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

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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 examining the relationship between expenditure and economic growth show conflicting results and mainly focus on aggregate expenditure. Hence this study focused on disaggregated expenditure over the period from 1980 to 2010. The objective of the study was to establish these expenditures that have effects on growth using balanced panel fixed effect model. Employing LLC test, this study tested for panel unit root and found that only GDP was stationary at level. The findings showed that expenditures on health and defense to be positive and statistically significant effect on growth. In contrast, education and agriculture expenditure were insignificant. This study suggests that for East Africa, the policy of increasing spending on health and defence budget to promote economic growth will be appropriate, but fewer funds should be channeled towards other sectors.

Key words: Government expenditure, Economic Growth, East Africa, Disaggregated

1 Introduction

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).

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).

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). 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 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). Consequently, due to lack of sufficient revenue, there is a need to categorise productive and non-productive government expenditure for East Africa in order to reduce the non-productive expenditure.

1.1 Economic Growth and Sectoral Expenditure Trends

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. 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). Uganda is landlocked, Tanzania is actively exploiting natural resources (gold), and two have resources on stream (Uganda, Kenya) (EAC, 2011).

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. 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. 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). 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 (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).

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). Defence expenditure (% of GDP) in Tanzania was 1.07 as of 2011. But its highest value over the past 23 years was 2.38 in 1989 and lowest 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, its highest value over the past 23 years was 3.00 in 1988, while its lowest value was 1.18 in 1999 (KNBS, 2012). For Uganda, its highest value over the past 23 years was 3.87 in 1988, while its lowest value was 1.63 in 2011 (UBOS, 2013). 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). 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. 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).

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. 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. Finally, 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.

2 LITERATURE AND THEORETICAL REVIEW

2.1 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. 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 (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 (Husnain *et al.*, 2011).

Determination of total government expenditure and its patterns is complex and may include many factors, such as fiscal conditions and political, cultural, demographic and economic factors. 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).

2.2 Expenditure Growth Models

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).

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.

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

$$RGDP = \alpha + \beta G - \delta G^2 + \gamma T \quad (2.0)$$

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).

2.3 Empirical Literature

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

$$g = \alpha_0 + \alpha_1 E + \alpha_2 H + \alpha_3 S + \alpha_4 A + \alpha_5 T + \mu \quad (2.1)$$

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.

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.

Kalio (2000) examined the effect of different components of government expenditures on GDP growth using OLS method for a sample of time data (1970-1992) on Kenya. The study concluded that government expenditure on education, defence, and agriculture had a positive effect on GDP growth and that of health and transport and communication were negatively related to economic growth. 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).

1. MATERIALS AND METHODS

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. 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. Building on Lin (1994), a simple growth model in which total expenditure is disaggregated into expenditure on health, education, defence and agriculture 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.

μ_i – country fixed effects

ν_t – time fixed effects

$\mathcal{E}_{i,t}$ – is the error term.

RGDPG = f (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 Edu - education, Def - defence, Hea - health and Agr - agricultural expenditure.

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

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.

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 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 (Agriculture, Health and Education) would have a positive sign, implying that they are productive expenditure. But defence was 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. 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. 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 positively.

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:

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

This study adopted Levin-Lin-Chu (2002) technique to verify the presence of unit root. Following Engel and Granger, the study attempted to determine whether long-run relationship exist between the variables. 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. 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.

2. RESULTS AND DISCUSSIONS

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 1, the results reveal that all the variables are non-stationary at level except real GDP. However, they become stationary after the first difference implying that the variables are integrated of order one, I (1).

But from the results in Table 1, 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. The Hausman (1978) test was applied to underpin the application of the balanced panel fixed effects model in this analysis. From the result, p-value is 0.0329, hence the null hypothesis is rejected and the fixed effect model is selected.

It is appropriate to disaggregate government expenditure further into four categories, since growth effects of government expenditure vary across its different components. The study uses openness, terms of trade, population and total government expenditure as the control variables. Thus, the model to be estimated was specified in logarithim form as:

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

The findings (Table 2) 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.

It is evident from Table 2 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. 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.

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. 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).

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. 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). 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. 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.

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. 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.

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. 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.

Effect of total government expenditure on real GDP growth is positively related and significant at 1 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 8 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. In most studies, total government expenditures have a negative effect on growth (Romer, 1990). 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 was found to be positively related to economic growth but insignificant at any conventional level of significance. 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. 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 and failure of the countries in bringing about a structural transformation that would have broaden the export base (Teshome, 2006). The adjusted R^2 is 0.31 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.

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 2 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 2 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.

3. CONCLUSION AND POLICY RECOMMENDATIONS

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.

The results reveal that spending on health and defense should be a priority for a government interested in promoting economic growth. Conversely, government expenditure on education and agriculture 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. With respect to government spending on education and agriculture, 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.

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. 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.

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. From the result, agricultural and education expenditure need to be reduced. 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. 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). 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 and remain open.

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). 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. 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.

APPENDIX

Table 1 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)	_	_	_
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 2 Effect of Sectoral Expenditure on Economic Growth

Variable	Coefficient	Standard error	t- Statistics	p- value
Constant	4.476	1.406	3.18	0.002
DlnHeaY	0.746	0.279	2.67	0.033
DlnDefY	0.719	0.388	1.86	0.068
DlnAgrY	0.094	0.336	0.28	0.805
DlnEduY	0.318	0.238	1.33	0.315
DlnTgY	0.804	0.264	3.04	0.009
DlnTOT	-1.304	0.893	-1.46	0.282
DlnOPEN	0.777	0.457	1.70	0.231
DlnPGR	-2.388	0.529	-4.51	0.000
Goodness of Fit Test	R^2 = 0.361031		Adjusted R^2 = 0.308410	
F(7,85)= 5.855935	P-value(F)= 0.000015		D.W = 1.934719	
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	

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