KENYA BANKERS ASSOCIATION

One Industry. Transforming Kenya.

WPS/02/17

Influence of Bank Lending to the Government on Private Sector Credit in Kenya: A Fiscal Deficit Specification

Steve Makambi, Reuben Muhindi and Gillian Nduku

KBA Centre for Research on Financial Markets and Policy®
Working Paper Series

18

KENYA BANKERS ASSOCIATION

One Industry. Transforming Kenya.

Working Paper Series

Centre for Research on Financial Markets and Policy

The Centre for Research on Financial Markets and Policy® was established by the Kenya Bankers Association in 2012 to offer an array of research, commentary, and dialogue regarding critical policy matters that impact on financial markets in Kenya. The Centre sponsors original research, provides thoughtful commentary, and hosts dialogues and conferences involving scholars and practitioners on key financial market issues. Through these activities, the Centre acts as a platform for intellectual engagement and dialogue between financial market experts, the banking sector and the policy makers in Kenya. It therefore contributes to an informed discussion that influences critical financial market debates and policies.

The Kenya Bankers Association (KBA) *Working Papers Series* disseminates research findings of studies conducted by the KBA Centre for Research on Financial Markets and Policy. *The Working Papers* constitute "work in progress" and are published to stimulate discussion and contribute to the advancement of the banking industry's knowledge of matters of markets, economic outcomes and policy. Constructive feedback on the *Working Papers* is welcome. *The Working Papers* are published in the names of the author(s). Therefore their views do not necessarily represent those of the KBA.

Influence of Bank Lending to the Government on Private Sector Credit in Kenya: A Fiscal Deficit Specification

By Steve Makambi, Reuben Muhindi and Gillian Nduku*

April 2017

Abstract

This study investigated the nexus of domestic bank lending to the Kenyan Government and Private sector credit taking into consideration the fiscal deficit environment characteristic of government debt accumulation. The main innovation of the study was to investigate the extent to which government borrowing crowds out(in) private sector credit after consideration of changes in fiscal regimes from 1966 to 2014. Two fiscal policy regimes are identified. Fiscal regime is defined as "active" if domestic public debt to GDP ratio increases in response to temporary rise in government expenditure. Fiscal policy regime is defined as "passive" if the government does not use domestic borrowing to finance unplanned expenditure. The investigations involved two major steps. Firstly, Markov switching model was used to identify fiscal policy regimes. Second, ARDL bound testing model was fitted and estimated to analyze the long run and short run effect of key variables on domestic private sector credit and the possible effect of regime changes on private sector credit. It was established that fiscal policy regime changes in Kenya were triggered by economic shocks and policy changes over the study period. The study also established that fiscal policy regimes are significant in explaining the relationship government debt-private sector credit. There was evidence that persistence increase in government debt crowds out private sector credit. The paper recommends prudential management of fiscal policy whic is core in managing government domestic borrowing.

Key Words: *government domestic borrowing, private sector credit, crowding out and fiscal policy regimes.*

* *Makambi and Nduku are affiliated with the Centre for Applied Economics at Strathmore University (Kenya). Reuben Muhindi is affiliated with McKinsey & Company, Nairobi.*

1.0 Introduction

Private sector credit from commercial banks is an important avenue for private investment in developing countries such as Kenya. In addition, government borrowing plays a critical role in creating productive capacity and influence growth in the economy.

Therefore, given that commercial banks are the main source of both private sector credit and domestic government debt in Kenya, the need to evaluate the balance between provision of credit by commercial banks to private sector and government is critical for enhancing sustainable growth in Kenya (Muthama, 2015).

Crowding out of private sector credit by public economic activity is a multidimensional concept that has been widely studied. The question of whether higher government debt accumulation 'crowds out' private investment has been the subject of copious amount of empirical discussions and investigations. According to Aschauer, (1989) the rationale is that higher public capital accumulation raises the national investment rate above the level chosen by rational agents and induces an ex ante crowding out of private investment.

It is within the scope of this subject that our attention is drawn to seeking to understand if (and consequently how) the effect of government borrowing on private investment debt is influenced by the structural dynamics and changes in the government's fiscal environment. According to Traum & Yang (2011), two key factors drive the private sector investment response to rising government debt; first, the source of policy changes that give rise to expansionary debt and distortionary debt financing. The focus in this paper lies in establishing the response of private sector investment given different fiscal policy regimes that characterize the nature and cycles of government debt accumulation.

This study attempts to provide evidence of possible asymmetric effects of fiscal policy regimes on the private sector credit and government borrowing

nexus. In this regard, government expenditure gap is used to capture temporary changes in government expenditure. Consequently, regimes are identified by evaluating when government expenditure gap influences rise in domestic debt is used to identify fiscal policy regimes as follows: A regime is regarded as 'active' if domestic public debt to GDP ratio increases in response to temporary rise in government expenditure. This essentially means that the government finances unplanned expenditure using domestic debt. If the government does not use domestic borrowing to finance unplanned expenditure, the regime is regarded as 'passive'. Passive regimes manifest if domestic debt to GDP ratio does not significantly increase or reduces domestic debt in response to temporary rise in government expenditure.

This paper provides a brief overview of the evolution of Kenya's fiscal and macroeconomic environment since independence. Chapter 2 covers literature review, highlighting empirical studies related to the study. Chapter 3 presents the methodology employed by the study and Chapter 4 presents results of the study.

Evolution of Kenya's Fiscal and Macroeconomic Environment

According to The Annual Public Debt Reports by The National Treasury Directorate of Public Debt Management, the principal objective of Kenya's public debt management has been and still is to meet the Central Government financing requirements at the least cost with a prudent degree of risk. Government domestic debt consists of stock of Government securities and Government Overdraft at Central Bank of Kenya. Government securities comprise of Treasury Bills, Treasury Bonds, Infrastructure Bonds and the Pre- 1997 Government Debt.

Kenya's fiscal environment has evolved continuously since independence. According to M'Amanja & Morrissey (2005), the remarkable performance of the economy during the first decade of independence in 1963 was due to consistency of economic policy. In their study, they also characterize the second decade as one with powerful external shocks combined with imprudent fiscal and monetary management which led to a decline in economic growth.

In particular, during the period 1971-1975, domestic financing showed a declining trend with fluctuations which are attributed to absence of loans raised internally for the recurrent account in 1971/72 and 1972/73. In addition, in 1972/73 import duty collection fell substantially due to decline in imports. (Central Bureau of Statistics, 1973). The recovery in Kenya's economy in 1976 owed much to the growth and the rise in prices of agricultural production, particularly of coffee and tea, the main export crops, and to a substantial increase in the output of the manufactured products.

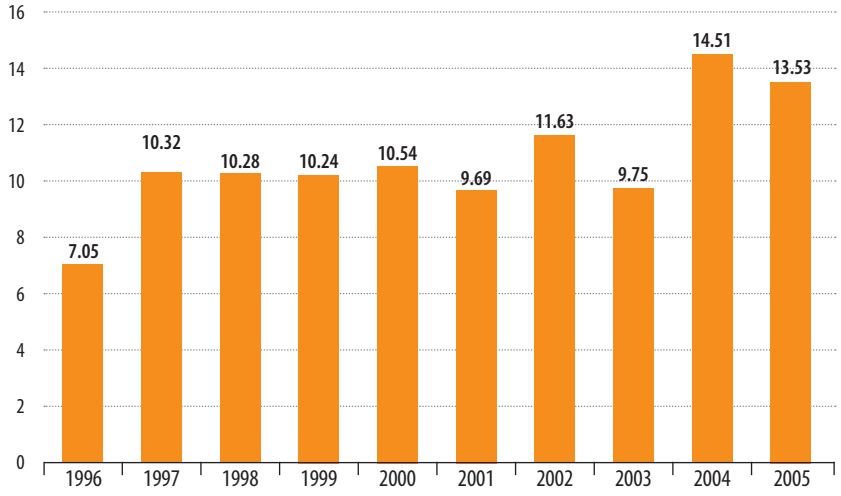
The third decade showcased a rapid increase in budget deficits and a fall in exports and imports as a result of expansionary fiscal policy of the previous decade,

during which majorly inefficient private industries and state corporations had been established. Tax revenue during this period declined from 21 percent to 17 percent; the economy had been adversely affected by widespread drought during the mid-six months of the year 1984.

The downhill spiral continued into the 1990s with a vast combination of poor fiscal and monetary policy regime, external and internal shocks as well as political events. There was a sharp decline in investment in 1992 which can be attributed to the political instability brought about by the multi-party elections that caused uncertainty which may have discouraged private investment.

In 1993, the Kenyan government began major economic reforms and financial reforms where the government eliminated price controls and import licensing, and introduced conservative fiscal and monetary policies which led to economic growth and investment growth.

Figure 1: Commercial Banks Loans to Public Sector (KShs Billions)



Source: Economic Survey, 1999, 2005

Between 1994 and 1997, this period was characterized by a decline in tax revenues from 25.5 percent in 1994 to 22 percent in 1997 which was attributed to the decline in exports in the same period. During this period, world coffee prices dropped dramatically aggravating Kenya's low export value.

According to the Economic Survey Report (2000), credit to the public sector increased by KShs 285 million or 2.8 percent compared to a 0.3 percent drop in 1999 (**Figure 1**). The declining growth in commercial bank credit to the public sector is largely attributed to a build-up of Government deposits with banks and tighter expenditure controls. During this time, there was an unfavourable movement in the balance of payments attributed to the widening current account deficit and reduced capital account inflows following the suspension of the IMF Enhanced Structural Adjustment Facility (ESAF) in July 1997 which adversely affected both bilateral and multi-lateral capital inflows.

However, in 2001/02, changes in budgetary planning, execution and monitoring were undertaken, in order to maximize returns from public expenditure. The Treasury introduced a new format of the vote book as a strategy to improve cash management. Each line ministry was also assigned separate bank accounts in each district to improve budget execution at the district level. These along with other changes, including amendment of the VAT regulations (by making it compulsory for taxpayers to keep stock records) strengthened macroeconomic management. (Africa Development Bank, 2003).

Public sector borrowing from commercial banks declined by 16.2 per cent from KShs 11,633 million in 2002 to KShs 9,745 million in 2003. There was roughly a 10 per cent decline in loans to central government and 19 per cent decline to other public entities in 2003. As seen from **Figure 1** above, borrowing by the public sector decreased in December 2005 (by 6.8 percent) compared to the same period in 2004. Decrease in credit to the public sector was largely due to the decrease in borrowing by the Central Government which fell from KShs 3,007 million in 2004 to KShs 2,068 million in 2005. This accounted for 95.3 per cent of the decrease in the public sector borrowing.

The amount of Public and Publicly Guaranteed Debt has been rising consistently in the past decade as evidenced in **Figure 2**. In particular, looking at the past five years, the total domestic component of government debt (from the Central Bank, Commercial Banks and other financial institutions) grew from 0.764 trillion (27.4 per cent of GDP) in June 2011 to KShs 0.86 trillion (26.2 per cent of GDP) in 2012. Similarly, for the period between 2012 and 2013, the domestic component grew by KShs 0.191 trillion to KShs. 1.050 trillion (28.7 percent of GDP). In the period between 2013 and 2014, Domestic debt rose from KShs 1.05 trillion (23.3 per cent of GDP) to KShs 1.284 trillion (25.4 per cent of GDP).

From **figure 2** it is evident that the trends of government debt held by various providers has commercial banks holding the largest propotion.

Figure 2: Public and Publicly Guaranteed Debt in KShs Billion

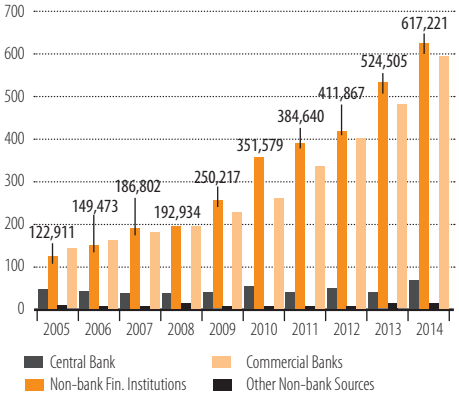
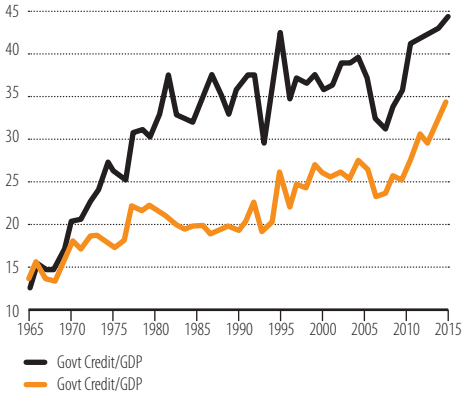


Figure 3: Government Credit and Private sector credit as % of GDP



Source: Annual Public Debt Report 2013-2014

The holdings by non-bank investors (non-bank financial institutions) such as pension funds and insurance companies continues to grow while that from the Central Bank has remained relatively stable. **Figure 3** shows that there is evidence of co-movement between growth of government credit and private sector credit as ratios of GDP. These figure suggests that the role of commercial bank in provision of domestic government debt is not only significant but there is some evidence suggesting that a relationship exists between government and private sector credit in Kenya.

Against this background, this paper attempts to evaluate the allocation of commercial banks' credit between private sector and the government and how it is affected by fiscal regime cycles. Two main objectives are evaluated: First; to investigate the nature of fiscal policy regimes from 1966 to 2014 in Kenya. Second, to evaluate the effect of government borrowing on private sector credit and economic growth after providing for changes in fiscal policy regime.

02 TWO

Theoretical and Empirical Literature Review

Theoretical Literature

According to Barro (1974) *"the assumption that government debt is perceived as net wealth by the private sector is crucial in demonstrating the real effects of shifts in the stock of public debt".* While studies still attempt to characterize the nature of the relationship between government debt and the economy's ability to undertake productive investment, the key question remains whether, and if so to what extent, government debt is a part of this optimal wealth holding. In an attempt to explain the above standpoint, there are three different theoretical views.

First, Keynesian school of thought supports the notion that fiscal expansion has positive effect on private demand and output. Keynes noted that the effects of the government directly increasing employment on public works may include *"increasing the rate of interest and so retarding investment in other directions."* However, this does not imply that increase in interest rate will lead to dollar-for-dollar crowding out especially if the fiscal multiplier is significant. Also, under the Keynesian school of thought, it is understood that under depression conditions an increase in government spending can result in an increase in total output larger than the initial spending increase (Barro, 1990; Perotti, 1999). To this end, Keynesian approach supports the notion that if the optimal level of resource employment has not been achieved, government debt may crowd in private investment through boosting aggregate demand

Second, the neoclassical school of thought contradicts Keynesian theory and contends that equilibrium in the economy is achieved by balancing savings and investment via interest rate mechanism. In this

regard, government borrowing prompts increase in interest rates which leads to crowding out effect due to decrease in private sector credit. Friedman (2006) in an investigation on the extent to which government budget deficits, raise real interest rates and impairs the economy's ability to undertake productive investment, highlight that if people do not take such future tax liabilities into account (irrational expectations), then in equilibrium higher government debt levels relative to income imply a lower capital-income ratio.

The third theoretical perspective is the Ricardian equivalence theorem which holds that current fiscal deficit will be matched by increase in future taxes so that the interest rate-private investment nexus remains unchanged. This is because debt implies future taxes with a present value equal to the value of the debt, and therefore, rational households, recognizing this equivalence, will proceed as if the debt did not exist, as if there were no additional stimulus provided by the policy, resulting in the debt having no effects on economic activity (Perotti, 1999).

Barro (1974), who provided the theoretical foundation of the Ricardian equivalence, has argued that it may be optimal for households to react to an increased deficit by increasing their saving by an equal amount. Consequently, neither aggregate demand nor interest rates may rise. An increase in the deficit will therefore entail an equal increase in saving, which will just suffice to pay the extra future taxes levied on present households and subsequent generations. According to Bernheim (1987), it is essential to distinguish between the short run effects of government borrowing (primarily the potential for stimulating aggregate demand) and the long run effects (primarily the potential for depressing capital accumulation). Overall, he concludes that there is a significant likelihood that deficits have large effects on current consumption, but disputes the view that sustained deficits significantly depress capital accumulation in the long run. Furthermore, the strong underlying assumption (particularly on the foresight of households) of the Barro/Ricardo equivalence proposition which purports a neutral effect of government debt accumulation on output, raises doubts on its legitimacy especially for developing countries.

Empirical literature

Empirical literature shows that the effect of government debt on private sector credit/investment differs across economies. Doi, Hoshi & Okimoto (2011) studies sustainability government debt given fiscal policy cycles. Of importance to this study is the Doi et al (2011) focus on response of primary surpluses given changes in debt under two fiscal policy regimes. Active fiscal policy regime was defined no change (rise) in tax revenue given rise on government debt while passive regime was defined as rise in tax revenue given rise in debt. Using quarterly data from 1980 to 2009 the study established that active fiscal policy was not sustainable. However, the study concluded that the unsustainability of active fiscal policy can be countermanded by prudent monetary policy reaction.

Bouthevillain & Dufrénot (2011), estimate time-varying probability Markov-switching models (TVPMS) to see whether the effects of fiscal policy on the real economy vary in France between times of crisis and non-crisis. The study identified the two regimes are identified endogenously. It was established that when the effects of structural public spending are considered, there exists a non-monotonic effect of government spending with a positive and significant impact on the real GDP during crises, but no impact during non-crisis periods (both for the short-and long-run). They provide a plausible explanation for such behaviour being that during crises, liquidity constraints are important and reinforce the impact of government expenditure on the activity. During non-crisis periods, crowding-out effects moderate the positive impact of the discretionary policy (this is confirmed farther by the estimation of our investment equation).

Ko & Morita (2012), investigate the changing dynamics of fiscal policy shocks to the macroeconomy in Japan. By estimating a Markov-switching vector-autoregressive (VAR) model, regime switches in both automatic fiscal responses to output and discretionary fiscal shocks are investigated. The results showed that if one considers the aggregate GDP, public expenditure has a stronger impact during crisis and the expenditure multiplier is greater than the tax multiplier (which is in line to the Traditional Keynesian Theory). Particularly, for the first two regimes, government spending shocks are found to be persistently effective in increasing output. In the second regime, the period from the end of the first oil crisis to the beginning of the recession after the bubble burst, the Japanese economy enjoyed the most favorable and statistically significant effect of the fiscal shocks. In the third regime, however, the effect on output becomes negative both in the short run and the long run. Crowding out is only seen in the fourth regime.

Chibi, Benbouziane, & Chekouri (2014), investigate whether the impact of fiscal policy in economic activity is symmetric in Algeria. The study investigated effects of fiscal policy on Algerian economic activity using a Markov Switching Vector Autoregressive (MSVAR) model to take into account the evidence for the non-linear effects of fiscal policy in Algeria. They find evidence of asymmetric effects of fiscal policy across regimes, defined by two state of the business cycle; recession and boom. The results indicate small positive government spending and revenue multipliers in the short term in both regimes. In addition, fiscal policy shocks have a stronger impact in times of economic stress than in times of expansion and that the impact of government spending is stronger than the impact of public revenue in recession periods.

Fazzari, Morley, & Panovska, (2015) investigate the effects of government spending shocks and tax shocks on U.S. economic activity using a threshold vector auto-regression (TVAR) model. They consider Bayesian

model comparison and generalized impulse response analysis to test for nonlinearities in the responses of output to government spending. The effects of government spending on output in the low regime are large and persistent, while they are small in the high regime. Consumption increases in both regimes, but the increase is smaller and less permanent in the high regime. Investment increases across regimes, but the increase in negligible in the high regime. Tax cuts have larger short-run effects but smaller long run effects when the economy is in the low regime. In the high regime, tax cuts always have larger effects than spending shocks.

In conclusion, review of theoretical literature provides three contradicting viewpoints which shows that government debt can either crowd in, crowd out or have a neutral effect on private investment. Empirical literature focused on studies that accommodated changes in fiscal policy regimes which explain drivers of expansionary or contractionary fiscal policy. Generally, the studies reveal that fiscal policy regimes are important in explaining the effect of government debt on key macroeconomic variables. However, none of the studies have narrowed down to the dynamics of allocation of commercial bank credit to government and private agents taking into account different fiscal policy cycles.

03 THREE

3.0 METHODOLOGY

Introduction

This paper seeks to establish whether the relationship among government borrowing, private sector credit and economic growth differs across public debt regimes. The theoretical model informing this study is loanable funds theory which links private sector credit and fiscal policy.

The intuition behind estimation of regime-switching model is pegged on the assumption that the extent to which government borrowing from domestic banking sector crowds out (in) private sector credit may differ across fiscal policy regimes and/or differ across financial sector regimes. The study uses annual data from 1966 to 2014. Key variables used in the study include domestic public credit obtained from private commercial banks in Kenya, private sector credit obtained from commercial banks, average commercial banks' lending rate, Gross domestic product, Broad money as a ratio of GDP as a measure of financial deepening in Kenya, and temporary changes in government expenditure is used to identify regime changes in Markov-switching model.

Model Specification

The investigations involved two major steps. Firstly, Markov switching model was used to identify fiscal policy regimes with respect to domestic borrowing. Second, having identified fiscal policy regimes, ARDL bound testing model was fitted and estimated to analyze the long run and short run effect of key variables on domestic private sector credit and the possible effect of regime changes on private sector credit.

Markov Switching regression model was used to estimate regime switching changes for both public policy regimes. According to Hamilton (2005), Markov-switching method assumes that the transition from

one regime to another is stochastic and therefore the regimes are determined within the model. The general Markov-switching model encompassing regime changes is given as:

$$y_t = C_{si} + \beta y_{t-1} + \varepsilon_t \quad \text{.....(1)}$$

Where Si represents unobserved states or regimes such that $i=1,2\ldots, K$. Hamilton (2005), it is reasonable to restrict number of regimes to two states where fiscal policy reaction is assumed to be either pro-cyclical or countercyclical. Assuming a two-state Markov model, domestic debt borrowed by the government from Commercial Banks was used as an instrument of fiscal policy feedback reaction function. A modified version of Bohn (1998) and Doi et al., (2011) was used to specify the fiscal reaction function as presented in **equation (2).**

Where y_t represents ratio of domestic debt to GDP at time t, g represents GDP growth at time t and GE_Gap represents deviation of government expenditure from the long run trend as a ratio of GDP measured as

$$\frac{GE\text{-}GE^*}{GDP}$$

where GE represents government expenditure and GE^* represent expected or planned government expenditure. Lastly ε_t, represents the disturbance term where $\varepsilon_t \sim I.I.D(0,\sigma^2)$ (Hamiltom, 2005; Doi et al., 2011).

Markov-switching model estimates transition probabilities which are assumed to be constant. Therefore, for a two-state Markov-switching model, the probability of switching from regime i to j

$\forall i, j=1,2$ is estimated by the transition probability matrix:

$$\begin{bmatrix} P_{11} & P_{12} \\ P_{21} & P_{22} \end{bmatrix}$$

Time varying probabilities represent the probability that state i will be observed at period t. time varying probabilities were used to identify 'active' and 'passive' fiscal policy regimes. Model specified in **equation (2)** was used to identify stochastic regimes. GE_Gap represents temporary changes in government expenditure at any time period and maybe used to identify fiscal policy regimes. A is regarded as 'active' if domestic public debt to GDP ratio increases in response to temporary rise in government expenditure. This essentially means that the government finances

$$y_t = \beta_0(S_t) + \beta_1(S_t) y_{t-1} + \beta_0(S_t) GE\_Gap_t + + \beta_0(S_t)\, g_t + (S_t)\varepsilon_t \quad \text{.....(2)}$$

$$D_t = \begin{cases} 1, & \text{active regime is observed at period t if } P_{active} > 0.5 \\ 0, & \text{pasive regime is observed at period t if } P_{active} \leq 0.5) \end{cases} \quad \text{.....Eqn (3)}$$

unplanned expenditure using domestic debt and is captured by positive and significant coefficient of GE_GAP. If the government does not use domestic borrowing to finance unplanned expenditure, the regime is regarded as 'passive'. Passive regimes manifests if domestic debt to GDP ratio does not significantly increase or reduces domestic debt in response to temporary rise in government expenditure (Hamilton, 2005; Doi *et al*, 2011).

Having identified passive and active regimes, dummy variable representing fiscal policy regimes is created as follows: For any period t,

The long-run private sector credit model was specified and incorporates different policy regimes. ARDL bounds testing approach, attributed to Pesaran et al., (2001) incorporates dynamic regressors which provide for endogeneity and possible endogeneity problems in estimation. Secondly, Bounds testing approach can be used to test for long run relationship irrespective of whether the variables are integrated of order one I(1) or order zero I(0) and tests for cointegration directly. The ARDL model was specified as mixture of lagged values of the variables and the respective differenced variables as follows:

Where $PCred_t$ represents private sector credit as a ratio of GDP from Commercial Banks to private sector at period t. $PDCred_t$ represents credit as a ratio of GDP from commercial sector to the government at period t. $lnGDP_t$ represents log of Gross Domestic Product at period t and $M3/GDP_t$ represent broad money supply as a ratio of GDP at period t. LR_t represents average commercial banks' lending rate and D_t is the dummy representing fiscal policy change with respect to domestic borrowing.

Estimation Procedure

Descriptive analysis was conducted to evaluate key characteristics of the variables under investigation. The trend of domestic public debt and private sector credit was evaluated to discern structural breaks and the general trend. Thereafter, each variable was subjected to stationarity test to determine the order of integration.

$$\Delta PCred_t = \beta_o + \beta_1 PCred_{t-1} + \beta_2 PDCred_{t-1} + \beta_3 PLnGDP_{t-1} + \beta_4 M3/GDP_{t-1} + \beta_5 LR + \beta_6 D_t + \sum_{i=1}^{q} \alpha_i \Delta PCred_{t-i} + \sum_{i=1}^{q} \theta_j \Delta PDCred_{t-j} + \sum_{k=1}^{s} \gamma_k \Delta PDCred_{t-k} + \sum_{l=1}^{w} \tau_l \Delta lnGDP_{t-l} + \sum_{m=1}^{n} \pi_m \Delta m3.GDP_{t-m} + \sum_{r=1}^{w} \sigma_r \Delta LR_{t-r} + \varepsilon_t \quad \text{.....Eqn (4)}$$

Second, the Markov-switching model was estimated and 'active' and 'passive' fiscal policy regimes identified. The nature of regime changes was evaluated and time varying probabilities estimated and used to create the dummy representing regime change (Doi et al., 2011). Thirdly, ARDL model specified in **equation (4)** was estimated. Akaike Information Criteria and Swartz Information criteria were used to select the appropriate number of lags. Having specified the most appropriate dynamic model, cointegration test was conducted using the bound testing approach. For robust checks, the ARDL model was subjected to a series of diagnostics. The following diagnostic tests were used to test for validity and reliability of the models. Firstly, Jarque-Bera test was used to test for normality of the residuals under the null hypothesis stating that the residuals are normally distributed. Both Markov Switching and ARDL models were subjected to Heteroskedasticity and serial correlation diagnostic tests. Breusch-Pagan test was used to test for heteroscedasticity in the stochastic term while LM test was used to test for serial correlation. OLS was to estimate both model in absence and heteroscedasticity. Ramsey-reset test was used to evaluate whether the ARDL model was well specified (Greene, 2002).

Bounds testing approach was used to test for cointegration in **equation (4)**. This tests uses F-test with the null hypothesis of no cointegration specified as $\beta_1=\beta_2=\beta_3=\beta_4=\beta_5=0$. Having established existence of cointegration, long run model was estimated to investigate the study objective. In addition, equivalent models namely Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) were used to evaluate the cointegrating regression to ascertain reliability of the results. This models are important as they correct for endogeneity and serial correlation in single equation models (Pesaran *et al*., 2001; Greene, 2002).

4.0 Findings and Conclusion

Descriptive Analysis and Stationarity test

Descriptive analysis presented in **table 1A** (see appendix) shows that the economy has grown at an average rate of 4.8 percent from 1966 to 2014. The average ratio of private sector credit to GDP is 21 percent which is less than the ratio of credit to government to GDP which stood at 32 percent over the period under investigation.

Figure 1A shows that generally, all variables trended upwards. **Figure 4.1** compares private sector credit and government credit in Kenya. The former maybe attributed to global crisis caused by oil prices in early 1970's while the later breaks maybe attributed to political strife witnessed during electioneering periods in Kenya.

Figure 4.1: Trending Private sector credit and Government Credit from 1966 to 2014

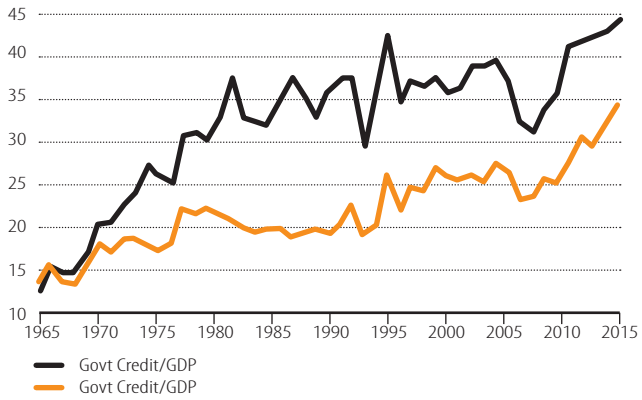


Figure 4.1 confirms that major share of commercial banks' credit is lend to the government compared to the private sector and this gap widened for the better part of 1980's. The trend also exhibit co-movement between private sector credit and government credit hence signaling the existence of crowding in or crowding out effect. As supported by **figure 1A**, the effect of structural breaks also affected financial sector performance given the visible shocks during the periods outlined in the preceding section. Stationarity conditions for all variables under investigation were tested using Augmented Dickey Fuller (ADF) test and Kwiatkowski-Philip-Schimdt and Shin (KPSS) test. **Table 4.1** shows the results with critical values at 5 percent level of significance.

Table 4.1: Stationarity Tests Results

Variable	Type of the Test and test Statistics					Conclusion
		ADF Test		KPSS Test		
		Test statistic	Critical value	Test statistic	Critical value	
Private sector credit as a ratio of GDP	Level	-0.7108	-2.924	0.8700	0.4630	Non -stationary
	1st Diff	-8.829		0.099		Stationary
Govt Credit/GDP	Level	-2.075	-2.924	0.7727	0.4630	Non-stationary
	1st Diff	-7.525	-2.927	0.2183		Stationary
Natural Log of GDP	Level	-0.0088	-2.924	0.9233	0.4630	Non -stationary
	1st Diff	-5.268	2.925	0.0595		Stationary
Lending rate	Level	-1.559	-2.923	0.3819	0.4630	Non –stationary*
	1st Diff	-6.732	-2.986			Stationary
M3/GDP	Level	-1.7117	-2.923	0.8747	0.4630	Non-Stationary
	1st Diff	-7.895	-2.925	0.045		Non -stationary
Government expenditure Gap	Level	-6.755	-2.923	0.074	0.4630	Non -stationary

Critical values at 5 percent significant level

Stationarity test presented in **table 4.1** shows that with exception of government expenditure gap all other variables are integrated of order one I(1). However, it is important to note that KPSS and ADF tests provide contradicting results with regards to lending rate. ADF tests shows that LR is not I(2) and therefore can be incorporated as an independent variable in the ARDL model. Secondly, stationarity test with structural breaks confirmed the above results.

Regression Estimation.

To determine 'active' and 'passive' fiscal policy regimes, Markov switching model was estimated as specified in equation (2) and the results presented in **table 4.2**.

Table 4.2: Markov-Switching Regression Model Results

Dependent Variable: Government Debt	Coef	Z-Stat	P-Value
Regime 1 (Active)			
Constant	6.678	7.87	0.000***
Change in Government Debt: Lag 1	-0.207	-2.32	0.02**
Government Expenditure Gap	0.147	2.89	0.004***
Change in Lending Rate	-0.143	-1.108	0.309
Change in log(GDP)	-28.64	-5.11	0.000***
Regime 2 (Passive)			
Constant	1.35	1.459	0.1446
Change in Government Debt: Lag 1	-0.249	-1.499	0.1337
Government Expenditure Gap	0.026	0.232	0.816
Change in Lending Rate	-0.397	-2.78	0.005***
Change in log(GDP)	-23.92	-3.19	0.0014***
Common			
Change in Government Debt: Lag 2	-0.219	2.7	0.007***
Log(Sigma)	0.1432	1.02	0.3056
Normality Test (Jarque-Bera)		1.89	0.387
Probability (Active)/Expectation		0.815	5.4 years
Probability (Passive)/Expectation		0.711	3.5 years

Key: *** Significant at 1%, **Significant at 5%, *Significant at 10%

Table 4.2 shows that the most parsimonious markov-switching model included two lags of the dependent variable. Active regime is identified by a positive and significant relationship between temporary rise in government expenditure gap and government domestic debt borrowed from banks as indicated by the coefficient 0.147 with P-value of 0.004. The coefficient of government expenditure gap during the passive regime is insignificant. Notably, lending rate are significant and negatively influence changes in government domestic during passive regimes but is insignificant during active regime. In both active and passive regimes, GDP changes leads to decrease in government debt borrowed domestically.

The results further show that probability of observing an active regime was 0.815 which was higher than probability of observing passive regime policy. This means that Kenyan government is likely to pursue active fiscal policy compared to passive approach. The expected duration shows that active regime is likely to last for an average 5.4 years compared to passive regime which may last for approximately 3.5 years.

Figure 4.2: P(S(t)=1 refers to probability of observing regime 1(Active)

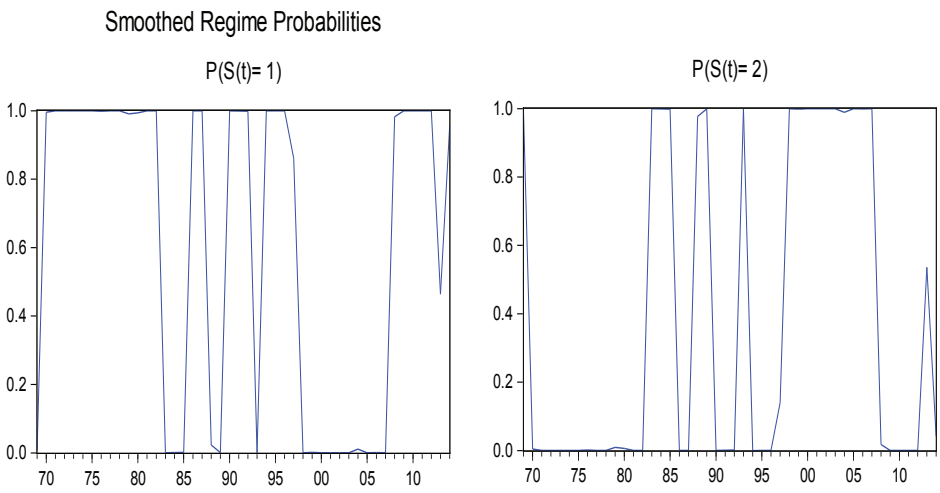


Figure 4.2 shows regime changes from active to passive fiscal regimes over the period under investigation. Note that the probability of observing active fiscal regime (represented by the graph top panel in **figure 4.2**) is mutually exclusive to probability of observing passive fiscal regimes. It can be noted that the period from 1970 to 1980 was characterized by active fiscal regime. Meaning that domestic debt was significantly influenced by government expenditure gap. This can be explained by the fact that the Kenyan economy faced major challenges following collapse of Bretton wood institutions and oil crisis of 1973 (Muthama, 2015). **Figure 4.2** also shows that the period from 1983 to 1995 was characterized by relatively volatile regime changes. This may be attributed to high interest rates, second oil shock and poor management of both fiscal and monetary policy. Introduction of prudent macroeconomic policies from year 2000 is led to a relatively long period of passive fiscal policy regime. These results are corroborate the fact that economic reform strategies led to transformation of macroeconomic management (Muthama, 2015).

The results therefore confirm that transitioning of regimes from active to passive can be validated by dynamics in the economic and policy landscape in Kenya. The findings confirm that government borrowing from banks is likely to increase during periods of temporary rise in government spending during active fiscal policy regime. Secondly, active regimes are more pronounces and last longer than passive regimes. The response of government debt to GDP and lending rate indicate that domestic debt responds procyclically hence signaling sustainability.

The study investigated the implication of policy rule on long run growth by providing for regime switching obtained from markov-switching model. Dummy variable was created as specified in equation 3 to capture the long run effect of different regimes. ARDL model specified in equation (4) was estimated (see **table 2A** in the appendix) and long run relationship tested using Bounds testing approach. **Table 4.3** shows the bounds test results.

Table 4.3: ARDL Bounds Test

Test Statistic	Value	K
F-statistic	7.979909	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Under the null hypothesis of no cointegration, as revealed by results in **table 4.3** shows that the F-Stat was 7.98 which is greater than the critical values at

1 percent level. In this regard, the null was strongly rejected implying existence of long run relationship. In this case, the error correction version of the ARDL model was estimated and the results presented in **table 4.4**. For robustness Fully Modified Ordinary Least Squares and Dynamic Ordinary least squares were used to estimate the long run model and the results compared to the ARDL model (Results in **tables 4A** and **5A** in the appendix).

Table 4.4: Short run and Long Run ARDL Model

Cointegrating form			
Dep Variable: Private sector credit	**Coef**	**Z-Stat**	**P-Value**
Short Run Coefficients			
Co integrating (Error Correction) term	-0.553	-4.858	0.000***
Change in Government Debt: (ΔDebt/GDP)	0.176	2.499	0.0181**
Change in Government Debt: Lag 1 Δ(Debt/GDP(-1))	-0.143	-2.333	0.0265**
Change in Lending rate: Lag 1 ΔLR(-1)	-0.282	-3.087	0.0043***
: Lag 2 ΔLR(-2)	0.043	0.552	0.585
: Lag 3 ΔLR(-3)	0.195	3.068	0.005***
Change in Broad Money Δ(M3/GDP)	0.178	2.536	0.0166**
Regime Change Dummy	0.99	2.557	0.0159**
Long Run Coefficients			
Constant	-19.75	-3.17	0.0035***
Government Debt	0.0546	0.609	0.5474
Log GDP	0.952	2.34	0.0262**
Lending rate	-0.274	-4.81	0.000***
Broad Money	0.643	4.98	0.000***

Cointegrating form			
Dep Variable: Private sector credit	**Coef**	**Z-Stat**	**P-Value**
Regime Change (Dummy)	1.79	2.67	0.0121**
Diagnostics Tests			
Specification test: Ramsey RESET test: F-Stat(2,28)	2.597	0.0923	
Normality test: Jarque-Bera		0.259	0.6283
Breusch-Godfrey Serial Correlation test: F-Stat (2,28)	3.393	0.1395	
Heteroskedasticity Test: Breusch-Pagan-Godfrey: F-Stat (14,30)	0.5869	0.8539	

(*** Significant at 1%, **Significant at 5%, *Significant at 10%)

Diagnostic tests shows that the model was well specified and none of the Gauss-Markov assumptions were violated. Estimation using Eviews 9 selected an ARDL (1,2,1,4,1). Interrogation of the results in **table 4.4** shows that the cointegrating coefficient is negative and significant. The cointegrating coefficient of -0.55 implies that deviation from the long run credit path is corrected by 55 percent the following period.

The long run model shows that government debt has no effect on the long run credit growth path. GDP, broad money supply and Lending rate results conform to theory. GDP growth and broad money have a positive and significant influence on private sector credit while lending rate has a negative influence on private sector credit in the long run. Notably, comparison between FMOLS and DOLS shows that the signage and significance was fairly consistence for all three models (**table 4.4**). However, in DOLS and FMOLS the coefficient of government debt was positive and significant. This provides some evidence of government debt crowding in private sector credit in the long run.

The short run model shows that log of GDP and lending rate (including the first lag) have a negative and significant influence on private sector credit. As expected, enterprises react to increases in cost of debt by reducing the amount of credit borrowed from banks. Notably, negative influence of lending rate output growth on private sector credit maybe explained by the fact that temporary increases in income reduced demand for credit due to increase in own source of finance. This supports the argument that in Kenya, enterprises prefer own source of finance during 'good economic times' as compared to external sources of finance which is predominantly composed of debt from mainstream banking.

Evaluation of the effect of government debt on private sector credit shows that the coefficient is positive but insignificant. However, comparison with FMOLS and DOLS model shows that the coefficient is positive and significant in FMOLS model and positive but insignificant at 5 percent in the DOLS. Therefore, the results suggests that increase in government debt has a positive but weak influence on private sector credit growth path. Evaluation of the regime switching dummy variable shows that in both the short run and the long run period regime change has a positive and significant influence on private sector credit at 5 percent significance level. In the short run, change from passive fiscal regime to active fiscal regime leads to increase in private sector credit by 0.99. In the long run, change from passive fiscal regime to active fiscal regime leads to increase in private sector credit by 1.79. The long run influence of regime change is confirmed in both the FMOLS (with coefficient of 1.95) and DOLS (with coefficient of 1.64).

In conclusion, the first objective sought to evaluate the nature of fiscal policy regime in Kenya. The results in **table 4.2** and **figure 4.2** suggests that the temporary rise of government expenditure leads the government to source debt domestically from private banks in Kenya hence pursuing 'active' fiscal policy. The second objective sought to establish whether government borrowing from commercial banks crowds out private sector credit. The results in **table 4.4** show that in the short run growth of current government expenditure has a positive effect on private sector credit with a coefficient of 0.176 (significant at 5 percent). However the lagged value of government expenditure growth of 0.143 is also significant at 5 percent. These results suggests that while instantaneous increase in government expenditure leads to crowding in of private sector credit, persistent rise in government expenditure eventually leads to crowding out of private sector credit. **Table 4.4** show that government debt is not significant in the long run.

In conclusion, the study sought to find out whether fiscal regime cycle affects allocation of credit between private sector and the government. First, there is evidence to suggest that government debt borrowed from commercial banks crowds in private sector credit. It was established that probability active fiscal policy regime was dominant during the study period and regimes changes from active to passive can be validated by dynamics in the economic and policy landscape in Kenya. The results also shows that persistence rise in government debt crowds out private sector credit and fiscal policy regimes actively influence allocation of commercial banks' credit between private sector and the government.

In this regard, the following recommendation were made. First, management of fiscal policy cycles is critical in managing the government domestic borrowing. Secondly fiscal policy is critical in allocation of credit in the economy. Therefore, assuming private sector is more efficient in transforming private sector credit into investment, it is critical that the levels of government domestic credit are prudently managed to avoid crowding out of private sector credit. Lastly, it is important for further studies to evaluate whether monetary policy pacifies or exacerbates fiscal policy action in Kenya. Fiscal policy coordination might also be critical in ensuring balanced growth of the economy.

Reference

1. Africa Development Bank, A. (2003). *African Economic Outlook*. OECD Publishing.

2. Argimon, I., Gonzailez-Paramo, J. M., & Roldan, J. M. (1995). *Does Public Investment Crowd-Out Private Investment? Evidence From a Panel of 14 OECD Countries* . Bank of Spain, Working Paper: No. 9523.

3. Aschauer, D. A. (1989). *Does Public Capital Crowd Out Private Capital?* Journal of Monetary Economics 24(2), 171-188.

4. Barro, R. (1990). *Government Spending in a Simple Model of Endogenous Growth*. Journal of Politcal Economy.

5. Barro, R. J. (1974). *Are Government Bonds Net Wealth. Journal of Political Economy* 82(6), 1095-1117.

6. Bernheim, B. D. (1987). *Ricardian Equivalence: An Evaluation of Theory and Evidence.* NBER Macroeconomics Annual (Cambridge: MIT Press).

7. Blanchard, O., & Perotti, R. (2002). *An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output. Quarterly Journal of Economics,* 117(4), 1329-68. .

8. Bouthevillain, C., & Dufrénot, G. (2011). *Are the effects of fiscal changes different in times of crisis and non crisis? The French case.* Revue d'économie politique.

9. Central Bureau of Statistics, C. (1973). *Economic Survey.*

10. Chibi, A., Benbouziane, M., & Chekouri, S. M. (2014). *The Impact Of Fiscal Policy On Economic Activity over the Business Cycle: An Empirical Investigation in the Case of Algeria.* The Economic Research Forum (ERF).

11. Elmendorf, D. W., & Reifschneider, D. L. (2002). *Short-Run Effects of Fiscal Policy with Forward-Looking Financial Markets.* Board of Governors of the Federal Reserve System.

12. Emran, S., & Farazi, S. (2009). *Lazy Banks? Government Borrowing and Private sector credit in Developing Countries*. Institute for International Economic Policy Working Paper Series.

13. Evans, P. (1985). *Do Large Deficits Produce High Interest Rates?* American Economic Review, Vol. 75, Iss. 1 , 68-87.

14. Fazzari, S., Morley, J., & Panovska, I. (2015). *State-dependent effects of fiscal policy.*

15. Friedman, B. (2006). *Deficits and Debt in the Short and Long Run. The Macroeconomics of Fiscal Policy,* Cambridge, MA, MIT Press.

16. Giavazzi, F., & Pagano, M. (1990). *CAN SEVERE FISCAL CONTRACTIONS BE EXPANSIONARY? A TALE OF TWO SMALL EUROPEAN COUNTRIES.* NEER Macroeconomics Annual Conference.

17. Greene W (2002). *Econometrics Analysis.* Fifth Edition. Prentice hall Pub. Upper saddle River: New Jersey.

18. Hamilton, J. (2005). *Regime Switching Models.* University of California. Retrieved June 2016 from http://econweb.ucsd.edu/~jhamilton/palgrav1.pdf

19. Hansen, P. (2003). *Structural changes in the cointegrated vector autoregressive model.*

20. Kenya National Bureau of Statistics, K. (2000). *Economic Survey Report.*

21. Khalid, A. (1996). *Ricardian Equivalence: Empirical Evidence from Developing Economies.*

22. Khalid, A. (1996). *Ricardian Equivalence: Empirical Evidence from Developing Economies.* Journal of Development Economics, Vol. 51, 413-432.

23. Ko, J.-H., & Morita, H. (2012, December). *Regime Switches in Japanese Fiscal Policy: Markov-Switching VAR Approach*. Global COE Hi-Stat Discussion Paper Series.

24. Ko, J.-H., & Morita, H. (2013). *Regime Switches in Japanese Fiscal Policy: Markov-Switching VAR Approach.* Global COE Hi-Stat Discussion Paper Series 270.

25. Kulkarni, K. G., & Erickson, E. L. (1995). *Is Crowding out Hypothesis Evident in LDCS? A Case of India.* Indian Economic Journal, 43(1), 116-26.

26. Kumhof, M., & Tanner, E. (2005). *Government Debt: A Key Role in Financial Intermediation*. IMF Working Paper 05/57.

27. M'Amanja, D., & Morrissey, O. (2003). *Fiscal Policy and Economic Growth in Kenya.* Centre for Research in Economic Development and International Trade, University of Nottingham.

28. M'Amanja, D., & Morrissey, O. (2005). *Fiscal Policy and Economic Growth in Kenya.* Centre for Research in Economic Development and International Trade, in Economic Development and International Trade.

29. Miller, S., & Russek, F. (1997). *Fiscal Structures and Economic Growth.*

30. Muthama M., (2015). *Fiscal and Monetary Policy Analysis in Kenya: An Empirical analysis.* University of Dar es Salaam

31. Perotti, R. (1999). *Fiscal Policy in Good Times and Bad. The Quarterly Journal of Economics*.

32. Pesaran H., Shin, Y Smith R. (2001). *Bounds testing approaches to the analysis of the level relationships.* Journal of Applied Econometrics. Vol 3 (2). pp. 289-326

33. Serven, L. (1999). *Does Public Capital Crowd out Private Capital? Evidence from India.* The World Bank, Policy Research Working Paper Series.

34. The National Treasury Directorate of Public Debt Management, D. (2013-2014). *Annual Public Debt Report.*

35. Traum, N., & Yang, S. (2011). *When Does Government Debt Crowd out Investment.*

36. Treasury, T. N. (April 2015). *Monthly Debt Bulletin.*

Appendix

Table 1A: Summary of Descriptive Statistics

	Private sector credit as a ratio of GDP	Government Credit as a ratio of GDP	GDP Growth	M3/GDP	Lending Rate
Mean	21.49679	32.00544	4.818661	33.1766	15.91743
Median	20.97326	34.30785	4.300562	34.3548	14.3715
Maximum	34.35215	44.58486	22.17389	42.92716	36.24
Minimum	12.6112	12.02212	-4.65545	22.66169	8
Standard Deviation	4.891332	8.363218	4.441607	5.353109	7.093332
Skewness	0.385123	-0.896468	1.585191	-0.02056	1.197126
Kurtosis	2.884718	2.971986	7.417229	1.975527	3.820971
Jarque-Bera	1.238412	6.564787	60.35827	2.146271	13.07981
Probability	0.538372	0.037538	0	0.341935	0.001445
Squared Deviation	1053.342	1568.266	236.1144	1625.654	779.9539
Sum Squared Deviation	1148.406	3357.284	946.9378	1375.477	2415.137
Number of Obs.	49	49	49	49	49

Figure 1A: Trending Private sector credit, Government Credit, GDP Growth, Broad Money (M3/GDP) and Lending Rate (LR) from 1966 to 2014

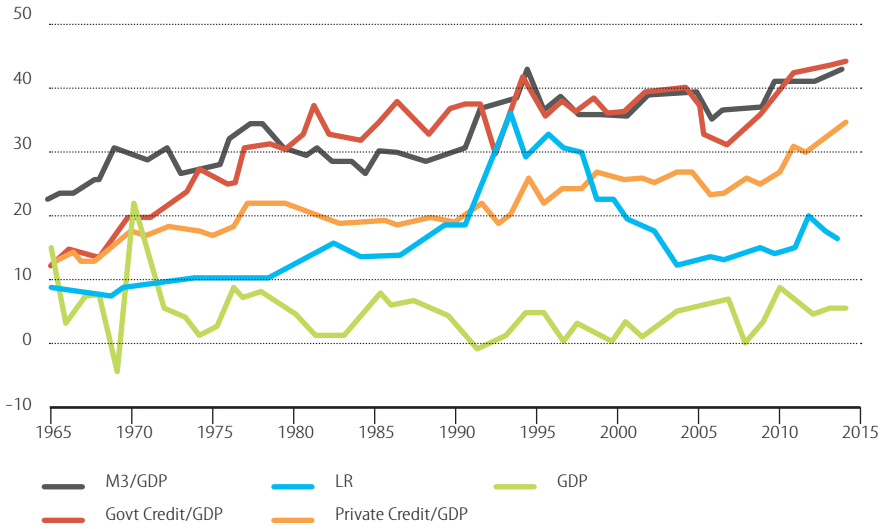


Table 2 A: Autoregressive Distributive Lag Model: Bounds testing Approach

Dependent Variable: CRED
Method: ARDL
Sample (adjusted): 1970 2014
Included observations: 45 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Schwarz criterion (SIC)

Dynamic regressors (4 lags, automatic): DEBT_GDP LGDP LR M3_GDP
Fixed regressors: DUMMY C
Number of models evaluated: 2500
Selected Model: ARDL(1, 2, 1, 4, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
CRED(-1)	0.447124	0.113807	3.928778	0.0005
DEBT_GDP	0.176467	0.070590	2.499890	0.0181
DEBT_GDP(-1)	-0.289071	0.085908	-3.364900	0.0021
DEBT_GDP(-2)	0.142766	0.061184	2.333370	0.0265
LGDP	-10.09765	3.743550	-2.697346	0.0114
LGDP(-1)	10.62399	3.754773	2.829462	0.0082
LR	-0.295937	0.060393	-4.900225	0.0000
LR(-1)	0.100526	0.093902	1.070547	0.2929
LR(-2)	0.282263	0.091419	3.087572	0.0043
LR(-3)	-0.043067	0.077964	-0.552399	0.5848
LR(-4)	-0.195057	0.063570	-3.068391	0.0045
M3_GDP	0.178253	0.070276	2.536463	0.0166
M3_GDP(-1)	0.177146	0.087299	2.029195	0.0514
DUMMY	0.990184	0.387241	2.557024	0.0159
C	-10.91855	4.006753	-2.725037	0.0106
R-squared	0.973790	Mean dependent var	22.23395	
Adjusted R-squared	0.961559	S.D. dependent var	4.385589	
S.E. of regression	0.859857	Akaike info criterion	2.797100	
Sum squared resid	22.18061	Schwarz criterion	3.399320	
Log likelihood	-47.93474	Hannan-Quinn criter.	3.021601	
F-statistic	79.61477	Durbin-Watson stat	2.376713	
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection

Tables I through III: Diagnostics Tests for the ARDL Model

Table I: Ramsey RESET Test

Equation: ARDL

Specification: CRED CRED(-1) DEBT_GDP DEBT_GDP(-1) DEBT_GDP(-2) LGDP LGDP(-1) LR LR(-1) LR (2)LR(-3) LR(-4) M3_GDP M3_GDP(-1) DUMMY C

Omitted Variables: Powers of fitted values from 2 to 3

	Value	df	Probability
F-statistic	2.597091	(2, 28)	0.0923
F-test summary:			
	Sum of Sq.	**df**	**Mean Squares**
Test SSR	3.470792	2	1.735396
Restricted SSR	22.18061	30	0.739354
Unrestricted SSR	18.70982	28	0.668208

Table II: Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.343387	Prob. F(2,28)	0.2773
Obs*R-squared	3.939965	Prob. Chi-Square(2)	0.1395

Table II: Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.586976	Prob. F(14,30)	0.8539
Obs*R-squared	9.676025	Prob. Chi-Square(14)	0.7855
Scaled explained SS	5.650920	Prob. Chi-Square(14)	0.9745

Table 3A: ARDL Cointegrating and Long Run Form (Presented in Table 4.4)

Dependent Variable: CRED
Selected Model: ARDL(1, 2, 1, 4, 1)
Date: 08/03/16 Time: 12:36

Sample: 1966 2015
Included observations: 45

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DEBT_GDP)	0.176467	0.070590	2.499890	0.0181
D(DEBT_GDP(-1))	-0.142766	0.061184	-2.333370	0.0265
D(LGDP)	-10.097651	3.743550	-2.697346	0.0114
D(LR)	-0.295937	0.060393	-4.900225	0.0000
D(LR(-1))	-0.282263	0.091419	-3.087572	0.0043
D(LR(-2))	0.043067	0.077964	0.552399	0.5848
D(LR(-3))	0.195057	0.063570	3.068391	0.0045
D(M3_GDP)	0.178253	0.070276	2.536463	0.0166
D(DUMMY)	0.990184	0.387241	2.557024	0.0159
CointEq(-1)	-0.552876	0.113807	-4.857996	0.0000
Cointeq = CRED - (0.0546*DEBT_GDP + 0.9520*LGDP -0.2736*LR + 0.6428*M3_GDP + 1.7910*DUMMY -19.7486)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEBT_GDP	0.054556	0.089656	0.608505	0.5474
LGDP	0.951997	0.406936	2.339430	0.0262
LR	-0.273610	0.056876	-4.810662	0.0000
M3_GDP	0.642819	0.129174	4.976369	0.0000
DUMMY	1.790970	0.670268	2.672021	0.0121
C	-19.748643	6.235747	-3.167005	0.0035

Table 4A: Results showing Long run Model Using Dynamic Ordinary Least Squares

Dependent Variable: CRED
Method: Dynamic Least Squares (DOLS)
Date: 08/03/16 Time: 16:07
Sample (adjusted): 1969 2014
Included observations: 46 after adjustments

Cointegrating equation deterministics: C
Fixed leads and lags specification (lead=0, lag=2)
Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = (4.000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEBT_GDP	0.128326	0.066928	1.917381	0.0667
LGDP	0.842324	0.409005	2.059444	0.0500
LR	-0.207182	0.051179	-4.048206	0.0004
M3_GDP	0.552316	0.133232	4.145516	0.0003
DUMMY	1.957334	1.005665	1.946309	0.0629
C	-19.99309	6.487631	-3.081724	0.0050
R-squared	0.964926	Mean dependent var		22.02733
Adjusted R-squared	0.936867	S.D. dependent var		4.557401
S.E. of regression	1.145109	Sum squared resid		32.78186
Long-run variance	1.632032			

Table 5A: Results showing Long run Model Using Fully Modified Ordinary Least Squares

Dependent Variable: CRED
Method: Fully Modified Least Squares (FMOLS)
Date: 08/03/16 Time: 16:06
Sample (adjusted): 1967 2014

Included observations: 48 after adjustments
Cointegrating equation deterministics: C
Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEBT_GDP	0.165228	0.046570	3.547934	0.0010
LGDP	0.876090	0.226721	3.864171	0.0004
LR	-0.199150	0.033882	-5.877803	0.0000
M3_GDP	0.475736	0.071091	6.691927	0.0000
DUMMY	1.649497	0.403602	4.086943	0.0002
C	-20.01906	3.877809	-5.162466	0.0000
R-squared	0.922175	Mean dependent var		21.68190
Adjusted R-squared	0.912910	S.D. dependent var		4.766478
S.E. of regression	1.406639	Sum squared resid		83.10263
Long-run variance	1.682628			

Kenya Bankers Association
13th Floor, International House, Mama Ngina Street
P.O. Box 73100– 00200 NAIROBI
Telephone: 254 20 2221704/2217757/2224014/5
Cell: 0733 812770/0711 562910
Fax: 254 20 2221792
Email: research@kba.co.ke
Website: www.kba.co.ke

KENYA BANKERS
ASSOCIATION

One Industry. Transforming Kenya.