# EFFECT OF GOVERNMENT EXPENDITURE ON ECONOMIC GROWTH IN EAST AFRICA: A DISAGGREGATED MODEL

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## DECLARATION AND RECOMMENDATION

### DECLARATION

This thesis is my original work and to the best of my knowledge has not been presented for the award of any degree in any university.

Signature..... Date……

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### RECOMMENDATION

This thesis has been submitted for examination with our approval as University supervisors.

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## COPYRIGHT

## DEDICATION

I dedicate this work to my dear parents, Mr. John Ongere and Mrs. Josephine Ongere, for not only bringing me into the world, but raising me in a wonderful way despite many challenges.

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## ABSTRACT

The goal of this research was to investigate empirically how government expenditure contributes to economic growth in East Africa. Most existing studies on the association between government expenditure and economic growth show conflicting results and mainly focus on developed economies. Hence this study focused on both the functional and composition of public spending of the East African countries over the period from 1980 to 2010, with a particular focus on sectoral expenditures: Education, Agriculture, Defense and Health. The objective of the study was to establish these government expenditure components that have effects on economic growth using panel data series for East Africa (for 31 years) in order to provide a guide for policy formulation. The study used the neoclassical augmented Solow growth theory as the theoretical framework. In this study, both descriptive and econometric inferential analyses were carried out. In the econometric analysis, total government expenditure was disaggregated to scrutinise the effect of different components of public spending on economic growth. This study used secondary data which was obtained from sources such as the specific countries Bureau of Statistics, Statistical abstracts and World Bank. Employing Levin-Lin-Chu test, this study tested for panel unit root and found that only two variables, that is, real GDP growth and investment expenditure are stationary at level while others were stationary at the first difference level. The collected data was estimated by balanced panel fixed effect model. The findings showed that expenditures on health, defense and investment were found to be positive and statistically significant effect on economic growth in East Africa. In contrast, expenditure on consumption was found to be negative and statistically significant effect on economic growth. Finally, education, agriculture and human capital expenditure were found to be insignificant. This study suggests that for East Africa, the policy of increasing government spending on health, defence and investment budget to promote economic growth will be appropriate, but fewer funds should be channeled towards other governmental programs.

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## ABBREVIATIONS

| | |
|---|---|
| **BOP:** | Balance of Payment |
| **EAC:** | East African Community |
| **EU:** | European Union |
| **GDP:** | Gross Domestic Product |
| **GMM:** | General Method of Moments |
| **FGLS:** | Feasible Generalized Least-Squares |
| **IFS:** | International Financial Statistics |
| **IMF:** | International Monetary Fund |
| **KNBS:** | Kenya National Bureau of Statistics |
| **LDC:** | Less Developed Countries |
| **NBS:** | National Bureau of Statistics |
| **OLS:** | Ordinary Least Square |
| **TOT:** | Terms of Trade |
| **UBOS:** | Uganda Bureau of Statistics |
| **WB:** | World Bank |

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background Information

Economic theory does not automatically generate strong conclusions about the effect of government expenditure on economic performance. Indeed, most economists would agree that there are circumstances in which lower levels of government spending would enhance economic growth and other circumstances in which higher levels of government spending would be desirable. If government spending is zero, presumably there will be very little economic growth because enforcing contracts, protecting property, and developing an infrastructure would be very difficult. In other words, some government spending is necessary for the successful operation of the rule of law (Mitchell, 2005).

The role of government in economic growth is an issue of debate since the time of Adam Smith. Recent wave of privatization in many developing and developed countries is based on perceptions that, "for sustainable development and efficient output, the role of government in economic policies should be reduced"(Kakar, 2011). Economists are of two different views about the role of government in economic activities. According to the neo-classical economists, reducing the role of private sector by crowding-out effect is important because it reduces the inflation in the economy; increase in public debt, increases the interest rate which reduces inflation in the economy as well as output. The new-Keynesians present the multiplier effect in response and argue that the increase in government expenditure will increase demand and thus increase economic growth. The vision of ensuring sustainable economic development and reduction of mass poverty is enshrined, in one way or another, in the government's development strategy documents of virtually all developing economies. In this respect, economic growth, which is the annual rate of increase in a nation's real GDP, is taken as main objective for overcoming persistent poverty and offering hope for the possible improvement of society (Kakar, 2011).

Faced with the financial crisis and global economic recessions, governments have rediscovered the importance of public finance. They use it to rescue the bankrupt banks, and to create more economic activity to hold back recession. Tens of millions of workers are in jobs today and would be unemployed without that economic boost from public spending. But now there is a backlash demanding that the deficits used to create the stimulus must be cut back by cutting public spending on a grand scale. The backlash comes not only from governments, but from international institutions, led by the International Monetary Fund (IMF) and World Bank (WB), which are insisting that public services are now 'unaffordable', and that healthcare, education and pensions in particular should be dependent on the market (Mitchell, 2005).

The relationship between government expenditure and economic growth has continued to generate a series of controversies. While some researchers conclude that the effect of government expenditure on economic growth is negative and insignificant (Akpan, 2005) and (Romer, 1990), others indicate that the effect is positive and significant (Korman and Bratimaserene, 2007) and (Gregorious and Ghosh, 2007). Government expenditure on investment and productive activities is expected to contribute positively to economic growth, while government consumption spending is expected to be growth retarding. This instrument of fiscal policy promotes economic growth in the sense that public investment contributes to capital accumulation. Other importance of government expenditure includes the provision of those facilities that are not fully covered by the market economy such as health and education. That is, human capital promotes positive benefits associated with economic growth, but the financial source for public expenditure which is taxation, reduces the benefits of the taxpayers and as such reduces the benefits associated with economic growth (Barro, 1990).

There are some components of government expenditures that are productive while some are unproductive. Government expenditures on health and education raise the productivity of labour and increase the growth of national output. Education is one of the important factors that determine the quality of labour. Government expenditure on health could lead to economic growth in the sense that human capital is essential to growth. Good investment in

the form of national defense is a necessity for safeguarding and protecting the nation from outside aggression, while agriculture, in the form of food security, is a necessity for human existence. But due to lack of sufficient revenue, there is need to categorise productive and non-productive government expenditure for East Africa in order to reduce the non-productive expenditure.

### 1.1.1 An Overview of Macroeconomic Trends of East Africa

The East African Community (EAC) was established in 2000 by Kenya, Tanzania and Uganda; Burundi and Rwanda joined in 2007. Its objectives are to deepen cooperation among member states in political, economic, and social fields - including establishment of a customs union (2005), common market (July 2010), monetary union and ultimately political federation of East African States. Burundi and Rwanda joined the customs union in 2009. While the current EAC has existed for more than a decade, there has been a long history of cooperation under successive regional integration arrangements in the region. Kenya, Tanzania and Uganda have participated in regional integration arrangements dating back to 1917, starting with a Customs Union between Kenya and Uganda in 1917, which the then Tanganyika joined in 1927; the East African Community (1967–1977) and the East African Co-operation (1993–2000) (EAC, 2011).

EAC members nonetheless remain diverse in terms of incomes, industrial structures, and social indicators. The EAC has a population of about 127 million, a land area of 1.8 million square kilometers, and nominal GDP of $73.8 billion (2009). Kenya has the largest economy, with a nominal GDP of US$30.1 billion (41 percent of the region's total). Measured in GDP per capita, Burundi is the poorest member, with an average nominal per capita GDP of US$164, less than one-third of the EAC average (US$560). Kenya has the highest per capita income of US$ 833.4, followed by Rwanda, Uganda, Tanzania, and Burundi in that order. Large shares of the population live in rural areas across the region. Uganda is landlocked, Tanzania is actively exploiting natural resources (gold), and two have resources on stream (Uganda, Kenya) (EAC, 2011).

**Table 1.1: The EAC Economic Statistics**

Table 1.1 displays the economic statistics of East African countries as reported in the year 2011.

| KENYA 580,000 Sq km | | | TANZANIA 945,000 km | | UGANDA 241,000 km | | RWANDA 26,000 km | | BURUNDI 28,000 Km | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | GDP Mln$ | POP Mln | GDP Mln$ | POP Mln | GDG Mln$ | POP Mln | GDP Mln$ | POP Mln | GDP Mln$ | POP Mln |
| 2005 | 15514 | 35.1 | 10749 | 37.3 | 8319 | 26.5 | 1669 | 7.9 | 703 | 8.8 |
| 2006 | 17259 | 36.1 | 10289 | 38.0 | 8659 | 27.6 | 1790 | 8.0 | 883 | 9.1 |
| 2007 | 19842 | 37.2 | 11195 | 39.4 | 9943 | 28.6 | 1972 | 8.0 | 858 | 9.3 |
| 2008 | 19675 | 38.3 | 12395 | 40.7 | 10999 | 29.6 | 3682 | 8.1 | 836 | 9.8 |
| 2009 | 17969 | 38.6 | 11907 | 41.9 | 9685 | 30.7 | 3852 | 8.2 | 1331 | 10.1 |
| 2010 | 18543 | 38.6 | 11941 | 43.9 | 9538 | 31.8 | 4032 | 8.4 | 1499 | 10.4 |

Mln – million in US dollars.

*Source*: EAC (2011).

### 1.1.2 An Overview of Government Expenditure and Economic Growth of East Africa.

Kenya's economic growth was strong in the first two decades after independence and grew slowly or negative thereafter. Between 1963 and 1970, the economy grew at an average real growth rate of 5 percent and from 1970 to 1980 at 8 percent. Economic growth experienced a real per capita GDP that was two-thirds higher in 1980 than in 1963. In contrast, the following two decades are characterised by a stagnating economy with average growth rates of 4 and 2 percent in the 1990/80 and 2000/90 periods. By the year 2000, real per capita GDP had slightly declined relative to 1980 (Legovini, 2002). For the last ten years, other than in 2005, Kenya recorded lower annual GDP growth than the average for sub-Saharan Africa (SSA), and compared to its neighbours in the East African Community. Kenya's annual growth rate for the decade averaged 4.6 percent, compared to 6 percent for SSA, 6.9 percent for Tanzania, 7.1 percent for Uganda, and 7.2 percent for Rwanda (KNBS, 2008). The Kenyan government expanded quickly in the 1970 and 1980s. Between 1972 and 1994, total government expenditures rose by 12 percentage points of GDP to 32 %. Expenditure contracted thereafter to 26.1 percent of GDP in 2003. The wage bill inched further up in the 2004 to about 8.6 percent of GDP as a result of salary increases awarded to teachers, police,

university teaching staff and introduction of free primary education (KNBS, 2008). Generally government expenditure has been increasing at high rate than economic growth.

Uganda has made great strides toward economic growth and poverty reduction since the late 1980s. In the 1990s, annual GDP growth increased steadily to 6.9 percent from only 3 percent per annum during the 1980s. Uganda's growth acceleration started earlier than the other East African countries and has lasted more than 20 years, with per capita income growth averaging 3.4 percent a year during 1990–2010. While Uganda's government expenditures in constant 1997 prices increased from 264 billion Uganda shillings in 1982 to 1,043 billion shillings in 1999, a growth rate of more than 8.4 percent per annum. From 2008 until 2013, Uganda GDP annual growth rate averaged 5.6 Percent reaching an all time high of 12.2 Percent in June of 2009 and a record low of 0.3 Percent in December of 2011 (UBOS, 2012).

From 1995, Tanzania's GDP per capita growth averaged 1.3% compared to negative rates throughout early 1990s. In 2009, the real GDP grew by 6.0 percent compared to 7.4 percent in 2008 (NBS, 2012). The government of Tanzania has managed to keep a high proportion of consumption expenditure, which averaged 15% and 20% of GDP during 1967-1978 and 1979-1992, respectively. Government investment expenditure was, on average, only 6% of GDP during 1979-1992, having slightly declined from an average of 8% during 1967-1978 (Nyoni, 1997). Even though infrastructure remains a main bottleneck in Tanzania, capital expenditure remains a small portion of overall capital expenditure in the government's budget. Capital expenditure as a share of Tanzania's total budget declined from 36.3 percent in 2008 to 30.5 percent in 2010, though it improved to 35.5 percent in 2011. However, capital expenditure as a share of development expenditure has declined from over 60 percent to a little above 50 percent. As a result, capital expenditure stands for less than one fifth of total public expenditure in 2010/11, or at 5.5 percent of GDP. This trend is inconsistent with the government's commitment to make infrastructure investment a priority for a broader-based growth (NBS, 2012).

For East Africa, all components of government expenditure recently have been experiencing an increasing trend as presented in the table. Table 1.2 shows the combined figures of total government expenditure, recurrent expenditure (Cg) and capital expenditure (Ig) at current prices; both figures are in millions of US dollars. Table 1.2 represents different components of government expenditure in EAC.

**Table 1.2: Components of Government Expenditure**

| KENYA | | | | TANZANIA | | | UGANDA | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | CURRENT Mln $ | CAPITAL Mln $ | TOTAL Mln $ | Cg Mln $ | Ig Mln $ | TOTAL Mln $ | Cg Mln $ | Ig Mln $ | TOTAL Mln $ |
| 2005 | 5135 | 865 | 6000 | 2066 | 1024 | 3090 | 1249 | 662 | 1911 |
| 2006 | 5837 | 1275 | 7112 | 2648 | 1066 | 3714 | 1499 | 460 | 1959 |
| 2007 | 7612 | 3075 | 10687 | 2906 | 1456 | 4362 | 1641 | 575 | 2216 |
| 2008 | 10175 | 2731 | 12906 | 4132 | 1766 | 5895 | 1706 | 976 | 2682 |
| 2009 | 8175 | 3265 | 11443 | 4479 | 1978 | 6457 | 2123 | 1244 | 3367 |
| 2010 | 8566 | 3719 | 12285 | 4991 | 1919 | 6910 | 2564 | 1297 | 3861 |

Mln $ – Million in US dollars.

*Source*: EAC (2011).

### 1.1.3 Government Expenditure on Agriculture

Agriculture is the backbone of the East African economies. It employs over 90% of the workforce in Burundi; contributes approximately 51% of GDP in Kenya; is a leading export facilitator and foreign exchange earner in Uganda; provides crucial raw materials for industrialisation in Tanzania and is the ultimate answer to food security in the region (EAC, 2011). The agricultural sector has been largely underfunded despite its potential to deal with both rural and urban poverty, create employment and bolster economic growth in many economies worldwide. On average, none of the EAC countries spends more than 5% of total government expenditure on the agricultural sector (EAC, 2011).

The Uganda‘s agricultural sector output that includes cash crops, food crops, livestock, forestry and fishing activities grew by 2.6 percent in 2009 compared to an increase of 1.3 percent in 2008. The percentage contribution of agriculture, forestry and fishing to the total GDP at current prices was 23.7 percent in 2009 (UBOS, 2010). Recently in Kenya, the

agricultural expenditure as a percentage of total government expenditure increased marginally from 1.2 percent in 2001 to1.6 percent in 2004, while it has remained at a low of 0.5 percent as a proportion of GDP over the year 2000 to 2003 period before it rose to 6.5 percent in 2009 (KNBS, 2010 ). In general the budget allocations to the agricultural sector in Tanzania have shown an upward trend. The trend shows an increasing pattern from TShs. 186.99 billion (2006) to TShs. 259.24 billion (2009) based on the current prices (NBS, 2010).

### 1.1.4 Government Expenditure on Defence

The value for defence expenditure in Tanzania over the past 21 years reached a maximum value of Tsh 286,661,000,000 in 2009 and a minimum value of Tsh 7,050,000,000 in 1988 Military expenditure (% of GDP) in Tanzania was 1.07 as of 2011. Its highest value over the past 23 years was 2.38 in 1989, while its lowest value was 0.94 in 2008 (NBS, 2012). While the trend in the official defense expenditure of Kenya was highest in the1980s, peaking in 1982 when defense accounted for 11.6 per cent of central government expenditure and 4.6 per cent of GDP. The main reason for the increase was the attempted military coup in 1982, which almost shattered the assumption of the political nature of the Kenyan military. Between 2000 and 2002 it increased by 24 per cent in real terms, a reverse of trend compared with the previous decade. This was the result of a 40 per cent increase in salaries and increases of 75–95 per cent in allowances for all ranks in the military affected from 2000 (KNBS, 2003). Defence expenditure (% of GDP) in Kenya was 1.54 as of 2011. Its highest value over the past 23 years was 3.00 in 1988, while its lowest value was 1.18 in 1999 (KNBS, 2012). In the 1980s, defense expenditure constituted a huge burden on the Ugandan government at an average of more than 23 percent of total government expenditure. By 1990, in real terms it was 17 percent higher than previous year. However in 2002, the government again overshot the limit, but this time with the support of donors in its war against Lord's Resistance Army in the north of the country (UBOS, 2003). Defence expenditure (% of GDP) in Uganda was 1.63 as of 2011. Its highest value over the past 23 years was 3.87 in 1988, while its lowest value was 1.63 in 2011 (UBOS, 2013).

### 1.1.5 Government Expenditure on Health

The Kenya's budget allocation to the two health ministries-Ministry of Medical Services and Public Health and Sanitation for 2010 accumulated to a total of Ksh 39.9 billion of government resources which represents 7% of the total estimated government budget and 1.7% of GDP (KNBS, 2010). In Tanzania, actual health expenditure grew by 41% in 2006 and by 12% in 2008 (NBS, 2009). Total health care expenditure in Uganda for the 1998 amounted to UShs310 billion (US$ 269 million), this was equivalent to 4.7% of GDP. According to a World Bank report, published in 2010, Public Health expenditure (% of total health expenditure) in Uganda was at 17.41 in 2008 and 18.95 in 2009.

### 1.1.6 Government Expenditure on Education

The percentage of government spending on education to the total government expenditure in Uganda was 18.85 in 2008 and 15.04 in 2009 (UBOS, 2010). For Tanzania, its highest value of education sector spending over the past 39 years was 29.19 in 2004, while its lowest value was 14.84 in 1985 (NBS, 2005). Kenya spent about 6.5 percent of GDP or 20 percent of total central government spending on the education sector, which sums to Kshs. 136.89 billion in 2009 (KNBS, 2010). Hansson and Henrekson (1994) concluded that government consumption expenditure is growth retarding but increased expenditure on education affects positively economic growth. The trend shows an increasing pattern of government expenditure and GDP growth.

## 1.2 Statement of the Problem

The steady rise of government expenditure for many years, in most countries, demonstrates a commanding link between public spending and economic development (Korman and Brahmasrene, 2007). However, most developing countries face a heavy debt burden, high rate of inflation, budget deficit and balance of payment deficit. This may be as a result of poor domestic policies or external shocks. Generally, the main problem is argued to be the ever increasing government expenditure. This higher spending undermines economic growth by transferring scarce resources from the productive sector of the economy to less

productive sectors, which uses them less efficiently. For example between 1980 and 2003, Kenya's total government expenditures rose by 12 percent of GDP to 26.1% (KNBS, 2008) In contrast, the following two decades are characterised by a stagnating economy with average growth rates of 4 and 2 percent in the 1980/90 and 90/2000 periods (Legovini, 2002). The results from the research on growth effects of government expenditure by individual sectors of the economy will provide information that is particularly useful for East Africa countries, which are resource constrained and where the allocation of limited public resources between the sectors is an issue of paramount importance. Most of the existing studies on the subject paid more attention to developed countries and the inclusion of developing countries in terms of cross country studies was mainly meant to generate enough degrees of freedom in the course of statistical analysis. Furthermore, existing studies on the association between government expenditure and economic growth show conflicting results. For instance, according to Kormain and Bratimasrene (2007), there was a significant and positive relationship between government expenditure and economic growth. In contrast, Husnain *et al*. (2011) found a significant but negative relationship. Akpan (2005) found the relationship to be insignificant. These contrasting results provided an opening that required further study particularly in East Africa. This research, therefore, adopts the question as to whether or not components of government expenditure have contributed to economic growth in East Africa.

## 1.3 Objectives of the Study

### 1.3.1 General Objective

The broad objective of the study is to analyse the effect of government expenditure on economic growth of East African countries during the period 1980-2010.

### 1.3.2 Specific Objectives

i. To examine the effect of government investment expenditure on economic growth in East Africa.
ii. To determine the effect of government consumption expenditure on economic growth in East Africa.

iii. To examine the effect of government human capital expenditure on economic growth in East Africa.
iv. To determine the effect of government sectoral spending (Health, Education, Agriculture and Defence) on economic growth in East Africa.

### 1.4 Research Hypotheses

i. There is no significant effect of government investment expenditure on economic growth in East Africa.
ii. There is no significant effect of government consumption expenditure on economic growth in East Africa.
iii. There is no causal relationship between government human capital expenditure and economic growth in East Africa.
iv. Government sectoral expenditure (Health, Education, Agriculture and Defence) has no influence on economic growth in East Africa.

### 1.5 Justification of the Study

The study is significant in the following ways. First, due to dissagregation of data, the study provides more understanding of the relationship between components of government spending and economic growth as compared to empirical studies that used an aggregate government expenditure measures. Second, it enables us to compare regression results across individual measures and across groups.

Thirdly, this study attempted to shade more light on the causal relationship between government expenditure and economc growth. The results of the study may help in deciding on how the resources should be shifted from the less productive to the more productive sectors of the economy so as to boost economic growth. Fourthly, one of the major advantages of this study was that it incorporated the most recent data and employed both descriptive analysis and more advanced econometric technique (panel data estimation) to study the effect of government expenditure on economic growth. Finally, the study will add to the body of existing knowledge and pave way for further study in the area.

## 1.6 Scope and Limitations of the Study

The study looked at the East African countries' government expenditure, particularly in four sectors: Agriculture, Defense, Education and Health. They are most fundamental in the government functioning and their contribution to economic growth is also paramount. These sectors are found across all countries and more so they take more than half of the budget. Table 1.3 represents the sectors found in EAC from which four sectors were selected for this study.

**Table 1.3: Functional Classification of Central Government Expenditure in EAC**

| | |
|---|---|
| Ministry of Mining | Ministry of Transport and Infrastructure |
| Ministry of Defence | Land and Housing and Urban Development |
| Ministry of Education | Information,Communication and Technology |
| Ministry of Health | Sports, Culture and the Arts |
| Agriculture, Livestock and Fisheries | Labour, Social Security and Services |
| Ministry of Foreign Affairs | Energy and Petroleum |
| Environment, Water and Natural Resource | Industrialisation and Enterprise Development |
| Ministry of Devolution and Planning | The National Treasury |
| Interior and Security | Commerce and Tourism |

*Source:* KNBS (2013).

The study was limited to the period 1980 to 2010. The choice of the study period was informed by availability of data, most recent and the magnitude of the problem on the study period. This was a sample of thirty one (31) years. The reasoning behind this country sample was to reveal a pattern of government expenditure in East Africa countries. One limitation of this study rose from lack of clear agreement on the causes of economic growth. The econometric result of this study was also limited by the quality of the data as reported by different sources. This limitation rose from the problem of inconsistency of data as reported by different institutions. Also due to political instabilities experienced, some of these countries had data gaps. Where data was missing, the study employed interpolation and extrapolation technique to fill the gaps. In fill-in or imputing the missing values, the study used past data to predict the missing values. Simply replacing the missing value of a predictor with the average value of that predictor is one easy method. Using regression on the other predictors was another possibility.

## 1.7 Definition of Terms

**Consumption Expenditure**: The recurrent expenditure contains expenditures by the sectors covering day to day normal services by the ministry, in terms of wages and salaries, operation and maintenance.

**Disaggregated Data:** The separation of an aggregate body of data into its component parts to uncover patterns, trends and other important information.

**East African Countries**: In this study it refers to Kenya, Uganda and Tanzania.

**Economic Growth:** Annual percentage growth rate of real GDP.

**Government Expenditure**: It refers to total government purchase of goods and services such as roads expenditure and salaries of government employees.

**Human Capital** is the stock of competencies, knowledge, social and personality attributes, including creativity, embodied in the ability to perform labor so as to produce economic goods.

**Investment Expenditure:** A capital expenditure is incurred when a government spends money either to buy fixed assets or to add to the value of an existing fixed asset with a useful life extending beyond the taxable year.

**Openness:** Exports of goods and services (% of GDP) plus imports of goods and services (% of GDP).

**Population**: This term applies to the totality of all units of interest in a study or investigation at a given time in a given area.

**Panel data:** Data that combines the time series with cross sectional variation in analysis of determinants of economic growth.

**Reproducible Factor:** A reproducible factor is one which is endogeneously accumulated. In the Solow growth model, capital is the only reproducible factor.

**Terms of Trade (TOT):** Terms of trade refers to the price of a country's exports ($P_X$) relative to the price of its imports ($P_M$).

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter is devoted to a brief review of relevant theoretical and empirical literature. The chapter also captures theoretical frame-work and the conceptual framework developed from theoretical literature.

## 2.2 Theoretical Literature

Since 1959, when Richard Musgrave (1989) published *The Theory of Public Finance*, it has been a tradition for economists to classify governmental functions in the three classes of allocation, stabilisation and redistribution as proposed by Musgrave. In 1959, growth was not recognized as a governmental objective requiring explicit policy action. The pursuit of the other three functions was assumed to automatically generate a natural long-run rate of growth. However in recent decades, growth has acquired great prominence in many countries. As a consequence, various policies that do not easily fit into Musgrave's categories have been introduced. It is high time to recognize economic growth as an explicit, fourth objective to be added to Musgrave's trio. It is an objective that many countries now try to promote with good and, at times, bad policies (Musgrave, 1989).

Indeed, if appropriately managed and utilised, government expenditure has significant positive effect on real GDP growth, especially in less developing countries where there exist inadequate and underdeveloped infrastructural facilities and where private sector is not mature enough to play the expected role in the economy. The government action to the economic growth may be beneficial and at the same time be detrimental. The beneficial side of government action can result in: The use of fiscal policies like income taxes and transfer payments which can lead to more equitable redistribution of income; The supply of pure public goods which may constitute a sizeable component of aggregate demand; Government often acts as facilitator in the markets with asymmetric and imperfect information (Husnain *et al.,* 2011).

The action of the state may also impede economic growth. This is possible as a result of competition between the less efficient public sector and the private sector in the credit market which may increase interest rate thereby disallocating private investment and eventually reducing economic growth. Also, taxes imposed by the state can equally distort market prices and effective resources allocation. There is a popular assertion in the empirical literature that government expenditure is negatively correlated with economic growth due to inefficiency of the public sector especially in the developing countries where a large proportion of public spending is attributed to non development expenditure like defence and interest payments on debt (Husnain *et al.*, 2011). Kenya, Uganda and Tanzania are not an exception.

### 2.2.1 Sectoral Composition of Government Expenditure

Aggregate government expenditure is decomposed into five different functional components. First, social expenditure is total spending allocated to education, health, social security, housing and community amenities. Infrastructure expenditure is defined as spending on electricity, gas, water, roads, waterways and other transport and communications. Productive expenditure is on economic services such as agriculture, forestry and fishing, mining, manufacturing and construction, and other economic services. Defence (military spending) is another component. Finally, the rest of expenditures (spending on cultural, religious and recreational services and other expenditure) are grouped together. This disaggregation is chosen because it outlines the main activities of the government mentioned earlier. These are: provision of public goods (social expenditure), military protection (defence expenditure), building of the infrastructure (infrastructure expenditure), and undertaking production (production expenditure). But the research looked at specifically four sectors because they are the most fundamental in the government functioning and they are the same across all countries and more important they take more than half of the budget.

The composition of government expenditure reflects government spending priorities. The composition of total expenditure across continents reveals many variations. The top three expenditures for Africa in 2002 were health, defence and education. Although education

expenditure was the largest (14 percent), the percentage is smaller than in Asia and comparable to Latin America. Defense accounted for 8 percent of total government expenditures in Africa which was similar to Asia. African countries spent 8 percent of total government expenditures on health. A discouraging trend is that African countries and Latin America spent very little on transportation and telecommunication sector. Africa's share in total government expenditures gradually declined from 6.4 percent in 1980 to 3.8 percent in 2002. The decline is much sharper in the case of Latin America from 6.6 percent to 2 percent from 1980 to 2002. Education spending was the largest among all government expenditures in Asia, accounting for 16 percent in 2002 (Fan and Rao, 2003). Public spending on education; total (% of government expenditure) in Sub Saharan Africa was reported at 18.85 in 2008, according to the World Bank (2010). It is not surprising that Asia has the highest quality of human capital among regions. Defense and agriculture expenditure ranked second and third, accounting for 9 percent each, of total government expenditures in 2002, reduced from 18 percent and 15 percent, respectively, in 1980 (Fan and Rao, 2003).

While an increasing number of African countries have already reached Middle Income status, EAC has lagged behind today, out of 48 sub-Saharan African countries, 22 countries have reached a per-capita income of US$ 1025, the official threshold of middle income. At about US$ 820 Kenya's GDP per capita, it ranks 24$^{th}$and only represents about half the sub-Saharan Africa (SSA) average. Excluding South Africa, sub-Saharan Africa grew at an average of 6 percent since 2008. East Africa as a whole grew even more, at 6.5 percent, and without Kenya it would have grown at almost 7 percent (KNBS, 2009).

### 2.2.2 Investment, Human Capital Verses Consumption Expenditure

Despite the conspicuous pitfalls in putting clear demarcation between capital, human capital and recurrent expenditures, dealing with them sheds some light on implication of changes in the structure of government expenditure. In principle, capital expenditure is broadly defined as an outlay on development projects that result in the acquisition of fixed assets to enhance the capacity of the economy for the production of goods and the provision of economic and social services. Such outlays include spending on land development, construction of power plants, buildings, dams, roads and purchase of machinery and equipment, the benefits of

which are more durable, lasting several years of decades. Recurrent spending comprises expenditure items which are recurring in the process of delivering government economic and social services. Wages, subsidies, operation and maintenance, pension and debt servicing are among the major components of recurrent expenditure. These are broadly considered to be consumable items, the benefits of which are consumed or exhausted within each financial year. Both components involve exhaustive and transfer expenditures.

Human capital is the stock of competencies, knowledge, social and personality attributes, including creativity, embodied in the ability to perform labour so as to produce economic growth. Many theories explicitly connect investment in human capital development to education and health, and the role of human capital in economic development, productivity growth, and innovation has frequently been cited as a justification for government subsidies for education. Job skills training expenditure on human capital is measured by the total health and education expenditure (current and capital).

### 2.3 Determination of Government Expenditure

Determination of total government expenditure and its patterns is complex and may include many factors, such as fiscal conditions and political, cultural and economic factors. In the 19$^{th}$ century, economists generally advocated for an economy with minimal government influence, or the so-called Laissez-Faire. After World War I, the perception about the role of government changed again due to the influence of John Keynes who argued that the government still had many things to do that were not being done. In response to the Great Depression, the United States introduced major public expenditure programs to generate public goods and create employment. This period continued up to the 1980s (Nitzan, 1994).

More complex is the determination of the composition of government expenditure. The government can act as a social planner when allocating government expenditure. The social planner determines the optimal allocation by maximizing a weighted social welfare function. Under this approach, the government maximizes a utility function, defined over a set of public services consumed by the individuals or electorate, subject to a budget constraint

equal to the sum of public service expenditures. Rent seeking behavior has been an increasingly important subject under study in determining the allocation of government spending. Specifically, the distribution of potential individual beneficiaries of rents, the number of groups competing, the rule used to distribute private good transfers within groups, and the individual valuation of the local public good shape public spending patterns Rent seeking behaviour, economic and political structures, economic development level among others are all important in this process (Nitzan, 1994).

Most governments have continued to rely on external assistance to finance some of their public expenditures. A stronger association of aid with higher government consumption rather than with public investment would suggest both a "flypaper effect" and fungibility. This may imply that aid recipient governments view foreign aid like any other source of revenue and consequently use it for increased consumption, tax reductions or reduced fiscal deficits (future tax obligations) (Hindriks, 2004). Demographic variables also influence the level and composition of public spending as an aging population demand spending on health, housing, and social security.

### 2.4 Expenditure Growth Models

Brown and Jackson (1996) identified three macro models of public expenditure to explain how government spending has behaved over long term. Development models of government expenditure growth are best represented by the works of Musgrave and Rostows. Their views are generalizations gleaned from examination of a large number of different historical trends of developed economies. In the early stages of economic growth and development, public sector investment as a proportion of the total investment of the economy is found to be high since public capital formation is of particular importance at this stage. The public sector is therefore seen to provide social infrastructure overheads such as roads, transportation systems, sanitation systems, law and order, health and education and other investments. This public sector investment, it is argued, is necessary to increase productivity and to gear up the economy for take-off into the middle stages of economic and social development. In the middle stage of growth, the government continues to supply investment goods but this time public investment is complementary to the growth in private investment.

During all the stages of development, market failures and information asymmetry exist which can frustrate the push towards maturity, hence the increase in government involvement in order to deal with these market failures. Rostow's claims are that once the economy reaches the maturity stages the mix of public expenditures will shift from expenditures on infrastructure to increasing expenditures on education, health and welfare services. In the mass consumption stage, income maintenance programs, and policies designed to redistribute welfare, will grow significantly relative to other items of public expenditure and also relative to GDP (Brown and Jackson, 1996).

Musgrave (1969) argues that over the development period, as total investment as a proportion of GDP increases, the relative share of public sector investment falls. This is because as the economy develops and a larger flow of savings becomes available, the capital stock in private industry and agriculture must be built up. The basic stock of social overhead capital has now been created and additions are made at a slower rate. The structure of social overhead capital, similar to public utilities, becomes a declining share of net capital formation.

The German economist Adolf Wagner (Backhaus, 1997) advanced his 'law of rising government expenditures' by analysing trends in the growth of government expenditure and in the size of public sector in many countries of the world. Wagner's law or the law of increasing public expenditure postulates that; (i) the extension of the functions of the states leads to an increase in public expenditure on administration and regulation of the economy; (ii) the development of modern industrial society would give rise to increasing political pressure for social progress and call for increased allowance for social consideration in the conduct of industry (iii) the rise in government expenditure will be more than the proportional increase in the national income (income elastic wants) and will thus result in a relative expansion of the public sector. Wagner's model, while containing many insights, suffered from different criticisms. These critics view Wagner's predictions as essentially explaining causes of increase in expenditure and argue that the relationship lacks a firm theoretical basis. Wagner assumed away the problems of public choice by employing an organic theory of the state. Thus the state was assumed to behave as if it were an individual

existing and making decisions independently of the members of society (Brown and Jackson, 1996).

Keynesian analysis leads to the conclusion that aggregate demand management policies can and should be used to improve economic performance. For Keynesians demand is a prerequisite for growth. According Romer (1996), Harrod-Dommar growth model is the prominent model in Keynesian framework which gives some insights into the dynamics of growth. According to Harrod-domar model, to determine an equilibrium growth rate (g) in the economy, the balance between supply and demand for a nation's output should be maintained. On the supply side, saving is a function of the level of GDP (Y), say $S=sY$. The level of capital K needed to produce an output Y is given by the equation $K=rY$ where r is called capital output ratio. Investment (I) represents an important component of the demand for the output of an economy as well as the increase in capital stock (Thus, $\Delta K=r\Delta Y = I$). Therefore, the equilibrium rate of growth (g) is given by $g = \Delta Y/Y = s/r$. This is a very significant result as it tells us how the economy can grow such that the growth in the capacity of the economy to produce is matched by the demand for economy's output. One of the weaknesses of the Harrod-Dommar model is the assumption of fixed coefficients production function (it does not allow for factor substitution) and the other limitation is that the saving ratio is assumed to be fixed. It is also less relevant to developing countries as it assumes full employment and easy availability of capital.

The assumption of fixed coefficient of production is relaxed by neo-classical growth model. According to the Solow (1956) model, other things being equal; saving/investment and population growth rates are important determinants of economic growth. Higher saving/investment rates lead to accumulation of more capital per worker and hence more output per worker. On the other hand, high population growth has a negative effect on economic growth simply because a higher fraction of saving in economies with high population growth has to go to keep the capital-labour ratio constant. The principal conclusion of Solow (1956) model is that the accumulation of physical capital cannot account for either the vast growth over time in output per person or the vast geographic differences in output per person. The model predicted technological progress typically

assumed to grow at a constant 'steady state'- is what determines most output growth. This implies that poor countries with lower value of capital and output grow faster than rich ones and consequently the former tend to catch up with the latter. In the Solow neo-classical growth model, if an expansionary fiscal policy is maintained, then the long-term consequences may be a lower level of steady state GDP. This is because the government-via a budget deficit-drives a wedge between private saving and investment. The reason is that government absorbs part of private saving to finance the deficit.

### 2.4.1 Armey Curve Theory

The Armey Curve theory (Armey, 1995) builds on the foundations of the Laffer curve, by theorizing on the level of government interference in relation to economic growth. It demonstrates the relation between government expenditure and economic development and hypothesizes that an optimal size of government expenditure exists.

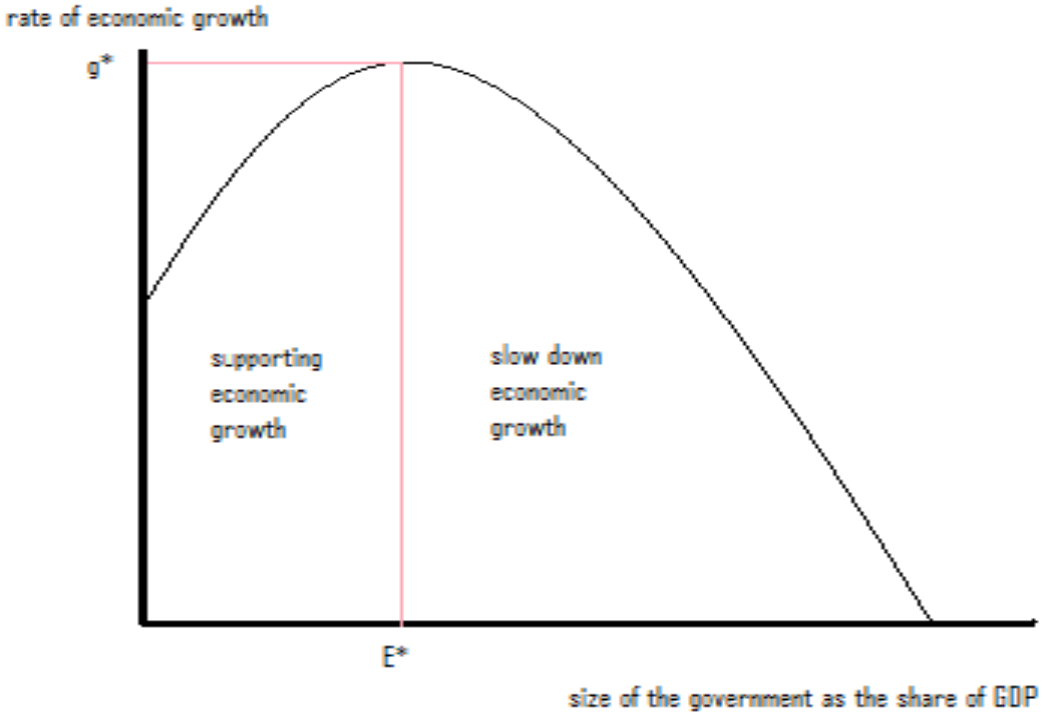


**Figure 2.1: Armey Curve**

*Source*: Dick Armey (1995).

Furthermore, this relation was previously investigated by Barro (1990), who stipulated a functional relation between economic growth and the size of the government empirically in the beginning of the 1990s. However, it was US-senator Armey who refined the theory. As illustrated in the graphical representation of the Armey Curve, a State with a non-existent government results in minimum GDP growth. This is explained by the lack of rule of law and protection of property rights. Due to the uncertain economic environment, there is no intention to save or invest. However, if the role of the government grows to full ownership of resources and control of economic decision making, economic growth is limited and may decline to zero.

Explanations for this trend can be found in the decrease of private investments due to the 'crowding- out'effect, higher tax rates and less free market. Additionally, the Armey Curve indicates an optimal size of the government E*, where maximum economic growth is reached. At this point, an increasing amount of government expenditure leads to a decrease of economic growth. This point differs country by country and may rely on economic factors like openness of the economy as well social factors like family size (Leach, 2002).

The Armey Curve can be expressed in a simple quadratic form, as follows:

$$\boldsymbol{RGDP = \alpha + \beta G - \delta G^2 + \gamma T} \qquad \textbf{(2.0)}$$

The positive sign on the linear term, G (government expenditure), is designed to show the beneficial effects of government spending on economic growth (Real GDP), while the negative sign for the squared term means the variable measures any adverse effects associated with increased government size. Since the squared term increases in value faster than the linear term, the presence of negative effects from government spending eventually will outweigh the positive effect, producing downward-sloping portion of the Armey Curve. To control for factors unrelated to government spending, Vedder and Gallaway (1998) introduced the time variable T. Therefore, the faster and greater the expenditure increases, the greater the probability of diminishing returns and ineffective use (Leach, 2002).

## 2.5 The Empirical Literature

According to the Keynesian macroeconomic school of thought, government expenditure can contribute positively to economic growth. Hence, an increase in the government consumption is likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. As a result, government spending augments the aggregate demand, which provokes an increased output depending on expenditure multiplier (Romer, 1996). The opponents of this approach stipulate that government consumption crowds out private investment, discourages economic growth in the short-run and diminishes capital accumulation in the long-run.

Loto (2011) specified the growth model in equation 2.1 below to study the relationship between government spending on Education (E), Health (H), Security (SEC), Agriculture (Ag) and Transport and Communication (TC) on economic growth for Nigeria:

$$g = \alpha_0 + \alpha_1 E + \alpha_2 H + \alpha_3 SEC + \alpha_4 Ag + \alpha_5 TC + \mu \quad (2.1)$$

The findings, unlike those by Korman and Bratimasrene (2007), showed that expenditure on education had a negative and insignificant relationship with economic growth, while on the other hand health expenditure was found to be positively and significantly related to economic growth. Further, Loto (2011) found government spending on security, transport and communication was found to have positive but insignificant effect on economic growth. Spending on agriculture though was found to be significant and negatively related to economic growth.

Moreover, Barro and Sala-i-Martins (1995) classified government expenditures as productive and unproductive and assumed that productive expenditures have a direct effect on the rate of economic growth and the unproductive expenditures have an indirect or no effect. However, government expenditure on basic infrastructure plays a crucial role in economic growth. Having, for instance, an efficient road network could reduce the time and the cost to move goods and services across the country. It also facilitates the connection

among the different parts of the country and enhances their interaction. In addition, the rehabilitation of electricity and the establishment of efficient project for energy will reduce costs and have positive effect on economic growth.

Kweka and Morrissey (1999) examined the effect of government expenditures on GDP growth using OLS method for a sample of time series data (1965-1996) on Tanzania. They found that increased productive expenditure is associated with lower growth. According to them, this negative relationship suggests the inefficiency associated with the use of public funds and public investments in Tanzania. The negative association between total government expenditure and growth also seems to indicate the unproductive effect of government investment spending. Consumption expenditure relates negatively to growth, as anticipated, but appears to be associated with increased private consumption. They also found that there is positive relationship between growth and expenditure on human capital.

Josaphat and Oliver (2000) examined the effect of government expenditure on economic growth in Tanzania (1965-1996) using time series data for 31years. They formulated a simple growth accounting model, adapting Ram model in which total government expenditure was disaggregated into expenditure on capital expenditure, recurrent expenditure and human capital expenditure. It was found that increased productive expenditure have a negative effect on growth and consumption expenditure relates positively to growth, and which in particular appears to be associated with increased private consumption. The results revealed that expenditure on human capital investment was insignificant in their regression and confirm the view that public investment in Tanzania has not been productive, as at when the research was conducted.

Korman and Brahmasrene (2007) studied the economy of Thailand on relation to economic growth, by making use of the Granger causality tests. Their finding was that government expenditures and economic growth are not co-integrated but indicated undirectional relationship. This is because, causality runs from government expenditure to growth, and also detected a significant positive effect of government expenditure on economic growth. Gregorious and Ghosh (2007) made use of the heterogeneous panel data to study the effect

of government expenditure on economic growth. The result was that countries with large government expenditure tend to experience higher economic growth.

Fan and Rao (2003) analyzed the effect of different types of government expenditure on overall economic growth across 43 developing countries between 1980 and 1998 using OLS method and found mixed result. In Africa, government spending on agriculture and health was particularly strong on promoting economic growth. Among all types of government expenditures, agriculture, education, and defense contributed positively to GDP growth in Asia. In Latin America, health spending had a positive growth-promoting effect. Structural adjustment programs had a positive growth-promoting effect in Asia and Latin America, but not in Africa.

Devarajan *et al.* (1993) employed panel data for 14 developed countries (1970-1990) and using OLS method, 5-year moving average. They took various functional types of expenditure (health, education, transport, and others) as explanatory variables and found that health; transport and communication have significant positive effect while education and defense have a negative effect on economic growth. Using panels of annual and period-averaged data for 22 Organizations for OECD countries during 1970-95, Bleaney *et al.* (2001) studied the effect of government expenditure on GDP growth. Applying OLS and GLS methods, they found that productive expenditures enhance growth, but non-productive spending does not, in accordance with the predictions of Barro's (1990) model.

Gemmell (2001) provide empirical evidence on the effect on the economy of fiscal policy on long-run growth for European economy. Their study required that at least two of the taxation or expenditure or deficit effects must be examined simultaneously and they employed panel and time series econometric techniques, including dealing with the endogeneity of fiscal policy. Their general conclusions are: Some public expenditure affects positively on growth and consumption and social security expenditure have zero or negative growth effects. Donald and Shuanglin (1993) studied the differential effects of different levels of expenditure on economic growth for 58 sampled countries. They came up with the result

that government expenditure on education and defense has positive effect on economic growth and that of welfare was insignificant and negative.

Bose *et al*. (2003) examined the growth effect of government expenditure for a panel of thirty developing countries over the decades of the 1970s and 1980s, with a particular focus on sectoral expenditures. Their primary results are twofold. Firstly, the share of government capital expenditure in GDP is positively and significantly correlated with economic growth, but current expenditure is insignificant. Secondly, at the sectoral level, government investment and total expenditures on education are the only outlays that are significantly associated with growth once the budget constraint and omitted variables are taken in to consideration.

Akpan (2005) employed disaggregated approach in order to determine the components of government expenditure that stimulate GDP growth. The study concluded that there was no significant relationship between most components of government expenditure and economic growth in Nigeria. The empirical studies concerning the effect of government expenditure on defense have led to inconclusive results. Some studies argued that military spending has a negative effect on economic growth such as (Tomori and Adebiyi, 2002). However, others found a positive relationship between them (Diamond, 1989).

### 2.5.1 Limitations of Previous Studies

Over the last decade, the growth effect of fiscal policy has generated large volume of both theoretical and empirical literature. However, most of these studies paid more attention to developed economies and the inclusion of less developed countries in case of cross country studies were mainly to generate enough degrees of freedom in the course of statistical analysis (Aregbeyen, 2007). In East Africa case, there have been few recent econometric studies regarding the effect of different government spending components on economic growth. But most of them have been country specific and used time series methods; hence this research focus specifically in East Africa as a whole and employed panel data.

A significant number of studies (Akpan, 2005 and Romer, 1990) have been carried out on the relationship between government expenditure (aggregate) and economic growth. However, majority of those studies (Akpan, 2005 and Romer, 1990) do not examine the effect of human capital expenditure on economic growth. In addition, some of the studies made use of OLS approach and were cross-country or time series based which are prone to many econometrics disadvantages like multicolliniality and omitted variable bias. This study utilised panel estimation which addresses the problems of omitted variable bias and multicolliniality.

The above empirical studies provide better understanding on the process by which public expenditure policies shape the prospect of economic growth for developing countries as they are not only a significant difference in the composition of public expenditure between developed and developing countries, but the difference is also profound in the role of public expenditures for growth. Thus the focus on developing countries and human capital expenditure is going to provide more understanding on their effect on the relationship between economic growth and government spending. As a result of the above mentioned factors, the researcher found it necessary to devolve into the study so as to fill the existing research gap.

## 2.6 Theoretical Framework

In spite of various theoretical advances of endogeneous growth models, their particular characteristics, especially those related to the presence of exactly constant returns to scale in the key production processes (that is, human capital and knowledge in Romer (1990), require very specific values of parameters, which makes their empirical tests rather difficult. Therefore, the use of a neoclassical Solow model augmented with some of the key variables in endogenous growth models seems to be a better option to study the determinants of real GDP growth.

### 2.6.1 Neoclassical Solow Model Augmented

Thus a number of empirical studies have introduced different modifications to the neoclassical Solow model aiming at highlighting the role of a (some) factor(s) in explaining growth (Mankiw *et al.*, 1992). Mankiw emphasises the importance of adding human capital to the Solow model. Islam (1995) examines whether or not the results of the augmented Solow model obtained by MRW using cross-section regressions change by using different techniques, namely panel data. Barro (1990), in turn, allows for the government to affect the production function. To achieve this goal, a model built on the basis of the literature above mentioned is now introduced.

The model is basically a variation of the augmented Solow model introduced by MRW (1992). It includes public capital as an additional input in the assumed Cobb-Douglas production function as follows:

$$Y=K(t)^{\alpha}H(t)^{\beta}\left[\frac{G(t)}{K(t)}\right]^{y}\left[\frac{G_M(t)}{K(t)}\right]^{ym}(A(t)L(t))^{1-\alpha-\beta-\Sigma y} \qquad (2.2)$$

where Y is output, K is the stock of private physical capital, H is the stock of human capital, G is the stocks of government capital, L is labour force, and A is a labour augmenting technological factor. Returns to scale are assumed to be constant, and L and A to grow exogenously at rates n and r so that

$$L(t)=L(0)e^{nt}$$

$$A(t)=A(0)e^{rt}$$

For a given level of each type of government capital stock, $G_i$, the quantity of public services available to each producer declines as other producers congest the facilities by increasing their stocks of private physical capital K.

Let a constant fraction of private output be saved and invested, and another one be devoted to human capital investment, which are denoted by $S_K$ and $S_H$, respectively. Besides, let constant shares in the public budget, $S_{G1},\ldots, S_{Gm}$, be invested in the different types of public

capital. The model assumes that accumulation of reproducible factors goes according to the following equations,

$$K=S_K(1-\lambda)\,Y-\delta k$$
$$H=S_H(1-\lambda)\,Y-\delta H$$
$$G_t=S_G\,\lambda Y-\delta G \qquad \cup\, i=1,\ldots,m \tag{2.3}$$

where $\delta$ is the depreciation rate, which for simplicity is assumed to be common to every category of capital stock and constant over time and $\lambda$ is the size of the public sector, which is the share of the public budget in total output. Growth of output per worker depends on initial output per worker, *Y (0),* the initial level of technology, *A (0),* the rate of technological progress, *r*, the growth rate of the workforce, *n*, the depreciation rate, δ, the share of capital in output, α, and λ is the size of the public sector, which is the share of the public budget in total output.

Defining output and the stocks of capital per unit of effective labour as $y = Y / AL$ , $k = K / AL$ , $h = H / AL$ , $g_1 = G_1 / AL_1$ ,…, $g = G_m/AL$, the dynamic equation for k, h, and g are given by

$$k=S_K(1-\lambda)\,y-(n+r+\delta)\,k$$
$$h=S_H(1-\lambda)\,y-(n+r+\delta)\,h$$
$$Gt=S_G\lambda y-(n+r+\delta)\,g_i \tag{2.4}$$

By equating all the three equations to zero, the study get the steady-state values of k, h and g. Replacing these values into the production function, and taking logs yields an equation for the steady state value of income per worker as:

$$\ln\left[\frac{Y(t)}{L(t)}\right]^{*} = \ln A(0) + rt + \frac{\alpha}{1-\alpha-\beta-\Sigma y_t}[\ln Sk-\ln(n+r+\delta)] + \frac{\beta}{1-\alpha-\beta-\Sigma y_t}[\ln Sh-\ln(n+r+\delta)] + \frac{Y_t}{1-\alpha-\beta-\Sigma y}[\ln Sy-\ln(n+r+\delta)] + \ldots\ldots + \frac{Y_m}{1-\alpha-\beta-\Sigma y_t}[\ln Sm-\ln(n+r+\delta)] + \frac{\Sigma y_t}{1-\alpha-\beta-\Sigma y_t}\ln\lambda + \frac{\alpha+\beta+\Sigma y_t}{1-\alpha-\beta-\Sigma y_t}\ln(1-\lambda) \tag{2.5}$$

This equation shows how steady state per worker income depends on population growth, technological change, accumulation of private, public capital and human capital, the size of the public sector, and depreciation rate. Let $y^*$ be the steady state level of income per worker, and $y(t)$ be its actual value at any time t. Following MRW (1992) and Barro (1990) and Sala-i-Martin (1995), approximating around the state of the speed of convergence is given by

$$\frac{\partial \ln y(t)}{\partial t} = \lambda [\ln y^* - \ln y(t)]$$

where $\lambda = (n+r+\delta)(1-\alpha-y)$ is the convergence rate (2.6)

$$y = \Sigma y_t$$

The above equation (2.6) implies that

$$\ln y(t) = (1-e^{-\lambda r})\ln y^* + e^{-\lambda r}\ln y(o) \quad (2.7)$$

where y (0) is income per worker at some initial date. Finally, subtracting lny (0) from both sides and substituting for $y=[Y(t)/L(t)]$ *from equation (2.5), now the equation for growth rate of output per worker is given by:

$$\ln y(t) - \ln y(0) = (1-e^{-\lambda r})\ln A(0) + rt + (1-e^{-\lambda r})\left\{\frac{\alpha-\Sigma y_t}{1-\alpha-\beta-y_t}[\ln Sk - \ln(n+r+\delta)] + \frac{\beta}{1-\alpha-\beta-y}[\ln Sh - \ln(n+r+\delta)] + \frac{y_1}{1-\alpha-\beta-y}[\ln Sy - \ln(n+r+\delta)] + \ldots + \frac{y_M}{1-\alpha-\beta-y}[\ln Sm - \ln(n+r+\delta)] + \frac{y}{1-\alpha-\beta-y}\ln\lambda + \frac{\alpha+\beta-y}{1-\alpha-\beta-y}\ln(1-\lambda)\right\} - (1-e^{-\lambda r})\ln y(0) \quad (2.8)$$

This equation shows the per worker growth rate between periods zero and t as a function of the following investment ratios adjusted by the factor (n+r+ δ): Investment in physical capital ($s_K$), investment in human capital ($s_H$), and each of the m categories of public investment (sG1,…, sGm), the size of the public sector (λ), and the initial income per worker y (0). This equation can now be estimated. The resulting estimates would be restricted or constrained since the coefficient of each of the investment ratios mentioned before is restricted to be equal and opposite to that of the factor (n+r+ δ). However, this restriction can be relaxed so that equation (2.9) would be given by

$$lny(t) - lny(0 = rt + (1-e^{-\lambda r})[lnA(0) + \frac{\alpha - y}{1-\alpha-\beta-y} lnSk + \frac{\beta}{1-\alpha-\beta-y} lnSh + \frac{y_1}{1-\alpha-\beta-y_t} lnSy + \ldots + \frac{y_m}{1-\alpha-\beta-y} lnSm + \frac{y}{1-\alpha-\beta-y} ln\lambda +$$

$$\frac{\alpha+\beta-y}{1-\alpha-\beta-y} ln(1-\lambda) - \frac{\alpha+\beta-y}{1-\alpha-\beta-y} ln(n+r+\delta) - lny(0)] \quad (2.9)$$

This equation corresponds to the unrestricted version of the model since the factor (n+r+ δ) has been separated out to become additional explanatory variables. The restricted and unrestricted equations (2.8) and (2.9) constitute the basis of the theoretical framework of this study since they allow one to achieve its general purpose, which is to estimate the growth effects of various components of government expenditure in a set of East Africa countries over the period 1980 - 2010.

The main limitations of the Solow model include: it focuses on investment and capital, while the much more important factor of entrepreneurship, land and factor productivity is still unexplained, it does not explain why different countries have different investment and resource base and the model does not provide a theory of sustained long-run GDP growth.

### 2.6.2 Ram Model

The model of Ram (1986) forms a basis for empirical model of government expenditure and economic growth. In the model, total government expenditure is disaggregated into investment expenditure, consumption expenditure and human capital expenditure. Considering a two sector economy, public (G) and private sector (D), with two factors of production capital (K) and labour (L) allocated between the two sectors such that

$$K = K_D + K_G \text{ and } L = L_D + L_G \quad (2.10)$$

To capture externalities associated with the public sector, *G* enters the production function of the private sector *D*: Thus, the production functions for each sector are:

$$D = D(K_D, L_D, G) \quad (2.11)$$

$$G = G\,(K_G, L_G) \tag{2.12}$$

Assuming a constant productivity differential between labour in both sectors:

$$G_L = (1 + \delta)\, DL \tag{2.13}$$

Totally differentiating Equations 2.11 and 2.12, given that national income Y = D + G, gives

$$dY = D_K dK_D + G_K\, dK_G + D_L dL_D + G_L\, dL_G + D_G dG \tag{2.14}$$

where $D_K$ and $G_K$ are marginal products of capital in sector D and G respectively, while $D_L$ and $G_L$ are marginal products of labour in sector D and G in that order. Substituting equation 2.13 into 2.14 and rearranging, then the study derives:

$$dY = D_K dK_D + G_K dK_G + D_L(dL_D + dL_G) + \delta D_L dL_G + D_G Dg \tag{2.15}$$

Totally differentiating Equation 2.11, we get:

$$dG = GKdKG + GLdLG$$

Substituting equation 2.14 into 2.15 and collecting like terms, the sudy derives:

$$dY = D_K dK_D + \left(1 - \frac{\delta}{1+\delta}\right) G_K dK_G + D_L d_L + \left(D_G + \frac{\delta}{1+\delta}\right) \tag{2.16}$$

Letting $dK_D = I_p$ (private investment), and $dK_G = I_G$ (government investment), substituting into (2.16), dividing through by Y:

$$\frac{dy}{Y} = \frac{Ip}{Y} + \frac{Ic}{Y} + \frac{dL}{L} + \left(Dc + \frac{\delta}{1+\delta}\right)\left(\frac{dG}{G}\right)\left(\frac{G}{Y}\right) \tag{2.17}$$

Denoting dL/*L* = (Hg), government human capital expenditure and it can capture the change in the quality of labour force and G = Cg (government consumption expenditure).

## 2.7 Conceptual Framework

The study postulates that different components of government expenditure, openness, population growth, terms of trade and total government expenditure determines real GDP growth of East Africa. In between the dependent and explanatory variables are the intervening variables which are not controlled for and they are exchange rate instabilities, political instabilities, environmental factors, inflation and recessions. These determinants of economic growth are conceptualized in Figure 2.2 below.

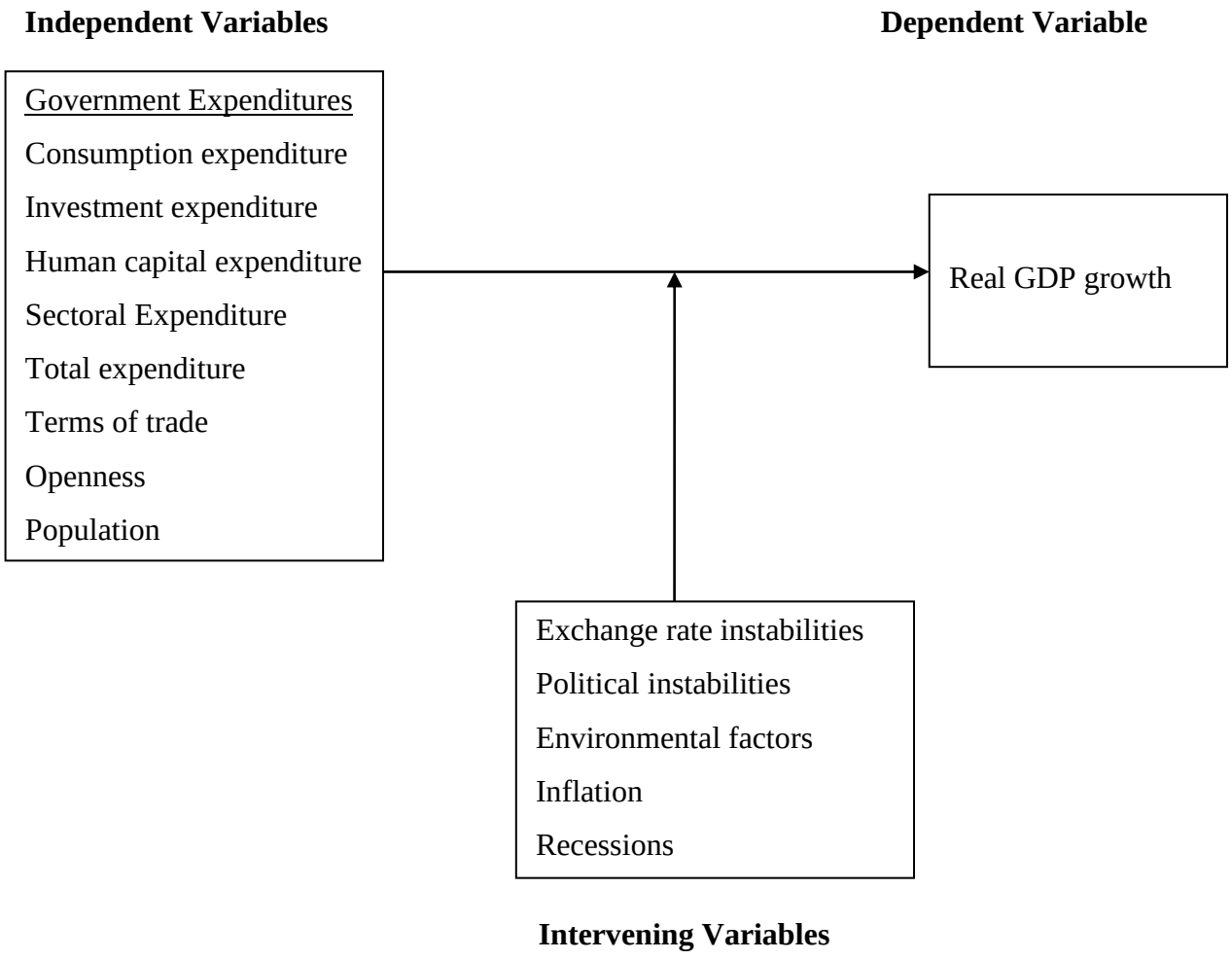


**Figure 2.2: Conceptual Framework.**

*Source*: Aurthor (2013).

# CHAPTER THREE

# METHODOLOGY

## 3.1 Introduction

This chapter entails the design of the study, the sample size of the study based on East African countries and data analysis.

## 3.2 Research Design

The study employed historical research design so as to capture the trend of economic growth and government expenditure of East Africa. This was carried out in the period 1980-2010 using secondary data and fixed balanced panel data analysis.

## 3.3 Study Area

East Africa is found within the continent of Africa in the Sub Saharan region. The EAC region comprising of Burundi, Tanzania, Uganda, Kenya and Rwanda is located between 5030"N 120S and 28045"E 41050" E. The region has a total surface area of 1,817.7 thousand square kilometres with Burundi, Tanzania, Uganda, Kenya and Rwanda accounting for 1.5, 51.7, 13.3, 32.1 and 1.4 percent respectively. Kenya, Uganda and Tanzania share a number of similarities, resulting from their common location, climate, economic factors and history. Notably, Uganda is landlocked, relying on access to sea ports in Kenya (Mombasa) and Tanzania (Dar-es-Salaam). The East African Community (EAC) is focused on widening and deepening the integration process among the five Partner States. The entry point of the integration process of the EAC is the Customs Union which commenced in 2005. The EAC entered into a fully fledged Customs Union in January, 2010 and commenced the implementation of the Common Market six months later in July, 2010. The consolidation on the Customs Union and smooth running of a common Market and Monetary Union will invariably rely on availability of accurate, reliable, timely and comparable data for planning, monitoring and evaluation purposes. Equally, the successful adoption and implementation of the EAMU Protocol places a high premium on close and effective monitoring of macroeconomic performance. Hence this study will provide the

important information on the effect of different components of government expenditure on economic growth for EAC (EAC, 2011). Figure 3.1 below represents the map for EAC.

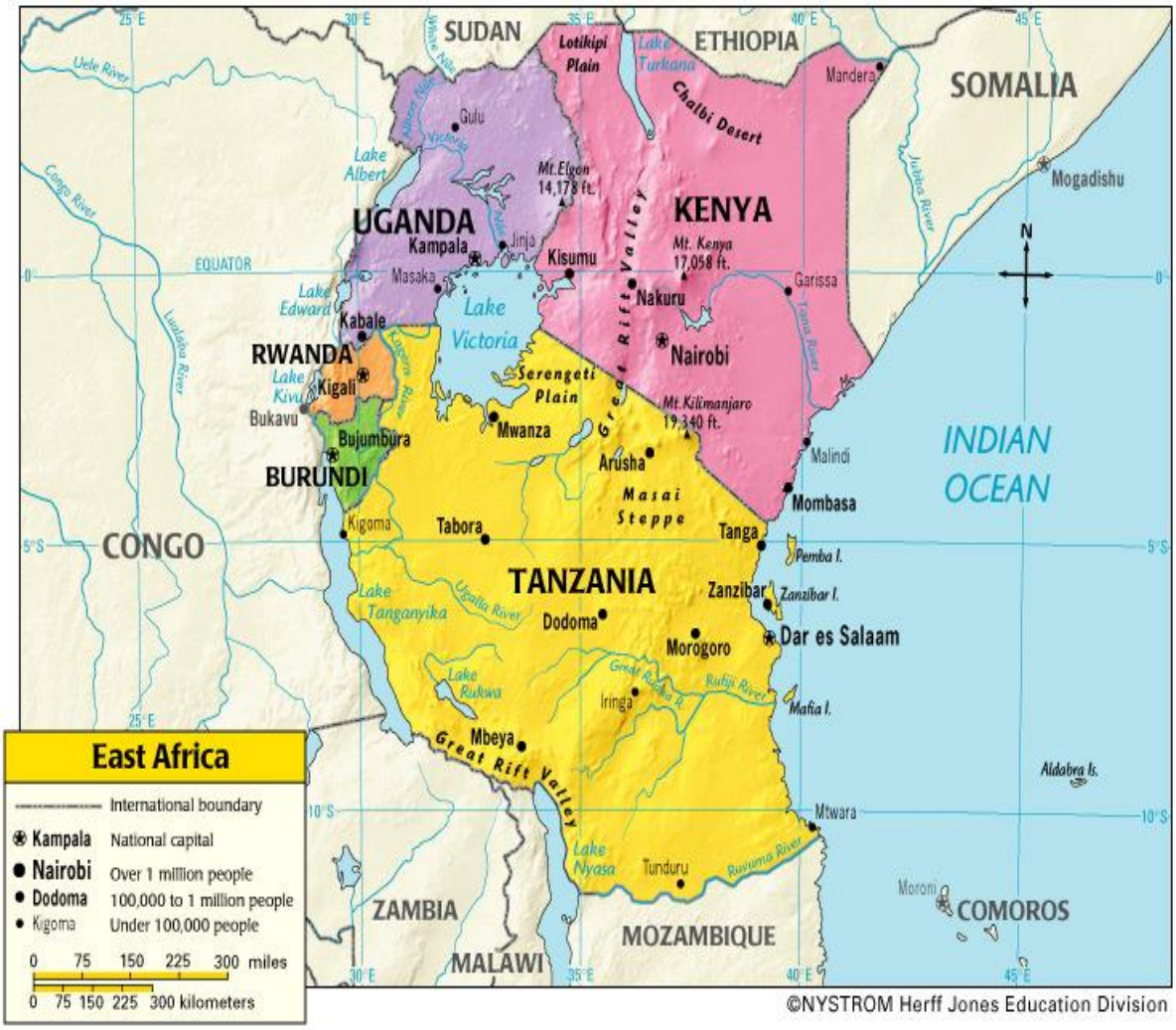


**Figure 3.1: Map of East African Community.**

*Source:* EAC (2011).

### 3.4 Specification of Model

In this study, a model adopted from Ram (1986) and developed further by Kweka and Morrissey (1999) was adopted for this econometric analysis. In the model, output (Y) was assumed to be a function of three factors of production, Capital (K), Labour (L) and Government expenditure (G). In the context of developing economies like East Africa, Openness (O), Population and Terms of trade (T) are potential determinants of growth

which are not accounted for by other independent variables, hence were included in the model below.

$$Y = f(K, L, G, O, P, T) \quad (3.0)$$

In addition, change in capital (ΔK) is expressed as investment (I). Government expenditure was thus disaggregated into productive (Ig) and unproductive (Cg) components, and the model had total investment (I = Ip + Ig). Private investment (Ip) was proxied by private capital formation, while Government investment spending (Ig) was proxied by government capital expenditure. It was assumed that labour (L) can be proxied by public expenditure on Human capital (Hg). Government consumption expenditure (Cg) was measured by government recurrent expenditure. Expenditure on human capital (Hg) was thus measured by the total health and education expenditure (current and capital). Both current and capital expenditure were considered here because recurrent expenditure for these two sub-sectors of social sector play a very significant role in improving the quality of the labour force and of course there is no definite line dividing the recurrent and capital government expenditure in these sub sectors.

Building on Lin (1994), a simple growth model in which total expenditure is disaggregated into expenditure on consumption, investment and human capital was formulated. Therefore, the regression equation was specified as:

$$Y_{i,t} = \beta X_{i,t} + \gamma G_{i,t} + \mu_i + \nu_t + \mathcal{E}_{i,t} \quad (3.1)$$

Where:

$Y_{i,t}$ - is the dependent variable.
$X_{i,t}$ - set of explanatory variables.
$G_{i,t}$ – is the government expenditure variable.
$\mu_i$ – country fixed effects
$\nu_t$ – time fixed effects
$\mathcal{E}_{i,t}$ – is the error term.

and the subscripts *i* and *t* represent country and time period respectively.

$$RGDPG = f(Cg, Ig, Hg, Open, Tot, Pop, Tg, Hea, Edu, Def, Agr,)$$

$Y_{i,t}$ - is the dependent variable and is given as RGDPG - Real Gross Domestic Product Growth, while the explanatory variables, $X_{i,t}$, are OPEN – Openness, TOT - Terms of trade, POP-Population and Tg-Total government expenditure. Finally the $G_{i,t}$ – is the expenditure variable which is made up of independent disaggregated expenditures. These expenditures

included Cg- government consumption, Ig - government Investment, Hg - human capital, Edu - education, Def - defence, Hea - health and Agr - agricultural expenditure.

The explanatory variables in the above function are components of GDP, that is, by measuring the explanatory variables as shares of GDP. After expressing the dependent and independent variables in natural logarithm form and as shares of GDP, an attempt was made to examine the effect of each explanatory variable on growth of real GDP. Thus, the model to be estimated was specified in logarithim form as:

$$lngrgdp_{i,t} = \beta lnX_{i,t} + \gamma ln\, G_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (3.2)$$

### 3.4.1 Meeting the Objectives

To analyse objective one, that is, the effect of Investment Expenditure (IgY) on economic growth in East Africa equation, 3.3 was used.

$$lngrgdp_{i,t} = \beta lnX_{i,t} + \gamma ln\, IgY_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (3.3)$$

Analysing objective two, that is, the effect of Consumption Expenditure (CgY) on economic growth in East Africa, the study used equation 3.4.

$$lngrgdp_{i,t} = \beta lnX_{i,t} + \gamma ln\, CgY_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (3.4)$$

In order to analyse objective three, that is, the effect of Human Capital Expenditure (HgY) on economic gowth, equation (3.5) was estimated.

$$lngrgdp_{i,t} = \beta lnX_{i,t} + \gamma ln\, HgY_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (3.5)$$

The human capital expenditure was made up of recurrent and capital expenditure from both sectors of education and health.

The analysis of objective four, that is, the effect of government expenditure on sectoral expenditure was done using equations 3.6, 3.7, 3.8 and 3.9. The functional and composition of government expenditure are important determinants of growth. Thus, model expressed real GDP growth (RGDPG) as a function of various sectoral government expenditures, which included total expenditures on Defence (DefY), Agriculture (AgrY), Education (EduY) and Health (HeaY). In addition, the model included the control variables (Openness,

Terms of Trade, Total Expenditure and Population) since they have important contribution to economic growth. Thus, the growth models were specified as:

$$lngrgdp_{i,t} = \beta lnX_{i,t} + \gamma ln\ HeaY_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (3.6)$$

$$lngrgdp_{i,t} = \beta lnX_{i,t} + \gamma ln\ EduY_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (3.7)$$

$$lngrgdp_{i,t} = \beta lnX_{i,t} + \gamma ln\ DefY_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (3.8)$$

$$lngrgdp_{i,t} = \beta lnX_{i,t} + \gamma ln\ AgrY_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (3.9)$$

### 3.4.2 Justification for Panel Data Approach

The adoption of panel data estimation techniques combines the dynamics in time series with cross sectional variation in the analyses of the determinants of economic growth in an attempt to solve most of the econometric challenges of cross sectional data estimation. Combining cross-section and time series data is useful for three main reasons. First, it is necessary when analysing GDP growth especially in East Africa. This is because the growth performance of most countries varies substantially over time. In addition, the time-series dimension of the variables of interest provides much of the information ignored in cross-sectional studies. Secondly, the use of panel data allows expanding the sample size, and the gain in the degrees of freedom is particularly important when a relatively large number of regressors are used. Finally, panel data estimation can improve upon the issues that cross-sectional data fails to address, such as potential endogeneity of the regressors, and controlling for country specific effects (Plasmans, 2005).

Analysis of the influence of components of government expenditure on economic growth was performed by the balanced panel fixed effects model. This model enables the ability to analyse time series (different periods) and cross-sections (different countries) simultaneously, each with one dependent and possible multiple independent variables. Following recent advances in panel data estimation methods, this study therefore utilises balanced fixed effect model of panel estimation technique which addresses the problems of

omitted variable bias, endogeneity, and multicolliniality. An assumption of the fixed effects model is that differences across cross sections can be captured by the constant term.

### 3.5 Justification of the Variables and Sources of Data

The study used data from East African countries, which were selected mainly based on the availability of data for the period under consideration and the need for more degrees of freedom which is particularly important when a relatively large number of regressors are used. The data covered the period between 1980 and 2010. Consequently the variables were expressed in annual changes for a total of 93 observations on each variable. The government spending data was collected from the World Bank (World Tables, 2012), Statistical abstracts, Central Bank reports, and other government publications on public finance and International Financial Statistics Year Books. The study constructed panel database with information along three dimensions: The growth variable, the government expenditure variables, and control variables. The sectors included in the sample were: Agriculture, Health, Education and Defence. The real GDP growth was used to capture the effect of inflation on economic growth.

It was expected that the components of public expenditure (Human capital, Investment, Agriculture, Health and Education) would have a positive sign, implying that they are productive expenditure. Government expenditure on capital goods was supposed to add a country's physical capital (infrastructure) which, in turn, could complement private sector productivity and increase growth in the process. The sign of the variable is therefore expected tbe positive. But consumption expenditure and defence were expected to give a negative result, since most recurrent expenditure is for consumption purposes and therefore an increase in the ratio should reduce real GDP growth. Consumption expenditure is ineffective on the grounds of well –known crowding – out phenomenon that is, as public goods are substituted for private goods, thus causing lower private spending. Furthermore, when governments borrow heavily to fund spending, pressure in the credit market results in higher interest rate which reduces private investment.

In addition, openness variable was also introduced based on the fact that in most of the selected countries, growth has occurred in connection with export-led growth strategies. Openness and terms of trade were expected to have a positive and significant effect on economic growth because open economies can have more access to foreign resources and markets. Thus, a more open economy was expected to have a higher growth rate than a closed economy. Also better terms of trade meant an increase in the countries income and subsequently economic growth. Thus an improvement of a country's terms of trade is beneficial, because then the country can pay for many imports by selling a small amount of exports. Likewise should the terms of trade deteriorate, the country can import fewer goods and services in exchange for a given volume of exports. A large number of studies used trade shares in GDP and found, as reviewed in Harrison (1996), a positive and strong relationship with economic growth. Trade openness brings competition into the domestic market, encourages redistribution of skilled workers to trade related activities and reduces opportunities for rent seeking. For this region, the study expected a negative sign since most of this countries export primary goods.

Population growth was also expected to retard economic growth especially in developing economies. Hence the study expected a negative sign. Total government expenditure was expected to affect real GDP growth either positively or negatively. Government spending augments the aggregate demand, which provokes an increased output depending on expenditure multipliers. The opponents of this approach stipulate that government consumption crowds-out private investment, reduces economic growth in the short- run and diminishes capital accumulation in the long-run.

### 3.6 Data Analysis

Descriptive and inferential analyses were used to analyse the data, all in an effort to investigate the relationship between government expenditure and economic growth in East Africa. The Panel data was estimated using the balanced fixed effect model of panel estimation technique, geared at controlling for time-invariant and unobservable country effects. In the panel model with fixed effects, all unit-specific characteristics that are constant over time were absorbed in the constant terms.

### 3.7 Panel Data Diagnostic Test

The Hausman (1978) test was applied to underpin the application of the balanced panel fixed effects model in this analysis. This statistical test was generally used for deciding between applying a fixed or random effects model. The Hausman test (H) was estimated by the following equation:

$$\mathbf{H} = (\beta_{FE} - \beta_{RE}) * \mathbf{INVERSE}[V_{FE} - V_{RE}] * (\beta_{FE} - \beta_{RE})$$

Fixed-effects (FE) are used whenever one is only interested in analysing the effect of variables that vary over time. FE explores the relationship between predictor and outcome variables within an entity (country, person, company, etc). Each entity has its own individual characteristics that may or may not influence the predictor variables. When using FE, it is assumed that something within the individual may impact or bias the predictor or outcome variables and hence the need to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. FE removes the effect of those time-invariant characteristics from the predictor variables so as to assess the predictors' net effect. Another important assumption of the FE model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each entity is different, therefore, the entity's error term and the constant (which captures individual characteristics) should not be correlated with the others (Baum, 2006). If the error terms are correlated, then FE is not suitable since inferences may not be correct and one would need to model that relationship (probably using random-effects). The equation for the fixed effects model can be expressed as:

$$Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it} \qquad (3.10)$$

Where

$\alpha_i$ ($i$ =1….n) is the unknown intercept for each entity ($n$ entity-specific intercepts).

$Y_{it}$ is the dependent variable (DV) where $i$ = entity and $t$ = time.

$X_{it}$ represents one independent variable (IV),

$\beta_1$ is the coefficient for that IV,

$u_{it}$ is the error term

One side effect of the features of fixed effects models is that they cannot be used to investigate time-invariant causes of the dependent variables. The rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. An advantage of random effects is that one can include time invariant variables (for example gender). In the fixed effects model, these variables are absorbed by the intercept (Baum, 2006).

Random effects (RE) model assumes that the entity's error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables. In random-effects one needs to specify those individual characteristics that may or may not influence the predictor variables. The problem with this is that some variables may not be available, leading to omitted variable bias in the model. RE allows generalizing the inferences beyond the sample used in the model (Baum, 2006).
The random effects model is expressed as:

$$\text{Yit} = \beta X_{\text{it}} + \alpha + u_{\text{it}} + \varepsilon_{\text{it}} \qquad (3.11)$$

### 3.8 Properties of Panel Data

#### 3.8.1 Panel Unit Root Test

Empirical work based on time series data assumes that the underlying time series is stationary. Stationarity implies that the distribution of a process remains unchanged when shifted in time by an arbitrary value. More formally, a stochastic process is said to be weakly stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends only on the distance or gap between the two time periods. It is a test on whether a time series variable is non-stationary using an autoregressive model. Whether a variable is stationary depends on whether it has a unit root. If a variable contains a unit root, then it is non-stationary and if not, then it is stationary. Macroeconomic time series data are generally characterised by stochastic trend which can be removed by differencing. This study adopted Levin-Lin-Chu (2002) technique to verify the presence of unit root.

### 3.8.2 Co-integration Test

There are two major procedures to test for the existence of cointegration, namely, the Engle-Granger two step procedures and the Johansen Maximum Likelihood Estimation procedure. Following Engel and Granger, the study attempted to determine whether long-run relationship exist between the variables. The Engle-Granger approach is used to investigate whether cointegration relations exist between these variables. However, this approach can only be applied if there exists just one cointegrating relation. Thus, we start by checking whether the time series are pairwise cointegrated. If the variables are co-integrated, they cannot move far away from each other. Having established the existence of a long-run relationship, one may proceed to specify the short-run dynamic relation for the economic aggregates hence vector error correction models. Thus the Vector Error Correction Model (VECM) is tested. This indicates short-run dynamics of the model. The error correction model combines the short and long- term relations between analyzed variable.

## 3.9 Post–Estimation Panel Diagnostic Tests

Post-estimation panel diagnostic tests were carried out during the study. Heteroskedasticity, serial correlation and cross sectional dependence/contemporaneous correlation were tested for the above models before estimation and corrected accordingly.

### 3.9.1 Testing for Serial Correlation

Autocorrelation refers to the correlation of a time series or individual observations with its own past and future values. Autocorrelation complicates the application of statistical tests by reducing the number of independent observations. Autocorrelation occurs when the residuals do not have a random trend around the regression line. Positive autocorrelation which is the common one for time series is when the trend of the residuals is formed systematically above or below the line. One way of eliminating autocorrelation is by identifying the factors responsible for the autocorrelation and the regression done accordingly. The Cochrane-Orcutt method does this with an iterative process with five different steps. First, the original equation is regressed. Second, residuals are calculated. Third, $e_t$ (residual) regressed against $e_{t-1}$ to estimate the correlation between the two (ρ). Fourth step is put the actual value of correlation (ρ) to the original equation. Step five re-calculate the residuals and the process

starts over at step three untill the autocorrelation is eliminated (Dougherty, 1992). Serial correlation causes the standard errors of the coefficients to be smaller than they actually are and higher R-squared. The study used Wooldridge test for autocorrelation in panel data.

### 3.9.2 Testing for Heteroskedasticity

Heteroskedasticity occurs when the variance of the disturbance term is not constant. Hence, the t-values for the estimated coefficients cannot be trusted. A modified Wald test was carried out to test for heteroskedasticity.

### 3.9.3 Testing for Cross-Sectional Dependence

Cross-sectional dependence/contemporaneous correlation were tested using Breusch-Pagan Lagrange Multiplier (B-P/LM) test of independence. B-P/LM (cross-sectional dependence) test is used to test whether the residuals are correlated across entities. Cross-sectional dependence can lead to bias in tests results (also called contemporaneous correlation). The null hypothesis in the B-P/LM test of independence is that residuals across entities are not correlated.

# CHAPTER FOUR

# RESULTS AND DISCUSSIONS

## 4.1 Introduction

This chapter presents findings from the data that were analysed. It is divided into two sections. The first section presents descriptive results of the variables and panel diagnostic test results. Panel data tests were carried out to establish stationarity and cointegration of the variables. The second section presents the panel data estimation results that were carried out using balanced fixed panel estimation model on the effects of different components of government expenditure on economic growth. The process involved analysis of seven models in which all variables were expressed in logs.

## 4.2 Descriptive Analysis

Normality test was done to determine if the variables used in the analysis are normally distributed while descriptive statistics was used to simply describe the trends.

### 4.2.1 Descriptive Statistics

The Table 4.1 below shows the results of the normality test and descriptive statistics of the variables under study. Normality test is done to test whether the variables used in the analysis are normally distributed. The common test for normality is the Jarque-Bera statistics test (Jarque and Bera, 1980). This test utilises the mean based coefficient of skewness and kurtosis to check the normality of all the variables used.

On one hand, Skewness measures the direction and degree of asymmetry. A value of zero indicates symmetrical distribution. A positive value indicates skewness to the right while a negative value indicates skewness to the left. Values between -3 and +3 indicate that they are typical values of samples from a normal distribution. In this study, figures indicate normal curves for all the variables, with negative values of skewness indicating a tail to the right except for terms of trade, defence and agriculture. This means that the positively skewed variables were high during the beginning years but have been progressively

declining over the years. The negatively skewed variables, shows an increasing trend during the latter years.

**Table 4.1 Descriptive Statistics**

| | GDP | PO | OPE | TOT | TgY | IgY | CgY | HgY | HE | ED | DEF | AG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N Valid | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| Missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | .56 | .47 | 1.54 | 2.06 | 1.31 | .47 | 1.10 | .57 | -.01 | .42 | .26 | -.03 |
| Std. Error of Mean | .04 | .01 | .02 | .014 | .022 | .03 | .03 | .03 | .031 | .03 | .02 | .04 |
| Std. Deviation | .41 | .08 | .21 | .13 | .21 | .32 | .24 | .31 | .32 | .32 | .16 | .37 |
| Variance | .17 | .01 | .044 | .02 | .04 | .10 | .056 | .10 | .10 | .10 | .03 | .14 |
| Skewness | -1.40 | -.29 | -1.29 | 1.36 | -.92 | -.09 | -1.16 | -.72 | -1.02 | -.59 | .09 | .51 |
| Std. Error of Skewness | .25 | .25 | .25 | .25 | .25 | .25 | .25 | .25 | .25 | .25 | .25 | .25 |
| Kurtosis | 1.17 | -.80 | 2.31 | 1.94 | 1.91 | -.59 | 2.00 | .01 | 1.56 | -.55 | -.61 | -.58 |
| Std. Error of Kurtosis | .50 | .50 | .50 | .50 | .50 | .50 | .50 | .50 | .50 | .50 | .50 | .50 |

On the other hand, Kurtosis measures the heaviness of the tails of a distribution. The usual reference point in Kurtosis is the normal distribution. If this kurtosis statistic equals three and the skewness is zero, the distribution is normal. Unimodal distributions that have kurtosis greater than three have heavier or thicker tails than the normal. These same distributions also tend to have higher peaks in the center of the distribution (leptokurtosis). Unimodal distributions whose tails are lighter than the normal distribution tend to have a kurtosis that is less than three. In this case, the peak of the distribution tends to be broader than the normal (platykurtosis). Negative kurtosis indicates too many cases in the tails of distribution while positive kurtosis indicates too few cases. From the Kurtosis result above, all the variables have kurtosis value of less than three which means the variables have platykurtosis distribution (fatter middles or fewer extreme value). Therefore, put simply, kurtosis describes how bunched around the center or spread at the endpoints a frequency distribution is.

### 4.2.2 Correlation Matrix

The correlation matrix results are shown in Table 4.2.

**Table 4.2 Correlation Matrix**

| | GD | PG | OP | TO | HG | IG | CG | HE | DF | ED | AG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **GD** | 1 | -0.09 | 0.06 | -0.22* | 0.02 | 0.16 | -0.09 | 0.13 | -0.11 | -0.04 | -0.12 |
| **PG** | | 1 | -0.28* | 0.11 | -0.11 | -0.09 | -0.20 | -0.02 | 0.33** | -0.12 | 0.34** |
| **OP** | | | 1 | -0.38** | 0.66** | 0.61* | 0.43** | 0.34** | -0.33** | 0.70** | -0.08 |
| **TO** | | | | 1 | -0.50 | -0.24* | -0.49** | -0.38** | 0.14 | -0.50** | -0.31** |
| **HG** | | | | | 1 | 0.58** | 0.83** | 0.79** | 0.27** | 0.97** | 0.30** |
| **IG** | | | | | | 1 | -0.36** | 0.39** | 0.14 | 0.57** | -0.05 |
| **CG** | | | | | | | 1 | 0.71** | 0.30** | 0.80** | 0.30** |
| **HE** | | | | | | | | 1 | 0.36 | 0.69** | 0.26** |
| **DF** | | | | | | | | | 1 | 0.23* | 0.31** |
| **ED** | | | | | | | | | | 1 | 0.31** |
| **AG** | | | | | | | | | | | 1 |

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Bivariate correlation was used to evaluate the degree of relationship between the components of government expenditure and economic growth. Using Pearson Correlation (r), the most commonly used bivariate correlation technique, the association between the variables was estimated. The absolute value of the correlation coefficient ranges from 0 to 1. A value of zero indicates that there is no correlation between the variables whereas a value of one indicates that there is a perfect correlation between the variables. The sign of the correlation coefficient will be positive for direct relationship and negative for an indirect in relationship. Table 4.2 presents the correlation matrix of the model proxies. The diagonal of the matrix has values of one because a variable always has a perfect correlation with itself. From the table, it was revealed that investment expenditure, human capital expenditure and health expenditure had a positive correlation with real GDP growth in East Africa within the period under review. Investment expenditure promotes economic growth in the sense that public investment contributes to capital accumulation. In addition, expenditure on health raises the productivity of labour and increases the growth of national output. Furthermore, the correlation matrix results indicate that terms of trade had a negative correlation with

economic growth within the period under review. In general, most government expenditure components seem to be positively correlated between themselves.

### 4.3 Properties of Panel Data

#### 4.3.1 Panel Unit Root Test

As earlier discussed, tests for the unit roots are the prerequisites before estimating the coefficients. The test was carried out in order to eliminate any possibility of spurious regressions and erroneous inferences. This involved determining the order of integration of the time series through unit root test. Accordingly, Levin-Lin-Chu (LLC, 2002) method was conducted at level and at first difference and the result is reported in Table 4.3. While doing the LLC test, the study picked the lag length on the augmentation term based on whether the exclusion of lagged term causes serial correlation in the test equation's error term. The results reveal that all the variables are non-stationary at level except real GDP and government investment. However, they become stationary after the first difference implying that the variables are integrated of order one, I (1).

**Table 4.3 Panel Unit Root Test Results**

| Variables in Logs | Levin-Lin-Chu at Level | | Order | LLC at First difference | | Order |
|---|---|---|---|---|---|---|
| | Unadjusted t | Adjusted t | | Unadjusted t | Adjusted t | |
| LnRGGDP | -5.5309 | -3.2789 | I(0) | _ | _ | _ |
| LnIgY | -4.8545 | -2.6132 | I(0) | _ | _ | _ |
| LnCgY | -2.0781 | -0.0564 | I(1) | -7.6901 | -5.0570 | I(0) |
| LnHgY | -1.1185 | 0.7759 | I(1) | -9.0697 | -6.2458 | I(0) |
| LnHeaY | -1.8285 | 0.5157 | I(1) | -7.5225 | -4.6993 | I(0) |
| LnEduY | -0.6204 | 1.2257 | I(1) | -8.5838 | -5.5125 | I(0) |
| LnDefY | -2.6601 | -0.6566 | I(1) | -9.1705 | -6.1553 | I(0) |
| LnAgrY | -1.9751 | -0.2468 | I(1) | -9.4167 | -6.5761 | I(0) |
| LnTgY | -1.7508 | -0.0060 | I(1) | -6.7663 | -3.9830 | I(0) |
| LnOPEN | -1.3804 | 0.2276 | I(1) | -6.6571 | -3.7979 | I(0) |
| LnTOT | -2.7023 | -0.1778 | I(1) | -6.3576 | -3.1815 | I(0) |
| LnPGR | -3.6390 | -1.0393 | I(1) | -8.1229 | -5.3380 | I(0) |

Order (Order of Intergration)

All at 1 % level of significance (critical value:-2.460)

Table 4.3 reports results of non stationary test for lnCgY, lnHgY, lnHeaY, lnEduY, lnDefY, lnAgrY, lnTgY, lnOpen, lnTOT and lnPGR using LLC test. Hence, hypothesis of a unit root

is accepted at 1 percent level of significance, indicating that all the above variables are integrated of order one I (1). While other test results signify that the hypothesis of a unit root in lnRGGDP and lnIgY are rejected at one percent level of significance, this indicates that the two variables are integrated of order zero I (0).

### 4.3.2 Cointegration

Engel-Granger (1988) has shown that if two series $y_t$ and $x_t$ are cointegrated of order *d*, *b*, that is, $y_t \sim CI\ (d, b)$, then the series have a long-run equilibrium relationship and any deviation from this equilibrium is temporal and will eventually be corrected and the long-run equilibrium restored. For this to happen, however, two conditions must hold. First, all the components of $y_t$ must be *I(d)* such that differencing them generates series that are integrated of a lower order. Second, there must exist a vector $\boldsymbol{b}$ such that, $zt = {}_{\boldsymbol{b}}y_t \sim I(d\text{-}b)$. If for instance $y_t$ is integrated of order one ($y_t \sim$ I (1)), then its first difference would be integrated of order zero (stationary) that is, $y_t \sim$ I (0), in which case $y_t$ and $x_t$ are co-integrated. Estimation of cointegrating relationship requires that all time series variables in the model to be integrated order of one. But from the results in Table 4.3, the dependant variable real GDP growth is already stationary I (0) while the rest of the variables are of order (1), hence they are not of the same integration. This therefore implies there was no co- integration since the variables are of different integration.

### 4.3.3 Fixed or Random: Hausman Test

The Hausman (1978) test was applied to underpin the application of the balanced panel fixed effects model in this analysis. This statistical test is generally used for deciding between applying a fixed or random effects model. The Hausman test (H) was estimated by the following equation:

$$\mathbf{H} = (\beta_{FE} - \beta_{RE}) * \mathbf{INVERSE}[V_{FE} - V_{RE}] * (\beta_{FE} - \beta_{RE})$$

*$H_o$: random effects are consistent and efficient*
*$H_1$: random effects are inconsistent*

In order to perform this test, both fixed effects and the random effects models were regressed. The Hausman test results (Table 4.4) suggest a rejection of the null hypothesis.

Panel FE explores the relationship between predictor and outcome variables within an entity (country, person, company).

**Table 4.4 Hausman Fixed-Random Results**

| Variables (V) | Fixed(b) | Random(B) | Difference(b-B) | S.E |
|---|---|---|---|---|
| Lpgr | -0.4548875 | -1.08887 | 0.6339825 | 0.7231816 |
| lOPEN | -0.6122139 | 0.045758 | -0.6579719 | 0. 2086402 |
| lTOT | -1.614091 | -1.37161 | -0.2424806 | 0.3438667 |
| lTgY | -1.806607 | -0.8265189 | -0.9800882 | 0.6163219 |
| lHeaY | 0.444017 | 0.6429 | -0.198883 | 0.4077887 |
| lEduY | 0.4410705 | -1.09683 | 1.5379 | 0.9308005 |
| lDefY | 0.309603 | 0.5300171 | -0.220414 | 0.3169548 |
| lAgrY | -0.0904379 | -0.1976837 | 0.1072459 | 0.2016124 |
| lIgY | 0.1523686 | 0.1425108 | 0.0098578 | 0.1135331 |
| lCgY | -0.7636242 | -1.191591 | 0.4279665 | 0.4309205 |
| lHgY | -1.07299 | 0.7534167 | -1.826407 | 1.197662 |
| $\chi^2$ (10) = 19.64 | | | Prob> $\chi^2$ = 0.0329 | |

SE - Standard Error

If the p-value is significant (for example <0.05) then use fixed effects, if not use random effects. From the result, p-value is 0.0329, hence the null hypothesis is rejected and the fixed effect model is selected.

**4.4 Classification by Level Expenditure**

Estimation process of the role of government expenditure starts by disaggregating it into just three levels of economic components, namely human capital, consumption and investment expenditure. The rationale for doing so is that one strand of the economic growth literature shows that investment and human capital are important factors in explaining growth. In contrast, consumption expenditure has been considered as growth retarding (Barro, 1991). The study uses openness, terms of trade, population and total government expenditure as the control variables.

### 4.4.1 Effect of Investment Expenditure on Economic Growth

Table 4.5 represents the result on effect of Investment expenditure (IgY) on economic growth.

**Table 4.5 Effect of Investment Expenditure on Economic Growth**

| Variable | Coefficient | Standard error | t- Statistics | p –Value |
|---|---|---|---|---|
| Constant | 4.992 | 1.472 | 3.39 | 0.0011 |
| lnIgY | 0.494 | 0.175 | 2.816 | 0.0456 |
| DlnTgY | 0.804 | 0.264 | 3.04 | 0.0093 |
| DlnTOT | -1.103 | 0.858 | -1.29 | 0.327 |
| DlnOPEN | 1.024 | 0.371 | 2.76 | 0.0560 |
| DlnPGR | -1.167 | 0.538 | -2.168 | 0.083 |
| Goodness of Fit Test | $R^2$ = 0.333195 | | Adjusted $R^2$ = 0.278282 | |
| F(7, 85) = 6.067661 | P-value(F) =9.34e-06 | | D.Watson = 1.907471 | |
| Wooldridge Test | F( 1,2) = 12.991 | | Prob > F = 0.0691 | |
| Modified Wald Test | $\chi^2$ (3) = 1.38 | | Prob> $\chi^2$ = 0.7099 | |
| Breusch-Pagan Test | $\chi^2$ (3) = 3.970 | | Pr = 0.2648 | |

From the results, the effect of investment expenditure on real GDP growth is positive and significant at five percent level of significance. This result is in line with the hypothesis that the capital component of government expenditure and economic growth are positively related. Hence the study rejects null hypothesis at five percent significance level. It implies that a ten percent increase in investment expenditure will lead to about five percent increase in economic growth. This type of expenditure could be associated with the productive government expenditure that Barro (1990) and Gemmell (2001) pointed out to be an additional input to the private production function. This public investment, as argued in growth models, is necessary to increase productivity and to gear up the economy for take-off into the middle stages of economic and social development. Public investment in basic infrastructure is an essential precondition for capital accumulation in the private sector (Barro, 1990). Niloy *et al.* (2003) employed the same disaggregated approach as follod by Josaphat and Oliver (2000). They examined the growth effects of government expenditure for a panel of thirty developing countries over the decades of the 1970s and 1980. The primary research results showed that the share of government capital expenditure in GDP is positively and significantly correlated with economic growth, but current expenditure is

insignificant. In contrast Josaphat and Oliver (2000) and Morrissey and Kweka (1999) found the relationship between investment expenditure and growth for Tanzania to be negative.

Population growth is negatively and significantly related to economic growth at ten percent significant level. This implies a 10 percent increase in population growth will lead to 11.7 percent decrease in economic growth. The population growth rate affects both the consumption and the productivity of a country's economy. In East Africa, where the population growth is increasing more and more drastically, the economic growth also changes critically over time. The Malthus'(1826) model stated that population growth can reduce the output per capita because population increases at a geometrical rate while production rises at an arithmetic rate so that output growth rate can not keep the same pace. Unlike Malthus (1826), Solow (1956) focused on the term "population growth rate" instead of the "population level". The author stated that an increase in the population growth rate can decrease the capital per worker as well as the steady-state output per worker. As a result, higher population growth can be detrimental to the productivity and economic growth of East Africa. Simon (1981) went as far as suggesting that population growth may have had a positive impact on per capita GDP growth in the long-run through improvement of productivity and the learning-by-doing resulting from increased production volume. In contrast, Barro and Sala-i-Martin (2004), concluded that population growth has exerted a significant negative effect on economic growth in developing countries.

Total government expenditure is significant at the one percent level of significance and positively related to economic growth. Openness is statistically significant at 10 percent level of significance and postively related to economic growth. That implies that 10 percent increase in openness will lead to 10 % increase in economic growth. But terms of trade is insignificant at any conventional level of significance. This implies that export in EAC remains unproductive. The countries continue to export the same primary commodities as they did for many years while world price is on a declining trend. Therefore, the main reason that constrains export from playing its role in promoting growth probably lies on the failure of the countries in bringing about a structural transformation that would broaden the export base (Teshome, 2006).

The F-test statitstic results show that the coefficients are simultaneously non-zero and hence the independent variables have explanatory power on the dependent variable at one percent level of significance. The joint effect of these components of government expenditure and control variables on economic growth is statistically significant as indicated by the computed F-Statistic and its probability. The adjusted coeffificient of determination (adjusted $R^2$) test is used to show the total variation of the dependent variable that can be explained by the independent variable. The adjusted $R^2$ is equal to 0.28, which implies that 28% of the variations in the dependent variable (real Gross Domestic Product) are explained by the changes in explanatory variables in the model within the period under review.

Different post estimation panel diagnostic tets were carried out. The study used Wooldridge test for autocorrelation in panel data. Serial correlation causes the standard errors of the coefficients to be smaller than they actually are and higher R-squared. The null is no serial correlation (0.0691). From Table 4.5 result, the p-value is greater than 0.05, the study fails to reject the null hypothesis and conclude that the data does not have first-order autocorrelation. The Durbin Watson statistic is used to test the existence of serial correlation between the variables. Durbin Watson is equal to 1.9, implying serial correlation is not a problem. This is because the closer the Durbin Watson value is to 2, the better the evidence of the absence of autocorrelation. Heteroskedasticity occurs when the variance of the disturbance term is not constant. Hence, the t-values for the estimated coefficients cannot be trusted. A modified Wald test was carried out to test for heteroskedasticity and the result presented as shown in table 4.5 the null is homoskedasticity (or constant variance). From above result (0.7099) the null hypothesis is accepted hence no heteroskedasticity. The p-value is above 0.05 and as such it is not significant hence revealing that heteroscedasticity is not a problem. Contemporaneous correlation was tested using Breusch-Pagan Lagrange Multiplier (B-P/LM) test of independence. B-P/LM test is used to test whether the residuals are correlated across entities. Cross-sectional dependence can lead to bias in tests results. The p-value is greater than 0.05 (0.2648) and therefore not significant at five percent level of significance. From the Breusch-Pagan Lagrange Multiplier test cross-sectional dependence/ contemporaneous correlation is not a problem.

### 4.4.2 Effect of Consumption Expenditure on Economic Growth

Table 4.6 reports the result of the regression analysis on the effect of consumption expenditure (CgY) on economic growth.

**Table 4.6 Effect of Consumption Expenditure on Economic Growth**

| Variable | Coefficient | Standard error | t- Statistics | p-value |
|---|---|---|---|---|
| Constant | 4.284 | 1.368 | 3.132 | 0.0024 |
| DlnCgY | -2.298 | 0.808 | -2.844 | 0.0056 |
| DlnTgY | 1.616 | 0.797 | 2.03 | 0.180 |
| DlnTOT | -1.127 | 0.832 | -1.36 | 0.308 |
| DlnOPEN | 0.933 | 0.438 | 2.13 | 0.167 |
| DlnPGR | -2.488 | 0.309 | -8.05 | 0.015 |
| Goodness of Fit Test | $R^2 = 0.332579$ | | Adjusted $R^2$ = | 0.297015 |
| F(7,85) = 6.050840 | P-value(F) = 9.67e-06 | | Durbin.W = | 1.915664 |
| Wooldridge Test | F( 1,2) = 11.654 | | Prob > F = | 0.0761 |
| Modified Wald Test | $\chi2$ (3) = 1.26 | | Prob> $\chi2$ = | 0.7378 |
| Breusch-Pagan Test | $\chi2$ (3) = 4.438 | | Pr = | 0.2187 |

The above results point out that consumption expenditure has a negative and statistically significant effect on economic growth at one percent level of significance. Since the result is significant at 1 percent level of significance, null hypothesis is rejected at 1 percent level of significance. From the result, it means a 10 percent increase in consumption expenditure will lead to a 22.98 percent decrease in economic growth. This finding is consistent with the research expectation and gives some credibility to the policy advice given out by various international institutions such as World Bank and IMF. They recommend a cut in consumption expenditure other than investment expenditure in order to foster long term economic growth. It can be said that increased government consumption expenditure is usually at the expense of investment expenditure or the private sector's investment which in most cases leads to instances of reduced economic growth. Classical and Neoclassical theories consider consumption expenditure ineffective on the grounds of well known crowding – out phenomenon, that is, when public goods are substituted for private goods, this leads to lower private spending on education, health, transportation and other goods and services. As the governments borrow heavily to fund spending, pressure in the credit market results in higher interest rates which discourages private investment.

In contrast, according to Keynesian macroeconomic thought, government consumption expenditure can contribute positively to economic growth by injecting purchasing power into the economy. Hence, an increase in the government consumption expenditure might lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand (Romer, 1996). As a result, government spending augments the aggregate demand, which stimulates an increased output depending on expenditure multipliers. Those who oppose this approach say that government consumption crowds-out private investment, that is, increase in consumption spending is likely to reduce growth rate given that in order to finance them, higher taxes must be introduced which has a negative effect on investment decisions by the private sector and therefore on economic growth. This slows down economic growth in the short-run and diminishes capital accumulation in the long-run.

With regard to government consumption spending, the results of this study agree with the findings obtained by researchers like Barro (1991), and Kalio (2000). Kalio examined the effect of government consumption expenditure on GDP growth using the OLS method and time series data for Kenya and concluded that countries with high shares of this spending in their GDP grow slower than others. In contrast Josaphat and Oliver (2000) and Kweka and Morrissey (1999) found the relationship to be positive in Tanzania which they associated with increased private consumption. However, Lin (1994) while using a panel data analysis for the period 1960-1985 on 62 countries, both developing and developed economies, obtained mixed results, that is, government consumption was insignificant in developed economies, but significantly positive in developing countries.

Population is significant at the five percent level of significance and negatively related to real GDP growth. That implies 10% increase in population will result to about 25% decrease in economic growth. Terms of trade, openness and total government expenditure were insignificant at any conventional level of significance. Considering the coefficient of determination (adjusted $R^2$), it indicates that 30 percent of the variation in economic growth is explained within the model.

A modified Wald test was carried out to test for heteroskedasticity. From above result (0.7378) the null hypothesis is accepted hence no heteroskedasticity. The p-value is above 0.05 and as such it is not significant hence revealing that heteroscedasticity is not a problem. Contemporaneous correlation was tested using Breusch-Pagan Lagrange Multiplier test of independence. The p-value is greater than 0.05 (0.2178) and therefore not significant at five percent level of significance. From the result, cross-sectional dependence/ contemporaneous correlation is not a problem. Durbin Watson is equal to 1.9, implying the auto correlation is not a problem. The F test result indicates that all independent variables have explanatory power jointly on the dependent variable at 1 % level of significance. The study used Wooldridge test for autocorrelation in panel data. The null is no serial correlation (0.0761). From the result, the p-value is greater than 0.05, the study fails to reject the null hypothesis and conclude that the data does not have first-order autocorrelation.

### 4.4.3 Effect of Human Capital Expenditure on Economic Growth

The results on effect of human capital expenditure (HgY) on economic growth can be seen on Table 4.7.

**Table 4.7 Effect of Human capital on Economic Growth**

| Variable | Coefficient | Standard error | t-Statistics | p-value |
|---|---|---|---|---|
| Constant | 4.174 | 1.438 | 2.903 | 0.005 |
| DlnHgY | 0.532 | 0.302 | 1.76 | 0.220 |
| DlnTgY | 0.618 | 0.183 | 3.37 | 0.078 |
| DlnTOT | -1.414 | 0.989 | -1.43 | 0.289 |
| DlnOPEN | 0.979 | 0.392 | 2.50 | 0.063 |
| DlnPGR | -2.395 | 0.094 | -25.42 | 0.002 |
| Goodness of Fit Test | | $R^2$ = 0.325206 | Adjusted $R^2$ = 0.269634 | |
| F(7,85) = 5.852046 | | P-value(F) =0.000015 | Durbin.W = 1.812974 | |
| Wooldridge Test | | F( 1,2) = 10.035 | Prob > F = 0.0869 | |
| Modified Wald Test | | $\chi2$ (3) = 1.39 | Prob> $\chi2$ = 0.7077 | |
| Breusch-Pagan Test | | $\chi2$ (3) = 4.518 | Pr = 0.2107 | |

From the regression results the coefficient of human capital is positive as expected but statistically insignificant at any conventional level. East Africa has made large strides in raising literacy levels and school enrolments and improving health (Appleton and Teal, 1998). However, in the case of both education and health, these gains are lower than those in

other developing countries. Human capital is only one factor accounting for differences in growth rates across countries. While low starting levels of human capital may have hindered East Africa's economic growth, its poor performance cannot be attributed to a lack of subsequent investment in human capital. A possible explanation is the low level of government spending in investment expenditure (infrastructure). Low rates of investment in physical capital have implications for the rates of return on human capital, particularly education (Appleton and Teal, 1998). Moreover, Rajkumar and Swaroop (2008) say that in 'very corrupt' countries with a very inefficient bureaucracy, public health spending will be ineffective at the margin. Thus, government spending on health and education is less likely to lead to better outcomes if countries have poor governance, which is, on average, a characteristic of developing countries (Rajkumar and Swaroop, 2008).

This finding conforms to the findings by Loto (2011) and Knight *et al.* (1996) but contrasts those by Gemmell (2001) and Devarajan *et al*. (1993) for 140 OECD countries. According to Morrissey and Kweka (1999) Josaphat and Oliver (2000) on their study on Tanzania, expenditure on human capital investment was insignificant in the regressions, probably because effects from education sector would have very long lags.

Effect of total government expenditure on real GDP growth is positively related and significant at 10 percent level of significance, suggesting that the productivity of government spending exceeds the deadweight loss associated with the tax used to pay for it. This implies that 10 percent increase in total expenditure will lead to a 6.2 percent increase in economic growth. If appropriately managed and utilised, total government spending has significant positive effect on economic growth, especially in less developed countries where there exists inadequate infrastructural facilities and where the private sector is not developed enough to play its expected role in the economy. The advantages of increased government spending include: The use of fiscal policies like income taxes and transfer payments which can lead to more equitable redistribution of income; The supply of pure public goods which may constitute a sizeable component of aggregate demand; Government often acts as facilitator in the markets with imperfect information. In most studies, total government expenditures have a negative effect on growth (Romer, 1990). This was to be expected as

our earlier results confirm the need to try and decompose government spending. In contrast, Gregorious and Ghosh (2007) found positive relationship between total expenditure and economic growth. This was used as a control for the level effect of public expenditure because the study was basically interested in examining the relationship between composition of expenditure and growth.

Openness is statistically significant at 10% level of significance and positively related to economic growth. That implies that 10% increase in openness will result to 9.79% increase in economic growth. Trade openness brings competition into the domestic market, encourages redistribution of skilled workers to trade related activities and reduces opportunities for rent seeking. The same point has been stressed in Murphy *et al.* (1991) as well. Engaging in International trade requires conforming to international standards and knowledge of foreign markets which only educated labour can possess.The increased competition from trade also compels domestic producers to invest in new technologies which expand the knowledge base of the economy. Trade encourages exchange of ideas and technologies which implies that the developing countries like Kenya, Uganda and Tanzania can have access to superior technologies. The effect of population growth on economic growth reveals that it is negatively related to real GDP and significant at 1 percent level of significance.

The adjusted $R^2$ is 0.27 implying that 27 percent of the variations of the dependent variable are explained by the explanatory variables in the model. The F stastic test result reveals that the null hypothesis is rejected and a conclusion made that the estimators are non zero and therefore are simulataneously significant at 1 percent level of significance. Durbin-Watson result is 1.8, implying serial correlation is not a problem. The study used Wooldridge test for autocorrelation in panel data. The null is no serial correlation (0.0869). The study accepts null hypothesis and conclude that the data does not have first-order autocorrelation. From above result (0.7077) heteroscedasticity is not a problem. From the result on Table 4.7, cross-sectional dependence/ contemporaneous correlation is not a problem.

### 4.5 Classification by Functional Expenditure

In this section, the study considers functional classification of government spending and estimates its effects on economic growth. Those sectors are expenditures on health, education, defense and agriculture. It is appropriate to disaggregate government expenditure further into four categories, since growth effects of government expenditure vary across its different components. All variables were transformed into logs for easy interpretation.

#### 4.5.1 Effect of Health Expenditure on Economic Growth

Table 4.8 presents the results on effect of health expenditure (HeaY) on economic growth.

**Table 4.8 Effect of Health Expenditure on Economic Growth**

| Variable | Coefficient | Standard error | t- Statistics | p- value |
|---|---|---|---|---|
| Constant | 4.336 | 1.446 | 3.00 | 0.0035 |
| DlnHeaY | 0.746 | 0.079 | 9.40 | 0.011 |
| DlnTgY | 0.561 | 0.164 | 3.43 | 0.076 |
| DlnTOT | -1.464 | 0.873 | -1.68 | 0.235 |
| DlnOPEN | 0.777 | 0.457 | 1.70 | 0.231 |
| DlnPGR | -2.624 | 0.351 | -7.48 | 0.017 |
| Goodness of Fit Test | $R^2$ = 0.325352 | | Adjusted $R^2$ = 0.269792 | |
| F(7,85)= 5.855935 | P-value(F)= 0.000015 | | D.W = 1.831629 | |
| Wooldridge Test | F( 1,2) = 9.436 | | Prob > F = 0.0916 | |
| Modified Wald Test | $\chi2$ (3) = 1.54 | | Prob> $\chi2$ = 0.6730 | |
| Breusch-Pagan Test | $\chi2$ (3) = 4.538 | | Pr = 0.2089 | |

The findings showed that government expenditure on health has a positive and stastically significant effect on economic growth at 5 percent level of significance. This implies that a 10 percentage increase in expenditure on health the sector will increase real gross domestic product by about 7.5%. The findings show that public expenditure on health is critical in enhancing economic growth. This is because a healthy population is productive, which is necessary in increasing both the industrial and the agricultural production. The improvements in health programmes brings about an increase in the preference for smaller families, which, together with better provision of family planning services, helps to deal with the population problems in many developing countries. The same is expected to happen by switching spending from expensive curative health care systems to preventive systems.

These findings are consistent with the findings by Fan and Rao (2003) and Loto (2011) that found spending on health had a positive effect on economic growth but seem to contrast those of Kalio (2000) and Devarajan *et al.* (1993). The study recommends increased expenditure on health as one of the key pillars of economic growth for East Africa.

Population growth is statistically significant at 5 % level of significance; hence a 10 percent increase in population will lead to a 26% decline in economic growth. The coefficient of determination (adjusted $R^2$) shows that 27% of the dependant variable is explained within the model. The F test result indicates that all the independent variables have explanatory power at 1% level of significance. The study used Wooldridge test for autocorrelation in panel data. The study concludes that the data does not have first-order autocorrelation. The value for Durbin-Watson is equal to 1.8, implying auto correlation is not a problem. From above result heteroscedasticity and contemporaneous correlation are not a problem.

### 4.5.2 Effect of Education Expenditure on Economic Growth

Table 4.9 presents the result on effect of education expenditure (EduY) on economic growth.

**Table 4.9 Effect of Education Expenditure on Economic Growth**

| Variable | Coefficient | Standard error | t- Statistics | P-value |
|---|---|---|---|---|
| Constant | 4.058 | 1.437 | 2.82 | 0.0059 |
| DlnEduY | 0.318 | 0.238 | 1.33 | 0.315 |
| DlnTgY | 0.757 | 0.165 | 4.60 | 0.044 |
| DlnTOT | -1.288 | 0.978 | -1.32 | 0.319 |
| DlnOPEN | 0.994 | 0.385 | 2.58 | 0.123 |
| DlnPGR | -2.358 | 0.134 | -17. 64 | 0.003 |
| Goodness of Fit Test | $R^2$ = 0.325565 | | Adjusted $R^2$ = 0.270024 | |
| F(7,85) = 5.861637 | P-value(F) = 0.000014 | | Durbin.W = 1.934719 | |
| Wooldridge Test | F( 1,2) = 10.428 | | Prob > F = 0.0840 | |
| Modified Wald Test | $\chi2$ (3) = 1.51 | | Prob> $\chi2$ = 0.6806 | |
| Breusch-Pagan Test | $\chi2$ (3) = 4.347 | | Pr = 0.2264 | |

It is evident from Table 4.9 that education expenditure is insignificant at any conventional level of significance. From the findings, education expenditure is positively related to economic growth. Theoretically, education expenditure should boost economic growth. There are other factors also such as the country's institutional structure which determines

whether investments in education sector will affect growth significantly or not. The reason for insignificance could be that, compared to other sectors, it takes a longer time for education expenditure to affect growth because of long time of schooling especially in East Africa (Kenya 8-4-4, Tanzania7-4-2-3 and Uganda 7-6-3), the teacher-pupil ratio, which is often used as an index of efficiency of an education system had deteriorated at all levels of education. In addition, fewer development funds are allocated to the educational sector. Moreover, East Africa has faced numerous challenges in trying to make education accessible to all, especially primary school education. These challenges include cost of education and inequity in access, under-enrollment and school drop-out. Finally, it can be due to poor governance and high levels of corruption (KNBS, 2010).

These findings are consistent with the findings by Korman and Bratimasrene (2007), and Niloy *et al.* (2003), but contrast with those by Donald and Shuanglin (1993) and Gupta *et al*. (2002). Korman and Bratimasrene (2007) and Niloy *et al.* (2003) showed that spending on education had a negative and insignificant relationship with economic growth (attributed to brain drain). This result may imply that a finer disaggregation is required for education as exemplified in Davarajan *et al.* (1993) who found that spending on subsidiary services to education (for example food, medical and transportation) and program units engaged in teaching methods and investments in programs aimed at improving teaching and research methods affect economic growth positively. Fiszbein and Psacharopoulos (1993), conducted a study to assess the effects of education investments in Venezuela and found that primary education investments have the highest effects on growth whereas higher education investments exhibits the lowest returns among the three levels of education. This is mainly due to the fact that the high costs of university education offsets the benefits accrued from a university degree.

Population growth was negatively related to economic growth and statistically significant at 1% level of significance. The study concludes that higher population growth will lower the real GDP growth as well as pull the economy in these countries down. Total government expenditure was positively related to economic growth and significant at 5% level of significance. The adjusted $R^2$ is 0.27, implying that 27 percent of the variation of the

dependant variable is jointly explained by the independent variables in the model. The F test results conclude that all the variables are non zero and as a result the independent variables have joint explanatory power at 1% level of significance. Durbin Watson is equal to 1.9, implying auto correlation might not be a problem. From Table 4.9 result, the p-value is greater than 0.05, the study fails to reject the null hypothesis and conclude that the data does not have first-order autocorrelation. From the above result heteroskedasticity and contemporaneous correlation were tested and found not to be a problem.

### 4.5.3 Effect of Defense Expenditure on Economic Growth

Table 4.10 presents results on effect of defence expenditure (DefY) on economic growth.

**Table 4.10 Effect of Defense Expenditure on Economic Growth**

| Variable | Coefficient | Standard error | t statistics | P-value |
|---|---|---|---|---|
| Constant | 4.476 | 1.406 | 3.18 | 0.002 |
| DlnDefY | 0.719 | 0.388 | 1.86 | 0.068 |
| DlnTgY | 0.512 | 0.342 | 1.49 | 0.274 |
| DlnTOT | -1.304 | 0.893 | -1.46 | 0.282 |
| DlnOPEN | 0.952 | 0.479 | 1.99 | 0.051 |
| DlnPGR | -2.470 | 0.241 | -10.25 | 0.009 |
| Goodness of Fit Test | $R^2 = 0.361031$ | | Adjusted$R^2 = 0.308410$ | |
| F(7,85) = 6.860966 | P-value(F) = 1.84e-06 | | Durbin-Watson = 1.853832 | |
| Wooldridge Test | F( 1,2) = 10.666 | | Prob > F = 0.0823 | |
| Modified Wald Test | $\chi2$ (3) = 0.96 | | Prob> $\chi2$ = 0.8101 | |
| Breusch-Pagan Test | $\chi2$ (3) = 3.829 | | Pr = 0.2805 | |

Defense expenditure in East Africa is positive and statistically significant at 10 % level of significance. This implies that a 10 % increase in defense expenditure will lead to a 7.2 % increase in economic growth. Investment in the form of national defense is a necessity for safeguarding and protecting the nation from outside aggression. It also increases investors' confidence through increased security and stability. Defense expenditure, which is an integral part of government expenditure, serves as an injection to the economy, and as such could positively stimulate the demand in the economy. The increase in any of the aggregate demand variables will increase the capital stock in the society, which will lead to high profits and may induce high investments, thus generating short-run positive effects and higher growth rates on the aggregate economy. A more plausible argument is that defence

expenditure stimulates economic growth through various kinds of 'spillover effects' on civilian production, as argued in detail in Benoit's study (Lai *et al.,* 2002). For instance, research and development for defence purposes often has civilian applications. However, military expenditure in developing countries may have other types of spillover effects such as of military infrastructure by civilians (e.g. roads and satellites) and the role of the army in providing disaster relief. Lai *et al.* (2002) examines the linkages between balanced economic growth and defence expenditure using endogenous growth model that captures demand side factors as well as supply side factors. The results show that when an economy spends more on its defense, it enjoys a high growth rate. The result is consistent with Benoit's (1978) findings that high defence spending leads to high economic growth. Most studies have found that defense expenditure can influence an economy both positively and negatively. For example, defence expenditure can affect an economy positively through an expansion of aggregate demand or through increased security, (Fan and Rao, 2003) and Lai *et al.,* 2002); and negatively through a crowding out of investment (Tomori and Adebiyi, 2002) and (Husnain *et al.,* 2011).

Terms of trade are negatively related to economic growth but insignificant at any conventional level of significance. Terms of trade control for the effects of external sector activities. In this study, terms of trade is used as a control variable to see whether countries that absorb more foreign trade have greater economic performance than the countries that trade less. For example, if export prices are rising relative to import prices (i.e. the terms of trade are improving), then the income accruing to producers is increasing, and for a given volume of exports, a larger volume of imports can be purchased. Thus, a high ratio of terms of trade will accelerate economic growth. Morley (1992) examined stabilisation programs in least developed countries using panel data and found that the terms of trade had a significant positive impact on investment and output. However, this is not the case for East Africa since they are primary product exporters and prices for exports are extremely volatile. At the global level, the dependence of East Africa on agricultural exports creates many problems because the demand for these products tends to be both income and price inelastic. As a result, the growth rate of export earnings is held at a relatively low level due to price fluctuations. Population growth was found to be statistically significant at 1% level of

significance. This implies a 10% increase in population leads to a 25% decrease in economic growth. Openness was found to be significant at ten percent level of significance. Total government expenditure is insignificant at any conventional level of significance. Adjusted $R^2$ is 0.31, implying that 31% of the dependent variable is explained by the explanatory variables within the model.

Durbin Watson is equal to 1.8, implying serial correlation is not a problem. The F test result indicates that all the independent variables have explanatory power at 1 percent level of significance. Serial correlation causes the standard errors of the coefficients to be smaller than they actually are and higher R-squared. The study used Wooldridge test for autocorrelation in panel data. The null is no serial correlation (0.0823). From Table 4.10 result, the p-value is greater than 0.05, the study fails to reject the null hypothesis and conclude that the data does not have first-order autocorrelation. A modified Wald test was carried out to test for heteroskedasticity and from the result heteroskedasticity is not a problem. Contemporaneous correlation was tested using (B-P/LM) test of independence and from the result cross-sectional dependence/ contemporaneous correlation is not a problem.

### 4.5.4 Effect of Agricultural Expenditure on Economic Growth

Table 4.11 presents the results of the effect of agricultural expenditure (AgrY) on economic growth.

**Table 4.11 Effect of Agricultural Expenditure on Economic Growth**

| Variable | Coefficient | Standard error | t- Statistics | p-value |
|---|---|---|---|---|
| Constant | 4.107 | 1.417 | 2.90 | 0.0048 |
| DlnAgrY | 0.094 | 0.336 | 0.28 | 0.805 |
| DlnTgY | 0.874 | 0.528 | 1.66 | 0.240 |
| DlnTOT | -1.052 | 0.773 | -1.36 | 0.307 |
| DlnOPEN | 0.948 | 0.402 | 2.36 | 0.143 |
| DlnPGR | -2.388 | 0.529 | -4.514 | 0.000 |
| Goodness of Fit Test | $R^2$ = 0.342391 | | Adjusted $R^2$ = 0.288235 | |
| F(7,85) = 6.322307 | P-value(F) = 5.51e-06 | | Durbin.W = 1.809939 | |
| Wooldridge Test | F( 1,2) = 10.660 | | Prob > F = 0.0824 | |
| Modified Wald Test | $\chi2$ (3) = 1.76 | | Prob> $\chi2$ = 0.6236 | |
| Breusch-Pagan Test | $\chi2$ (3) = 4.184 | | Pr = 0.2422 | |

Expenditure on agriculture was found to have a positive effect on economic growth but insignificant at any conventional level of significance. This insignificance can be attributed to poor funding of this sector. On average, none of the EAC countries spends more than 5% of total government expenditure on the agriculture sector (EAC, 2011). Agriculture is the most important sector in the EAC economies given its contribution to employment, foreign exchange, food, and its linkages with other sectors of the economy. Indeed, the sector's performance directly mirrors that of the overall economy. In the last ten years or so, the performance of the sector has been steadily declining, especially in Kenya, culminating in a negative growth rate in 2000 (Nyangito *et al.,* 2004). It is possible to argue that agriculture has less to explain in GDP growth in EAC probably because the economies are highly dependent on labour intensive agricultural sector which in turn depends on vagaries of nature (availability of rain fall). Declining agricultural growth has been identified as a major determinant of poverty in these countries. For the Agricultural sector, the declining performance can be attributed to low government spending especially in infrastructure, research and extension which culminates in low factor productivity growth (Nyangito *et al.,* 2004).

This positive relationship of Agricultural spending with GDP growth is within the precinct of economic theory and especially for East Africa countries which are mainly agricultural. Agriculture, in the form of food security is a necessity for human existence. In developing countries, it is almost always the foundation and backbone of the economy since most people relies on it for food, income and employment. As farmers' incomes rise, so does their demand both for farm inputs and services, and for non-farm goods. Increased agricultural production also leads to increased demand for processing facilities. The need to commercialise the agriculture goods, to provide financial support through loans and subsidies, and to modernise the tools and techniques used in this sector have been among the most pressing issues. This finding is in agreement with the findings by Kalio (2000). But the findings contrasted with a similar study carried out in Kenya by Mudaki and Masaviru (2012) from1978 to 2008 and Loto (2011) who found government spending on agriculture to have a negative and significant effect on economic growth.

Openness was found to be positively related to economic growth but insignificant at any conventional level of significance. In addition, the openness variable was introduced based on the fact that in most of the selected countries growth has occurred in connection with export-led development strategies. The most basic measure of openness is the simple trade shares, which is exports plus imports divided by GDP. A large number of studies used trade shares in GDP and found, as reviewed in Harrison (1996), openness had a positive and strong relationship with economic growth. Trade openness brings competition into the domestic market, encourages redistribution of skilled workers on trade related activities and reduces opportunities for rent seeking. Engaging in International trade requires conforming to international standards and knowledge of foreign markets which only educated labour can possess. The increased competition from trade also compels domestic producers to invest in new technologies which expand the knowledge base of the economy. Trade encourages exchange of ideas and technologies which implies that the developing countries like Kenya, Uganda and Tanzania can have access to superior technologies. This implies that export in EAC remains unproductive. The countries continue to export the same primary commodities as they did for many years while world prices are on a declining trend. Therefore, the main reason that constrain exports from playing their role in promoting growth probably lies on failure of the countries in bringing about a structural transformation that would have broaden the export base ( Teshome, 2006). On the very model, population growth was also found to be significant at 1% level of significance. Adjusted $R^2$ is 0.29, implying that explanatory variables explains 29% of the dependent variable. The F test result reveals that independent variables have explanatory power on the explained variable at 1 % level of significance.

A modified Wald test was carried out to test for heteroskedasticity and from the result heteroskedasticity is not a problem. Contemporaneous correlation was tested using (B-P/LM) test of independence and from the result cross-sectional dependence/ contemporaneous correlation is not a problem. The study used Wooldridge test for autocorrelation in panel data. The null is no serial correlation (0.0824). From Table 4.11 result, the p-value is greater than 0.05, the study fails to reject the null hypothesis and conclude that the data does not have first-order autocorrelation. Durbin Watson is equal to 1.8, implies autocorrelation may not be a pr

# CHAPTER FIVE

# CONCLUSION AND POLICY RECOMMENDATIONS

## 5.1 Conclusion

Economic growth, which can be defined as sustainable growth in real GDP, is the overriding objective of East African countries in their effort to minimise poverty levels and achieve sustainable economic development. Fiscal instruments are deemed to be essential in creating opportunities for widening the base at which developing countries could grow. Among fiscal instruments, government spending, which is the focus of this study, is very important for these countries. It follows that to achieve accelerated economic growth and sustainable development, government spending should be such that it creates a conducive environment for the private sector development and repairs market failures. In this case, the empirical study of the effects of government spending on economic growth has paramount importance to draw important policy implications.

This study has determined the effects of different components of government expenditure on the real GDP growth rate in a set of East African countries over the period 1980 - 2010. Government spending was disaggregated because the literature shows that some categories of it are more likely to have a significant effect on growth than others. The study then proceeded to use recent developments in econometrics by employing balanced fixed panel data analysis to analyse some of the important variables affecting real GDP growth in East Africa. The resultant model appears robust and can be used to draw some important policy recommendations for the economies of East Africa and other developing economies.

Heteroskedasticity, serial correlation, Hausman test and cross sectional dependence/ contemporaneous correlation were tested before estimation and corrected accordingly. The study employed Levin-Lin-Chu (LLC, 2002) test to test for panel unit root and found that the variables were stationary at first difference except real GDP and investment expenditure that are stationary at their level. The joint effect of some components of government expenditure on economic growth is statistically significant as indicated by the computed F-

Statistic and its probability. Therefore, the study submits that there is a relationship between most components of government expenditure and economic growth, and that the former exerts significant effect on the latter.

The results reveal that spending on health, defense and investment should be a priority for a government interested in promoting economic growth. Conversely, government expenditure on education, agriculture and consumption spending may not translate into sustainable economic growth since they will affect mainly the demand side of the economy. However, one should be careful to draw strong conclusions since some studies conclude that education is an important factor in economic growth. On the one hand, consumption expenditure seems to have a strong negative effect on growth, suggesting that the composition of this expenditure category needs to be re-examined with a view to re-organising it so that it contributes to economic growth. Neoclassicals theories considers consumption spending ineffective on the grounds of the crowding-out effects, that is, when public goods are substituted for private goods, this causes lower private spending on education, health, transportation and other goods and services.

The results further suggest that boosting government investment can enhance its complementarity role with private investment and economic growth. The governments should increase its own investment in areas that are beneficial to the private sector and move away from those that compete with or crowd it out. In the same vein, any austerity measures aimed at reducing government expenditure should not be achieved by budgetary cuts on development budget, as is often the case in East Africa, for this reduces government investment. Consistent with theoretical prediction, consumption expenditure has negative effects while investment expenditure has positive effects on economic growth. Reducing consumption expenditure to prop up government investment is a policy recommendation worthy pursuing.

With respect to government spending on education, agricultre and human capital, this study expected to find a positive and significant effect on growth. However, most of the results were not significant. Perhaps one of the reasons of this finding has something to do with

poor governance and high levels of corruption, features that tend to be more common in less developed countries, like the ones considered in this study, than in rich countries. Moreover, the full impact of public spending on education is likely to take longer time periods than the time considered under this study. In addition, it may largely depend on the budget allocation to the concerned sectors. Other challenges include high cost of education, a high student to teacher ratio, under-enrollment and school drop-out. For agricultural sector, the poor performance can be attributed to low government spending especially in infrastructure, research and extension which culminates to low factor productivity growth.

Population growth and overpopulation hinders the growth output per worker. The important factor to this theory is Malthusian (Malthus, 1826) diminishing returns to labour, as the stock of capital, including land, does not increase in the same proportion as labour. Another important factor is the dependency effect, which suggests that saving is more difficult for households when there are more children and that higher fertility causes social investment funds to be diverted away from high-productivity uses. These factors seem to suggest that high fertility, and, more importantly, increasing population growth in EAC creates a negative effect on output per worker and on the broader aspect, it creates negative economic growth. On the macroeconomic level, it is more believable to argue that population does undermine a nation's economy because an increase in the number of people leads to an increase of the number of mouths to feed. Other negative effects of population growth and, specifically, overpopulation include poverty caused by low income per capita, famine, and disease.

This study finds that more open EAC countries indeed have experienced faster economic growth. Murphy *et al.* ( 1991) notes that past studies have suggested that countries that are more open to the rest of the world are better able to absorb the rapid technological advances of leading nations. If the costs of technological imitation are lower than the costs of internally developed innovations, then a poorer country will grow faster than a more developed one. This faster rate of growth will continue so long as that country remains open to capturing new ideas until, at some point, equilibrium is reached and the rate of growth slows.

## 5.2 Policy Recommendations

From a policy standpoint, these findings suggest that East Africa countries should increase government expenditure on health, which can enhance human capital formation, and on defence, which is closely associated with expenditure on security and aggregate demand. Agricultural expenditure should also be increased for the sake of economic growth enhancing and food security. On investment expenditure, this instrument of fiscal policy promotes economic growth in the sense that public investment contributes to capital accumulation. In addition, the government can employ better financial management and try to fight graft. However, to increase spending on these sectors, governments should also reduce expenditure on other categories given the presence of a budget constraint. A reallocation of government spending like the above-mentioned, giving more preference to more productive sectors is not only critical for boosting growth, but also for achieving more sustained fiscal adjustments (Gupta *et al*., 2004).

The study cautions the adoption of reduced government spending on consumption expenditure which was found to be a negative determinant of economic growth. According to the Keynesian macroeconomic thought, government expenditure can contribute positively to growth by injecting purchasing power into the economy. Hence, an increase in the government consumption is likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. Governemt expenditures on human capital, agriculture and education were found to be insignificant. The study infers that inadequate amount of resources allocated to these sectors, insufficient investments and inefficiencies, inadequate factor productivity growth, slow adoption of technology and corruption in these areas led to this adverse finding. However, the study resorted to economic theory to recommend increased spending in these sectors which are important pillars of the economy. In addititon, they improve food security and labour productivity in these economies.

Mauro (1998) points out that corruption negatively affects investment and economic growth, and also changes the composition of public expenditure. In the education sector, opportunities to collect bribes may be abundant in the procurement of physical infrastructure

and state-of the-art school equipment but more limited in the payment of teachers' and lecturers' salaries. Thus corruption may cause a less-than-optimal composition of government expenditure, reducing the share of education and perhaps health spending as well, and increasing capital expenditure, on which corrupt governments can benefit easier. In macro-economic theory, investments in the education sector and reforms affect the growth of labour productivity. First of all, for education reforms, governments need to build infrastructure in the education sector such as schools and universities. The second solution is increasing knowledge and skill of teachers and lecturers by issuing scholarships and sending them to study in advanced countries. The main reason for this policy is to transfer knowledge and technology from advanced countries to East Africa.

In addition, the quality of government expenditure should be taken into account more accurately in connection with the governance variable, in light of recent results showing that governance can largely explain differences in the impact of public spending on human development indicators (Swaroop and Rajkumar, 2008). Finally, government has a bigger responsibility in creating a stable and conducive economic and political environment, building general consensus and mobilizing its people in development endeavours if the country has to direct itself on a long-run growth path. This study finds that more open EAC countries indeed have experienced faster economic growth. This faster rate of growth will continue so long as that country remains open to capturing new ideas until, at some point, equilibrium is reached and the rate of growth slows. Higher population growth can be detrimental to the productivity and economic growth of East African countries. Hence need for these countries to control population growth.

## 5.3 Areas of Further Research

From the findings of this study, it is important to explore further what portfolio of government outlays are ideal for growth to support resource constrained governments on optimal resource allocation and prioritization of expenditure. Important is the need for further disaggregation of the data in education and agricultural sector. This result may imply that a finer disaggregation is required for education as exemplified in Davarajan *et al.* (1993) who found that spending on subsidiary services to education (for example food, medical and transportation) and program units engaged in teaching methods and investments in programs aimed at improving teaching and research methods affect economic growth positively. There is need for further sectoral disaggregation into capital and recurrent government expenditure for deeper policy presciption.

Given the small size of the sample, it is also important to extend the analysis to cover a wide region such as Sub Saharan Africa economies in order to test the robustness of the results. In particular, introducing a comparison group including good performers in terms of real GDP growth who would allow the study to explore further the extent to which government expenditure contributes to growth, and whether there are clear differences between fast and slow-growing economies.

Finally, although the focus of this research was solely on measuring the effect of government expenditure on growth, an important issue to address in future studies is what determines governments' budget allocation for various sectors and in particular, the role of demographic factors and the nature of the political process. Thus, an important avenue for future research could be to extend our growth regression framework so as to account for the effect of government spending choices.

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