

## Research Article

### Domestic Debt and Economic Growth Nexus in Kenya

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**Abstract:** Literature is scanty on the relationship between domestic debt and economic growth with most researchers focusing on external debt. However, the shift in the composition of overall public debt in favour of domestic debt in sub-Saharan Africa countries has brought to the fore the need for governments to formulate and implement prudent domestic debt management strategies to mitigate the effects of the rising debt levels. This study investigates the effects of domestic debt on economic growth in Kenya. The issue is examined empirically using advanced econometric technique and quarterly time series data spanning 2000 to 2010. The Jacque Bera (JB) and Augmented Dickey-Fuller (ADF) tests have been used preliminarily in investigating the properties of the macroeconomic time series in the aspect of normality and unit roots respectively. The long run relationship between the variables was investigated using the Engel-Granger residual based and Johannes VAR based cointegration tests. There is evidence of cointegration hence an error correction model has been used to capture short run dynamics. The study shows that domestic debt expansion in Kenya, for the period of study, has a positive and significant effect on economic growth. In view of this, the study recommends that the Kenyan government should encourage sustainable domestic borrowing provided the funds are utilized in productive economic avenues.

**Keywords:** Economic growth, debt management, public domestic debt, size of government

#### INTRODUCTION

Government needs resources for public expenditure. While taxes generally provide the bulk of the revenue, public borrowings bridge the resource gap between receipt and expenditure. Public borrowing could be in the domestic market or abroad. However, where local markets are not developed, external sources provide the bulk of funding for the resource gap (UNITAR-DFM E-Learning, 2008). An emerging economy would therefore begin by tapping concessional external sources and choose between domestic and external commercial borrowing to bridge the gap. Though borrowing increases resource availability, it is a contractual liability and has to be repaid. Borrowings overtime leads to accumulation of debt and increases principal and interest liability. Therefore, unless used productively, borrowings could soon begin to strain government finances, as more and more resources have to be diverted for debt service, which would leave less money for routine and development expenditure. Borrowed resources should therefore be used productively and efficiently to increase the capacity to service debt through accretion to government resources. A misuse of resources may easily lead to a buildup of debt to unsustainable levels which has been a major impediment to growth in emerging economies.

The analysis of public debt in developing countries has traditionally focused on external debt. Past research has focused on external debt for two reasons; first, while external borrowing can increase a country's access to resources, domestic borrowing only transfers resources within the country. Hence, only external debt generates a "transfer" problem (Keynes, 1929). Second, since central banks in developing countries cannot print the hard currency necessary to repay external debt, external borrowing is usually associated with vulnerabilities that may lead to debt crises (Panizza, 2009). In almost all of sub-Saharan Africa there is a high degree of indebtedness, high unemployment, absolute poverty and poor economic performance despite a previous culture of massive foreign aid. The average per capita income in the region has fallen since 1970 despite the high aid flows. This scenario has prompted aid donor agencies and experts to revisit the earlier discussions on the effectiveness of foreign aid (Lancaster, 1999). The high flow of foreign aid has also created dependency syndrome (Levy, 1987; Mosley *et al.*, 1987; Devarajan *et al.*, 1998; Ali *et al.*, 1999). Unfortunately, with fiscal problems and the change in political focus by the donor community, the foreign aid taps seem to be running dry (Feyzioglu *et al.*, 1998) posing serious economic and social ramifications. This therefore made public debt one of the major economic policy issue that confronted governments of poor countries.

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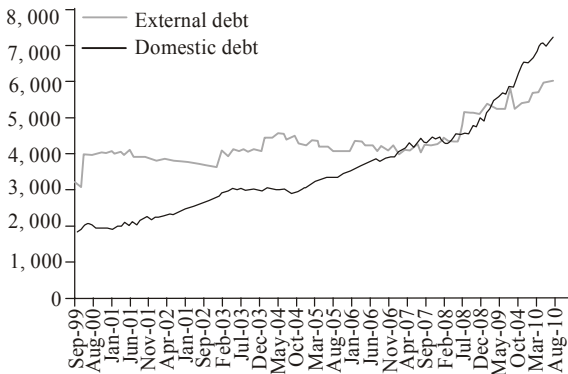


Fig. 1: Real GDP growth and change in domestic debt (2001-2010)

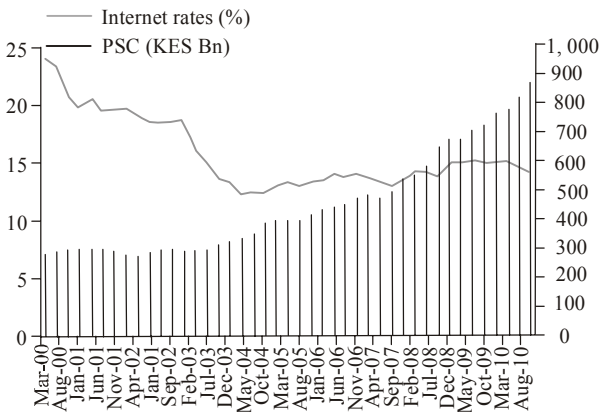


Fig. 2: Public sector credit and interest rates (2000-2010)

In recent years, several developing countries adopted aggressive policies aimed at retiring external debt and substituting it with domestically issued debt. This has since created another problem -the problem of a high and growing domestic debt. According to the IMF (2003), domestic debt accounted for 23% of total debt in sub-Saharan Africa between 1995 and 2000, up from an average of 20% between 1990 and 1994. Furthermore, the domestic debt to GDP ratio for these countries increased considerably from 12-16% in the same period. This shift in the composition of overall public debt in favour of domestic debt in sub-Saharan Africa countries has brought to the fore the need for governments to formulate and implement prudent domestic debt management strategies to mitigate the effects of the rising debt levels. Economic theory suggests that reasonable levels of borrowing by a developing country are likely to enhance its economic growth (Patillo *et al.*, 2002). Stiglitz (2000) stated that government borrowing can crowd out investment, which will reduce future output and wages. When output and wages are affected the welfare of the citizens will be made vulnerable.

Buchanan (1958) suggests that the incurrence of domestic debt results in the postponement of the tax liability from current to future generations. This shift from current to future taxation could imply a shifting of tax burden from the current to future generations. Barro (1978) argues that the shift from current to future taxation implied by debt issue does not involve a burden on later generations due to the phenomenon of operative intergenerational transfer. In a broader Macroeconomic context for public policy, governments should seek to ensure that both the level and the rate of growth in their public debt are fundamentally sustainable over time and can be serviced under a wide range of circumstances while meeting cost/risk objectives (IMF, 2003). Lipsey (1986) defined economic growth as the positive trend in the nation's total output over a long period of time. This is expressed in terms of increase in Gross Domestic Product (GDP) that must be adjusted for the effects of inflation for it to be meaningful.

**Review of Kenya's debt level:** In the 1980s and the years preceding, Kenya was among the major aid recipients in Africa, largely to put up infrastructure so as to integrate the large rural economy into the then emerging import substitution Kenyan economy. The 1990s witnessed a steady decline in development assistance to Kenya occasioned by a perception of poor governance and mismanagement of public resources and development assistance. Other factors include the end of the cold war and the collapse of the Soviet Union. These led to a debt crisis in the country in the early 1990s which turned Kenya into a highly indebted nation. The debt problem was exacerbated by macroeconomic mismanagement in the 1990s such as the Goldenberg scandal which fleeced Kenyans billions of shillings leading to a reduction of donor inflows. The government thus resorted to occasional debt rescheduling and expensive short-term domestic borrowing to finance its expenditures. The details of Kenya's debt burden continue to be disheartening, as of August 2008 the public debt stood at Kshs 867 billion in a country with a population of 36 million people with numerous challenges.

This study analyses the development in public domestic debt in Kenya and its impact on the economy for the period 2000 to 2010 with the objective of making policy recommendations for improving the management of domestic debt. Figure 1 and 2 shows the domestic debt trajectory with the stock of domestic debt rising steadily to stand above external debt into 2010. Again, debt composition in government securities since 2003 has been skewed in favour of long term borrowing through Treasury bonds as shown in Fig. 3. Interest rates within the period were sticky below 13% as shown in Fig. 4 although the situation may however change in 2011 as monetary policy stance changes

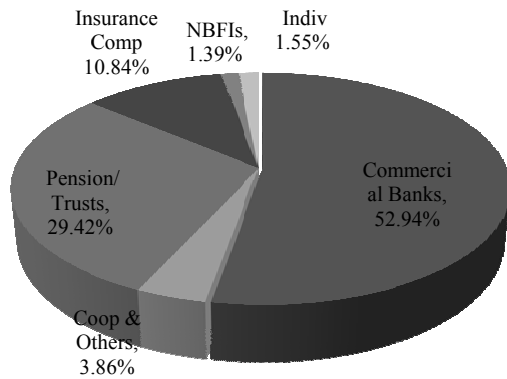


Fig. 3: Holders of government securities June 2011

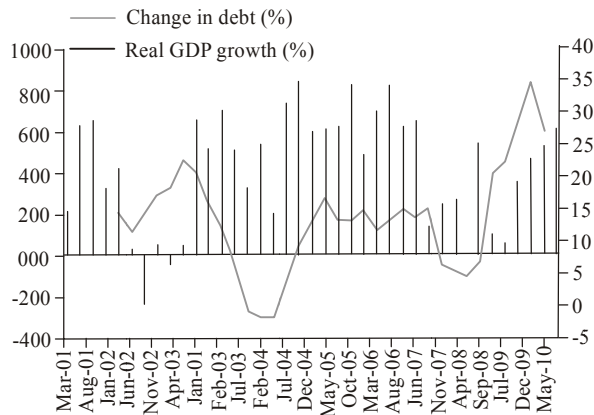


Fig. 4: Real GDP growth and change in debt (2001-2010), research department, central bank of Kenya

from expansionary to tightening to curb rising inflation and to cushion a weakening of the Kenya shilling.

### EMPERICAL OVERVIEW

Literature is scanty on the relationship between domestic debt and economic growth with most researchers focusing on external debt. Barro (1978) investigated the effect of domestic debt on economic growth using the unanticipated component of domestic debt, or the debt stock and growth. He concludes that the unanticipated component of domestic debt affects growth.

The other empirical work is that of Kormendi (1983). Kormendi used a cross-section study of 34 countries. The sample extends widely from the highly developed countries (the USA, the UK, Japan and Australia) to the underdeveloped countries (Sri Lanka). He concludes that debt and growth are not related. However, many of his critics viewed that the

aggregation of such diverse groups may not yield meaningful results.

Charan (1999) investigated the relationship between domestic debt and economic growth for India using the cointegration and Granger causality tests for India for the period 1959-95. Cointegration and Granger causality tests support the Ricardian equivalence hypothesis between domestic debt and economic growth. Ricardian equivalence suggests that it does not matter whether a government finances its spending with debt or a tax increase; the effect on total level of demand in an economy is the same.

Christensen (2005) used a cross country survey of the role of domestic debt markets in sub-Saharan Africa based on a new data set of 27 sub-Saharan African countries during the 20 year period (1980-2000) and found out that domestic markets in these countries are generally small, highly short term and often have a narrower investor base. He also found out that domestic interest rate payments present a significant burden to the budget with significant crowding-out effects. In another study, Abbas (2007) and Abbas and Christensen (2010) analyzed optimal domestic debt levels in low income countries (including 40 sub-Saharan Africa countries) and emerging markets between 1975 and 2004 and found that moderate levels of marketable domestic debt as a percentage of GDP have significant positive effects on economic growth. The study provided evidence that debt levels exceeding 35% of total bank deposits have negative impact on economic growth.

Gurley and Shaw (1956) observed that mounting volume of public debt is a necessary feature of a strong and healthy financial structure of an economy and some secular increase in public debt should be planned by every government. Patillo *et al.* (2002), in their study assessed the non-linear impact of external debt on growth using a panel data of 93 countries over 1969-98 employing econometric methodologies. Their findings suggested the average impact of debt becomes negative at about 160-170 %of exports or 35-40% of GDP. Their findings also show that the marginal impact of debt starts being negative at about half of these values.

Adofu and Abula (2010) investigated the relationship between domestic and economic growth in Nigeria for the period 1986-2005. Their findings showed that domestic debt has affected the growth of the Nigerian economy negatively and recommended that it be discouraged. They suggested that the Nigerian economy should instead concentrate on widening the tax revenue base. Were (2001) in her study of Sub-Saharan Africa (SSA) stated that SSA is still plagued by its heavy external debt burden compounded by massive poverty and structural weaknesses of most of

the economies, which has made attainment of rapid and sustainable growth and development difficult.

More recently, Maana *et al.* (2008) did a study on the impact of domestic debt in the Kenyan economy using the Barro growth regression model. The results indicate that although the composition of Kenya's public debt has shifted in favour of domestic debt, domestic debt expansion had a positive but not significant effect on economic growth during the period. They further stated that the Barro model needs a sophisticated data set which may not be available for a developing country like Kenya. This study investigates debt and economic growth nexus in Kenya using advanced econometric technique involving the tests for cointegration, stationarity and estimation of an error correction model.

## RESEARCH METHODOLOGY

**Data source:** The study uses real quarterly time series data from 2000 to 2010 which translates into 43 observations. Data for GDP, Domestic Debt, Private Sector Credit and Interest rates was obtained from the Central Bank of Kenya (1996), the Treasury and the Kenya National Bureau of Statistics.

**Preliminary data analysis:** The data is summarized in form of tables and graphs to reveal the trends of variables evolution overtime. To capture the relationship between the variables, a co-integrating regression model is utilized on the time series data. In preliminary analysis the study tested variable normality using the Jacque Bera (JB) test. Since the study employs time series data, the test for stationarity and the order of integration is necessary thus the use of the Augmented Dickey-Fuller (ADF) test. The presence of long run relationship between the variables is tested using the two step Engel-Granger and Johannestest for cointegration. The model exhibits cointegration and an error correction model is utilized to capture the short run movements or the adjustment mechanism in the empirical model. This is accomplished by moving from over parametrization modeling to parsimonious modeling.

**Model specification:** In line with past studies and to better analyze the impact of domestic debt on economic growth, the multivariate statistical model specification will use variables like domestic credit and interest rates that have been shown empirically to be robust determinants in this relationship. We therefore proceed by using a modified version of Adofu and Abula (2010) Classical Linear Normal Regression Model (CLRM) of the following form:

$$LN\text{GDP}_i = \beta_0 + \beta_1 LN\text{DOL} + \beta_2 LN\text{PSC}_2 + \beta_3 LN\text{INT}_3 + \varepsilon \quad (1)$$

where,

GDD = Real Gross Domestic Product  
DoD<sub>1</sub> = Domestic Debt  
PSC<sub>2</sub> = Private Sector Credit  
INT<sub>3</sub> = Domestic Interest Rates and  
 $\varepsilon$  = The error term

$\beta_1$ ,  $\beta_2$  and  $\beta_3$  are the slope coefficients of DoD, PSC and INT respectively. LN is natural logarithm.

**Model assumptions and corrective measures:** Linear regressions and time series models are mainly premised on the assumption of linearity, normality, homoscedasticity, no multicollinearity and stationarity. Time series linear models assume that the underlying time series data is stationary. Regression of non-stationary time series data is likely to give spurious results (Demirbas, 1999). The Augmented Dickey Fuller (ADF) test is used to test for stationarity. The data has been differenced for non-stationary as Gujarati (2007) suggested. The long run relationship between the variables has been examined using the Engel-Granger test for cointegration (Granger and Newbold, 1974). The basic idea behind co-integration is that if in the long run two or more series move closely together, even though the series are trended, the difference between them is constant (Hall and Henry, 1989). Lack of cointegration suggests that such variables have no long run relationship, in principal they can wander arbitrary far away from each other, Dickey and Fuller (1981).

## DATA ANALYSIS AND PRESENTATION

**Normality test:** The initial step is to investigate whether the variables follow the normal distribution. This study relies on the Jargue-Bera test where a null hypothesis of normality is tested against the alternative hypothesis of non-normal distribution. For normal distribution the JB statistic is expected to be statistically indifferent from zero.

H<sub>0</sub>: JB = 0 (normally distributed)  
H<sub>1</sub>: JB ≠ 0 (not normally distributed)

Rejection of the null for any of the variables would imply that the variables are not normally distributed and a logarithmic transformation is necessary. From Table 1 it's inferred that the JB statistic is not statistically significant from zero implying that the variables are all normally distributed. Normality rules out the possibility

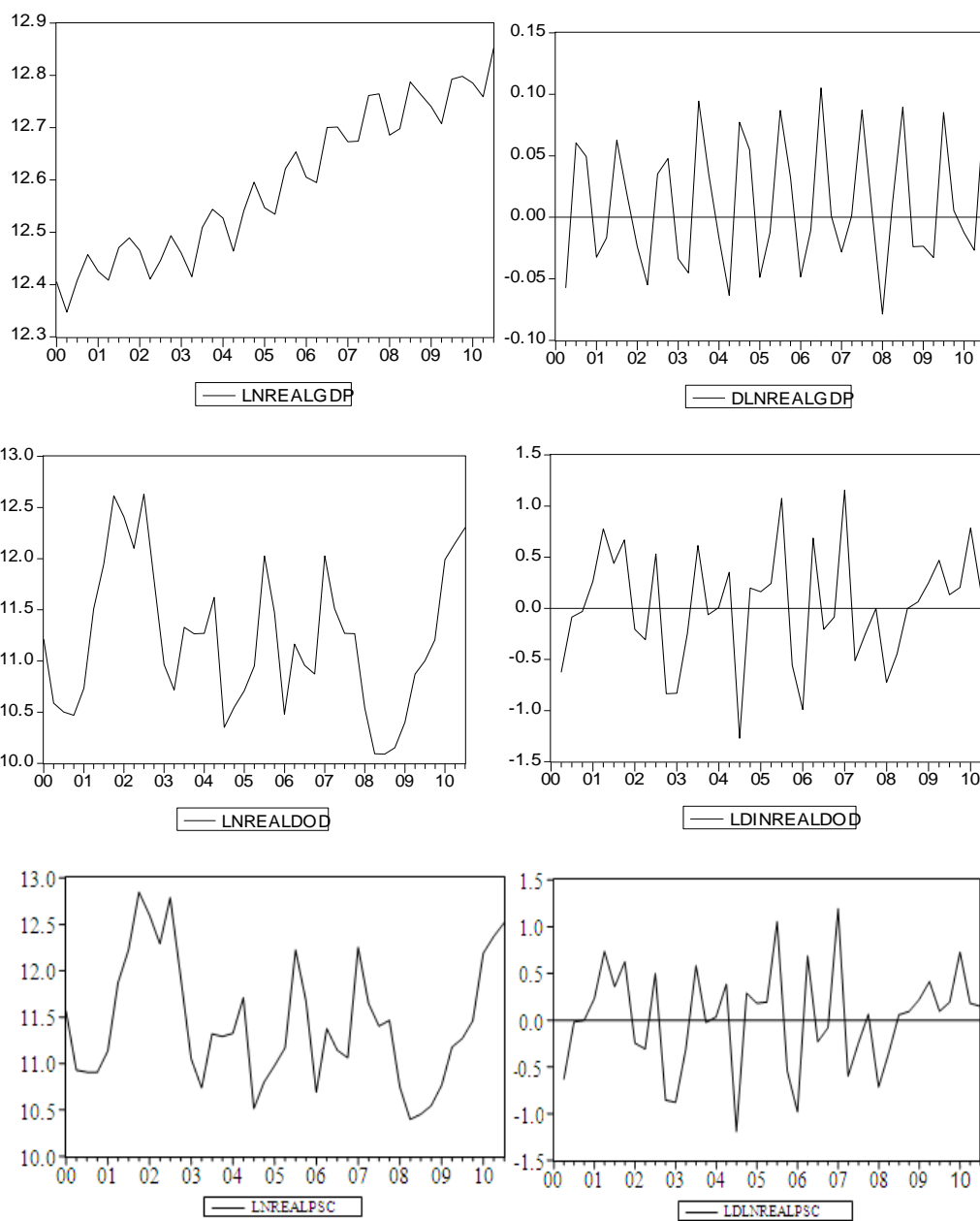
Table 1: Descriptive statistics

	LNGDP	LNDOD	LNINT	LNPSG
Mean	12.59284	12.71892	2.728698	12.13792
Median	12.59521	12.66214	2.666534	12.11243
Maximum	12.85247	13.46553	3.168003	14.25600
Minimum	12.34765	12.16871	2.498974	10.79921
Standard Deviation	0.141422	0.356504	0.184028	0.730477
Skewness	0.094113	0.266376	0.796813	0.365037
Kurtosis	1.679501	2.225594	2.412032	3.424671
Jarque-Bera	3.18763*	1.582989*	5.169590*	1.278091*

\*: Statistically insignificant at 5% level

of getting non standard estimators. The standard deviation as a measure of volatility shows that the credit to private sector is more fluctuating. This can be explained probably by the sensitivity of credit extension by commercial banks in response to macroeconomic environment within the sample period.

**Testing for stationarity using ADF test:** When dealing with macroeconomic time series data it is important to determine the order of integration or non-



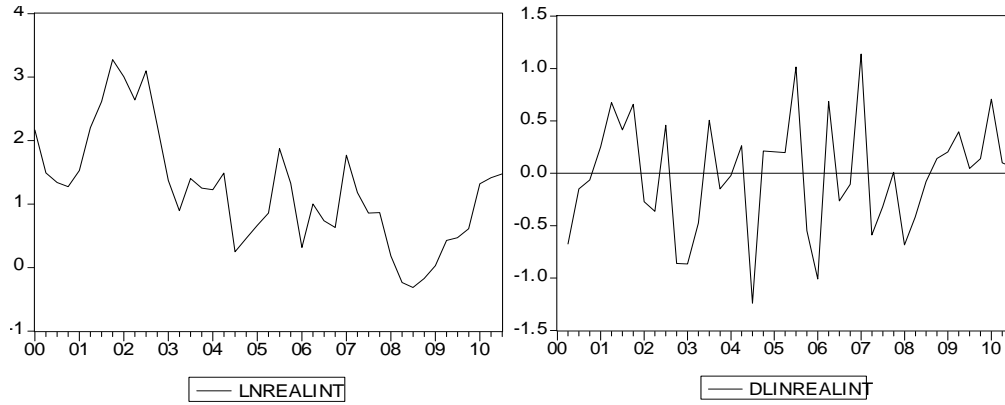


Fig. 5: Full sample time series multiple graphs at level and first difference

stationarity properties of the series. If a vector  $y_t$  is integrated of order  $d$  (i.e.,  $y_t \sim I(d)$ ), then the variables in  $y_t$  need to be differenced  $d$  times to induce stationarity. If the individual series has a stochastic trend it means that the variable of this series does not revert to average or long run values after a shock strikes and its distribution does not have a constant mean and variance (Hendry and Juselius, 2000). This study employed the Augmented Dickey-Fuller (ADF) test which involves estimating a regression of the following form.

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \sum_{i=1}^p \delta_i \Delta y_{t-i} + \varepsilon_t$$

( for levels ) (2)

$$\Delta \Delta y_t = \alpha + \beta t + \gamma \Delta y_{t-1} + \sum_{i=1}^p \delta_i \Delta \Delta y_{t-i} + \varepsilon_t$$

(for first difference) (3)

where,  $\alpha$  is an intercept term,  $\beta$  and  $\gamma$  are coefficients of time trend and level of lagged dependent variable respectively, while  $\varepsilon_t$  are white noise residuals;  $\varepsilon_t \sim \text{IID}(0, \sigma^2)$ ;  $p$  is the number of lags required to produce residuals that are statistically white noise by correcting for any autocorrelation and  $\Delta$  implies the first difference of the series. The null hypothesis in this test is unit root or non-stationarity while the alternative hypothesis is the series are stationary, requiring  $\gamma$  to be negative and significantly different from zero. That is  $H_0: \gamma = 0$ ;  $H_1: \gamma < 0$ . The estimated  $t$  values for  $\gamma$  follows the tau statistic not the conventional  $t$  distribution, thus the relevant critical values are obtained from Dickey and Fuller (1981) and MacKinnon tables (1991) where the critical values of the tau-statistic have been computed on the bases of Monte- carlo simulation. Under the ADF test, the null hypothesis is that the true values of the coefficients are zero (unit roots) which

would be rejected if computed  $t$ -ratios are larger than their critical values.

Figure 5 shows the graphical representation of the natural logarithm transformation of the variables. By visual inspection it appears that the variables are not stationary. The variables seem to be persistently trending upwards with fluctuations suggesting that the time series have a unit root and are likely to be a  $I(1)$  process. The differenced variables suggests that they are integrated of order one since they seem to be mean reverting at first difference. A formal test is necessary.

ADF test results: ADF test was employed with intercept, with and without both intercept and trend with the lag length selected based on the SIC information criterion to ensure that the residuals are white noise. This test shows that all the variables are non- stationary in levels at 5% and 10% significance level. This means that the individual time series has a stochastic trend and it does not revert to average or long run values after a shock strikes and the distributions has no constant mean and variance. The non-stationary variables exhibit difference stationarity since they are integrated of order one  $I(1)$  implying that they should be differenced once to attain stationarity. The results are shown on Table 2.

**Cointegration analysis:** Co-integration (Granger and Newbold, 1974) is the statistical implication of long run relationship between economic variables. The basic idea behind co-integration is that if in the long run two or more series move closely together, even though the series are trended, the difference between them is constant, Hall and Henry (1989). Lack of cointegration suggests that such variables have no long run relationship, in principal they can wander arbitrary far away from each other, Dickey and Fuller (1981). A linear combination of non-stationary variables is said to be cointegrating if the error term obtained from the co-integrated equation is stationary at level.

Table 2: ADF test results

Variable	Lag length	DW	Calculated value	Critical value	Decision
LNGDP	3	1.98	(-0.848){0.5053}[1.0812]	(-3.5025){-2.9515}[1.9474]	I(1)
DLNGD	3	1.96	(-3.8221){-2.8822}[-2.6137]	(-3.5025){-2.5982}[-1.9474]	I(0)
	1	2.10	(-2.4993){-2.2790}[1.1283]	(-3.4987){-2.9190}[-1.9473]	I(1)
	1	1.96	(-4.0888){-4.2063}[-4.2268]	(-1.9473){-3.5005}[-2.9209]	I(0)
	1	1.97	(-2.5372){-2.7061}[-2.5320]	(-2.9256){-3.5088}[-2.6143]	I(1)
	1	1.99	(-4.9191){-4.8854}[-4.9618]	(-2.9271){-3.5112}[-1.9481]	I(0)
	1	2.10	(-2.4993){-2.2790}[1.1283]	(-3.5025){-2.9515}[1.9474]	I(1)
	1	1.96	(-4.0888){-4.2063}[-4.2268]	(-3.5025){-2.5982}[-1.9474]	I(1)

D: Differenced variable, LN: Natural logarithm, ( ): ADF test statistic and critical value with intercept and trend, { }: ADF test statistic and critical value with intercept, [ ]: ADF test statistic and critical value without intercept and trend, DW: Durbin-Watson statistic, I (0): Integrated of order zero and I (1): Integrated of order one

Table 3: Johannes co integration test results

Series: LNGDP, LN\_INT, LN\_DOD, LN\_PSC

Lags interval (in first differences): 1 to 3

Trace test

Hypothesized		Trace	0.05	
No. of CE (s)	Eigen value	statistic	Critical value	Prob.**
None *	0.906708	342.8671	139.2753	0.0000
At most 1 *	0.842920	233.7539	107.3466	0.0000
At most 2	0.713634	148.6080	79.34145	0.0000

Maximum eigenvalue test

Hypothesized		Max-Eigen	0.05	
No. of CE (s)	Eigen value	statistic	Critical value	Prob.**
None *	0.906708	109.1131	49.58633	0.0000
At most 1	0.842920	85.14599	43.41977	0.0000

Trace test indicates 2 co integrating eqn (s) at the 0.05 level; Max-Eigen value test indicates 1 co integrating eqn at the 0.05 level; \*: Denotes rejection of the hypothesis at the 0.05 level; \*\*: MacKinnon-Haug-Michelis (1999) p-values

**Engle granger two steps cointegration test:** The study has employed the Engle and Granger and Newbold (1974) two stage procedures and Johannes test to determine the existence of long-run relationship between the variables. The Engle and Granger test is a residual based and it is necessary so as to avoid running a spurious regression. The first step is to estimate the hypothesized long run relationship using OLS method (Co-integrating regression). In the second step, the residual series are generated using Eviews software and subjected to an ADF test. It's expected that the error term will be I (0) process for the variables to be co-integrated. Applying the ADF test on the residuals ( $\mathcal{E}$ ) involves running the following regression where  $m$  is the optimal lag length chosen to ensure that the error term  $v$  is a pure white noise while  $\Delta$  is the difference operator.

$$\Delta \mathcal{E}_t = \psi \mathcal{E}_{t-1} + \sum_{i=1}^m \Delta \mathcal{E}_{t-i} + v_t \quad (4)$$

The hypothesis tested is:  $H_0: \psi = 0$  (non stationary) against  $H_1: \psi \neq 0$  (stationary). Comparing the MacKinnon critical value (-3.5217) with the tau statistic computed by the Eviews software (-6.393980) at 5% level the null cannot be accepted implying that the

variables share a common stochastic trend in the longrun. The idea behind cointegration is that there are common forces that move the variables overtime implying that though the variables are stochastic, they share a common trend. The evidence of cointegration rulesout the possibility of obtaining spurious results by regressing non stationary variables at level, Hall and Henry (1989). This study has also relied on the cointegration method by Johansen (1995). The Vector Autoregression (VAR) based cointegration test methodology by Johansen (1995) is described under a VAR of order  $p$ :

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + BZ_t + \lambda \quad (5)$$

where,  $y_t$  is a vector of non-stationary I (1) variables (interest rate and expected inflation),  $Z_t$  is a vector of deterministic variables and  $\lambda_t$  is a vector of innovations (other variables not in the model). This test is robust to any departure from normality since it gives room for normalization with respect to any variable in the model that becomes the depended variable. The test has Eigen and the Trace statistics which are employed in the analysis. The Johannes test, Eigen and the Trace statistics are reported in Table 3.

Table 4: The Estimation of the co integrating model dependent variable LN-GDP

Explanatory Variable	Coefficient	p-value
LN_GDP(-1)	0.796728	0.0024*
LN_INT	-0.01304	0.6021
LN_PSC	-0.06193	0.003*
LN_PSC (-1)	0.003080	0.3463
LN_DOD	0.14187	0.0032*
CONSTANT	1.4456	0.0222
Statistic	Value	
R <sup>2</sup>	0.9636	
Adjusted R <sup>2</sup>	0.9586	
D.W	2.0129	
F statistic	190.93*	0.004*

\*Statistically significant at 5% level, D.W is Durbin-Watson statistic, SC is the Schwarz criterion and the (-1) in parenthesis indicates lagging the variable once. GDD is Real Gross Domestic Product; DoD1 is Domestic Debt; PSC2 is Private Sector Credit, INT3 is Domestic Interest rates while LN is natural logarithm

Table 5: The error correction model

Dependent variable: DGDP

Method: least squares

Variable	Coefficient	S.E.	t-Statistic	Prob.
DGDP (-2)	-0.365273	0.126431	-2.889115	0.0075
DGDP (-4)	0.302317	0.165220	1.829784	0.0783
DDOD (-3)	-0.255922	0.142636	-1.794237	0.0840
DDOD (-4)	0.184069	0.146858	1.253381	0.2208
DINT	-0.150966	0.102610	-1.471262	0.1528
DINT (-1)	0.059342	0.083825	0.707927	0.4851
DINT (-2)	0.123691	0.097358	1.270479	0.2148
DPSC (-3)	0.019005	0.005213	3.645882	0.0011
DPSC	-0.011223	0.006907	-1.624796	0.1158
LAGECM	-0.373811	0.137564	-2.717354	0.0113
C	0.387373	0.137865	2.809793	0.0091
R <sup>2</sup>	0.904696	Schwarz criterion	-4.400477	
Adjusted R <sup>2</sup>	0.869398	F-statistic	25.63043	
Durbin-Watson stat	1.848157	Prob (F-statistic)	0.000000	

Both statistics suggest the existence of more than one co-integrating vector implying that there exists a unique long run relationship between the set of variables.

The regression coefficient of domestic debt in the estimated regression line presented above (Table 4) is 0.14187, positive and statistically significant at 5% level which implies that domestic debt has a positive and significant impact on economic growth. This is consistent with the findings of Barro (1978), Gurley and Shaw (1956) and Maana *et al.* (2008). The findings by Maana *et al.* (2008) indicated that although the relationship between domestic debt and economic growth is positive, it is insignificant. From the estimated co-integrating regression line, a one unit expansion on Domestic debt leads to 14.2% growth in GDP. This significant effect could be attributed to better debt management structures in and reduction in corruption with the formation of the Kenya Anti-corruption Commission.

The lagged variable for PSC reveals its persistent effect on GDP and the regression coefficient is 0.003080, positive and not statistically significant at 5% level. This reveals that the effect of PSC in the Kenyan economy is yet to be a significant drive of GDP. The results show that 100 percent point increase in PSC has led to 3 percentage point increase in gross domestic product. This may be explained by the slow growth of credit in the Kenyan economy due to risk aversion particularly to the real sector. Agriculture for example should have been the drive to economic expansion but this sector has faced numerous challenges.

The regression coefficient of interest rate in the estimated regression line is -0.01304, negative and it is not statistically significant at 5% level which shows that a 100% point increase in interest rate led to 1 percentage point decrease in gross domestic product. Although the findings indicate that the relationship between gross domestic product and interest rate is negative, it is not statistically significant at 5% level.

**Error correction model:** The model estimated reveals that there is a long run relationship in the variables hence it can be referred as a long-run or a cointegrating model. There is a need to employ the error correction model so as to capture the short-run relationship between the variables, Granger and Newbold (1974). The Error correction model represents the adjustment mechanism towards equilibrium. To construct this model the variables are used at their first difference and simply the ECM is overparametised then one moves from overparametised modeling to parsimonious by eradicating the variables that are statistically insignificant from the model. This is known as General to Specific Approach. The ECM contains the lagged error term obtained from the cointegrating equation which is termed as the error correction term and the negative coefficient being the rate of adjustment per quarter. The Schwarz Information Criterion (sic) is used to determine the required lag length or as a guide to parsimonious reduction. A fall in its value indicates model parsimony.

From the error correction model shown in Table 5, it's clear that the coefficient of the error term is negative as theoretically expected and it is statistically significant at 5% level. The negative sign implies that any deviations from equilibrium by a variable will be corrected or reversed in the future while the coefficient indicates that 37% of any disequilibrium in the co integrating model will be corrected in the next quarter. It also indicates that the explanatory variables maintain the GDP equilibrium throughout time.



## CONCLUSION

The study attempted to fill the remarkably gap that exists in the formal study of the impact of Domestic Debt on economic growth for Kenya. It covered the period 2000-2010 and revealed that Domestic Debt play an increasingly important role in supporting economic growth. The findings in this study show that domestic debt expansion has a positive, long run and significant effect on economic growth. This is consistent with the findings of Barro (1978), Gurley and Shaw (1956) and Maana *et al.* (2008).

The study has also revealed evidence that interest rates and private sector credit have no effect on economic growth. Based on this empirical evidence, the study makes the following recommendations: Firstly, the government should institute efforts to channel Domestic Debt revenue to productive activities in the economy so that debt does not rise to become unsustainable. This would require funding well appraised productive projects to foster economic growth. Secondly, a proper legal framework for contracting debt is essential. Greece is currently in a debt crisis with overall debt comprising above 130% of GDP (Bank for International Settlements, 2008); Kenya's GDP-Debt ratio is still below 60% (CBK, 2010) and sustainable though constant monitoring is required. To mitigate unsustainability, the government should explore other avenues of financing the budget deficit by improving on the present revenue base rather than resulting to more domestic borrowing. Thirdly, debt is a contractual liability and has to be paid. There are alternatives in non-debt creating flows like grants, foreign direct and portfolio investment and workers remittances that supplement credit flows in meeting resource requirement of emerging economies.

Lastly, excessive domestic borrowing can be inflationary and may crowd out private sector borrowing. Close monitoring of government borrowing through the domestic market is therefore necessary. The problem of a high domestic debt is more difficult to solve vis-à-vis external debt, mainly because the relationship between the borrower (government) and creditor is different; the solutions of debt write-off, debt conversion, debt rescheduling etc will not apply because these solutions could be counterproductive and would mean government renegeing on its commitments, which would affect future mobilization of resources (UNITAR-DFM E-Learning, 2008). It is also noted that Private sector credit is yet to be a significant drive of economic development and policy should look into ways of enhancing credit delivery to the private sector such as Development Banking and microfinance.

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