International Journal of Current Aspects in Finance, Banking and Accounting, Volume 3, Issue 1, 2021 PP 21-40, ISSN 2707-8035
IJCAB

Effect of Various Categories of Government Expenditure on Economic Growth in Kenya

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ABSTRACT

In Kenya, government expenditure has been changing tremendously in its composition and size. Noticeably, since Kenya's independence, government expenditure has witnessed great expansion. However, the country has not achieved consistent economic growth for a long duration of time. Despite the increase in allocation of resources through increasing public spending, economic growth has not grown at the same rate. As such, economic growth did not consummate with the increase in allocation of resources through government expenditure. The study sought to determine the effect of education expenditure, defense expenditure, health expenditure and infrastructure expenditure on economic growth. It used an explanatory research design and secondary time-series data for the period between 1985 and 2018. Data on education expenditure, defense expenditure, health expenditure as well as infrastructure expenditure and economic growth was acquired from Kenya National Bureau of Statistics. The quantitative data was collected, edited and coded into Statistical software known as STATA version 14. Analysis of the quantitative data was based on descriptive as well as inferential statistics. Correlation analysis was employed to assess the strength of correlation between independent and dependent variables whereas regression analysis determined the weight of association between independent and dependent variables. Diagnostic test was performed to test for the regression model assumptions before carrying out regression analysis. The research focused on autocorrelation test, stationarity test, autocorrelation test, normality as well as heteroscedasticity test. The study revealed that education expenditure had a positive effect on economic growth in Kenya. The study found that defense expenditure had a positive effect on economic growth in Kenya. The results revealed that health expenditure had a positive effect on economic growth in Kenya. In addition, the study found that infrastructure expenditure had a positive effect on economic growth. The study concludes that government expenditure has a significant effect on economic growth in Kenya. The study policy implication of the study is that Kenyan government as well as policy makers should formulate policies and guidelines geared towards increasing education expenditure. This will help in ensuring adequacy in a trained, qualified and productive labor that is important in ensuring an improvement in economic growth. In addition, the government of Kenya should allocate at least 15 percent of their total expenditure to the healthcare so as to ensure a productive and healthy workforce. The government also needs to increase infrastructure funding as recommended by the World Bank to between 7 and 9 percent.

Key Words: *Government Expenditure, Economic Growth*
DOI: 10.35942/ijcfa.v3i1.178
Cite this Article:
Kimani, G., & Maingi, J. (2021). Effect of Various Categories of Government Expenditure on Economic Growth in Kenya. *International Journal of Current Aspects in Finance, Banking and Accounting*, 3(1), 21-40. https://doi.org/10.35942/ijcfa.v3i1.178

1. Introduction

Economic development is the goal of every human society (Alexiou & Nellis, 2017). In the pursuit of development, efficient resources for investment on various infrastructures are required. As indicated by the Keynesian model, the aim of the expansionary fiscal system is to ensure stimulation of the economy. This is achieved by maximizing the utilization of government expenditure and minimizing taxes. It is indicated that in this case the fiscal polies fail to achieve the expected rate of growth, the government will not be in a position to attain the targeted revenue for financing the state in the following financial year (Shah & Xiaoqin, 2016). The impact of the spending on development depends on the form of its investment. However public spending can act in two different ways (Aydina & Esen, 2019). It can either affect gross product positively or affect some sectors negatively. For instance, government expenditure can negatively affect private investments hence negatively influencing the general economic growth. This happens in situations where the expenditure comes at the expense of raising taxes or the use of public debt in financing public expenditure (Chen, Yao & Lin, 2017). Mazorodze (2018) argued that the taxation value can be increased through increase in public expenditure.

Keynesian and Monetarist approaches are some of the theories used to expound the correlation between economic growth and public spending (Shah & Xiaoqin, 2016). As indicated by the Keynesian macroeconomics, several types of public spending have a positive influence on growth of the economy (Muguro, 2017). This is shown by the multiplier effects on the total demand. In addition, public consumption can negatively affect the private investments hence adversely influencing growth of the economy in the short run thereby diminishing the capital spending in the long run (Stournaras, 2010). A high level of public expenditure is likely to reduce unemployment, increase profitability in the private sector, and also increase investment via the multiplier effect on the aggregate demand. The monetarists, on the other hand, argue that since increases in money supply would cause inflation, this increase in money supply has to be regulated hence the need to regulate government expenditure (Aydina & Esen, 2019).

In the new approach, increase in gross product is triggered by continuous provision of the labour force with resources like technological resources, human resources and physical resources (Chen, Yao & Lin, 2017). Hence the accumulation of production factors influence or facilitate growth of the economy. The accumulation is brought by the massive investment in the private sector. This indicates that through proper investment in various sectors including education investment, research and development investment and investment on the government is in a position to influence the economic growth in the long run. The world development report by the World Bank in 1990 showed the scale of world's poverty and the essence of growing the economy with an aim of reducing poverty (Muguro, 2017). It is clear that some nations have made high achievements on economic growth while other countries still remain underdeveloped. In the recent historical record, some nations especially from the East Asian have good record in terms of performance and are in the process of catching up with the well-established countries. However, other nations, especially from Sub-Saharan Africa have shown negative or stagnant economic growth (Maingi, 2017). The performance of a country's economy is mostly measured in terms of change in GDP of a nation per annum. However, the figure is adjusted for the purpose of allowing comparison over time as well as allowing inflation.

All over the world, the growth of the economy has been decreasing over the years. The highest GDP growth in 1964 was at 6.6 percent while the lowest was in 2009 at -1.73 per cent. In addition, the global GDP growth was 0.74 per cent in 1975 and 0.39 per cent in 1982. The 2009 decrease in

economic growth could have resulted from the 2007-2008 post global economic depression, which is also referred to as the economic depression. This crisis is termed by many economic experts as the worst crisis ever after the Great Depression of 1930s (UNCTAD, 2017). In the year 2000, Rwanda had the highest GDP growth at 8.37 per cent among East African Countries, followed by Tanzania at 4.93 per cent, Uganda at 3.14 per cent, Kenya at 0.599 per cent and Burundi at -0.85 per cent. In the year 2017, Tanzania had a GDP growth of 7.10 per cent, followed by Rwanda at 6.05 per cent, Kenya at 4.87 per cent, Uganda at 3.86 per cent and Burundi at 0.50 per cent (UNCTAD, 2017). One of the main trends that can be observed from the performance of economic performance in East Africa Community Counties for the last 17 years is considerable fluctuations.

2. Statement of the Problem

Economic growth in Kenya has been fluctuating since the year 1961. From a GDP growth rate of 22.174 in 1971, economic growth has decreased over the years to 4.804 per cent in 2017. In addition, GDP growth rate decreased from 5.879 per cent in 2013 to 5.357 per cent in 2015. In addition, GDP growth rate decreased from 5.869 per cent in 2016 to 4.874 per cent in 2017 (World Bank, 2018). Further, economic growth measured in terms of GDP growth, decreased from 6.318 percent in 2018 to 5.366 percent in 2019. Government expenditure has been fluctuating in different sectors, which means that while it has been decreasing in some departments, it has been increasing in others in different years. In addition, public spending, as a percent of the GDP, decreased from 18.13 per cent in 2003 to 13.69 per cent in 2016. In addition, while government expenditure on defense remained stable over the years, expenditure on education decreased from 7.34 per cent in 2005 to 4.54 per cent in 2017. Further, health expenditure experienced a general decrease from 6.12 per cent in 2010 to 4.54 per cent in 2017 (The World Bank, 2018). The ever changing growth of the Kenyan economy prevents the country from reducing unemployment rate and eradicating poverty. Despite the increase in total public spending, and the varying allocation of resources in different sectors, economic growth has been fluctuating. As such, economic growth did not consummate with the increase in allocation of resources through government expenditure. Therefore, it is important to establish whether public expenditure in Kenya has any impact on economic growth.

Studies conducted on the effect of public expenditure on economic growth on Kenya have been conducted in different periods of time and have shown mixed findings. Mahrous (2016) examined the impact of changes in public spending economic growth in Kenya (1963-2015) and revealed that there is no significant association between government spending and economic growth. However, Maingi (2017) established that public spending has a significant effect on economic growth (1963-2008). However, the study was conducted between 1963 and 2008 and since this study period there has been significant changes in public expenditure. Ismail (2016) found that public expenditure on agriculture as well as infrastructure facilitates growth whereas public spending on health as well as education impacts growth in a negative way (1980-2010). Due to mixed findings by different studies it is important to establish whether government spending has a positive or negative impact on economic growth. In addition, these studies were conducted before the year 2015 and the government of Kenya has considerably increased expenditure in education, health and infrastructure in the last five years. This study thus sought to understand whether government expenditure influences economic growth in Kenya covering the year 1985 and 2017.

3. Research Questions

The researcher sought to respond to the below questions;

i. What is the effect of education expenditure on economic growth in Kenya?
ii. How does defense expenditure affect economic growth in Kenya?
iii. What is the effect of health expenditure on economic growth in Kenya?
iv. How does infrastructure expenditure affect economic growth in Kenya?

4. Theoretical Literature

There are various theories which have been employed to elaborate the relationship between economic advancement and government expenditure. Amongst them includes: Keynesian Theory, Endogenous Growth Theory and Monetarist Theory.

4.1 Keynesian Theory

The above theory was developed by a British economist known as Keynes (1936) in a book titled "*The General Theory of Employment, Interest and Money*" to comprehend the Great Depression. Keynesian theory states that increasing government expenses and lowering taxes to accelerate demand and the global economy is pulled out of the depression affects economic advancement. Proponents of this theory claim that government expenditure influences economic growth. Government expenditure is an element of fiscal policy and also can be used as an instrumental policy to impact growth. This is based on the conclusion made by Keynesian economics that in some circumstances, there was no powerful automatic formula to move employment and finished products towards full levels of employment (McDonald, 2019). In this view, rise in the government expenditure may result in rise in employment, investment as well as profitability via multiplier influence on aggregate demand. Hence, causality flows from government expenses to economic advancement. However, the government could reverse recession or depression through money borrowing from the private sector and then repaying the money to the private sector using several spending programs (Mason, 2014).

Keynesian theory claims that private sectors sometimes lead to inefficient macroeconomic outcomes. In this case, the developer recommended a combined economy with the private sector dominating but the government and public sector playing a large role. The government would establish jobs and raise the purchasing power by borrowing money to use on things such as public works. Keynesian theory implied that the government should partake a greater task in the economy because it has the ability to intervene and manage market failures effectively. In his view government intervention was superior to that of the market. Keynesian theory has laid the intellectual foundations for a well-managed and welfare-oriented form of capitalism in many economies of developing and developed countries (Foley, 2010). In relation to this study, the theory has been one of the implicit rationales for the stimulus spending: it is needed to boost economic output and promote growth (Ramey, 2009). Adoption of the Keynesian message has largely been responsible for the generally high levels of employment achieved by most developed countries and for a significant reorientation in attitudes toward the role of the state in economic life (McDonald, 2019). However, Keynesian theory is faced with the limitation that it ignores the problem of inflation which might be caused by the increase in government spending (Renshaw, 2017).

4.2 Endogenous Growth Theory

The Endogenous growth model was postulated by Arrow (1962) in response to Solow – Swan (1956) model's weakness in considering growth to be solely due to exogenous forces. It holds that growth of the economy is the outcome of the endogenous powers and not the outer powers. As

indicated by the theory; increase in productivity is resulted by continuous provision of the human resources together with other resources. The essential resources comprise human resources, physical resources, together with technological resources. This implies that growth is driven by aggregation of production factors while the aggregation in turn is due to private sector investment (Fagan, Gaspar & McAdam, 2016). The inference of the theory is the government of a certain country can influence economic growth in the long run through its persistence on national output is determined by the system governing the production process rather than by forces outside that system (Smith and Todaro, 2009). The production investment involves capital investment, education investment, as well as research and development investment. In this case improved education is very important in achieving economic growth (Spear & Young, 2018). Rather than diminishing returns to capital to define capital in the production function more broadly to include knowledge, endogenous growth theory assumes constant rather than diminishing return to capital. In relation to this study, endogenous development models recommend that administration arrangements can influence the rate of long haul monetary development by affecting the amassing of both physical and human capital and the exertion given to improvement. Henceforth, in order to maximize productivity, more resources should be availed to the human resource which consequently leads to economic growth (Rangongo & Ngwakwe, 2019).

4.3 Monetarist Theory

The Monetarist Theory was formulated by Milton Friedman (1970). This theory focuses on determination of the nominal GDP as well as the price levels through money supply. The theory states that money supply is the most important tool for economic productivity. According to its proponent, increasing money supply leads to a temporary increase in economic growth as well as job creation but in the long run it will raise inflation. Monetarists believe that monetary policy is more effective as compared to fiscal policy. There is therefore a need to control the money supply (Wood, 2014). In the view that fiscal policy, that is, government spending and taxation was not effective monetarists tended to trust free markets and disliked big governments. Government spending as a consequence fiscal policy was not helpful in bringing about economic growth. Big governments meant high expenditure and thus increased inflationary pressure which would be a disincentive to savings and investment. Where fiscal policy could be beneficial, monetary policy was the best option. Over expenditure by the government only interfered in the workings of free markets and could lead to bloated bureaucracies, social programs and large deficits (Ilyashenko, 2014).

In relation to the current study, monetarist theory is used to explain that changes in money supply through education, defense, and health and infrastructure expenditure are the major source of cyclical fluctuations in economic growth. The monetarists' view of cyclical fluctuations in terms of money shocks to the economy result in cyclical fluctuations (Gherasim, 2011). It may happen that the government (through the Central Bank) injects more money supply to fight recession when the trough of recession might be several months in the past. If so, the injection of more money supply at such time may magnify the expansion already in progress and possibly may cause the economy to overheat so that aggregate demand increases beyond the potential Gross Domestic Production level (Wilber, 2019).

5. Research Methods

This study used explanatory research design. Further, the study adopted a modified version of Ram (1986) model based on endogenous growth theory. This model was adopted since it

incorporates most of the public spending factors which can easily be separated into different sections (education, health, defense and infrastructure). Furthermore the model outlined clearly the external impact of public expenditure on the private sector. Moreover, the model displayed the productivity level of different sectors of the government spending. This model therefore laid a basis for models relating to public spending and growth of the economy. This is so since growth of the economy improves as a result of incorporating both labor and capital resources as additional resources for facilitating public production. This therefore creates the linkage between public spending and growth of the economy. The model was derived from private sector output (D) and public sector output (G), with capital (K) and labor (L) allocated between both sectors such that $K = K_D + K_G$ and $L = L_D + L_G$ according to the growth theory. To capture externalities associated with the public sector, *G* entered the production function of the private sector *D* following:

$D = D(K_D, L_D, G)$ ..... (1)

$G = G(K_D, L_D)$ ..... (2)

Assuming constant productivity differential between labors in both sectors:

$\frac{G_L}{D_L} = \frac{G_K}{D_K} = (1 + \delta)$..... .... (3)

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

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

$dY = D_K dK_D + G_K dK_G + D_L dL_G + G_L dL_G + D_G dG$ ..... (4)

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

Similarly, D_L and G_L were marginal products of factor L. Further, D_G was the marginal externality effect of public on private sector. From (3.3):

$G_L = (1 + \delta)D_L$ ..... (5)

Substituting (5) into (4) and rearranging:

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

$dY = D_K dK_D + G_K dK_G + D_L(dL_D + dL_G) + \delta D_L dL_G + D_G dG$ ..... (6)

Using (3.5) in model then:

$dG = G_K dK_G + (dL_D + dL_G)D_L dL_G$

This implied:

$\frac{dG}{(1+\delta)} = \frac{G_K}{(1+\delta)} dK_G = D_L dL_G$..... (7)

Substituting (7) into (6) and collecting terms:

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

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

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

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

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

$dY = D_K dK_D + D_L dL_D + (1 + D_G)dG$ ..... (8)

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

Letting $dK_D = 1$ (gross investment), and substituting it into (3.8), then dividing through by Y gave:

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

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

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

$\frac{dY}{Y} = D_K \frac{I}{Y} + \frac{\frac{Y}{L} dL_D}{Y} + \frac{(1+D_G)dG}{Y}$ ..... (9)

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

$\frac{dY}{Y} \alpha \frac{I}{Y} + \beta \frac{dL_D}{L} ʎ \frac{dG}{Y}$ ..... (10)

Where equation (10) matched with Ram (1986) equation. Thus, equation (3.10) created the basic model for estimating regression. The theoretical framework presented above predicts that economic productivity $\left(\frac{dY}{Y}\right)$ responds to the ratio of gross investment (I) to GDP, growth of labor force $\frac{dL_D}{Y}$ and the ratio of public spending to GDP $\left(\frac{Cg}{Y}\right)$ the mechanisms through which public spending influences growth of the economy are as follows. First public investment on infrastructure directly impacts growth of the economy whereby it raises the capital stock in the economy. Secondly, public spending impacts growth of the economy inversely through expansion of the marginal productivity of private production factors. This is done through education spending, healthcare spending as well as spending on other services which facilitates human capital accumulation. Thirdly, public spending on products facilitated the aggregate economic demand. The last channel is the public spending on inter-departmental productivity variances which favors some sectors as compared to others in terms of productivity.

The study used ordinary least squares (OLS) method, which is a type of linear least squares method for estimating the unknown parameters in a linear regression model (Kothari, 2012). As indicated by Ram (1986) study in the endogenous growth model, total government expenditure is disintegrated into human capital expenditure, consumption expenditure and investment expenditure. This study focused on both consumption expenditure and investment expenditure. The defense and health expenditure are both consumption expenditure and investment expenditure. However, education and infrastructure expenditure were taken as investment expenditures in this study.

The first objective of on-going study was to determine the effect of education expenditure on economic growth in Kenya. Regression model was;

$GDP_t = \beta_0 + \beta_{1t} EE_t + \varepsilon_t GDP_t = \beta_0 + \beta_{1t} EE_t + \varepsilon_t$

..... (11)

GDP_tGDP_t is dependent variable (Gross Domestic Product), B_0 is y intercept (Constant), β_1 and coefficient of determination, $EE_{1t}EE_{1t}$ is Education Expenditure, t represents time and $\varepsilon_t\varepsilon_t$ is an error term.

The second objective of the study was to examine the effect of defense expenditure on economic growth in Kenya. Regression model was as follows;

$$GDP_t = \beta_0 + \beta_{1t}DE_t + \varepsilon_t GDP_t = \beta_0 + \beta_{1t}DE_t + \varepsilon_t$$

…… (12)

GDP_tGDP_t is the dependent variable (Gross Domestic Product), B_0 is the y intercept (Constant), β_1 and coefficient of determination, DE_tDE_t is the Defense Expenditure, t represents time and ε_t ε_t is an error term.

The third objective of the study was to assess the effect of health expenditure on economic growth in Kenya. Regression model was as follows;

$$GDP_t = \beta_0 + \beta_{3t}HE_t + \varepsilon_t GDP_t = \beta_0 + \beta_{3t}HE_t + \varepsilon_t$$

…… (13)

GDP_tGDP_t Is the dependent variable (Gross Domestic Product), B_0 is y intercept (Constant), β_1 and coefficient of determination, HE_tHE_t is Health Expenditure, t represents time and $\varepsilon_t\varepsilon_t$ is an error term.

The fourth objective was to examine the effect of IE on growth of the economy in Kenya. Regression model was as follows;

$$GDP_t = \beta_0 + \beta_{1t}IE_t + \varepsilon_t GDP_t = \beta_0 + \beta_{1t}IE_t + \varepsilon_t$$

…… (14)

GDP_tGDP_t Is the dependent variable (Gross Domestic Product), B_0 is the y intercept (Constant), β_1 and coefficient of determination, IE_tIE_t is Infrastructure Expenditure, t represents time and ε_t ε_t is an error term.

In the multivariate model on the effect of various categories of government expenditure (education expenditure, defense expenditure, health expenditure and infrastructure expenditure) on economic growth in Kenya the study also used three control variables: Terms of Trade, Inflation and Public Debt (Alexiou & Nellis, 2017). The regression model was as follows;

$$GDP_t = \beta_0 + \beta_{1t}EE_t + \beta_{2t}DE_t + \beta_{3t}HE_t + \beta_{4t}IE_t + \beta_{5t}ToT_t + \beta_{6t}PD_t + \beta_{7t}In_t + \varepsilon_t$$

$$GDP_t = \beta_0 + \beta_{1t}EE_t + \beta_{2t}DE_t + \beta_{3t}HE_t + \beta_{4t}IE_t + \beta_{5t}ToT_t + \beta_{6t}PD_t + \beta_{7t}In_t + \varepsilon_t \quad (15)$$

GDP_tGDP_t is the dependent variable (Gross Domestic Product), B_0 is the y intercept (Constant), β_1- β_4 and coefficients of determination, $EE_{1t}\,EE_{1t}$ is the Education Expenditure, ME_tME_t is the Defense Expenditure, HE_tHE_t is Health Expenditure, and IE_tIE_t is Infrastructure Expenditure, ToT_tToT_t is Terms of Trade, PD_tPD_t Public Debt, In_tIn_t Inflation, t represents time and $\varepsilon_t\varepsilon_t$ is an error term.

In the present study, secondary data covered a period between 1985 and 2018. Data on education expenditure, defense expenditure, health expenditure and infrastructure expenditure and economic growth was obtained from Kenya National Bureau of Statistics (KNBS). Quantitative data was gathered, edited and coded into Statistical software known as STATA version 14. Data was analyzed using descriptive and inferential statistics. Descriptive statistics focused on computation of mean, percentage, standard deviation and frequencies. Inferential statistics focused on calculation of correlation and multivariate regression analysis. Regression analysis was used to examine the weight of the relationship between independent variables and dependent variables. The multiple regression method was used in the study to determine the effect of the independent variables (education expenditure, defense expenditure, health expenditure and infrastructure expenditure) on the dependent variable (Russell, 2013).

6. Data Analysis

6.1 Correlation Analysis

This study adopted Pearson product-moment correlation coefficient to conduct a correlation analysis between independent and dependent variables.

Table 1: Correlations Coefficient for Variables in the Study

		Gross Domestic Product	Education Expenditure	Defense Expenditure	Health Expenditure	Infrastructure Expenditure
Gross Domestic Product	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	34				
Education Expenditure	Pearson Correlation	.720**	1			
	Sig. (2-tailed)	.000				
	N	34	34			
Defense Expenditure	Pearson Correlation	.344*	.061	1		
	Sig. (2-tailed)	.047	.135			
	N	34	34	34		

		Gross Domestic Product	Education Expenditure	Defense Expenditure	Health Expenditure	Infrastructure Expenditure
Health Expenditure	Pearson Correlation	.630**	.102	.061	1	
	Sig. (2-tailed)	.000	.921	.135		
	N	34	34	34	34	
Infrastructure Expenditure	Pearson Correlation	.503**	.330	.052	.058	1
	Sig. (2-tailed)	.002	.056	.182	.161	
	N	34	34	34	34	34

Source: Research Data (2020)

From the study findings as depicted in Table 1, there is a positive relationship between education expenditure and economic growth (GDP) in Kenya (r = 720, p-value=0.000). These findings are contrary to Kouton (2018) observation that government education spending has no short term impact on Côte d'Ivoire's growth of the economy and there is a negative long term impact of education spending on economic growth. Further, findings revealed that defense expenditure had a positive significant association with economic growth (GDP) in Kenya (r = 0.344, p-value=0.035). These findings agree with Ismail (2017) who found a positive impact of defense spending on economic growth in South Asian Countries. However, according to Apanisile and Okunlola (2013), defense expenditure affects economic growth in a negative way in the short run as well as a positive way in the long run.

Moreover, results show that health expenditure had a positive correlation with economic growth (GDP) in Kenya (r= 0.603, p-value=0.000). These findings conform to Aboubacar and Xu (2017) argument that health spending and growth of the economy have a positive relationship which is also significant. Further, Ilori and AjiboyeI(2015) argued that spending on health care and capital has a positive impact on growth of Nigerian economy. In addition, the findings show that infrastructure expenditure had a positive correlation with growth of the economy (GDP) in Kenya (r=0.503, p-value=0.002). The findings are contrary to Ochieng, Shukla, Okello and Oduor (2017) findings that have a significant negative impact of infrastructure expenditure on economic growth in Rwanda. However, Iheanacho and Iheanacho (2016) found that recurrent infrastructure expenditure has a positive effect on economic productivity within Nigeria.

6.2 Univariate Regression Results

The study used univariate regression analysis to determine the weight of the relationship between dependent economic growth in Kenya and each of the variables education expenditure, defense expenditure, health expenditure as well as infrastructure expenditure. The univariate regression was used since the correlation coefficient does to depict any causal association among variables thus there was a need to assess the weight of the relationships among the variables. Univariate regression analysis enabled the study to determine the influence of education expenditure, defense expenditure, health expenditure as well as infrastructure expenditure on economic growth in Kenya.

6.2.1 Effect of Education Expenditure on Economic Growth

The first objective was to determine the effect of education expenditure on growth of the economy in Kenya. The results were as presented in Table 2.

Table 2: Regression Coefficient for Education Expenditure and Economic Growth

Source	**SS**	**df**	**MS**	Number of Obs	= 34
Model	72.752	1	72.752	F(1,32)	= 34.44
Residual	67.604	32	2.113	Prob > 5	= 0.000
				R-Squared	= 0.518
Total	140.357	33	4.253	Adj R-squared	= 0.503
				Root MSE	= 1.454

Gross Domestic Product	Coef.	Std. Err.	t	P>[t]	[95% Conf. Interval]	
Education Expenditure	1.157	.197	5.87	0.000	0.755	1.559
Cons	-1.919	1.101	-1.74	0.091	-4.163	.324

Source: Research Data (2020)

The R-squared for the relationship between education expenditure and economic growth was 0.518. This indicated that education expenditure can explain 51.8percent of the economic growth in Kenya. Moreover, the p-value for F-statistic was 0.000, which shows that the model fitted the data well, hence could be deployed in predicting the effect of education expenditure on economic growth in Kenya. The results show that education expenditure has a positive effect on economic growth as indicated by the regression coefficient of 1.157. This denotes that an increase in education expenditure by 1 percent would increase economic growth by 1.157619 percent. The p-value (0.000) was less than the significance level (0.05) hence the regression coefficient was significant. The findings agree with Musila and Belassi (2004) observation that education spending per employee was found to influence growth of the economy in a positive and significant way. Also, the findings agree with Trabelsi (2017) findings that education expenditure had a positive impact on economic growth in Tunisia.

6.2.2 Effect of Defense Expenditure on Economic Growth

The second objective of the study was to examine the effect of defense expenditure on economic growth in Kenya. The results were as presented in Table 3.

Table 3: Regression Coefficient for Defense Expenditure and Economic Growth

Source	**SS**	**df**	**MS**	Number of Obs	= 34
Model	16.562	1	16.562	F(1,32)	= 4.28
Residual	123.795	32	3.868	Prob > 5	= 0.046
				R-Squared	= 0.118
Total	140.357	33	4.253	Adj R-squared	= 0.090
				Root MSE	= 1.967

Gross Domestic Product	Coef.	Std. Err.	t	P>[t]	[95% Conf. Interval]	
Defense Expenditure	1.181	.571	2.07	0.047	.018	2.344
Cons	1.375	1.024	2.32	0.027	.289	4.462

Source: Research Data (2020)

The results, as shown in Table 3, show that the relationship between defense expenditure and economic growth in Kenya had an R-squared of 0.118. The findings show that defense expenditure can explain 11.8 percent of the economic growth in Kenya. In addition, the p-value for F-statistic was 0.000, which shows that the model fitted the data well hence could be deployed in predicting the effect of defense expenditure on economic growth in Kenya. The results show that defense expenditure has a positive effect on economic growth in Kenya as indicated by a regression coefficient of 1.18113. These findings imply that 1percent increase in defense expenditure would increase economic growth by 1.18113percent. Findings conform to Khalid and Noor (2015) findings that defense spending has positive as well as significant effects on economic productivity in developing countries. Also, findings are in agreement with Apanisile and Okunlola (2013) findings that defense expenses do not influence economic productivity in Nigeria.

6.2.3 Effect of Health Expenditure on Economic Growth

The third objective of the study was to assess the effect of health expenditure on economic growth in Kenya. The results were as presented in Table 4.

Table 4: Regression Coefficient for Health Expenditure and Economic Growth

Source	**SS**	**df**	**MS**	Number of Obs	= 34	
Model	55.622	1	55.622	F(1,32)	= 21.01	
Residual	84.735	32	2.647	Prob > 5	= 0.000	
				R-Squared	= 0.396	
Total	140.357	33	4.253	Adj R-squared	= 0.377	
				Root MSE	= 1.627	
Gross Domestic Product	Coef.	Std. Err.	t	P>[t]	[95% Conf. Interval]	
Health Expenditure	.913	.199	4.58	0.000	.507	1.319
Cons	.259	.941	0.28	0.785	-1.656	2.176

Source: Research Data (2020)

As shown in Table 4, R-squared for the relationship between health expenditure and economic growth was 0.396. This indicates that the independent variable (health expenditure) can explain 39.6percent of the economic growth in Kenya. Moreover, the p-value for F-statistic was 0.000, which shows that the model fitted the data well hence could be deployed in predicting the effect of health expenditure on economic growth in Kenya.

The results show that health expenditure has a positive effect on economic growth as indicated by a regression coefficient of 0.913. This denotes that an increase in health expenditure by one percent

would lead to an increase in economic growth by 0.913 percent. P-value (0.000) was not more than a significance level of 0.05. These findings agree with Ilori and Ajiboye(2015) observation that spending on health care and capital has a positive impact on growth of Nigerian economy. In addition, the findings agree with Boussalem, Boussalem and Taiba (2014) argument that government spending in health had a long term effect on economic productivity in Nigeria.

6.2.4 Effect of Infrastructure Expenditure on Economic Growth

The fourth objective of the study was to establish the effect of infrastructure expenditure on the growth of Kenyan economy. The results were as presented in Table 5.

Table 5: Regression Coefficient for Infrastructure Expenditure and Economic Growth

Source	**SS**	**df**	**MS**	Number of Obs	= 34
Model	35.457	1	35.458	F(1,32)	= 10.82
Residual	104.899	32	3.278	Prob > 5	= 0.025
				R-Squared	= 0.253
Total	140.357	33	4.253	Adj R-squared	= 0.229
				Root MSE	= 1.810
Gross Domestic Product	Coef.	Std. Err.	t	P>[t]	[95% Conf. Interval]
Infrastructure Expenditure	.458	.139	3.29	0.002	.174 .742
Cons	1.837	.832	2.21	0.035	.142 3.532

Source: Research Data (2020)

As indicated in Table 4.11, the results show that the relationship between infrastructure expenditure and economic growth in Kenya had an R-squared of 0.253. The findings show that infrastructure expenditure can explain 25.3percent of the economic growth in Kenya. In addition, the p-value for F-statistic was 0.000, which shows that the model fitted the data well hence could be deployed in predicting the effect of infrastructure expenditure on EG in Kenya.

The results show that infrastructure expenditure has a positive effect on economic growth in Kenya as indicated by a regression coefficient of 0.458. The findings imply that 1 percent increase in infrastructure expenditure would increase EG by 0.458percent. These findings conform to Babatunde (2018) findings that public spending on infrastructure including communication and transport had a significant positive impact on growth of Nigerian economy. However, findings are contrary to Iheanacho and Iheanacho (2016) argument that negative as well as significant effects exist between infrastructure capitals spending on growth of the economy in the long run.

4.3 Multivariate Regression

In the multivariate regression model on the effect of government expenditure (education expenditure, defense expenditure, health expenditure as well as infrastructure expenditure) on growth of Kenyan economy, the study also used three control variables: Terms of Trade, Inflation and Public Debt. The results were as presented in Table 6.

Table 6: Multivariate Regression coefficients

Source	**SS**	**df**	**MS**	Number of Obs	= 34
Model	113.618	7	16.231	F(1,32)	= 15.78
Residual	26.739	26	1.028	Prob > 5	= 0.000
				R-Squared	= 0.809
Total	140.357	33	4.253	Adj R-squared	= 0.758
				Root MSE	= 1.014

Gross Domestic Product	Coef.	Std. Err.	t	P>[t]	[95% Conf. Interval]	
Education Expenditure	.951	.217	4.39	0.000	0.505	1.397
Defense Expenditure	1.097	.495	2.21	0.036	0.079	2.116
Health Expenditure	.769	.337	2.28	0.031	0.076	1.463
Infrastructure Expenditure	-.501	.323	-1.55	0.134	-1.166	.164
Terms of Trade	-.073	.094	-0.77	0.448	-.267	.121
Inflation	.023	.007	3.44	0.002	.009	.037
Public debt	.002	.018	0.11	0.914	-.037	.041
Cons	-5.427	1.802	-3.01	0.006	-9.131	-1.723

Source: Research Data (2020)

R-squared for the relationship of the four independent variables (education expenditure, defense expenditure, health expenditure and infrastructure expenditure), control variables (public debt, inflation and terms of trade) and the dependent variable (economic growth in Kenya) was 0809. This indicates that the four independent variables and the three control variables can help in explaining 80.9percent of the economic growth in Kenya, as a percent of the GDP. Moreover, the p-value for F-statistic was 0.000, which shows that the model can be used in predicting the effect of the government expenditure and control variables (public debt, inflation and terms of trade) on economic growth. Results show that education expenditure has a positive as well as significant effect on the economic growth in Kenya as indicated by a regression coefficient of 0.951. The p-value (0.000) was not more than significance level (0.05) and hence the regression coefficient was significant. This implies that one percent increase in education expenditure would lead to a 0.951 increase in growth of the economy. These findings are contrary to Kouton (2018) observation that government education spending has no short term impact on Côte d'Ivoire's growth of the economy and there is negative long term impact of education expenditure on economic growth.

In addition, the results revealed that defense expenditure has a positive significant effect on economic growth as indicated by the regression coefficient of 1.097. P-value (0.036) was not more than a significance level of 0.05, hence the regression coefficient was significant. This shows that a one percent increase in defense expenditure would lead to a 1.097 increase in growth of Kenyan economy. These findings agree with Ismail (2017) who found a positive impact of defense expenditure on economic growth in South Asian Countries. Further, results show that health expenditure has a positive significant influence on economic growth as shown by the regression coefficient of 0.769. P-value (0.031) was less than significance level (0.05) and hence the regression coefficient was significant. This denotes that 1 percent increase in health expenditure

would lead to 0.769 increase in growth of Kenyan economy. Findings agree with Ilori and Ajiboye (2015) argument that spending on health care as well as capital has a positive impact on economic growth in Nigeria.

The results found that infrastructure expenditure has an inverse as well as insignificant effect on economic growth in Kenya as indicated by a regression coefficient of -0.501. P-value (0.134) was greater than significance level (0.05) and hence the regression coefficient was not significant. Moreover, the results are contrary to Iheanacho and Iheanacho (2016) findings that recurrent spending on infrastructure has a positive effect on economic productivity in Nigeria. Moreover, results show that terms of trade had a negative effect on economic growth in Kenya as indicated by a regression coefficient of -0.073. P-value (0.448) was greater than significance level (0.05) and hence the regression coefficient was insignificant. The results show that inflation (consumer price index) had a positive effect on economic growth in Kenya as indicated by a repression coefficient of 0.023. P-value (0.002) was less than significance level (0.05) and hence the regression coefficient was significant. Also, the findings indicated that public debt had a positive effect on economic growth in Kenya as indicated by a repression coefficient of 0.002. P-value (0.914) was greater than significance level (0.05) and hence the regression coefficient was insignificant.

7. Conclusions

The study concludes education expenditure has a positive effect on economic growth in Kenya. Economic growth of developing countries like Kenya is dependent on the effectiveness of the education system, whose contribution is based on providing a trained, qualified and productive labor. The study also concludes that defense expenditure has a positive effect on economic growth in Kenya. Increase in defense is not a waste of money but a key step in managing the national defense. With the higher number of Al-Shabaab attacks in the country, defense expenditure helps in increasing investors' confidence with the national security. The study further concludes that health expenditure has a positive effect on economic growth in Kenya. Health is a key determinant of economic growth as a healthy population denotes higher productivity, hence higher income per head. In addition, the study concludes that infrastructure expenditure has a positive effect on economic growth in Kenya. Infrastructure raises growth as well as lowers income inequality, which implies that for poverty reduction development of infrastructure may be a major win-win ingredient. Additionally to raise society's overall income level, it would raise the income of the poor more than proportionately. The study concludes that while inflation showed a positive and significant effect on growth of Kenya economy, terms of trade and public debt had insignificant effect on economic growth.

8. Policy Implications

The study recommends that Kenyan government as well as policy makers should formulate policies and guidelines geared towards increasing education expenditure so as to ensure adequacy in a trained, qualified and productive labor that is important in ensuring an improvement in economic growth. The research also recommends that the Kenyan government ought to improve on its defense expenditure. However, this should only be increased to a certain limit, otherwise it will start using resources that are supposed to be used in other investments for instance infrastructure, education as well as health. In the year 2001, countries in African Union promised to assign at least 15percent of their budget to the health sector, in an Abuja declaration. Nevertheless, since then the year 2001, the country is not even close to achieving this objective.

The study recommends that the government of Kenya should allocate at least 15 percent of their total expenditure to the healthcare so as to ensure a productive and healthy workforce.

The government needs to increase infrastructure funding to 7to 9percent of GDP as recommended by the World Bank. This will lead to increased productivity due to increased physical and human capital thus high economic growth. In addition, misappropriation of public funds allocated to infrastructure investment needs to be curbed by sealing any loopholes identified and carrying out regular monitoring and evaluation on their use. Investors are discouraged by negative inflation rates due to lower rate of return in profits. The study hence recommends that the government of Kenya should formulate policies to curb inflation rate to levels that speeds up investment. This study recommends that the government should develop tight fiscal policies to reduce inflation. The study recommends that development of supply side policies to increase long-term competitiveness through privatization as well as deregulation, which helps in reducing cost of businesses and hence leading to lower inflation.

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