of public debt servicing expenditure to GDP, ratio of public order and national security expenditure to GDP, ratio of expenditure on economic affairs to GDP, ratio of general administration and services expenditure to GDP, ratio of public consumption expenditure to GDP and ratio of defense expenditure to GDP were stationary and integrated of order I(0). This suggested that there was a long-run relationship between ratio of government investment, ratio of physical infrastructure, ratio of education, ratio of health care, ratio of public debt servicing, ratio of public order and national security, ratio of economic affairs, ratio of general administration and services, ratio of public consumption and ratio of defense and GDP growth rate variables (Engle and 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 stationrity as compared to the ADF.

Johansen test was then carried out to investigate whether there was more than a single cointegration relationship between economic growth and the government expenditure variables. The results of the Johansen tests of variables are reported in Table 4.2.

Table 4.2 The Johansen cointegration test

Eigen value	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.96	1308.53**	233.13	247.18	None
0.95	1044.01**	233.13	247.18	At most 1
0.93	807.02**	192.89	205.95	At most 2
0.89	592.52**	156.00	168.36	At most 3
0.81	415.25**	124.24	133.57	At most 4
0.78	281.30**	94.15	103.18	At most 5
0.52	161.20**	68.52	76.07	At most 6
0.43	102.14**	47.21	54.46	At most 7
0.36	57.72**	29.68	35.65	At most 8
0.20	22.39**	15.41	20.04	At most 9
0.04	3.82*	3.76	6.65	At most 10
*(**) denotes rejection of the hypothesis at 5% (1%) significant level L.R. test indicates 11 cointegrating equations at 5% significant level				
Series: Government consumption, defense, economic affairs, education, health, GDP growth, general administration, public order and national security, public debt, government investment, physical infrastructure				

Source: Constructed from the Study Data

In the Johansen procedure, the likelihood ratio (LR) test is used to test the significance of estimates of Eigen values. The results in Table 4.2 showed the existence of a cointegrating relationship between GDP growth rate, government investment, physical infrastructure, public consumption, defense, economic affairs, education, general administration, health, national security and public debt. The LR test indicated eleven cointegrating equations at 5 percent level of significance. This meant that the variables had a long-run

relationship, which could not necessarily hold in the short-run (Enders, 1995). The evidence of cointegration also ruled out the possibility of spurious correlation. Moreover, the cointegration tests results presented in table 4.2 revealed that the variables in their level form had a long-run relationship and hence the model estimation could be conducted in the standard Sims-type VAR at levels (Enders, 1995).

Nevertheless, the cointegration result did not point the direction of the long-run relationship between variables. Since there was evidence of cointegration, then this implied that there must be Granger-causality from GDP growth rate to government expenditure, or vice versa, or both. Therefore, the next step was to carry out Granger-causality tests. It is a technique for searching the direction of causation between variables after the existence of cointegration (Kalyoncu and Yucel, 2006).

Granger causality was used to determine whether one time series was useful in forecasting another (Enders, 1995). Prior to the application of the test, the study had to determine the appropriate VAR model. This was done by conducting diagnostic tests.

4.2.2 VAR diagnostic tests

Several diagnostic tests were performed to check the appropriateness of the estimated VAR. They ensured that the study did not end up with spurious VAR estimation results. The results are presented in table 4.3. The result

showed that the VAR system was stable at both lag 1 and 2. However, since there was serial correlation at lag of order 2, VAR system of lag of order 1 was preferred. The lag exclusion test indicated lag one as important in the VAR system which supports the lag selection criteria.

Table 4.3: VAR diagnostic statistics

VAR Condition Check	Statistic	Conclusion
Stability condition	Roots of the polynomial are within unit cycle. Highest is 0.946	VAR is stable
Lag Exclusion Test	Wald test for 1 lags, 225 df, Chi-square = 394971, p-value = 0.0000	1 lag is important
Residual Serial Correlation	LM test statistic	Shows serial correlation at lag order 2 hence lag 1 is used
Residual Multivariate Normality	Jarque-Bera test statistic (joint) = 78.83 p-value = 0.000	Residuals are multivariate normal.

Source: Constructed from the Study Data

The calculated Jarque-Bera statistics and corresponding p-values (see appendix VI) 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 results are presented in table 4.3

A VAR model with minimum Akaike and Schwarz information criteria and an optimum lag of one appeared to be a better model specification (see Appendix A6). Hence, the Granger - causality test was performed on the model.

Rejection of the null hypothesis of no causality implied that a temporal change in categories of government expenditure led to permanent change in GDP growth rate. On the other hand, failing to reject the null hypothesis of no causality meant that GDP growth rate was not directly explained by the categories of government expenditure. The results of the Granger-causality tests are presented in table 4.4.

Table 4.4 Granger causality tests

Null Hypothesis	F-Statistic	Lags	Probability	Conclusion
GDP growth does not Granger - Cause government expenditure on investment	2.89*	10	0.034	Bi-directional
Government expenditure on investment does not Granger - Cause GDP growth	23.81**	2	0.000	
GDP growth does not Granger - Cause expenditure on physical infrastructure	6.57**	9	0.001	Bi-directional
Expenditure on physical infrastructure does not Granger - Cause GDP growth	8.16**	3	0.000	
GDP growth does not Granger - Cause expenditure on government consumption expenditure	3.56	1	0.067	Uni-directional causality running from Public consumption to GDP growth
Expenditure on government consumption does not Granger - Cause GDP growth	16.67**	2	0.003	
GDP growth does not Granger - Cause expenditure on defense	6.34**	4	0.001	Bi-directional
Expenditure on defense does not Granger - Cause GDP growth	4.89**	4	0.001	
GDP growth does not Granger - Cause expenditure on economic affairs	3.16**	10	0.006	Bi-directional
Expenditure on economic affairs does not Granger - Cause GDP growth	4.39**	5	0.001	
GDP growth does not Granger - Cause expenditure on education	3.01*	5	0.024	Bi-directional
Expenditure on education does not Granger - Cause GDP growth	6.06**	5	0.001	
GDP growth does not Granger - Cause expenditure on general administration and services	2.93	10	0.056	Uni-directional causality running from General administration and services to GDP growth
Expenditure on general administration and services does not Granger - Cause GDP growth	3.18*	2	0.029	
GDP growth does not Granger - Cause expenditure on heath care	3.35*	5	0.034	Bi-directional
Expenditure on health care does not Granger - Cause GDP growth	31.19*	10	0.019	
GDP growth does not Granger - Cause expenditure on public order and national security	6.16**	6	0.001	Bi-directional
Expenditure on public order and national security does not Granger - Cause GDP growth	12.61**	10	0.000	
GDP growth does not Granger - Cause expenditure on public debt servicing	8.97	14	0.376	Uni-directional causality running from Public debt servicing to GDP growth
Expenditure on public debt servicing does not Granger - Cause GDP growth	3.98**	14	0.000	
*(**) denotes rejection of the hypothesis at 5%(1%) significance level				

Source: Constructed from the Study Data

The Granger causality test results revealed that there was bidirectional causality between government expenditure on defense, economic affairs, education, health care, public order and national security, government investment, physical infrastructure and economic growth. This means that these set of variables predicted each other and hence could be on either side of the equation, (either as dependent or as an independent variable).

The variables that had a unidirectional causality included: government expenditure on consumption, general administration and services, and public debt servicing. This implies that only one variable could explain the other. In this case, they were required to be on the right hand side of the equation as independent variables.

The Granger causality tests revealed important information on the relationship between the variables of interest in this study. Government expenditure on investment, physical infrastructure, consumption, defense, economic affairs, education, general administration and services, public order and national security, health care and public debt predicts economic growth.

These findings confirms the use of VAR model, given that there was bidirectional causality between government expenditure on defense, economic affairs, education, health care, public order and national security, government investment, physical infrastructure and economic growth.

In a nutshell, there was a feedback effect between government expenditure components and GDP growth rate, which supported the Wagner's hypothesis that states that increase in GDP causes growth in the government expenditure, and the Keynesian hypothesis that states that increase in government expenditure causes GDP to increase. This suggests that allocation of government resources should be designed carefully in order to spur economic growth of the country.

4.3 Effects of Government Expenditure on Economic Growth

The second objective of the study was to examine the effects of the various components of government expenditure on economic growth. This was done by the estimation of the Vector Auto Regression (VAR) model and the subsequent use of impulse responses and variance decomposition analysis.

The VAR results presented in table A6 in appendix IV were not interpreted like ordinary regression equations because they were not derived from structural equations (Enders, 1995). They were used for the generation of both the impulse response functions and for conducting the variance decomposition analysis, which depicted the effect of various components of government expenditure on economic growth.

The impulse response analysis traced the effects of one standard deviation shock to the innovation on current and future values of all the endogenous variables of the system. A shock to the j^{th} variable affected the same variable

and was also transmitted to all other endogenous variables in the system through the dynamic structure of the VAR (Enders, 1995).

The ordering of variables used in this study was based on the relationship presented in equation (3.12) in chapter three. This ordering was also consistent with the variance decomposition analysis postulation that the variation to two shocks were more pronounced in the initial periods of the shock, and the influence reduced with the lags as the percentage variation of the other variables in the model increased. The impulse response of each expenditure component to a one standard deviation positive shock was generated over a thirty year period with ordering as government expenditure on; investment, physical infrastructure, education, health care, public debt servicing, economic affairs, general administration and services, defense, public order and national security, government consumption and dummy variables for budget rationalization, expenditure downsizing and outsourcing, privatization and governance.

The plots and impulse responses that follow summarize the results of the shock evaluation, indicating the responses of each variable over the 30 years horizon to one standard deviation positive shock to each of the eleven variables and four dummies in the VAR equation.

(a) The Impact of Government Investment Expenditure on GDP Growth Rate.

The impact of one standard deviation shock to government investment expenditure on GDP growth rate is shown in figure 4.1.

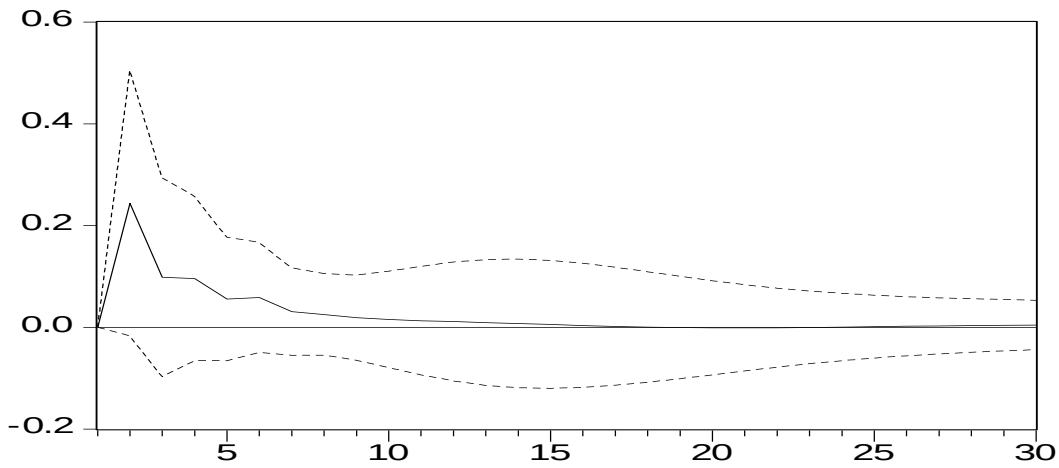

Figure 4.1 Impact of government investment on GDP growth rate
Source: Constructed from the Study Data

The response to one standard deviation to government investment expenditure resulted in a stable time path, which declined to zero with respect to economic growth as shown in figure 4.1. This effect lasted for sixteen years on the positive territory before fizzling out. The evidence on the relationship between government investment and economic growth remained inconclusive. Knight, Loayza and Villanueva (1993) and Nelson and Singh (1994) found that the level of government investment had a significant effect on economic growth during 1980s, while Khan and Kumar (1997) and Peter (2003) found government investment less effective on growth compared with private investment. Milbourne, Otto and Voss (2003) found evidence of a positive correlation between public investment and economic growth.

The reasons for the increase in GDP growth was because government expenditure on buildings, plant, machinery and equipment helped to increase the productivity of the inputs used by private sector. By increasing aggregate demand, public investment could have also stimulated private investment through the accelerator effect. The increase of what was also due to increase in aggregate demand through investment.

The decline could be due to the increased fiscal deficit or the crowding out of private capital formation by reducing credit available to the private sector or by raising interest rates.

(b) The Impact of Government Expenditure on Physical Infrastructure on GDP Growth Rate.

The impact of one standard deviation shock to physical infrastructure expenditure on GDP growth rate is shown in figure 4.2.

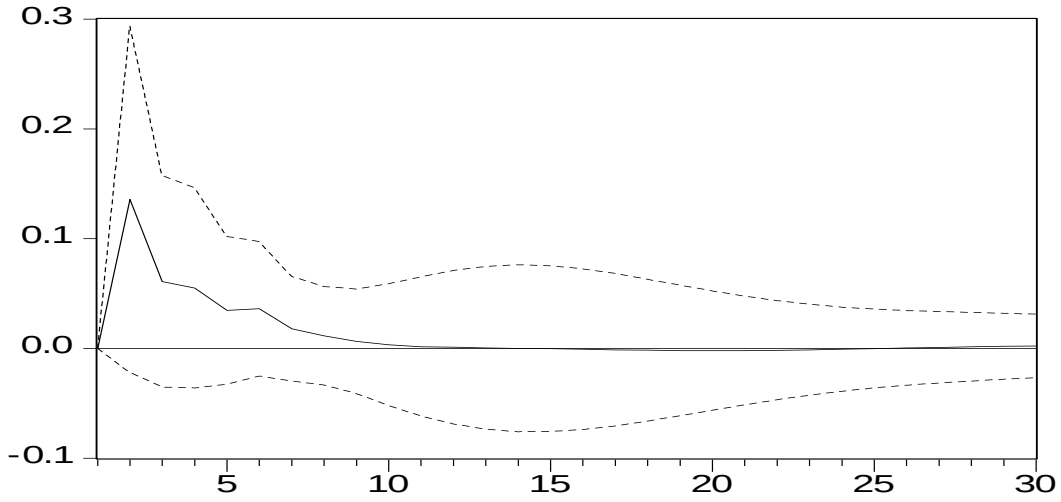

Figure 4.2 Impact of physical infrastructure expenditure on GDP growth rate

Source: Constructed from the Study Data

The response to one standard deviation to government infrastructural expenditure resulted in a stable time path, which declined to zero with respect to economic growth as shown in figure 4.2. The effect of a one standard deviation shock on physical infrastructure investment on economic growth lasted for twelve years on the positive territory, and then remained at the equilibrium in the long-run. This positive effect between infrastructure and economic growth finds support in studies by Aschauer (1989) and Easterly and Robelo (1993).

Additional expenditure on infrastructure in such areas as roads, railways, ports, communication, water and electricity could have contributed to economic growth by increasing the productivity of inputs in the private sector. High government expenditure on transport and communication and energy created an enabling environment for businesses to strive through reduced cost of production.

(c) The Impact of Government Expenditure on Education on GDP Growth Rate.

The impact of one standard deviation shock to education expenditure on GDP growth rate is shown in figure 4.3.

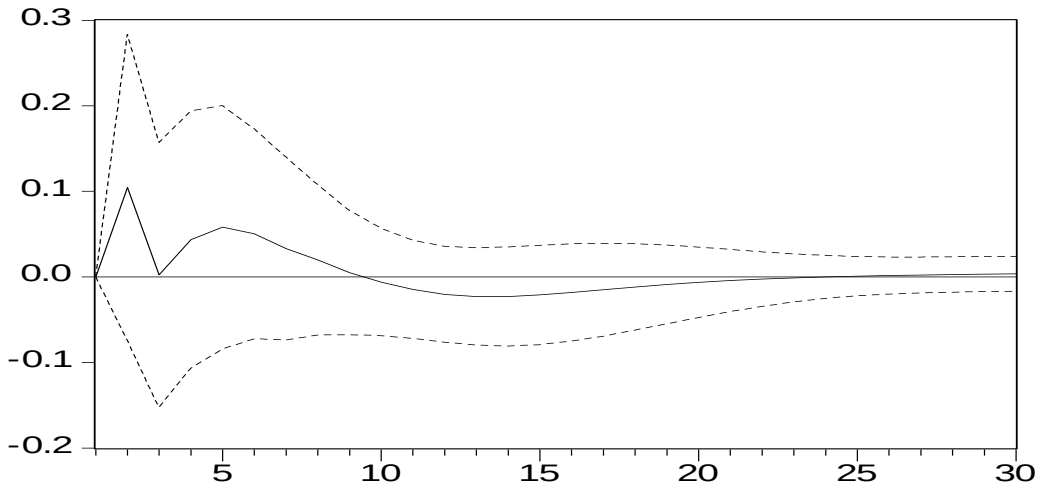

Figure 4.3 Impact of expenditure on education on GDP growth rate
Source: Constructed from the Study Data

Government expenditure on education improved the economic growth initially for nine years, before dampening it to the negative side for another 13 years. The response to one standard deviation to education expenditure resulted in a stable time path, which declined to zero with respect to economic growth. The effect lasted for twenty two years before fizzling out.

This phenomenon could be attributed to the increased marginal productivity of privately supplied factors of production. This could have occurred due to the provision of free primary and secondary education, expansion of the universities and middle level colleges, and bursary given to the needy students. Provision of free basic education and creation of subsidy schemes created positive externalities and raised the steady state rate of economic growth. However, there was a decline in its positive effect possibly due to the fact that the rate of unemployment is very high in Kenya, and therefore, there was no room for the majority of graduates in the Kenyan labour market.

Further, government investment on building of schools, colleges and universities were expenditure on the core functions, and therefore were expected to have a positive effect on the economy. The slight negative effect in the long-run could be because funds meant for the development of the education sector had not been properly utilized and in most cases embezzled, thus precipitating the incessant strike by academic staff union of the university and national union of teachers.

The results differ from conclusion drawn by previous studies (Landau, 1986; Barro, 1995, 1999; and Devarajan, 1996). These earlier studies indicated that the association between education expenditure and economic growth was negative. The departure of the current finding from the previous studies is because of high level of unemployment in Kenya due to high misappropriation of government funds in education and due to change of education system that have experienced in Kenya.

(d) The Impact of Health Care Expenditure on GDP Growth Rate.

The impact of one standard deviation shock to health care expenditure on GDP growth rate is shown in figure 4.4.

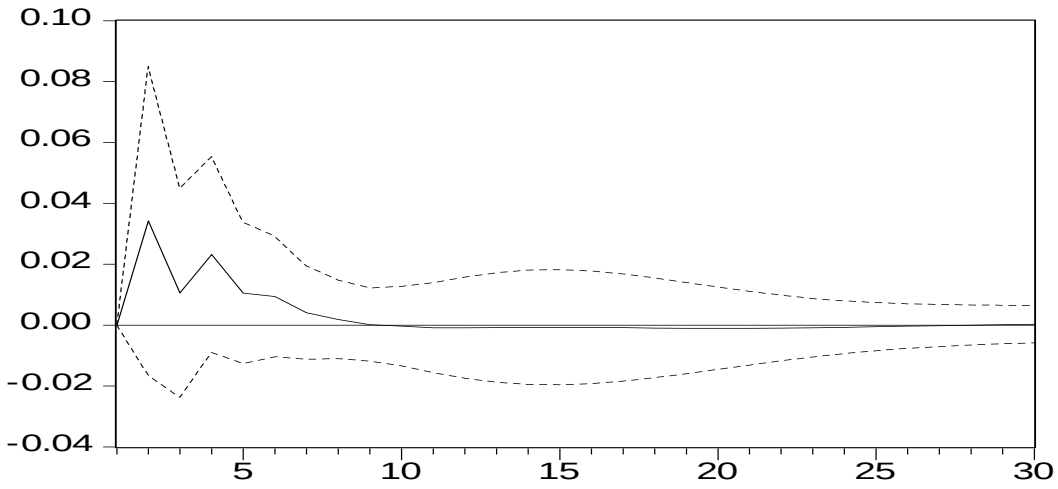

Figure 4.4 Impact of health care expenditure on GDP growth
Source: Constructed from the Study Data

The response to one standard deviation innovation to expenditure on health resulted in a stable time path that declined to zero with respect to economic growth as shown in figure 4.4. The positive effect lasted for nine years after which it fizzled out. The evidence of positive effect agrees with the results obtained by Diamond (1989).

This phenomenon could be due to the fact that health expenditure by the government raises the health status and productivity of the people, thereby promoting economic growth. The increased expectation of a longer life could affect the intertemporal discount rate and therefore savings. Increased health expenditure could increase the participation of women in the labour market, and affect fertility, which has effect on demographic transition and therefore on the economy. Further, government investments on buildings of hospitals represent expenditure on the core functions and therefore are expected to have a positive effect on the economy.

(e) The Impact of Public Debt Servicing Expenditure on GDP Growth Rate.

The impact of one standard deviation shock to public debt servicing expenditure on GDP growth rate is shown in figure 4.5.

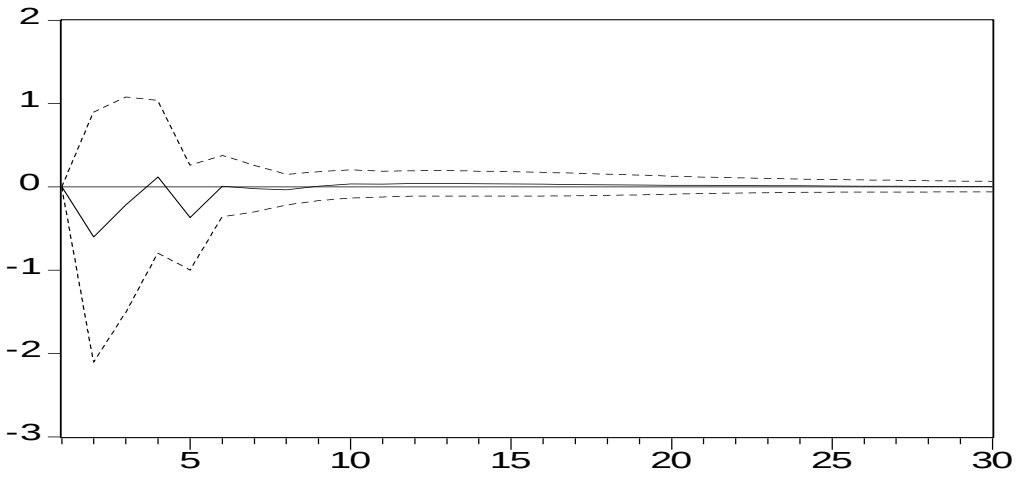

Figure 4.5 Impact of public debt servicing expenditure on GDP growth rate
Source: Constructed from the Study Data

The response to one standard deviation innovation to public debt result in a stable time path that last for only seven years before reducing to zero. Its long-run impact on economic growth was nil. The evidence of negative effect of public debt on economic growth is in support of what Ranjan (2008) found in Pakistan. The sources of negative effect of public debt on economic growth are four fold: the resources used to service the public debt could have crowded out government investment in areas where complementarities existed between public and private capital outlays and this could have contributed to reduced private investment; high debt ratio could have led domestic agents to transfer funds abroad instead of saving domestically because of the fear of future tax

liabilities to service the debt could; high debt burden might have discouraged foreign direct investment by increasing the likelihood that the government could resort to the imposition of restriction on external payments. Finally, firms could have held a large stock of foreign currency liability and as a result they were vulnerable to exchange rate fluctuations. The increase in risk of default could have made the domestic banks to tighten credit restrictions that depressed domestic investment.

(f) The Impact of Expenditure on Economic Affairs on GDP Growth Rate.

The impact of one standard deviation shock to economic affairs expenditure on GDP growth rate is shown in figure 4.6.

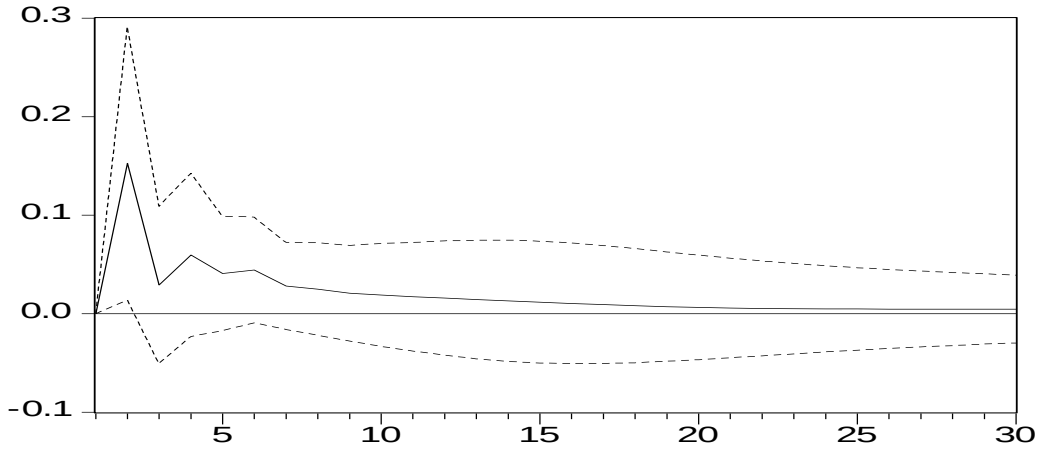

Figure 4.6 Impact of expenditure on economic affairs on GDP growth rate
Source: Constructed from the Study Data

The government expenditure on economic affairs exhibits a positive short-run impact on the GDP growth rate that takes about fifteen years to translate fully into a permanent shift in the GDP growth rate. This result is supported by Romer (1990), who found a positive relationship between government expenditure on economic affairs and economic growth. Nevertheless, when considering the impact in the long-run growth, it is zero. The reason for the positive effect could be because economic affairs provides a direct provision of productive activities through its expenditure in areas of agriculture, manufacturing, trade, mining, fisheries, forestry, tourism and constructions.

The findings of the study supports the finding of the study Njuguna (2009a) which noted that sectors such as trade, tourism and manufacturing are very critical areas of a nation's development and therefore the allocations to these sectors could make significant contribution to the economy if the resources are channeled to the right areas of development.

(g) The Impact of General Administration and Services Expenditure on GDP Growth Rate

The impact of one standard deviation shock to general administration and services expenditure on GDP growth rate is shown in figure 4.7.

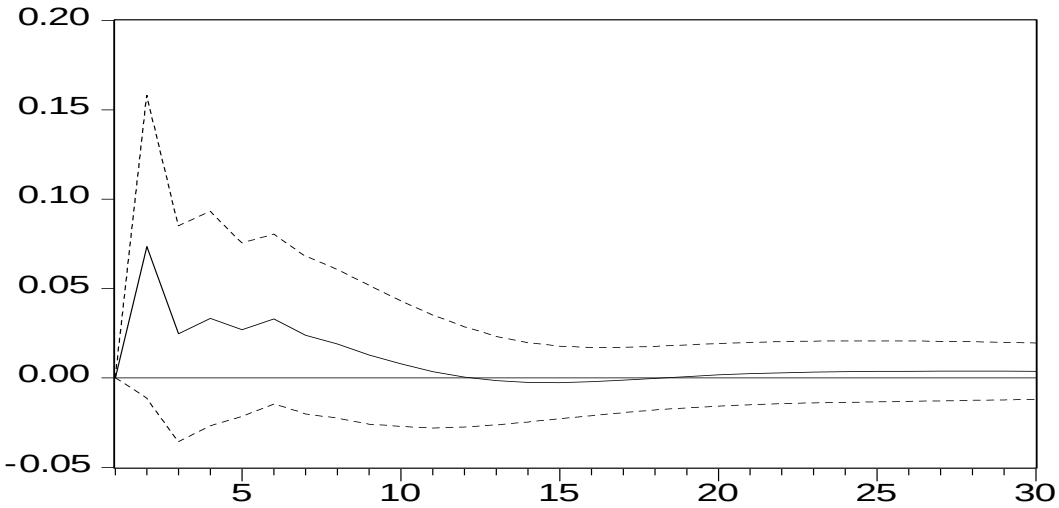

Figure 4.7 Impact of general administration and services expenditure on GDP growth rate
Source: Constructed from the Study Data

The response to one standard deviation to general administration expenditure result in a stable time path, which declines to zero with respect to economic growth as shown in figure 4.7. The effect of a one standard deviation shock on general administration on economic growth lasted for twelve years on the positive territory. This is in contrast with the findings of Ranjan (2008), who found a negative effect of general administration expenditure on growth.

General administration encompasses all expenditures that are of recurrent in nature. These are expenditures channeled to pay staff, buy office supplies, personnel management, purchase equity and transfer to households, public enterprises and the rest of the world. The positive effect could be attributed to the increased government expenditure on capital and transfer to households and enterprises, which act as a productive input and also help to increase the after –tax private return on capital. Transfers generated positive externalities

that raised marginal product of private capital. Although a typical theoretical result is that for a given tax rate, economic growth is adversely affected by an increase in redistribution through public transfer, the result for this study is consistent with Barro (1989), Sal-i-Martin (1992) and Cashin (1995). Further, general administration could have led to an improvement in the efficiency in the markets for goods and services, factor markets and asset markets. Asset markets help to mobilize resources for investment. The negative effect could be as a result of increased government expenditure on establishment of inefficient public corporations, recruitment and promotion of staff in government owned institutions, increased salaries, wages and allowances for teachers and members of parliament, expansion of number of ministries and expenses on the coalition government.

(h) The Impact of Government Expenditure on Defense on GDP Growth Rate.

The impact of one standard deviation shock to defense expenditure on GDP growth rate is shown in figure 4.8.

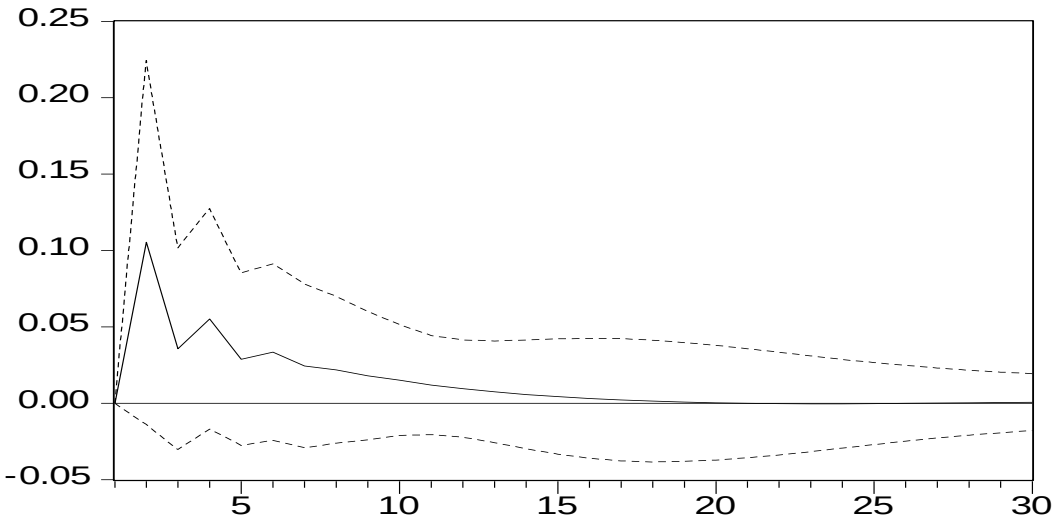

Figure 4.8 Impact of expenditure on defense on GDP growth rate
Source: Constructed from the Study Data

As shown in figure 4.8, it would take eighteen years for the effect on economic growth due to fizzle out if a one standard deviation shock on defense expenditure is affected. The effect is positive in the short run but in the long run it has no effect. In the existing literature, this effect has sometimes been reported as positive and significant for example by Benoit (1978); and Frideriksen and Loony (1982). At the same time, other studies have found it to be negative for example Bils and Kienow (1998); and Knight *et al.* (1996), while in yet other studies, effect of defense expenditure on GDP growth has been found to be neutral by for example Ram, (1986). The attributes of this phenomenon could be due to improved security within the economy thereby increasing economic activities such as tourism, and private investment.

(i) The Impact of Public Order and National Security Expenditure on GDP Growth Rate.

The impact of one standard deviation shock to public order and national security expenditure on GDP growth rate is shown in figure 4.9.

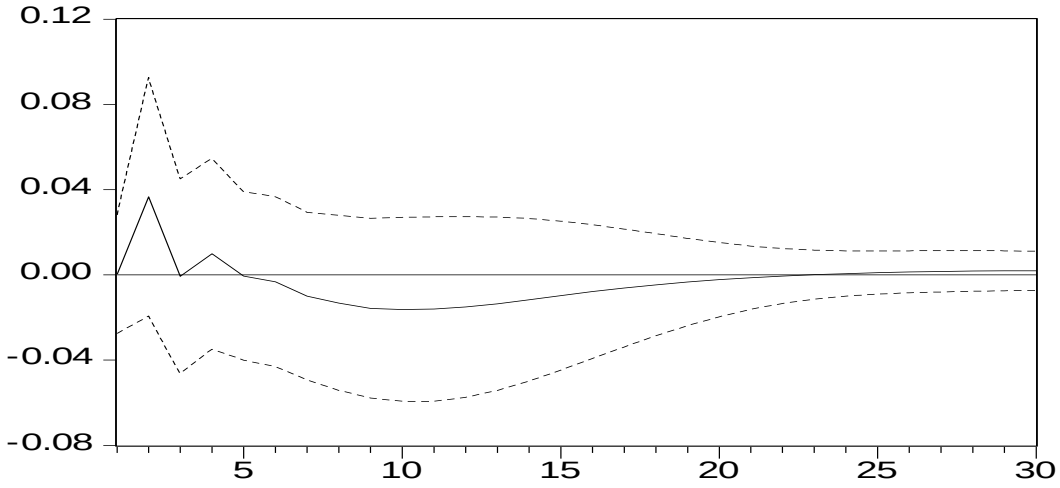

Figure 4.9 Impact of public order and national security on GDP growth rate
Source: Constructed from the Study Data

The response to one standard deviation innovation in public order and national security and public order resulted in a stable time path, which declined to zero with respect to economic growth as shown in figure 4.8. The effect of one standard deviation shock on national security on GDP growth rate took twenty two years to fizzle out. The effect was initially on the positive side for a period of five years, and then moved to negative territory for seventeen years before moving to the equilibrium. The long period on negative side is because on unproductive nature of expenditure on public order and national security. This suggests that national security has a mixed effect on GDP growth rate and the effect is felt for a long time in the economy. The mixed effect of public order and national security is because of its efficiency of markets on mobilization of

resources. This result is in support of Romer (1990), who found a negative relationship between this variable and economic growth.

There is no existing literature of the positive effect and therefore this study makes an important contribution to the existing literature in this area. The positive effect could be attributed to the increased competition in the economy due to increased protection and enforcement of government legal structure. The government spending more on the rule of law helped to improve the rights ownership of possessions and property as well as basic human rights to life and the right not to be kidnapped and enslaved. As a result, there was an improvement in the efficiency in the markets for goods and services, factor markets and asset markets. Asset markets helped to mobilize resources for investment. However, this turned into negative effect perhaps due to loss of confidence in the local courts by the public. As a result, the competition was curtailed and there was inefficiency in the above mentioned markets, which may have led to the decline in economic growth.

(j) The Impact of Government Consumption Expenditure on GDP Growth Rate.

Figure 4.10 shows the impact of a one standard deviation shock on the government consumption expenditure on GDP growth rate.

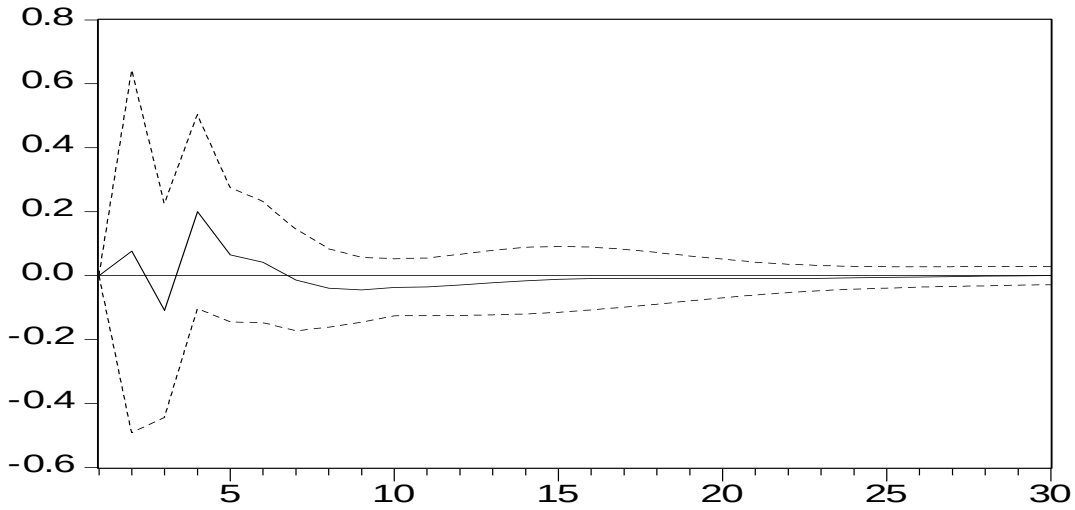

Figure 4.10 Impact of government consumption expenditure on GDP growth rate
Source: Constructed from the Study Data

The response of economic growth to one standard deviation to government consumption expenditure resulted in a stable time path, which declined to zero. The results show that a one standard deviation shock on government consumption has a mixed effect on GDP growth rate that lasted for fifteen years.

In the short-run, government consumption expenditure has a positive effect on economic growth but in the long-run its effect was negative. This suggests that government consumption expenditure had a mixed effect on economic growth both in the short-run and in the long-run. In the existing literature, the effect of government consumption expenditure has produced mixed results for various studies. Barro (1997) found that government consumption expenditure measured as a proportion of GDP was negatively correlated with GDP growth. Devarajan, Swaroop and Zou (1996) in contrast found a positive relationship

between GDP growth and government consumption expenditure. Caselli, Esquivel and Lefort (1996) also found a positive effect on growth of government expenditure as a share of output. Easterly, Loayza and Montiel (1997) found no significant effect of the share of government consumption expenditure on GDP on economic growth in Latin America.

The positive effect could be as a result of increase in aggregate demand through the multiplier effect. The negative effect could have resulted from the crowding out effect due to a fall in disposable income of the households. Financing government consumption expenditure is done through taxes or by borrowing. Hence, increased taxes lower disposable income for households and private consumption may fall accordingly. Government consumption expenditure could also have a crowding-out effect on private sector by causing positive effect on interest rates, which in turn could decrease private investment.

In summary, impulse responses traced out the responses of current and future values of each of the variables to a one unit increase in the current value of one of the VAR errors, assuming that this error returned to zero in subsequent periods, and that all other errors were equal to zero. These estimated impulse responses showed patterns of persistent common variation. The effect of the shock in government expenditure components was realized for a period of between ten and fifteen years. This means that government expenditure components have long-run impact on economic growth in Kenya.

4.4 The Effects of Government Expenditure Reforms on Economic Growth

The fourth objective of this study was to analyze the impact of government expenditure reforms on economic growth. To attain this objective, the dummies for budget rationalization, expenditure downsizing and outsourcing, privatization and governance were included in the VAR model estimation. The impulse responses and variance decomposition for the given dummies were analyzed and interpreted.

(a) The Impact of Budget Rationalization on GDP Growth Rate.

Budget rationalization was a dummy representing the reallocation of government expenditure from less productive to more productive projects of the government. It assumed the value of one during the years of budget rationalization and zero otherwise. The impact of one standard deviation shock to policy on budget rationalization on economic growth is presented in figure 4.11.

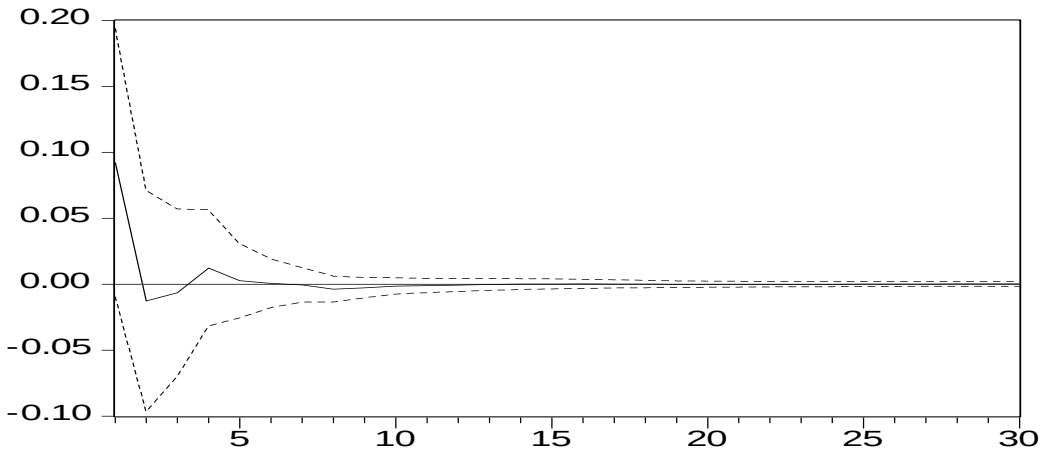

Figure 4.11 Impact of budget rationalizing on GDP growth rate
Source: Constructed from the Study Data

A shock on budget rationalization had a stable time path as far as its effect on economic growth was concerned. It had an instantaneous positive effect that declined to zero within a period of one year and then moved along the equilibrium after five years. The budget rationalization policy adopted during various years helped to increase the productivity of public expenditure. This is because it helped to re-allocate resources towards the core functions of the government. These are maintenance of law and order, the administration of justice, the provision of broad-based education and health, the provision of economic infrastructure and the protection of the environment. It also helped to shift resources from non-productive expenditure to development and recurrent non-wage operating and maintenance expenditure, which appear to have helped to spur the economic growth. Further, it helped to enhance the role of private sector as the leading sector in wealth creation by changing the composition of government expenditure. Finally, it helped to achieve efficiency in the public sector. Efficiency in resource use in the public sector is

important as it helps in reducing government expenditure that are not related to the economic growth and increase on those that increase growth.

(b) The Impact of Expenditure Downsizing and Outsourcing on GDP Growth Rate.

Expenditure downsizing and outsourcing was a dummy representing reduction in costs as a result of reducing the number of civil servants. It assumed the value of one in the years 1991, 1993, 1994 and 2002 when the government implemented the golden hand shake and comprehensive civil reforms, and zero otherwise. The impact of one standard deviation shock to policy on downsizing and outsourcing on economic growth is presented in figure 4.12.

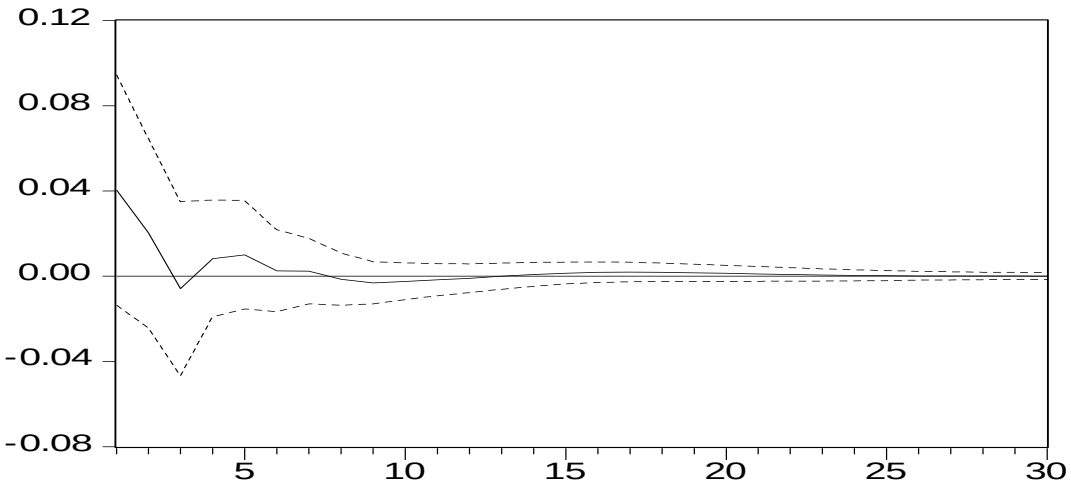

Figure 4.12 Impact of expenditure downsizing and outsourcing on GDP growth rate
Source: Constructed from the Study Data

The effect of one standard deviation shock on expenditure downsizing and outsourcing on economic growth took eight years to fizzle out. The effect was initially an instantaneous positive before declining to negative and then to the

positive side and finally moving along the equilibrium in the long-run. The source of the positive effect could have been diversion of resources from unproductive expenditure on wages and salaries, to a productive expenditure in form of infrastructure or education.

(c) The Impact of Privatization on GDP Growth Rate.

Privatization was a dummy taking the value of one from 1991 onwards when the government started carrying out comprehensive privatization of the parastatals and restructuring programme, and zero otherwise. The impact of a one standard deviation shock to policy on privatization on economic growth is presented in figure 4.13.

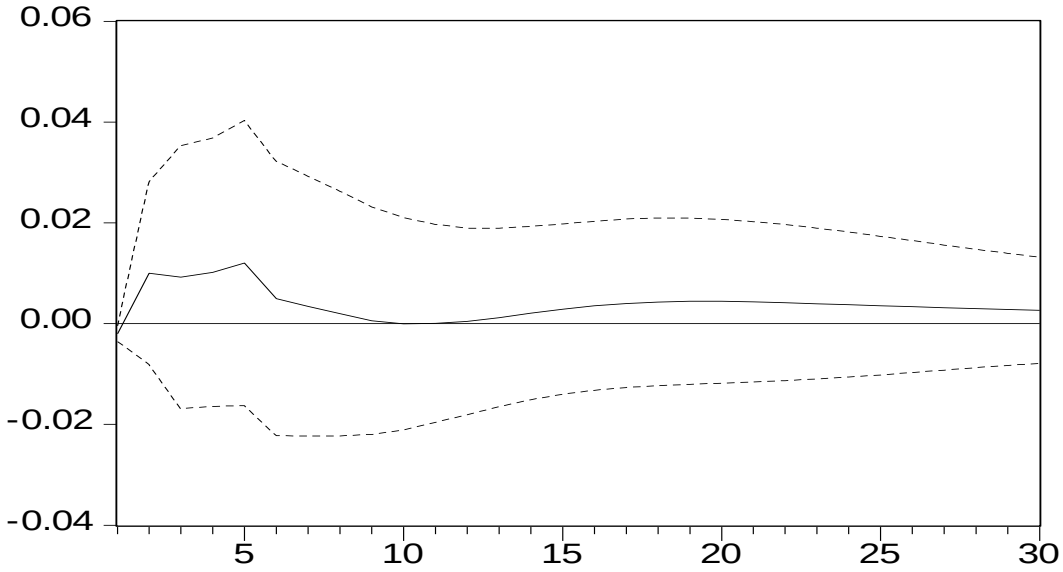

Figure 4.13 Impact of privatization on GDP growth rate
Source: Constructed from the Study Data

Government expenditure policy on privatization seemed to have a positive impact on the economic growth in the short-run as well as in the long-run.

This behavior could be explained by the fact that privatization helped to increase competition and efficiency in the market. It also eased the pressure on central government budget and provided short-term revenue to the government for financing development infrastructure. Furthermore, it helped to reduce the government size to an optimal size and in turn budget deficit.

(d) The Impact of Governance on GDP Growth Rate.

Governance was a dummy capturing the electoral and political processes of the country. It was equal to one in 1992 when Kenya had the first multiparty election, in 2002 when there was a change in government, and in 2007 when coalition government was put in place, and zero otherwise. The impact of one standard deviation shock to governance on economic growth is presented in figure 4.14.

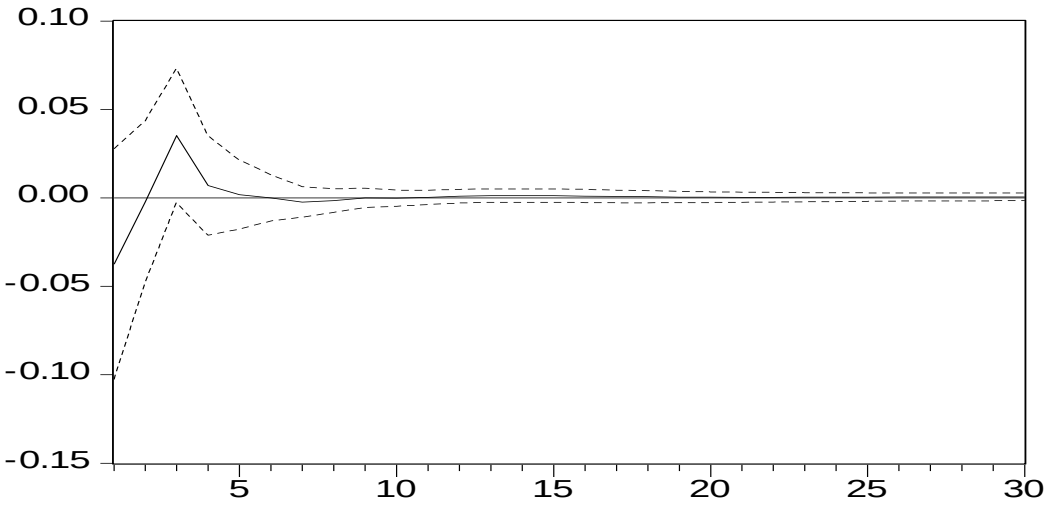

Figure 4.14 Impact of governance on GDP growth rate
Source: Constructed from the Study Data

The response to a one standard deviation shock to governance resulted in a stable time path that moved from an instantaneous negative effect within one

year and towards the positive side for a period of four years before fizzling out.

Governance affects economic growth negatively because of uncertainty associated with elections and lack of continuity of government policies when the government regime was changed. It also links government policies with politics which led to rent seeking, corruption and embezzlement of public funds. Because the interest of the special group in general is different from the broad public interest, by accepting money from special interest group, politicians compromise the public interest. This affects the economic growth negatively. The positive effect within the remaining four years could be attributed to return of confidence after an electioneering period, when government policies of the elected government were understood and implemented before another cycle of political campaigns and elections.

4.5 Variance Decomposition Analysis (VDA)

The VDA presented a further step of establishing the percentage of the variation in a series that was due to its own shocks and that which was due to shocks of other variables in the model at a given period following Enders (1995) and Stocks and Watson (2001). VDA determined the proportions of a variance in a series that was due to its own shock, the other variable's shocks and other identified institution shocks.

The variations in GDP growth rate brought about by changes in government expenditure components were analyzed. This was an alternative method to

impulse response functions for examining the effects of shocks to the GDP growth rate. This technique determined how much of the forecast error variance for any variable in the system was explained by innovations to each explanatory variable over a series of time horizon (Enders, 1995). The own series shocks explained most of the error variance, although the shock also affected other variables in the system. It was also important to consider the ordering of the variables when conducting VDA. This was because in practice the error terms of the equations in VAR were correlated, so that the result depended on the order in which the equations were estimated in the model.

The results of VDA of GDP growth rate are given in the table A8 Appendix V. The results show that most of the variations in GDP growth rate were due to its own shock at 41.036 percent in the first year. The variations of own shocks in economic growth reduced to 28.665 percent in the second year and even to a lower level as the forecasting horizon increased. It was further observed that the variations in the GDP growth rate in the first year was brought about by expenditure components, but the expenditure reforms and governance did not contribute to the variations.

A further observation of the results reveal that the effects of other variables apart from GDP growth rate in the system increased with the increase in forecast period. This implies that GDP growth had feedback effects with variables in the system, and the effects were multidirectional. These findings confirm the results of Granger causality, given that there was a feedback

effects. The VDA graphs together with the results in table A 7 in Appendix V further support the findings of this study that government expenditure components had significant effect on economic growth.

This section reveals that government expenditure components have effects on the economic growth, which lasts for 30 years. The impulse response functions and the VDA have shown that the effects of government expenditure on economic growth are far reaching and they are felt for long periods of time. The effects of public expenditure policy reforms have also far reaching effects on economic growth but their effect is only in the short-run.

The own series shocks explained most of the error variance, although the shocks also affected other variables. The largest proportion of the variance was taken by education, economic affairs, physical infrastructure, investment, health, general administration and budget rationalization. However, their proportions declined over time. Defense expenditure, national security, government consumption, public debts, budget downsizing and outsourcing, privatization and governance did not affect the variance very much within the 30 years.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the study and makes conclusions based on the results. The policy implications from the findings and areas for further research are also presented

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: investigate the relationship between the components of government expenditure and economic growth; examine the effects of components of government expenditure on GDP growth rate; analyze the effects of government expenditure reforms on economic growth; and to draw policy implications from the findings.

The study applied Vector Auto Regression (VAR) estimation technique together with annual time series data for the period 1963 to 2008 to evaluate the empirical impact of government expenditure on economic growth. The data used were selected government expenditure components that included government expenditure on government investment, physical infrastructure, education, health care, public debt servicing, economic affairs, general administration and services, defense, public order and national security and government consumption. Data was collected from Kenya government documents such as economic surveys, statistical abstracts, sessional papers and international financial statistics publications.

The study, unlike most other previous studies that used cross-sectional analysis, has used the time-series analysis. Furthermore, unlike the majority of the reviewed literature that used ordinary least squares technique to estimate the relationship between components of government expenditure and economic growth without conducting cointegration and Granger causality test this study used the VAR model. The study examined the effects of government expenditure reforms on economic growth in Kenya. The reforms strategies included budget rationalization, expenditure downsizing and outsourcing, privatization and governance.

The first objective of the study was to investigate the relationship between components of government expenditure and economic growth. The study conducted Johansen cointegration tests for all the variables. The results

indicated a long-run relationship between GDP growth rate and government expenditure components.

The study then conducted the Granger causality test between GDP growth rate and the various components of government expenditure. Bidirectional causality between categories of government expenditure and economic growth was detected. The findings support the Keynesian theory, which suggest that increased government expenditure leads to economic growth. The findings also 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 second objective was to examine the effects of components of government expenditure on economic growth. The VAR model yielded, impulse response functions and variance decomposition analysis, which revealed that government expenditure on investment, physical infrastructure, education, health, defense, public order and national security, public debt, economic affairs and general administration were important in explaining changes in economic growth. The results showed that government expenditure on physical infrastructure, government investment, economic affairs, health

and defense had positive impact on the economic growth. However, expenditure on public debt caused economic growth to decline. Furthermore, expenditures on government consumption, education, general administration and public order and national security had mixed impacts on the economic growth.

The findings support the Rams (1986) model which indicated that large government size was likely to be a more powerful engine of economic growth. This is due to various reasons such as: role of government in encouraging private investors and securing an increase in productive investment and a socially optimal direction for growth and development.

The third objective was to analyze the impact of government expenditure reforms on economic growth. Four government expenditure reforms were identified and included in the VAR model as dummies for estimation purposes. The study showed that the impacts of budget rationalization, downsizing and outsourcing and privatization on economic growth were positive. Governance had initially a negative effect and then a positive effect on economic growth, which means that during an electioneering period, economic growth declined before it started responding favourably once an elected government was in place and its policies were implemented and understood by the public.

5.3 Conclusion

On the basis of the empirical results, the study concludes that the composition of government expenditure matters for economic growth. In the long-run, expenditure on economic affairs, defense, education, government investment, general administration and services and physical infrastructure have positive impacts on economic growth. In the short run health care, public order and national security have positive impact on economic growth, whereas, public debt servicing has negative impact on economic growth.

The government also plays a leading role in determining the pattern of economic growth through public expenditure reforms, which determine directly how much of an economy's resources to divert to its own use and how those resources should be allocated in order to increase economic growth. The results reveal that government expenditure reform on privatization should be given priority for a government interested in promoting long-run growth. Budget rationalization, governance and downsizing and outsourcing appear to be appropriate policies for increasing economic growth in the short-run. Therefore, the results of this study emphasize the fact that the composition of government expenditure and public expenditure reforms are important in determining economic growth.

In summary the contributions of this study to the knowledge include: First, the study disaggregated government expenditure into various sectors and reforms and found that each component of government expenditure and reforms had

different impact on economic growth. Second, the study found a bi-directional causality between components of government expenditure and economic growth. This indicated that there was feedback effect between components of government expenditure and economic growth. 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.

5.4 Policy Implications

Several policy implications can be drawn from the research findings:

The government should increase its investment in areas that are beneficial to the private sector and eschew from those that compete with or crowd it out. It should increase its expenditures on those items that enter private production functions as productive public inputs that enhance economic growth. Such productive government investment expenditure includes expenditure on buildings, plant, machinery and equipment all of which generate positive externalities that raise private investment and thus economic growth. The increase in investment would increase economic growth by four percent on average per year.

The government should allocate more resources to areas of physical infrastructural development in order to stimulate economic growth as envisaged in the vision 2030. This is because according to the study finding,

additional expenditure on physical infrastructure in such areas as roads, railways, ports, communication, water and electricity contribute significantly to the economic growth by increasing the marginal productivity of inputs in the private and public sectors. Furthermore high government expenditure on transportation and communication and energy create an enabling environment for business to thrive through reduced cost of production. The increase in physical infrastructure will affect economic growth by forty two percent.

The government should increase it its expenditure allocation to the education and human capital development. This is because the study found that education affect economic growth positively. This could be done through provision of education facilities, training and employing more teachers, ensuring access to education to all citizens, reduction of the cost burden to the parents/guardian and expanding education to the marginalized groups. This is because quality education creates positive externalities and increases the productive capacity that helps to raise the steady state rate of economic growth. Increase in education expenditure is expected to affect economic growth by six percent.

The government should allocate more funds for the development of the health care sector. This is because the study found that health care contributes positively to the economic growth. This should be achieved through investment in capital equipments, health facilities and provision of quality medical supplies. The government should also consider human capital

investment through training of the human resources relevant to this sector such as doctors and nurses. This is because, when there is an increase in expenditure allocation to the health care sector, the level of economic growth increases since a health nation is a wealth nation. This increment is expected to influence growth by two percent.

The government should streamline its expenditure allocation to the debt servicing. This is because it was found that public debt servicing affect economic growth negatively. Public debt servicing reduces the resources that could otherwise have been allocated to more productive sectors of the economy. Furthermore, public debt servicing crowd out private investment which affect economic growth adversely. The reduction in public debt can be achieved by reducing government borrowing and ensuring that borrowed loans are concessional in nature. This means that since the government would have a long repayment period at a lower interest rate, the burden on public debt would be lesser. The reduction in public debt servicing would affect growth by two percent on average annually.

The allocation to economic affairs should be increased by the government. Economic affairs were found to affect economic growth positively. This would affect economic growth by four percent annually. This would be achieved by ensuring that the sectors that are productive in nature under this allocation are accorded the right attention while those that are non-productive in nature are rationalized. This is because economic affairs provide a direct

provision of productive activities through its expenditure in areas of maintenance and operations, agriculture, manufacturing, trade, mining, fisheries, forestry, tourism and construction.

The government should increase its expenditure allocation to the general administration and services and also increase its efficiency in service delivery. The study established that general administration and services affect economic growth positively. This would go a long way in saving funds that could be used in other priority sectors. This implies that the government should have sustainable policies for development to avoid crowding out the private investors who play a vital role to the growth and development of the economy. The efficiency in government sector could also lead to improved efficiency in the markets for goods and services, factor market and financial asset markets that help to mobilize resources for private investment. The effect would affect economic growth by three percent annually.

The government should increase its expenditure allocation to defense and public order and national security. This is because the study found that defense and public order and national security have a positive effect on economic growth. When the allocation to these sectors is increased, there is a positive change in economic growth. These sectors help to improve security within the economy thereby increasing economic activities in areas of tourism and private investment. In addition the sectors help to increase competition in the

economy due to increased protection and enforcement of government legal structure. This would affect growth by one percent per year.

Effort should be made by the government to reduce its consumption. This is because consumption on goods and services has a negative effect on economic growth. Increased government consumption seems to crowd out private investments by reducing the disposable income of the people which result in reduced household consumption in the economy. The reduction in government consumption would increase growth by one percent per year.

The government should restructure government expenditure through budget rationalization in order to achieve an effective public sector. This would affect economic growth by two percent per year. The study found that budget rationalization had a positive effect on economic growth. It is important for policy makers to pay attention not just to the levels of government expenditure, but also to its composition. Besides, prioritization of government expenditure should be judged not only by virtue of its economic returns, but also on the technical, administrative and financial feasibility front. Measures for cost and benefits of various government expenditures are essential in this respect. A clear set of specified criteria for deciding the allocations of resources should be followed to avoid arbitrary allocation and rent seeking by promoting transparency and accountability. This requires long-term programmes of budget rationalization focusing on elimination of wasteful and unproductive expenditure thus improving equity through distributional

impacts and maximizing economic growth by ensuring that fiscal operations are conducted in the least cost manner.

In order to reduce the rate of growth of expenditure on salaries and allowances, 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.

The government should reduce its size to an optimal one by adopting a policy on privatization and expenditure downsizing and outsourcing to cut its expenditure and in turn ease public debt. This is because privatization was found to effect economic growth positively. The result showed that this will increase economic growth by one percent per year. Running a large public debt for a long-period of time could have an adverse effect on the economic growth since borrowing might crowd out private sector investment.

Donors and development partners should partner with government in creating a platform for investment and development and support the initiatives

spearheaded by the government. This is because study found that government investment contributes positively to economic growth Regional integration should therefore be explored to ensure that gains that could be obtained regionally such as trade and industrialization are maximized.

The private sector should partner with government in provision of certain services through Public-Private Partnership (PPP). This could be achieved through joint efforts in provision of services such as infrastructure, energy, health and education. This is because physical infrastructure was found to affect economic growth positively.

5.5 Areas for Further Research

In view of political challenges such as the demographic burden and climatic change, it becomes increasingly important to explore further what portfolio of government outlays is optimal in economic growth and welfare terms.

Although the focus of this study was solely on measuring the impact of government expenditure on economic growth, an important issue to address in future research is what determines government decision to allocate expenditure among various components?. In particular, the role of demographic factors and the nature of the political process is important.

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APPENDICIES

Appendix I: Percent of Government expenditure and GDP Growth.

Table A 1: Recurrent, Development, GDP, Public Expenditure and Total Expenditure

YEAR	R.E %	D. E %	GDP Growth %	P.E Growth%	Total Exp (Million KSH)
1963	83	17	6	48	1,340
1964	81	19	3	49	1,380
1965	78	22	13	52	1,520
1966	76	24	5	58	1,680
1967	72	28	8	67	2,040
1968	69	31	7	66	2,300
1969	71	29	6.5	17	2,420
1970	64	36	6.6	11	3,120
1971	67	33	8.1	12	3,600
1972	68	32	6.5	15	4,000
1973	70	30	5.5	17	45,800
1974	68	32	2	20	5,920
1975	65	35	7.5	27	7,440
1976	70	30	9	28	8,180
1977	68	32	8.5	31	11,800
1978	25	75	6.2	32	13,740
1979	67	33	5.1	32	15,480
1980	71	29	6.1	34	19,440
1981	74	26	2.5	34	22,440
1982	81	19	3	34	23,940
1983	77	23	1.1	32	25,920
1984	79	21	6	35	29,660
1985	81	19	5.5	33	33,100
1986	77	23	5.4	40	41,760
1987	81	19	5.4	39	44,380
1988	75	25	5.4	39	60,280
1989	77	23	5	38	65,260
1990	79	21	4	41	82,120
1991	85	15	3.4	40	88,880
1992	83	17	0.4	48	123,840
1993	88	12	0.5	50	180,140
1994	85	15	0.5	48	184,100
1995	84	16	5	50	183,400
1996	77	23	5	51	202,940
1997	99	1	3	53	145,982
1998	99	1	2	52	112,325
1999	98	2	2.2	55	124,308

2000	87	13	2	56	268,000
2001	92	8	0.1	57	307,000
2002	89	11	0.5	58	304,000
2003	84	16	2.9	60	388,000
2004	89	11	5.1	62	379,000
2005	85	15	5.8	64	432,000
2006	79	21	6.3	65	508,000
2007	71	29	7.1	68	713,000
2008	73	27	1.7	69	773,000

Sources: Republic of Kenya *Economic Survey* and *Statistical Abstract* for various years. Nairobi: Government Printer.

Appendix II: Raw data

Table A 2: Raw Data for the Components of Government Expenditure (1963-2008) in million Ksh

FISCAL YEAR	I	PI	ED	HT	PD	NS	EA	GA	Cg	DE
1963/64	260	100	140	60	100	160	300	60	1120	20
1964/65	260	100	120	60	120	160	300	80	1120	60
1965/66	320	100	120	60	140	160	320	80	1200	80
1966/67	400	200	140	80	160	180	280	80	1280	100
1967/68	480	280	180	100	160	220	300	80	1380	120
1968/69	580	280	220	100	180	220	320	100	1500	100
1969/70	700	300	360	140	200	240	460	120	1720	120
1970/71	1100	620	540	200	360	260	400	160	2020	120
1971/72	1120	500	660	240	340	320	620	200	2480	180
1972/73	1260	600	800	240	320	300	720	240	2740	220
1973/74	1360	660	920	280	360	360	840	240	3220	280
1974/75	1840	780	1240	380	480	380	1300	300	4180	320
1975/76	2600	2000	1420	460	620	480	780	360	4840	400
1976/77	2440	1240	1600	580	980	460	1340	720	5740	840
1977/78	3760	2000	1880	720	1500	680	1820	1060	8040	1580
1978/79	4340	2420	2160	820	1480	700	2680	1200	9380	2100
1979/80	5000	2080	2780	920	1880	800	2420	1600	10480	1940
1980/81	5400	2160	3480	1300	2940	1160	3520	1920	13820	1780
1981/82	6520	2600	3980	1160	3380	1220	4000	2200	15740	2680
1982/83	4460	2140	4120	1380	6400	820	3320	1720	19320	2740
1983/84	4920	2440	4400	1460	6060	1240	3600	1680	19920	2800
1984/85	6140	1920	5180	1580	7720	1340	5740	2440	23500	2220
1985/86	6180	2780	6760	1760	6780	1420	5480	2680	25100	2380
1986/87	9240	2540	7920	2200	10320	1920	7080	3900	32520	3320
1987/88	8160	2280	9120	2340	11600	2380	6240	3140	36360	4880
1988/89	12560	3920	10460	2760	19960	2900	8180	4300	45280	2760
1989/90	19780	4640	13220	3260	18900	3240	12060	6640	50480	5700
1990/91	16420	4400	13580	3440	30740	3680	10180	6400	65020	5900
1991/92	12980	3540	14440	3800	39420	3960	9440	6500	75880	4640
1992/93	17020	4680	17080	4640	62460	4620	12200	8640	106300	5400
1993/94	20480	4860	21160	6480	105480	5780	15160	10240	158680	5300
1994/95	42260	13740	30700	9580	72060	8060	18600	23440	147180	7360
1995/96	27580	14920	31720	9080	72020	8120	12860	17680	155800	9020
1996/97	46160	17300	35740	13820	59640	9660	19480	29200	156780	10860
1997/98	24072	11530	46226	12883	177777	11764	14078	23908	291064	10182

Sources: Republic of Kenya Economic Survey, Various Issues. Nairobi. Government Printer, World Bank, and International Financial Statistics. Washington, Dc: International Monetary Fund

Key :	I	=	Government Investment
	PI	=	Physical Infrastructure
	ED	=	Education
	HT	=	Health Care
	PD	=	Public Debt
	NS	=	Public Order and National Security
	EA	=	Economic Affairs
	GA	=	General Administration and Services
	Cg	=	Government Consumption
	DE	=	Defense

APPENDIX III: Refined data

Table A 3: Refined Data for the Components of Government Expenditure

YEAR	GDP	I	PI	ED	HT	PD	NS	EA	GA	Cg	DE	GDP Deflator	Cpi
1963	6441	250	95	120	40	100	140	240	30	1100	20	6.8	0.055
1964	7120	260	130	130	60	110	160	300	70	1120	40	7.2	0.056
1965	7139	290	180	120	60	130	160	310	80	1160	70	8.3	0.058
1966	8224	360	240	130	70	150	170	300	80	1240	90	9.6	0.061
1967	8751	440	280	160	90	160	200	290	80	1330	110	10.16	0.062
1968	9595	530	270	200	100	170	220	310	90	1440	110	10.26	0.063
1969	10416	640	310	290	120	190	230	390	110	1610	120	10.55	0.062
1970	11499	900	420	450	170	280	250	430	140	1870	150	10.85	0.052
1971	12845	1110	530	600	220	350	290	510	180	2250	200	11.34	0.056
1972	13776	1190	610	730	240	330	310	670	220	2610	250	7.05	0.039
1973	15790	1310	690	860	260	340	330	780	240	2980	300	7.56	0.046
1974	18776	1600	870	1080	330	420	370	1070	270	3700	360	8.86	0.051
1975	21140	2220	1120	1330	420	550	430	1040	330	4510	620	9.65	0.06
1976	25562	2520	1620	1510	520	800	470	1060	540	5290	1210	10.9	0.065
1977	32699	3100	1620	1740	650	1240	570	1580	890	6890	1840	8.82	0.079
1978	35601	4050	2210	2020	770	1490	690	2250	1130	8710	2020	12.94	0.09
1979	39543	4670	2250	2470	870	1680	750	2550	1400	9930	1860	9.42	0.098
1980	44648	5200	2120	3130	1110	2410	980	2970	1760	12150	2230	10.23	0.111
1981	51640	5960	2380	3730	1230	3160	1190	3760	2060	14780	2710	11.16	0.132
1982	58214	5490	2370	4050	1270	4890	1020	3660	1960	17540	2770	12.36	0.15
1983	66218	4690	2290	4260	1420	6230	1030	3460	1700	19640	2510	13.49	0.165
1984	72550	5530	2180	4790	1520	6890	1290	4670	2060	21710	2300	14.64	0.183

1985	100831	6160	2350	5970	1670	7250	1380	5610	2560	24300	2850	16.49	0.202
1986	117472	7710	2660	7340	1980	8550	1670	3810	3290	28810	4100	17.93	0.21
1987	131169	8700	2410	8520	2270	10960	2150	6660	3520	34440	3820	18.89	0.222
1988	151194	10360	3100	9790	2550	15780	2640	7210	3720	40820	4230	20.51	0.244
1989	171589	16170	4280	11840	3010	19430	3070	10120	5470	47880	4250	22.23	0.268
1990	195536	18100	4520	7300	3350	243820	3460	11120	6520	57750	5800	24.32	0.368
1991	224232	14700	3970	14010	3620	35080	3820	9810	6450	70450	5270	27.49	0.42
1992	264475	15000	4110	15760	4220	50940	4290	10820	7570	91090	5020	32.69	0.578
1993	333616	18750	4770	19120	5560	83970	5200	13680	9440	132490	6380	41.08	0.508
1994	400700	31370	9300	25930	8030	88770	6920	16880	16840	152930	8190	48.08	0.655
1995	465654	34920	14330	31210	9330	72040	8090	15730	20560	151490	9940	53.51	0.665
1996	687998	36870	16110	33730	11450	65830	8890	16170	23440	156290	10521	75.91	0.725
1997	770312	35116	14415	40983	13352	118709	10712	16779	26554	223922	10381	84.59	0.806
1998	850808	22086	11259	46723	11666	140142	11715	15192	25465	256853	10503	90.46	0.856
1999	906928	18974	11111	47359	10252	93151	12116	16389	26392	214218	12347	94.27	0.906
2000	967838	37609	13143	49116	11777	99817	14949	25056	43329	237917	15267	100	1
2001	1020020	40800	13529	52696	13918	119839	18202	29851	52463	276761	16936	101.55	1.058
2002	1035370	28002	11668	59894	14844	112453	20140	24884	42572	277886	18762	102.52	1.079
2003	1138060	45200	12060	72956	18028	114167	24057	27233	45289	301107	20450	109.48	1.185
2004	1286460	49383	21062	82752	18507	117680	28665	23529	54226	334808	23294	117.77	1.325
2005	1445480	51261	23716	90376	20136	104782	35114	18840	56589	354949	25366	125.16	1.459
2006	1642400	84489	34163	102632	25740	115594	40797	26292	53443	386229	25122	134.03	1.676
2007	1795005	133522	49785	117073	28100	132667	45808	35444	85014	449941	36741	140.23	1.864
2008	1849314	183978	82065	138292	33202	141694	57624	44555	102135	513565	41209	145.55	1.898

Source: Own Calculations

Table A4: Real Data for the Components of Government Expenditure

Year	real GDP	Reali	Realpi	real ed	real ht	real pd	real ns	real ea	real ga	real cg	real de
1963	947.2059	4545.455	1727.273	2181.818	727.2727	1818.182	2545.455	4363.636	545.4545	20000	363.6364
1964	988.8889	4642.857	2321.429	2321.429	1071.429	1964.286	2857.143	5357.143	1250	20000	714.2857
1965	860.1205	5000	3103.448	2068.966	1034.483	2241.379	2758.621	5344.828	1379.31	20000	1206.897
1966	856.6667	5901.639	3934.426	2131.148	1147.541	2459.016	2786.885	4918.033	1311.475	20327.87	1475.41
1967	861.3189	7096.774	4516.129	2580.645	1451.613	2580.645	3225.806	4677.419	1290.323	21451.61	1774.194
1968	935.1852	8412.698	4285.714	3174.603	1587.302	2698.413	3492.063	4920.635	1428.571	22857.14	1746.032
1969	987.2986	10322.58	5000	4677.419	1935.484	3064.516	3709.677	6290.323	1774.194	25967.74	1935.484
1970	1059.816	17307.69	8076.923	8653.846	3269.231	5384.615	4807.692	8269.231	2692.308	35961.54	2884.615
1971	1132.716	19821.43	9464.286	10714.29	3928.571	6250	5178.571	9107.143	3214.286	40178.57	3571.429
1972	1954.043	30512.82	15641.03	18717.95	6153.846	8461.538	7948.718	17179.49	5641.026	66923.08	6410.256
1973	2088.624	28478.26	15000	18695.65	5652.174	7391.304	7173.913	16956.52	5217.391	64782.61	6521.739
1974	2119.187	31372.55	17058.82	21176.47	6470.588	8235.294	7254.902	20980.39	5294.118	72549.02	7058.824
1975	2190.674	37000	18666.67	22166.67	7000	9166.667	7166.667	17333.33	5500	75166.67	10333.33
1976	2345.138	38769.23	24923.08	23230.77	8000	12307.69	7230.769	16307.69	8307.692	81384.62	18615.38
1977	3707.37	39240.51	20506.33	22025.32	8227.848	15696.2	7215.19	20000	11265.82	87215.19	23291.14
1978	2751.236	45000	24555.56	22444.44	8555.556	16555.56	7666.667	25000	12555.56	96777.78	22444.44
1979	4197.771	47653.06	22959.18	25204.08	8877.551	17142.86	7653.061	26020.41	14285.71	101326.5	18979.59
1980	4364.418	46846.85	19099.1	28198.2	10000	21711.71	8828.829	26756.76	15855.86	109459.5	20090.09
1981	4627.24	45151.52	18030.3	28257.58	9318.182	23939.39	9015.152	28484.85	15606.06	111969.7	20530.3
1982	4709.871	36600	15800	27000	8466.667	32600	6800	24400	13066.67	116933.3	18466.67
1983	4908.673	28424.24	13878.79	25818.18	8606.061	37757.58	6242.424	20969.7	10303.03	119030.3	15212.12
1984	4955.601	30218.58	11912.57	26174.86	8306.011	37650.27	7049.18	25519.13	11256.83	118633.9	12568.31
1985	6114.676	30495.05	11633.66	29554.46	8267.327	35891.09	6831.683	27772.28	12673.27	120297	14108.91
1986	6551.701	36714.29	12666.67	34952.38	9428.571	40714.29	7952.381	18142.86	15666.67	137190.5	19523.81
1987	6943.833	39189.19	10855.86	38378.38	10225.23	49369.37	9684.685	30000	15855.86	155135.1	17207.21

1988	7371.721	42459.02	12704.92	40122.95	10450.82	64672.13	10819.67	29549.18	15245.9	167295.1	17336.07
1989	7718.803	60335.82	15970.15	44179.1	11231.34	72500	11455.22	37761.19	20410.45	178656.7	15858.21
1990	8040.132	49184.78	12282.61	19836.96	9103.261	662554.3	9402.174	30217.39	17717.39	156929.3	15760.87
1991	8156.857	35000	9452.381	33357.14	8619.048	83523.81	9095.238	23357.14	15357.14	167738.1	12547.62
1992	8090.395	25951.56	7110.727	27266.44	7301.038	88131.49	7422.145	18719.72	13096.89	157595.2	8685.121
1993	8121.13	36909.45	9389.764	37637.8	10944.88	165295.3	10236.22	26929.13	18582.68	260807.1	12559.06
1994	8334.027	47893.13	14198.47	39587.79	12259.54	135526.7	10564.89	25770.99	25709.92	233480.9	12503.82
1995	8702.187	52511.28	21548.87	46932.33	14030.08	108330.8	12165.41	23654.14	30917.29	227804.5	14947.37
1996	9063.338	50855.17	22220.69	46524.14	15793.1	90800	12262.07	22303.45	32331.03	215572.4	14511.72
1997	9106.419	43568.24	17884.62	50847.39	16565.76	147281.6	13290.32	20817.62	32945.41	277818.9	12879.65
1998	9405.35	25801.4	13153.04	54582.94	13628.5	163717.3	13685.75	17747.66	29748.83	300061.9	12269.86
1999	9620.537	20942.6	12263.8	52272.63	11315.67	102815.7	13373.07	18089.4	29130.24	236443.7	13628.04
2000	9678.38	37609	13143	49116	11777	99817	14949	25056	43329	237917	15267
2001	10044.51	38563.33	12787.33	49807.18	13155.01	113269.4	17204.16	28214.56	49586.96	261588.8	16007.56
2002	10099.2	25951.81	10813.72	55508.8	13757.18	104219.6	18665.43	23062.09	39455.05	257540.3	17388.32
2003	10395.14	38143.46	10177.22	61566.24	15213.5	96343.46	20301.27	22981.43	38218.57	254098.7	17257.38
2004	10923.49	37270.19	15895.85	62454.34	13967.55	88815.09	21633.96	17757.74	40925.28	252685.3	17580.38
2005	11549.06	35134.34	16254.97	61943.8	13801.23	71817.68	24067.17	12912.95	38786.15	243282.4	17385.88
2006	12253.97	50411.1	20383.65	61236.28	15358	68970.17	24341.89	15687.35	31887.23	230446.9	14989.26
2007	12800.43	71631.97	26708.69	62807.4	15075.11	71173.28	24575.11	19015.02	45608.37	241384.7	19710.84
2008	12705.7	96932.56	43237.62	72861.96	17493.15	74654.37	30360.38	23474.71	53811.91	270582.2	21711.8

Source: Own Calculations

Table A 5: The Growth rate of Real GDP and the Ratio of Components of Real Government Expenditure to the Real GDP

YEAR	growth in Real GDP	I/real GDP	pi/real GDP	ed/real GDP	ht/real GDP	pd/real GDP	ns/real GDP	ea/real GDP	Ga /real GDP	cg/real GDP	de/real GDP
1963		4.798803	1.823545	2.303425	0.767808	1.919521	2.68733	4.606851	0.575856	21.11473	0.38304
1964	4.400628	4.695024	2.347512	2.347512	1.083467	1.986356	2.889246	5.417335	1.264045	20.22472	0.72231
1965	-13.0215	5.813139	3.608155	2.405437	1.202718	2.60589	3.207249	6.214045	1.603625	23.25256	1.40317
1966	-0.40155	6.889073	4.592715	2.487721	1.339542	2.870447	3.253173	5.740894	1.530905	23.72903	1.72226
1967	0.543062	8.239427	5.243272	2.996155	1.685337	2.996155	3.745194	5.430531	1.498078	24.90554	2.05985
1968	8.575951	8.995757	4.582744	3.394625	1.697313	2.885431	3.734088	5.261669	1.527581	24.4413	1.86704
1969	5.572521	10.45538	5.064324	4.737594	1.960384	3.103941	3.757402	6.371246	1.797018	26.30181	1.96038
1970	7.345001	16.33085	7.621064	8.165426	3.084716	5.080709	4.536348	7.802518	2.540355	33.93188	2.72180
1971	6.878591	17.49903	8.355391	9.458933	3.468276	5.517711	4.571818	8.040093	2.83768	35.471	3.15297
1972	72.50948	15.61523	8.004445	9.57909	3.14929	4.330273	4.067833	8.791767	2.886849	34.24853	3.28051
1973	6.887352	13.63494	7.181761	8.95118	2.706171	3.538839	3.434755	8.118512	2.498004	31.01688	3.12250
1974	1.463309	14.80405	8.0497	9.992732	3.053335	3.886062	3.423436	9.900206	2.498183	34.23436	3.33091
1975	3.373284	16.88978	8.520971	10.11865	3.195364	4.184406	3.271444	7.91233	2.510643	34.31213	4.71696
1976	7.050984	16.53175	10.62755	9.90593	3.411314	5.248175	3.083303	6.953832	3.542518	34.70356	7.93786
1977	58.08751	10.58446	5.531234	5.940955	2.219322	4.233784	1.946175	5.39466	3.038764	23.52482	6.28238
1978	-25.7901	16.35628	8.92528	8.157948	3.109713	6.017496	2.786626	9.086823	4.563605	35.1761	8.15794
1979	52.5776	11.35199	5.469375	6.004159	2.114825	4.0838	1.823125	6.198625	3.403167	24.13818	4.52135
1980	3.969909	10.73381	4.376093	6.460929	2.291256	4.974709	2.022911	6.130658	3.632983	25.07996	4.60315
1981	6.02192	9.757764	3.896557	6.106788	2.013767	5.173579	1.948278	6.155905	3.37265	24.19794	4.43683
1982	1.785738	7.770914	3.354657	5.732642	1.797643	6.921634	1.443776	5.180609	2.774315	24.82729	3.92084
1983	4.220977	5.790616	2.827401	5.259707	1.753236	7.692013	1.271713	4.271969	2.098944	24.24898	3.09902
1984	0.956022	6.097864	2.403859	5.281875	1.676085	7.597519	1.422467	5.149552	2.271537	23.93935	2.53618
1985	23.38918	4.98719	1.902581	4.833364	1.352047	5.869664	1.11726	4.541905	2.072598	19.67349	2.30738

1986	7.147158	5.603779	1.93334	5.334856	1.439103	6.214308	1.213789	2.769183	2.391236	20.93967	2.97996
1987	5.985188	5.64374	1.563381	5.526973	1.472562	7.109815	1.394717	4.320381	2.283444	22.34143	2.47805
1988	6.162136	5.759716	1.723467	5.44282	1.417691	8.773003	1.467727	4.008451	2.06816	22.69417	2.35169
1989	4.708294	7.816732	2.068993	5.723569	1.455063	9.392648	1.484067	4.892105	2.64425	23.14565	2.05449
1990	4.162927	6.11741	1.527663	2.467243	1.132228	82.40591	1.169405	3.75832	2.20362	19.51826	1.96027
1991	1.451785	4.290868	1.158826	4.08946	1.056663	10.2397	1.115042	2.863498	1.882728	20.56406	1.53829
1992	-0.8148	3.2077	0.87891	3.370223	0.902433	10.89335	0.917402	2.313821	1.618819	19.47929	1.07351
1993	0.379894	4.544866	1.156214	4.634552	1.347704	20.35373	1.260443	3.315935	2.288189	32.11463	1.54646
1994	2.621521	5.746697	1.703675	4.750139	1.471023	16.26185	1.267681	3.092262	3.084934	28.01538	1.50033
1995	4.417551	6.034263	2.47626	5.393165	1.612247	12.44869	1.397972	2.718183	3.552819	26.17785	1.71765
1996	4.150125	5.611086	2.451711	5.133223	1.742526	10.01838	1.352931	2.460843	3.567233	23.7851	1.60114
1997	0.475333	4.784344	1.963957	5.583687	1.81913	16.17339	1.459446	2.286038	3.617823	30.50802	1.41434
1998	3.282643	2.743269	1.398463	5.803393	1.449016	17.40683	1.455102	1.886975	3.162969	31.90332	1.30456
1999	2.287914	2.176864	1.274752	5.433442	1.1762	10.6871	1.390054	1.880291	3.027923	24.57698	1.41655
2000	0.601248	3.885878	1.357975	5.074816	1.216836	10.3134	1.544577	2.588863	4.476886	24.58232	1.57743
2001	3.782969	3.839244	1.273067	4.958647	1.309672	11.27674	1.712792	2.808953	4.936722	26.04297	1.59366
2002	0.544477	2.569689	1.07075	5.496357	1.362205	10.31959	1.848209	2.283557	3.90675	25.50106	1.72175
2003	2.930336	3.669355	0.979036	5.922599	1.463521	9.268125	1.952957	2.210786	3.67658	24.44399	1.66014
2004	5.082705	3.411929	1.455198	5.717432	1.27867	8.130648	1.980498	1.625646	3.746537	23.13227	1.60941
2005	5.726759	3.042182	1.407472	5.363537	1.19501	6.218489	2.083908	1.118096	3.358383	21.06513	1.50539
2006	6.103665	4.113857	1.663432	4.997259	1.253307	5.628392	1.986448	1.280185	2.602195	18.80589	1.22321
2007	4.459468	5.596058	2.086546	4.906662	1.177703	5.560224	1.919865	1.485498	3.563033	18.85754	1.53985
2008	-0.74013	7.629064	3.403011	5.73459	1.376796	5.875662	2.389509	1.847574	4.235259	21.29613	1.70882

Source: Own Calculations

Appendix IV: VAR Estimation

Table A 6: VAR Estimation Results (Lag 2)

Sample(adjusted): 1963 2008															
Included observations: 42 after adjusting endpoints															
Standard errors & t-statistics in parentheses															
	I	PI	CG	DE	EA	ED	GA	HT	NS	PD	G	D1	D2	D3	D4
I(-1)	-0.35	0.32	-1.01	0.51	-0.42	-0.90	0.25	-0.08	-0.13	15.46	-5.78	-0.05	-0.07	-0.01	0.23
	(1.03)	(0.63)	(2.26)	(0.28)	(0.52)	(0.61)	(0.28)	(0.22)	(0.18)	(7.76)	(9.11)	(0.29)	(0.14)	(0.01)	(0.18)
	(-0.34)	(0.51)	(-0.4)	(1.80)	(-0.80)	(-1.47)	(0.88)	(-0.37)	(-0.72)	(1.99)	(-0.63)	(-0.17)	(-0.45)	(-0.90)	(1.26)
I(-2)	-0.39	-0.62	-0.47	-0.30	0.13	-0.25	-0.24	-0.07	-0.04	-1.41	4.00	-0.02	0.16	-0.01	0.06
	(0.67)	(0.41)	(1.48)	(0.19)	(0.34)	(0.40)	(0.18)	(0.15)	(0.12)	(5.08)	(5.96)	(0.19)	(0.09)	(0.00)	(0.12)
	(-0.58)	(-1.49)	(-.32)	(-1.64)	(0.39)	(-0.63)	(-1.31)	(-0.47)	(-0.37)	(-0.28)	(0.67)	(-0.10)	(1.71)	(-1.46)	(0.47)
PI(-1)	-1.90	-1.36	-3.68	-1.42	-0.53	-1.19	-0.50	-0.36	-0.32	7.21	12.03	0.17	-0.26	0.02	-0.21
	(1.31)	(0.80)	2.88)	(0.36)	(0.66)	(0.78)	(0.36)	(0.28)	(0.23)	(9.87)	(11.60)	(0.37)	(0.18)	(0.01)	(0.23)
	(-1.46)	(-1.69)	(-.28)	(-3.94)	(-0.80)	(-1.53)	(-1.42)	(-1.25)	(-1.35)	(0.73)	(1.04)	(0.45)	(-1.39)	(1.88)	(-0.93)
PI(-2)	2.09	1.19	3.39	1.04	0.51	0.40	0.28	0.36	0.27	12.34	-14.91	0.51	-0.16	0.01	-0.12
	(1.19)	(0.73)	(2.61)	(0.33)	(0.60)	(0.71)	(0.32)	(0.26)	(0.21)	(8.96)	(10.52)	(0.33)	(0.17)	(0.01)	(0.21)
	(1.76)	(1.63)	1.30)	(3.18)	(0.85)	(0.56)	(0.86)	(1.39)	(1.29)	(1.38)	(-1.42)	(1.54)	(-0.97)	(0.72)	(-0.59)
CG(-1)	-0.01	0.03	0.71	-0.09	0.17	0.01	-0.08	-0.01	0.01	1.49	-1.11	0.14	0.07	-0.01	-0.01
	(0.34)	(0.21)	(0.75)	(0.09)	(0.17)	(0.20)	(0.09)	(0.07)	(0.06)	(2.59)	(3.04)	(0.10)	(0.05)	(0.00)	(0.06)
	(-0.04)	(0.15)	0.94)	(-0.99)	(0.96)	(0.07)	(-0.89)	(-0.11)	(0.12)	(0.58)	(-0.36)	(1.43)	(1.35)	(-6.50)	(-0.16)
CG(-2)	-0.66	-0.15	-1.19	0.21	-0.27	-0.23	0.20	-0.06	0.02	-4.50	-1.20	-0.04	-0.03	0.00	0.02
	(0.92)	(0.57)	2.02)	(0.25)	(0.47)	(0.55)	(0.25)	(0.20)	(0.16)	(6.95)	(8.16)	(0.26)	(0.13)	(0.01)	(0.16)
	(-0.72)	(-0.26)	(-.59)	(0.83)	(-0.57)	(-0.42)	(0.78)	(-0.30)	(0.10)	(-0.65)	(-0.15)	(-0.17)	(-0.23)	(0.13)	(0.14)
DE(-1)	0.54	0.74	-0.32	1.48	-0.42	-0.07	0.25	0.02	-0.01	-7.36	-6.12	-0.25	0.15	0.00	0.27
	(1.19)	(0.73)	2.62)	(0.33)	(0.60)	(0.71)	(0.32)	(0.26)	(0.21)	(9.00)	(10.56)	(0.33)	(0.17)	(0.01)	(0.21)

	(0.45)	(1.01)	(-.12)	(4.49)	(-0.70)	(-0.09)	(0.78)	(0.07)	(-0.06)	(-0.82)	(-0.58)	(-0.74)	(0.86)	(0.17)	(1.27)
DE(-2)	0.94	0.00	0.06	-0.72	0.55	0.78	-0.19	0.12	0.18	-11.16	6.12	0.32	0.07	0.00	-0.31
	(1.11)	(0.68)	2.45)	(0.31)	(0.56)	(0.66)	(0.30)	(0.24)	(0.20)	(8.40)	(9.86)	(0.31)	(0.16)	(0.01)	(0.20)
	(0.85)	(0.00)	0.02)	(-2.36)	(0.98)	(1.18)	(-0.61)	(0.52)	(0.92)	(-1.33)	(0.62)	(1.03)	(0.46)	(-0.16)	(-1.56)
EA(-1)	0.69	0.28	0.88	0.14	0.36	0.21	0.11	0.04	-0.02	-3.28	-2.92	-0.12	0.10	0.01	0.15
	(0.66)	(0.41)	1.46)	(0.18)	(0.33)	(0.39)	(0.18)	(0.14)	(0.12)	(5.00)	(5.87)	(0.18)	(0.09)	(0.00)	(0.12)
	(1.04)	(0.70)	0.60)	(0.78)	(1.07)	(0.54)	(0.62)	(0.31)	(-0.19)	(-0.66)	(-0.50)	(-0.65)	(1.11)	(1.59)	(1.25)
EA(-2)	0.64	0.56	1.40	0.27	0.15	0.70	-0.06	0.16	0.14	-8.96	-3.14	-0.30	0.15	0.00	-0.10
	(0.97)	(0.60)	2.13)	(0.27)	(0.49)	(0.58)	(0.26)	(0.21)	(0.17)	(7.31)	(8.59)	(0.27)	(0.14)	(0.01)	(0.17)
	(0.66)	(0.93)	0.66)	(1.01)	(0.30)	(1.21)	(-0.22)	(0.74)	(0.79)	(-1.23)	(-0.37)	(-1.11)	(1.07)	(0.69)	(-0.56)
ED(-1)	0.69	0.08	-2.19	0.48	-0.99	0.82	-0.16	0.21	0.17	-2.31	-7.52	0.51	-0.36	0.02	-0.28
	(1.78)	(1.10)	3.92)	(0.49)	(0.90)	(1.06)	(0.48)	(0.39)	(0.32)	(13.47)	(15.82)	(0.50)	(0.25)	(0.01)	(0.32)
	(0.39)	(0.07)	(-.56)	(0.97)	(-1.10)	(0.77)	(-0.33)	(0.54)	(0.55)	(-0.17)	(-0.48)	(1.03)	(-1.44)	(1.59)	(-0.90)
ED(-2)	0.72	0.33	2.21	-0.25	1.19	-0.02	-0.04	-0.06	-0.10	7.00	3.26	-0.14	0.36	-0.01	0.09
	(1.70)	(1.05)	3.74)	(0.47)	(0.86)	(1.01)	(0.46)	(0.37)	(0.30)	(12.84)	(15.08)	(0.48)	(0.24)	(0.01)	(0.30)
	(0.42)	(0.31)	0.59)	(-0.52)	(1.38)	(-0.02)	(-0.09)	(-0.16)	(-0.33)	(0.54)	(0.22)	(-0.29)	(1.51)	(-0.85)	(0.29)
GA(-1	-0.98	-0.79	0.45	-0.35	0.08	0.22	0.49	0.04	0.13	1.59	10.74	0.13	-0.05	0.01	-0.31
	(1.54)	(0.95)	3.39)	(0.42)	(0.78)	(0.92)	(0.42)	(0.33)	(0.28)	(11.64)	(13.67)	(0.43)	(0.22)	(0.01)	(0.27)
	(-0.64)	(-0.84)	(0.13)	(-0.83)	(0.11)	(0.24)	(1.16)	(0.13)	(0.45)	(0.14)	(0.79)	(0.31)	(-0.21)	(0.84)	(-1.14)
GA(-2	-0.50	-0.11	-1.52	-0.13	-0.52	-0.79	-0.19	-0.18	-0.26	14.98	-11.20	-0.11	-0.14	0.00	0.49
	(1.57)	(0.97)	3.46)	(0.43)	(0.80)	(0.94)	(0.43)	(0.34)	(0.28)	(11.87)	(13.94)	(0.44)	(0.22)	(0.01)	(0.28)
	(-0.32)	(-0.11)	(-.44)	(-0.30)	(-0.66)	(-0.85)	(-0.44)	(-0.53)	(-0.92)	(1.26)	(-0.80)	(-0.25)	(-0.61)	(0.17)	(1.76)
HT(-1)	9.13	2.51	20.54	-0.86	4.62	8.56	1.41	1.82	1.08	-91.00	40.12	-1.55	1.24	-0.01	0.05
	(7.42)	(4.56)	6.31)	(2.05)	(3.75)	(4.42)	(2.02)	(1.61)	(1.32)	(56.02)	(65.78)	(2.07)	(1.05)	(0.05)	(1.31)
	(1.23)	(0.55)	1.26)	(-0.42)	(1.23)	(1.94)	(0.70)	(1.13)	(0.82)	(-1.62)	(0.61)	(-0.75)	(1.19)	(-0.20)	(0.04)
HT(-2)	-9.38	-1.95	-1.00	0.02	-3.85	-2.92	-0.46	-1.23	-1.43	10.60	28.27	-1.36	-1.80	0.03	-0.16
	(6.16)	(3.79)	13.5)	(1.70)	(3.12)	(3.67)	(1.68)	(1.34)	(1.10)	(46.56)	(54.68)	(1.72)	(0.87)	(0.04)	(1.09)
	(-1.52)	(-0.51)	(-.81)	(0.01)	(-1.23)	(-0.80)	(-0.27)	(-0.92)	(-1.30)	(0.23)	(0.52)	(-0.79)	(-2.08)	(0.72)	(-0.15)
NS(-1)	-3.92	-0.97	-7.68	0.01	-0.25	-3.03	-0.92	-0.84	0.21	-2.39	5.11	-1.05	-0.25	0.03	-0.42

	(3.73)	(2.29)	8.20)	(1.03)	(1.89)	(2.22)	(1.01)	(0.81)	(0.67)	(28.16)	(33.07)	(1.04)	(0.53)	(0.02)	(0.66)
	(-1.05)	(-0.42)	(-.94)	(0.01)	(-0.13)	(-1.36)	(-0.91)	(-1.04)	(0.31)	(-0.08)	(0.15)	(-1.01)	(-0.48)	(1.26)	(-0.63)
NS(-2)	8.64	3.13	11.56	-0.44	2.07	5.24	0.50	1.39	1.12	-11.55	1.12	1.17	0.55	0.00	0.23
	(4.88)	(3.00)	0.74)	(1.35)	(2.47)	(2.91)	(1.33)	(1.06)	(0.87)	(36.89)	(43.32)	(1.36)	(0.69)	(0.03)	(0.86)
	(1.77)	(1.04)	1.08)	(-0.33)	(0.84)	(1.80)	(0.37)	(1.31)	(1.29)	(-0.31)	(0.03)	(0.86)	(0.80)	(-0.03)	(0.27)
PD(-1)	0.00	-0.01	-0.07	0.00	-0.04	0.04	0.00	0.00	0.01	-0.79	-0.07	0.03	0.00	0.01	-0.02
	(0.07)	(0.04)	0.15)	(0.02)	(0.03)	(0.04)	(0.02)	(0.01)	(0.01)	(0.52)	(0.61)	(0.02)	(0.01)	(0.00)	(0.01)
	(0.00)	(-0.17)	(-.44)	(0.02)	(-1.25)	(1.06)	(-0.24)	(0.29)	(0.52)	(-1.52)	(-0.12)	(1.41)	(-0.22)	(32.94)	(-1.52)
PD(-2)	0.64	0.14	0.86	-0.20	0.29	0.04	-0.10	0.05	-0.02	6.42	1.01	-0.04	0.03	0.00	(-0.02)
	(0.90)	(0.55)	1.98)	(0.25)	(0.46)	(0.54)	(0.25)	(0.20)	(0.16)	(6.81)	(8.00)	(0.25)	(0.13)	(0.01)	(0.16)
	(0.71)	(0.26)	0.43)	(-0.79)	(0.63)	(0.08)	(-0.42)	(0.25)	(-0.11)	(0.94)	(0.13)	(-0.16)	(0.26)	(-0.28)	(-0.12)
G(-1)	-0.02	-0.02	-0.04	-0.02	0.00	-0.01	0.00	-0.01	0.00	-0.10	-0.39	-0.01	0.00	0.00	0.00
	(0.05)	(0.03)	0.10)	(0.01)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)	(0.36)	(0.42)	(0.01)	(0.01)	(0.00)	(0.01)
	(-0.51)	(-0.76)	(-.37)	(-1.43)	(0.01)	(-0.46)	(0.02)	(-0.66)	(-0.35)	(-0.27)	(-0.93)	(-0.64)	(0.70)	(-0.77)	(-0.18)
G(-2)	-0.01	0.00	-0.01	-0.02	0.02	0.00	0.00	0.00	0.00	-0.15	-0.18	0.00	0.00	0.00	0.00
	(0.03)	(0.02)	0.07)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.23)	(0.27)	(0.01)	(0.00)	(0.00)	(0.01)
	(-0.28)	(-0.09)	(-.13)	(-2.06)	(1.48)	(0.26)	(0.06)	(-0.21)	(0.32)	(-0.66)	(-0.67)	(-0.31)	(0.23)	(0.01)	(-0.53)
D1(-1)	1.11	0.20	1.84	0.19	0.28	1.01	0.21	0.16	0.13	-4.23	1.50	-0.29	0.16	0.00	0.02
	(1.05)	(0.64)	2.30)	(0.29)	(0.53)	(0.62)	(0.28)	(0.23)	(0.19)	(7.90)	(9.27)	(0.29)	(0.15)	(0.01)	(0.18)
	(1.06)	(0.31)	0.80)	(0.65)	(0.54)	(1.61)	(0.73)	(0.69)	(0.71)	(-0.54)	(0.16)	(-0.98)	(1.07)	(0.27)	(0.11)
D1(-2)	0.84	-0.49	1.47	-0.58	0.84	0.59	0.10	0.03	-0.06	-0.69	10.28	0.10	0.14	0.00	-0.02
	(1.28)	(0.79)	2.82)	(0.35)	(0.65)	(0.76)	(0.35)	(0.28)	(0.23)	(9.69)	(11.38)	(0.36)	(0.18)	(0.01)	(0.23)
	(0.66)	(-0.62)	0.52)	(-1.65)	(1.29)	(0.77)	(0.30)	(0.11)	(-0.24)	(-0.07)	(0.90)	(0.27)	(0.76)	(-0.47)	(-0.09)
D2(-1)	0.70	0.62	-3.91	0.37	-0.33	0.11	0.04	0.13	-0.02	-6.87	1.18	-0.32	-0.30	0.00	-0.12
	(1.75)	(1.08)	3.85)	(0.48)	(0.89)	(1.04)	(0.48)	(0.38)	(0.31)	(13.21)	(15.51)	(0.49)	(0.25)	(0.01)	(0.31)
	(0.40)	(0.58)	(-.02)	(0.76)	(-0.37)	(0.11)	(0.09)	(0.33)	(-0.07)	(-0.52)	(0.08)	(-0.65)	(-1.20)	(-0.01)	(-0.37)
D2(-2)	0.94	0.54	3.20	0.03	0.16	1.19	-0.57	0.24	0.27	-6.67	-9.37	0.54	0.04	0.00	-0.38
	(1.92)	(1.18)	4.23)	(0.53)	(0.97)	(1.15)	(0.52)	(0.42)	(0.34)	(14.53)	(17.06)	(0.54)	(0.27)	(0.01)	(0.34)
	(0.49)	(0.45)	-0.7)	(0.06)	(0.17)	(1.03)	(-1.09)	(0.57)	(0.77)	(-0.46)	(-0.55)	(1.00)	(0.15)	(0.22)	(-1.10)

D3(-1)	-49.87	-9.94	-59.5	14.37	-21.53	-3.88	8.05	-4.26	0.88	-492.42	-79.09	3.03	-1.90	1.09	2.66
	(66.98	(41.20	147.)	(18.47	(33.91	(39.91	(18.21	(14.56	(11.97)	505.90)	594.10)	18.72)	(9.44)	(0.41)	(11.84)
	(-0.74)	(-0.24)	(-.40)	(0.78)	(-0.63)	(-0.10)	(0.44)	(-0.29)	(0.07)	(-0.97)	(-0.13)	(0.16)	(-0.20)	(2.67)	(0.22)
D3(-2)	50.57	11.70	3.51	-12.44	19.58	5.23	-6.52	4.51	-0.74	439.37	67.48	-4.03	2.69	-0.11	-2.01
	65.58)	40.34)	144.)	18.08)	33.20)	(39.07	17.83)	14.25)	(11.72)	495.29)	581.65)	(18.33	(9.24)	(0.40)	(11.59)
	(0.77)	(0.29)	(0.44)	(-0.69)	(0.59)	(0.13)	(-0.37)	(0.32)	(-0.06)	(0.89)	(0.12)	(-0.22)	(0.29)	(-0.27)	(-0.17)
D4(-1)	-3.00	-1.20	0.68	-0.26	-0.02	-1.39	-0.04	-0.26	-0.24	18.64	5.67	0.07	-0.16	0.00	-0.41
	(2.05)	(1.26)	(4.52)	(0.57)	(1.04)	(1.22)	(0.56)	(0.45)	(0.37)	(15.51)	(18.22)	(0.57)	(0.29)	(0.01)	(0.36)
	(-1.46)	(-0.95)	(0.15)	(-0.46)	(-0.01)	(-1.14)	(-0.08)	(-0.59)	(-0.65)	(1.20)	(0.31)	(0.13)	(-0.54)	(0.12)	(-1.13)
D4(-2)	-3.34	-1.43	-4.58	-0.43	-0.52	-2.49	0.20	-0.49	-0.42	25.49	4.83	-0.33	-0.27	0.00	0.03
	(2.34)	(1.44)	5.14)	(0.64)	(1.18)	(1.39)	(0.64)	(0.51)	(0.42)	(17.66)	(20.73)	(0.65)	(0.33)	(0.01)	(0.41)
	(-1.43)	(-0.99)	-0.89)	(-0.66)	(-0.44)	(-1.79)	(0.32)	(-0.96)	(-1.02)	(1.44)	(0.23)	(-0.51)	(-0.81)	(0.23)	(0.07)
C	0.74	-3.33	9.34	-0.78	-0.45	-3.06	-0.09	0.14	-0.27	99.72	2.57	1.45	-1.58	0.05	0.08
	(7.14)	(4.39)	(15.7)	(1.97)	(3.62)	(4.25)	(1.94)	(1.55)	(1.28)	(53.94)	(63.34)	(2.00)	(1.01)	(0.04)	(1.26)
	(0.10)	(-0.76)	0.59)	(-0.40)	(-0.12)	(-0.72)	(-0.05)	(0.09)	(-0.21)	(1.85)	(0.04)	(0.73)	(-1.57)	(1.10)	(0.07)
Adj. R2	0.86	0.84	0.41	0.92	0.86	0.71	0.69	0.72	0.91	-0.17	0.09	-0.02	0.43	1.00	-0.09
F-statisti	9.11	8.42	1.94	16.11	9.60	4.40	3.97	4.51	14.56	0.80	1.14	0.97	2.03	2947.99	0.89
Akaike	4.10	3.13	5.68	1.52	2.74	3.06	1.49	1.05	0.65	8.14	8.46	1.55	0.18	-6.10	0.63
Schwarz IC	5.38	4.41	6.96	2.80	4.02	4.35	2.78	2.33	1.94	9.43	9.75	2.83	1.46	-4.82	1.92

Source: Constructed from the Study Data

Table A 7: VAR Estimation Results (Lag 1)

Included observations: 43 after adjusting endpoints															
Standard errors & t-statistics in parentheses															
	I	PI	CG	DE	EA	ED	GA	HT	NS	PD	GDP	D1	D2	D3	D4
I(-1)	0.900	0.220	0.805	0.084	0.150	-0.020	0.080	0.092	0.011	8.480	0.830	0.163	0.121	-0.009	0.046
	(0.431)	(0.277)	(0.803)	(0.207)	(0.242)	(0.242)	(0.128)	(0.083)	(0.072)	(2.584)	(3.154)	(0.121)	(0.057)	(0.002)	(0.070)
	(2.086)	(0.794)	(1.002)	(0.408)	(0.619)	(-0.081)	(0.626)	(1.110)	(0.157)	(3.282)	(0.263)	(1.341)	(2.115)	(-4.426)	(0.660)
PI(-1)	-0.498	0.111	-1.125	0.110	-0.475	-0.408	-0.036	-0.016	0.010	-1.935	0.697	-0.083	-0.060	0.017	-0.108
	(0.758)	(0.487)	(1.410)	(0.363)	(0.426)	(0.425)	(0.224)	(0.146)	(0.127)	(4.539)	(5.540)	(0.213)	(0.101)	(0.004)	(0.123)
	(-0.657)	(0.229)	(-0.798)	(0.304)	(-1.116)	(-0.961)	(-0.161)	(-0.108)	(0.082)	(-0.426)	(0.126)	(-0.389)	(-0.593)	(4.578)	(-0.877)
CG(-1)	-0.083	-0.018	0.380	-0.023	0.020	-0.083	0.006	-0.009	-0.003	1.911	0.279	0.063	0.038	-0.013	-0.047
	(0.162)	(0.104)	(0.302)	(0.078)	(0.091)	(0.091)	(0.048)	(0.031)	(0.027)	(0.973)	(1.187)	(0.046)	(0.022)	(0.001)	(0.026)
	(-0.513)	(-0.173)	(1.259)	(-0.299)	(0.215)	(-0.916)	(0.124)	(-0.279)	(-0.097)	(1.964)	(0.235)	(1.385)	(1.755)	(-16.98)	(-1.777)
DE(-1)	0.153	0.162	-0.888	0.625	0.266	-0.238	0.053	-0.110	-0.103	-3.441	1.271	0.219	0.006	0.001	0.075
	(0.626)	(0.402)	(1.166)	(0.300)	(0.352)	(0.351)	(0.185)	(0.121)	(0.105)	(3.751)	(4.579)	(0.176)	(0.083)	(0.003)	(0.101)
	(0.245)	(0.402)	(-0.762)	(2.084)	(0.755)	(-0.678)	(0.285)	(-0.909)	(-0.982)	(-0.917)	(0.278)	(1.243)	(0.068)	(0.174)	(0.740)
EA(-1)	0.196	0.278	0.807	0.016	0.562	0.130	-0.077	-0.007	-0.023	-3.401	-5.105	-0.047	0.038	0.009	0.083
	(0.501)	(0.322)	(0.933)	(0.240)	(0.282)	(0.281)	(0.148)	(0.097)	(0.084)	(3.004)	(3.667)	(0.141)	(0.067)	(0.002)	(0.081)
	(0.390)	(0.863)	(0.864)	(0.065)	(1.995)	(0.462)	(-0.521)	(-0.076)	(-0.268)	(-1.132)	(-1.392)	(-0.334)	(0.569)	(3.709)	(1.027)
ED(-1)	0.090	0.029	-1.768	0.164	-0.189	0.436	-0.005	-0.048	-0.108	2.316	0.034	0.034	-0.066	0.009	0.020
	(0.440)	(0.283)	(0.819)	(0.211)	(0.247)	(0.247)	(0.130)	(0.085)	(0.074)	(2.636)	(3.218)	(0.124)	(0.058)	(0.002)	(0.071)
	(0.206)	(0.103)	(-2.158)	(0.780)	(-0.765)	(1.767)	(-0.039)	(-0.563)	(-1.470)	(0.878)	(0.011)	(0.275)	(-1.136)	(4.295)	(0.281)
GA(-1)	-0.892	-0.634	-1.458	-0.273	-0.539	-0.096	0.527	-0.022	0.026	2.055	1.117	-0.208	-0.027	0.008	0.000
	(0.674)	(0.433)	(1.254)	(0.323)	(0.379)	(0.377)	(0.199)	(0.130)	(0.113)	(4.035)	(4.926)	(0.190)	(0.089)	(0.003)	(0.109)
	(-1.324)	(-1.466)	(-1.163)	(-0.845)	(-1.425)	(-0.253)	(2.643)	(-0.169)	(0.234)	(0.509)	(0.227)	(-1.098)	(-0.301)	(2.433)	(0.001)
HT(-1)	0.088	-0.027	8.024	-0.416	0.888	3.077	-0.063	0.702	0.116	-46.610	12.353	-1.307	-0.538	0.013	-0.027
	(3.149)	(2.023)	(5.861)	(1.509)	(1.770)	(1.764)	(0.932)	(0.607)	(0.528)	(18.86)	(23.02)	(0.887)	(0.418)	(0.015)	(0.510)
	(0.028)	(-0.013)	(1.369)	(-0.276)	(0.502)	(1.744)	(-0.068)	(1.156)	(0.219)	(-2.471)	(0.537)	(-1.473)	(-1.288)	(0.841)	(-0.053)
NS(-1)	1.114	0.787	-1.235	-0.178	0.599	0.284	-0.069	0.004	0.942	-8.317	2.155	0.107	-0.107	0.033	0.093

	(0.891)	(0.572)	(1.659)	(0.427)	(0.501)	(0.499)	(0.264)	(0.172)	(0.149)	(5.339)	(6.517)	(0.251)	(0.118)	(0.004)	(0.144)
	(1.250)	(1.375)	(-0.745)	(-0.416)	(1.196)	(0.569)	(-0.260)	(0.023)	(6.302)	(-1.558)	(0.331)	(0.428)	(-0.905)	(7.794)	(0.645)
PD(-1)	-0.032	-0.010	-0.050	-0.008	-0.017	0.007	-0.008	-0.007	-0.007	-0.194	0.066	0.006	0.009	0.013	-0.001
	(0.031)	(0.020)	(0.058)	(0.015)	(0.017)	(0.017)	(0.009)	(0.006)	(0.005)	(0.186)	(0.227)	(0.009)	(0.004)	(0.000)	(0.005)
	(-1.043)	(-0.522)	(-0.866)	(-0.550)	(-0.969)	(0.427)	(-0.886)	(-1.105)	(-1.343)	(-1.044)	(0.288)	(0.698)	(2.211)	(90.54)	(-0.280)
GDP(-1	0.026	0.019	0.067	0.015	0.026	0.014	0.008	0.005	0.005	0.004	-0.387	0.002	0.001	0.000	-0.002
	(0.021)	(0.013)	(0.039)	(0.010)	(0.012)	(0.012)	(0.006)	(0.004)	(0.003)	(0.124)	(0.152)	(0.006)	(0.003)	(0.000)	(0.003)
	(1.264)	(1.420)	(1.722)	(1.521)	(2.194)	(1.244)	(1.291)	(1.298)	(1.458)	(0.032)	(-2.545)	(0.414)	(0.474)	(-1.757)	(-0.630)
D1(-1)	1.087	0.177	0.304	0.235	-0.127	0.683	0.244	0.142	0.154	-4.350	-3.287	-0.238	0.091	0.002	0.053
	(0.671)	(0.431)	(1.249)	(0.322)	(0.377)	(0.376)	(0.199)	(0.129)	(0.113)	(4.021)	(4.908)	(0.189)	(0.089)	(0.003)	(0.109)
	(1.619)	(0.411)	(0.243)	(0.729)	(-0.337)	(1.817)	(1.230)	(1.100)	(1.367)	(-1.082)	(-0.670)	(-1.259)	(1.025)	(0.652)	(0.487)
D2(-1)	0.057	-0.268	-4.941	-0.255	-0.261	-0.358	-0.206	-0.008	-0.105	-5.848	3.117	-0.611	-0.128	-0.003	0.043
	(1.235)	(0.793)	(2.299)	(0.592)	(0.694)	(0.692)	(0.365)	(0.238)	(0.207)	(7.398)	(9.030)	(0.348)	(0.164)	(0.006)	(0.200)
	(0.046)	(-0.338)	(-2.150)	(-0.431)	(-0.376)	(-0.517)	(-0.564)	(-0.032)	(-0.506)	(-0.790)	(0.345)	(-1.757)	(-0.783)	(-0.584)	(0.215)
D3(-1)	0.972	1.330	7.423	0.289	-0.007	0.639	0.671	0.074	-0.070	-8.398	-9.490	0.544	0.402	0.976	0.541
	(2.024)	(1.300)	(3.767)	(0.970)	(1.137)	(1.134)	(0.599)	(0.390)	(0.339)	(12.12)	(14.79)	(0.570)	(0.269)	(0.010)	(0.328)
	(0.480)	(1.023)	(1.971)	(0.298)	(-0.006)	(0.563)	(1.121)	(0.189)	(-0.208)	(-0.693)	(-0.641)	(0.954)	(1.497)	(100.9)	(1.650)
D4(-1)	-0.226	-0.229	4.213	-0.015	0.226	0.548	-0.237	0.207	0.083	4.443	0.633	0.130	0.198	0.000	-0.243
	(1.208)	(0.776)	(2.248)	(0.579)	(0.679)	(0.677)	(0.357)	(0.233)	(0.203)	(7.234)	(8.830)	(0.340)	(0.160)	(0.006)	(0.196)
	(-0.187)	(-0.295)	(1.875)	(-0.026)	(0.333)	(0.810)	(-0.664)	(0.887)	(0.410)	(0.614)	(0.072)	(0.383)	(1.236)	(0.041)	(-1.241)
C	1.913	-0.439	12.021	1.203	1.012	0.324	0.903	0.654	0.727	17.550	-11.747	0.106	-0.418	0.049	0.285
	(2.970)	(1.908)	(5.528)	(1.423)	(1.669)	(1.664)	(0.879)	(0.573)	(0.498)	(17.79)	(21.71)	(0.836)	(0.394)	(0.014)	(0.481)
	(0.644)	(-0.230)	(2.174)	(0.845)	(0.606)	(0.194)	(1.028)	(1.141)	(1.459)	(0.986)	(-0.541)	(0.127)	(-1.062)	(3.423)	(0.593)
R-squared	0.891	0.871	0.679	0.812	0.873	0.820	0.730	0.835	0.940	0.443	0.547	0.242	0.617	1.000	0.306
Log Likelihood		-233.62													
Akaike fCriteria		22.029													
Schwarz Criter		31.859													

Source: Constructed from the Study Data

Appendix V: Variance Decomposition Analysis

Table A 8. The Results of Variance Decomposition of GDP growth Rate

Period	S.E.	PI	I	CG	DE	EA	ED	GA	HT	NS	PD	g	D1	D2	D3	D4
1.000	0.960	42.198	0.341	2.109	0.134	0.507	4.663	3.726	2.305	0.383	2.599	41.036	0.000	0.000	0.000	0.000
2.000	1.145	52.266	0.210	1.432	1.088	5.054	3.373	2.325	2.669	0.358	1.861	28.665	0.529	0.161	0.003	0.006
3.000	1.270	46.961	2.491	1.842	1.670	4.595	6.388	2.086	2.691	0.401	1.667	26.539	2.434	0.150	0.011	0.076
4.000	1.336	47.574	2.748	1.785	1.636	4.505	6.205	2.258	2.716	0.535	1.613	25.703	2.355	0.148	0.028	0.190
5.000	1.383	47.206	2.927	1.803	1.627	4.470	6.200	2.346	2.714	0.609	1.665	25.585	2.452	0.153	0.030	0.214
6.000	1.409	47.126	3.083	1.794	1.617	4.455	6.166	2.399	2.698	0.731	1.658	25.426	2.444	0.156	0.030	0.216
7.000	1.429	46.971	3.129	1.792	1.616	4.440	6.149	2.440	2.691	0.891	1.659	25.350	2.468	0.158	0.030	0.217
8.000	1.456	46.906	3.124	1.789	1.613	4.438	6.143	2.445	2.687	1.018	1.656	25.308	2.466	0.161	0.030	0.217
9.000	1.495	46.840	3.135	1.787	1.612	4.433	6.134	2.443	2.684	1.127	1.659	25.272	2.464	0.163	0.030	0.217
10.000	1.546	46.741	3.202	1.783	1.608	4.424	6.126	2.457	2.683	1.212	1.673	25.218	2.460	0.165	0.030	0.219
11.000	1.604	46.595	3.342	1.779	1.603	4.410	6.117	2.500	2.682	1.266	1.697	25.137	2.457	0.166	0.030	0.219
12.000	1.665	46.403	3.543	1.774	1.597	4.391	6.116	2.564	2.681	1.296	1.728	25.031	2.460	0.166	0.030	0.221
13.000	1.724	46.181	3.784	1.768	1.591	4.371	6.126	2.636	2.678	1.309	1.759	24.908	2.471	0.166	0.030	0.222
14.000	1.778	45.947	4.039	1.762	1.586	4.352	6.155	2.703	2.673	1.312	1.786	24.780	2.488	0.165	0.030	0.223
15.000	1.824	45.722	4.282	1.757	1.582	4.335	6.200	2.756	2.665	1.309	1.805	24.657	2.510	0.165	0.030	0.225
16.000	1.862	45.521	4.494	1.753	1.580	4.322	6.258	2.793	2.657	1.304	1.817	24.548	2.535	0.164	0.030	0.226
17.000	1.893	45.351	4.668	1.749	1.579	4.312	6.320	2.815	2.649	1.299	1.822	24.457	2.559	0.164	0.030	0.226
18.000	1.916	45.217	4.800	1.747	1.578	4.305	6.380	2.826	2.642	1.296	1.824	24.384	2.580	0.163	0.030	0.227

19.000	1.933	45.117	4.895	1.745	1.579	4.300	6.432	2.830	2.636	1.293	1.823	24.330	2.597	0.163	0.030	0.227
20.000	1.945	45.048	4.960	1.745	1.579	4.297	6.473	2.831	2.632	1.292	1.822	24.291	2.610	0.163	0.031	0.228
21.000	1.954	45.003	5.000	1.744	1.579	4.296	6.502	2.830	2.629	1.292	1.821	24.265	2.620	0.163	0.031	0.228
22.000	1.960	44.976	5.023	1.744	1.579	4.295	6.521	2.829	2.628	1.292	1.819	24.248	2.626	0.162	0.031	0.228
23.000	1.964	44.962	5.036	1.744	1.579	4.294	6.533	2.828	2.627	1.294	1.819	24.237	2.629	0.162	0.031	0.227
24.000	1.966	44.955	5.041	1.744	1.579	4.294	6.539	2.827	2.626	1.295	1.818	24.231	2.631	0.162	0.031	0.227
25.000	1.967	44.952	5.043	1.744	1.579	4.294	6.542	2.827	2.626	1.296	1.818	24.228	2.632	0.162	0.031	0.227
26.000	1.968	44.952	5.043	1.744	1.579	4.293	6.542	2.826	2.626	1.298	1.818	24.226	2.633	0.162	0.031	0.227
27.000	1.969	44.952	5.043	1.744	1.579	4.293	6.542	2.826	2.626	1.299	1.818	24.225	2.633	0.162	0.031	0.227
28.000	1.969	44.952	5.043	1.744	1.579	4.293	6.542	2.827	2.626	1.300	1.818	24.224	2.633	0.162	0.031	0.227
29.000	1.969	44.951	5.044	1.744	1.578	4.293	6.542	2.827	2.626	1.301	1.819	24.223	2.633	0.162	0.031	0.227
30.000	1.969	44.950	5.045	1.744	1.578	4.293	6.542	2.827	2.626	1.302	1.819	24.222	2.633	0.162	0.031	0.227

Source: Constructed from the Study Data

Appendix VI: VAR Diagnostic tests results

Table A 9: Stability Condition

Endogenous variables: Government investment, Physical infrastructure, Government consumption, Defense, Economic affairs, Education, General administration, Health care, Public order and national, security, Public debt servicing, Gross domestic product, Budget rationalization, Expenditure downsizing, privatization, and Governance	
Root	Modulus
0.94	0.94
0.88	0.89
0.88	0.89
0.74	0.81
0.74	0.81
0.56	0.66
0.56	0.66
0.19	0.56
0.19	0.56
0.19	0.54
-0.24	0.54
-0.24	0.48
-0.48	0.44
0.44	0.23
-0.11	0.23
-0.11	0.23
No root lies outside the unit circle.	
VAR satisfies the stability condition.	

Source: Constructed from the Study Data

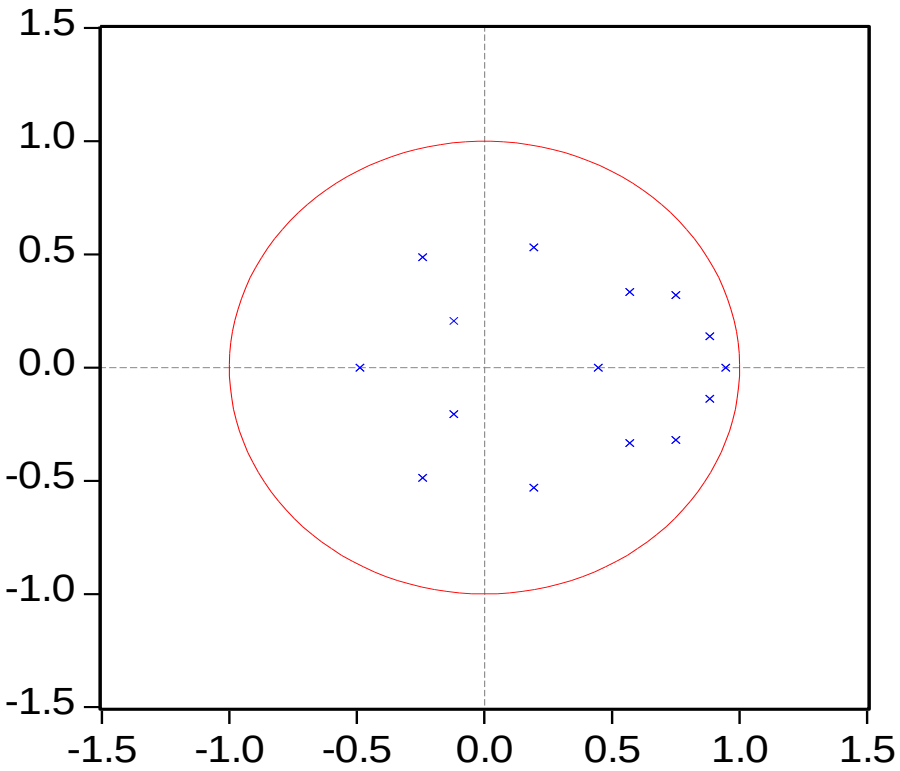

Figure A1: Inverse Roots of AR Characteristic Polynomial

Table A 10: LAG Exclusion test

Variable	P-value	D.F	Chi-squared test statistic for lag selection
Government investment	0.00	15	220.01
Physical infrastructure	0.00	15	182.21
Government consumption	0.85	15	57.11
Defense	0.00	15	116.61
Economic affairs	0.00	15	185.31
Education	0.00	15	123.11
General administration	0.26	15	73.06
Health care	0.00	15	136.74
Public order and national security	0.00	15	423.49
Public debt servicing	0.12	15	21.49
Gross domestic product	0.00	15	32.58
Budget rationalization	0.89	15	8.59
Expenditure downsizing	0.00	15	43.53
Privatization	0.00	15	126597.5
Governance	0.68	15	11.89
Joint	0.00	15	394971.5

VAR Lag Exclusion Wald Tests
Source: Constructed from the Study Data

Table A11: Lag Selection Criteria

VAR Lag Order Selection Criteria						
Endogenous variables: Government investment, Physical infrastructure, Government consumption, Defense, Economic affairs, Education, General administration, Health care, Public order and national, security, Public debt servicing, Gross domestic product, Budget rationalization, Expenditure downsizing, privatization, and Governance						
Exogenous variables: C						
Sample: 1963 2008						
Included observations: 42						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-817.6438	NA	0.054025	39.64971	40.27030	39.87718
1	-226.9372	731.3510	2.71e-09	22.23511	32.16465	25.87468
2	NA	NA*	0.000000*	NA*	NA*	NA*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: Constructed from the Study Data

Table A 12: VAR Lag Order

Selection Criteria						
Endogenous variables: Government investment, Physical infrastructure, Government consumption, Defense, Economic affairs, Education, General administration, Health care, Public order and national, security, Public debt servicing, Gross domestic product, Budget rationalization, Expenditure downsizing, privatization, and Governance						
Exogenous variables: C						
Sample: 1963 2008						
Included observations: 43						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-838.5069	NA	0.056697	39.69800	40.31237	39.92456
1	-233.6275	759.6160*	2.11e-09*	22.02919*	31.85914*	25.65417*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: Constructed from the Study Data

Table A13 Residual serial correlation test

VAR Residual Serial Correlation LM Tests
H0: no serial correlation at lag order h
Sample: 1963 2008
Included observations: 43

Lags	LM-Stat	Probability
1	NA	NA
2	1399.579	0.0000
3	1419.827	0.0000

Probs from chi-square with 225 df.

Source: Constructed from the Study Data

Table A14: Residual Multivariate Normality

VAR Residual Normarity test Ho: residuals are multivariate normal Sample:1963-2008			
Component	Jarque-Bera	df	Prob.
1	2.421961	2	0.2979
2	8.833108	2	0.0121
3	6.664491	2	0.0357
4	5.954304	2	0.0509
5	6.511401	2	0.0386
6	2.466158	2	0.2914
7	2.978490	2	0.2255
8	5.147743	2	0.0762
9	4.592554	2	0.1006
10	6.601554	2	0.0369
11	2.440851	2	0.2951
12	6.720248	2	0.0347
13	3.075925	2	0.2148
14	7.460115	2	0.0240
15	6.964534	2	0.0307
Joint	78.83344	30	0.0000

Source: Constructed from the Study Data