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EFFECT OF GOVERNMENT EXPENDITURE ON ECONOMIC GROWTH IN COMESA COUNTRIES: DISAGGREGATED APPROACH

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ABSTRACT

Government expenditure contributes indirectly to economic growth by increasing the marginal productivity of both government and private supplied factors of production and also on research and development which provides higher productivity in the interaction between physical and human capital factors. However, owing to the fact that there are limited studies on government expenditure and economic growth, various studies indicate divergent views on the effect of government expenditure on economic growth. For this reason, it is not clear whether or not government expenditure affect economic growth in COMESA countries. The main objective of this study is to investigate the effect of Government expenditure on economic growth in COMESA countries. This study was modeled using the Endogenous growth theory and correlation research design will be adopted. Panel unit root test and Hausman Specification tests was conducted to assess whether to use the fixed effects or random effect panel estimation. Results revealed that Government final consumption expenditure had negative and statistically significant relationship with economic growth at five percent level, military expenditure had negative and statistically significant at 1 percent significant level and Capital stock in the study had positive and statistically significant relationship with economic growth at five percent level. The study thus recommends that governments in COMESA counties to embark on expansionary fiscal policies in the form of investing in infrastructure particularly infrastructure that would boost human capital, to increase its investments in areas that are beneficial to the private sector and eschew from those that compete with or crowd it out. Also the government in COMESA countries should increase its expenditures allocation to defense and public order and national security Governments should streamline its expenditures allocation to the debt servicing.Sample size consisted a panel data set of 9 COMESA countries for the period from 2003-2018 and secondary data was collected. A total of 144 observations.

1.0 INTRODUCTION

1.1 Background of the study

The nature of the impact of government expenditure on growth depends on its form. According to Barro (1990), expenditure on investment and productive activities including state owned production should contribute positively to growth, whereas government consumption expenditure is expected to be growth retarding. However, in empirical studies, it is sometimes difficult to determine which particular items of public expenditure should be categorized an investment and which as consumption.Several analytical and empirical studies have focused on the traditional and new channels through which different types of government expenditure can affect growth(King and Robelo,1990;Barro,1990,Barro and Sala-i-martin,1992;and 1995;Bleaney *et al*,2001).A direct effect relates to an increase in the economies capital stock (physical or human) reflecting higher flows of government funds, especially when they are complementary to those privately financed. Government expenditure in education and health, for example, contribute to an increase in the stock of human capital. Similarly, to the extent that they trigger accumulation of physical capital, most government expenditure on infrastructure falls in the category of having a direct impact on growth (Barro and Sala-i-Martin, 1992).

In addition, government expenditure can also contribute indirectly to economic growth by increasing the marginal productivity of both government and private supplied factors of production. Government expenditure on research and development, for example, provides higher productivity in the interaction between physical and human capital factors. similarly ,other components of government expenditure related to enforcement of property rights and maintenance of public order can exert positive indirect effect on growth by contributing to better use of existing capital and labour assets (Trotman,1997).In countries where crime and violence are endemic, increased government expenditure on security can lead to lower production costs by reducing the need to protect employees and the physical assets, hence increasing worker productivity and stimulating private physical investments.There is growing evidence that suggest that in developing countries, externalities associated with infrastructure expenditure may be Important in enhancing growth (Landau,1985).Indeed, it has been found that infrastructure may have an impact on human capital as well. According to Age'nor and Moreno (2007), government expenditure on infrastructure affects growth not only through its direct impact on investment and the productivity of factors in the private sector, but also through health and education outcomes. Government expenditure that facilitates access to clean water and sanitation helps to improve health and thereby labour productivity. These expenditures can be in the form of provision of electricity, which is essential for the functioning of hospitals and the delivery of health services, and better transportation networks, which contributes to easier access to health care, particularly in the rural areas. In addition, there is evidence of direct linkages between infrastructure and education. Education allows for more training and greater access to learning technologies. Enrollment rates and the quality of education tend to improve with better transportation networks, particularly in rural areas. Greater access to sanitation and clean water in schools tend to raise attendance rates (Stiglitz, 1989).

There are two traditional approaches used to analyze the effects of government expenditure on growth. One is the monetarist approach and the other is the Keynesian approach. Proponents of the monetarist approach led by Milton Friedman argued that sustained money growth in excess of the growth of output produces inflation (Branson,1989).The proponents re-evaluated the quantity theory of money argued that to reduce inflation, the growth in the money supply needs to be controlled and thus the need to control or reduce government expenditure(Brunner and Meltzer,1992).Proponent of this school of thought further argued that in examining the effects of disaggregated government expenditure on investment using fixed and random effect methods, tax financed government expenditure crowds out private investment (Ahmed,1999).This is because when is tax-financed, any extra expenditure calls for more taxation. A higher tax burden reduces the disposable income for individuals, which results to a reduction in consumption, lower savings and hence lower investment.

2.0 Literature Review

2.1 Introduction

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

Theoretical Framework

This study will use a modified version of Ram (1986) model and Maingi(2010) based on endogenous growth theory. The model was chosen because it captured most of the government expenditure variables, which could easily be disaggregated into various sectors. In addition, the model showed clearly how the expenditure by government externality effect on output in the other sector (private). Furthermore, the model was able to show the intersectoral productivity differentials of the government expenditure. The endogenous growth theory formed a basis for empirical models of government expenditure and growth. This is because growth could arise when capital and labour are augmented by additional government input in the production function. This input provides the link between government expenditure and economic growth. The model was derived from private sector output (D) and public sector output (G), with capital (K) and labour (L) allocated between both sectors such that K= KD +KG and L = LD + LG. To capture externalities associated with the public sector, G entered the production function of the private sector D:

D = D(KD,LD,G)…… (3.1)

G = G(KG,LG)…….(3.2)

Assuming a constant productivity differential between labour in both sectors:

GL = GK = (1+δ)……..……(3.3)

DL DK

Where δ> 0 implies lower productivity in the public sector (the reverse would be the case if δ < 0) and δ ≠ 0

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

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

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

Similarly, DL and GL were marginal product of factor L. further, DG was the marginal externality effect of public on private sector. From (3.3):

GL = (1 +δ)DL……...…(3.5)

Substituting (3.5) into (3.4) and rearranging:

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

Using (3.5) then:

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

This implied

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

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

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

……3.8

Assume the existence of a linear relationship between the marginal products of labour in each sector and the average output per unit of labour in the economy,

That is $D_L = \left(\frac{Y}{L} \right)$

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

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

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

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

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

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

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

:**Source derived: Maingi (2010)**

where equation (3.10) corresponded to Ram (1986) equation. Thus, equation (3.10) formed the basic model for regression estimation. The theoretical framework presented above predicts that economic growth $\left(\frac{dY}{Y}\right)$ responds to the ratio of gross investment (I) to GDP, growth of labour force $\frac{dL_D}{Y}$ and the ratio of government consumption to GDP $\left(\frac{C_g}{Y}\right)$. The mechanisms through which government expenditure may affect economic growth are as follows. First, government investment in infrastructure is believed to have a direct effect on economic growth through increasing the economy's capital stock. The second channel is the externality effect of government spending that alters economic growth indirectly by raising the marginal productivity of privately supplied factors of production through expenditure on education, health and other services, which contribute to the accumulation of human capital. The third channel is government expenditure on goods and services that increases the aggregate demand in the economy. The fourth channel is intersectoral productivity differentials which makes some sectors to be more productive than others (Ag'enor, 2007).In order to estimate the growth effects of the composition of government expenditure and take care of the intersectoral productivity differentials, equation (3.10) was modified by disaggregation investment into government investment and physical infrastructural. There was no time series data on $\frac{dL_D}{Y}$. Therefore, the study used human capital development. This is because it captured the changing quality and stock of the labour force and as such, was preferred of $\frac{dL_D}{Y}$. Government expenditure on education and health contribute to accumulation of human capital development. There were core functions of the government that could improve economic efficiency and thereby improve economic growth. These were protective and provision of a limited set of collective goods. The protective function included establishment of rule of law and property rights as exemplified by public order and national security. This helped to reduce the risks of criminal offences and social unrest so that safe and stable institutional environment for economic activities could be created. The involvement in producing goods for collective consumption included defense and general administration and services.Government is also involved in direct production of goods and services in the economy. Further borrowing that was required to finance growing government expenditure could affect economic growth as well. To capture these influences, the study added expenditure on economic affairs and services, and the public debt servicing variables to Rams equation (3.10). The modified Rams model becomes.

$$\frac{dY}{Y} = \alpha_0 \frac{GGFCE}{Y} + \alpha_2 \frac{EXT}{Y} + \alpha_3 \frac{GCF}{Y} + \alpha_4 \frac{ME}{Y} + \alpha_5 \frac{POPL}{Y} + \alpha_6 \frac{TOPEN}{Y} \quad \text{.....(3.11)}$$

Where: I is the government investment, PI is the physical infrastructure expenditure, ED is education expenditure, HT is health expenditure, PD is the debt servicing expenditure.

2.3. Theoretical Literature

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

2.3.1 Wagner's Organic State Theory

The German economist Adolf Wagner (1835-1917) advanced a law of rising public expenditure by analyzing trends in the growth of public expenditure and in the size of public sector in many countries of the world. This theory is primarily concerned with the explanation of the growth of the share of GNP taken up by the public sector. This theory, popularly known as Wagner's law, states that as per capita income grows, the relative size of the public sector will grow also. This is because the state would need to expand administration and law and order services; increased concern for distributional issues; and a greater need to control private monopolies and other forms of market failures. Thus, the state grows like an organism reflecting changes in the society and economy and making decisions on behalf (and to the benefit) of its citizens (Browne *et al* 1996).

The flaw in Wagner's theory is that it does not contain a well articulated theory of public choice. The law assumes the problems of public choice by employing an organic theory of the state. Thus the state is assumed to behave as if it were an individual existing and making decision independently of the members of society. Expansion of public sector also cannot be explained in the absence of industrialization, and finally, the law concentrates upon a demand side explanation of government expenditure growth without considering the supply side explanations. In many ways, Wagner's law-provides a good explanation of public sector growth. Its main limitation is that it concentrates solely on the demand for public sector services.Wagner(1893).What must determine the level is some interaction between demand and supply.

2.3 Empirical Literature

2.3.1 Government expenditure and economic Growth

There are several empirical literature that have been conducted on the effect of government expenditure on economic growth. These studies have looked at aggregate and disaggregated levels.

Maingi (2010) investigated the impact of government expenditure on economic growth in Kenya. The study applied vector Auto regression estimation technique using annual time series data for the period 1963 to 2008.Johansen Co-integration tests revealed a long-run relationship between GDP growth rate and components of government expenditure. The data used were the government expenditure components that included expenditure on government investment, physical infrastructure, education, health care, public debt servicing, economic affairs, general administration and services, defense, public order and national security and government consumption. The results of the impulse response function and variance decomposition revealed that components of government expenditure had effect on economic growth. Further, the granger causality test indicated bi-directional causality between GDP growth rate and the selected components of government expenditure. However; the study on government expenditure was only conducted in Kenya and did not extend the analysis to cover other regions such as East Africa countries in order to test the robustness of results.

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

Kwendo and Muturi (2015) analyzed the effect of public expenditure on economic growth in East African community and the countries included in the study were; Kenya,Uganda, Rwanda, Burundi, and Tanzania. The specific objectives of the study were to investigate the effect of public expenditure on components of consumption, health, defense and agriculture using a panel data covering the period from 1995 to 2010. The study applied Hausman test and verified results through the fixed effects method. The findings were that agriculture and defense expenditure had a negative impact on economic growth while health and consumption expenditure had a positive impact on economic growth.

2.3.2 Defense Expenditure and Economic Growth

Zaman *et al* (2013) investigated the impact of military expenditure and economic growth on external debt in SAARC countries. The study was on a panel data of five selected SAARC countries including Bangladesh, India,

Nepal and Sri Lanka over the period 1988 to 2008. The study used Pedroni's (2004) test for panel cointegration and found that there is a long run relationship between external debt economic growth and military and military expenditure. Results also revealed that external debt is elastic with respect to military expenditure in the long run and inelastic in the short run.

Korkmaz (2015) examined the effect of military spending on economic growth and unemployment in the Mediterranean countries. Due to the unease in Arab regions after Arab spring and Mediterranean region has strategic importance, ten countries in Mediterranean region were selected and analysis conducted with panel data performed for years 2005 to 2012. The ten countries. The ten countries included in the study were Spain, Bosnia, Herzegovina, Croatia, Egypt, France, Greece, Israel, Italy, Turkey and Slovenia using panel data method. The study employed Levin-lin-chu, Im-Pesaran-Shin unit root tests, as well as the fixed effect model was the preferred model since probability was less than 5% significant well. Results from the fixed effect analyzed revealed that variables of GDP and unemployment was statistically significant at 10% for 10 Mediterranean countries while the military spending affected economic growth negatively and also affected unemployment positively.

Yildrim *et al* (2005) examined empirically the effects of military expenditure on economic growth for Middle Eastern countries and turkey for the time period 1989 to 1999.The relationship between military expenditure and economic growth was investigated by using cross-section and dynamic panel estimation technique which included generalized method of moments. The equations were estimated employing state and dynamic panel data techniques such as fixed effects panel analysis and the GMM method. Empirical analysis results indicated that military expenditure enhances economic growth in the Middle Eastern countries and Turkey as whole.

2.3.3 External Debt and Economic Growth

Oryema (2009) investigated the impact of external debt on economic growth in Sub-Saharan Africa on the panel data of 42 of Sub-Saharan African countries over the period 1990 to 2005.A theoretical framework was built based on a neoclassical growth model. The study employed fixed and random effect panel regression analysis as well as generalized method of moments. The variables included in the study were GDP per capita growth, Gross capital formation, total labour force, Human capital accumulation, external debt service to GDP ratio, inflation rate and institutional efficiencies. Panel data estimation results showed that external debt stock to GDP ratio had statistically significant negative effect on economic growth. Meanwhile the external debt service to GDP ratio was statistically insignificant.

Irina and Iulian (2015) examined the relationship between public debt and economic growth for a panel of 33 European Countries over the period 1990 to 2011. More specifically the study investigated if there was evidence of a non-linear relationship, both of the entire Europeans countries group and for the developed and developing countries sub-groups. Results of the study confirmed the existence of inverted relationship with a maximum debt threshold of about 94% of GDP.After thus threshold public debt is expected to negatively affect the economic growth rate, due to higher interest rates, fear of public debt unsustainability and severe budgetary consolidation measures. However, this threshold was found to be more than twice lower in developing Europeans countries compared to the developed ones, as the former enjoyed lower credibility, higher vulnerability to hocks and depend more on external capital transfers.

Mensinger *et al* (2014) conducted a study on the impact of growing public debt on economic growth in the European union. The empirical analysis primarily included a panel data set of the EU. The sample of the EU countries was divided into sub-groups of distinguishing between so called old member states, covering the period 1980 to 2010. In order to account for the impact of the level of the debt to GDP ratio on the real growth rate of GDP, the study employed a panel estimation on a generalized economic growth model augmented with a debt variable, while also considering some methodological issues like the problems of heterogeneity and endogeneity. Results across all model indicted a significant non-linear impact of public debt ratios on annual gdp per capita growth rates. Further, the calculated debt-to-GDP turning point, where the positive effect of accumulated public debt inverts into a negative effect was roughly between 80% and 94% for the old member states and for the new member states the debt to GDP turning point was lower namely between 53% and 54%.

3.0 RESEARCH METHODOLOGY

3.1 Introduction

The section presents the model specified for the study. The variables used in the study are defined. The data sources and the methods used in data analysis are explained.

3.2 Model Specification

$$\ln GDP = \beta_0 + \beta_1 \ln GGFCE_{it} + \beta_2 \ln EXT_{it} + \beta_3 \ln GCF_{it} + \beta_4 \ln ME_{it} + \beta_5 \ln POPL_{it} + \beta_6 \ln TOPEN_{it} + \varepsilon_{it}$$

……..(3.12)

Where lnGDP= is the GDP growth rate measured by economic growth

Ln= Natural logarithm

$\ln GGFCE_{it}$ = is the natural log of General Government Final Consumption Expenditure

$\ln EXT_{it}$ =is the natural log of External Debt

$LNGCF_{it}$ =is the natural log of Capital Stock Proxied by the Gross Capital Formation

$\ln ME_{it}$ =is the natural log of Military Expenditure a Proxy for Defence Expenditure

$\ln POPL_{it}$ =is the natural log of the Population Growth Rate

$\ln TOPEN_{it}$ =is the natural log of the Trade Openness

ε_i = the error term

i=…n, where n is the number of firms. β_0 =constant/the intercept point of the regression line and the Y-axis. β =is the slope /gradient of the regression line. ε =is the error term.

The expected signs $\beta_1 \geq 0, \beta_2 \geq 0, \beta_3 \geq 0$

Source derived Maingi (2010)

3.3. Diagnostic Tests

To examine whether fixed and or random effects in the panel data, joint validity of fixed and period effects and Hausman's test were conducted.

3.3.1. Panel Unit Root Test

Panel unit root test will be conducted to investigate whether there were any variables in the model that where non-stationary.The test was developed by IM,pesaran and Shin(2002).The IPS estimates the t-test for unit roots in heterogeneous panels (Karagu,2012).The test allows for individual effects time trends and common time effects.It is based on the mean of the individual Dickey fuller (DF) statistics of each unit in the panel and assumes that all series are non-stationery (have unit roots) under the null hypothesis that all panel contain unit roots.Panel unit root test is a standard procedure performed to ensure that the series have a constant mean and variance, so that the resultant regression results would be meaningful (Tsay, 2001). Otherwise, if non-stationary of the series is present and not checked, the presence of trend in the data series would mean that the regression results are spurious. The Im –Pesaran-Shin (IPS) panel unit root was performed. The IPS estimates the t-test for unit roots in heterogeneous panels (Perron, 1998). The test allows for individuals effects, time trends and common time effects. If is based on the mean of the individual Dickey Filler (CD) t- statistics of each unit in the panel, and assumes that all series are non-stationary (have unit roots) under the null hypothesis that all panel contain unit roots.

Table 3.1 Im Pesaran and Shin Panel Unit Root Test

Variable	Level First difference	Constant	Constant +trend
LN GDP	Level	-2.4462 (0.0072)	2.6705 (0.9962)
	1^{ST} difference		-2.4004 (0.0082)
LNEXT	Level	1.8708 (0.9693)	0.8056 (0.7898)
	1^{ST} difference	-2.4524 (0.0071)	-2.7997 (0.0026)
LN GGFCE	Level	-1.1610 (0.1228)	-1.1990 (0.1153)
	1^{ST} difference	-7.0395 (0.0000)	-6.6265 (0.0000)

LN ME	Level	-0.9945 (0.1600)	-2.2064 (0.0137)
	1ST difference	-5.0887 (0.0000)	-2.7713 (0.0028)
LNP OPL	Level	-5.3311 (0.0000)	-10.8125 (0.0000)
LN OPE N	Level	-0.2732 (0.3923)	-0.0091 (0.4964)
	1ST difference	-4.5795 (0.0000)	-2.6364 (0.0042)
LN GCF	Level	-1.1141 (0.1326)	-0.1059 (0.4578)
	1ST difference	-3.6035 (0.0002)	-2.5058 (0.0061)

Source:Research data

From the panel unit root test table above , the results reveals that gross domestic product and population growth rate were stationary at level. A stochastic process is said to be stationary when the mean and variance do not change over time .Even though unit roots are often associated with time series data set, there is also need to test for stationarity of panel data sets .This is because running a regression with variables that are not stationary will produce spurious regression results (Nelson and Plosser,1982), Nyokabi(2017).The table above presents panel unit root test between government expenditure variables and economic growth in COMESA countries. According to the Im-Pesaran-Shin test results in table 3.3 shows that the test statistic for variables population growth rate and GDP were statistically significant at one percent level.

However , test statistics for external debt, government final consumption expenditure ,military expenditure ,trade openness and gross capital formation were not statistically significant . This suggests that these variables were not stationary at levels and had to be differenced once at least for them to become stationary. Also after including constant and trend one Im-Pesaran and Shin panel unit results revealed that military expenditure and population growth rate were statistically significant implying that they were stationary at level. However variables such as gross domestic product ,external debt ,government final consumption expenditure, trade openness and gross capital formation were not statistically significant meaning that they were non-stationary at level after including trend . After differencing them they become stationary. Variables that could be considered not to be stationery at levels in accordance with IPS once they become stationary suggesting that they were integrated of order one(1),thus panel unit root test result in table 3.3 shows that the variables for the government expenditure have mixed order of integration .some variables were integrated of order zero while others were integrated for order one (1).

3.3.2 Panel Cointegration Test

Panel cointegration test will be carried out to investigate whether there are more than a single cointegration relationship between private capital inflows and remittances variables for the 8 countries in Eastern Africa. Kao residual cointegration test will be carried out on the panel data for Eastern African countries. The concept of cointegration implies the existence of a long run relationship between economic variables. If the variables are cointegrated, they move together overtime so that short term disturbances will be corrected in the long term (Mahmoud and Fatima, 2007).The evidence of cointegration between the variables implies no spurious correlation, Enders (1995).In order to test for cointegration in panel setting. First the cointegration equation is estimated separately for each panel member and second, the residuals are examined with respect to the unit root feature. If the null hypothesis of unit root is rejected, the long-run equilibrium exists, but the cointegration vector may be different for each cross-section. In addition, deterministic components are allowed to be individual specific (Dreger and Hans-Eggert, 2005).

3.3.2.1Pedroni Panel Cointegration Test

Table 3.2 Pedroni Panel Cointegration Test Between Government Expenditure and Economic Growth in Comesa Countries

Pedroni Residual Cointegration Test				
Series: LNGDP LNGGFCE1 LNEXT LNGCF1 LNME1 LNPOPL LNTOPEN				
Included observations: 144				
Cross-sections included: 9				
Null Hypothesis: No cointegration				
Trend assumption: No deterministic trend				
Automatic lag length selection based on SIC with a max lag of 1				
Alternative hypothesis: common AR coefs. (within-dimension)				
			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	0.153005	0.4392	-0.490928	0.6883
Panel rho-Statistic	3.712798	0.9999	3.043331	0.9988
Panel PP-Statistic	0.059374	0.5237	-1.742870	0.0407
Panel ADF-Statistic	-4.425785	0.0000	-3.574341	0.0002
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	4.212850	1.0000		
Group PP-Statistic	-5.202781	0.0000		
Group ADF-Statistic	-4.585392	0.0000		

Source:Research data

Table 4.4 above shows that majority of the tests statistics of panel cointegration tests and group mean cointegration tests indicate that we strongly reject the null hypothesis of no cointegration since the probability values are significant at 1% level except the panel v-statistics, panel Rho-statistics and group Rho-statistics. Basing on the Pedroni(1999) cointegration tests we hence conclude that there is a long-run relationship between economic growth and government expenditure variables in COMESA countries. The null is no cointegration and alternative hypothesis cointegration exists. Thus we rejected the null and accepted the alternative.

3.3.2.2 Kao Residual Panel Cointegration Test

Table 3.3 Kao Panel Cointegration Test Between Government Expenditure and Economic Growth in COMESA Countries

Kao Residual Cointegration Test		
Series: LNGDP LNGGFCE1 LNEXT LNGCF1 LNME1 LNPOPL LNTOPEN		
Included observations: 144		
Null Hypothesis: No cointegration		
Trend assumption: No deterministic trend		
Automatic lag length selection based on SIC with a max lag of 3		
Newey-West automatic bandwidth selection and Bartlett kernel		
	t-Statistic	Prob.
ADF	-3.996399	0.0000
Residual variance	0.024090	
HAC variance	0.037158	

Source:Research data

The panel cointegration test conducted was aimed at investigating whether there was more than a single cointegrating relationship between government expenditure variables and economic growth in COMESA countries.The Kao residual panel cointegration test showed rejection of null hypothesis of no cointegration for all the panel data sets, hence implying long run cointegration between government expenditure and economic growth.The Kao residual cointegration test ADF was 0.000 which was significant. The null is no cointegration and

alternative hypothesis cointegration exists. Thus we rejected the null and accepted the alternative.Acccording to Enders (1995) the evidence of cointegration between the variables implies no spurious correlation.

3.4 Data Collection

The research study will use secondary data from World Development Indicators (WDI) for the period 2003-2018 for the eleven COMESA Countries namely,Burundi,congo democratic,Egypt,Kenya,Madagascar,Malawi,Mauritious,Mauritania,Sudan,Uganda and Zimbabwe. Other sources will include international financial statistics (IFS), World development indicators (WDI), World Bank African Database, African Development indicators and international monetary fund (CD-ROMS).This will be proceeded by identification of data sources and designing of suitable template caution will be taken to ensure consistency in data for variables.

4.0 RESULTS AND DISCUSSION 4.1 Descriptive Statistics

Table 3.4 Descriptive statistics of Government Expenditure and Economic Growth in Comesa Countries

	LNGDP	LNGGFCE1	LNEXT	LNGCF1	LNME1	LNPOPL	LNTOPEN
Mean	6.680371	4.101465	22.51960	4.121051	3.829041	0.737955	3.981273
Median	6.289166	4.350257	22.56880	4.375737	4.197174	1.003668	3.976658
Maximum	9.327118	5.117994	25.31540	5.099866	5.105946	1.321723	4.844682
Minimum	4.732396	0.000000	20.19452	0.000000	0.000000	-2.908688	2.949730
Std. Dev.	1.125941	0.957703	1.235845	0.852714	1.309017	0.829229	0.397845
Skewness	0.771069	-1.513570	-0.075834	-1.612851	-1.571160	-2.741948	-0.017009
Kurtosis	2.702889	5.641626	2.218019	6.443142	4.984313	9.814196	3.108123
Jarque-Bera	14.79877	96.85059	3.806987	133.5623	82.87008	459.0383	0.076551
Probability	0.000612	0.000000	0.149047	0.000000	0.000000	0.000000	0.962448
Sum	961.9734	590.6110	3242.822	593.4314	551.3818	106.2656	569.3220
Sum Sq. Dev.	181.2871	131.1589	218.4057	103.9784	245.0341	98.32971	22.47586
Observations	144	144	144	144	144	144	143

Source:Research data

The Table 3.4 above shows the results of 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 of normality is the Jarque-Bera statistics (Jarque and Bera 1980). This test utilizes the mean based coefficient of skewness and kurtosis to check normality of the variables used. On the other 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 indicates that they are typical values of samples from a normal distribution(Gisore,2014).In this study figures indicates normal curve for all the variables with negative values of skewness indicating a tail to the right except for gross domestic product. 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 he later years.

On the other hand Kurtosis measures the heaviness of the tails of a distribution. The usual reference in kurtosis is the normal distribution. In this Kurtosis statistics equals three i.e. open 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. In this study government final consumption expenditure, gross capital formation, military expenditure and population growth rate had Kurtosis values of more than three implying that they have thicker tails than the normal. trade openness had Kurtosis of three negative Kurtosis indicates too many cases in the tails of distribution while positive Kurtosis ideates too few cases from the Kurtosis results above gross domestic product and external debt have Kurtosis value of the less than three which means the variables have platy Kurtosis distributions, fatter middle of few extensive values.

From the study, domestic product had a mean of 6.680,amaximum value of 9.327118, a minimum value of 4.732 and standard deviation of 1.125941.General government final consumption expenditure had a mean of 4.101465, a maximum value of 5.117994, a minimum of 0.000 and standard deviation of 0.957703.External debt had a mean of 22.51960 ,a maximum of 25.31540 ,a minimum of 20.19452 and a standard deviation of 1.235845.Gross capital formation had an average value of 4.121051 ,maximum value of 5.099866,a maximum value of 0.0000 and a standard deviation of 0.852714.Military expenditure had a mean value of 3.829041,a maximum value of 5.105946,a minimum value of 0.0000and a standard deviation of 1.309017.Population growth on the other hand had a mean

value of 0.737955,a maximum value of 1.321723,a minimum value of -2.908688 with a standard deviation of 0.829229.Trade openness had a mean value of 3.981273, a maximum of 4.844682 ,a minimum value of 2.949730 with a standard deviation of 0.397845.

4.2 Correlation Analysis: Table 3.5 Correlation Analysis Between Government Expenditure and Economic Growth in COMESA Countries

Covariance Analysis: Ordinary							
Included observations: 143							
Correlation							
Probability	LNGDP	LNGGFCE1	LNEXT	LNGCF1	LNME1	LNPOPL	LNTOPEN
LNGDP	1.000000						

LNGGFCE1	-0.340797	1.000000					
	(0.0000)	-----					
LNEXT	0.595821	-0.342326	1.000000				
	0.0000)	0.0000	-----				
LNGCF1	0.235110	-0.061452	0.118498	1.000000			
	0.0047	0.4659	0.1587	-----			
LNME1	-0.326803	-0.005662	0.091642	-0.053154	1.000000		
	0.0001	0.9465	0.2763	0.5284	-----		
LNPOPL	-0.792421	0.126795	-0.209981	-0.141638	0.419557	1.000000	
	0.0000	0.1313	0.0118	0.0915	0.0000	-----	
LNTOPEN	0.303824	-0.003299	-0.112564	0.106940	-0.264859	-0.559891	1.000000
	0.0002	0.9688	0.1807	0.2036	0.0014	0.0000	-----

Source:Research data

The above table indicates correlation matrix economic growth, government final consumption expenditure, external debt, gross capital formation, military expenditure ,population growth rate and trade openness .The absolute value of the correlation co-efficient ranges from 0 and 1 .A value of zero indicates that there is a perfect correlation between the variables. The sign of the correlation coefficient will be possible for direct relationship and negative for an indirect relationship .Overall , with the correlation coefficient between the variables in the range below 0.5,indicated that multicollinearity was not an issue in these estimates as no two variables were highly correlated.Hailer *at al* (2006) and Muchomba(2003) supported that multicollinearity problem should only be corrected when the correlation is above 0.8 and 0.9 respectively.

From the table above gross domestic products had a positive and statistical correlation with external debt (0.59582), capital formation(0.235110) and trade openness(0.303824).Also gross domestic products had negative and significant correlation with government final consumption expenditure (-0.340797),military expenditure(-0.326803) and population growth rate(-0.792421).The correlation matrix suggested a positive relationship between trade openness and economic growth . This suggests that the more open an economy is the more likely that economy will be subjected to growth. This suggests that the more open an economy is the more likely the economy will be subjected to growth. This results seem to support the trade liberation policies. This finding from the correlation matrix is consistent with other studies like ,Edward(1998), Ghali(1999) and Ofosuah(2014).

Government final expenditure had negative correlation with external debt (-0.342326), gross capital formation (-0.061452), military expenditure(-0.005662) and trade openness(-0.003299).Also government final consumption expenditure had positive and insignificant correlation with population growth. On the other hand external debt had positive and insignificant relationship with gross capital formation (0.118498) and military expenditure (0.09164) and negative correlation with population growth rate (-0.209981) and trade openness (-0.112564).Also gross capital formation had negative and insignificant relationship with military expenditure (-0.053154) and population growth rate (-0.141638).Gross capital formation positive and insignificant correlation with trade openness (0.106940).Military expenditure had positive and statistically significant correlation with population growth rate (0.419557)and negative and significant correlation with trade openness (-0.2648590).Population growth rate had negative and insignificant correlation with trade openness(-0.559891)

4.3 Fixed Effect Model Aggregated model

Table 3.6 Fixed Effect Model of Government Expenditure and Economic Growth in COMESA Countries

Fixed-effects (within) regression				Number of obs = 143		
Group variable: id				Number of groups = 9		
R-sq: within = 0.1914				Obs per group: min = 15		
Between = 0.6307				avg = 15.9		
Overall = 0.4698				max = 16		
				F(6,128) = 5.05		
corr(u_i, Xb) = 0.5619				Prob > F = 0.0001		
lngdp	Coef	Std. Err.	T	P>|t|	[95% Conf. Interval]	
lnext	.0753881	.0730384	1.03	0.304	-.0691308	.2199069
lnpopl	-.2116074	.1135875	-1.86	0.065	-.4363596	.0131448
lnggfce1	-.0038969	.0425935	-0.09	0.927	-.0881754	.0803816
lnTopen	-.4978228	.1612468	-3.09	0.002	-.8168771	-.1787684
lnme1	-.0792785	.0266988	-2.97	0.004	-.1321067	-.0264503
lngcf1	.0409819	.0455779	0.90	0.370	-.0492017	.1311656
cons	7.274542	1.982371	3.67	0.000	3.352083	11.197
sigma_u .96522621						
sigma_e .33607402						
rho .89187732 (fraction of variance due to u_i)						
F test that all u_i=0: F(8, 128) = 14.36 Prob > F = 0.0000						

Source:Research data

The fixed effect model results are presented in table 3.6.the results reveal that external debt had a positive and insignificant relationship with economic growth .on the other hand population growth rate had a negative and insignificant relationship with gross domestic product. Government final expenditure had a negative and insignificant relationship with gross domestic product whereas trade openness had a negative and significant relationship with economic growth . the relationship was statistically significant at 5% level. Military expenditure had a negative and significant relationship with gross domestic product. The relationship was statistically significant at 1% level. Gross capital formation had a positive and insignificant relationship with gross domestic product .The coefficients for economic growth external debt , population ,government final expenditure and gross capital formation were 0.753881,-0.2116,-0.003896,-0.4978,-0.0792785,0.04098719

4.4 Random Effect Model Aggregated model

Table 3.7 Random effect model of Government Expenditure and Economic Growth in COMESA Countries

Random-effects GLS regression			Number of obs = 143			
Group variable: id			Number of groups = 9			
R-sq: within = 0.1044			Obs per group: min = 15			
Between = 0.9828			avg = 15.9			
Overall = 0.8474			max =16			
			Wald chi2(6) = 416.91			
corr(u_i, X) = 0 (assumed)			Prob > chi2 = 0.0000			
lngdp	Coef.	Std. Err.	Z	P>|z	[95% Conf. Interval]	
lnext	.3579907	.0427604	8.37	0.000	.2741819	.4417995
lnpopl	-.8479473	.0728738	-11.64	0.000	-.9907774	-.7051172

lnggfce1	-.1026947	.0471247	-2.18	0.029	-.1950574	-.0103321
lnTopen	-.14398	.1374857	-1.05	0.295	-.413447	.125487
lnme1	-.0901159	.0320908	-2.81	0.005	-.1530126	-.0272191
lngcf1	.11422	.0507977	2.25	0.025	.0146583	.2137816
cons	.1137894	1.316819	0.09	0.931	-2.467129	2.694707
sigma_u .08003105						
sigma_e .33607402						
rho .05366511 (fraction of variance due to u_i)						

Source:Research data

The random effects model results are presented in table 3.7 the results shows that external debt had positive and significant relationship with economic growth. The relationship was statistically significant at 1% level. Population growth rate on the other hand had negative and significant relationship with economic growth. The relationship was significant at 1% level. Government final consumption expenditure was negative and significant at 5%. Trade openness had negative and insignificant relationship with economic growth. Military expenditure had negative and significant relationship with gross domestic product and gross capital formation and positive and significant relationship with gross domestic product at 5% statistical significant level.

4.5 Hausman Specification Test

Table 3.8 Hausman Specification test of Government Expenditure and Economic Growth in COMESA Countries

---- Coefficients ----				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	random	Difference	S.E
lnext	.0753881	.3579907	-.2826026	.0592128
lnpopl	-.2116074	-.8479473	.63634	.0871293
lnggfce1	-.0038969	-.1026947	.0987978	.
lnTopen	-.4978228	-.14398	-.3538427	.0842509
lnme1	-.0792785	-.0901159	.0108374	.
lngcf1	.0409819	.11422	-.073238	.
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 115.84				
Prob>chi2 = 0.0000				
(V_b-V_B is not positive definite)				

Source:Research data

Table 3.8 above was the Hausman specification test which showed that fixed effect model was the preferred model .The null hypothesis was that the preferred model was random effect and the alternative fixed model preferred model. The probability was 0.0000 which was statistically significant at 1 %.The probability was significant at 1 % implying that we shall reject the null hypothesis and accept the alternative hypothesis. Thus the fixed effect model was the preferred model. Also the chi-square test value 115.84 which was more than the probability value at 1 % which indicated that there was correlation between the unique errors (ui) and the regressors.

4.6 Breusch Pagan Test of Heteroskedasticity

Table 3.9 Heteroscedasticity Test of Government Expenditure and Economic Growth in COMESA Countries

Breusch and Pagan Lagrangian multiplier test for random

effects		
lngdp[id,t] = Xb + u[id] + e[id,t]		
Estimated results:		
Var	sd = sqrt(Var)	
lngdp	1.273037	1.128289
e	.1129457	.336074
u	.006405	.080031
Test: Var(u) = 0		
chibar2(01) = 3.61		
Prob > chibar2 = 0.0287		

Source:Research data

Table 3.9 Breusch –Pagan test of heteroscedasticity for economic growth was conducted. The null hypothesis was that no heteroscedasticity existed and alternative heteroscedasticity exists. The chi-square value was 3.61 less than the probability value at 0.0287.The probability was 2.87 % which was less than the 5% significant level. This indicated that heteroscedasticity existed.

4.7 Disaggregated Model

Table 4.0 Fixed Effect Model of Government Expenditure and Economic Growth in COMESA Countries disaggregated model

Fixed Effect Model

Fixed-effects (within) regression			Number of obs = 143			
Group variable: id			Number of groups = 9			
R-sq: within = 0.1309			Obs per group: min = 15			
Between = 0.3514			avg = 15.9			
Overall = 0.2772			max = 16			
			F(4,130) = 4.89			
corr(u_i, Xb) = 0.3779			Prob > F = 0.0010			
lngdp	Coef.	Std. Err.	t	P>|t|	[95% Interval]	Conf.
lnggfce1	-.0219328	.0431457	-0.51	0.612	-.1072914	.0634257
lnTopen	-.53501	.1640243	-3.26	0.001	-.8595125	-.2105075
lnpopl	-.195294	.116727	-1.67	0.097	-.4262244	.0356364
lnext	.0657986	.0735728	0.89	0.373	-.0797563	.2113535
_cons	7.567574	1.978165	3.83	0.000	3.654011	11.48114
sigma_u 1.0256763						
sigma_e .34573539						
rho .8979698 (fraction of variance due to u_i)						
F test that all u_i=0: F(8, 130) = 15.11 Prob > F = 0.0000						

Source:Research data

The fixed effect model results are presented in the table 4.0 the results reveals that government final expenditure had negative and significant relationship with gross domestic product. While trade openness had negative and significant relationship with gross domestic product. Population growth rate on the other hand had a negative and insignificant relationship with gross domestic product . external debt had negative and insignificant relationship with gross domestic product.

4.8 Random Effect Model

Table 4.1 Random Effect Model of Government Expenditure and Economic Growth in COMESA Countries disaggregated model

Random-effects GLS regression			Number of obs = 143			
Group variable: id			Number of groups = 9			
R-sq: within = 0.0644			Obs per group: min = 15			
Between = 0.9847			avg = 15.9			
Overall = 0.8335			max = 16			
			Wald chi2(4) =192.12			
corr(u_i, X) = 0 (assumed)			Prob > chi2 = 0.0000			
lngdp	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lnggfce1	-.0912618	.0495228	-1.84	0.065	-.1883246	.0058011
lnTopen	-.1112964	.1564093	-0.71	0.477	-.417853	.1952602
lnpopl	-.8078456	.0847677	-9.53	0.000	-.9739873	-.641704
lnext	.3050541	.0532178	5.73	0.000	.2007492	.409359
_cons	1.227502	1.58165	0.78	0.438	-1.872475	4.327478
sigma_u .14354917						
sigma_e .34573539						
rho .14704198 (fraction of variance due to u_i)						

Source:Research data

The random effect model results are presented in the table 4.1 the results shows that the government final consumption expenditure had negative and insignificant relationship with gross domestic product. Trade openness had negative and insignificant relationship with gross domestic product. Population growth rate had negative and significant relationship with gross domestic product. The relationship was significant at 1% level. External debt also had positive and statistically significant relationship with gross domestic product. The relationship was statistically significant at 1% level.

4.9 Hausman Specification Test

Table 4.2 Hausman Specification Test of Government Expenditure and Economic Growth in COMESA Countries disaggregated model

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	random	Difference	S.E.
lnggfce1	-.0219328	-.0912618	.0693289	.
lnTopen	-.53501	-.1112964	-.4237136	.0493974
lnpopl	-.195294	-.8078456	.6125516	.0802473
lnext	.0657986	.3050541	-.2392555	.0508018
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 68.57				
Prob>chi2 = 0.0000				
(V_b-V_B is not positive definite)				

Source:Research data

Table 4.2 above was the Hausman specification test which showed that fixed effect model was the preferred model .The null hypothesis was that the preferred model was random effect and the alternative fixed model preferred

model. The probability was 0.0000 which was statistically significant at 1 %.The probability was significant at 1 % implying that we shall reject the null hypothesis and accept the alternative hypothesis. Thus the fixed effect model was the preferred model. Also the chi-square test value 68.57 which was more than the probability value at 1 % which indicated that there was correlation between the unique errors (ui) and the regressors.

5.0 Breusch Pagan Test of Heteroscedasticity

Table 4.3 Heteroscedasticity test of Government Expenditure and Economic Growth in COMESA Countries disaggregated model

Breusch and Pagan Lagrangian multiplier test for random effects		
lngdp[id,t] = Xb + u[id] + e[id,t]		
Estimated results:		
Var sd = sqrt(Var)		
lngdp	1.273037	1.128289
e	.119533	.3457354
u	.0206064	.1435492
Test: Var(u) = 0		
chibar2(01) = 3.44		
Prob > chibar2 = 0.0317		

Source:Research data

Table 4.3 Breusch –Pagan test of heteroscedasticity for economic growth was conducted. The null hypothesis was that no heteroscedasticity existed and alternative heteroscedasticity exists. The chi-square value was 3.44 less than the probability value at 0.0317.The probability was 3.17 % which was less than the 5% significant level. This indicated that heteroscedasticity existed.

5.1 Fixed Effect Model

The fixed effect model results are presented in the table 4.4 in the appendix section .The results shows that the military expenditure had negative and significant relationship with gross domestic product at 1% significant level. Government final consumption expenditure had negative and significant relationship with gross domestic product. Trade openness had negative and statistically significant relationship with gross domestic product at 1%level. While population growth rate had negative and significant relationship with gross domestic product at 5% significant level. The coefficients for military expenditure government final expenditure trade openness and population growth rate -0.07948, -0.00906, -0.5204484 and -.2391941.

5.2 Random Effect Model

The random effect model results are presented in the appendix in the table 4.5 the results revealed that military expenditure had negative and significant relationship with gross domestic product at 1% level. Government final consumption expenditure had negative and insignificant relationship with gross domestic product. Trade openness had negative and significant relationship with gross domestic product at 1% level. While population growth rate had negative and statistically significant relationship with gross domestic product at 1% level of significance.

5.3 Hausman Specification Test

In the appendix Table 4.6 was the Hausman specification test which showed that fixed effect model was the preferred model .The null hypothesis was that the preferred model was random effect and the alternative fixed model preferred model. The probability was 0.0003 which was statistically significant at 5 %.The probability was significant at 0.03 % implying that we shall reject the null hypothesis and accept the alternative hypothesis. Thus the fixed effect model was the preferred model. Also the chi-square test value 21.07 which was more than the probability value at 0.03 % which indicated that there was correlation between the unique errors (ui) and the regressors.

5.4 Breusch Pagan Test of Heteroskedasticity

Table 4.7 Heteroscedasticity Test on Military Expenditure and Economic Growth in COMESA Countries disaggregated model

Breusch and Pagan Lagrangian multiplier test for random effects		
lngdp[id,t] = Xb + u[id] + e[id,t]		
Estimated results:		
Var	sd = sqrt(Var)	
lngdp	1.273037	1.128289
e	.1125654	.3355077
u	.2350089	.4847771
Test: Var(u) = 0		
chibar2(01) = 197.73		
Prob > chibar2 = 0.0000		

Source:Research data

Table 4.7 Breusch –Pagan test of heteroscedasticity for economic growth was conducted. The null hypothesis was that no heteroscedasticity existed and alternative heteroscedasticity exists. The chi-square value was 197.73 less than the probability value at 0.0000.The probability was significant at 1 % which was less than the 5% level. This indicated that heteroscedasticity existed.

5.5 Fixed Effect Model

The fixed effects model results are presented in the appendix section in a table 4.8 The results clearly show that gross capital formation had positive and insignificant relationship with gross domestic product. Government fuel had Trade openness had negative and significant relationship with gross domestic product at1% level. While population growth rate had statistically significant relationship with gross domestic product at 5% level.

5.6 Random Effect Model

The random effect models are presented in table 4.9 in the appendix section. The result shows that gross capital formation had positive and insignificant relationship with gross domestic product. Government final consumption expenditure had negative and insignificant relationship with gross domestic product. While trade openness had negative significant relationship with domestic product at5% level of significance. Population growth rate had negative and statistically significant relationship with gross domestic product at 1% level.

5.7 Hausman Specification Test

Table 5.0 in the appendix was the Hausman specification test which showed that fixed effect model was the preferred model .The null hypothesis was that the preferred model was random effect and the alternative fixed model preferred model. The probability was 0.0000 which was statistically significant at 1 %.The probability was significant at 1 % implying that we shall reject the null hypothesis and accept the alternative hypothesis. Thus the fixed effect model was the preferred model. Also the chi-square test value 42.84 which was more than the probability value at 1 % which indicated that there was correlation between the unique errors (ui) and the regressors.

5.8 Breusch Pagan Test

Table 5.1 Heteroscedasticity test on Capital Stock and Economic Growth in COMESA Countries disaggregated model

Breusch and Pagan Lagrangian multiplier test for random effects		
lngdp[id,t] = Xb + u[id] + e[id,t]		
Estimated results:		
Var	sd = sqrt(Var)	
lngdp	1.273037	1.128289
e	.1198783	.3462345
u	.1221074	.3494387

Test: Var(u) = 0
chibar2(01) = 150.09
Prob > chibar2 = 0.0000

Source:Research data

Table 5.1 Breusch –Pagan test of heteroscedasticity for economic growth was conducted. The null hypothesis was that no heteroscedasticity existed and alternative heteroscedasticity exists. The chi-square value was 150.09 less than the probability value at 0.0000.The probability was 0.1 % which was less than the 5% significant level. This indicated that heteroscedasticity existed.

DISCUSSION OF FINDINGS

The main objective of this was to investigate the effect of government expenditure on economic growth in COMESA countries. The study specifically sought to examine the effect of government consumption expenditure on economic growth, examine the effect of military expenditure and estimate effect of capital stock on economic growth in COMESA countries using a panel data for nine COMESA countries from the panel 2003 to 2018.

The first objective of the study was to examine the effect of government consumption expenditure on economic growth. Analysis of data on this objective was based on the null hypothesis that government consumption expenditure has no effect on economic growth in COMESA countries. Government final consumption expenditure had negative and statistically significant relationship with economic growth at 5% level. The results are contrary to the results of Kruah(2010) who found that government final consumption expenditure has positive and significant impact on economic growth. Similar results was found by Ram(1986), Lin(1994) and Kweka and Morrissey (2000). This results challenge both the theoretical prediction of the study and the study and the popular view in economic literature that government consumption expenditure decreases economic growth. However, the probable explanation is that increases in government expenditures to improve the general security condition in particular and macroeconomic environment as a whole, helped to attract foreign investments and supports into the country, Kruah (2010).

Results are also inconsistent with Munene (2015)who found that government size has positive and statistically significant relationship with economic growth in Kenya. Other country results are (Fachini and Melki(2011), Gisore(2014) who found that total Government expenditure is significant at 1% level of significance and positively related to economic growth in East Africa.

Also Ofosuah (2014) who found positive relationship between government expenditure and economic growth in Sub-Saharan Africa. Other contrary results are for (Calderon and Serven (2008),Sobhee(2010).Ofosuah(2014) results for fixed effect, random effect and system GMM showed positive sign between government expenditure and economic growth in Sub-Saharan Africa. This results could be Attributed to the fact that most developing economies spend much on infrastructure and other growth Engendering activities and hence propelling economic growth. Ofosuah(2014).The role of government expenditure was found to be significant and tend to support the Keynesian hypothesis rather than the neoclassical argument that government expenditure is growth reducing. Other contrary results are Ruturaga(2013) who found that government expenditure is positively correlated to economic growth in Tanzania. This study finding is consistent with Nurudeen and Abdullahi(2010) who found that government total capital expenditure, total recurrent expenditure have negative effect on economic growth in Nigeria. This findings are also intended with landau(1986),Barro(1991)and Engen and skinner(1992) that government expenditure may show down economic growth. From the results of the study therefore rejects the null hypothesis and accepts the alternative hypothesis that states that government final consumption expenditure affects economic growth in COMESA countries.

The second objective of the study was to examine the effect of military expenditure on economic in COMESA countries .Analysis of data on this objective was based on the null hypothesis that military expenditure has no effect on the economic growth in COMESA countries. Findings from the study revealed that military expenditure had negative and statistically significant at 1 percent significant level.The results is contrary to Khalid and Zaleha (2015) conducted a study on military expenditure and economic growth in developing countries and findings indicated that military spending has a positive and significant effect on economic growth in the sampled countries.Zaman *et al* (2013) results also revealed that external debt is elastic with respect to military expenditure in the long run and inelastic in the short run.Nasir and Akhtar (1997) results of Granger-casualty test showed that there is bi-directional feedback between the defense burden and GDP growth. Results show that the savings ratio was positively affected by the defense ratio and negatively by the inflation rate. The Pakistan defense burden was impacted negatively by the Indian defense burden and positively by the government budget. Results are also inconsistent with Gisore(2014) who found that defense expenditure has positive and statistically significant relationship to economic growth at East Africa at 10% level of significance. This implied that a 10% increases in defense expenditure will lead to a 7.2% increase in economic growth.Gisore (2014). 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. A more plausible argument is that defense expenditure stimulates economic growth through various kinds of spillover effects on civilian production and as argued in detail in Benoits study (Lai *et al* 2002). For instance, research and development for defense purposes often has civilian applications.
However, military expenditure by civilians and the role of the army in providing disaster relief. Lai *et al* (2002) examines the linkages between balanced economic growth and defense expenditure using endogenous growth models that captures demand side factors as well as supply side factors. The results shows that when an economy spends more on its defense expenditure can influence an economy both positively and negatively. For example defense expenditure can affect an economy positively through an expansion of aggregate demand or through increased security, (Fan and Pao, 2003) and Lai *et al* 2002). Other contrary results are of Yusuf (2009) who found that defense has positive coefficient, implying that defense has a positive relationship with economic growth in Nigeria. This results can be as a result of the political stability.

However, results is consistent with Korkmaz (2015) who examined the effect of military spending on economic growth and unemployment in the Mediterranean countries and the results from the fixed effect analyzed revealed that variables of GDP and unemployment was statistically significant at 10% for 10 Mediterranean countries while the military spending affected economic growth negatively and also affected unemployment positively.Also,Kwendo and Muturi (2015)who examined the effect of public expenditure and economic growth in East Africa Community and found that agriculture and defense expenditure had a negative impact on economic growth in East African Community. Results indicated a negative and insignificant relationship implying that defense expenditure did not play any role in determining economic growth in East African Community.Kwedo and Muturi (2015).From the results therefore the study rejects the null hypothesis and accept the alternative hypothesis which states that military expenditure affects economic growth in COMESA countries because military expenditure coefficient is negative and statistically significant at 1% level.

The third objective of the study was to estimate the effect of capital stock on economic growth in COMESA countries. Analysis on data on this objective was based on the null hypothesis that capital stock has no effect on economic growth in COMESA countries. Capital stock in the study had positive and statistically significant relationship with economic growth at 5% significance level. Results are consistent with Bose *et al*(2003) and Alexiou(2009) who found that capital expenditure is statistically significant and positively related to economic growth in 30 LDCS in South Eastern Europe (SEE) respectively. And Ofosuah (2014) who found that private investment positively had effect on economic growth in Sub-Saharan Africa. Results indicated statistical significance at 1% for both ordinary least square and the system GMM (Ofosuah, 2014). The results indicated that an increase in private investment by 1% would lead to an increase in economic growth rate by 0.019 percent. Results are consistent with the growth theory underlining this study. Capital accumulation or investment ,according to theory propels growth (Ofosuah, 2014).
Also results are in tandem with Gisore(2014) whose findings showed that investment expenditure have positive and significant effect on economic growth at 5% level of significance . This results is in line with the hypothesis that the capital component of government expenditure and economic growth are positively related. 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 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 followed by Josphat 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 positive and significantly correlated with economic growth, but current expenditure is insignificant.
Also results are in tandem with Munene (2015)Who investigated the optimal size of the government expenditure and economic growth in Kenya and results showed that the private investment coefficient was significant at 10% level with a valve of 4.2158 implying a positive relationship with economic growth. These results conform to findings of Mehdi and Jalal (2010) in a study on the impact of government size on economic growth in Italy which revealed that private investment has a significant positive effect on economic growth.
Results are inconsistent with Forte and Magazzino (2010) who found that private investment was not significant for most of the EU countries. This was attributed to crowding out effect by the high government spending especially in the years before 1980 in European Union countries. In contrast also Josaphat and Oliver (2000) and Morissey and Kweka (1999) found the relationship between investment expenditure and growth for Tanzania to be negative and Kruah (2010) who found that gross capital formation which was used as a proxy for total domestic investment to be statistically insignificant implying that gross capital formation does not play any role in determining economic

growth in Liberia. Therefore, the study rejects the null hypothesis and accept the alternative hypothesis which states that capital stock affects economic growth in COMESA countries because capital stock is statistically significant and positively affects economic growth in COMESA countries.

CHAPTER 5: CONCLUSION AND POLICY RECOMMENDATION

5.1 Conclusion

Economic growth, which can be defined as sustainable growth in real GDP , is the overriding objective of the COMESA countries in their efforts to minimize 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 the study is very important for COMESA countries. It follows that achieve accelerated economic growth and sustainable development, government spending should be such that it creates a conducive environment for the private sector development and repair market failures. The study examined the effects of different components of government expenditure on economic growth in COMESA countries over the period 2003 to 2018. The study employed a strongly balanced panel data to analyze some of the important variables affecting gross domestic product in COMESA countries.

Heteroskedasticity and Hausman specification test were tested before estimation and corrected accordingly. The study employed Im-Pesaran and Shin test to test for the panel unit root and found that the variables were stationary at first difference except gross domestic product and population growth rate that are stationary at level. Results further suggests that boosting government investment can enhance its complementarity role with private sector and economic growth. The government should increase its own investments 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 or development budgets for this reduces governments investment.

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 COMESA countries creates a negative effect on output per work random the broader aspect it creates negative population growth and specifically over population include poverty caused by low population per capital ,famine and diseases,

This study finds that more open COMESA countries indeed have experienced faster economic growth. Murphy *et al* (1991) and Gisore (2014)notes that past studies have suggested that countries that are more open to the rest of the world are better to absorb the rapid technological advances of leading Nations. If the cost of technological imitations are lower than the costs of internally developed innovations , then a poor 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 Implications

Several policy Implications can be drawn from the research findings. To begin with, government expenditure which was used as a policy variable was found to be negative and significant. This implies that government expenditure is growth enhancing. It would be recommended of governments to embark on expansionary fiscal policies in the form of investing in infrastructure particularly infrastructure that would boost human capital. This if done will increase the productivity of labor and enhance growth . However , it is worthy to note that, greater care must be taken by governments in COMESA countries on excessive spending since the coefficient of government spending from our empirical results had a negative effect on economic growth in COMESA countries. On investment expenditure, this instrument of fiscal policy promotes economic growth in the sense that public investment contributes to capital accumulation

The government should increase its investments in areas that are beneficial to the private sector and eschew from those that compete with or crowd it out. It should increase its expenditures on those items that enter private production functions as productive public inputs that enhance economic growth .Such productive government expenditures include : expenditures on buildings ,plant ,machinery and equipment all of which generates positive externalities that raise private investment and thus economic growth.

Also the government in COMESA countries should increase its expenditures allocation to defense and public order and national security .This is because the study found that the defense proxied by the military expenditure to have negative and significant effect on economic growth. When the allocation of these sectors is increased , there is a positive change in economic growth. These sectors help to improve security within the economy thereby increasing economic activities in areas of tourism and private investment.

Governments in COMESA countries should streamline its expenditures allocation to the debt servicing. This is because external debt was found to affect economic growth positively. Public debt servicing reduces the resources that could have otherwise allocated to more productive sectors of the economy. Furthermore,public debt crowd out private investments which affect economic growth adversely. The reduction in public debt can be achieved by reducing government borrowing and ensuring that borrowed loans are concessional in nature. This means that since the government would have a long repayment period at a lower interest rate, this burden on public debt would be loser.

In addition, the government in COMESA countries can employ better financial management and try to fight graft. The present government policies of zero tolerance on corruption and proper fiscal management are land-able and must be encouraged at all levels in the society. Besides the government must ensure that borrowed funds are actually utilized for the greater benefit on the country and not for the top few. However, to increases spending on these sectors, governments should also reduce expenditure on these categories given the presence of budget constraint. A reallocation of government spending giving more preferences to more productive sectors is not only critical for boosting growth , but also for achieving more sustained fiscal adjustments. Government has a bigger responsibility in creating a stable and conducive economic and political environment, building general consensus and mobilizing its people in development endeavors if the country has to direct itself on a long-run growth path.

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 resources constraint governments on optimal resources allocation and prioritization of expenditure, important is the need for further disaggregation of the data in military,education and agriculture sector.

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

Finally, future research could analyze the effect of government expenditure on economic growth by concentrating on oiled economies and non-oil economies since the effect of oil and natural resources would have a greater effect on growth and also determine the extent to which economies spend.

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APPENDIX
APENDIX 1
5.5 Fixed Effect Model
Table 4.4 Capital Stock and Economic Growth in COMESA Countries disaggregated model

Fixed-effects (within) regression			Number of obs = 143			
Group variable: id			Number of groups = 9			
R-sq: within = 0.1283			Obs per group: min = 15			
Between = 0.2476			avg = 15.9			
Overall = 0.1947			max = 16			
			F(4,130) = 4.79			
corr(u_i, Xb) = 0.2895			Prob > F = 0.0012			
lngdp	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
lngcf1	.0299069	.0459815	0.65	0.517	-.0610621	.1208758
lnggfce1	-.017634	.0436478	-0.40	0.687	-.103986	.068718
lnTopen	-.5917541	.1601459	-3.70	0.000	-.9085837	-.2749246
lnpopl	-.2314674	.112065	-2.07	0.041	-.4531747	-.0097602
_cons	9.160467	.6852	13.37	0.000	7.804881	10.51605
sigma_u 1.0544218						
sigma_e .34623445						
rho .9026712 (fraction of variance due to u_i)						
F test that all u_i=0: F(8, 130) = 35.94 Prob > F = 0.0000						
. estimates store fixed						

Source:Research data

APPENDIX 2
5.6 Random Effect Model
Table 4.5 Capital Stock and Economic Growth in COMESA Countries disaggregated model

Random-effects GLS regression			Number of obs = 143			
Group variable: id			Number of groups = 9			
R-sq: within = 0.0886			Obs per group: min = 15			
between = 0.8350			avg = 15.9			
overall = 0.6916			max = 16			
			Wald chi2(4) = 38.97			
corr(u_i, X) = 0 (assumed)			Prob > chi2 = 0.0000			
lngdp	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lngcf1	.0493258	.051303	0.96	0.336	-.0512262	.1498779
lnggfce1	-.0491934	.0483225	-1.02	0.309	-.1439038	.0455171
lnTopen	-.4165013	.1653384	-2.52	0.012	-.7405586	-.0924441
lnpopl	-.6058918	.1027936	-5.89	0.000	-.8073635	-.40442
_cons	8.784493	.7372047	11.92	0.000	7.339599	10.22939
sigma_u .34943867						
sigma_e .34623445						
rho | .50460583 (fraction of variance due to u_i)						
. estimates store random						

Source:Research data

APPENDIX 3
5.7 Hausman Specification Test
Table 4.6 Capital Stock and Economic Growth in COMESA Countries disaggregated model

---- Coefficients ----				
(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))	
	fixed	random	difference	S.E.
lngcf1	.0299069	.0493258	-.019419	.
lnggfce1	-.017634	-.0491934	.0315593	.
lnTopen	-.5917541	-.4165013	-.1752528	.
lnpopl	-.2314674	-.6058918	.3744243	.0446324
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 42.84				
Prob>chi2 = 0.0000				
(V_b-V_B is not positive definite)				

Source:Research data

APPENDIX 4

5.1 Fixed Effect Model

Table 4.8 Military Expenditure and Economic Growth in COMESA Countries disaggregated model

Fixed-effects (within) regression			Number of obs = 143			
Group variable: id			Number of groups = 9			
R-sq: within = 0.1815			Obs per group: min = 15			
between = 0.4482			avg = 15.9			
overall = 0.3230			max = 16			
			F(4,130) = 7.21			
corr(u_i, Xb) = 0.4255			Prob > F = 0.0000			
lngdp	Coef.	Std. Err.	t	P>|t	[95% Conf. Interval]	
lnme1	-.0794834	.0266489	-2.98	0.003	-.132205	-.0267618
lnggfce1	-.0090666	.0420806	-0.22	0.830	-.0923181	.0741848
lnTopen	-.5204484	.1542415	-3.37	0.001	-.8255968	-.2153001
lnpopl	-.2391941	.1083722	-2.21	0.029	-.4535954	-.0247927
_cons	9.275364	.6559475	14.14	0.000	7.977651	10.57308
sigma_u 1.0157186						
sigma_e .33550773						
rho .90162511 (fraction of variance due to u_i)						
F test that all u_i=0: F(8, 130) = 42.14 Prob > F = 0.0000						

Source:Research data

APPENDIX 5
5.2 Random Effect Model
Table 4.9 Military Expenditure and Economic Growth in COMESA Countries disaggregated model

Random-effects GLS regression			Number of obs = 143			
Group variable: id			Number of groups = 9			
R-sq: within = 0.1620			Obs per group: min = 15			
Between = 0.7412			avg = 15.9			
Overall = 0.6123			max = 16			
			Wald chi2(4) = 37.49			
corr(u_i, X) = 0 (assumed)			Prob > chi2 = 0.0000			
lngdp	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lnme1	-.087144	.0281988	-3.09	0.002	-.1424126	-.0318753
lnggfce1	-.026891	.044449	-0.60	0.545	-.1140095	.0602275
lnTopen	-.4073531	.1558647	-2.61	0.009	-.7128422	-.1018639
lnpopl	-.4537676	.102585	-4.42	0.000	-.6548306	-.2527047
_cons	9.081576	.6968648	13.03	0.000	7.715746	10.44741
sigma_u .48477713						
sigma_e .33550773						
rho .67613993 (fraction of variance due to u_i)						

Source:Research data

APPENDIX 6
5.3 Hausman Specification Test
Table 5.0 Military Expenditure and Economic Growth in COMESA Countries disaggregated model

---- Coefficients ----				
(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))	
	fixed	random	Difference	S.E.
lnme1	-.0794834	-.087144	.0076605	.
lnggfce1	-.0090666	-.026891	.0178243	.
lnTopen	-.5204484	-.4073531	-.1130953	.
lnpopl|	-.2391941	-.4537676	.2145736	.0349405
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 21.07				
Prob>chi2 = 0.0003				
(V_b-V_B is not positive definite)				

Source:Research data