DETERMINANTS OF PRIVATE SECTOR CREDIT GROWTH IN KENYA, DOES INTERBANK LENDING MATTER?

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS, POPULATION AND DEVELOPMENT STUDIES, UNIVERSITY OF NAIROBI IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN ECONOMICS

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DECLARATION

This research paper is my original work and has not been presented for any partial fulfilment of the award of degree in any other university.

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GDP	Gross Domestic Product
CBK	Central Bank of Kenya
IMF	International Monetary Fund
IFRS	International Financial Reporting Standards
T-Bills	Treasury Bills
ARDL	Auto Regressive Distributed Lag
VAR	Vector Auto Regression.

ABSTRACT

Capital as factor of production is a key input in both the private and the public sector for growth and development. Regulation plays an important role in maintaining the balance between the demand and supply side hence preventing market or economic failure by achieving equilibrium in both price and quantity. Private sector credit growth in Kenya and most developing economies has failed to grow at impressive rates, on the other hand interbank bank lending across frontier markets remain poorly structured. The main aim of the paper was to examine the nature of the relationship between the interbank operations and lending to the private sector. Using an Auto Regressive Distributed lag model (ARDL), the time series analysis examines if the demand for credit in the interbank market affects credit available for the non-bank private sector. The study used the 91-day T-bill rate, average lending rate, interbank rate, deposit rate, inflation and the exchange rates. The study opted level-level (linear-linear) model. The study established that there is no statistical evidence that interbank lending affects credit growth that any of the significant levels. Deposit rate and the inflation rate were statistically significant at the 10 and 5 percent level respectively. The 91-Day T-bill rate was not statistically significant at any of the critical meaning that short term credit to the government doesn't affect credit to the private disbursement to the private sector. Lending rates were found to affect credit growth positively. Exchange rates also had a positive relationship with private sector credit growth and significant at the 1 percent level. As a key policy recommendation, the paper recommends that the Central Bank should tighten the screws on interbank lending to safeguard the banking space against the collapse of another lender since the rate does not have an effect on credit disbursement. A key recommendation to the Central Bank is to tighten is monetary policy tools to keep inflation in check which will put credit growth on a sustainable path since inflation and exchange rates were found to be statistically significant.

Chapter one: Introduction

1.1 Background to the study

Lack of access to credit in frontier and least developed economies remains an obstacle to growth and development. This is blamed on relatively low incomes, which have led to low levels of savings, and investments (Ibrahim and Mwega, 2000). The financial sector is obligated to avail credit to the domestic market to supplement for shortfalls in investments and/or consumption. Lending rates and risk levels play the biggest role in determining whether commercial banks will lend to the public or the private sector. In most developed countries inclusive growth has been actualized by limiting commercial banks on public lending and pushing them to lend to private sector and trigger economic growth (International Monetary Fund, 2017)

The competition for the limited credit between different sectors of the economy has led to a crowding out effect. Banks may decide to practice biased lending to either the public or the private sector based on interest charged and the prevailing economic environment, thereby crowding out the other sector. Lending to the private sector creates further competition between the financial (Interbank) and non-financial sectors (Central Bank of Kenya, 2021). Throughout the world, banks participate in short term lending from each other to meet operational requirements (Franklin et al. 2020). This may create inflationary pressures and lead to economic instability in case the market fails. In Europe, countries that have high trust levels exhibit high levels of interbank activities while countries with low trust levels tend to have low interbank activity (Franklin et al., 2020).

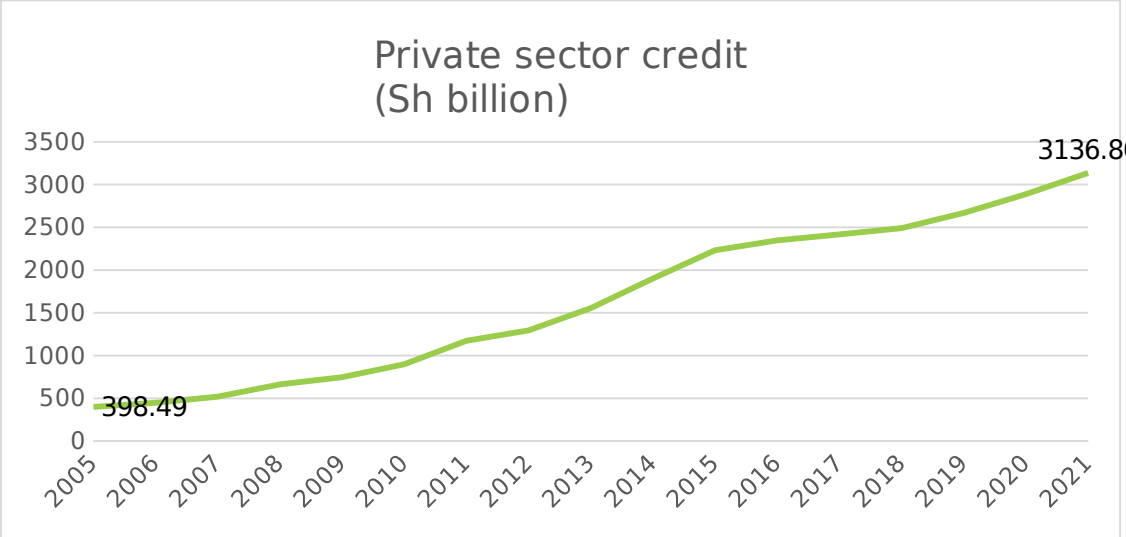
In Africa, financial inclusion has been on an upward trend but has suffered greatly from weak regulatory institutions. Commercial banks in the continent have to a large extent been unable to play their roles effectively in economic development due to weaknesses in legislation and regulation (Sherillyn and Tyson, 2021). Credit growth in many African countries has been slower in comparison to middle income and high-income economies this has led to low levels of private sector investments (Honohan and Beck, 2007). High cost of credit has also been pointed out as impediment to credit uptake in Sub Saharan Africa with banks' lending selectively and favoring sectors with lower default rates such as the government or fellow banking institutions (Emilio, 2005)

In light of this Central banks are mandated to monitor operations in the credit market. This regulation is meant to protect the suppliers of credit from default and the consumers of credit from predatory lending. In Kenya efforts by both the Central Bank and the government to oversee operations in the financial sector has brought mixed results in credit growth. Households, firms and the government tap into domestic credit to help expansion, boost income and growth. In Kenya all 40 commercial banks participate in interbank lending to meet the required threshold of liquidity to manage day to day operations.

1.2 Private sector credit growth in Kenya

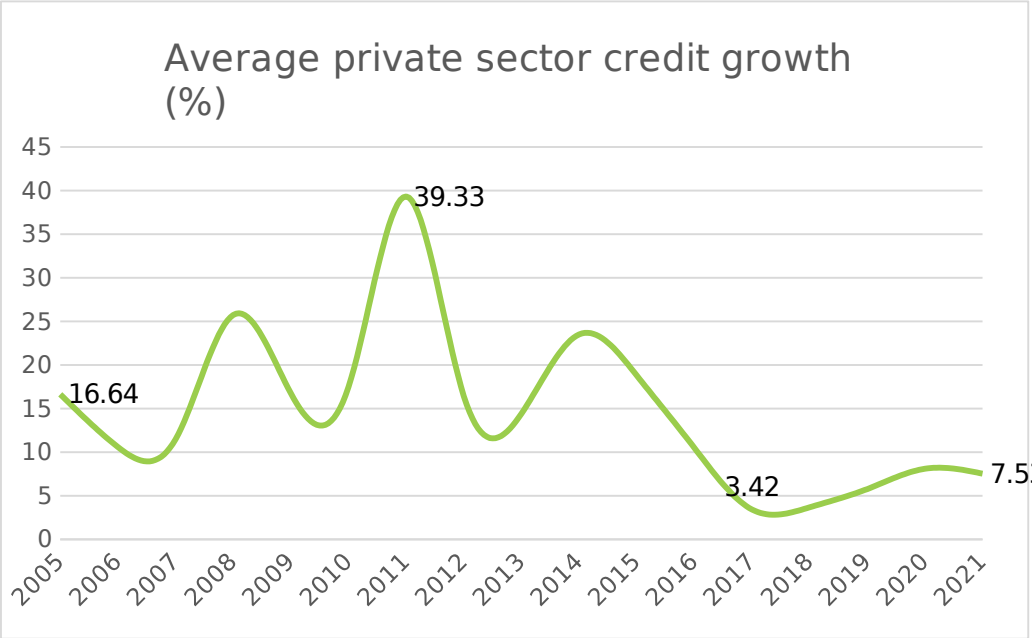
Figure 1 shows how private sector credit in Kenya rose from Sh166.28 billion in December 1995 to Sh3.13 trillion in December 2021. From the figure, it can be seen that the rise is gradual up to June 2006. It then picks up and grows at a faster rate. Data from the Central Bank of Kenya shows whereas credit to GDP ratio has remained stagnant averaging 37%, credit advanced to the private sector has risen by 652% between July 2005 and December 2020.

Figure 1 Private sector credit growth in Kenya (January 2005-December 2020)



Source: Central Bank of Kenya

Figure 2: Private sector credit growth rate



Source: Central Bank of Kenya

Growth rate fell to a low of 2.38 percent during the rate cap era

The period between January 2005 and December 2021, there were some small dips largely associated with the 2008 disputed elections that saw violence erupt afterwards. Contraction in credit growth can also be seen during the election period of 2013 and 2017. Introduction of the rate caps in 2016 meant banks were not allowed to charge over 4 percent of the base lending rate. The main aim of the cap was to make credit more affordable to the public but instead banks opted to shun risky customers and purchase more of government securities. Although it was later scrapped in 2019, most of the damage had already been done.

Following the introduction of the International Financial Reporting Standards (IFRS, 9). Commercial banks are required to increase their loan loss provisions, this in turn has seen credit to the private sector grow at a lower rate. Credit growth hit its highest in September of 2011 as the world recovered from the global economic meltdown and was lowest in September 2002, contracting by 7 percent as the country geared towards the 2002 general elections (Central Bank of Kenya, 2020).

During the Covid-19 pandemic the 12-month credit growth to the non-government sector in the country stalled when banks reduced lending because of the high uncertainty levels and economic slowdowns. The Central bank of Kenya intervened through monetary policy tools. The benchmark lending rate was reduced to 7 percent from 8.25 percent and the reserve ratio requirement on banks was reduced by 1 percentage point to 4.25 percent (Central Bank of Kenya, 2020). These measures were meant to encourage lending during the pandemic as firms and households struggled with disruptions in productions coupled with reduced private consumption (Central Bank of Kenya, 2020). The revisions in monetary tools were done because

they have a direct influence on lending and savings. During the Covid-19 pandemic asset quality in the banking sector measured by non-performing loans ratio worsened to an all-time high 14.5 percent, because of the recession that led to job losses and massive business closures, Central Bank of Kenya, (2020). According to the World Bank (WB, 2020), Shutdown in companies combined with market disruptions led to a significant drop in demand and supply in the global space.

In Kenya, commercial banks continue to apply pressure to the Central bank for the approval of risk-based loan pricing to unlock lending to medium, small and micro businesses arguing that the small business cannot compete fairly with big businesses for the available credit because big businesses have bigger securities to secure and guarantee loans whereas small business are riskier to lend to. Risk based loan pricing allows commercial banks and micro finance institutions to advance credit at interest rates that match the level of risk associated with the borrowing entity.

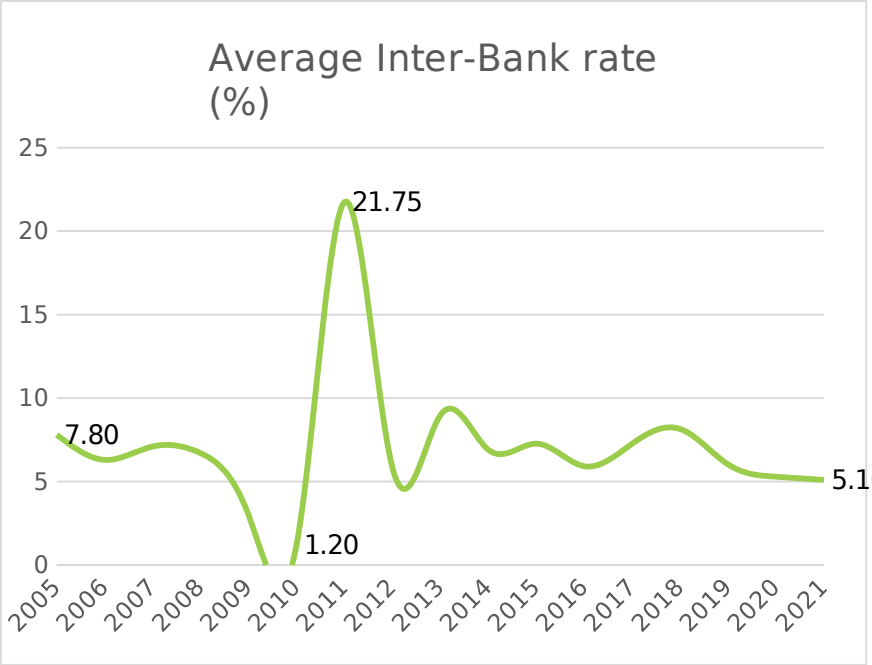
1.3 Interbank lending Market in Kenya

The Kenyan banking sector is made up of 39 commercial banks, 14 microfinance banks all regulated by the Central bank of Kenya, Central bank of Kenya, (2020). Furfine (2001) has it that since the early days lenders have been regulated and supervised to avert failures and collapse of financial systems. Kenyan banks are required to keep their critical operating ratios above the minimum statutory requirement. When unable to meet the capital requirements, commercial banks borrow from each other at a fee on short term basis, this market is called the interbank market.

In the Kenyan bank market lenders advance credit to another lender for a specified time, majority of this credit have a maturity period of at most 1 week, the pricing of this credit is done through the interbank rate. Commercial banks are supposed to have a sufficient level of cash for daily operations and service client requirements. In case a lender is unable to meet this needs it has to borrow on shorterm basis from another bank. Big commercial banks have more than the required liquidity they therefore are at better position to lend money to smaller banks at an interest rate. The interest rate is determined by availability of credit in the market. The market plays an important role in allocating liquidity from lenders who more to those who have little (Osoro and Muriithi, 2017).

Studies such as (Kim, 2014) have shown that bigger banks enjoy lower lending rates because of their bigger asset sizes and lower risk levels while smaller banks pay a premium to get these loans because of their few assets and high-risk levels associated with them.

Figure 3: Interbank rates % (January 2005-December 2020)



Source: Central Bank of Kenya

Interbank rates in Kenya hit a record high of 28.7 percent in November 2011 being a spillover of the global financial crisis. Osoro and Murithi 2017 argue that rapid rises in interbank rates have been seen in periods were a bank is either nearing collapse or has collapsed as seen in the case of Dubai bank, Imperial bank and Chase bank, in their paper the also established that increase in government lending leads to stress interbank markets and can be seen by the high causality of the 91-day treasury bill on the interbank market. In their paper they also argue that one week's rate is greatly affected by the prevailing rates in the prior week.

1.4 Problem Statement

Interbank markets are informal and poorly structured creating a loophole for commercial banks to selectively lend to fellow banks and crowd out the non-bank private sector (Franklin et al. 2020). According to Central Bank of Kenya, (2021) with improvement in liquidity as at June 2021, commercial banks planned to increase their lending to fellow banks by 17 percent. The lack of proper regulation also creates a big risk. It poses a big threat of destabilizing the economy should the interbank lending market fail. In the past 10 years 3 commercial banks in Kenya have collapsed namely Chase Bank, Charterhouse Bank and Imperial Bank (Kenya Deposit Insurance Corporation, 2018). These failures pose a risk of depositors and creditors losing their money (Kenya Deposit Insurance Corporation, 2018)

Away from the potential risks posed by unregulated interbank lending, credit squeeze in Kenya has been amplified by low level of savings in the country (World Bank, 2020). Because of low rates of savings, the pool for credit remains smaller and highly unfavorable to smaller players in the private sector. Banks conduct credit profiling process on each other i.e. assessing the creditworthiness of the other banks. It is largely done on the basis of size of bank, assets size structure of ownership among other factors. This competition of funds is likely to crowd out

other sectors because of lack of data and information on credit worthiness and riskiness of other borrowers. Availability of money, prevailing interest rates and terms involved are the main determinants of the interbank rate. Interbank markets play a critical role in the financial markets however they continue to receive little attention (Osoro and Muriithi, 2017).

Sherillyn and Tyson (2021) carried out a study on the progress, barriers and policy implications of interbank markets in Sub-Saharan Africa. They established a high level of existence of perceived risk resulting from level of market confidence emanating from information asymmetry associated with an underdeveloped financial market. Their study also established that bank size is important in determining borrowing cost in that the bigger the bank the lower the cost of credit and vice versa.

Oduor et al, (2014) assessed the importance of bank classification in the operations of interbank market. The study established that notwithstanding inefficiencies at the interbank market, in the long run monetary policy works. They noted that to improve efficiency of the interbank market, central banks must increase tenors of government securities, increase the number of currencies in the money markets, create a connection between the interbank markets and other money markets.

Osoro and Muriithi (2017), explored the nexus between volatility in the Kenyan interbank market and the T-Bill market in the event of market distress arising from a collapsed bank, the aim of the research was to ascertain if interventions by the Central Bank to improve efficiency in the interbank market in times of bank failure is either proactive or reactive. Their finding was that the T-Bill rate positively and significantly affects the interbank market rate.

This study aims at exploring the gap between interbank lending and private sector credit growth rate in Kenya for the period between January 2005 to June2022.

1.5 Research questions

1. Does the interbank lending affect private sector credit growth?
2. Which other factors influence private sector credit in the country?
3. What are the effects of short-term government domestic borrowing on private sector credit uptake?
4. What policy options are available in controlling private sector credit growth?

1.6 Study objectives

The main aim of this research is to establish if interbank operations affect credit disbursement to the private sector.

Specific objectives are:

1. To determine other factors influencing credit growth in Kenya
2. To determine the effect of short-term government borrowing on non-government credit growth.
3. Suggest relevant policy options to help improve credit transmission to the private sector.

1.7 Significance of the Study

Because of the slow growth in private sector credit, informal and poorly structured interbank market, the study aims at establishing if there exists a nexus between credit growth and interbank lending. Credit growth in Sub Saharan African countries have failed to hit impressive levels World Bank (2012). It is also very important for countries to understand the key drivers of credit growth. Strong legislation, institutions and policies provide the perfect environment for the private sector to prosper. The main objective of this study therefore is to show if the interbank market has contributed to the slow credit uptake in the private sector in Kenya. The study therefore provides evidence if interbank lending has created a credit squeeze to the non-bank private sector.

The study will also help in understanding how the government's involvement in the credit market affects credit for all other sectors, since the government is a significant player in the domestic credit market and short term government lending has shown to have a sizeable influence on market liquidity.

The findings of this research will help inform policy by guiding the Central Bank of Kenya in understanding the knock-on effects on private sector lending as a result of the Central Bank creating laws and regulation that govern commercial banks' operating ratios and liquidity requirements and how that affects private sector credit.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This section reviews relevant studies on the effect on interbank lending on the growth of domestic credit and the gaps available.

2.1 Theoretical literature.

2.1.1 Loanable funds theory

Advanced by Knut Wicksell in 1898, this theory notes that interest rates in the money market are determined by the availability and need for funds. The demand for credit is dependent on investment levels, speculatory demand for money (Money hoarding) and dissaving. Lower interest rates attract high demand for capital. When interest rates are low people will hoard more money and save less. The availability of credit is dependent on available deposits, dishoarding, disinvestment and Bank money, when interest rates are high people will save more and dishoarding will be higher. The theory also argues that since savings equal investment (S=I) then the prevailing price of credit is at the point of intersection between supply and demand of credit.

2.1.2 Neoclassical theory of investment

According to the neoclassical theory of investment by Dale Jorgenson, the marginal product of capital determines the level of investments and the user cost of capital. Relative prices of factors of production determines the optimal capital accumulation. Firms use the different combination of labour and capital to produce goods for sale. In determining the mix of these factors of production firms are guided by factor prices and the contribution of this factors to revenue. It argues that the rate of investment is a factor of the rate at which firms adjust their capital stock towards the preferred level. Due to the law of diminishing returns, assuming all other factors of production are constant, as more units of capital are consumed, the marginal product of capital declines. Since firms try to maximize profits as long as the marginal product of capital is more than the user cost of capital, it will be profitable for the firm to add to its stock of capital. The Neoclassical theory shows us the optimal capital stock is the amount of capital at the point of intersection between marginal benefit and marginal (no more profits can be made). Since cost of capital is determined by the prevailing interest rates, investments therefore are negatively affected by increase in cost of capital and negatively affects the profit rate of capital.

2.1.3 Intertemporal optimizing theory of consumption by Irving Fisher and Roy Harrod.

A consumer has to consider a consumption path that maximizes utility now and, in the future, given current income, future income and current wealth given that he lives from time 0 to time T. There exists a trade-off between consuming more today or saving more today and consuming more in the future. The theory argues that a consumer spends all his income and wealth by the time he/she dies, given a discount factor r (rate at which consumption is discounted) given $r<1$ an individual will choose to consume an amount c today than to consume the same amount the amount in the future since he/she aims to smoothen his/her consumption across time. The theory argues that for a given discount rate, consumption is positively related to the present value of income at time 0.

2.1.4 Credit creation theory of banking and the multiplier theory

The theory argues that banks create money because of lending. Commercial banks keep a fraction of their depositors' cash in order to meet the depositor's amount and lend a large chunk of customer's deposits. Banks assume that not all its customers would turn up demanding cash against their deposits at one point in time. In the creation of credit, banks have to be confident that loans will be paid. The central bank creates high powered money (H), base money, and monetary base or reserve money. High powered money is important to the central bank in 2 main ways;

- It is the only monetary aggregate it can directly control.
- The Central Bank can use it to generate revenue in terms of seignorage.

In the Central Bank's sheet Net foreign assets and domestic credit form the assets while Currency in circulation and reserve requirement form the liabilities side. High powered money is the equivalent of the summation of currency in circulation and reserve requirement which equals also Net foreign assets added to the domestic credit. By combining the Central banks and commercial banks' balance sheet we get the banking sector's balance sheet. Broad money supply (M2) equals to the currency in circulation added to customer deposits. M2 is directly

proportional to high-powered money, High powered money multiplied by a constant (u) gives M2, where u is the multiplier.

2.2 Empirical literature

Chebet and Muriu, (2016) studied the variables determining credit uptake by the non - government sector. Using yearly data from 1980-2012 they estimated the Vector Error Correction Model. Public investment, interest rates both long term and short term, employment, domestic debt, per capita GDP and exchange rates were used as the explanatory variables. Their findings were that public investment, interest rates, rate of employment together with internal borrowing, positively and to a significant level impact credit uptake but GDP per capita and exchange rates negatively impacted credit uptake by the non-government sector.

Osoro and Muriithi (2017), used Exponential General Autoregressive Conditional Heteroskedastic (EGARCH) model to explore the relationship between volatility in the Kenyan interbank market and the T-Bill market in times of bank failure. The aim of the research was to ascertain if the Central Bank intervention in the market to correct inefficiency in the interbank market upon the collapse of a bank is either proactive or reactive. Their finding was that T-Bills have a positive and significant effect on the interbank rates.

Giray (2013) analyzed the determinants of credit uptake in least developed economies, using panel data for 24 countries. The study findings revealed that monetary policy combined with lending rates and trade policy affect credit uptake. Giray found out that external balance and perceptions curtail the growth of credit. Similar findings were reported by Baoko, (2017) who used ARDL to examine the variables affecting the distribution of domestic credit. The study established real lending rates, broad money supply, loans advanced to customers and customer deposits are critical factors in credit disbursements.

Alper et al. (2019) carried out a research titled “Do Interest rate control work? Evidence from Kenya,” they set out to establish the effect of rate capping introduced in 2016 on loan disbursement to the private sector. Using a VAR model, they established that there was increased divergence of interbank rates from policy rate following the interest rate caps. Adede (2014), did a study on the relationship between lending rates and GDP growth, using a causal research design approach he established that there was a negative relationship between interbank lending rates and the economic growth.

Musha, (2012) used the Ordinary Least Squares approach to examine factors affecting credit uptake by the youth in Kenya. In his paper he used terms of credit, Business and entrepreneurial skills and awareness at the independent variables, he established that all three independent variables were statistically significant and affect credit uptake by the youth in Kenya.

Guo and Stepanyan (2011) using the Ordinary Least Squares method carried out a study on the factors affecting credit growth in developing countries, using data from 50 emerging market economies, the study used bank savings, GDP growth rate, price levels, return on deposits, exchange rate, federal funds rate, broad money supply and bad loan ratio as their explanatory variables. The findings showed that domestic, foreign funding, loose monetary conditions (those

that seek to expand the economy) contribute positively to credit growth while higher inflation is detrimental to credit growth. Ayeni (2020) employed an ARDL model to analyze the long-run equilibrium model of investment in Gambia, He also used exchange rates, lending rate, and inflation he established that high exchange rates increased the real cost of imports especially capital goods which in turn makes investments costly.

Imran et al. (2013) did a study on the determinants of credit pricing in Pakistan using the ARDL technique. They established that foreign liabilities, bank deposits, GDP growth, currency exchange rate and the monetary policy are to a large extent inter linked with bank credit expansion in Pakistan. They also suggested that price levels and the rates offered by money market fund managers do not affect credit growth. A similar study was done by Castro et al, (2019) to establish how the political environment and the nature of governance institutions affects credit growth, using a fixed logit model over a panel wealthy and emerging economies. They found out that credit booms seldom happen during a socialist regime. The study also indicated that unchecked Central Banks discourage the chances of rapid credit growths.

Giray, (2019) did a study on the effect of economic uncertainty on domestic credit, using panel data of 139 countries spanning 1996 to 2017 using Generalized Method of Moments. The findings showed that during periods of uncertainties credit growth slows down, GDP per capita and money circulation had a positive influence on credit expansion, the study established that current account deficit slows down credit expansion.

Ali (2016) carried out a study to establish factors affecting private sector credit uptake in Lebanon using fixed effects model. The study found out that savings, economic growth, price levels and money circulation all impacted credit expansion positively. Risk of default, high credit pricing high return on government securities and increase in remittances all led to shrinking in credit to the non-government sector. The findings are similar to that of Dorothy et al. (2016) who studied the factors affecting credit expansion in Uganda with focus on the importance of mobile money while employing the Vector Error Correction Model (VECM). They found out that mobile money balances and low lending rates led to rapid credit expansion positively of credit while core CPI negatively affects private sector credit.

Shijaku et al. (2013) conducted a study on factors affecting credit growth in Albania using the VECM. They established that credit was positively related to currency exchange rate and negatively to domestic borrowing. A stable macroeconomic situation leads to favorable loan pricing and increases financial liberalization which would in turn lead to credit expansion.

2.3 Overview of literature

Multiple studies have used the ARDL model to establish factors affecting credit uptake, considering interest rates, inflation rate and exchange rates as the dominant independent variables. Low interest rates are seen to encourage credit uptake as established by Ali Awdeh, (2016). Baoko, (2017) using an ARDL model established that inflation has a positive impact only in the short-run, as the real value of money becomes eroded, borrowing by economic agents increases to meet budgetary shortfalls. A notable omission in previous studies is how interbank operations and deposit rates affect credit uptake since deposits/savings by the private sector form

the pool for lending. Another study done by Katusiime, (2018) established that credit uptake has a positive link with inflation volatility when lagged by one period. Findings from that study creates an interesting area for researchers to attempt to establish influence of lagged variables on credit growth which is an area that this paper will explore.

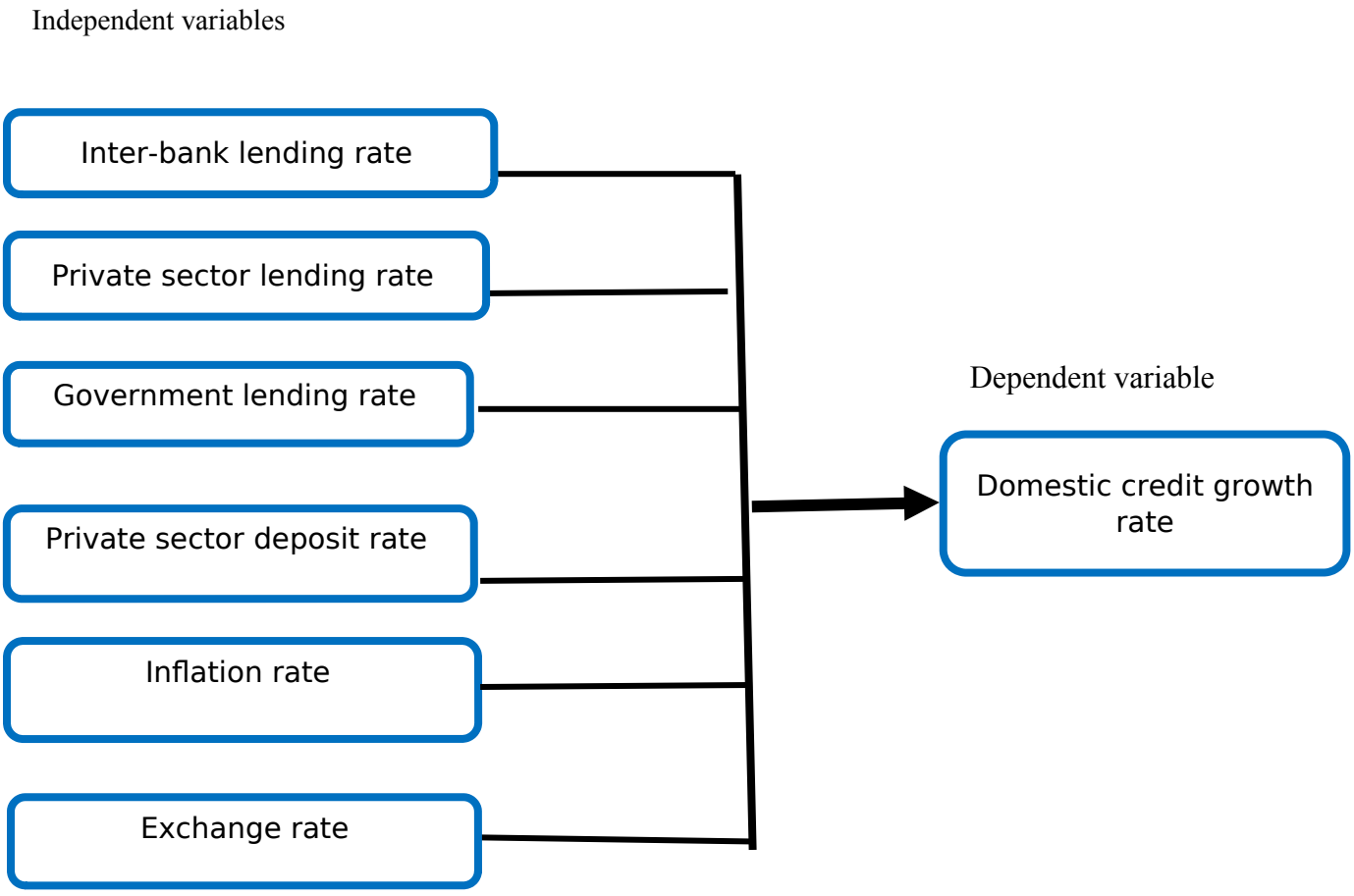
This study will contribute greatly to this field by filing the knowledge gap that exists on the relationship between credit growth and interbank lending. It assumes that the government, banks and the non-bank private institutions are in competition for available credit.

CHAPTER THREE: METHODOLOGY

3.1 Conceptual Framework

The study adopts the conceptual framework used by Cheruiyot (2020) where he visualized demographic and socioeconomic factors that influence health insurance status. In the framework, interbank rates, lending rates, exchange rates, 90-day Treasury bill rate-proxy for government lending rate-, deposit rates and inflation rates are conceptualized to directly influence the private sector credit growth. The relationship between these variables is shown in Figure 4.

Figure 4 Conceptual Framework



Source: Author's own compilation

Credit available for lending, is either lent to the private sector, the government or fellow commercial banks. When the interest on the government paper (T-bill) increases, lending to private sector is expected to decrease since the government is a less risky customer. An increase in lending rate reduces credit uptake in the non-government sector. An Increase in interbank rates reduces lending to the non-bank private sector. Inflation rate and exchange rate are also conceptualized to be directly affecting credit uptake. High inflation pushes the public to seek

more credit while a depreciating currency also pushes the public to seek more credit to fill the consumption shortfall

3.2 Model specification

There is no universal way to model for the determinants of domestic credit Katusiime (2018). To achieve the objectives of the study, we will consider a regression model linking private sector credit uptake to credit demand by both the government and the non-government sectors. Guo and Stepanyan (2011) expressed credit growth as a function of share of deposits by the private citizens and businesses and deposit increase, share of total loans to the private sector, price levels, lagged both GDP growth and return rate on deposits and changes in Fed Fund rate. Using OLS (Ordinary Least Square) technique the researchers analyzed a quarterly time series data from 2002 Q1 to 2010 Q2. The precise estimable model used by Guo and Stepanyan (2011) was;

Credit growth= $\beta_0+\beta_1(Shdepo_{i,\ t-4}$ X Deposit $growth_{i,t}) + \beta_2$ ($Shforeignlia_{i,t-4}$X Non-resident liability $growth_{i,t}) + \beta_3\pi_{i,t}+ \beta_4G_{i,t-1}+ \beta_5$ Deposit $rate_{i,t-1} + \beta_6$Fed fund rate change $_{i,t}$ $+FE_i+ \varepsilon_{it}$

Where;

($Shdepo_{i,\ t-4}$ X Deposit $growth_{i,t}$ is the weighted share of deposits in total credit to the private sector four quarters ago. $Shforeignlia_{i,t-4}$X Non-resident liability $growth_{i,t}$ is the weighted share of liabilities to non-resident in total credit to private sector four quarters ago, π is inflation, G is GDP growth rate.
Most studies on credit uptake, interest rates, real GDP and prices serve as explanatory variables Egert et al, (2007). In regards to this our empirical model will borrow from this model since they are appropriate amongst credit growth variables.

Our study attempts to estimate the extent of causality of different variables on non-government credit uptake. Since the phenomenon under investigation (private sector credit) is a monthly variable, we will focus on independent variables that are accounted for on monthly basis and take into consideration the error term to account for other omitted variables. We model our demand for credit function using a multivariate time series analysis, to assess the effect interbank lending and other variables on the dependent variable (private sector credit growth). We introduce the interbank lending rate to our empirical function. The functional form of the model in general therefore is as follows:
DC = f (Dr, Lr, Ibr,Tr,Inf,Exch)

Where;
Dc =Private sector credit growth
Dr= Deposit rate
Lr=lending rate
Ibr=Interbank rate
Tr= 90-day T-bill rate
Inf=Inflation rate
Exch=Shilling to dollar exchange rate

Applying the level -level relationship helped us establish the estimated change in private sector credit as a result of an independent variable changing by 1 unit, the precise estimable model (Econometric from of the equation) becomes:

$$Dc_t = \beta_{0+} \beta_1 Dr_t + \beta_2 Lr_t + \beta_3 Ibr_t + \beta_4 Inf_t + \beta_5 Exch_t + \beta_6 Tr_t + \varepsilon_t$$

Where;

Dc : domestic credit

Dr : deposit rate

Lr : lending rate

Ibr : interbank rate

Tr : T-bill rate

Inf : inflation rate

Exch : exchange rate

ε : Error term

3.3 Definition and measurement of variables

Table 1 Definition of variables

Variable	Explanation	Measure	Expected sign
Dependent variable **Private sector domestic credit growth**	Financial resources provided by commercial banks mainly to the non-government sector (World Bank, 2020),	Percentage change in total outstanding loans to citizens and businesses in a given month compared to the same month a year ago	
Independent variables **Deposit rate**	Rate of return that banks offer on deposits by customers (Investopedia, 2020),	Measured on monthly basis a percentage, this is the interest earned by depositors on their savings. It is selected because an increase in savings rate motivates people to save more and therefore increase cash available for onward lending by banks.	Positive (Tatum, 2012)
Lending rate	The interest paid by borrowers on their loans also termed as the price for credit to the non-government sector (IMF, 2017).	Mainly a function of the Central Bank benchmark rate then adjusted for inflation and a risk factor is then added. The rate (measured in percentage) is computed taking the repayable interest on a loan divided by the principal amount and is selected because high interest rates depress credit advancement to the	Negative. (Borio, 2017).

		private sector.	
Inter-bank rate	The rate at which commercial banks advance short-term loans to one another (CBK, 2007).	Measured as a percentage, which is the rate of return offered by commercial on short term loans advanced by other commercial banks Computed taking the repayable interest on a loan divided by the principal amount loaned to a fellow bank. High interbank rates encourage banks to do lend to each other as opposed to the public,	Negative.
91-day Treasury bill rate	This is given.	Measured in percentage terms, this is the rate of return offered by the government on the 91-day treasury bill. The rate has been selected as proxy to gauge how government appetite for domestic debt squeezes the credit available to the non-government sector leading to the crowding out effect phenomenon. The 91-day T-bill rate is determined by the interest paid by the government after every 3 months on the short-term paper. Higher rate of return on government papers reduced credit growth to the private sector	Negative. (Lidiema, 2017)
Inflation rate	The annual percentage change in the cost of living. (World Bank, 2014)	The change of consumer price index of one period from the previous period. High inflation levels make people borrow more money in order to meet the cost the living. The variable is computed using the consumer price indices.	Positive. (Mba & Dazoue, 2013)

Exchange rate	The average price of one currency in terms of another (Investopedia, 2020) in Kenyan terms we look at it as the price of the Kenyan shilling in terms of the United States' dollar.	The variable is selected because it has been highly volatile especially during the pandemic and elections period.	Negative. (Magud et al., 2014)

3.4 Data sources

The study used monthly data of 210 observations obtained between January 2005 to June 2022. All the data (private sector credit growth, average lending rates, average deposit rates, interbank rates, 91-day T-bill rate, inflation rate and average exchange rates) was obtained from the Central Bank of Kenya Monthly Economic Indicators. The publication contains data on performance of various sectors of the economy such as the banking sector, international trade and public finance and is released on a monthly basis. All the data are given as monthly averages and are measured in percentages. Variables that are measured daily such as the exchange rates and the interbank rates were transformed into monthly entries by determining the monthly averages.

3.5 Estimation issues.

The study adopts a time series analysis, diagnostic checks will be carried out to ensure it conforms to the classical linear regression assumptions. The problems associated with a time series analysis include, non-stationarity, co-integration, heteroscedasticity, Auto correlation and multicollinearity. To check for the existence, we will carry out diagnostic tests as shown below.

Table 2 Diagnostic tests

Diagnosis	Explanation	Test	Justification
Unit root test (Pre-estimation)	If a series is stationary or not, the moments of the series should be independent of time (stationary).	Augmented Dickey-fuller test Gujarati, (2003).	If the series is non-stationary the regression could be spurious or inconsistent.
Co-integration test (Pre-estimation)	Helps us establish if a relationship exists between the time series in the long run, co-integration occurs when two or more nonstationary series have a long-run equilibrium.	The bounds test	Co-integration provides a means of partitioning the time series into the long-run equilibrium and the short-run disequilibrium.

Heteroscedasticity test (Post estimation)	Heteroscedasticity refers to a situation where the variance of the error term is not constant.	Breusch-Pagan. Gujarati, (2003).	When the variance of the error term is not constant, the standard errors are biased therefore affecting hypothesis testing.
Autocorrelation (Post estimation)	Check if there exists serial correlation in the error term across different time periods.	Durbin Watson test and the Breusch-Godfrey test will be used for this. Gujarati, (2003).	Existence of autocorrelation brings about biased standard errors which affect hypothesis testing.

CHAPTER FOUR: RESULTS AND ESTIMATION

4.1 Introduction

This chapter contains descriptive statistics, correlation analysis, pre-estimation tests, estimation results and post estimation tests.

4.2 Descriptive Statistics

The descriptive statistics analyzed by this study include the means, standard deviations minimum and maximum values, variance, skewness, kurtosis and the number of observations of the variables under study.

Table 3 Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Domestic credit	210	14.08073	8.11969	2.384069	35.91186
Deposit rate	210	5.974333	1.447973	3.08	9.04
Lending rate	210	14.49267	2.184416	11.75	20.34
Interbank lending rate	210	6.71381	4.008799	0.98	28.72
91-Day T-Bill rate	210	8.0096	2.73988	1.6	21.65
Inflation rate	210	7.533619	4.122554	1.85	19.72
Exchange rate	210	89.61667	14.26523	62.029	117.29

The study spans across 210 months, the average rate of private sector credit growth in the period was 14.08 percent with a standard deviation of 8.12. The highest recorded growth was 35.9 and the lowest was 2.38 percent the variable had a right skew. The deposit rate over the period also had a moderate skew but slightly to the left with a mean of 5.97 percent with a standard deviation of 1.45. The lending was skewed to the right with a mean of 14.49 percent hitting a high of 20.34 percent and a low of 11.75 percent.

The interbank lending rate was also skewed to the right with an average value of 6.71 percent and a standard deviation of 4.01, the variable hit a high of 28.72 percent. The 91-day Treasury bill had a mean return of 8.01 percent with a standard deviation 2.74, minimum value was 1.6 percent with the highest value being 21.65 percent on the 3-month government paper. Rate of inflation hit a high of 19.2 percent and a low of 1.85 percent, average inflation for the 210 months was 7.53 percent and also had positive skew. Exchange rate relative had a symmetrical skew but to the left, average exchange rate over the period was 89.62 percent hitting the highest level of 117.29 and a low of 62.03.

4.3 Correlation analysis

This helps in understanding the degree and direction of relationship between the selected variables. The results of test were as follows

Table 4: Correlation matrix

	Domestic credit	Deposit rate	Lending rate	Interbank lending	91-Day T-Bill	Inflation rate	Exchange rate

				rate	rate		
Domestic credit	1						
Deposit rate	-0.428	1					
Lending rate	0.399	0.2815	1				
Interbank lending rate	0.3955	0.1991	0.5555	1			
91-Day T-Bill rate	0.2648	0.4422	0.5636	0.807	1		
Inflation rate	0.6742	-0.2132	0.1776	0.4639	0.4346	1	
Exchange rate	-0.4176	0.7003	-0.1861	-0.1184	0.1021	-0.2381	1

From the correlation analysis, credit growth rate had a low correlation with most of the variables, but had a fairly positive correlation with inflation. The variable also showed a fair negative correlation with the deposit and the exchange rate. Deposit rate had a positive correlation with the exchange rate. Interbank rate had a fair positive correlation with the lending rate. Return on the three-month government paper had a very correlation with private sector credit.

Table 5: Lag Selection criteria

Variable	Lags	FPE	AIC	HQIC	SBIC
Domestic credit	4	4.28863*	4.29384*	4.3265*	4.37461*
Deposit rate	4	.09426*	.47617*	0.508838	0.556944
Lending rate	4	.190813*	1.18141*	1.21407*	1.26218
Interbank lending rate	4	4.21489*	4.27649*	4.30916	4.35727
Inflation rate	4	1.34631*	3.13523*	3.1679*	3.21601*
Exchange rate	4	1.21672*	3.03403*	3.0667*	3.1148
91-Day T-Bill rate	4	2.66776*	3.81911*	3.85177*	3.89988*

The lag selection criterion was done before determining the existence of the unit root to help in determining accurately the stationarity status of the variables. The Akaike Information Criteria (AIC) was preferred for all variable and it was determined that the optimal lag length of the variables was 4.

4.4 Pre-estimation tests

Since the study employs a time series analysis, the pre-estimation tests will help select the most appropriate estimation technique given the relationships and the condition of the variables selected for the study.

4.4.1 Unit root test

Test of existence of unit root was carried out this test for stationarity helps avoid a spurious or inconsistent regression. A series is to be stationary if the moment of the series are independent of time. The Augmented Dickey Fuller (ADF) test was used to check for stationarity with the null hypothesis being the existence of a unit root (non-stationarity) and the alternative hypothesis being no unit root (stationarity). If the absolute value of the calculated t-statistic is greater than the critical t-value or the computed p-value is lower than the p-value at the 5 percent significant level then the decision reached is the variable was stationary and we reject the null hypothesis

.

Table 6: Augmented Dickey Fuller test

Variable	Lags	Test statistic	1% critical value	5% critical value	10% critical value	P-value	Stationarity status (5% critical value)
Domestic credit	4	-3.037	-2.345	-1.653	-1.286	0.0014	Stationary
Deposit rate	4	-2.534	-2.345	-1.653	-1.286	0.0060	Stationary
Lending rate	4	-1.97	-2.345	-1.653	-1.286	0.0251	Stationary
Interbank lending rate	4	-3.884	-2.345	-1.653	-1.286	0.0001	Stationary
Inflation rate	4	-4.31	-2.345	-1.653	-1.286	0.0000	Stationary
Exchange rate	4	-0.206	-2.345	-1.653	-1.286	0.4185	Non-stationary
91-Day T-Bill rate	4	-3.803	-2.345	-1.653	-1.286	0.0001	Stationary

At 4 lags the absolute value test statistics for domestic credit, deposit rate, lending rate, Interbank rate, inflation rate, and the T-bill rate were more than the absolute value at the 5 percent critical level. Only the Exchange rate was non-stationary since the absolute value at the 4^{th} lag was 0.206 which is lower than the absolute value at the 5 percent critical level (1.653). The non-stationary variable (Exchange rate) was differenced then subjected to the augmented dickey fuller test until we achieved stationarity.

Table 7: Augmented Dickey fuller test after first differencing

Variable	Test statistic	1% critical value	5% critical value	10% critical value	P-value	Stationarity status
Exchange rate (Dexch)	-6.87	-2.345	-1.653	-1.286	0.0000	Stationary

All non-stationary variables became stationary after the first differencing since the absolute value of the test statistic was 6.87, now greater than the absolute values at the 3 critical levels. The series IS now integrated of different orders I(0) and I(1) series, as a result we will need to carry out a cointegration test to establish if there is existence of a long run relationship.

4.4.2 Cointegration test.

The study involved a linear combination of I(0) and I(1) the series are integrated at different we will use bounds test Pesaran, Shin and Smith (2001). The null hypothesis of this test is there is no cointegrating equation and the alternative hypothesis is there is a cointegrating equation. If the F-statistic is less than the critical value for the lower bound I(1) we accept the null hypothesis and conclude there is no cointegration and estimate the short-run model which is the autoregressive distributed lag (ARDL) model. If indeed there is a cointegrating relationship we estimate the long-run model, error correction model (ECM).

Table 8: ARDL bounds test for Cointergration

ARDL Bounds Test
F=2.409

Level of significance	Bound	Bounds at critical Value
10%	I(0)	2.12
	I(1)	3.23
5%	I(0)	2.45
	I(1)	3.61
1%	I(0)	3.15
	I(1)	4.43

The F value (2.409) falls below the lower bound at the 5 percent significance level, meaning we cannot reject the null hypothesis, variables have no long run relationship (not cointegrated). We will therefore estimate the ARDL short run model.

4.5 ARDL short-run models

Table 9: ARDL Model

ARDL Regression

Number of obs = 205
F (12, 192) = 334.54
Prob > F = 0.0000
R-squared = 0.9544

Adj R-squared = 0.9515
Root MSE =1.7951

Private sector credit growth	Coefficients	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Private sector credit growth L1* **	0.7615584	0.0647695	11.76	0.000	0.6338	0.8893
Deposit rate **	-0.30217	0.13985	-2.16	0.032	-0.57801	-0.02632
Lending rate	0.076711	0.08939	0.86	0.392	-0.0996	0.25302
Inter-bank rate	0.0145724	0.05725	0.25	0.799	-0.09835	0.1274952
91-Day T-bill	-0.019044	0.09705	-0.2	0.845	-0.21048	0.17239
Inflation rate **	0.276766	0.12113	2.28	0.023	0.03784	0.515692
D.Exchange rate* **	0.399532	0.0783189	5.10	0.000	0.24505	0.554
Cons*	1.892712	1.062511	1.78	0.076	-0.2029	3.9884

*(*** significance at the 1 percent level, **significance at the 5 percent level, *significance at the 10 percent level)*

The model has an R squared of 95.4 percent, a good fit meaning that 95.4 percent of the variations of credit growth can be explained by the independent variables. The model has Prob>F at 0.0 meaning the model as a whole is statistically significant the coefficient of the first lag of domestic credit is positive (0.761) and is significant at the 1 percent level.

The coefficient of Deposit rate on credit growth is negative (-0.302) and is significant at the 5 percent level. This implies that an increase in deposit rate by 1 unit causes a reduction in private sector credit by 0.302 having all other factors constant. The coefficient of lending rate on credit growth is positive (0.076) but it is not significant at any of the 3 critical levels.

The coefficient of the interbank rate on domestic credit is Inter-bank rate (0.014) but is not statistically significant at any of the confidence level. The coefficient inflation rate on credit growth is positive (0.2767) and is significant at the 95 percent level. This implies that an increase in deposit rate by 1 unit causes an increase in private sector credit by 0.2767 having all other factors constant. The coefficient of the 91-Day t-bill rate on domestic credit is negative (-0.019) but was not statistically significant at any of the critical levels.

The coefficient of exchange rate when differenced on credit growth is positive (0.3995) and is significant at the 99 percent level. This implies that an increase in deposit rate by 1 unit causes an increase in private sector credit by 0.399 having all other factors constant. The constant is positive (1.892) and is significant at the 90 percent confidence level.

4.6 Discussion of results

The first objective of the study was to determine the effect of Interbank lending on private sector credit, the model established that the coefficient was not significant therefore the study concluded that the Interbank this means that volatility in the bank market does not affect credit disbursements to the private sector. The paper also set out to establish other key factors that affects private sector credit, it established

that deposit rates affect growth of private sector credit given by the negative coefficient which is also significant, a rise in the deposit rates causes a fall in credit growth as the private sector would opt to save more than to borrow.

The coefficient of Inflation is positive and also statistically significant, this means in periods of high inflation, the private sector would borrow more from the banking sector to supplement their income and meet their expenditure. Exchange rate also had a positive relationship with private sector credit growth and the coefficient is statistically significant meaning that when the exchange rate (units of the local currency exchanging for 1 dollar) increases, the private sector would borrow more money to meet their import demands.

The study also established that indeed government borrowing in the domestic market does crowd out the private sector, this is given by the negative coefficient of the T-Bill but the variable was found to be statistically insignificant meaning that short term government lending does not affect credit disbursement to the private sector compared to long-term credit to the government., this is because the government is perceived a less risky borrower compared to private sector players as a result banks will prefer lending to government than to the private sector in the long term. According to the study the lending rate had a positive coefficient meaning that commercial banks would opt to lend to the public at higher interest rates but the variable was to be insignificant at the 3 critical level.

4.7 Post estimation tests

4.7.1 Autocorrelation

Test for serial correlation in the error terms using the Durbin Watson test revealed there was no autocorrelation in the model. Since the Durbin Watson d-statistic falls between the preferred range of 1.5-2.5 .

Table 10: Durbin Watson test for Autocorrelation

Model	d-statistic
1	2.1302

4.7.2 Heteroscedasticity

The Breusch-Pagan test for heteroscedasticity was applied to the model. H0: homoscedasticity and H1: unrestricted heteroscedasticity. If Prob> chi2 value is, greater than 0.05 we fail to reject the null hypothesis.
Since the P value is 0.9499 (greater than 0.05) we fail to reject the null and conclude homoscedasticity.

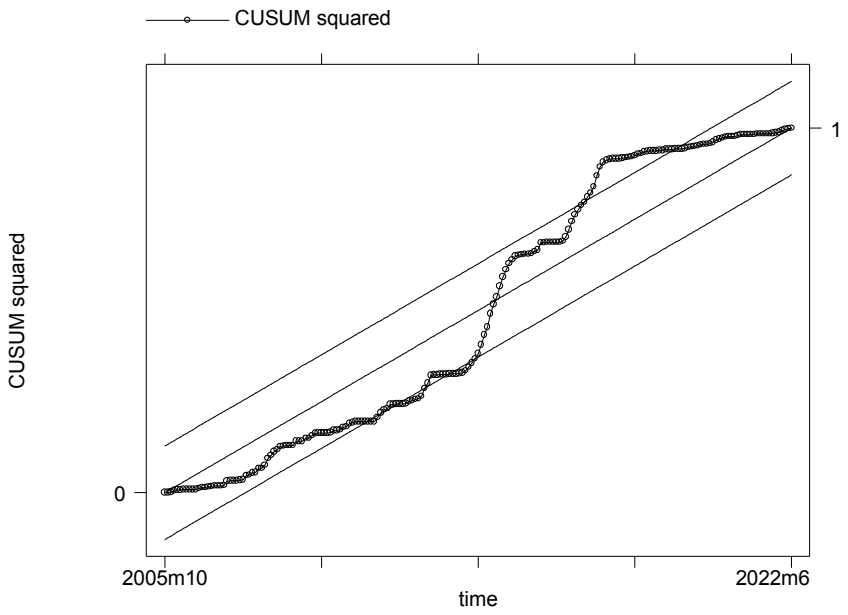
Table 11: Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity

source	Chi2 (1)	Prob> chi2
Heteroskedasticity	14.13	0.2

4.7.3 Model Stability

The cusum graph shows the model lies within the 5 percent significant level showing the model is stable.

Figure 5:Cusum graph



CHAPTER FIVE: SUMMARY, CONCLUSSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter focusses on the summary of the results obtained. Limitations of the study, it looks at policy recommendations that will enable growth in domestic credit to spur economic growth. This last section also looks at possible areas for further research.

5.2 Summary

The objectives of the study were to establish the pattern and nature of domestic credit growth in Kenya and main factors affecting it and if the inter-bank rates were among the key factors. Private sector credit growth in the 16 and half year period of study hit a maximum value of 35.9 percent clearly showing the potential and the goodwill of banks to lend money to the private sector. However, during periods of shocks e.g. electioneering period, pandemic periods, rate cap period credit growth has failed to grow to desirable levels. We have no statistical evidence to conclude that interbank lending affects credit growth to a significant level. Exchange rate levels, return on savings, loan pricing, inflation and and the return given to banks by government on the short-term paper other variables used to test the second and the third objective. The findings of the study indicated that deposit rate, exchange rate and inflation rate significantly affect credit growth to the private sector.

5.3 Conclusions

With most discussions happening in the economic sphere being centered on the effectiveness of monetary policy in, low and lower middle-income countries. Transmission mechanisms of monetary policy to households has often been questioned. With poor transmission mechanisms of monetary policy, fiscal policy has been stronger in this country, whereas in high income countries monetary policy has been very effective.

The study concludes that inter-bank lending does not crowds out the non-financial sector, this means that volatility in the interbank market are not passed to the credit market to cause an increase or a reduction in private sector credit. When banks offer higher returns on savings, economic agents (households and firms) opt to save more money and borrow less hence the negative effect of the deposit rate on private sector credit growth.

From the study, it can be seen than reduction in interest rates do lead to a reduction in domestic credit, this is so because commercial banks often price credit based on the riskiness of the customer. Commercial banks will opt to lend to the government and less risky customers in periods of low interest rates or rather banks will increase lending when the market offers high interest rates which is the return on capital.

According to the study inflation levels also proved to impact private sector credit positively. Indicating that when price levels rise people borrow more to supplement their income. Also, of importance, volatility in exchange rates showed a very a big ripple effect on private sector credit, when the shilling depreciates against the United States dollar private sector credit tends to grow.

Government involvement in the domestic credit leads to a reduction in privates sector credit growth confirming the heavy crowding out effect in Kenya. This has been because banks prefer lending to the government because of the low risk involved in comparison to risk associated with lending to the private sector.

5.4 Policy recommendations

As a country continues on its growth trajectory credit availability and affordability plays a vital role in both at micro and macro level to build effective demand and effective supply. Regulation remains important in the financial markets remains very important to ensure the wellbeing of both the lender and

the borrower are well catered for. The following are the policy recommendations from the study to strengthen the credit market.

- Central Bank should tighten the screws in the Interbank market to safeguard the banking space against the collapse of another lender but the variable does not affect private sector credit growth.

- The government should reduce its involvement in the domestic credit to free more credit to the private sector this will help jump start the economy.

- Since the Inflation rate and the exchange rate showed a significant influence on private sector credit growth, the Central should tighten its monetary policy tools to take of inflationary pressures and keep credit growth on a sustainable path

- In order to grow private sector credit, the central bank needs to develop a framework that makes sure that banks borrow from it for onward lending this will make monetary policy more effective by improving the transmission mechanisms i.e. a reduction in the benchmark lending rate should lead to lower commercial bank lending rates and a faster credit growth.

- In order to grow the domestic credit to desirable levels the government through the legislature should completely liberalize the financial markets and not introduce any forms of rate caps in the future, as this slows down credit growth and slows down economic growth.

5.5 Limitations of the Study

The study focused on a shorter time period (16.5 years) because of the unavailability of monthly data from on the previous periods.
The study used variables that are aggregated on a monthly basis, this inhibited the examination of key variables that may affect domestic credit growth but are aggregated annually such as GDP growth and population growth rate.

5.6 Areas for further research.

More studies need to be done on credit growth and factors such as population growth, prevailing economic times, among others that lead to high or low advancement of credit by commercial banks to the private sector to help boost the private sector and accelerate economic growth.
Since interbank rates are mainly a result of demand and supply of credit in the banking sector, studies in future could try and establish how other factors such as riskiness of bank, prevailing economic environment among affects movements in the interbank rates.
On lending rates, research needs to be done on causality since commercial banks rarely depend on the central bank for funds for onward lending, the base lending rate from the central bank has been rendered almost useless in loan pricing hence banks rely on other instruments such as T-bill rates for loan pricing.
The study showed an impressive relationship between credit uptake and exchange rate, this forms an area where researchers can proceed for an in-depth research to help understand this relationship better.

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