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THE EFFECT OF GOVERNMENT DOMESTIC DEBT ON PRIVATE SECTOR INVESTMENT IN KENYA

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Abstract

The main objective of the paper is to examine the effect of government domestic debt on private sector investment in Kenya. The explanatory variables considered were the amount of government debt absorbed through Treasury bills and Treasury bonds, the lending rate and commercial bank deposits. Private investments are proxied by private sector credit. Quarterly secondary data was used in the study. The small sample size and the different orders of integration of the variables prompted the use of the ARDL (the autoregressive distributed lag) model. The study established a long run relationship between private sector credit and Treasury bills, Treasury bonds and the Lending Rate while a short run relationship with all the explanatory variables used in the study. The study recommends the following; the absorption of debt through Treasury bills over the long run should be monitored, the government should focus on absorbing more of its debt through Treasury bonds given that has the potential to crowd in private sector credit, the secondary market needs to be more efficient and that it is of importance to prudently manage government domestic debt to avoid crowding out private sector credit.

Keywords: *Commercial Banks, Crowding in, Crowding Out, Government Domestic Debt, Lazy Banking*

Introduction

Government borrowing curtails from the challenges in raising sufficient government revenues to finance government expenditure needs. In developing economies, low revenue collection has primarily been attributed to low levels of income (Sah, 1992; Stigliz, 1992; Fielding, 2007). Additionally, the rise in informal markets has limited the success of tax regimes thus constraining the government's ability to raise revenue from the domestic market. Reduced government revenues, given expected government spending needs, not only leads to wider budget deficits but it also increases the government's debt appetite.

In Kenya, government borrowing is directed towards financing both recurrent and development expenditure needs. Government spending has, however, repeatedly outpaced revenue collection due to ballooning expenditure needs and fluctuating economic activity that results in volatility in revenue collection. Public expenditure is financed either through the domestic or external market. Umary, Aminu and Musa (2013) concluded that external debt had an unfavorable effect on GDP growth while domestic debt was more favorable for economic growth. Intuitively, access to international credit markets for financing has also been constrained

given prohibitive interest rates and consequent foreign exchange exposure that could be at the detriment to the economy and local currency once foreign debt falls due.

Given the noted constraints in the external market, the government relies heavily on domestic borrowing (Emran and Farazi, 2009) to meet its expenditure obligations. Domestic borrowing can either be in the form of Treasury bills and bonds, advances from commercial banks, overdraft from the central bank, government stocks and other domestic debt. Treasury bills comprise about 34% while Treasury bonds comprise about 62% of total domestic debt in Kenya (Central Bank of Kenya, 2017) underscoring the importance of these two sources of borrowing for the government. Treasury bills are normally used to finance the government's recurrent spending needs. While Treasury bonds could as well be used to finance recurrent spending, this form of domestic debt is directed more towards development spending and as such could contribute to crowding in effects (Baldacci, et al., 2004).

It could then be possible that the type of government debt security used to finance budget deficits could have a direct impact on private sector credit which plays a significant role in the development and facilitation of private investments (Anyanwu, 2017). While the method of government borrowing is normally linked to the type of government expenditure being financed, there is further need to understand the relationship between the level and decomposition of government debt and its effect on private sector credit (Anyanwu, 2017) owing to its significant role in the development and facilitation of private investments.

Given that commercial banks are the largest lenders to the government and the private sector, traditional theory suggests that this could lead to potential crowding out effects through constrained credit to the private sector. Initially, crowding out was associated with an increase in market lending rates as a result of increased government borrowing. However, the said relationship was overall seen to be weak (Blanchard, 2007) and was assumed to be even weaker in developing economies. This is because the banking sector in developing economies has generally been subject to government intervention and market rates are often monitored by the central bank. Therefore, commercial banks may not increase lending rates even with increased demand for funds (Stiglitz and Weiss,1992).

Majority of research focusses on the relationship between government borrowing and lending rates (price channel), in developed economies (Ardagna et al, 2007; Blanchard, 2007; Faini, 2006; Friedman, 2005). Nonetheless, even if the banking sector was indeed liberalized the consequence of government borrowing on interest rates could be mediated by the availability of credit (quantity channel). The quantity channel may then be important to study given that developing markets have less developed credit markets and experience credit rationing (Ghoshet et al, 2000; Ray, 1998).

Although the connection between government debt and private sector credit is assumed to be negative, the degree of crowding-out is contingent on the reaction by commercial banks to increased government debt given their balance sheet optimizations. It could be assumed that when commercial banks have excess liquidity, augmented lending to the government may not end in a noteworthy drop in the amount of credit extended to the private sector. Additionally, this could also sanction commercial banks to increase their risk appetite to extend credit to the private sector (risk diversification model). Relatedly, a high amount of commercial bank lending to the government could create moral hazard and thus dampen commercial banks from advancing credit to the considerably risky private sector (lazy bank model).

Given the Kenyan government's goal of maintaining a potential annual economic growth rate of 6% (Kenya Budget, FY 2017/18) and the importance of private investment in leading the economy towards such a goal,

much needs to be done in order to facilitate the access to credit for the private sector and hence boost economic growth. To enhance private investment, the efficiency in financial intermediation is critical. Commercial banks intermediate funds and thus reduce financing constraints for the private sector which will play a crucial role in expanding economic activities, enhancing efficiency and productivity, and inducing economic growth (Correa, 2008).

Several studies have offered some discernment on the impact of government borrowing on private investments in Kenya. Achieng (2010) carried out a study on the effect of domestic debt on the private investment in Kenya from 1963-2009 indicated that the debt service ratio and government domestic debt was significant at 5%, Njuru (2012) analyzed the impact of fiscal policy on private investment in Kenya and noted that the fiscal policy design mattered to private investment. Most analysis focusses on the impact of government borrowing through the price channel (interest rates) with little research on the quantity channel. Subsequently, there is limited research on the transmission mechanism and the scale of government borrowing on private investments (Engen and Hubbard, 2004). This study seeks to examine the quantity channel through the impact of the composition of government domestic debt on private investments. Therefore, does government debt quantitatively reduce private sector investments in Kenya?

Research Objectives

The main objective of this study was to investigate the impact of government borrowing on private sector investment.

The specific objectives of this study were

I. To investigate the impact of government debt absorbed through Treasury bills on private sector investment.

II. To investigate the impact of government debt absorbed through Treasury bonds on private sector investment.

Empirical Literature Review

Relationship between Treasury Bills and Private Sector Investments

Gaber (2010) studied the effect of government borrowing through the issue of treasury bills in fiscal deficit countries. The study explored the consequences of government borrowing through Treasury bills and concluded that there was a negative impact of government borrowing on private sector credit as it crowded out the private sector in the capital market.

A study by Paiko (2012) tested the connection between private investment and the funding of the Nigerian budget deficit, which was primarily funded through Treasury bills. The sample period was from 1990 to 2007 and the study revealed joint integration and a negative correlation between deficit financing and investment. This implies that financing the budget deficit in Nigeria using Treasury bills crowded out private investment.

A study by Essam (2012), set to establish the relationship between the credit extended to the private sector and government borrowing in Egypt. The sample period used quarterly data between the years 1998 to 2010. The study revealed that government debt crowded out private sector credit though this was due to commercial banks exploiting the lazy bank model policy thus the strong concentration of investment by commercial banks in

Treasury bills. The study concluded that the overall policies of the banking system explain the phenomenon of crowding out in the Egyptian economy.

Relationship between Treasury Bonds and Private Sector Investments

Ewin and Yanochick (1999) studied the impact of budget deficits on the term structure of interest rates in the period 1977 to 1991. They used the co-integration technique and the results suggested that budget deficits widened the yield spread between long term government bonds and the three-month Treasury bill rate. The researchers concluded that budget deficits could potentially deter long term economic growth by crowding out much needed private investment through the increase of long term interest rates.

The study by Latif (2006) tested the influence of competition and the impact of integration in the government bond market with private sector investment in the Japanese economy, over the sample the period of 1998 and 2006. The study concluded that financing the Japanese budget deficit through the issue of Treasury bonds did not crowd out the private investment as the relationship was integrated. This integration was credited to the sensitivity of interest rates on account of changes in the amount of the Japanese budget deficit. The integration was also on account of the high efficiency of the Japanese public spending and the high degree of integration between the Japanese capital market and the global financial markets.

Cebula (2015) examined the bearing of US government debt on the yield of ten-year Treasury bonds using annual data between the sample period 1972 to 2012. The study used GLM (Generalized Linear Model) estimates that revealed that budget deficits have a positive and statistically significant impact on the nominal interest rate yield on the ten-year Treasury bonds.

Relationship between Commercial Bank Deposits and Private Sector Investments

Monadjemi (1995) studied the impact of public investments on private investments in a panel of developing economies from the period 1980 to 1995. The study revealed that public investment complemented private investments. However, private investment is normally constrained by the accessibility of credit from financial institutions given the amount of commercial bank deposits.

Bwonde (2000) studied the relationship between public and private investments in 25 countries in Africa, Asia and Latin America over a 30-year period using the Granger causality approach. The results suggested that public investments crowd in private investments as this contributed to improved fortunes for the private sector that indirectly resulted in an increase in commercial bank deposits that led to greater credit extension activities to the private sector.

Shetta and Kamaly (2014) studied the crowding out effect of government borrowing on private sector in Egypt using quarterly data in the period 1970 to 2009. The study utilized the VAR model and revealed that a $1.00 upsurge in government debt reduces private sector credit by $1.80. The study concluded that bank policies negatively affected private investment and thus growth in private output. This suggested that GDP growth has a positive impact on the willingness of the banking system to expand lending to both the government and the private sector given the increase in commercial bank deposits.

Relationship between Lending Rates and Private Sector Investments

Knot and de Haan (1999) examined the relationship between budget deficits and interest rates in Germany in the period 1987 to 1993. The results suggest that there is a positive correlation between budget deficits and interest rates. This could imply that government debt crowds out private investments given that higher interest

rates on account of wider budget deficits (thus increased government borrowing) would lead to higher lending rates.

Baldacci and Kumar (2010), studied the bearing of fiscal deficits and government debt on interest rates. The study examined a panel of 31 advanced and emerging economies between 1980 to 2008 using fixed effect and system GMM estimation. The results showed that wider deficits and increased public debt resulted in a significant increase in long term interest rate that resulted in higher lending rates thus crowded out private investments.

Capener et al. (2017) used the autoregressive, AR (1) and two-stage method of least squares to investigate the impact of the budget deficit in the US on the ex-ante interest rate yield on Moody's rated Baa corporate bond from the period 1960 to 2015. The study concluded that a one percentage point increase in the budget deficit leads to a 58 basis points increase in the ex-ante interest rate resulting in an increase in overall lending rates thus crowding out private sector credit.

Research Methodology

This study used the empirical model by Emran and Farazi, (2009). Whereas Emran and Farazi based their analysis on a cross-country panel data set consisting of 60 developing countries and 32 years (annual data for 1975-2006) this study focussed on one country, Kenya. Due to this, the study uses the ARDL (the autoregressive distributed lag model) developed by Pesaran et al. (2001).

The model seeks to examine the long-run relationship between each pair of variables under consideration adopting the F-bounds test for co-integration within ARDL modeling approach. The ARDL model and can be applied irrespective of whether regressors are purely I (0), purely I (1) or mutually co-integrated. The ARDL methodology was chosen as it has certain advantages over other co-integration procedures. It can be applied regardless of the stationary of the variables in the sample. Secondly, it allows for inferences on long run estimates which are not possible under alternative co-integration procedures. Finally, ARDL Model can accommodate greater number of variables in comparison to other Vector Autoregressive (VAR) models.

Data was collected from secondary sources such as the Central Bank of Kenya. The time series data used was quarterly over a 17-year period from 2001 to 2017. Data collected included the amount of government debt absorbed through Treasury bills and bonds, private sector credit, private deposits held by commercial banks and average lending rates. This data was collected from the Central Bank of Kenya. Secondary data offered the advantage of convenience, cost and time given the need to out the data collection and analysis. The collected data was analyzed using trend analysis through the use of tabular representations that explicitly revealed trends among the data. Diagnostic tests were performed so as to ensure no violation of assumptions of normality, homogeneity, stationarity, heteroscedasticity and serial correlation using the Eviews software package version 9.5.

The study was guided by a multiple regression model using the below variables:

$$F(y) = (LogPSC, LogTbills, LogTbonds, Lending\_Rate, LogPvtDeposits, Ut) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.10$$

Where: Log (PSC) is the amount of credit extended to the private sector by commercial banks, Log (Tbills) is the amount of government debt absorbed through Treasury bills, Log (Tbonds) is the amount of government

debt absorbed through Treasury bonds, Lending_Rates is the average lending rates for private sector credit, Log (PvtDeposits) is the amount of private deposits held by commercial banks and Ut is the error term.

Brief Explanation of Variables

A Treasury Bill is a paperless short-term debt instrument issued by the government through the Central Bank of Kenya, as its fiscal agent to raise money on short term basis Treasury bills are issued in maturities of 91, 182 and 364 days. Treasury Bonds are medium to long term debt instruments, usually longer than one year issued by the government to raise money in local currency. The lending rate is the annual average interest rate charged by commercial banks on private sector credit. Commercial Bank (Private) Deposits are deposits held by commercial banks that comprise of demand, time and saving deposits made by the private sector. Private sector investments are investments that are important in the economic development agenda for a country as it provides various income and job opportunities for the general public.

Results and Discussion

This chapter presents the results of the effect of government domestic debt on private sector investment in Kenya. Logarithm is used for the variables (PSC, Tbills, Tbonds and PvtDeposits) because according to Cruz and Teixeira (1999), the data logarithm will increase the stability for variance and the optimization of empirical estimates. The variable Lending_Rate is not transformed into a logarithm as it is in percentage form. Diagnostic tests were conducted. These tests included descriptive tests so as to test the normality of the data, unit root rests to test for stationarity, the granger causality test to test the causal relationship between the variables, the test for heteroscedasticity and the test for serial correlation.

Table 4.1. Descriptive Statistics

	LogPSC	LogTbills	LogTbonds	LogPvtDeposits	Lending_Rate
Mean	5.847068	5.267676	5.566136	5.903414	0.155893
Median	5.831211	5.154125	5.561636	5.889738	0.147850
Maximum	6.363297	5.876731	6.157850	6.418644	0.202133
Minimum	5.373009	4.983222	4.523228	5.423890	0.122033
Std. Dev.	0.349237	0.256379	0.393926	0.331179	0.023593
Skewness	0.082662	1.036217	-0.477509	0.051770	0.497928
Kurtosis	1.551368	2.860154	2.634732	1.596318	1.936530
Jarque-Bera	6.023285	12.22453	2.962194	5.612954	6.014316
Probability	0.049211	0.002216	0.227388	0.060417	0.049432
Sum	397.6006	358.2020	378.4972	401.4321	10.60070
Sum Sq.Dev.	8.171743	4.403914	10.39690	7.348533	0.037293
Observations	68	68	68	68	68

Table 4.1. shows that the sample contains 68 observations, which is in line with the recommended range of at least 50 observations as larger samples often provide more precise estimates of process parameters such as mean and standard deviation. The mean and the median are both measures of central tendency. Based on the above results, the variables have a mean and median that are close in value suggesting little indication of outliers that could affect the mean more than the median. As a result, the study uses the mean as the standard measure of the center of distribution for all the data variables. The standard deviations of the data variables are close to 0 indicating that the variables are not volatile. Additionally, the standard deviations could also suggest that the data variables are not normally distributed. This is because with normal data, most observations are

spread within 3 standard deviations on each side of the mean. Relatedly, the P-values associated with the Jarque-Bera statistic, a test for the departure from normality, show that the variables deviate from a normal distribution.

The non-normality of the variables is supported by their skewness and kurtosis coefficients. The skewness of the data measures the degree and direction of asymmetry. A symmetric distribution, such as a normal distribution, has a skewness of 0. All the variables, except LogTbonds, are positively skewed. A positive skewness means that the distribution is skewed to the right while a negative skewness means the distribution is skewed to the left. Meanwhile, the kurtosis for all data variables are positive. The kurtosis number is evaluated in relation to the normal distribution on which the kurtosis is equal to 3. None of the data variables has a kurtosis greater than 3 suggesting that their respective distributions have lighter tails than a normal distribution.

Table 4.2. Granger Causality Test

Null Hypothesis (H_0)	**P<0.05 (reject H_0)**	**Causality**
LogPSC does not Granger Cause LogTbills	0.0019	One way causality
LogTbonds does not Granger Cause LogPSC and LogPSC does not Granger Cause LogTbonds	0.0028 and 0.0048	Dual causality
LogPvtDeposits does not Granger Cause LogPSC	0.0154	One way causality
LogPvtDeposits does not Granger Cause LogTbills	0.0121	One way causality
LogPvtDeposits does not Granger Cause LogTbonds	0.0435	One way causality
Lending_Rate does not Granger Cause LogTbonds	0.0445	One way causality

The results in the table above discloses the bidirectional relationship between Treasury bonds and private sector credit. This implies that the amount of government debt absorbed through Treasury bonds has a significant effect on the amount of credit extended to the private sector, in one hand, while on the other hand, private sector credit significantly affects the amount of government debt absorbed through Treasury bonds.

It was also observed that there was a unidirectional relationship between amount of credit extended to the private sector and the amount of government debt absorbed through Treasury bills whereby the causality flows from private sector credit to Treasury bills. This is in line with a study conducted by Gaber (2010) that established that there was a causal relationship which means that changes in the amount of private investment affects the value of treasury bills absorbed in the long term during the study period. Meanwhile, one-way causality flows from private deposits to Treasury bills, Treasury bonds and private sector credit.

Additionally, one-way causality flows from lending rates to Treasury bonds. There was no relationship detected between the lending rate and private sector credit, Treasury bonds and Treasury bills, Lending rates and Treasury bills and the lending rate and private deposits as evidenced by their respective insignificant p-values.

Table 4.3. Summary of Unit Root Tests:

	ADF Test Statistic – Constant and Linear Trend	
Variable	**Level - I(0)**	**First Difference - I(1)**
Log PSC	-2.992791	-3.289710 ***
LogTbills	-1.387124	-7.118881 *, **, ***
Log Tbonds	-7.341812 *, **, ***	-3.065041
LogPvtDeposits	-2.622822	-5.752319 *, **, ***
LendingRate	-2.809652	-4.651692 *, **, ***

*, ** and *** represent significance at 1%, 5% and 10% level

The results from the table indicate that the variables at stationary at different levels but none of the variables is integrated of order I(2). Therefore, the ARDL methodology is ideal for such a data set.

Table 4.4. VAR Lag Order Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	526.2908	NA	3.42e-14	-16.81583	-16.64429	-16.74848
1	1004.613	864.0654	1.53e-20	-31.43912	-30.40986*	-31.03501
2	1046.271	68.53475*	9.09e-21*	-31.97649*	-30.08951	-31.23562*
3	1064.589	27.18103	1.17e-20	-31.76093	-29.01624	-30.68329
4	1084.455	26.27410	1.50e-20	-31.59531	-27.99290	-30.18091
5	1106.203	25.25576	1.91e-20	-31.49041	-27.03029	-29.73925
6	1138.976	32.77310	1.85e-20	-31.74115	-26.42332	-29.65324

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The study chose to look at the AIC criterion in order to establish the optimal lag. According to the conducted VAR lag order selection model as shown below, a two-lag model is the optimal lag for the variables in the study.

Table 4.5. Serial Correlation LM Test:

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.239054	Prob. F(2,53)	0.7882
Obs*R-squared	0.590057	Prob. Chi-Square(2)	0.7445

The null hypothesis of the test is that there is no serial correlation in the residuals up to the specified order. The p-values for the serial correlation LM are not significant ($p>0.05$) thus we fail to reject the null hypothesis of no serial correlation thus the model is stable.

Table 4.6. Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.382902	Prob. F(10,55)	0.2126
Obs*R-squared	13.26062	Prob. Chi-Square(10)	0.2095
Scaled explained SS	6.858156	Prob. Chi-Square(10)	0.7388

The null hypothesis is that the is no heteroscedasticity, that is, homoskedasticity exists. The p-value in the results above is greater than 0.05 thus we fail to reject the null hypothesis thus the standard errors in the model are not biased.

Table 4.7. ARDL F-Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.961598	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

The value of the F-statistic is 4.96 which is greater than the upper bound value at 1%, 2.5%, 5% and 10% level of significance. Given this result, we can reject the null hypothesis of no long run relationship (no co-integration) and accept the alternative hypothesis that reveals existence of co-integration among variables. The findings provide proof that the dependent and independent variables are statistically co-integrated. The finding provided the basis for applying the ARDL approach.

Table 4.8. ARDL Long Run Model

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGTBILLS	-0.058623	0.029983	-1.955219	0.0556
LOGTBONDS	-0.158945	0.049275	-3.225642	0.0021
LOGPVTDEPOSITS	1.281415	0.061427	20.86065	0.0000
LENDING_RATE	-0.114256	0.141329	-0.808444	0.4223
C	-0.495803	0.050670	-9.784922	0.0000

Given the long run ARDL model, the estimated long run equation of private sector credit and the explanatory variables was estimated to be:

*LOGPSC = -0.0586*LOGTBILLS - 0.1589*LOGTBONDS + 1.2814**LOGPVTDEPOSITS - 0.1143*LENDING_RATE - 0.4958*

According to the data results, Treasury bills have a negative relationship (-0.059) with private sector credit. This implies that a 10% change in the value of absorbed government debt through Treasury bills leads to a 0.59% reduction in private sector credit thus translating to a crowding out effect in line with findings made by Yossef (2016) that Treasury bills crowded out private investments in the short run in Egypt. However, the relationship is weak (p=0.056) as the p-value is slightly greater than 0.05. This somewhat suggests that short term government borrowing such as Treasury bills could potentially crowd out private sector credit in the long run but due to the short-term nature of Treasury bills compared to the usually longer-term nature of private sector credit, commercial banks are able to use the matured short term invested funds for private sector credit activities (unless commercial banks choose to roll over the debt) thus explaining the somewhat weak relationship.

Meanwhile, Treasury bonds have a negative (-0.159) and significant (p=0.002) relationship with private sector credit. This implies that a 10% change in the value of absorbed government debt through Treasury bonds leads to a 1.59% reduction in private sector credit thus translating to a crowding out effect. This confirms the study by Yossef (2016) that revealed that Treasury bonds crowded out private investments in the short run in Egypt This suggests that when commercial banks invested their funds in longer dated government securities such as Treasury bonds, these funds were locked in for a long time and were not easily transformed into funds for private sector credit activities. This as well could point to the inefficiencies in the secondary bond market whereby bond investors potentially find it difficult to sell Treasury bonds so as to convert these invested funds into funds necessary for credit extension to the private sector.

Private deposits have a positive (1.281) and highly significant (p=0.000) relationship with private sector credit given that commercial banks transform these deposits to funds for private sector credit activities. This implies that a 10% change in private deposits leads to a 12.80% increase in private sector credit thus translating to a crowding in effect. This is in line with the Ricardian equivalence theorem whereby if the private sector took into account future tax liabilities that are presently implied by increased government debt issues this results in an increase in private savings, thus higher deposits in the period, as taxpayers realize that the tax is merely being postponed (Canto and Rapp, 1982).

The lending rate has a negative (-0.114) relationship with private sector credit implying that a 10% change in the lending rate leads to a 1.14% reduction in private sector credit. This is in line with neoclassical theory as higher interest rates could either discourage potential private sector borrowers or hamper the ability of current private sector borrowers to repay existing loans – in turn dampening private investments (Premchand, 1984). However, this relationship is insignificant (p=0.423) suggesting that borrowers were indifferent to changes in the lending rate given the limited alternatives of financing in the market. This insignificant relationship is in line with the Ricardian Equivalence theorem whereby increase in private savings means that increased government borrowing would not necessarily have an impact on market interest rates (Gale and Orszag, 2004), thus not have an impact on overall lending rates in the market to which are derived from the market interest rates.

Table 4.9. ARDL Short Run Model

ARDL Error Correction Regression
Dependent Variable: D(LOGPSC)
Selected Model: ARDL(2, 0, 2, 2, 0)
Case 2: Restricted Constant and No Trend
Date: 09/09/18 Time: 19:50
Sample: 2001Q1 2017Q4
Included observations: 66

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGPSC(-1))	0.552472	0.088518	6.241342	0.0000
D(LOGTBONDS)	-0.225222	0.043802	-5.141846	0.0000
D(LOGTBONDS(-1))	0.194627	0.042495	4.580000	0.0000
D(LOGPVTDEPOSITS)	0.497093	0.083953	5.921112	0.0000
D(LOGPVTDEPOSITS(-1))	-0.256287	0.114654	-2.235307	0.0295
CointEq(-1)*	-0.361173	0.063378	-5.698765	0.0000
R-squared	0.814367	Mean dependent var		0.014553
Adjusted R-squared	0.798898	S.D. dependent var		0.011358
S.E. of regression	0.005094	Akaike info criterion		-7.635195
Sum squared resid	0.001557	Schwarz criterion		-7.436135
Log likelihood	257.9614	Hannan-Quinn criter.		-7.556537
Durbin-Watson stat	2.111232			

* p-value incompatible with t-Bounds distribution.

The first lag (previous quarter) amount of credit extended to the private sector has a positive (0.552) and highly significant relationship (p=0.000) with the current amount of credit extended to the private sector. This implies that a 10% increase in the previous quarter value of private sector credit leads to a 5.52% increase in the current value of private sector credit.

The current value of Treasury bonds absorbed by the government has a negative (-0.225) and highly significant (p=0.000) relationship with private sector credit. This implies that a 10% increase in funds absorbed through Treasury bonds leads to a 2.25% reduction in private sector credit thus crowding out private sector credit. This could perhaps imply that the government debt absorbed in the present period immediately crowds out private sector credit as commercial banks have their funds tied with the government.

However, the first lag (previous quarter) value of absorbed government debt through Treasury bonds has a positive (0.1946) and highly significant relationship (p=0.000) relationship with private sector credit. This implies that a 10% increase in the value of absorbed government debt through Treasury bonds causes a 1.95% increase in private sector credit thus crowding in private sector credit. This confirms the study by Latif (2006) whereby Treasury bonds did not crowd out private investments but the relationship was integrated. This could imply that the absorbed government debt through Treasury bonds trickles back into the market as the

government makes payments to suppliers who then make deposits to commercial banks and these funds can then be used to fund private sector credit activities.

Private deposits have a positive (0.497) and highly significant (p=0.00) relationship with private sector credit. This implies that a 10% increase in private deposits leads to a 4.97% increase in private sector credit thus crowding in private sector credit. However, the first lag (previous quarter) of private deposits has a negative (-0.256) and significant (p=0.03) relationship with private sector credit. This result may imply that commercial banks would generally use the additional deposits in the previous period to invest in government securities thus crowding out private sector credit.

The cointegration coefficient (CointEq(-1)*) is the speed or pace of adjustment from the short run equilibrium point towards the long run equilibrium point. This is the short run adjustment to long run equilibrium relationship among variable by Error Correction Model (ECM). The coefficient of the cointegration term is negative (-0.361) as required and is highly significant at 5% level. According to Yossef (2016), this is also in line with economic theory that the deviation of the actual growth path of private sector credit from the equilibrium path in the long term has been correction in the next period. This indicates that the deviation from long-term private sector credit is corrected by around 36% (adjustment process speed to equilibrium) which could be considered as relatively slow. Put simply, the model will adjust towards the long run equilibrium, from a short run disturbance by the speed of 36% per quarter.

The R-squared value is used to analyze the fitness of the model. It provides the explanatory power of the model and reveals by how much the variation in the dependent variable is explained by the independent variables. The explanatory power of the ARDL model is reliably good at approximately 81%. This implies that 81% of the total variation in private sector credit is explained by the explanatory variables.

Summary of Findings

The study revealed a unidirectional relationship between the amount of credit extended to the private sector and the amount of government debt absorbed through Treasury bills whereby the causality flows from private sector credit to Treasury bills. This was further supported by the negative and weak relationship between Treasury bill issues and private sector credit over the long run. The study also revealed that Treasury bill issues had no relationship with private sector credit in the short run.

The study disclosed a bidirectional relationship between Treasury bond issues and private sector credit. This implies that the amount of government debt absorbed through Treasury bonds has a significant effect on the amount of credit extended to the private sector, in one hand, while on the other hand, private sector credit significantly affects the amount of government debt absorbed through Treasury bonds. According to the ARDL model, Treasury bond issues had a significant relationship with private sector credit both in the short and in the long run. In the long run, Treasury bonds had a negative relationship with private sector credit as well as in the short run, the current value of Treasury bonds absorbed by the government had a negative relationship with private sector credit. However, the first lag (previous quarter) value of absorbed government debt through Treasury bonds had a positive relationship with private sector credit

The study revealed a unidirectional relationship between the amount of credit extended to the private sector and the amount of private deposits held by commercial banks whereby the causality flows from private deposits to private sector credit. This was further supported by the significant relationship between private deposits and private sector credit as revealed through the ARDL model. In the long run, private deposits have a positive

relationship with private sector credit translating to crowding in effects in line with the Ricardian equivalence theorem. In the short run, the current value of private deposits has a positive relationship with private sector credit further supporting crowing in.

The study revealed no causal relationship was detected between the lending rate and private sector credit and this was further supported by the insignificant relationship as revealed in the ARDL model. In the long run, the lending rate had a negative relationship with private sector credit in line with neoclassical theory as higher interest rates could either discourage potential private sector borrowers or hamper the ability of current private sector borrowers to repay existing loans – in turn dampening private investments (Premchand, 1984). However, this relationship was insignificant in line with the Ricardian Equivalence theorem whereby an increase in private savings meant that increased government borrowing would not necessarily have an impact on market interest rates (Gale and Orszag, 2004), thus not have an impact on overall lending rates in the market to which are derived from the market interest rates.

Conclusion

The negative relationship between Treasury bills and private sector credit translates to potential crowding out effects of Treasury bill issues on private sector credit. However, the weak relationship somewhat suggested that the short term nature of Treasury bills implies that the funds invested by commercial banks in Treasury bills once matured (unless rolled over) could easily be converted to fund necessary for private sector credit activities. This implies that the government should be cautious of increased rolled over maturities as this could have negative implications on the growth of private sector credit in the economy thus overall private investments.

The negative relationship between Treasury bonds and private sector credit suggests that invested funds in longer dated government securities such as Treasury bonds, could not easily be transformed into funds for private sector credit activities, perhaps owing to inefficiencies in the secondary bond market thus crowding out private sector credit and lowering the growth in private investments. However, the first lag (previous quarter) value of absorbed government debt through Treasury bonds had a positive relationship with private sector credit implying that the absorbed government debt through Treasury bonds trickled back into the market as the government made payments to suppliers who then made deposits to commercial banks and these funds could be used to fund private sector credit activities – thus crowding in private sector credit.

The positive and significant relationship between private deposits and private sector credit implies that the private sector takes into account the possible increase in future taxes presently implied by increased government debt issues and absorption thus it will cause them to increase their private savings, thus higher deposits in the period, as taxpayers realize that the tax is merely being postponed (Canto and Rapp, 1982). Additionally, an increase in funds absorbed through Treasury bonds in the previous quarter could increase the present quarter's value of private deposits as the government makes payments to suppliers who then make deposits to commercial banks and these funds could be used to fund private sector credit activities.

In the long run, the negative relationship between lending rates and private sector credit is in line with neoclassical theory as higher interest rates could either discourage potential private sector borrowers or hamper the ability of current private sector borrowers to repay existing loans – in turn dampening private investments (Premchand, 1984). However, the insignificant relationship is in line with the Ricardian Equivalence theorem whereby increase in private savings means that increased government borrowing would not necessarily have

an impact on market interest rates (Gale and Orszag, 2004), thus not have an impact on overall lending rates in the market to which are derived from the market interest rates.

Recommendations

The study suggests that there should be regulatory controls in the way commercial banks choose to invest private deposits in both government securities (Treasury bills and Treasury bonds) and in private sector credit. These controls will establish a balance between the proportion of investment in government securities and the amount of credit extended to the private sector. This is expected to address the competition for commercial bank funds between government securities and private sector credit and aims to counter the phenomenon of 'lazy banking',

In this regard, the following recommendations were made. The study recommends that the absorption of debt through Treasury bills over the long run should be monitored given that commercial banks have the option of continuously rolling over the maturing funds invested in these short term government securities thus crowding out private sector credit.

The study suggests that the government should focus on absorbing more of its debt through Treasury bonds given that it has the potential of crowding in private sector credit. The extent of the crowding in will largely depend on the efficient utilization of funds in infrastructure and development projects that would stimulate domestic consumption thus elevate private investments. The study suggests that the secondary debt market needs to be reviewed and improved so that Treasury bonds are effectively traded and easily converted into funds for private sector credit activities.

Areas of Further Research

The study was unable to evaluate the impact of monetary policy on private sector credit. The study recommends that further research be conducted on the effect of monetary policy through its ability to pacify or exacerbate fiscal policy in Kenya. Effective policy coordination is key in promoting balanced growth in the economy of Kenya.

The study recommends further research to improve the model so as to establish what variables could as well explain the variations in private sector credit given that the short run ARDL only explain 81% if the variation.

The study recommends the use of CPI in the explanatory variables so as to capture the impact of price changes on private sector investments as it would devalue the stock of outstanding debt.

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