Effect of Public Debt on the Gross Domestic Product in Kenya

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Abstract: The underlying key issue behind economic development but which has mostly been ignored by empirical research is the issue of public debt. Yet it is now universally accepted that a country's ability to grow also depends on its level of indebtedness. Whereas public debt can drive investment and economic growth, it could also have the opposite effect if channeled to unproductive investment, consumption, and/or if its growth surpasses productive capacity of the economy. The purpose of this study was to find the effect of public debt on gross domestic product of Kenya. The specific objectives of this study were to disaggregate public debt into: external debt on gross domestic product, advances from commercial banks on GDP, overdraft from Central Bank of Kenya on GDP and government securities on GDP. The relationship among variables incorporated in the study was estimated through Ordinary Least Square regression (OLS) employed along causal research design on annual time series data covering period 2003-2015. The study employed Augmented Dickey Fuller test and variables were found to be normally distributed and stationary at their level form. The study found that bank loans, external debt and government securities have a significant relationship with gross domestic product at five percent significance level with bank loans and external debt being inversely related to GDP. On the other hand, overdraft from the Central Bank and government securities have a direct positive relationship with GDP. In view of this, the study recommends that the government should encourage sustainable domestic and external borrowing and utilize funds in productive economic areas.
Keywords: disaggregates, economic development, gross domestic product; indebtedness; public debt

I. Introduction

Kenya experienced rapid economic growth after independence, through public investments, increased smallholder agricultural production and private foreign industrial investments. Gross domestic product (GDP) grew at an annual average of 6.6% from 1963 to 1973. Between 1974 and 1990, however, Kenya's economic performance declined due to economic shocks (mainly oil shocks), poor governance and the resultant political instability (International Monetary Fund, 2009). There was excessive reliance on oil imports and an attempt at industrialization meant that demand for oil was greater. Therefore with oil prices increasing, they could not afford the oil imports creating Balance of Payment problems and so the government resorted to heavy external borrowing (Onyango, 2014).

For any government, the main source of funds is from taxes and if not enough, borrowings are made to bridge the gap between revenues and expenses. According to (Patenio & Tan-Cruz, 2007), a public debt is a debt owed to both external and internal parties by a government of an independent country. Public debt indicates how much public spending is financed by borrowing instead of taxation (Makau, 2008). External Public Debt is debt owed to external creditors which are multilateral creditors such as African Development Bank, World Bank, International Monetary Fund and bilateral creditors who are essentially governments of other countries and commercial creditors (Babu et al, 2014).Domestic debt also referred to as government debt is created through instruments such as treasury bonds and bills, borrowing from commercial banks and overdraft from the Central Bank. Government debt provides a benchmark for issuance of private sector securitized debt such as corporate bonds. The government starts by issuing short term Treasury bills to build investor confidence through guaranteed or secure return, and thereafter financial deepening is achieved by issuing longer dated instruments(Central Bank of Kenya Act, 2014).). The composition of domestic debt portfolio by instrument has changed significantly in favor of Treasury bonds overtime. The proportion of Treasury bonds in the overall domestic debt has been increasing while Treasury bills has dropped of the overall domestic debt over the periods. The shift in the composition of domestic debt in favor of the longer dated instruments followed the government initiative in May 2001 to restructure public domestic debt and develop the domestic debt markets. The first objective of the process was to restructure domestic debt from the short-dated Treasury bills to the long-dated Treasury bonds in order to minimize roll-over risks associated with short-term borrowing (Mageto, 2015). Bonds market is an alternative vehicle for mobilizing finance for both the government and the private sector in financing long-term projects such as housing and infrastructure development in addition to financing the government deficit (Matiti, 2013).

The Kenya Government issues bonds majorly to finance domestic debt borrowing, which is part of a general objective of financing public debt. The shift in composition of domestic debt has also affected the proportion of overdraft. The proportion of government overdraft at the Central Bank of Kenya in the overall domestic debt dropped from 20 percent to zero during period under review. The reduction in utilization of the overdraft facility was not only due to improved fiscal discipline but also due to amendment of the CBK Act in April 1997 to limit the overdraft level to 5 percent of the latest audited ordinary government revenue (Central Bank of Kenya Act, 2014). As at the end of 2007, therefore, the maximum overdraft the government could utilize was Kshs 13.3 billion. As a result, the percentage of budget deficit financed by money creation through overdraft from the central bank decreased significantly.

1.1 Public Debt in Kenya

Kenya's public debt stood at Kshs. 709.7 billion at the end of June 2004. Out of the outstanding public debt, Kshs. 306.2 billion or 43.2% was domestic. The share of domestic debt in GDP stood at 26.4% in June 2004. Overall, the ratio of total public debt to GDP was at 61.2% in June 2004 (Central Bank of Kenya Act, 2014). Domestic debt was majorly financed through the sale of Treasury bonds to commercial banks and the non-banks (61.6%), and through utilization of the overdraft facility at the Central Bank of Kenya. According to National Treasury bulletin (GoK, 2013) as at end of June 2013 external debt was at 45% of GDP and this increase was due to rise in disbursements and depreciation of Kenya shilling against the major currencies. There has been an emerging trend of high and growing domestic debt in most African countries. In Kenya, the ratio of domestic debt as compared to total public debt has been increasing over the years. The domestic debt has been on the rise in the period under review.

Figure 1: Evolution of Debt Stock in Kenya, 2000 – 2013
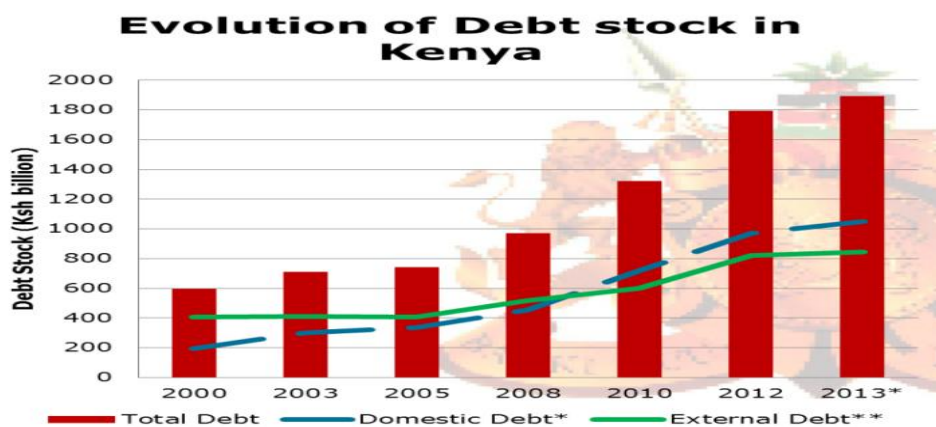
Source: Central Bank of Kenya, 2014

1.2 GDP Growth Rate in Kenya

Kenya had its worst economic performance since independence from 1991 to 1993. Growth in GDP stagnated, and agricultural production shrank at an annual rate of 3.9%. Inflation reached a record 100% in August 1993 and government budget deficit was over 10% of GDP (Himbara, 1993). The country's real GDP growth picked up at 2.3% in early 2004 and to nearly 6% in 2005 and 2006. From the IMF and World Bank Sustainability Analysis, External debt in Kenya declined from 47.3% to 29.8% from 2004 to 2006. This improvement was largely because of expansions in tourisms, telecommunications, transport and construction and a recovery in agriculture.

The GDP in Kenya is estimated to have expanded by 5.6% in 2015 which was a slight improvement compared to 5.3 per cent growth in 2014. This performance was mainly supported by macroeconomic stability and improvement in outputs of agriculture, construction, finance and insurance and real estate. On the international front, the economic growth in Sub-Saharan Africa (SSA) slowed from 5.1 per cent in 2014 to 3.8 per cent in 2015. This was mainly attributed by decline in prices of main commodities and a weak global economic performance. There was a slowed growth of 3.4 per cent for the EAC mainly associated with political instability in Burundi and uncertainties associated with general elections in Tanzania and Uganda.

Figure 2: Kenya GDP Annual Growth Rate

KENYA GDP ANNUAL GROWTH RATE

SOURCE: WWW.TRADINGECONOMICS.COM | KENYA NATIONAL BUREAU OF STATISTICS

Source: World bank Database, 2014

1.3 Statement of the problem

In many countries, the underlying key issue behind economic development but which has mostly been ignored by empirical research is the issue of public debt. Traditionally, the main drivers of economic growth are the level and quality of a country's physical and human capital, technological advancement and the quality of the labor force as well as the country's level of openness to international trade. However, it is now universally accepted that a country's ability to grow also depends critically on its level of indebtedness (Blake, 2015). Kenya's public debt has been increasing rapidly owing to infrastructure-related borrowing with the overall gross public debt reaching 56 percent of GDP at end-2015. Whereas financing infrastructure - should address bottlenecks and boost sustainable growth, high levels of debt can potentially lead to debt crisis and pose a serious risk to the economic and financial stability (Goosen, 2013). Unsustainable debt levels present risks to government expenditures on development and social programs since a large proportion of tax revenue would be diverted to debt service.

However, debt can create higher fiscal imbalances through greater debt servicing attributed, in part, to future increases in loans to repay existing debt. In addition, increased borrowing in the domestic economy can crowd out private sector investment. Indeed the recent pace of public debt accumulation has been rapid raising concerns. Public debt increased five-fold between June 2003 and June 2016. The shift in the composition of public debt in favor of domestic debt has occasionally seen the rise of nominal interest rates and consequently crowding out of the private sector to the detriment of economic growth.

The government of Kenya is not only experiencing an increase in public debt but there has also been a drastic decline of economic growth from 2011-2015. This is of great concern as large public debt figures are believed by many researchers to have adverse effects on economic growth. (Mill, 1989), argued that government borrowing was harmful because it destroys capital which could otherwise be used for productive employment. Moreover, studies are yet to reach consensus as to the effect of debt on growth. For instance (Augustor et al, 2015) found that public debt is negatively related to economic growth and exhibit, from a given level of debt, an inverted U behavior regarding the relationship between economic growth and public debt. However, other studies such as Panizza & Presbitero, (2014) find that there is no evidence of a causal negative relationship going from debt to economic growth while (Putunoi & Mutuku, 2013; Maana, *et al.,* 2008) find that domestic debt expansion has a positive and significant effect on economic growth.(Burguet & Ruiz, 1998) viewed domestic debt as more expensive in comparison to concessionary external financing as a result; interest load of domestic debt may absorb important government revenues and thus crowd-out pro-poor and growth enhancing expenditures. However, according to (Umaru, Hamidu, & Musa, 2013) external debt possess a negative impact on economic growth while domestic debt has a positive impact on economic growth (GDP). Additionally, in the long run, domestic debt has a negative impact on economic growth (Singh, 1999). These contradictions and lack of convergence in literature formed the basic motivation for this study with the question being; what is the effect public debt on gross domestic product of Kenya? Additionally, then compare which of external and domestic debt has more significance in stimulating growth.

1.4 Objectives of the Study

The general objective of the study was to study the effect of public debt in gross domestic product of Kenya. The specific objective was to:

1. To ascertain the effect of advances from commercial banks on the gross domestic product of Kenya
2. To examine the effect of overdraft from Central Bank on gross domestic product in Kenya.
3. To investigate the effect of external debt on gross domestic product in Kenya.
4. To determine the effect of government securities (Treasury Bills) on gross domestic product.

1.5 Significance of the Study

The study will help government and policy makers to know what levels of public debt will deter economic growth and thus adopt policies that will keep the country's debt level in a sustainable level. In other words the study's result will be highly relevant in the formulation and implementation of effective policies. Additionally, policy makers and economists will be able to assess whether the effect on debt is non-linear, that is if the effect on growth depends on the level of debt stock It will also help the government identify and study other variables related to growth including savings and inflation and to what level it should also stop accruing external debt with advice from the policy makers.

1.6 Scope of the Study

The study will ascertain the impact of public debt and other macroeconomic variables on the GDP growth in Kenya. It will seek to explore economic growth from broad areas, that is; public debt, domestic debt, and external debt. OLS regression model was employed along with descriptive statistics on time series data covering the period 2003-2015. This period is more recent and has not been covered by existing literature. Secondly, the period covers three political regimes in Kenya.

1.7 Limitations of the Study

In measuring the data collected, the gathered information might inhibit the ability to conduct a thorough analysis of the results. For example omission of a specific variable that could otherwise help address a particular issue in the study. In addition, the dynamics expected from public debt and economic growth may not be clearly examined.

II.   Literature Review

2.1 Theoretical Literature

The review of theories on economic growth and public debt is outlined below:

2.2 Neoclassical Growth Theory

The neoclassical growth model known as Solow-Swan model predicts that poor countries, characterized as having low initial capital stocks, tend to have high growth rates as they start off well below their steady states, in which their situation allows for a high accumulation of new capital goods. This school of thought stressed that the policy focus should be on increasing rate of savings and investment. Availability of increased savings spurs additional investments, which fuels economic growth. Due to limited and precarious revenue streams of developing countries, external sources represented a susceptible opportunity to fuel their aspirations for greater investments and growth.

(Modigliani, 2000), refining contributions by Buchanan (1988) argued that the national debt is a burden for next generations, which comes in the form of a reduced flow of income from a lower stock of private capital. He considered that a situation in which the gross burden of national debt may be offset in part or in total is when debt finances government expenditure that could contribute to the real income of future generations, such as productive public capital formation. (Krugman & Eggertson, 2012), coins the term of "debt overhang" as a situation in which a country's expected repayment ability on external debt falls below the contractual value of debt. In Krugman's specification, the external debt overhang affects economic growth through private investment, as both domestic and foreign investors are deterred from supplying further capital. The theory implies that debt reduction will lead to increased investment and repayment capacity and, as a result, the portion of the debt outstanding becomes more likely to be repaid. When this effect is strong, the debtor is said to be on the 'wrong side' side of the debt Laffer curve.

2.3 Traditional (Keynesian) Theory of Public Debt

Keynesians advocated for debt-financed government expenditure arguing that there exists employment creating effect of public outlays during unemployment period. According to Keynes, public debt would be of importance when the economy is at recession as a good fiscal measure in the short run, because at this time, there was low investment, increased unemployment and low economic growth due to in aggregate demand (Blinder, 2012). The theory relies on certain advantages of public borrowing. Through debt creation, the government can tap savings streams, put the resources thus raised to productive use and bring about an increase in national income. Keynes however indicated that debt financing should have a limit since much of it may crowd out private investors.

2.4 Classical Views on Public Debt

The new classical (Barro & Sala-i-Martin, 2003) based his case on Ricardian equivalence theorem (RET) hypothesis of neutrality of public debt arguing that increase in public expenditure which is debt financed would not have effect on the economy as future taxes are personified in the present debt. He supposed that

individuals don't die thus inherit among generations, presence of perfect capital mobility and that individuals can freely borrow and lend in the economy. According to (Malthus, 2013), the existence of the national debt by maintaining a body of unproductive consumers contributed powerfully to distribution and demand. (Malthus, 2013), argued that public debt contributed among other things to the evils resulting from changes in the value of money and expressed the desirability of containing the growth of public debt. (Mill, 1989), argued that government borrowing was harmful because it destroys capital which could otherwise be used for productive employment. According to (Mill, 1989), it is beneficial to pay-off a debt as early as possible either through immediate payment by a general contribution or by gradual payment from the surplus revenue.

Classical theorist disapproved views of public debt because they thought it interfered with the natural order which was conducive to the creation of wealth and increase in the material welfare of the nation. The theory mentioned that Government borrowing makes future financing more difficult by increasing the proportion of the budget which must go for fixed charges and by increasing the amount of taxes which must be paid to finance the interest on the debt.

2.5 Conceptual Framework
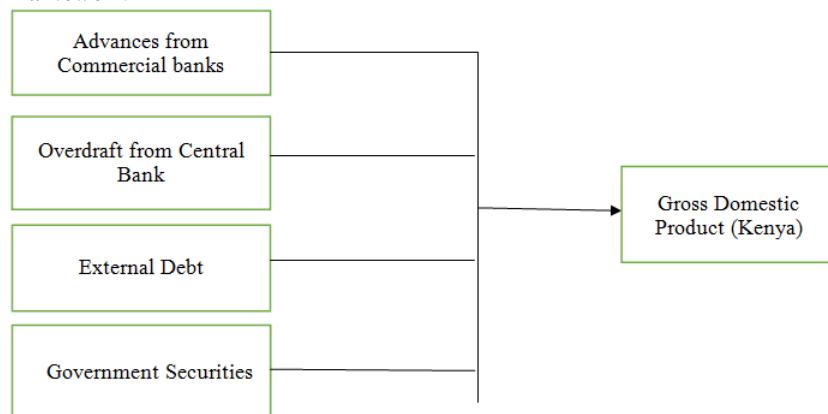
2.6 Empirical Literature

(Panizza & Presbitero, 2013), made a survey about the recent literature on the links between public debt and economic growth in advanced economies. They found out that theoretical models yield ambiguous results. Their reading of the empirical literature is that there is no paper that can make a strong case for a causal relationship going from debt to economic growth. They also found out that the presence of thresholds and, more in general, of a non-monotone relationship between debt and growth is not robust to small changes in data coverage and empirical techniques.

(Maana , Owin, & Mutai, 2008), analyzed the development in public domestic debt in Kenya and its impact on the economy for the period 1996 to 2007. The study found out that the composition of Kenya's public debt has shifted in favor of domestic debt while considerable progress has been made in extending the maturity profile of the debt, and diversification of the investor base towards institutional investors and individuals. The significant rise in domestic debt during the period resulted in higher domestic interest payments which present a significant burden to the budget. However, due to a considerable level of financial development in Kenya, the study found no evidence that the growth in domestic debt crowds-out private sector lending in Kenya.

Hui & Suvita (2013) by using Augmented Dickey Fuller and Ordinary Least Square for the period 1975-2010, the regression results indicated that deposits and assets have significant impact on the economic growth of Nepal while loan and advances has insignificant impact on the economic development. Furthermore, the Granger-Causality test suggests that there was no causality with deposit, loan and advances and assets with the economic acceleration.Adekanye (1986) observed that in making credit available, banks are rendering a great social service, because through their action production is increased, capital investment are expanded and a higher standard of living is realized. Similarly, Greenwood and Jovanovich (1990) observed that financial development can lead to rapid growth.

(Zhang & Wang, 2012), conducted a study on financial development and economic growth in China. The objective of the study was to investigate and establish the relationship between financial development and economic growth in China. The study was done at city level. 286 Chinese cities were studied over the five year period between 2001 and 2006. The study applied both traditional cross-sectional regression and first-differenced and system GMM estimators for dynamic panel data. The results of the research suggested that most traditional indicators of financial development like Credit Deposit, Savings, the share of fixed asset investment financed by domestic loans relative to that financed by state budgetary appropriation positively related to economic growth.

(Benhabib & Spiegel, 2000), incorporated restrictions on central bank lending to the government into their respective indices of central bank independence. These indices have been widely used to measure how central bank independence affects inflation across countries.(De Bondt, 2002), provided first evidence on the structure and dynamics of the corporate bond market in Euro land after the introduction of the euro. The paper reviews three theoretical frameworks to model corporate bond issuance: the first one models simultaneously all corporate financial liabilities in a portfolio modeling framework, the second one models supply and demand for corporate bonds simultaneously, and the third one is to specify a supply function of corporate bonds. The regression results and Granger causality tests show that various macroeconomic factors explain corporate bond spread movements and that the latter have forecasting power for real output growth.

(Beck, Levine , & Loyaza, 2000), found that financial development has a large and positive impact on total factor productivity, which feeds through to overall GDP growth, (Neusser & Kugler, 1998). A number of theorists have emphasized the role of financial development in better identifying investment opportunities, reducing investment in liquid but unproductive assets, mobilizing savings, boosting technological innovation, and improving risk taking.(Shabbir, 2005), investigated the impact of external debt on economic growth in 24 developing countries from 1976 to 2003. The study applied random effect and fixed effect estimation. (Rifaqat & Mustafa, 2012), examined the effect of external debt service payments on the economic growth in Nigeria by using ordinary least square multiple regression method for his analysis. The results from both studies showed that debt servicing to GDP negatively affect the economic growth and may leave less funds available to finance private investment in these countries leading to a crowding out effect.

The majority of existing empirical literature report that external debt adversely affects economic growth. (Cunningham, 1993), (Afxentiou & Serletis, 1996) (Deshpande, 1997), (Were, 2001), (Karagol, 2002) (Hameed & Chaudhary, 2008), reported that the external debt negatively affect the economic growth. Whereas Warner (1992), Cohen (1993), Afxentiou and Serletis (1996) and (Patenio & Tan-Cruz, 2007), concluded that external debt did not affect the economic growth. The empirical studies have shown mixed results on the impact of external debt on economic growth. Some studies are of the view that external debt impedes the economic growth but some are in the opinion that external debt positively affects the economic growth.

2.7 Critique of the Existing Literature relevant to the study
From the literature reviewed so far, although a lot of research has been done on debt, most studies have not focused on the overall debt. Empirical research has ignored public debt as a key issue behind economic development. Studies such as (Putunoi & Mutuku, 2013; Maana, *et al.,* 2008) have had an increased focus on either domestic or external debt but not a combination of both. Additionally, studies conducted abroad have been cross-sectional, that is mostly covering across countries. Furthermore, the data used is more historical. This study looks at a specific country (Kenya) and its gross domestic product and public debt covering the period 2003-2015.

2.8 Research Gap
The effects of public debt on economic growth have attracted a considerable disparity in theoretical and empirical literature. With the theoretical literature revealing contradicting views about the effect of public debt on the growth. For example (Buchanan, 1999)argues that public debt may be of great importance to the economy and the private sector. While (Malthus, 2013), indicates the contrary and argues that projects which the government uses its borrowings for take very long time to reap benefits from the same but the projects may be benefiting the private sector such as infrastructure construction. In addition to that most studies have failed to incorporate the fact that there are other macroeconomic variables that are brought about by debt increase, which affect economic growth. . This study aims at filling this gap by adding using more recent data and addressing overall debt with respect to economic growth.

III.   Methodology
3.1 Research Design
(Creswell, 2003), defines a research design as the scheme, outline or plan that is used to generate answers to research problems. Causal studies are usually the best methods for collecting information that will demonstrate relationships and explain the cause-effect relationship of variables. This research design enabled the study obtain complete and correct information from secondary data sources at Ministry of Finance, Kenya National Bureau of Statistics, and Central Bank of Kenya (CBK), world development indicators and World Bank, in order to accurately describe the relationship between variables included in the model. It is important to note that just because variables are related, does not necessarily mean that one directly causes the other. This study was causal in nature and involved quantitative analysis of data.

3.2 Target Population

The study focused on time series data of four macro-economic variables for the period from 2003 to 2015. This study concentrates on the following variables; dependent variable, economic performance (measured by the Real GDP) and independent variables namely, external debt, and domestic debt. The components of domestic debt being advances from commercial banks; Central Bank Overdraft and Government Securities (Treasury Bills). The choice is also for the avoidance of structural breaks problems. The data investigated the whole study area and for that reason there was no sampling undertaken.

3.3 Data Collection Instruments

According to (Ngechu, 2004), there are many methods of data collection. The choice of a tool and instrument depends mainly on the attributes of the subjects, research topic, problem question, objectives, design, expected data and results. This is because each tool and instrument collects specific data. This study will use secondary data which will be collected from the Central Bank of Kenya website, Kenya National Bureau of Statistics website, world development indicators and World Bank and the Treasury publications. The unit of analysis for this study is the economy of Kenya. The data on the economic survey available on the Kenya National Bureau of Statistics website is for the period ranging 1963-2016.

IV. Data Analysis and Presentation

Before subjecting the data to a regression analysis, a descriptive statistics test has to be conducted to provide a general view of the distribution and behavior of the variables in use by showing trends of the variables in form of tables, graphs, and charts. Residual test for normality of the data series was conducted and the Jacque Berra coefficient and its p-value observed for significance.

The following equation was derived in order to determine the effect of public debt on the economic performance of Kenya;

$$RGDPgr = f(LNBL, LNCBKOV, LNTBills, LNExD)\dots\dots\dots\dots\dots\dots\dots\dots\text{.i)}$$

Where $RGDPgr$ = Economic Performance measured by (GDP growth rate)

$LNBL$ = Natural Log of Advances form Commercial Banks

$LNCBKOV$ = Natural Log of Central Bank Overdraft

$LNTBills$ = Natural Log of Treasury Bills

$LNExD$ = Natural Log of External Debt Stock

4.1 Stationarity Test/Stability test

This is done to ensure that variables are stationary and that shocks are only temporary and will disintegrate and revert to their long-run mean (Maysami, Howe, & Hamzah, 2011). A variable is called stationary if it displays mean-reverting behavior. In time series analysis, the Ordinary Least Squares regression results might provide a spurious regression if the data series are non-stationary.

For solution to the research question to be feasible, a stability analysis will be carried out (Dimitrova, 2005). The augmented Dickey Fuller test was used to establish whether the data is stationary or not and also to determine the order of integration of the variables. If the test reveals that null hypothesis should be rejected than the variable will be said to be stationary.

4.2 Co-integration Test

The study used bound testing technique which is based on three validations to test for co-integration. First, (Pesaran et al, 2001)advocated the use of the ARDL model for the estimation of level relationships because the model suggests that once the order of the ARDL has been recognised, the relationship can be estimated by OLS. Second, the bounds test allows a mixture of I (1) and I (0) variables as regressors, that is, the order of integration of appropriate variables may not necessarily be the same. Therefore, the ARDL technique has the advantage of not requiring a specific identification of the order of the underlying data. Third, this technique is suitable for small or finite sample size (Pesaran et al, 2001).

4.3 Normality Test

When analysing time series data, there is need to investigate whether the variables under study are normally distributed. The Jarque-Bera test was applied based on the OLS residuals. When using the Jarque-Bera test, a null hypothesis of normal distribution was tested against the alternative hypothesis of non-normal distribution. For normal distribution, the JB statistic is expected to be statistically indifferent from zero.

H_0: The sample data are not significantly different than a normal population

H_1: the sample data are significantly different than a normal population

For a normal distribution, probability should be greater than 0.1.

4.4 Model Specification

The study aimed at determining the effect of public debt on the GDP of Kenya for the period 2003-2015. Every variable in this model was then be tested for stationarity and the logs (L) of all the variables will be calculated. All the variables were found to be integrated at level I (0). In order to determine the t relationship between domestic debt and economic performance In Kenya. The researcher conducted a multiple ordinary regression equation as follows;

$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$………………………………....…ii)

Where y = (RGDP); Economic Performance measured by (GDP growth rate)

X_1 = Advances form Commercial Banks (Measured by total value in Kshs)

X_2 = Central Bank Overdraft (Measured by total value in Kshs)

X_3 = External Debt Stock (Measured by total value in Kshs)

X_4 = Treasury Bills (Measured by total value in Kshs)

β_0- Captures all other explanatory variables which affect growth, but are not captured in the model.

$\beta_1 - \beta_4$ It is the regression co-efficient or change introduced in Y by each independent variable.

εIs the random error term accounting for all other variables that determine economic growth in Kenya but not captured in the model.

V.   Research Findings and Discussion

The data was analyzed using EVIEWS econometric software version 8. Since time series data was used from 2003 to 2015, it was necessary to difference the series so as to achieve stationarity. The data for the variables namely GDP (the dependent variable) and the independent variables namely: advances from commercial banks (BANK_LOANS), central bank overdraft (CBK_OV) external Debt (EXT) and government securities (T_BILLS) was tested for stationarity, normality and co-integration. This was followed by the regression analysis for the time-series data.

5.1 Test for Stationarity and Co-integration

Since the data is time-series, the study used the multiple OLS method of estimation. In order to avoid spurious results, the study first tested for the order of integration for the individual series by conducting unit root test for stationarity on each variable. According to (Granger & Newbold, 1974), if there is a unit root, then that particular series is considered to be non-stationary. Unit root tests using the Augmented Dickey-Fuller (ADF) test are conducted on each series to ascertain stationarity. There is no need for co-integration if variables are all stationary. The Augmented Dickey-Fuller (ADF) Test of stationarity was applied on all the time-series data. From the outputs (4.2-4.5) in the appendix, all the variables (BANK_LOANS, CBK_OV, EXT, T_BILLS) were found to be stationary at their level form since their absolute value of the t-statistic was less than 2 at 0.05 (5%) level of significance, implying that the coefficients were not statistically significant and hence reject the null hypothesis of non-stationarity.

The multiple Ordinary Least Squares regression equation (equation 4.1) is represented as follows;

$LRGDP_t = \beta_0 + \beta_1 BANK\_LOANS_t + \beta_2 CBK\_OV_t + \beta_3 EXT_t + \beta_4 T\_BILLS_t + \varepsilon_t$

5.2 Normality test of the residual

The histogram of the residuals is useful in detecting normality of the data by providing a graphical representation of the behavior of the random variables under estimation. It is important to note that the residual is normally distributed for ordinary least squares method to apply.

Output 4.1 Histogram of residuals.

Series: Residuals	
Sample 2003 2015	
Observations 13	
Mean	-8.66e-06
Median	1.92e+08
Maximum	7.75e+09
Minimum	-9.86e+09
Std. Dev.	5.01e+09
Skewness	-0.242627
Kurtosis	2.430829
Jarque-Bera	0.303023
Probability	0.859408
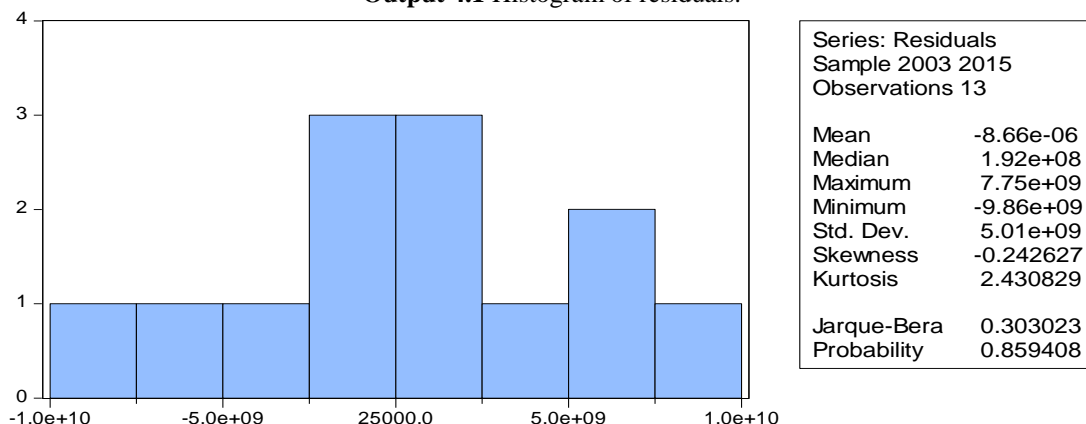
From output 4.1 above, the expected value (mean) of the residual is -0.0000866 which is approximately zero and the Jarque-Bera probability of 0.859408 which is greater than 0.1 shows that the residuals are normally distributed (at 5% level of significance).

5.3 Test of Multi-collinearity

Serial correlation in linear models leads to biased standard errors and causes the results to be less efficient. The covariance between the explanatory variables are shown in the variance-covariance matrix below. Multi-collinearity is severe if the correlation coefficient is greater than 0.8. From the results, all the correlation coefficients between the explanatory variables are 0.8 and below (to one decimal place) a clear indication of non-severity of Multi-collinearity in the series.

Output 4.6-Variance-covariance matrix

	BANK_LOANS	CBK_OV	EXT	T_BILLS
BANK_LO ANS	1.000000			
CBK_OV	-0.318284	1.000000		
EXT	-0.687185	0.262126	1.000000	
T_BILLS	0.7853796	0.125923	0.793167	1.000000

5.4 Test of Autocorrelation

Use of Ordinary Least squares method assumes lack of serial correlation in the residuals. The test of autocorrelation was achieved by expressing the residual (RESIDUAL) in equation 4.1 as a linear function of its lagged (previous) residual, (LRESIDUAL) and the output was represented below.

Output 4.7-Autocorrelation test

Dependent Variable: RESIDUAL				
Method: Least Squares				
Date: 09/08/16 Time: 07:51				
Sample (adjusted): 2003 2014				
Included observations: 12 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRESIDUAL	0.053401	0.294205	0.181510	0.8596
C	-6.22E+08	1.41E+09	-0.442553	0.6675
R-squared	0.003284	Mean dependent var		-6.46E+08
Adjusted R-squared	-0.096388	S.D. dependent var		4.63E+09
S.E. of regression	4.85E+09	Akaike info criterion		47.59423
Sum squared resid	2.35E+20	Schwarz criterion		47.67504
Log likelihood	-283.5654	Hannan-Quinn criter.		47.56430
F-statistic	0.032946	Durbin-Watson stat		1.310053
Prob(F-statistic)	0.859594			

From the above output, there is a clear indication that there is absence of serial correlation in the series since the t-statistic of the lagged residual is less than an absolute value of 2 (at 0.05 significance level) hence not statistically significant and thus no linear relationship between subsequent residuals.

5.5 Ordinary Least Squares (OLS) Estimation

The diagnostics tests above (outputs 4.1 to output 4.7) were important to establish that the data series were normally distributed thus the need for use ordinary squares method in estimation of the effect of each of the variables on economic performance.

Output 4.8-OLS output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dependent Variable: LGDP				
Method: Least Squares				
Date: 09/08/16 Time: 07:05				
Sample: 2003 2015				
Included observations: 13				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
BANK_LOANS	-54463949	18374613	-2.964087	0.0180
CBK_OV	1352933.	3333285.	-0.405886	0.6955
EXT	-22791211	7529333.	3.026990	0.0164
T_BILLS	521779.1	701145.9	4.744181	0.0081
C	1.89E+10	1.25E+11	6.150655	0.0040
R-squared	0.726825	Mean dependent var		3.79E+10
Adjusted R-squared	0.680237	S.D. dependent var		1.64E+10
S.E. of regression	6.14E+09	Akaike info criterion		48.19649
Sum squared resid	3.01E+20	Schwarz criterion		48.41378
Log likelihood	-308.2772	Hannan-Quinn criter.		48.15183
F-statistic	19.46493	Durbin-Watson stat		4.592533
Prob(F-statistic)	0.000349			

5.6Estimation and Findings of the results

The nature of the impact and significance of each of the dependent variables on economic growth was derived from the output above as shown in equation 4.2 below;

$LRGDP_t = 1.89^{10} - 54463949 * BANK\_LOANS_t + 1352933 CBK\_OV_t -$

$22791211 * EXT_t + 521779.10 * T\_BILLS_t + \varepsilon_t$

An examination of the econometric results shows that the overall fit was 72 percent meaning that 72 percent of the change in economic growth is well explained by the independent variables.

From the above output an amount of$1.89^{10}$of GDP is exogenous, i.e. does not depend on the level of the explanatory variables discussed above namely bank loans, central bank overdrafts, external loans and treasury bills.

5.7Discussion of Results

Bank loans is an important determinant of economic performance at 5% significance level (p-value=0.0180<0.05) and a t-statistic value of 2.964087 which is greater than 2 at absolute level. It has a negative coefficient meaning it has an inverse relationship with economic performance. The study concurs with studies undertaken by Fischer & Easterly (1990) and Hui & Suvita (2013) who indicated that the relationship between bank loans and economic performance is negative mainly because of crowding out of investors due to high interest rates. The positive effect of central bank overdrafts on economic growth is expected and conforms to theory since it's a cheap source of loan to the government compared to the other sources of loans discussed above. However, although, central bank overdraft has a positive coefficient, it is not an important determinant of economic performance at 5% significance level (P-value = 0.6955> 0.05) implying negligible or very small impacts on economic performance. This might be that overdraft uptake by the government is ordinarily equated to printing of money and is believed to trigger inflationary pressures. Overdraft is a short term debt which indicates that the money is not meant for development expenses but rather recurrent obligations such as payment of wages.

There is an inverse relationship between external advances and economic growth as indicated in output 4.8 above. This means that a unit change in external debt leads to a decrease in LGDP by 22791211 units. This can be attributed to the fact that external (bilateral and multilaterals) lead to adverse effects on economic growth by stagnating growth in the long term due to the high costs of servicing the loans. The other argument is the concept of overhang debt, which implies that the accumulation of capital stock slows down economic growth. The study concurs with studies undertaken by Cunningham (1993), Afxentiou (1993), Deshpande (1997), Were (2001), Karagol (2002), Cholifihani (2008), Hameed, et al. (2008, who reported that the external debt negatively affect the economic growth. External debt is however an important determinant of economic performance at 5% significance level (p-value=0.0164<0.05) and a t-statistic value of 3.026990 which is greater than 2 at absolute level.Results indicate a positive relationship between treasury bills and economic growth. This study agrees with the findings of G. De Bondt (2002) which indicated government securities have forecasting power for real output growth. Treasury bills are an important determinant of economic performance at 5% significance level (p-value=0.0081<0.05) and a t-statistic value of 4.744181 which is greater than 2 at absolute level.

5.8 Conclusions

The central focus of this study was to determine the effect of public debt on the economic performance in Kenya. The paper also examined the variables of economic performance in relation to debt; namely loans from commercial banks, overdraft from central bank, external debt and government securities.

The first objective of the study was to ascertain the effect of advances from commercial banks on the GDP in Kenya. The findings revealed that bank loans is an important determinant of economic performance. Bank loans has negative impact on Kenya's economic performance. This might be attributed to the argument that domestic borrowing from commercial banks can lead to crowding out of the private sector thus decline in economic growth due to the high interest rates that affect investment activities in the domestic economy adversely.

The second objective was to examine the effect of overdraft from Central Bank on GDP in Kenya. The analysis found that overdraft from central bank has a direct relationship with economic performance in Kenya. However, it is not an important determinant of economic performance at five percent significance level. This might be attributable to the fact that Central Banks have limits to which they increase credit to the government since inflationary pressures and a reduced foreign exchange cover are a possible risk.

The third objective was to investigate the effect of external debt on GDP in Kenya. External debt was found to have an inverse relationship on economic performance. The analysis further revealed that external debt is an important determinant of economic performance at five percent significance level.

Lastly, was to determine the effect of government securities (Treasury Bills) on GDP. The findings revealed a positive relationship on economic performance.

5.9 Recommendations

Following the conclusions drawn above from the study, it is recommended that the government should reduce reliance on external debt by maximizing tax revenue collection to finance both recurrent and capital expenditure. In the event that the government has to borrow, then it should negotiate for concessionary rates and longer repayment period. This would effectively reduce the tax burden even for future generations. On the other hand, domestic borrowing can be increased to finance growth enhancing investments. Where capital investments are to be financed through foreign debt, they should be vetted and a cost benefit analysis done to ascertain their economic benefit to the tax payer Public expenditure on key infrastructural projects should be encouraged as this stimulates economic performance. .Further research needs to be conducted to determine other macroeconomic variables that determine economic performance in Kenya. An area for further research would be determine the threshold level of debt beyond which it begins to adversely affect GDP or the maximum level of debt that can still spur economic performance.

5.10 Suggestions for further research

The study recommends that further study can be conducted on more complex models using a larger and perhaps granular dataset which capture the impact of maturity structure, interest rate and currency composition of debt to establish the relationship between debt and growth.

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Appendix

Table 1 Output 4.2 Unit root test for Bank Loans

Null Hypothesis: BANK_LOANS has a unit root				
Exogenous: Constant				
Augmented Dickey-Fuller test statistic			-1.457580	0.5193
Test critical values:	1% level		-4.121990	
	5% level		-3.144920	
	10% level		-2.713751	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 12				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(BANK_LOANS)				
Method: Least Squares				
Date: 09/08/16 Time: 07:16				
Sample (adjusted): 2004 2015				
Included observations: 12 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
BANK_LOANS(-1)	-0.249498	0.171173	-1.457580	0.1756
C	594.1672	441.1565	1.346840	0.2078
R-squared	0.175226	Mean dependent var		-47.06167
Adjusted R-squared	0.092749	S.D. dependent var		119.6928
S.E. of regression	114.0070	Akaike info criterion		12.46141
Sum squared resid	129976.0	Schwarz criterion		12.54223
Log likelihood	-72.76846	Hannan-Quinn criter.		12.43149
F-statistic	2.124539	Durbin-Watson stat		1.737874
Prob(F-statistic)	0.175633			

Table 2 Output 4.3 Unit root test for Central Bank Overdrafts (CBK_OV)

Null Hypothesis: CBK_OV has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=2)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-1.305153	0.5904
Test critical values:	1% level		-4.121990	
	5% level		-3.144920	
	10% level		-2.713751	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 12				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(CBK_OV)				
Method: Least Squares				
Date: 09/08/16 Time: 07:28				
Sample (adjusted): 2004 2015				
Included observations: 12 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CBK_OV(-1)	-0.363458	0.278480	-1.305153	0.2211
C	2372.185	1790.038	1.325214	0.2146
R-squared	0.145549	Mean dependent var		44.75333
Adjusted R-squared	0.060104	S.D. dependent var		555.9416
S.E. of regression	538.9756	Akaike info criterion		15.56823
Sum squared resid	2904946.	Schwarz criterion		15.64905
Log likelihood	-91.40938	Hannan-Quinn criter.		15.53831
F-statistic	1.703423	Durbin-Watson stat		1.910779
Prob(F-statistic)	0.221072			

Table 3 Output 4.4 Stationarity test for External Advances (EXT)

Null Hypothesis: EXT has a unit root				
Exogenous: Constant				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			0.039584	0.9409
Test critical values:	1% level		-4.297073	
	5% level		-3.212696	
	10% level		-2.747676	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 10				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(EXT)				
Method: Least Squares				
Date: 09/08/16 Time: 07:26				
Sample (adjusted): 2006 2015				
Included observations: 10 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXT(-1)	0.006285	0.158783	0.039584	0.9697
D(EXT(-1))	0.109032	0.318185	0.342668	0.7435
D(EXT(-2))	-0.369671	0.153871	-2.402472	0.0531
C	37.57376	1895.309	0.019825	0.9848
R-squared	0.519047	Mean dependent var		71.91524
Adjusted R-squared	0.278571	S.D. dependent var		151.9365
S.E. of regression	129.0503	Akaike info criterion		12.84746
Sum squared resid	99923.91	Schwarz criterion		12.96849
Log likelihood	-60.23728	Hannan-Quinn criter.		12.71468
F-statistic	2.158413	Durbin-Watson stat		3.166517
Prob(F-statistic)	0.194089			

Table 4 Output 4.5 Stationarity test for treasury bills (T-BILLS)

Null Hypothesis: T_BILLS has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=2)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-1.239127	0.1429
Test critical values:	1% level		-4.121990	
	5% level		-3.144920	
	10% level		-2.713751	
*MacKinnon (1996) one-sided p-values.				

Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 12				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(T_BILLS)				
Method: Least Squares				
Date: 09/08/16 Time: 07:34				
Sample (adjusted): 2004 2015				
Included observations: 12 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
T_BILLS(-1)	-0.389803	0.120342	-3.239127	0.0089
C	52834.93	15712.27	3.362654	0.0072
R-squared	0.512003	Mean dependent var		1994.992
Adjusted R-squared	0.463204	S.D. dependent var		3424.552
S.E. of regression	2509.046	Akaike info criterion		18.64420
Sum squared resid	62953098	Schwarz criterion		18.72502
Log likelihood	-109.8652	Hannan-Quinn criter.		18.61428
F-statistic	10.49194	Durbin-Watson stat		1.981732
Prob(F-statistic)	0.008883			