Does Composition of Public Expenditure affect Economic growth? Evidence from Kenya

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Does Composition of Public Expenditure affect Economic growth? Evidence from Kenya

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Abstract

Purpose: The main purpose of this study was to examine the impact of public expenditure on economic growth in Kenya with a view of establishing which specific components of government expenditure have significant impact on economic growth.

Methodology: The analysis was presented in the framework of a simple neoclassical production function of Cobb-Douglas production equation. Econometric model was used to link between various components of government expenditure and economic growth without pre-judging which area should be productive or unproductive. The study examined the properties of time series, after which the regression was estimated using ordinary least squares method. Testing unit root tests, co integration test and granger causality tests was also carried. Error correction model was used to guard against the possibility of a spurious relationship while maintaining thelevel information.

Results: Descriptive statistics indicates that there has been a steady increase in the real GDP from 1980 up until 2007 where a decrease was recorded. Jarque-Bera test statistic revealed that real agriculture, capital, defense, education, health, order and safety and transport expenditures are not normally distributed while GDP and labor were normally distributed. Bivariate correlation results presented indicate that there is a very strong and significantly positive correlation between the independent variables. The test results of the unit roots indicated that all variables are non-stationary. The model r squared was 0.998. This implied that the goodness of fit of the model was satisfactory as 99.8% of the variation in GDP was explained by the independent variables. The overall model was significant as demonstrated by an F statistic of 1480.4 (p value= 0.000).This further implied that the independent variables were good joint good predictors of long run GDP

Unique contribution to theory, practice and policy: The study recommends that government should spend in key areas that are likely to stimulate growth. Resources should be channeled to the education as it has a significant effect on GDP. It is also recommended that political instability should be addressed since it has a negative effect on GDP.

Key words: *Public expenditure, economic growth, policy recommendations.*

1.0 INTRODUCTION

In a bid to achieve the Millennium Development Goals (MDGs), most developing countries have intensified their efforts through increasing and redirecting resources towards achievement of these development objectives. Their major concern is whether public spending affects economic growth and how available public resources should be allocated among competing sectors such as education, agriculture, infrastructure, health and defense amongst others in order to achieve economic growth objectives (Bingxin *et al.,* 2009).

In these countries, expenditure needs exceed the available resources and they have limited options of raising additional revenue domestically. They have a large informal sector and no effective way of collecting taxes from this sector and hence a narrow tax base. Any attempt to raise more tax revenue is thus felt as a disincentive for private investment. The debt carrying capacity of these countries is also very low and external financing is least attractive. The only favorable option involves prioritizing government spending to the more efficient uses in a bid to achieve economic growth objectives. Therefore, the effective use of public resources for improvement of both human and physical capital would result to increased productivity and income, consequently expanding the scope for both private and public consumption opportunities (World Bank, 2007).

There has been rapid growth in government expenditure in Kenya despite the government's effort to rationalize expenditure through downsizing and other budgetary measures. This rise in public expenditure was witnessed against a sluggish economic growth raising a lot of concern among policy makers on the implication of such an expenditure on economic growth (Kibe, 2009). The public expenditure policy adopted by the Kenya government is targeted towards putting the economy on the vision 2030 growth path.

This public spending is based on the need to increase investment in key priority social and economic sectors together with critical physical infrastructure such as roads, rail, power generation and distribution, port modernization and expansion. The link between policy, planning and allocation of public resources has been strengthened through the medium term expenditure framework (MTEF) budget preparation process that underscores the importance of program based budgeting. This is intended to optimize returns from public investment through prioritized spending and enhanced absorption of budgeted funds.

The Kenyan budgetary expenditure comprises of two components, recurrent expenditure and development expenditure. Recurrent expenditure are the provisions made to meet government operations such as compensation to employees in the form of salaries and wages, transport operation expenses, repairs and maintenance of equipment. Development expenditures are provisions made for the creation of new assets. They include expenditures such as construction of roads, rehabilitation and construction of water installations and transfers from government to other agencies for capital expenditure. Development expenditure comprises of total expenditures from all the development projects undertaken by ministries. It accounts for slightly over 10 percent of total Government Expenditure and has been the most vulnerable to budget reductions.

1.1 Statement of the Problem

Public expenditure in Kenya has grown tremendously over the years despite the government efforts to rationalize expenditure through downsizing and other budgeting measures. As a result the government is faced with hard choices when undertaking public expenditure cuts since the

question of which component of public expenditure should be cut; whether health, education, infrastructure or defense depends on the contribution of these components to economic growth. Thus, there is a cause of concern to policy makers on the implications of such expenditure cuts to economic growth.

This paper therefore seeks to examine the different components of public spending in Kenya and how they influence the achievement of growth objectives. This research will analyze the trends and composition of Government expenditure and the contribution of each component to economic growth using 30 years time series data over the period 1982 to 2011. The results of the analysis will show the productive sectors of the economy where there is need for the Government to prioritize its expenditure allocations. The results will also enable policy makers to focus on sectors where expenditure cuts should be implemented in order to achieve budget rationalization and downsizing.

1.2 Objectives of the Study

(i) To examine the long- run effects of components of government expenditure on GDP growth rate.
(ii) To analyze the short-run effects of government expenditure reforms on economic growth.
(iii) To derive policy implications based on (i) and (ii) and give appropriate policy recommendations.

2.0 LITERATURE REVIEW

The possibility of a long run relationship between government spending and economic growth is discussed in the endogenous growth framework which stresses the composition of public expenditure as one of the determinants of growth (Sanz & Velazquez, 2001). Within the endogenous growth model, governments make policies aimed at improving the factor allocation where market forces have failed to do so. The model makes a distinction between nonproductive and productive public expenditure whereas productive public expenditure is believed to be critical in complementing private sector production.

Government consumption affect private sector productivity since an increase in share of non-productive government expenditures may affect incentive to invest which in turn affects GDP growth (Sennoga & Matovu, 2010). In addition to the growth-boosting public expenditures, the government provides some goods to create a favorable environment for economic growth. An example is provision of security and political stability. These contribute to public input by creating a safe environment for private investments and maintenance of stable institutions where economic activity can thrive (Nijkamp & Poot, 2004).

According to Keynes, there is need for government spending to increase employment when the economy is in depression with high unemployment of labor and capital. In his theory, government spending is necessary in promoting growth. However, lobbying by interest groups, political parties and private sector may lead to misallocation of these public resources. Increase of expenditure by government may also result to crowding out of private sector. Similarly if government cut spending there may be a decline in private investment (Mudaki & Masaviru, 2012). While Keynesian view argues that public consumption affect the economy positively, the

classical economists assert that the effect is temporally since long run adjustment of prices lead to optimal output and employment levels (Ocran, 2009)

Other justifications for government spending include; failure of markets to provide particular goods and services due to enormous initial costs and uncertain profits. Perfect example is research and development. Second is free rider problem where there is limited ability to charge a price or exclude those who have not paid from using the good or service. An example of such service is defense. The production of some goods is considered unprofitable on a scale demanded by the market therefore necessitating public spending. Therefore, public inputs, natural monopolies and spill-over effects are the reasons for government provision (Pejsavora, 2011).

Government's provision of public goods, make the private sector more efficient through reduction of transaction costs. Examples of public goods are roads, justice, defense and security. However, they are unprofitable if offered by the private sector because of their collective nature. Merit goods on the other hand are provided by government since the benefits the economy derives from them is way beyond their value in a private market (Hutchinson & Schumacher 1997). Examples of merit goods are education and healthcare. Government intervention in provision of healthcare is as a result of unique characteristics of this sector namely asymmetric information and externalities. There exists a positive effect of public health expenditure on life expectancy especially in developing countries. A higher share of government spending on this sector is thus believed to foster economic growth (Aisa & Pueyo, 2004).

Public spending on infrastructure is also viewed to have a strong growth-promoting effect as it impacts productivity of private inputs and return on capital, especially for a country growing from a low base of infrastructure assets. Good public infrastructure reduces the need for the private sector to spend on maintenance of its own stock of physical capital, raising the rate of capital formation and hence spurring economic growth (Sennoga & Matovu, 2010).

The objective of the government is to reallocate society's resources between private and public uses to improve economic efficiency. It is therefore expected that public expenditure should influence growth positively unless there exists some level of inefficiency that could erode this positive contribution (Hutchison and Schumacher, 1997). However, there exists no generally accepted optimal expenditure policy to provide well-defined rules for optimal expenditure allocation amongst several competing needs. For this reason, various guidelines proposed and used by public finance specialists are basically good practices perceived to have positive contribution to existing literature (Paternostro et *al.,* 2007). All governments are faced with tough choices on the optimal size necessary to achieve their objectives of welfare maximization, political stability and sustainable economic growth. This study focuses effect of public expenditure on the lastly mentioned goal bearing in mind that the government has limited resources and many competing needs.

2.1 Empirical Review

Devarajan, *et al.,* (1996) in their study on the composition of public expenditure and economic growth, used annual time series data for 43 developing countries for the period 1970 to 1990. In their model they did not classify government expenditure as productive and unproductive expenditure but instead allowed the results of the data demonstrate which components would be classified as productive. They used central government expenditure including current and capital

expenditure on defense, education, health, transport and communication with the share of each component of total government expenditure being the explanatory variable. The dependent variable was a five year moving average of per capita GDP growth with five year lags being used to eliminate short term fluctuations resulting from shifts in public expenditure.

The results of OLS estimation revealed both physical productivity of different components of public spending and the shares of government expenditure allocated to them matter for economic growth. They concluded that though the governments in developing countries may be focusing on capital expenditure as an engine for growth, current expenditures like maintenance may yield higher returns than the capital expenditure. This study ignored the fact that different countries have different objective functions which affects their choice of the level and composition of public spending. It is therefore important to narrow down to the specific countries in order to better results.

Pejsarova (2011) in his study, composition of public expenditure and growth: is there a nexus, used an Autoregressive Distributed Lag model to estimate the long run relationship between fiscal variables and growth using panel data of four Central European countries from 1995-2010. He argued that, components of government expenditure affect economic growth over an extended time period. He estimated the growth effects of per capita GDP on both levels and shares of various components of public expenditures in consideration to government decentralization and budget constraint. LSDV (Least Squares Dummy Variable) method was applied with the dependent variable taken as GDP per capita growth and its three year forward moving average. The explanatory variables included the respective levels and shares of different components of public spending, public revenues and control variables.

The results revealed a significant negative relationship between health expenditure and economic growth. Public spending on economic affairs exhibited negative but insignificant effect on three year per capita growth. The implication of this study was that shift from economic affairs spending towards spending on education or capital transfers may actually benefit economic growth.

Narvaez (2000) studied the effects of different components of public expenditure on per capita economic growth rate in a set of Low and Middle-Income Countries (LMICs) across the world over the period 1975 – 2000 using a variation of the augmented Solow model. The per capita GDP growth rate was used as the dependent variable while government spending was disaggregated to different components. The results of generalized method of moments (GMM) estimator revealed that there exists a positive and statistically significant effect of government spending on education, transport and communications, and a negative effect on spending on other economic affairs in a set of LMICs. The conclusion was that composition of government spending does matter for growth in the set of LMICs.

A recent study by Nurudeen and Usman, (2010) attempted to explain why rising government expenditure had not translated to meaningful development in Nigeria using time series data from 1970-2008. They treated both the level and composition of government expenditure as important determinants of growth. Economic growth (GRY) was expressed as a function of various levels and components of government expenditure. The results of OLS estimation revealed government expenditure on transport and communication, education and health are statistically significant in

explaining changes in economic growth. However, expenditures on defense and agriculture are insignificant.

Wang and Davis (2009), in their study on the Composition of State and Local Government Expenditures and Economic Growth, investigated how different areas of state and local government expenditure are related with economic growth at the state level. They applied Two-step GMM method to study the effects of different areas of state and local government expenditure on growth. The data drawn from the 48 U.S. states was spanned into three ten-year time periods from 1970-1980 though 1990-2000 and the dependent variable was the average ten-year growth in real per capita income in dollars. The independent variables included nine areas of state and local government expenditures namely expenditures on education, public welfare, highway, hospital and health, public safety, environment and housing, government administration, utility, and insurance trust.

The results revealed that state and local government expenditure on highway, public safety, and utilities affect growth positively while expenditure on state and local expenditures on education, hospitals and health, and administration were negatively related to growth. Changes of expenditures on environment and housing and insurance trust also had negative impacts on growth. The results conform to the assumption that different areas of expenditure affect growth differently.

Bingxin *et al.,* (2009) in the study; Does Composition of Government Spending Matter to Economic Growth assessed the impact of the composition of government spending on economic growth in developing countries using a dynamic GMM model and a panel data set for 44 developing countries Asia, Africa and Latin America between 1980-2004. The results of the generalized method of moments (GMM) estimator indicated that the performance of government spending in economic growth is mixed. In Africa, government spending in human capital was particularly strong in promoting economic growth while in Asia, human capital, agriculture, and education expenditure were all found to have positive significant impact on economic growth. However, data from Latin America revealed that none of the government spending items had any significant impact on GDP growth. The conclusion was that for governments to improve efficiency there is need to reallocate spending among sectors hence allocating more resources to the sectors that boost economic growth. This explains the need for empirical research on how different components of public expenditure affect growth at country level.

In Kenya, Maingi, (2011) examined the effects of components of government expenditure on GDP growth using time series data for the period. 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 were used as explanatory variables. The results of Vector Auto Regression revealed that government expenditure on investment, physical infrastructure, education; health care, public debt servicing, economic affairs, general administration and services, defense, public order and national security and government consumption had effect on economic growth.

A recent study by Nurudeen and Usman, (2010) attempted to explain why rising government expenditure had not translated to meaningful development in Nigeria using time series data from 1970-2008. They treated both the level and composition of government expenditure as important

determinants of growth. Economic growth (GRY) was expressed as a function of various levels and components of government expenditure. The results of OLS estimation revealed government expenditure on transport and communication, education and health are statistically significant in explaining changes in economic growth. However, expenditures on defense and agriculture are insignificant.

The study established that expenditure reforms that include budget rationalization, expenditure downsizing, privatization and governance affect economic growth. The study concludes that the composition of government expenditure and public expenditure reforms matter for economic growth. The study was inconclusive in that it did not narrow down into which specific components in government spending is more growth enhancing and how the government can reallocate these expenditures in order to achieve maximum growth outcomes.

3.0 RESEARCH METHODOLOGY

The analysis was presented in the framework of a simple neoclassical production function of Cobb-Douglas production equation. Econometric model was used tolink between various components of government expenditure and economic growth without pre-judging which area should be productive or unproductive. The study examined the properties of time series, after which the regression was estimated using ordinary least squares method. Testing unit root tests, co integration test and granger causality tests was also carried. Error correction model was used to guard against the possibility of a spurious relationship while maintaining thelevel information.

4.0 RESULTS AND DISCUSSION

A graph representation presented in figure 1 indicated that there has been a steady increase in real GDP from 1980 and peaked in 2006 after which a decrease was recorded in year 2007 due to post election violence after which GDP started rising again.
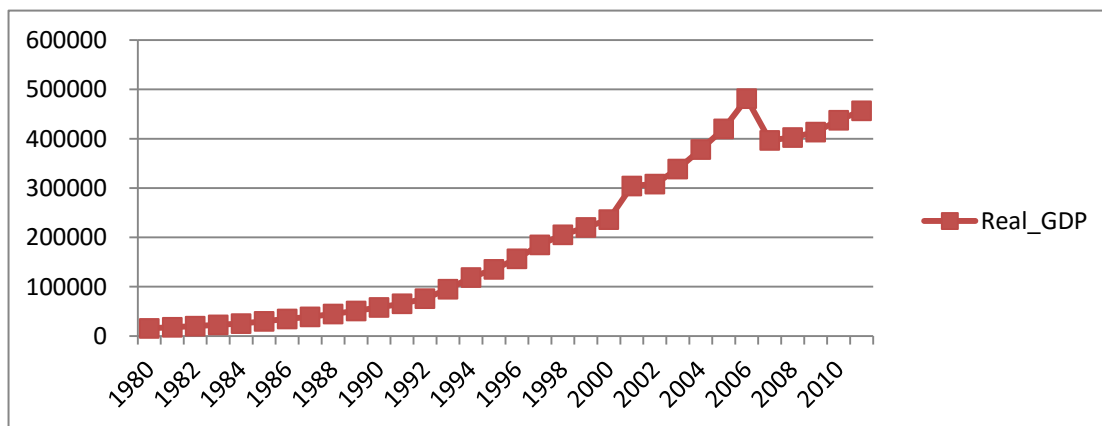
Figure 1: Trend in Real GDP

4.1 Normality tests

The skewness coefficients displayed in table 1 reveals that the distribution of the variables, real debt transactions, Real GDP and labor were normal. However, the kurtosis coefficients indicate that all the variables had a leptokurtic distribution. The high kurtosis indicated lack of normality. Since skewness and Kurtosis coefficient were not conclusive on whether the data was normal or not, the Jacque Bera test offered a more conclusive test on normality.

The Jarque-Bera test statistic tested the null hypothesis that the distribution of the variables was not significantly different from a normal distribution. The test reveals that real agriculture, capital, defense, education, health, order and safety and transport expenditures were not normally distributed as the reported p values were less than the critical p value of 0.05. The results indicate that real debt transactions expenditure, GDP and labor were normally distributed as the reported p values were high than the critical p value of 0.05. High p values indicate that there is a very high probability that the distribution of the data is normal.

Table 1: Descriptive Results before natural logs

	Real GDP	Real agriculture	Real capital	Real debt transact	Real defense	Real education	Real health	Real order safety	Real transport	Labour force
Mean	193532.7	3017.6	5651 4.9	22678.3	4682.8	16189.6	4077.0	5843.8	4938.5	1446.1
Median	146059.3	2288.7	4004 5.3	23120.7	2851.8	9687.9	2843.3	2634.1	2491.2	1214.3
Maximum	481434.4	13239.2	2602 43.9	55350.2	20370.9	65611.9	2051 3.7	27817.5	34088.1	3405.4
Minimum	15620.2	556.6	3308.4	857.6	532.6	1046.4	387.4	243.5	358.2	353.4
Std. Dev.	162309.5	3051.5	6357 6.5	17097.9	5096.8	17381.6	4601.1	7207.2	7652.6	1005.2
Skewness	0.4	2.0	1.6	0.2	1.6	1.3	1.9	1.5	2.4	0.5
Kurtosis	1.6	6.5	5.1	1.9	4.8	3.9	6.6	4.4	8.3	1.9
Jarque-Bera	3.5	38.4	19.3	1.9	18.7	10.2	36.6	14.6	66.3	3.1
Probability	0.2	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.2
Observations	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0

The results in table 2 indicated that it was necessary to convert the variables into natural log form in an effort to introduce normality. However, the study did not convert the dummies (PEV) into

their log form. The results in table 2 indicate that all variables achieve normality after converting to the natural logarithm.

Table2: Descriptive Results after natural logs

	Ln Agric	Ln Debt	Ln Def	L Nedu	Ln Health	Ln Gdp	Ln K	Ln Lf	Ln Order	Ln Trans
Mean	7.6	9.5	7.9	9.0	7.7	11.7	10.2	7.0	7.8	7.6
Median	7.7	10.1	8.0	9.2	8.0	11.9	10.6	7.1	7.9	7.8
Maximum	9.5	10.9	9.9	11.1	9.9	13.1	12.5	8.1	10.2	10.4
Minimum	6.3	6.8	6.3	7.0	6.0	9.7	8.1	5.9	5.5	5.9
Std. Dev.	0.8	1.3	1.0	1.3	1.2	1.1	1.3	0.8	1.4	1.4
Skewness	0.4	-0.8	0.3	-0.1	0.0	-0.3	-0.1	-0.1	0.0	0.4
Kurtosis	2.6	2.2	2.0	1.8	1.8	1.7	1.7	1.5	1.8	2.1
Jarque-Bera	1.0	4.1	1.6	2.0	1.8	2.9	2.3	3.0	2.0	2.0
Probability	0.6	0.1	0.4	0.4	0.4	0.2	0.3	0.2	0.4	0.4
Observations	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0

4.2 Multicollinearity test using Bivariate correlation and Variance Inflation Factor (VIF)

The next step was to check for multicollinearity among independent variables. However, even extreme multicollinearity (so long as it is not perfect) does not violate OLS assumptions. OLS estimates are still unbiased and BLUE (Best Linear Unbiased Estimators) in the presence of multicollinearity. Bivariate correlation results showed that there was a very strong and significantly positive correlation between the independent variables.

4.3 Unit Root Tests

Prior to testing for a causal relationship and cointegration between the time series, the first step is to check the stationarity of the variables used in the model. The aim is to verify whether the series have a stationary trend, and, if non-stationary, to establish orders of integration. The study used both Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests to test for stationarity. The test results of the unit roots were present. Results in table 3 indicated that all variables are non stationary (i.e. presence of unit roots) at 1%, 5% and 10% levels of significance. This calls for first differencing of the non stationary variables.

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Table3: Unit root tests-Level

Variable name	ADF test	PP test	1% Level	5% Level	10% Level	Conditions	Comment
LnGDP	0.688663	0.688663	-4.2826	-3.5614	-3.2138	Lag 0,Trend and Intercept	Non Stationary
LagLnGDP	0.748164	0.748164	-4.2949	-3.5670	-3.2169	Lag 0,Trend and Intercept	Non Stationary
LnAgric	-1.944087	-1.944087	-4.2826	-3.5614	-3.2138	Lag 0,Trend and Intercept	Non Stationary
LnDebt	-1.954211	-1.954211	-4.2826	-3.5614	-3.2138	Lag 0,Trend and Intercept	Non Stationary
LnDef	-2.951403	-2.951403	-4.2826	-3.5614	-3.2138	Lag 0,Trend and Intercept	Non Stationary
LnEdu	-2.029492	-2.029492	-4.2826	-3.5614	-3.2138	Lag 0,Trend and Intercept	Non Stationary
LnHealth	-2.330964	-2.330964	-4.2826	-3.5614	-3.2138	Lag 0,Trend and Intercept	Non Stationary
LnK	-1.533262	-1.533262	-4.2826	-3.5614	-3.2138	Lag 0,Trend and Intercept	Non Stationary
LnLf	-1.350630	-1.350630	-4.2826	-3.5614	-3.2138	Lag 0,Trend and Intercept	Non Stationary
LnOrder	0.628024	0.628024	-3.6576	-2.9591	-2.6181	Lag 0, Intercept only	Non Stationary
LnTrans	-1.610362	-1.610362	-4.2826	-3.5614	-3.2138	Lag 0,Trend and Intercept	Non Stationary

4.4 Long Run Results

The long run results presented in table 4 are generated from the non stationary variables. The model r squared was 0.998. This implied that the goodness of fit of the model was satisfactory as 99.8% of the variation in GDP was explained by the independent variables. The overall model was significant as demonstrated by an F statistic of 1480.4 (p value= 0.000). This further implied that the independent variables were good joint good predictors of long run GDP.

The results indicate that in the long run, public debt expenditure (lndebt) has a positive and significant relationship with GDP. (b=0.1063, pvalue=0.0123). This implies that an increase in public debt expenditure by one unit leads to an increase in GDP by 0.0123 units. The findings agree with those in Maingi (2011) who noted public debt servicing had effect on economic growth.

Results also indicate that the first lag of GDP has a positive and significant relationship with GDP (b=0.6125, p value =0.0003). This implies that an increase in GDP by 1 unit in the present period causes an increase in GDP. Post election Violence also has a negative but significant relationship with GDP. Years with post election violence led to a drop in GDP by 0.123018.

All the other variables were insignificant in the long run.

Table4: Long Run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEDU	0.223034	0.198928	1.121179	0.2762
LNDEF	-0.140990	0.067629	-2.084750	0.0508
LNDEBT	0.106322	0.038456	2.764774	0.0123
LNAGRIC	-0.132115	0.063204	-2.090304	0.0503
LAGLNGDP	0.612560	0.138046	4.437357	0.0003
LNHEALTH	0.188988	0.102997	1.834893	0.0822
LNK	-0.147838	0.086037	-1.718307	0.1020
LNLF	0.326114	0.165174	1.974372	0.0631
LNORDER	0.017452	0.110229	0.158323	0.8759
LNTRANS	-0.031894	0.038308	-0.832555	0.4154
PEV	-0.123018	0.032827	-3.747496	0.0014
C	1.579554	0.476317	3.316185	0.0036
R-squared	0.998835	Mean dependent var		11.73130
Adjusted R-squared	0.998160	S.D. dependent var		1.101169
S.E. of regression	0.047235	Akaike info criterion		-2.982710
Sum squared resid	0.042392	Schwarz criterion		-2.427618
Log likelihood	58.23200	F-statistic		1480.466
Durbin-Watson stat	3.024473	Prob(F-statistic)		0.000000

4.5 Co integration tests

The two step angle granger test was conducted and results presented in table 5. First a long run equation was run after which the residuals were generated. The residuals were then lagged. The second step was to test for stationary of the residuals using the ADF test. Results indicated that the lagged residuals were stationary at 1%, 5% and 10% levels. This implies that the lagged residuals were stationary. This further implies that there is cointergration among the long run variables. This also implies that the variables converge to long run equilibrium.

Table5: Engle Granger Cointergration Test

ADF Test Statistic	-11.15283	1% Value*	Critical -4.3082
		5% Value	Critical -3.5731
		10% Value	Critical -3.2203

4.6 Johansen Cointegration test

The Johansen Cointegration test was also conducted since it is more accurate and superior to Engle granger test of Cointegration. Johansen Results at the table 6 indicate that the null hypothesis of at most 4 Co integration equations for the model linking was rejected at 5% (1%) significance level. The likelihood ratio statistic for the null hypothesis of the existence of at most 4 Cointegration equations was larger than the z critical vales at 5% and a 1% level. This implies that more than 4 co integrating equation exists (results indicate 5 cointergrating equations exist). This further implies that all the variables in the long run model converge to an equilibrium in the long run.

Table6: Johansen Cointergration Test

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
1.000000	1291.388	233.13??	247.18??	None **
0.969318	414.1839	233.13??	247.18??	At most 1 **
0.924494	309.6616	233.13	247.18	At most 2 **
0.899863	232.1553	192.89	205.95	At most 3 **
0.812405	163.1186	156.00	168.36	At most 4 *
0.753852	112.9145	124.24	133.57	At most 5
0.573415	70.85985	94.15	103.18	At most 6
0.409465	45.30153	68.52	76.07	At most 7
0.353125	29.49973	47.21	54.46	At most 8
0.279204	16.43168	29.68	35.65	At most 9
0.191814	6.609707	15.41	20.04	At most 10
0.007333	0.220812	3.76	6.65	At most 11

4.7 Error correction Modelling

Since the variables in the model the determinants are cointegrated, and then an error-correction model can be specified to link the short-run and the long-run relationships. Residuals from the cointegrating regression are used to generate an error correction term (lagged residuals) which is then inserted into the short-run model. The specific lagged residual term is LAGRES. The estimates of the error-correction model are given in table 7.

Table7: Error Correction Model/Short run model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNHEALTH	0.107702	0.081087	1.328215	0.2017
DLNK	-0.156711	0.104752	-1.496021	0.1530
DLNLF	0.453605	0.216083	2.099222	0.0510
DLNORDER	0.013225	0.079404	0.166552	0.8697
DLNTRANS	-0.034262	0.035803	-0.956963	0.3520
DLNEDU	0.314576	0.144353	2.179213	0.0437
DLNDEF	-0.100547	0.051926	-1.936341	0.0696
DLNDEBT	0.078331	0.039777	1.969231	0.0654
DLNAGRIC	-0.060268	0.044266	-1.361493	0.1911
DLAGLNGDP	0.432081	0.115057	3.755375	0.0016
PEV	-0.141490	0.031331	-4.515984	0.0003
LAGRESID	0.842036	0.125925	6.686829	0.0000
C	0.016948	0.024784	0.683818	0.5033
R-squared	0.860410	Mean dependent var		0.107728
Adjusted R-squared	0.761876	S.D. dependent var		0.080543
S.E. of regression	0.039303	Akaike info criterion		-3.336327
Sum squared resid	0.026261	Schwarz criterion		-2.729142
Log likelihood	63.04491	F-statistic		8.732127
Durbin-Watson stat	1.668364	Prob(F-statistic)		0.000045

Results in table 7 indicated that in the short run, the overall model fitness was satisfactory. This was demonstrated by an R squared of 0.8604. This implied that 86.04% of the variations in the short run GDP were explained by the short run independent variables. The overall model was

significant as revealed by an F statistic of 8.73 (p value=0.000). This further implied that the independent variables were good joint good predictors of short run GDP.

Results revealed that the short run education expenditure has a positive relationship with shortrun GDP. A regression coefficient of 0.314 (p value=0.043) implies that an increase in short run education expenditure by one unit leads to an increase in short run GDP by 0.314 units. The findings agree with Mudaki Masaviru, 2012) who studied the impact of public spending on education, health, economic & affairs, defense, agriculture, transport and communication on economic growth with Kenyan time series data for the period 1972 to 2008. The results of OLS revealed that public expenditure on education is highly significant and positive determinant of economic growth

Results revealed that the short run GDP of the current period has a positive relationship with GDP of next period. A regression coefficient of 0.432 (pvalue=0.0016) implies that an increase in short run GDP by one unit in this period leads to an increase in short run GDP in the next period by 0.314 units.

Post election violence (PEV) has a negative relationship with the short run GDP. The occurrence of postelection violence reduces the short run GDP by 0.141.

The error correction term measures the speed of adjustment to the long run equilibrium in the dynamic model. The error correction term LAGRES has the expected sign and is significantly positive (0.842036, p value =0.000). This result implies that there is a positive gradual adjustment (convergence) to the long run equilibrium. The coefficient of (0.842) indicates that 0.842% of the disequilibria in short run GDP achieved in one period are corrected in the subsequent period.

All other short run variables did not have a significant relationship with short run GDP

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary Findings

Descriptive statistics indicates that there has been a steady increase in the real GDP from 1980 up until 2007 where a decrease was recorded. This was due to the country's instability position as a result of the post-election violence which brought the most of the country's operations to a halt. Later in 2009 where stability within the country was fully maintained, public expenditure started increasing thus increasing the GDP. A result also indicates that the education expenditure together with GDP have an increasing trend from 1980 to 2011. This means that there is high public spending on education that is expenditure on school fees, education materials such as textbooks and teaching equipment as well as personnel salaries.

The trend in the GDP and real expenditure on health indicates the two have been consistent for the period running 1980 to 1996. Later in 1997 towards 2011 there has been an increasing and decreasing trend on the real health expenditure with an upward movement on the real GDP throughout the years. Changes occurred on the GDP in 2005 when there was a drop, with the real health expenditure rising on the other hand. This explains that the impact of health care spending on GDP is minimal. From year 2007, the growth in health spending increased faster than the economic growth as the economy devoted a certain percentage of the GDP to health spending. This explains why health expenditure grew more quickly from 2007 than in other previous years.

Jarque-Bera test statistic tested the null hypothesis and accurately determined the normality of the real debt, labor and GDP variables. The test revealed that real agriculture, capital, defense, education, health, order and safety and transport expenditures are not normally distributed while GDP and labor were normally distributed. Bivariate correlation results presented indicate that there is a very strong and significantly positive correlation between the independent variables. This implies that the two variables could be multi correlated. The test results of the unit roots indicated that all variables are non-stationary (i.e. presence of unit roots) at 1%, 5% and 10% levels of significance. This calls for first differencing of the non-stationary variables. It is clear from the results that all the variables become stationary (unit root disappears) on first differencing.

The model r squared was 0.998. This implied that the goodness of fit of the model was satisfactory as 99.8% of the variation in GDP was explained by the independent variables. The overall model was significant as demonstrated by an F statistic of 1480.4 (p value= 0.000). This further implied that the independent variables were good joint good predictors of long run GDP.

The results indicate that in the long run, public debt expenditure (lndebt) has a positive and significant relationship with GDP. This implies that an increase in public debt expenditure by one unit leads to an increase in GDP by 0.0123 units. Results also indicate that the first lag of GDP has a positive and significant relationship with GDP (b=0.6125, p value =0.0003). This implies that an increase in GDP by 1 unit in the present period causes an increase in GDP. Post election Violence also has a negative but significant relationship with GDP. Years with post election violence led to a drop in GDP by 0.123018.

Cointegration tests results indicated that the lagged residuals were stationary at 1%, 5% and 10% levels. This implies that the lagged residuals were stationary and that there is cointergration among the long run variables. The Johansen Cointegration test was also conducted and the results indicated that the null hypothesis of at most 4 Co integration equations for the model linking was rejected at 5% (1%) significance level. Further results indicated that in the short run, the overall model fitness was satisfactory which implied that the independent variables were good predictors of short run GDP.

This was demonstrated by an R squared of 0.8604. This implied that 86.04% of the variations in the short run GDP were explained by the short run independent variables. The overall model was significant as revealed by an F statistic of 8.73 (p value=0.000). This further implied that the independent variables were good joint good predictors of short run GDP.

Results revealed that the short run education expenditure has a positive relationship with short run GDP. A regression coefficient of 0.314 (p value=0.043) implies that an increase in short run education expenditure by one unit leads to an increase in short run GDP by 0.314 units. The results of OLS revealed that public expenditure on education is highly significant and positive determinant of economic growth

Results revealed that the short run GDP of the current period has a positive relationship with GDP of next period. A regression coefficient of 0.432 (p value=0.0016) implies that an increase in short run GDP by one unit in this period leads to an increase in short run GDP in the next period by 0.314 units. Post election violence (PEV) has a negative relationship with the short run GDP. The occurrence of postelection violence reduces the short run GDP by 0.141.

The error correction term measures the speed of adjustment to the long run equilibrium in the dynamic model. The error correction term LAGRES has the expected sign and is significantly positive (0.842036, p value =0.000). This result implies that there is a positive gradual adjustment (convergence) to the long run equilibrium. The coefficient of (0.842) indicates that 0.842% of the disequilibria in short run GDP achieved in one period are corrected in the subsequent period. All other short run variables did not have a significant relationship with short run GDP

5.2 Conclusion

It was concluded that there was cointergration among the long run variables.Results also indicated that in the long run, public debt expenditure (lndebt) has a positive and significant relationship with GDP. Therefore, an increase in public debt expenditure leads to an increase in GDP.

Results also indicated that Post Election Violence had a long run effect on the economy. This further implies that the political environment may significantly influence the economic performance of a country. Therefore, it may be necessary to enhance political stability as a way to encourage productivity. In the long run, the lag of GDP has a positive and significant effect on GDP. This implies that higher levels of GDP leads to increased GDP in future periods.

The results led to the conclusion that expenditure on health, education, agriculture, defence, transport and communications and public order and safety are all insignificant determinants of long term GDP.

In the short run, it was possible to conclude from the study that education expenditure has a significant effect on GDP growth. The proportion of total financial resources devoted to education should be enhanced as this would improve GDP.

It was concluded that the in the short run, the lag of GDP has a positive and significant effect on GDP. This implies that higher levels of GDP leads to increased GDP in future periods.

It was concluded that the error correction term LAGRES has the expected sign and is significantly positive. This result implies that there is a positive gradual adjustment (convergence) to the long run equilibrium. The coefficient indicates that the disequilibria in short run GDP achieved in one period are corrected in the subsequent period. All other short run variables, health, agriculture, defence, transport and communications and public order and safety did not have a significant relationship with short run GDP.

5.3 Recommendations

The study recommends that government should carefully review their spending in a particular area that is likely to stimulate growth. Resources should be channeled to the education as it has a significant effect on GDP. In addition, the government should increase the expenditure on public debt transactions as this would improve the GDP.

It is also recommended that political instability should be addressed since it has a negative effect on GDP. Institutional structures such as a strong judiciary, a reformed police service, enhanced community intergration through empowering the Truth Justice and Reconciliation commission as well as the National Cohesion Commission. This will reduce the incidence of ethnic and politically instigated clashes.

5.4 Areas of Further Research

Further research should be to establish the impact of proportions of expenditure on GDP growth and compare such results with the current results that seem to dwell on aggregate figures. In addition, disaggregated studies at county level should be conducted. Such studies will attempt to establish the effect of expenditure on the growth of a county.

Further studies should be to disaggregate the expenditure into recurrent and developmental expenditure. The effect of disaggregated expenditure should then be regressed against economic growth.

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