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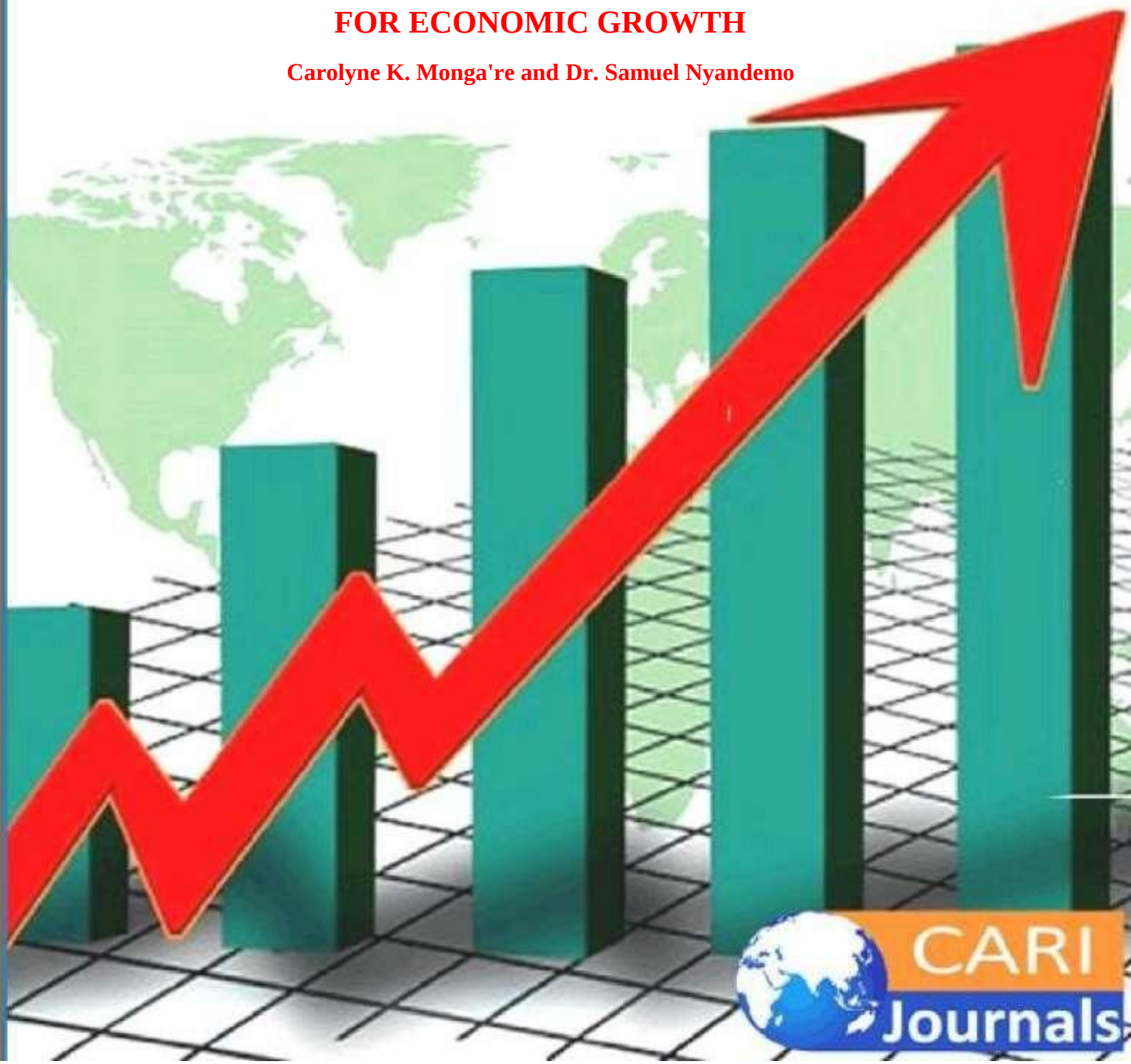

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POTENTIAL AND CONSTRAINTS OF PUBLIC DEBT AS A TOOL FOR ECONOMIC GROWTH

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Abstract

***Purpose*:** The study sought to determine the potential and constraints of public debt as a tool for economic growth.

Methodology: The study used secondary data for a time series of 1980 to 2012. Data used in this study is secondary and is extracted from the Government of Kenya Economic Surveys, Statistical Abstracts, World Development Indicators (WDI) of the World Bank and data from the public debt annual report of Kenya.

Results: It was concluded that there was co integration among the long run variables. Results also indicated that in the long run, public domestic debt has a positive and significant relationship with GDP growth rate.

Unique contribution to theory: The study recommends that government should borrow sustainably. It is also recommended that domestic debt should be kept to a manageable level. It is recommended that labour quality be improved through training and education as doing so would improve the GDP growth rate.

Keywords: *public debt, economic growth, policy recommendations, research findings,*

1.0 Introduction

1.1 Background

Do high levels of public debt reduce or increase economic growth? The answer to this question is important to policy and key for understanding whether expansionary fiscal policies that increase the level of debt will reduce future standards of living. Apositive answer would imply that, while it could be effective in the short-run, expansionary fiscal policies that increasing the debt level may reduce long-run growth, and therefore partly or fully negate the positive effects of the fiscal stimulus. Reinhart and Rogoff (2010 & 2012) showed that high levels of public debt are negatively correlated with economic growth, but that there is no link between debt and growth when public debt is below 90% of GDP. Reinhart and Rogoff were careful in stating that their results did not prove the existence of a causal relationship going from debt to growth. However, many

commentators and policymakers did give a causal interpretation to their findings and used the debtgrowth link as an argument in support of fiscal consolidation. Economic theory suggests that reasonable levels of borrowing by a developing country are likely to enhance its economic growth. When economic growth is enhanced the economy's poverty situation is likely to be affected positively.

In order to encourage growth, countries at early stages of development, need to augment what they have because of dominance of small stocks of capital hence they are likely to have investment opportunities with rates of return higher than that of their counterparts in developed economies. This becomes effective as long as borrowed funds and some internally ploughed back funds1 are properly utilized for productive investment (Checherita and Rother, 2012). Growth therefore is likely to increase and allow for timely debt repayments. When this cycle is maintained for a period of time growth will affect per capita income positively which is a prerequisite for poverty reduction. These predictions are known to hold even in theories based on the more realistic assumption that countries may not be able to borrow freely because of the risk of debt denial. Most policy makers do seem to think that debt reduces long-run economic growth. This view is in line with the results of a growing empirical literature which shows that there is a negative correlation between public debt and economic growth in advanced and emerging economies, and that this correlation becomes particularly strong when public debt approaches 100 percent of GDP (Reinhart and Rogoff, 2010b; Kumar and Woo, 2010;Cecchetti, Mohanty and Zampolli, 2011).According to Ferreira (2009), the relevance of the public debt to economic growth has become crucial, particularly to those policy-makers who nowadays have to face increasing fiscal imbalances. In terms of economic theory, it is widely accepted that at moderate levels of public debt, fiscal policy may induce economic growth, with a typical Keynesian behavior, but at high public debt levels, the expected tax increases will reduce the positive results of public spending, decreasing the investment and consumption expenses, with less employment and lower GDP growth rates.

On the other hand, there is a broad consensus view that lower GDP growth may also be synonymous with less public revenue and sometimes more public expenditure in social security transfers and other subsidies paid by the Government, which can contribute to the increase of public debt (Ferreira, 2009). However, little empirical investigation has been conducted into the link between public debt and economic growth and the obtained results are still rather inconclusive. Recently, several theoretical and empirical works analyzed the relationship between the external (and not specifically public) debt and economic growth in developing countries. Patillo et al. (2002 and 2004) conclude that at low levels, total external debt affects economic growth positively, while at high levels, this relationship becomes negative. Presbitero (2005) uses dynamic panel estimations and find a clear negative relationship between external debt and economic growth.Schclarek (2004) used a panel including 59 developing and 24 industrialized countries. For the developing countries, he concluded that there is always a negative and significant relationship between total external debt and economic growth, in clear contrast with the results obtained by Patillo et al. (2002 and 2004), while for Schclarek (2004), there is no evidence of a positive relationship between total external debt and growth at low debt levels. In the case of industrial countries, Schclarek (2004) did not find any robust relationship between gross government debt

and economic growth, suggesting that for these more developed countries, higher public debt levels are not necessarily associated with lower GDP growth rates.

Perroti (2002) had already concluded that fiscal consolidations are more likely to have non-Keynesian effects in countries with high debt levels. Furthermore, the European Commission (2003) verifies that during the past three decades, only half of the fiscal consolidation episodes in EU countries were followed by an immediate acceleration in economic growth. For some specific countries in the EU (namely the cohesion countries), Mehrotra and Peltonen (2005) found that an improvement in the net lending position of the government, as well as a fall in the level of public debt, would be beneficial for socio-economic development in the medium term.

Public Debt Trends in Kenya

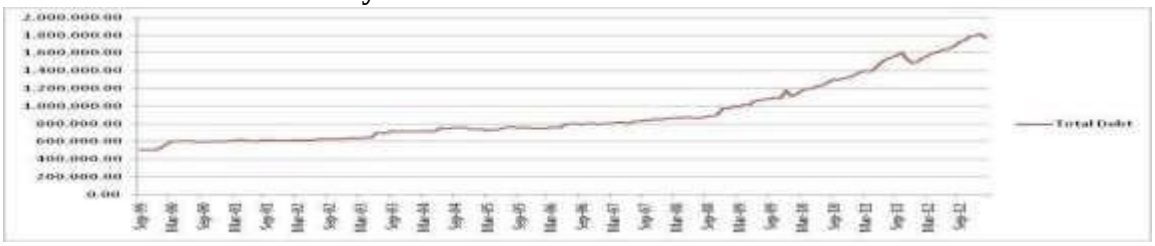
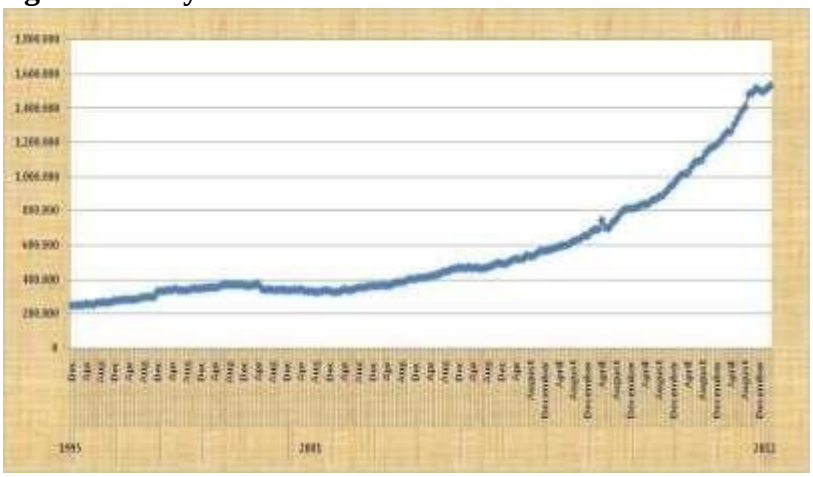


Figure 1: Kenya Public Debt Trends

Figure 1 shows the trend of public debt in Kenya which has been rising. Figure 2 shows the external debt stocks which although has been rising has been occasioned with some dips at times.

Figure 2: Kenya External Debt Trends.



Domestic Debt Trends

Nevertheless, HIPCs continue to experience difficulties in managing and servicing their huge stocks of debt. The rising debt in Kenya has brought about serious implications on development and sustainable economic growth. While this is happening, there has been a large net outflow of resources more so in the 1990s to meet the debt burden, thus widely accepted that the heavily indebted countries particularly in the sub-Saharan require debt relief initiative to have a turnaround in their economic performance and fight against poverty (World Bank, 2010).As at April 2010, Kenya's debt burden had reached Kshs. 1.19 trillion translating to each of the 40 million Kenyans

owing foreign and domestic creditor's Khs. 29,750 which are more than the take home salary of many workers. Of the Kshs.1.19 trillion, external debt stood at Kshs. 533 billion representing 21% of the country's Gross domestic product (ICJ Kenya, 2010). The growth in the debt burden is mainly through multi-lateral sources with foreign financial institutions like the African Development Bank, International Monetary Fund and the International Development Association as some of the major creditors. At the bilateral level, countries like Japan, France and Germany top the list with 56 billion, 28 billion and 16 billion respectively. With such large figures looming, it is unfortunate that Kenya is still not included in the debt-relief initiative of HIPCs. These owes to a poor record of reforms and economic performance rather than its ability to attain sustainable level of external debt (ICJ Kenya, 2010).External debt is a term used in international economic relations to describe the financial obligation that ties a borrower country to a lender country. This refers to a loan that is repayable in a foreign currency and it is mainly concerned with long term debts for development programmes. Beginning in the 1950s, deficits in the current account were considered normal. Countries were encouraged to borrow abroad to encourage economic growth (World Bank, 2010).

The trend in Eternal debt borrowing/stock is as shown in the figure below.In the process, little attention was paid to the liabilities side which increases the external indebtedness of these countries. A significant growth of multi-lateral debt began with the Latin American debt crisis of the early 1980s. Mexico, Argentina and Brazil all came to the brink of defaulting on loans that large private banks had freely offered during the 1970s to developing country governments in Latin America and elsewhere. Kenya resorted to heavy external borrowing during the oil crisis of 1973/74 which created severe balance of payments (BOP) problems that changed the economy outlook in the country. The external debt stock grew by 45.3% in 1973 from the previous year. The growth rate decelerated to less than 4%, being only 2.9% in 1975 (World Bank, 2010).A drop in debt-servicing ratio was experienced in 1978 owing to the coffee boom of 1977 which led to an abrupt increase in export volume earnings. However, the drop was short lived due to second oil crisis immediately after the coffee boom that saw a sharp deterioration in world commodity markets. The debt- servicing ratio for that matter began to blow out of proportion which in turn led to a rising Debt to GDP ratio. Were it not for the Aid finance, the drought conditions of the 1980s experienced in the country would have been far much disastrous. Increased real foreign interest rates oninternational loans raised the debt service charges substantially. This led to a decrease in net transfer on debt, being negative in 1981, 1984 and 1986 despite the IMF and World Bank introducing Structural Adjustment Programmes (SAPs) which were packages of economic reforms designed to restore economic health to indebted countries. SAPs have failed on most HIPCs as they have caused increased poverty, unemployment and environmental destruction and have usually led to an increase in the overall size of a country's multi-lateral debt and Kenya is no exception (ICJ Kenya, 2010).

Economic Growth of Kenya Trends

Table 1 in Appendix I shows the GDP growth rates from the period 1961 to 2012, plotted on figure 3

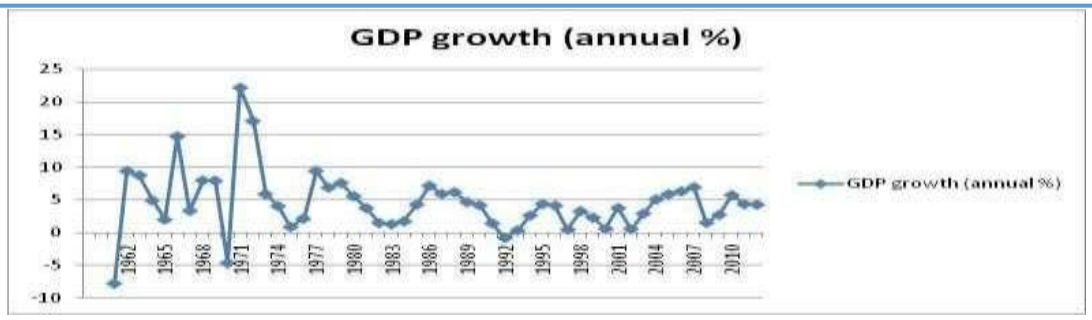


Figure 3: Kenyan Economic Growth Trends

Figure 4 shows the Kenyan economic growth at constant prices or at nominal level. The figure indicates that the GDP increased constantly since 1960.

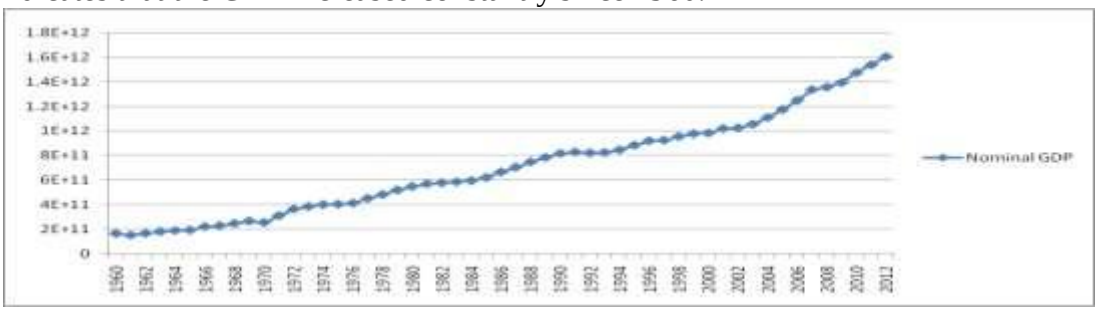


Figure 4: Kenyan Nominal Economic Growth Trends

1.2 Problem Statement

While there is evidence that public debt is negatively correlated with economic growth, correlation does not necessarily imply causality. The link between public debt and economic growth could be driven by the fact that it is low economic growth that leads to high levels of debt. Alternatively, the observed correlation between debt and growth could be due to a third factor that has a joint effect on these two variables. The surge in public debt across industrial countries during and after the recent global crisis has made it a prominent policy issue whether high debt levels have a negative impact on growth. There has been a rise in public debt in Kenya and this has presented a problem to policy makers. The problem that policy makers are facing relates to the sustainability of the increased debt. The same problem is what this study wishes to address by investigating the sustainability of public debt specifically this study wishes to understand at what point public debt becomes unsustainable.There have been numerous studies on the effect of public debt on economic growth (Panizza and Presbitero, 2012; Pattillo et al., 2002; Schclarek, 2004; Abbas and Christensen, 2007; Freeman and Webber, 2009). These studies reported conflicting results about the relationship between public debt and economic growth.Pattillo et al. (2002) used a large panel dataset of 93 developing countries for the period 1969-1998.

They found that the impact of external debt on per-capita GDP growth is negative for net present value of debt levels above 35-40% of GDP. Also Clements et al. (2003) used a panel of 55 lowincome countries for the period 1970-1999. They found that the turning point in the net present value of external debt is at around 20-25% of GDP. Schclarek (2004) in his study investigated the

relationship between gross government debt and per capita GDP growth in developed countries, but he didn't find any robust evidence of significant relationship.However these studies had contradicting results and were done on developed and emerging countries. Therefore this study intends to fill the gap by conducting a study on a developing country like Kenya. This study will add to the growing literature of debt and economic growth by disaggregating the components of debt and additionally include the effect of exchange rate and assess the respective effect on growth. There is also need to assess whether the debt composition in terms of currency has impact on economic growth.

1.3 Research Objectives

The general objective of the study was to establish the impact of public debt and economic growth. The main objective was pursued in line with the following specific objectives:

1. To examine the effect of public debt levels on economic growth in Kenya.
2. To determine the relationship of the constituents of total public debt on growth.
3. Make policy recommendations based on the research findings.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Harrod Dommar Growth Model

Harrod-Domar equation of economic growth and development indicates that the rate of growth of GDP ($\Delta Y/Y$) is determined jointly by the national saving ratio (usually expressed as a percentage), **s**, and the national capital-output ratio (expressed as an integer), k. Therefore, there is a direct linear relationship between economic growth and the savings ratio of a country. The more the savings, the higher the rate of growth in national income. In addition, the growth rate of national income is (negatively) related to the capital-output ratio of an economy, that is higher capital output ratios are associated with low rates of GDP growth. The theory in equation form;

$S = s(Y)$… ..... (1)

Savings is a function of income

$\Delta K/\Delta Y = k$ .....(2)

Change in capital in relation to change in income will equal capital output ratio (k). K here is determined exogenously

$\Delta K = k(\Delta Y)$ ..... (3)

Therefore, change in capital is an increasing function of changes in national income given the capital output ratio

$I = \Delta K$ and **$\Delta K = k(\Delta Y)$ .....**(4)

Investment =change in capital; and change in capital is a function of changes in income given the capital output ratio

I = k (ΔY) ..... (5)

Investments is therefore directly related to changes in income given the capital output ratio

Therefore: since S(Y)=I; then s (Y) can be given by;

s (Y) = k (ΔY) ..... (6)

Dividing both sides of the equation 6 above first by **Y** and then by **k**, the following equation is obtained:

s/k= ΔY/Y… ..... (7)

Note that **ΔY/Y** is equal to the rate of growth of GDP (the percentage change in GDP)

The underlying assumption of the Harrod-Domar growth model is that the incremental capital-output ratio is given by k = Y/K, growth is mainly determined by capital accumulation, growth can be sustained only if agricultural productivity rises and developing countries save too much and invest too little.

2.2 Empirical Review

The basic reason of external debt in developing countries is to fulfil lack of "saving-investment" gap (Chenery 1996). The developing countries facing with a current account deficit were encouraged to borrow from developed countries as well as an international community to boost their economic growth. Gohar et al. (2012) recommended that countries take debt from the external sources for many reasons that are their income is low, with budget deficit or they are having low investments. In addition, Soludo (2003) asserted that countries borrow for two broad categories; macroeconomic reasons or to finance the transitory balance of payments deficits aimed at boosting economic growth and reduce povertyAyadi and Ayadi, (2008), Were (2001) and Soludo (2003) in their separate investigations revealed that nations borrow for macroeconomic reasons to either finance capital investment and to circumvent hard budget constraint. Economies borrow to boost economic growth, improve standard of living and eradicate poverty. However, Nigeria has not recorded a reasonably economic growth and poverty reduction from external borrowings since 1960s.

This is largely due to non-government investments of the funds borrowed in infrastructure that is capable of fostering growth and socio-economic development. Ogunmuyiwa (2011) examines whether external debts promotes economic growth in Nigeria using time series data from 19702007. The regression equation was estimated using econometric techniques such as Augmented Dickey –Fuller test, Granger causality test, Johansen cointegration test and Vector Error Correction Method. The results revealed that causality does not exist between external debt and economic growth. Government debt rose considerably over the past decades and this trend

was generally accompanied by an expansion in the size of governments. For many industrial countries, the growth of general government expenditure was enormous in the 20th century. As shown in Tanzi and Schuknecht (1997), the average size of government for a group of thirteen industrial countries4 increased from 12% of GDP in 1913 to 43% of GDP in 1990. At the end of the period, average public debt-to-GDP ratio was 79% for the big governments, 60% for medium- seized governments and 53% for small governments.

Where big governments are defined as those with public expenditure-to-GDP ratio higher than 50%; medium-sized governments: between 40-50% and small governments: less than 40%.Economic and financial crises are also likely to contribute to the build-up of government debt, as shown in a severe post-World War II financial crisis. In this context, the 2008-2009 crisis has already put considerable strains on debt and, in general, on public finances in the euro area countries. The euro area government deficit ratio is projected to increase rapidly from 0.6% of GDP in 2007 to 6.6% of GDP in 2011, while the gross government debt ratio is expected to surge from 66.0% to 88.5% of GDP during the same period. Overall, long-term fiscal sustainability in the euro area has deteriorated markedly and many expect that such effects would linger on in the medium and longer term. According to the latest European Commission's Sustainability Report, many euro area and EU countries (8 in the euro area and 13 EU countries) are now at high risk with regard to fiscal sustainability (European Commission, 2009a). This reflects large current fiscal deficits, high debt levels, an outlook of possibly subdued GDP growth, as well as the projected fiscal implications of population ageing which are considerable in some countries.

The report calls the sustainability risks in the EU-27 so significant that "debt sustainability should get a very prominent and explicit role in the surveillance procedures" under the EU Stability and Growth Pact. This is also reflected in the work of the so-called Van Rompuy Task Force which is looking into ways to strengthen economic governance in the EU. Financial markets have reacted to the deterioration in the fiscal situation and outlook of individual countries with significant increases in sovereign yield spreads (European Commission, 2009b).A good starting point for discussing the relationship between public debt and economic growth in advanced economies is Reinhart and Rogoff (2010b; 2010a) finding that high levels of debt are negatively correlated with economic growth, but that there is no link between debt and growth when public debt is below 90 percent of GDP. Reinhart and Rogoff (2010b) illustrate this threshold effect by collecting annual data on debt and output growth for 20 advanced economies over 1946-2009 and splitting their sample into four groups: (i) country-years for which public debt is below 30 percent of GDP (443 observations); (ii) country-years for which public debt is between 30 and 60 percent of GDP (442 observations); (iii) country-years for which public debt is between 60 and 90 percent of GDP (199 observations); and (iv) country years for which public debt is above 90 percent of GDP (96 observations).

Next, they compute median and average GDP growth for each group and show that there are no large differences among the first three groups, but that average and median GDP growth are substantially lower in the fourth group.Minea and Parent (2012) conducted a study on the relationship between debt and growth by using the Panel Smooth Threshold Regressions model originally proposed by Gonz´alez, Ter¨asvirta, and van Dijk (2005). Using this approach, that allows for a gradual change in the regression coefficient when moving from one regime to the

other, Minea and Parent (2012) found that public debt is negatively associated with growth when the debt-to-GDP ratio is above 90 percent and below 115 percent. However, they also find that the correlation between debt and growth becomes positive when debt surpasses 115 percent of GDP. While Minea and Parent's (2012) results should not be interpreted as an argument for fiscal profligacy, they suggest the existence of complex non-linearities, which may not be captured by models that use a set of exogenous thresholds.Panizza and Presbitero (2012) did a study on whether public debt has a causal effect on economic growth in a sample of OECD countries. The results were consistent with the existing literature that found a negative correlation between debt and growth. However, the link between debt and growth disappeared once the author's instrument debt with a variable that captures valuation effects brought about by the interaction between foreign currency debt and exchange rate volatility.

The authors then conducted a battery of robustness tests and showed that the results were not affected by weak instrument problems and were robust to relaxing their exclusion restriction. Pattillo et al. (2002) used a large panel dataset of 93 developing countries for the period 19691998. They found that the impact of external debt on per-capita GDP growth is negative for net present value of debt levels above 35-40% of GDP. Also Clements et al. (2003) used a panel of 55 low-income countries for the period 1970-1999. They found that the turning point in the net present value of external debt is at around 20-25% of GDP.Schclarek (2004) in his study investigated the relationship between gross government debt and per capita GDP growth in developed countries, but he didn't find any robust evidence of significant relationship. In a recent paper Reinhart and Rogoff (2010), analyze the developments of public debt and the long-term real GDP growth rate in 20 developed countries for a period that cover about two centuries (1790 - 2009). They found that the relationship between government debt and long-term growth is weak for debt/GDP ratios below 90% of GDP; above 90%, the median growth rate is falling by 1% and the average by considerably more.

3.0 RESEARCH METHODOLOGY

The study adopted descriptive survey research. Data was collected by use of questionnaires comprising closed and open-ended questions Primary data was collected through a questionnaire and secondary data as a source of literature review.. The study used stratified random sampling to come up with a sample of 75 respondents .The study targeted population was employees from all the department of Kenya Eveready Company. There are 252 employees currently.The researcher used purposive sampling technique to select only those who have worked with the firm for more than five years. The information was codified and entered into a spreadsheet and analysed using descriptive statistics such as frequency tallies and percentages that were generated using SPSS (Statistical Package for Social Sciences. Descriptive statistics aided in analysis of percentages, frequencies and mean of responses while inferential statistics generated correlation to show the relationship between the variables under study.

4.0 RESULTS AND DISCUSSIONS

4.1 Descriptive Statistics

The mean GDP growth rate from 1980 to 2012 was 3.5% with a standard deviation of 2.15. The highest growth rate over the period was 7.18% and the lowest growth rate was -0.80%. The mean for public domestic debt from 1980 to 2012 was 13.56% with a standard deviation of 4.13. The highest growth rate over the period was 22.25% and the lowest growth rate was 7.32%. The mean for public domestic debt squared from 1980 to 2012 was 164.78% with a standard deviation of 80.58. The highest growth rate over the period was 371.58% and the lowest growth rate was 53.65%. In addition the mean for external debt from 1980 to 2012 was 0.72% with a standard deviation of 0.09. The highest growth rate over the period was 0.90% and the lowest growth rate was 0.57%. The mean for external debt squared from 1980 to 2012 was 0.46% with a standard deviation of 0.16. The highest growth rate over the period was 0.81% and the lowest growth rate was 0.28%. Finally the mean for capital from 1980 to 2012 was 45.67% with a

standard deviation of 5.51. The highest growth rate over the period was 53.48% and the lowest growth rate was 37.59%. The mean for labour from 1980 to 2012 was 0.47% with a standard deviation of 0.21. The highest growth rate over the period was 0.75% and the lowest growth rate was 0.22%.

The skewness coefficients displayed in table 1 reveals that the distribution of the variables was normal. This conclusion was arrived after since all the skewness coefficients were between +1 and -1 for these variables. In addition, the kurtosis coefficients indicate that all the variables had a mesokurtic distribution (normal distribution) since the reported excess kurtosis was less than the rule of the thumb of -3 and +3. The skeweness and kurtosis tests results were confirmed by 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 all the variables were normally distributed as the reported p values were more than the critical p value of 0.05.

Table 1: Descriptive Statistics

	GDPRATE	DD	DD2	ED	ED2	K	L
Mean	3.50	13.56	164.78	0.72	0.46	45.67	0.47
Median	3.78	13.22	149.82	0.71	0.39	46.63	0.47
Maximum	7.18	22.25	371.58	0.90	0.81	53.48	0.75
Minimum	-0.80	7.32	53.65	0.57	0.28	37.59	0.22
Std. Dev.	2.15	4.13	80.58	0.09	0.16	5.51	0.21

Skewness	-0.13	0.51	0.70	0.13	0.72	0.07	0.03
Kurtosis	2.00	2.32	2.77	2.04	2.17	1.40	1.32
Jarque-Bera	1.45	2.07	2.737	1.34	3.81	3.55	3.88
Probability	0.48	0.36	0.254	0.51	0.15	0.17	0.14
Observations	33	33	33	33	33	33	33

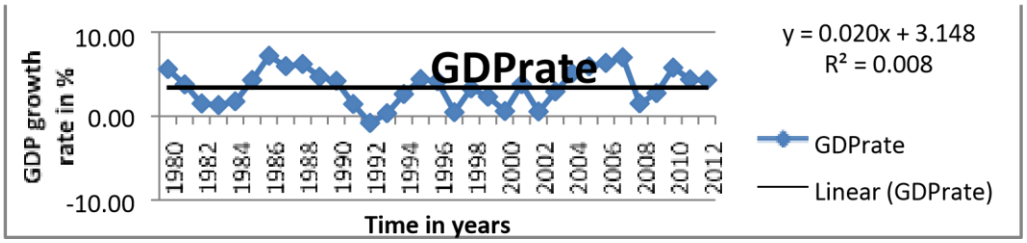


Figure 6: Trend in GDP growth rate

A graphical representation presented in figure 7 of the public domestic debt together with GDP growth rate indicates that the public domestic debt had an upward trend for the period running 1980 to 2012 and GDP growth rate had a downward trend for the same period. The mean for public domestic debt was 13.56%.

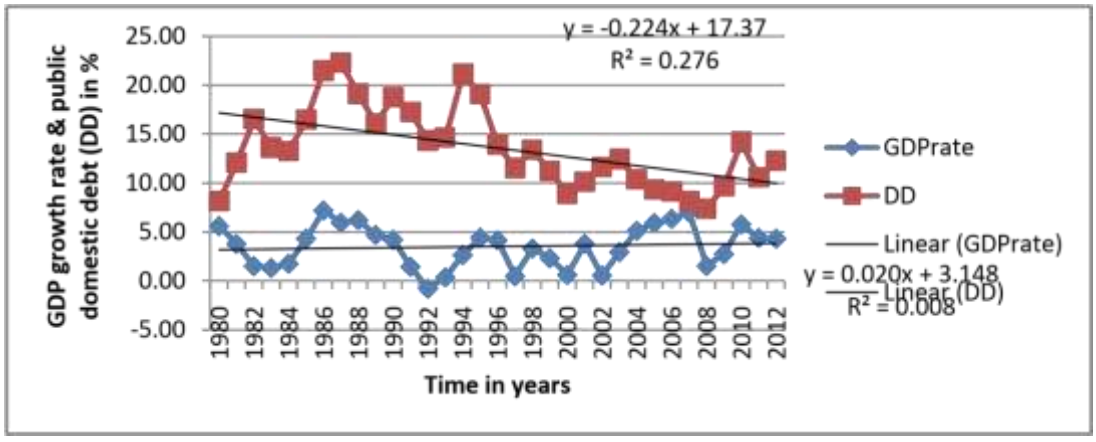


Figure 7: Trend in GDP growth rate and public domestic debt

A graphical representation presented in figure 8 of the external debt together with GDP growth rate indicates that the two series had an upward trend for the period running 1980 to 2012. The mean for external debt was 0.72%.

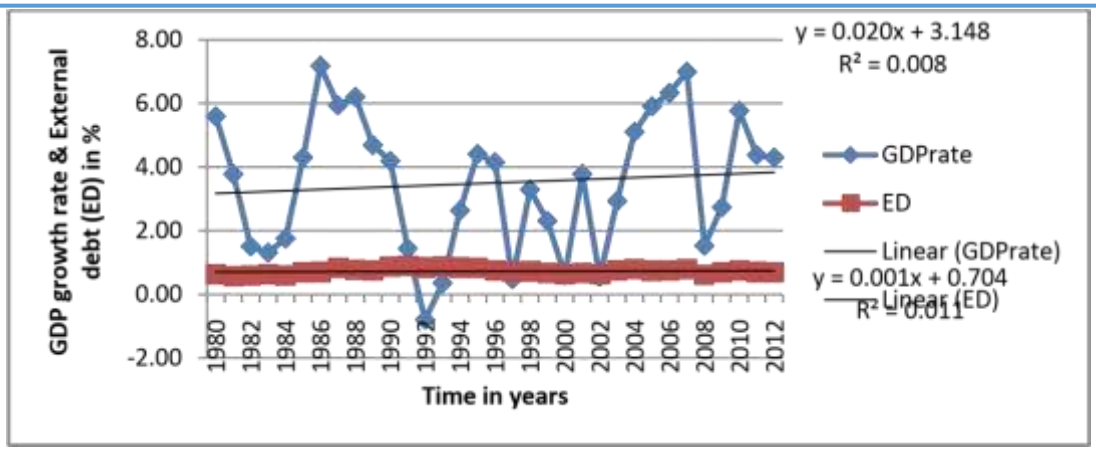


Figure 8: Trend in GDP growth rate and External debt

A graphical representation presented in figure 9 of the labour together with GDP growth rate indicates that the two series had an upward trend for the period running 1980 to 2012. The mean for labour was 0.47%.

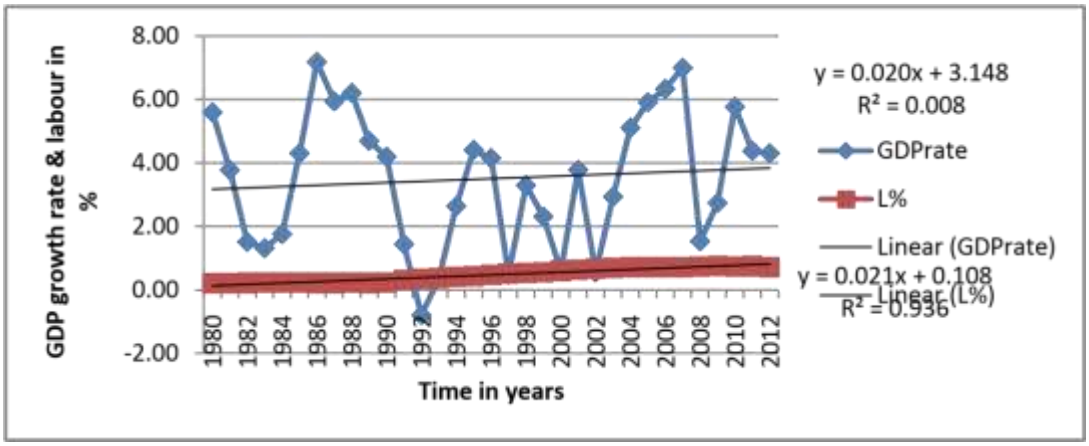


Figure 9: Trend in GDP growth rate and Labour

A graphical representation presented in figure 10 of capital together with GDP growth rate indicates that capital had an upward trend for the period running 1980 to 2012 and GDP and GDP growth rate had a downward trend for the same period. The mean for capital was 45.67%.

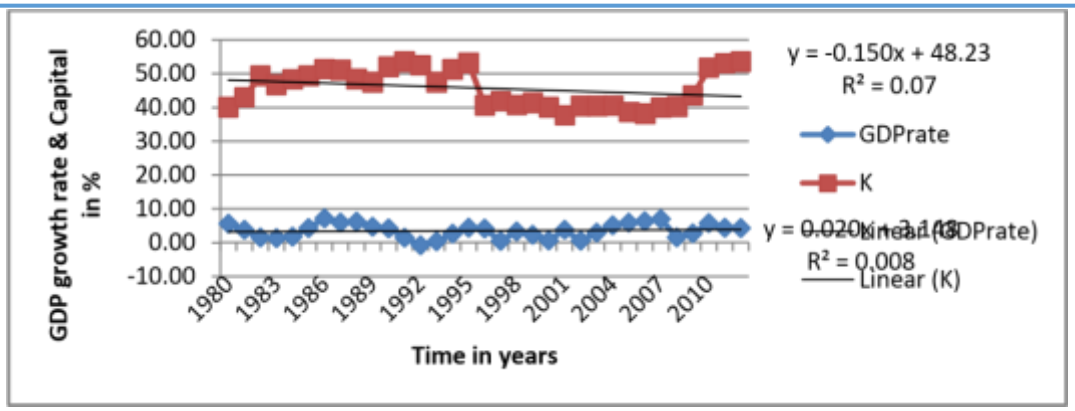


Figure 10: Trend in GDP growth rate and Capital

4.2 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 are presented next. Results in table 2 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.

Table 2: Unit root tests-Level

Variable name	ADF test	PP test	1% Level	5% Level	10% Level	Conditions	Comment
GDP growth rate	-3.310215	-3.310215	-3.6496	-2.9558	-2.6164	Lag 0 and Intercept	Non Stationary
Domestic debt	-2.288582	-2.288582	-3.6496	-2.9558	-2.6164	Lag 0 and Intercept	Non Stationary
DD2	-2.833266	-2.833266	-3.6496	-2.9558	-2.6164	Lag 0 and Intercept	Non Stationary
ED	-2.307158	-2.307158	-3.6496	-2.9558	-2.6164	Lag 0 and Intercept	Non Stationary
ED2	-1.099262	-1.099262	-3.6496	-2.9558	-2.6164	Lag 0 and Intercept	Non Stationary
K	-1.754484	-1.754484	-3.6496	-2.9558	-2.6164	Lag 0 and Intercept	Non Stationary
L	-0.332131	-0.332131	-3.6496	-2.9558	-2.6164	Lag 0 and Intercept	Non Stationary

Source: Eviews computation

The variables were differenced and unit roots tested. All the variables become stationery on first differencing.

Table 3: Unit root tests- first differencing

Variable name	ADF test	PP test	1% Level	5% Level	10% Level	Conditions	Comment
DGDP growth rate	-6.079748	-6.079748	-3.6576	-2.9591	-2.6181	Lag 0 and Intercept	Stationary
DDomestic debt	-5.126492	-5.126492	-3.6576	-2.9591	-2.6181	Lag 0 and Intercept and	Stationary
DDD2	-5.940844	-5.940844	-3.6576	-2.9591	-2.6181	Lag 0 and Intercept and	Stationary
DED	-6.516615	-6.516615	-3.6576	-2.9591	-2.6181	Lag 0 and Intercept and	Stationary
DED2	-5.149139	-5.149139	-3.6576	-2.9591	-2.6181	Lag 0 and Intercept and	Stationary
DK	-5.612004	-5.612004	-3.6576	-2.9591	-2.6181	Lag 0 and Intercept and	Stationary
DL	-3.341926	-3.341926	-3.6576	-2.9591	-2.6181	Lag 0 and Intercept and	Stationary

4.3 Long run relationship

Table 4: Long Run Results

Dependent Variable: GDPRATE

Method: Least Squares

Date: 11/15/13 Time: 17:38

Sample: 1980 2012

Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.

DD	0.895587	0.142471	6.286121	0.0000
DD2	-0.034346	0.007159	-4.797492	0.0001
ED	31.75236	4.274089	7.429037	0.0000
ED2	-23.97230	2.813477	-8.520523	0.0000
K	-0.043186	0.053761	-0.803299	0.4291
L	-5.534411	1.568208	-3.529130	0.0016
C	-10.21300	2.657532	-3.843038	0.0007

R-squared	0.805136	Mean dependent var	3.502494
Adjusted R-squared	0.760167	S.D. dependent var	2.150286
S.E. of regression	1.053053	Akaike info criterion	3.127096
Sum squared resid	28.83196	Schwarz criterion	3.444537
Log likelihood	-44.59709	F-statistic	17.90441
Durbin-Watson stat	1.007765	Prob(F-statistic)	0.000000

4.4 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.

Table 5: Engle Granger Cointergration Test

ADF Test Statistic	-5.164024	1% Critical Value*	-3.6576
		5% Critical Value	-2.9591
		10% Critical Value	-2.6181

*MacKinnon critical values for rejection of hypothesis of a unit root.

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 1 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 1 Cointegration equations was larger than the z critical vales at 5% and a 1% level. This implies that more than 1 co integrating equation exists (results indicate 2 cointergrating equations exist). This further implies that all the variables in the long run model converge to equilibrium in the long run (i.e. they are co integrated).

Table 6: Johansen Cointergration Test

Date: 11/16/13 Time: 17:48

Sample: 1980 2012 Included

observations: 31

Test assumption: Linear deterministic trend in the data

Series: GDPRATE DD DD2 ED ED2 K L

Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.866012	173.5957	124.24	133.57	None **

0.799216	111.2856	94.15	103.18	At most 1 **
0.650825	61.51435	68.52	76.07	At most 2
0.319461	28.89675	47.21	54.46	At most 3
0.250043	16.96578	29.68	35.65	At most 4
0.220689	8.045847	15.41	20.04	At most 5
0.010147	0.316152	3.76	6.65	At most 6

*(**) denotes rejection of the hypothesis at 5%(1%) significance level

L.R. test indicates 2 cointegrating equation(s) at 5% significance level

4.5 Error Correction MODEL

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 co-integrating 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.Results in table 7 indicated that in the short run, the overall model fitness was satisfactory. This was demonstrated by an R squared of 0.9224. This implied that 92.24% of the variations in the short run GDP growth rate were explained by the short run independent variables. The overall model was significant as revealed by an F statistic of 40.798 (p value=0.000). This further implied that the independent variables were good joint good predictors of short run GDP growth rate. Results revealed that the short run domestic debt has a positive relationship with short run GDP growth rate.

A regression coefficient of 1.030 (p value=0.000) implies that an increase in short run domestic debt by one unit leads to an increase in short run GDP by 1.03 units. The findings disagree with Reinhart and Rogoff (2010b) which showed that there is no link between debt and growth when the percentage of debt is below 90%. Results revealed that the square of the short run domestic debt has a hill shaped relationship with short run GDP growth rate. A regression coefficient of -

0.036 (p value=0.000) implies that the relationship between GDP growth rate is positive up to a certain point and then starts declining. The findings disagree with Panizza and Presbitero (2012) who did a study on whether public debt has a causal effect on economic growth in a sample of OECD countries. The results were consistent with the existing literature that found a negative correlation between debt and growth. However, the link between debt and growth disappeared once the author's instrument debt with a variable that captures valuation effects brought about by the interaction between foreign currency debt and exchange rate volatility.

The authors then conducted a battery of robustness tests and showed that the results were not affected by weak instrument problems and were robust to relaxing their exclusion restriction. Results revealed that the short run external debt has a positive relationship with short run GDP growth rate. A regression coefficient of 27.62 (p value=0.000) implies that an increase in short run external debt by one unit leads to an increase in short run GDP by 27.62 units. The findings

disagree with Ogunmuyiwa (2011) which examines whether external debts promotes economic growth in Nigeria using time series data from 1970-2007. The regression equation was estimated using econometric techniques such as Augmented Dickey –Fuller test, Granger causality test, Johansen cointegration test and Vector Error Correction Method. The results revealed that causality does not exist between external debt and economic growth.Results revealed that the square of the short run external debt has a hill shaped relationship with short run GDP growth rate. A regression coefficient of -20.75 (pvalue=0.000) implies that the relationship between GDP growth rate is positive up to a certain point and then starts declining.

The findings agree with Minea and Parent (2012) conducted a study on the relationship between debt and growth by using the Panel Smooth Threshold Regressions model originally proposed by Gonz´alez, Ter¨asvirta, and van Dijk (2005). Using this approach, that allows for a gradual change in the regression coefficient when moving from one regime to the other, Minea and Parent (2012) found that public debt is negatively associated with growth when the debt-to-GDP ratio is above 90 percent and below 115 percent. However, they also find that the correlation between debt and growth becomes positive when debt surpasses 115 percent of GDP. While Minea and Parent's (2012) results should not be interpreted as an argument for fiscal profligacy, they suggest the existence of complex non-linearities, which may not be captured by models that use a set of exogenous thresholds.The error correction term measures the speed of adjustment to the long run equilibrium in the dynamic model. The error correction term LAGRESID has the expected sign and is significantly negative (-0.658, p value =0.001). This result implies that there is a negative gradual adjustment (convergence) to the long run equilibrium. The coefficient of (0.658) indicates that -0.658% of the disequilibria in short run GDP achieved in one period are corrected in the subsequent period.

Table 7: Error Correction Model/Short run model

Dependent Variable: DGDPRATE

Method: Least Squares

Date: 11/16/13 Time: 17:57

Sample(adjusted): 1981 2012

Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DDD	1.030491	0.111541	9.238668	0.0000

DDD2	-0.036083	0.004627	-7.798244	0.0000
DED	27.62629	2.529564	10.92137	0.0000
DED2	-20.75845	2.391848	-8.678836	0.0000
DK	-0.045330	0.049262	-0.920181	0.3666
DL	-2.777944	6.127193	-0.453380	0.6543
LAGRESID	-0.658249	0.140528	-4.684129	0.0001
C	-0.137059	0.159066	-0.861646	0.3974
R-squared	0.922477	Mean dependent var		-0.040374
Adjusted R-squared	0.899867	S.D. dependent var		2.198555
S.E. of regression	0.695708	Akaike info criterion		2.324544
Sum squared resid	11.61622	Schwarz criterion		2.690978
Log likelihood	-29.19270	F-statistic		40.79814
Durbin-Watson stat	1.345981	Prob(F-statistic)		0.000000

5.0 DISCUSSION, 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. The mean GDP growth rate from 1980 to 2012 was 3.5% with a standard deviation of 2.15. The highest growth rate over the period was 7.18% and

the lowest growth rate was -0.80%. The mean for public domestic debt from 1980 to 2012 was 13.56% with a standard deviation of 4.13. The highest growth rate over the period was

22.25% and the lowest growth rate was 7.32%. The mean for public domestic debt squared from 1980 to 2012 was 164.78% with a standard deviation of 80.58. The highest growth rate over the period was 371.58% and the lowest growth rate was 53.65%. In addition the mean for external debt from 1980 to 2012 was 0.72% with a standard deviation of 0.09. The highest growth rate over the period was 0.90% and the lowest growth rate was 0.57%. The mean for external debt squared from 1980 to 2012 was 0.46% with a standard deviation of 0.16. The highest growth rate over the period was 0.81% and the lowest growth rate was 0.28%.

Finally the mean for capital from 1980 to 2012 was 45.67% with a standard deviation of 5.51. The highest growth rate over the period was 53.48% and the lowest growth rate was 37.59%. The mean for labour from 1980 to 2012 was 0.47% with a standard deviation of 0.21. The highest growth rate over the period was 0.75% and the lowest growth rate was 0.22%. The skewness coefficients revealed that the distribution of the variables was normal. This conclusion was arrived after since all the skewness coefficients were between +1 and -1 for these variables. In addition, the kurtosis coefficients indicate that all the variables had a mesokurtic distribution (normal distribution) since the reported excess kurtosis was less than the rule of the thumb of -3 and +3. The skeweness and kurtosis tests results were confirmed by the Jacque Bera test offered a more conclusive test on normality.TheJarque-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 all the variables were normally distributed as the reported p values were more than the critical p value of 0.05. In the long run, the model r squared was 0.805. This implied that the goodness of fit of the model was satisfactory as 80.5% of the variation in GDP growth rate was explained by the independent variables.

The overall model was significant as demonstrated by an F statistic of 17.90441 (p value= 0.000). This further implied that the independent variables were good joint good predictors of long run GDP growth rate.The results indicate that in the long run, public domestic debt (DD) has a positive and significant relationship with GDP growth rate. (b=0.895, p value=0.000). This implies that an increase in public domestic debt by one unit leads to an increase in GDP growth rate by 0.895 units. The results indicate that in the long run, the squared term of public domestic debt (DD2) has a hill shaped and significant relationship with GDP growth rate. (b=-0.034, p value=0.0001). This implies that an increase in public domestic debt by one unit leads to an increase in GDP growth rate up to a certain point where it starts to decline. The results indicate that in the long run, external debt (ED) has a positive and significant relationship with GDP growth rate. (b=31.752, p value=0.000). This implies that an increase in external debt by one unit leads to an increase in GDP growth rate by 31.752 units. The results indicate that in the long run, the square term of external debt (ED2) has a hill shaped and significant relationship with GDP growth rate. (b=-23.97, p value=0.000). This implies that an increase in external debt by one unit leads to an increase in GDP growth rate up to a certain point where it starts to decline.

Results further indicate that in the long run, capital (K) has a negative and insignificant relationship with GDP growth rate. (b=-0.04312, p value=0.429). This implies that an increase in capital by

one unit leads to a decrease in GDP growth rate by -0.0432 units. Finally the study findings indicate that in the long run labour (L) has a negative but significant relationship with GDP growth rate (b= -5.5344, p value=0.0016). This implies that an increase in labour by one unit leads to a decrease in GDP growth rate by -5.5344 units.The two step engle granger test for co integration revealed 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. Johansen co integration test indicated that there was more than 1 co integrating equation in existence (results indicate 2 cointergrating equations exist). This further implies that all the variables in the long run model converge to equilibrium in the long run (i.e. they are co integrated). In the short run, the overall model fitness was satisfactory. This was demonstrated by an R squared of 0.9224. This implied that 92.24% of the variations in the short run GDP growth rate were explained by the short run independent variables. The overall model was significant as revealed by an F statistic of 40.798 (p value=0.000). This further implied that the independent variables were good joint good predictors of short run GDP growth rate.Results revealed that the short run domestic debt has a positive relationship with short run GDP growth rate.

A regression coefficient of 1.030 (p value=0.000) implies that an increase in short run domestic debt by one unit leads to an increase in short run GDP by 1.03 units. Results revealed that the square of the short run domestic debt has a hill shaped relationship with short run GDP growth rate. A regression coefficient of -0.036 (p value=0.000) implies that the relationship between GDP growth rate is positive up to a certain point and then starts declining. Results revealed that the short run external debt has a positive relationship with short run GDP growth rate. A regression coefficient of 27.62 (p value=0.000) implies that an increase in short run external debt by one unit leads to an increase in short run GDP by 27.62 units. Results revealed that the square of the short run external debt has a hill shaped relationship with short run GDP growth rate. A

regression coefficient of -20.75 (p value=0.000) implies that the relationship between GDP growth rate is positive up to a certain point and then starts declining. The error correction term measures the speed of adjustment to the long run equilibrium in the dynamic model. The error correction term LAGRESID has the expected sign and is significantly negative (-0.658, p value =0.001). This result implies that there is a negative gradual adjustment (convergence) to the long run equilibrium. The coefficient of (-0.658) indicates that -0.658% of the disequilibria in short run GDP achieved in one period are corrected in the subsequent period.

5.2 Conclusion

It was concluded that there was co integration among the long run variables. Results also indicated that in the long run, public domestic debt has a positive and significant relationship with GDP growth rate. Therefore, an increase in public domestic debt leads to an increase in GDP growth rate. It was possible to conclude that in the long run, external debt (ED) has a positive and significant relationship with GDP growth rate. This implies that an increase in external debt by one unit leads to an increase in GDP growth rate.In the long run, the square of domestic debt and the square of external debt exhibit a hill shaped relationship to GDP growth rate. This implies that an increase in domestic and external debt increases GDP growth rate up to a certain level after which it decreases the GDP growth rate. This means that too much debt is unsustainable. It was

concluded that in the long run labour (L) has a negative but significant relationship with GDP growth rate. This implies that an increase in labour by one unit leads to a

decrease in GDP growth rate.In the short run, it was possible to conclude that the short run domestic debt has a positive relationship with short run GDP growth rate. This implies that an increase in short run domestic debt by one unit leads to an increase in short run GDP growth rate.The square of domestic debt and the square of external debt exhibit a hill shaped relationship to GDP growth rate. This implies that an increase in domestic and external debt increases GDP growth rate up to a certain level after which it decreases the GDP growth rate. This means that too much debt is unsustainable.

It was possible to conclude that the short run external debt has a positive relationship with short run GDP growth rate. This implies that an increase in short run external debt by one unit leads to an increase in short run GDP growth rate.The square of domestic debt and the square of external debt exhibit a hill shaped relationship to GDP growth rate. This implies that an increase in domestic and external debt increases GDP growth rate up to a certain level after which it decreases the GDP growth rate. This means that too much debt is unsustainable.It was concluded that the error correction term LAGRESID has the expected sign and is significantly negative. This result implies that there is a negative gradual adjustment (convergence) to the long run equilibrium. The coefficient indicates that the disequilibria in short run GDP growth rate achieved in one period are corrected in the subsequent period.

5.3 Recommendations

The study recommends that government should borrow sustainably. For instance the Government should ensure that the external debt stocks are at the levels that promote growth. External debt that is beyond the sustainable debt should b for sustainability purposes. It is also recommended that domestic debt should be kept to a manageable level. This is because too much domestic debt leads to overcrowding of the domestic private sector. Overcrowding of the domestic private sector implies that Government borrowing from the local market pushes up interest rates and hence discouraging private sector borrowing. This in turn leads to a reduction in private sector investment, the overall effect being a decline in growth rate of GDP. It is recommended that labour quality be improved through training and education as doing so would improve the GDP growth rate.

5.4 Areas of Further Research

Further research should be to establish the impact of domestic and external debt on disaggregated sectors of the economy. It may be important to identify how sectors such as agricultural sector, manufacturing sector and service sector are affected by domestic and external borrowing. Another area of research is on a country-to-country analysis and checking whether effects of domestic and external borrowing on GDP growth rate are consistent across the East African Countries.

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