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The Relationship between Government Domestic Borrowing from Commercial Banks and Private Sector Credit in Kenya

Camilla Chebet and Samuel Kiemo

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Price Channel versus Quantity Channel? The Relationship between Government Domestic Borrowing from Commercial Banks and Private Sector Credit in Kenya

By Camilla Chebet and Samuel Kiemo*

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Abstract

There has been a long standing debate on the effect of government domestic borrowing from commercial banks by increasing average lending rates, suggesting that increasing government spending financed by the banking sector crowds out private sector credit through price channel. However, empirical studies affirm that the price channel is not observed in developing economies due to financial frictions and financial repression as suggested by McKinnon (1973) and Shaw (1973). This paper aims to contribute to this debate by establishing the relationship between government domestic borrowing from commercial banks and private sector credit, identifying the channel of the crowding-in or crowding-out effect, estimating the magnitude and persistence of the crowding-in or crowding-out effect on private sector credit. The paper uses quarterly and monthly data to capture the dynamics of government borrowing and private sector credit from 1997-2016, applying the Autoregressive Distributed Lag model (ARDL) and impulse response functions. The estimated model confirms that government domestic borrowing from the banking sector crowds out investment as every shilling lend to the government from the banking sector reduces private sector credit by 15 cents. Evidence affirms that crowding out is prevalent via the quantity channel where government borrowing competes with loanable funds that would otherwise be lend to the private sector. Consistent with popular empirical findings, the price channel though present is muted and impulse response functions confirm that crowding out via the quantity channel dissipates within two years. In addition, private sector credit is more stimulative of growth than government borrowing from the banking sector, though transient.

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1.0 Introduction

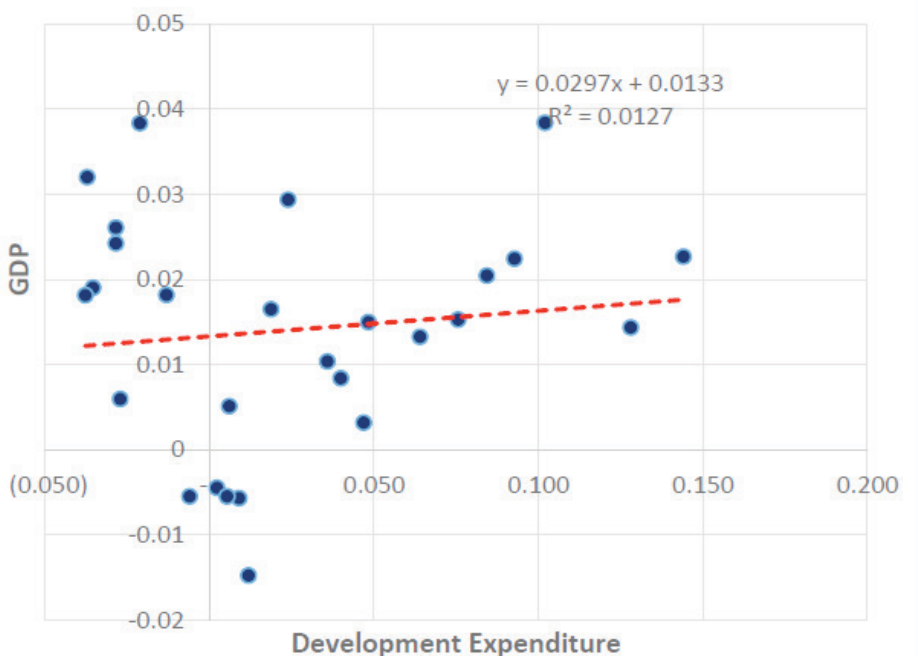
The objective of Kenya's blue print Vision 2030 is to help transform Kenya into a "newly industrializing, middle-income country providing a high quality of life to all its citizens. Delivering the country's ambitious growth aspirations requires active banking sector participation to deliver; a rise of national savings from 17% in 2006 to about 30%; accelerated GDP growth to an annual rate of 10 percent and an overall robust private sector growth.

The general perception is that domestic borrowing by the government of Kenya from the domestic banking sector crowds out private sector credit as evidenced by persistently rising interest rates faced by the private sector that coincide with periods of high government borrowing domestically. In a move to achieve Vision 2030 goals, the government has been gradually shifting its financing sources in favor of more affordable external financing development, to reduce its cost of borrowing. For instance, the government issued the first Eurobond in 2014 to service government obligations and finance development projects. This was followed by borrowing of $1.63 billion from the Exim bank of China to finance Kenya Standard Gauge Railway (SGR) in May 2014.

In Kenya, 68% of public debt is financed domestically where 55% of this domestic public debt was held by the banking sector as at December 2015 in the form of treasury bills and long term government bonds. 32% of the remaining public debt was externally financed primarily in the form of bilateral or multilateral concessional loans. However, external financing can be expensive for a net importing developing country to finance government spending, in addition to servicing government external debt obligations in a volatile exchange rate market that poses exchange rate risk. In developing countries

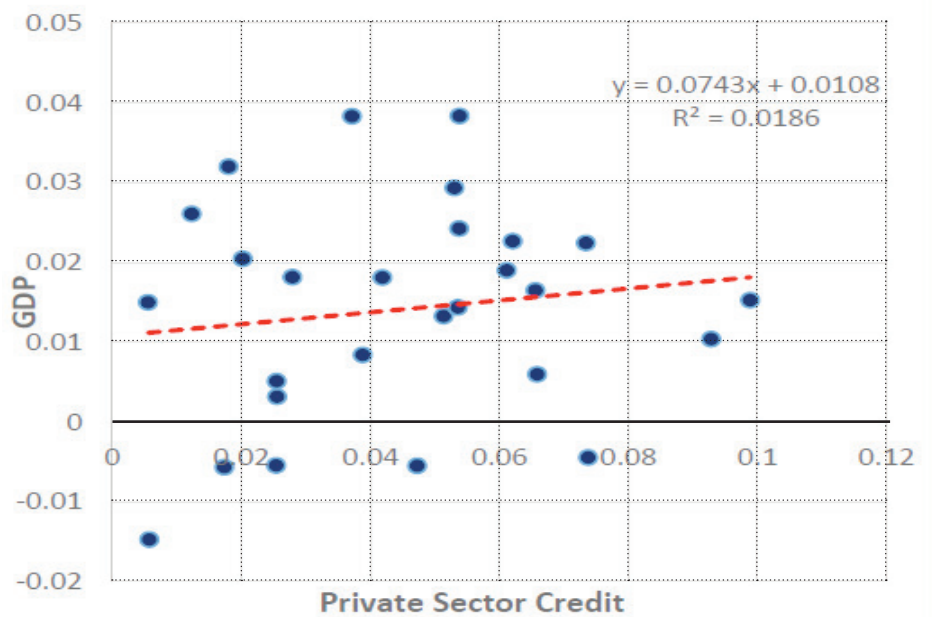
such as Kenya, a large proportion of government spending is purposed for infrastructure and development investments that have been suggested to be preconditions for robust sustainable long term economic growth. Data analysis on government development expenditure and GDP growth over the period 2009 to 2016 illustrates a positive relationship though weak giving credence to this premise (**Chart 1**). However, research suggests that in economies where financial repression is present, government debt may supersede financial markets function of credit provision resulting in a crowding out effect. Similar analysis relating private sector credit to GDP over the period 2009 to 2016 confirms a positive link of a greater magnitude relative to that of development government expenditure (**Chart 2**). Banking industry assets accounted for 67% of GDP as at December 2015.

Chart 1: Government Development Expenditure and GDP Growth Rate 2009-2016



Source: Central Bank of Kenya

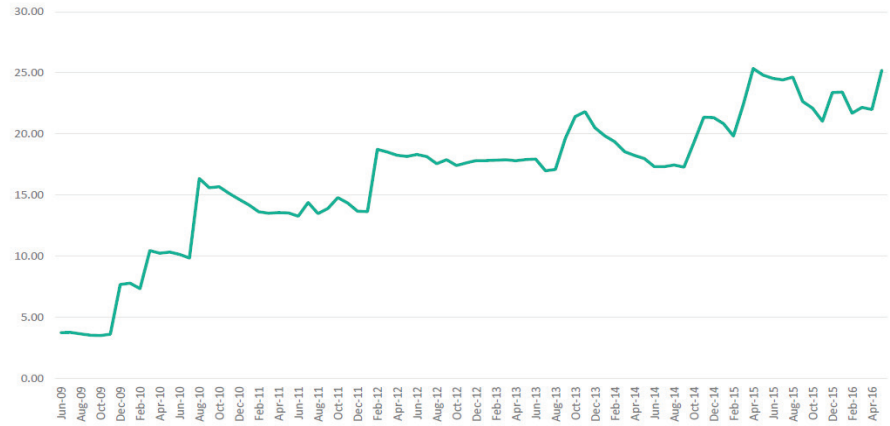
Chart 2: Private Sector Credit and GDP Growth Rate 2009-2016



Source: Central Bank of Kenya

Empirically, there is mixed evidence of the effect of government spending on growth, particularly in the context of developing countries. Barro (1990) using a Cobb-Douglas function affirms that an expansionary fiscal policy via an increase in government expenditure stimulates growth. Barro & Sulla-i-Martin (1992) go further to show that government spending has an impact on the direction of economic growth. Aschauer (1989) suggests that government spending is stimulative of growth as long as the expenditure funds infrastructural projects. Disaggregated data on holdings of government bonds by commercial banks illustrate that government infrastructural bonds held by banks account for only about 25% of total government bonds in its portfolio (**chart 3**). This may indicate that majority of government spending financed by the banking sector is to fund recurrent expenditure instead of growth hence is more likely to lead to crowding out (**chart 3**).

Chart 3: Proportion of Government Infrastructure Bonds to Total Government Bonds held by the Banking Sector 2009-2016



Source: Central Bank of Kenya

Discovering the most appropriate and efficient fiscal policy as it relates to government domestic borrowing is paramount for Kenya long-term economic growth. This discovery is hinged on the causal relationship between commercial bank credit to government and private sector credit. This paper aims to disentangle the effect of commercial bank credit to government on private sector credit in the following ways:

i) Examining the relationship between government domestic borrowing and private sector credit,

ii) Investigating the extent of crowding in/out of private sector credit

iii) Identifying the channel through which the crowding in/out occurs

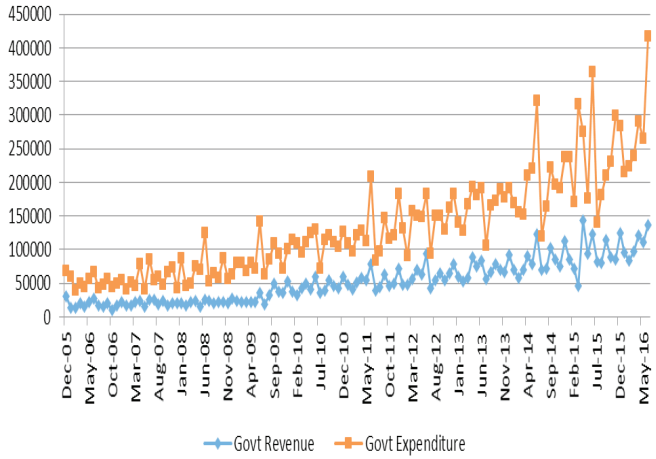
iv) Estimating the persistence of this effect.

The rest of the paper is organized as follows: section 2 provides a background analysis on the relationship between government domestic borrowing from commercial banks and private sector credit, section 3 reviews the theoretical and empirical literature, section 4 outlines the data and methodology to be used, section 5 presents results and findings while section 6 concludes with areas for further research.

2.0 Analysis of Government Domestic Borrowing and Private Sector Credit Indicators

Domestic government borrowing from commercial banks in Kenya is defined as net claims on government net of government deposits. Net claims on government by the central government incurred domestically through borrowing in the local currency from commercial banks comprises of government securities and advances from commercial banks. Government securities comprise Treasury bills, Treasury bonds and long-term stocks.

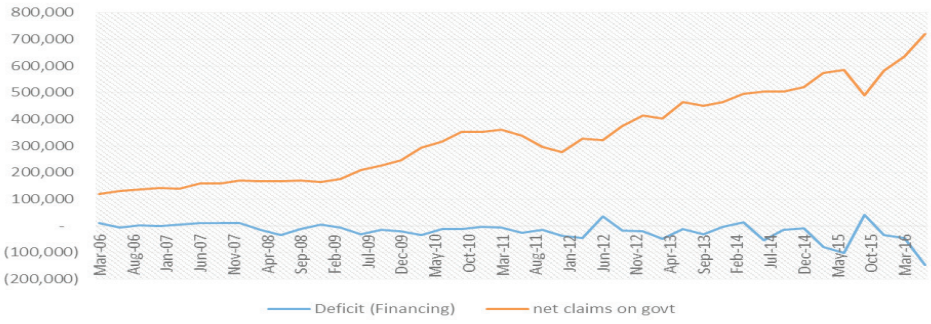
Chart 4: Government Revenue and Government Expenditure, 2006-2016



The main sources of government revenue are taxation and import duty. Due to approximately 15% of the population employed in formal non-farming employment contributing to tax revenue, the tax revenue has been increasing at a constant rate while government expenditure has been rising to fund development projects that are pivotal to Kenya's growth and development. (Economic Survey, 2016).As the gap between the government expenditure rises while government revenue remains constant, the budget deficit rises and is funded primarily from the domestic market (**chart 4)**. The banking industry has been the largest holder of government debt through holding of approximately 60% of government Treasury bills and 56% of Treasury bonds as at the first quarter of 2016. The banking industry's plays the key role of mobilizing deposits and savings and allocating deposits and domestic savings towards investment while managing risk of these large development projects (Shumpeter, 1911). King and Levine (1993), and Levine (1997) highlight an important positive link between the level of initial financial development measured by gross claims on the private sector to GDP and long run economic growth through increase in investment (capital accumulation), hence the more money banks lend to the private sector the higher the level of investment and thus long run growth through the investment-growth nexus.

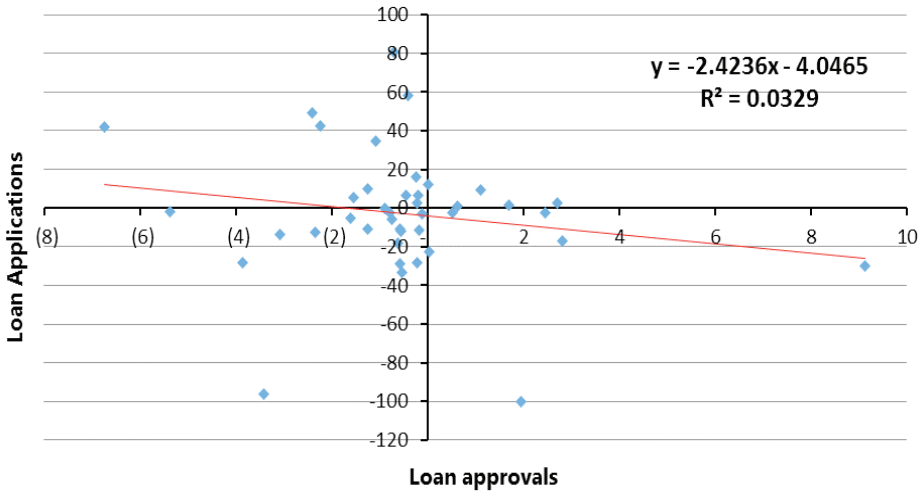
As the government finances the budget deficit through borrowing domestically and externally, this implies that when the budget deficit increases, the government has to borrow more domestically or externally. Due to the volatility of foreign exchange market, and in averting currency risk, the government is more likely to borrow domestically. It's therefore expected that periods of higher budget deficit will coincide with periods of higher government borrowing from the banking sector. As shown below in **chart 5**, net claims on government have been increasing as the deficit has been deepening.

Chart 5: Trend of budget deficit and government borrowing from banks (Ksh. Bns)



Source: Central Bank of Kenya

Chart 6: Analysis of loans applications and loan approvals



Source: Central Bank of Kenya

There is a general inverse association between budget deficits and loan approvals. Periods of high deficits coincide with periods of lower credit supply evidenced by lower levels of loan approvals. Therefore this poses an element of crowding out as banks finance the government deficit (**chart 6**).

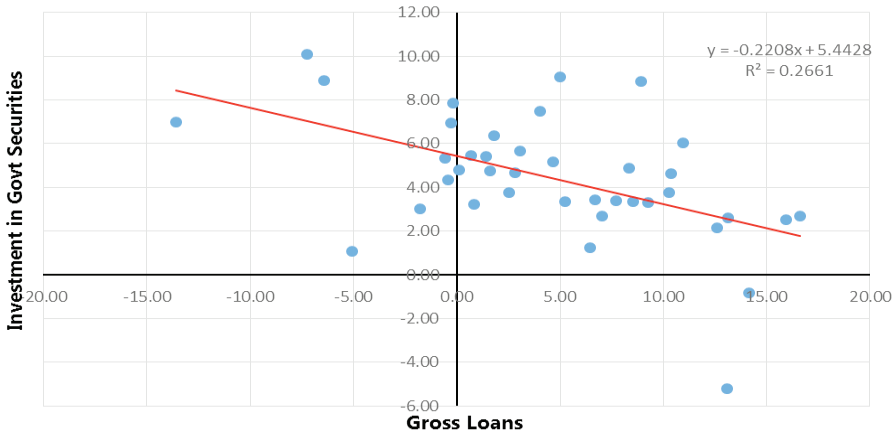
Banks will invest in a project with the highest rate of return so in the event where short term Treasury bills have a higher rate of return than loans to the private sector. Banks are more likely to lend to government through purchase of Treasury bills and less to the private sector. Moreover, due to the short maturity of Treasury bills vis-à-vis loans to the private sector banks face a lower risk of default. Lending to the Government through the purchase of Short term Treasury bills ranging from three (3) to six (6) months has been a more attractive investment to the banks than issuing an overdraft and short term loan to the private sector. This preference can be seen during periods where the government has a transient deficit through an increase in government spending via supplementary budgets.

According to economic fundamentals, banks are expected to have a greater affinity to lend to the private sector rather than investing in long term treasury bonds due to Kenya's underdeveloped secondary debt market,

high interest rates and hence low yields on bonds. However, due to legislation that classifies long-term government bonds as liquid instruments banks are incentivised to lend to government instead of the private sector. Furthermore, due to few investment instrument options, banks hold long term government bonds at equal or at times larger proportions to their loan book, resulting in a crowding out of private sector credit as the money that banks lend to the government would have been lend to the private sector.

Commercial banks funding sources include deposit and interbank liabilities, of which deposit liabilities account for approximately 71% of total banks funding liabilities as at June 2016. Banks therefore have limited funding that is mutually exclusive hence they have to make the decision on whether to allocate their liabilities to fund the loan book or fund investment. According to economic theory, a private agent will allocate scarce resources to maximize profits. Bank profits can be maximized through reducing cost or increasing the return, where the cost here is the risk on the loan or the investment and the return is the interest income to be received from the loan or investment. Therefore when banks invest one unit into purchasing government securities, the banks will have one less unit to lend to the private sector. This in essence is crowding out through the quantity channel. Therefore it's expected that an immediate inverse relationship between government borrowing from the commercial banks and private sector credit from the commercial banks on an aggregate level. A scatter plot of gross loans and investment in government securities reveals a negative relationship between private sector credit proxied by gross loans and net claims on government proxied by investment in government securities (**Chart 7**).

Chart 7: Investment in Government Securities and Gross Loans, 2006 Q1-2016 Q2



Source: Central Bank of Kenya

According to the views of David and Scadding (1974) public investment and private investment are near perfect substitutes. Some may argue that banks' lending to government may result in an overall crowding in effect as banks are financing government deficit arising from public investment of large infrastructure development projects that would not have been undertaken by the private sector due to lack of demand for credit for such investments. According to the IS-LM model, there would a substitution effect in the short run and in the long run an income effect as income would increase as future consumption increases due to an increase in investment that shifts the aggregate demand curve to the right. Data may support this by illustrating a uni-direction relationship between GDP and debt that runs from GDP to debt, illustrating the need for an initial level of GDP growth to allow for debt to be issued. This may be the situation in Kenya, particularly for private sector, where there may not be adequate demand from the private sector to fund such projects profitably and with relatively little risk. However, this is yet to be substantiated.

Nonetheless, the classification of long term government bonds as liquid instruments by the Central Bank of Kenya and the limited investment instruments available to banks create the financial repression where financial markets have been liberalized yet government interventions have a significant impact on financial markets (McKinnon (1973); Shaw(1973)). Financial repression through crowding out exacerbates potential limited demand for credit to fund large infrastructure projects and distorts the credit demand supply relationship and potentially the optimal allocation of credit and capital accumulation to support both financial and economic development in Kenya.

3.0 Theoretical and empirical literature

Crowding-in is a situation where expansionary fiscal policy, in this context government domestic debt stimulates economic activity through increasing capital accumulation over time, based on the investment-growth nexus.

However, crowding-out occurs when the same government domestic debt hinders an increase in economic activity by limiting capital accumulation through reduction in capital financing by commercial banks. The crowding out effect of government spending on private investment shows itself either directly or indirectly. Indirect crowding out takes place through an increase in interest rates and prices, but direct crowding out occurs with the reduction of the physical resources available to the private sector (Bailey 1971). Crowding-out is likely to be observed on a bank's balance sheet; if the government borrows one dollar more from the banking sector, the banks are left with one dollar less for the private sector. The banks, however, respond to a higher government borrowing by adjusting their loan portfolio optimally given the risk-return characteristics of different assets and liabilities. The degree of crowding-out/-in depends on the nature of the endogenous response of the banks to a higher government borrowing (Şen and Kaya 2013).

There are alternative models of bank behavior in the literature. Some argue that the access to safe government assets allows the banks to take more risk and thus increase their lending to the private sector (risk diversification model) leading to crowding-in effect. This model may be dependent on use or application of macro-prudential policy that may affect their risk diversification policy. The alternative hypothesis is that it may create moral hazard and thus discourage the banks from lending to the risky private

sector, and stifle their incentives to seek out new profitable investment opportunities in the private sector (lazy bank model) hence leading to crowding-out. However since, the banking sector is made of banks with diverse business models that influence their behavior, it would be erroneous to assume the lazy bank model as the prevailing model as the effect of some banks holding significantly large proportion of government debt is likely to be offset by banks with a different portfolio composition.

Neo-classists assume rationality in decision making, optimization of maximum utility by households and profits by firms, and clearing of markets with no price rigidity. Based on the neo-classical assumptions, private sector investment is negatively affected by changes in government domestic debt that is viewed to be in competition with the private sector for scarce loanable funds available in the economy. An increase in government expenditure financed by changes in domestic borrowing tends to decrease the ability of the private sector to access funds for investment (Barro 1997, Christensen 2005). The Neo-classical theory posits that crowding-out of private investment by government domestic borrowing occurs when the government decides to increase its spending. In terms of crowding in/out assuming that the slope of the Liquidity preference – Money supply (LM) curve is partially interest elastic and becomes partially interest inelastic as result of the expansionary fiscal policy, there would be a price channel of crowding out.

Contrastingly, Keynes (1929) assumes that the real economy has inertia and responds to changes slowly over time, thus the sensitivity of investment to interest rates changes is minimal in the short run. This theory introduces the element of a dynamic relationship between government debt and private investment. Keynesians believe that governments are justified to stimulate economic growth through the use of deficit, causing an expansionary fiscal policy based on assumption that the economy is not at full employment level and that the interest rate sensitivity of investment is low. In such a situation, increased government spending causes minimal increase in the interest rate whilst increasing output and income. Keynesian Theory suggests a crowding-in effect with a positive fiscal multiplier that increases the real interest rate and output assuming a non-vertical LM curve. According to this theory, an increase in government spending has an ambiguous effect on private sector credit through the Price and Quantity channels as it is dependent on the monetary and fiscal policy multipliers on income which is ultimately dependent on the elasticity of money demand to interest changes and the interest elasticity of investment.

However, David Ricardo (1919) suggests that there is no relationship between government debt and private investment as they are considered to behave independently from each other assuming no wealth effect as is the case in Kenya. The premise for this view is based on expectation theory similar to the neo-classical view, that an increase in government

spending is anticipated to be accompanied by a rise in taxes in the future, hence interest rates and private investment will remain unchanged as economic agents realize that their income would be taxed in the future, and hence, they do not alter their current savings and consumption level (Arestis 2011).

Quantity Channel versus the Price Channel

According to Keynes (1970), the crowding-out hypothesis maintains that if prices are held constant, as in the typical Investment Saving – Liquidity Preference (IS-LM) fashion, an increase in real government demand financed by real taxes or debt has no lasting effect on real income. Alternatively, crowding out implies that an increase in Government spending, given flexible prices and a constant money supply, has no lasting effect on nominal income, meaning the steady state government spending multiplier, under the above conditions, is approximately zero that is, government demand may crowd out exactly the same amount of private demand, more or less.

Interest rates serve the important function of signaling markets on efficient allocation of capital by channeling scarce money to the investments with the highest rates of return and thus encouraging savings and investments that promote growth. A variety of theories on interest determination have been developed including the classical theory, the liquidity preference theory, the loanable funds and the rational expectations theory, each with its benefits and setbacks. However, the most popular and widely accepted theory that has long driven policy is the loanable funds theory.

According to the classical theory, the interest rate is a function of the supply of savings mainly from the household and the demand for capital/investments primarily by firms. The supply of household savings is determined by higher interest rates that increase the marginal propensity to save, firms increase savings as their profits increase and government surpluses increase public savings. On the other hand, demand for investment is driven by higher rates of internal returns of the investment and inversely related to the interest rate which is the cost of capital pricing investment. The intersection of the supply of savings and demand for investable funds forms the interest rate. However as other things can affect the interest rates that are unrelated to supply or demand the liquidity preference for money theory was developed.

The liquidity preference of money assumes that supply and demand for money sets the equilibrium interest rate, where the demand for money includes demand for transactions, precautionary and speculative motives and supply of money is fixed. The liquidity preference of money only holds in the short term, its assumptions that income instability do not hold are not realistic and it does not explain the demand and supply of credit. The loanable funds theory emerged as a popular and widely accepted interest rate theory as it alleviates the deficiency of the liquidity preference theory by explaining the relationship between money, credit and interest rates.

The loanable funds theory distinguishes the risk-free interest as the prevailing interest rate and a function of demand for money and the supply of savings/deposits of the various economic agents (households, government, firms and foreigners). Demand for money/credit is described as interest inelastic for households and government and relatively interest elastic for firms and foreign demand. Supply of savings/deposits from households is a function of income, the marginal propensity to save, income and wealth effects, while supply from firms is from deposits of excess money and credit creation by the banking industry. Interest rates are therefore a function of an efficient clearing of different financial markets that include money market, loanable funds market and foreign market, hence any of these markets can influence interest rates.

Empirical literature

Andersen and Jordan (1989) estimated what is popularly termed as the St. Louis equation to investigate the effect of federal spending on the GNP on the US economy. In their investigation crowding out is defined as an expansionary fiscal policy that does not stimulate economic activity measured as the Gross National Product. Their investigation finds a nominal crowding out as federal spending financed by either borrowing or taxes has a minimal positive effect on the GNP of the U.S. economy in the short run that is offset in the long run by a negative effect on the U.S. GNP. The policy implication of the Andersen-Jordan equation that monetary policy has greater effect on nominal income relative to fiscal policy caused great controversy. Blanchard's (2007) investigation on the effect of government debt on interest rates finds relatively weak evidence of crowding-out.

Friedman (1972) asserts that crowding out does not necessitate a zero fiscal multiplier but it is rather the financing of the fiscal deficit that causes crowding out. Blinder and Solow (1973) bring to the fore the matter of expansionary fiscal policy that is not supported by new issues of money which requires bond issuance that raises the interest rates in financial markets by competing with private debt instruments. The higher interest rate reduces interest elastic private investment. They argue that ultimately, the fiscal multiplier will be zero and lower than the monetary multiplier, hence, the lower level of private investment as result of higher interest rates will offset the increased government spending. David and Scadding (1974) in an investigation of gross national savings to gross national product as a consequence of ultra-rationality of the private consumers, affirms crowding out and concludes that fiscal policy has no effect on aggregate demand and does not affect the marginal propensity to invest. Friedman (1970) asserts that monetary actions have a greater effect relative to fiscal actions and goes further to state that expansionary fiscal policy results in minimal effect on output and as a result a minor crowding out effect.

Rasche (1973) extends the theoretical IS-LM framework and distinguishes between real and nominal crowding out. According to Rasche (1973), an increase in government spending increases aggregate demand and commodity prices hence is inflationary. This increased government spending shifts the IS curve to the right by a large proportion increasing output and pushing the price level further up. The upward pressure on the price level results in a shift of the LM curve upward as the higher price level contracts money supply, this ultimately results in a smaller shift of the IS curve to the left as consumption, and investment falls and the price level declines to lower level.

Buiter (1977) defines crowding out by distinguishing direct and indirect crowding out and short run and long run crowding out. He defines short run crowding out theoretically when the LM curve is interest inelastic or the IS curve is interest inelastic such that changes in government spending have no effect on income and output. Another perspective on short run crowding out is in the event that the government spending multiplier is less than one though positive. Crowding out of private investment as a result of higher interest rates due to the upward shift of the IS curve following an increase in government spending can be considered a short run crowding out effect and partial where government borrowing and private sector credit are competing for limited loanable funds.

In developing countries, interest rate determination is affected as financial markets do not clear due to financial repression. McKinnon (1973) and Shaw (1973) define financial repression as government regulations and interventions that limit competition and hinder proper functioning of markets by distorting allocation of capital and thus affecting determination of interest rates. Blinder and Solow (1973) prove that an expansionary fiscal policy result in high interest rates as a consequence of net wealth effects via an upward shift of the LM curve as the demand for bonds instead of money increases in a simple IS-LM framework assuming wealth effects. Fromm and Klein (1973) found that the crowding out occurred to an increase in the price level, increasing interest rates among other factors that include capacity constraints when the economy is at full employment. Brunner and Meltzer (1972) assume that credit markets clear and adjust more quickly than output markets and that the interest rate is the set by market clearing and they therefore argue that expansionary fiscal spending increase interest rates.

Woodford (2001) suggests that fiscal policy affects interest rate determination and has a role to play in maintaining price stability within central banks. Baldacci, Hillman & Kojo (2003) posits that investment is likely to be interest inelastic due to financial repression and underdeveloped financial markets, therefore the effects of fiscal policy may not be observed via an increase in interest rates. Ngugi (2001) highlights inflationary pressure and a contractionary monetary policy in Kenya during the late 1970s and

early 1980s as a result of rising treasury bills during the periods where a large proportion of government deficits were financed domestically. Ngugi's (2001) findings imply a crowding effect of expansionary fiscal policy on interest rates, in the short term and possibly in the long term due to inflationary pressure. Ngugi (2001) indicates a difficulty in monetary policy effectiveness due to expansionary fiscal policy in the 1980's following the global oil price shocks suggesting a link between the Treasury bill interest rates and the market rates in the economy stemming from the expansionary fiscal policy and an element of fiscal dominance in the Kenyan economy, where fiscal policy has a greater effect on interest rates relative to monetary policy. By the early 1990's rising interest rates were directly attributed to deficit financing to support the expansionary fiscal policy by the Kenyan government. Friedman (1972) suggests a loss of market confidence as a result of an expansionary policy. According to the loanable funds theory, a loss in market confidence in finance markets will increase interest rates due to a reducing the supply of loanable funds.

Ngugi (2001) provides evidence of this in the Kenyan economy during periods of expansionary fiscal policy followed interest rate liberalization, the money multiplier increased despite a contractionary monetary policy stance. It has been observed currently in Kenya that during periods where the government faces a deficit and borrows domestically Treasury bill rates tend to increase above their historical average or their three-month moving average. A notable period was during the third quarter of 2015 where the 91-day Treasury bill rate increased to 21.9% over a period of 9 days. Despite the linkages between the short term interest rates;- the 91-day Treasury bill rate and the commercial bank lending rates, the rapid increase in the 91-day Treasury bill rate dissipated and did not translate to the long term commercial bank lending rates as expected. Therefore it's expected that crowding out through the price channel as the lending rate which is a function of the risk free 91-day Treasury bill will increase as the fiscal deficit widens. Consequently inflation will increase.

Studies on the crowding in/out effect in developing economies such as Emran *et al*. (2009) find that for every $1 that the government borrows from the banking industry, private sector credit falls unproportionately by $1.40. Barro (1997) and Maana *et al*., (2008) find that in liberalized developing economies with less developed credit markets, availability of credit may be constrained by various factors instead of market clearing thus it is expected that it may not be possible to observe this effect of government debt on private investment via rising interest rates. Moreover, the central bank's actions in stabilizing macroeconomic prices may dampen this effect, hence it is important to take into account the actions of the central bank, *inter alia* in this analysis.

In an investigation on the crowding out effect in Sub-Saharan Africa, Christensen (2005) finds evidence

of domestic government debt crowding out private sector credit using a panel data set of 27 countries over the period 1986-2000. In an effort to aver Christensen (2005) results in the context of Kenya's financial sector, Maana et.al (2008) applying Generalized Method of Moments on annual times series data over the period 1996-2006 on the Barro growth model analytical framework, finds no evidence of government domestic debt crowding out private sector credit but report a positive but insignificant crowding in effect of a growing government domestic debt on economic growth. The contradictory findings between Maana et.al (2008) and Christensen (2005) despite both investigating the quantity channel of crowding in/out may be attributed to different domestic debt structural changes, low frequency data, changes in the financial sector between the two time periods, the financial and macroeconomic reforms affecting the diversity of the investor base between the two time series, use of a shorter sample in the former causing large variance in errors and low financial depth between these periods.

4.0 Methodology

This research paper reconciles the differences in Maana et.al (2008) and Christensen (2005) research by ameliorating the challenges faced by the previous empirical work in this area.

Firstly, this investigation utilizes data based on the frequency of government cash flows that occur on either monthly or quarterly basis, thus this investigation utilizes a relatively larger sample composed of monthly data ranging from 1997-2016 to investigate the price channel and quarterly data over the same period to investigate the quantity channel. The time period selected covers the time at which both empirical works were undertaken and should enrich the analysis by tracking the evolution of the financial sector prior and post financial and economic reforms to account for any changes to the government borrowing programme, and private sector credit occasioned by the consequences of the reforms that may have altered the relationship between government domestic borrowing from the banking sector and private sector credit. An agnostic investigation is carried out, in terms of hypothesis of the crowding out/in and channels through which this can be observed.

Data utilized in this investigation covers the period from June 1997 to June 2016. This period was selected to reflect the government borrowing programme that runs from June to July of the next year which is also the government fiscal year. Although, the government's borrowing programme runs on a monthly cycle, and the government holds auctions once a week, quarters were selected as the unit of time in this investigation as the shortest government borrowing instrument, the 91-day Treasury bill has a term of 3 months.

To assess the long run relationship between government domestic borrowing from the banking sector and private sector credit, this investigation applies the Autoregressive Distributed Lag (ADRL) model. This model enables us to correct for any correlation between independent variables in (Kenya National Bureau of Statistics, 2016)the model leading to endogeneity and account for potential cointegration and multicollinearity. The optimal lag is selected using the ARDL model's two information criteria of lag selection. This investigation also applies the Vector Autoregressive (VAR) model to capture the evolution of these variables over time through impulse response function to model the contemporaneous correlations between government domestic borrowing, private sector credit and monetary policy variable using the Cholesky decomposition.

The main variables used in this analysis are private sector credit and lending rate as the dependent variables, respectively government domestic borrowing as a regressor, nominal GDP, broad money supply (M3), the nominal lending rate, and the 91 day Treasury bill rate as control variables for the quantity channel. To investigate the price channel, the commercial bank average lending rate is the dependent variable, while the regressors are treasury bills rate, net claims on government and the control variables include, the interbank rate, the policy rate (cbr), inflation and broad money supply (M3).

The Autoregressive Distributed Lag Model

This investigation will utilize the Autoregressive Distributed Lag model developed by Pesaran and Pesaran (1997); and Pesaran *et al*. (2001). The ARDL model is preferred due to its usefulness in capturing the dynamic temporary and permanent effects of regressors on the dependent variable simultaneously, whether the variables are stationary or non-stationary as long as the order of integration is not greater than 1. The autoregressive component of the model, that is using lagged values of the regressors and independent variables to lags p, q is a desirable quality of the model as it reduces autocorrelation in the model thus yielding unbiased estimates of coefficients. The ARDL model can therefore be run in ordinary least squares as it meets the Gauss-Markov 'blue' assumption of consistency. The model corrects the problem of multicollinearity between a regressor and its lag, and a regressor that is significantly correlated with the dependent variable as a result of having similar components. The ARDL model to be estimated in this investigation includes lags of both the dependent variable and the regressors. In order to identify the most appropriate lag, a simple VAR is estimated and the lag criteria table is used. The model is also estimated in Eviews 9 using a built in estimation command to verify that the model with the most appropriate lag is selected. This paper utilizes the autoregressive distributed lag (ARDL) model as specified as assuming

$$\emptyset\,(L)y = \delta + \beta(L)x_t + \mu_t \quad \text{.....(1)}$$

errors are normally distributed as $e_t \sim IID(0,\sigma^2)$, where the dependent variable are private sector credit and lending rate, respectively while the regressors include net claims on government, inflation, nominal lending rate, the 91-day Treasury bill rate and broad money supply (M3).

The Vector Autoregressive (VAR) Model

The vector autoregressive model developed by Sims (1980) assumes stationarity of all the variables. The VAR model allows for the estimation of multiple equations simultaneously and derivation of some useful information through the impulse response of the variables given a shock in one of the variables. In addition, the model enables running of a variance decomposition. The model enables tracking of the quantity and price channel effects of the expansionary fiscal policy through a shock to net claims on government. Based on the impulse responses of other variables and the variance decomposition, the model reveals which channel, whether price or quantity is affected and the magnitude of the effect given a shock in net claims on government.

5.0 Results & Analysis

The Quantity Channel

In the quantity equation, the estimated model test for the serial correlation using the Breusch-Godfrey serial correlation LM test concludes no presence of serial correlation. A correlogram statistic at levels and first differences confirm that all the regressors and the dependent variable are stationary at levels or after first differencing. A formal unit root test run using the ADF test confirms that no variable is integrated of more than order (I).

Table 1: Table of Results

	Equation 1 Quantity: Private Sector Credit		Equation 2 Price: Nominal Lending rate	
Intercept	0.0029	(0.1643)	-0.0852	(-1.1817)
DLog(Private Sector Credit (-1))	0.0944	(1.0286)		
DLog(Net Claims on Govt (-1))	-0.1526	(-5.6677)**	0.1402	(0.3476)
D(Inflation rate (-1))	0.0010	(4.4906)**	0.0008	(0.4879)
D(Nominal Lending rate (-1))	-0.0123	(-4.0633)**	-0.1212	(-1.5425)
DLog(M3)	0.6095	(4.7121)**		
Private Sector Credit (-1)	-2.42E-09	(-1.6211)		
Net Claims on Government (-1)	9.32E-09	(1.4866)		
Inflation (-1)	7.17E-05	(1.9938)*	0.000434	(0.8175)
Log(M3 (-1))	0.0134	(2.9532)**		
91-day Treasury Bill rate (-1)	0.0002	(2.5949)*	0.0008	(0.7359)

	Equation 1 Quantity: Private Sector Credit		Equation 2 Price: Nominal Lending rate	
D(Nominal Lending rate(-2))			-0.0301	(-0.3857)
D(Nominal Lending rate(-3))			0.1187	(1.5559)
D(91-day Treasury Bill rate (-2))			0.0284	(2.0823)*
D(Interbank rate (-1))			0.0006	(0.6630)
D(Interbank rate (-2))			0.0030	(3.5230)**
D(CBR(-1))			0.0152	(4.7119)**
CBR(-1)			0.0039	(2.4489)*
Log(Net Claims on Government(-1))			0.0107	(1.4513)
Nominal Lending rate(-1)			-0.0060	(-2.3239)*
Obs.	69		120	
R-Squared Statistic	0.799		0.563	
Adj. R-Squared Statistic	0.761		0.505	
DW Statistic	1.840		1.940	
Wald F- Statistic (6,57)	4.055a			
Wald F- Statistic (5,501)	2.317b			
Pesaran F- Critical (6,no trend,unres) Lower bound	2.45			
Pesaran F- Critical (6,no trend,unres) Upper bound	3.61			
Pesaran F- Critical (5,no trend,unres) Lower bound			2.62	
Pesaran F- Critical (5,no trend,unres) Upper bound			3.79	

* Is significant at the 10% significance level, ** Is significant at the 5% significance level and *** Is significant at the 1% significance level

Before undertaking the Bounds test on the ARDL model, the CUSUM test is done and confirmed that the model is dynamically stable. The bounds test is conducted by running the Wald test to obtain the F-statistic and the number of regressors. The Wald test F-statistic and the number of regressors in level was compared with the F-critical value from the Pesaran F-test table assuming no trend and an unrestricted constant coefficient. The lower and upper bounds of the F-Critical Value for an unrestricted constant with no trend and a model with six (6) regressors are 2.45 and 3.61 at the 5% level of significance. The F-Statistic obtained from the Wald test is 4.06. As the Wald F-Statistic is greater than the upper F-Critical Value of the Pesaran Table, it can be inferred that a long run relationship in the regressors in level at the 5% level of significance. The beta coefficient of net claims on government infers an inverse relationship between net claims on government and private sector as was expected. Specifically, when banks lend one Kenyan Shilling to the government, banks can only lend 85 cents to the private sector in the short run. This result is significant at the 1% significance level. The beta coefficient of the nominal lending rate indicates a negative effect of a higher nominal lending rate on private sector credit. As expected, when the nominal lending rate rises, it becomes more expensive for borrowers to borrow, hence, there is likely to be less demand for credit during periods of relatively higher nominal interest rates. On the other hand, the negative effect of the nominal lending rate is a lagged effect, where private sector credit contracts one quarter after the nominal lending rate. This effect is significant at the 1% significance level and of a lower magnitude than that of government borrowing.

Contrastingly, the crowding out effect of government borrowing occurs immediately without a lag. According to the Keynesian assumption of price stickiness, the negative relationship between private sector credit and the nominal lending rate may be evidence of a crowding out effect via the price channel as it may take up to one quarter for borrowers to feel the impact of higher nominal lending rate and thus take time before changing their demand for credit. The growth of money supply is expected to be positively associated with the private sector credit as private sector credit is a component of money supply, this positive association between the two is realized. Surprisingly, there is a minimal positive lagged effect of inflation on private sector credit which may be interpreted as statistically insignificant implying no inflationary pressure from crowding out.

In the long run, as indicated by the lagged coefficient of net claims on government at level, there is a positive relationship between net claims on government and private sector credit but this result is not significantly different from zero. The negative relationship between net claims on government and private sector credit indicates a crowding out effect only in the short run as described by Buiter (1977). In the long-run, net claims on government does not have an effect on private sector credit. The crowding out in the short

run is significant after controlling for the effect of inflation, the nominal lending rate, and the growth of money supply. In the long run, private sector credit is explained marginally by the growth of money supply as inflation, interest rates and government borrowing from the commercial banks do not have any effect on private sector credit. These results are in line with those of Carlson and Spencer (1975) who find that crowding out occurs over the current quarter and the subsequent one but the crowding out effects are offset and dissipate over a year. The results are also comparable with other studies on crowding out (Andersen and Jordan (1989); Emran *et al*., (2009); Christensen (2005)

The Price Channel

Similar to the quantity equation, the price model did not show any evidence of serial correlation using the correllogram and the serial correlation LM test. The Durbin Watson statistic was close to 2 which confirms no serial correlation. Although the financial series such as the interest rates showed evidence of fatter tails, estimation of an ARCH model and comparison with the ARDL model revealed that the ARDL model was the better model to estimate the price channel model based on the AIC criterion and standard errors. The normal distribution of errors i.e. no serial correlation, ARDL and the VAR model later estimated and the Ramsey RESET test confirm that the price channel has been estimated correctly. In addition, the model is dynamically stable according to the CUSUM test results. The Wald test statistic of 7.15 with 7 regressors for an estimation with no trend and an unrestricted constant, compared with the Pesaran critical values of 2.32 and 3.50 for lower and upper bounds, the bound test confirms a long run relationship between the lending rate, inflation, the policy rate, and net claims on government, however, the coefficients of inflation, net claims on government and the 91-day Treasury bill rate are not statistically significant. Only the policy rate is significant.

From the estimation, it can be inferred that a crowding out effect from the positive relationship between net claims on government and the 91-day Treasury bill rate that is significant at the 5% significance level. A similar positive relationship is found between net claims on government and the lending rate, though not significant at the 5% or 10% significance level. The paper concludes that a 1% increase of net claims on government increases the short-term rate marginally by 0.02%. Possibly through the monetary policy transmission channel a 1% increase in net claims on government increases the lending rate by 12%, though this is not statistically significant at the 5% and 10% level. In addition, this crowding out effect from both the short-term rate and the lending rate is only observed in the short run as in the long run the crowding out is not significant. Crowding out from the price channel is not observable through the lending rates. This is expected due to the underlying issues of asymmetric monetary policy transmission, elements of financial repression/fiscal dominance that

prevent markets from clearing. Research shows that when monetary policy multipliers are greater than the fiscal multiplier, crowding out may occur as fiscal multipliers have no effect on long term growth, which is common for economies with a relatively inelastic IS curve. Intuitively, when government borrows from commercial banks, government domestic debt is in competition with scare loanable funds, this may create a tight liquidity situation for banks. During such a period the central bank may intervene through reverse repos to inject liquidity into the market. This action may dampen any crowding out effect particularly from the price channel as injecting liquidity would reduce interest rates to a lower level. In an economy with a greater monetary multiplier, a small injection may reduce interest rates by more than the increase from the expansionary fiscal policy thus offsetting the crowding out effect from the price channel completely.

Summary of Findings

The ARDL model confirms crowding out effect mainly through the quantity channel. Ramsey RESET test confirms that both models of quantity and price channels are specified correctly as the errors are normally distributed. The serial correlation LM test confirms no serial correlation and the Durbin Watson statistic is close to 2 as expected.

Although Ngugi (2001) attributes the increase in interest rates to high fiscal deficit financed domestically to during various periods of instability in Kenya's economy, the results support Galdacci *et al*., (2003) argument regarding the absence of wealth effects and interest rate effects stemming from an expansionary fiscal policy. From the impulse response functions indciate that private sector credit has a greater effect on GDP growth rate relative to the marginal effect of expansionary fiscal policy on GDP growth rate. Despite the short lived effect of an increase in private sector credit on GDP growth rate it can be inferred that private expenditure is more productive or stimulative relative to government expenditure. Nonetheless, the Galdacci *et al* (2003) viewpoint that fiscal policy is not transmitted through investment to GDP is consistent with the results. The impulse response functions also affirm that crowding out effect is greater through the quantity channel than the price channel.

6.0 Conclusion and areas for further research

Modigliani (1961); Diamond (1965); Phelps and Shell (1969); Tobin (1965) and Sidrauski (1967) suggest that increasing stocks of government debt reduce investment by reducing the rates of capital accumulation as government debt replaces private investment.

However, Baldacci *et al*,. (2003) argue that fiscal policy in developing countries is not transmitted through increase in investment but rather an increase in factor productivity. The results herein support this view as there is no evidence of long term crowding out. The relationship between fiscal policy and private sector credit is mired by financial repression, the structure of financial markets including a low investor base, limited financial instruments, and low financial development. Moreover, the manner in which fiscal policy impacts growth in the economy is not via the investment-growth nexus by through small and medium enterprises and their spillover effects. In addition, the behavior of various economic agents including the government, commercial banks, non-bank financial institutions and financial sector agents that promote bottlenecks can be altered to improve the transmission of both monetary and fiscal policy thereby affecting growth positively via fiscal policy in Kenya.

Recently, empirical research in the area of crowding out has been branching out to consider the effects of crowding out on the real exchange rate. More granular analysis is currently underway to distinguish between different forms of government spending such as government spending on research and development and private expenditure on research and development.

In Kenya research on the fiscal multiplier and the marginal propensity to investment would enrich the research on elucidate some of the ambiguities in crowding out in Kenya's economy. In addition, research on the structure of financial markets and their response to government debt instruments versus private debt instruments would enhance understanding of the price channel of crowding out. Research on financial markets as well as the term structure of interest rates and interest rates determination in Kenya's financial sector would be useful in highlighting the links between interest rates and economic policy and inform both monetary and fiscal policy in enhancing their effectiveness on maintaining price stability and achieving growth and employment in the Kenyan economy.

In conclusion, this paper suggests a review of legislation and regulation to identify inefficiencies in financial markets arising from these government intervention, with aim of to promoting efficient clearing of financial markets. Secondly, measures by government and regulators to improve the coordination of fiscal and monetary policies that may at times signal different policy stances in the market leading to a loss of market confidence and lastly, in the long term for measures to be undertaken to promote financial sector development by increasing non-bank actors in investing in government bonds, developing and promoting a variety of debt instruments.

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