DECLARATION

This Research Paper is my original work and has not been presented for examination in any other university.

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SUPERVISOR’S APPROVAL

This Research Paper has been submitted for examination with our approval as the university supervisors.

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Ms. Susan A. Ayako
DEDICATION

I dedicate this paper to my husband, Eliud Chemweno, and my lovely daughter Maya Cheruto, for their moral support, prayers and for cheering me on throughout the time I was undertaking this research project.

And to my loving mother, Eusebia Muthoni Njiru, for her encouragement, unceasing prayers and for setting me on a strong academic foundation.
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ABSTRACT

With banks being the major avenue that the CBK relies on to execute monetary policy, the paper sought to investigate whether commercial banks are actually responsive to monetary policy. The study used an Error Correctional Model to estimate a relationship where lending rates were treated as the dependent variable while the independent variables were monetary policy, specifically CBR. The model was also expanded to include additional independent variables specifically monetary policy transmission channels. These include the credit channel which is represented by credit to the private sector, exchange rate channel represented as nominal exchange rate and asset price channel. For consistency, inflation and economic growth were included in the model because these are the targets of monetary policy. The study findings showed that there was a long run relationship between lending rates and Central Bank Rate, Exchange Rates, Asset Price, Credit to the Private Sector, Economic growth and Inflation Rates. The results also indicated that CBR and Inflation cause lending rates to increase in the short run while credit to the private sector causes lending rates to decrease in the short run. A statistically significant relationship was also established between lending rates and exchange rate, CBR, credit to the private sector and inflation rates. The study also showed an insignificant relationship between lending rates and asset prices as well as economic growth in short run. The study concludes that commercial banks’ lending rates are indeed positively responsive to CBR and that CBR as an instrument of monetary policy is indeed an effective tool as it increases lending rates and relieves demand pull pressures in the economy. This could however conflict with the promotion of economic growth.
LIST OF ABBREVIATIONS

CBK : Central Bank of Kenya

CBR : Central Bank Rate

CRR : Cash Reserve Ratio

KSH : Kenya Shilling

MPC : Monetary Policy Committee

OMO : Open Markets Operations

OLS : Ordinary Least Squares

ADF : Augmented Dickey-Fuller

GDP : Gross Domestic Product

FDI : Foreign Direct Investment

VIF : Variance Inflation Factor

ANOV : Analysis of Variance

ECM : Error Correction Model
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CHAPTER ONE

INTRODUCTION

1.1 Background

Commercial banks’ lending rates influence the availability of affordable funding for investment and consumption, therefore determining the overall rate of economic growth in an economy. When rates are high, people tend to shy away from borrowing because it will be difficult to pay back. Lower rates in any economy are beneficial because more people are likely to take loans in order to make purchases and expand their businesses, thus boosting economic growth. Monetary policy is one of the many factors that affect lending rates (Castro and Santos, 2010).

Freixas and Rochet (2008) describe bank loans as important long-term financing sources in many countries, making banks the main mobilizers of financial resources and allocators of these resources to investments. In giving loans to their customers, banks are guided by profitability, liquidity and solvency principles, as well as the volume of deposits they hold, their investments, the prevailing interest rates, prestige, competition and public recognition (Olokoyo 2011).

Studies by Romer and Romer (1990), Bernanke and Blinder (1992) and Christiano et al. (1994) confirm earlier findings by Friedman and Schwartz (1963) that monetary policy influences the real output of the economy for the succeeding two years or even more. Monetar policy is therefore without a doubt a powerful tool. However Mishkin (1995) warned that to conduct monetary policy successfully, the monetary authorities must have expertise in monitoring and interpreting the effect of policy actions on the workings of the
economy. This in turn requires the policymakers to understand the mechanism through which monetary policy affects the economy, which is often known as the monetary transmission mechanism.

In 2012, the Kenyan banking sector faced a tight monetary policy and a virtually slow rate of lowering their lending rates despite a considerable decline in the CBR in the second half of the year. Credit to the private sector grew at a slower rate of 11.7 percent in 2012 compared to 30.8 percent growth in 2011 mainly due to the high cost of borrowing (Ministry of Devolution and Planning Report, 2013). Consequently, the country’s banks have held home loan lending rates at between 17 and 19 percent in the past year (2013).

Continuing high levels of interest rates have been stifling the local real estate market creating an obstacle to widespread home ownership, with home loan payments now running at typically twice prevailing rents, hence leaving business inventories with unsold property (Hass Consult Mortgage Report Q1, 2013).

On 10th January 2013 the Monetary Policy Committee cut the CBR from 11 per cent to 9.5 per cent. However there has been a major uproar where commercial banks have been accused of not conforming to the various stances advised by the CBK. For example, with the CBR rate at 9.5 per cent in January 2013, it was expected that there would be at least a 4 per cent spread, meaning commercial banks were expected to set their rates at between 13 to 14 per cent. However the average rate offered by commercial banks remained close to 18 percent (Hass Consult Mortgage Report, 2013).

Changes in the CBR have often met resistance from commercial banks which have repeatedly failed to match this rate as depicted by the central bank. When CBK lowers its bench mark lending rates, this gives hope that commercial banks will follow suit although they are always reluctant to offer credit to their customers at a reduced rate. There have
been several instances where many lenders do not lower their lending rates. It has been widely noted that while the CBK generates much effort to influence money supply by instituting various policies whose success mainly depend on the response of commercial banks, the effectiveness of this tool is lacking.

This study therefore investigated the effect of monetary policy on the lending behavior of commercial banks in terms of interest rates and reserves available for lending. With banks being the major avenue that the central bank relies on to execute monetary policy, the paper sought to investigate whether monetary policy actually works and whether commercial banks are actually responsive to monetary policy. The study sought to establish the trends of monetary policy and lending rates in the country. The study specifically asked how the CBK’s monetary policy instruments, specifically the CBR, affects the lending behavior of commercial banks in Kenya.

**1.1.1 Banking Industry in Kenya**

During colonial times, most Kenyan banks had little business with the indigenous population of Kenya and even when they went into deposit banking they would concentrate on the settler immigrant community. Thus up to 1963, the only institution that helped mobilize African savings was the Post Office Savings Bank which accepted African savings from 1910. Even when the commercial banks started dealing with Africans, these dealings were limited to the acceptance of savings. They did not advance any credit to Africans thus the expansion of credit to Africans would become the major aim for intervention by the independence government in this sector (Kinyua, 2000).

After independence, the monetary and financial system in place served the colonial interest and hence on independence, emphasis was on ensuring that there was proper control of the financial and monetary system to facilitate the attainment of economic, social and political
objectives. Thus the independence government set out to rectify the situation by establishing a Kenyan Central Bank to take over the control of monetary and financial policy, introducing a Kenyan currency separate and distinct from the colonial currency and not shared with any other country. The government also entered into the community banking sector by establishing state owned community banks and buying shares in existing banks (Kinyua, 2000).

The Kenyan financial sector has grown massively in the past 5 years, due to high interest incomes and other charges by commercial banks and increased branch network and agency banking. There were 43 commercial banks, 1 mortgage finance company, 8 deposit taking microfinance institutions and 7 representatives of foreign banks by March 31st 2013 (CBK Report, 2013). Kenya’s financial sector is highly dominated by commercial banks and the level of bank penetration and competition is high. Foreign banks operating their subsidiaries in Kenya are also present and quite stable. With the increase in the number of banks in the country and the consequent rise in competitiveness, several banks are opening their doors to the low income people. Personal and retail banking has become accessible even to the rural unbanked as banks improved their branch network to cover most parts of the country. With this, banks were able to generate cheap deposits that did not require payment of high rates of interest on deposits. The overall performance of the banking sector in Kenya has since remained strong and sound, reporting enviable profits despite high inflation in the country.

1.1.2 Monetary policy in Kenya

The CBK is responsible for implementing monetary policy in Kenya in three main ways. Firstly by the use of OMO which refers to the buying and selling of securities to regulate money supply, short term interest rates and credit conditions in the economy. After the Central Bank buys securities, it increases the reserves of commercial banks thus enabling
them to lend more to their customers. This in turn increases the money supply in the economy (Central Bank of Kenya Monetary Policy Statement June, 2013). Secondly, monetary policy is implemented by the use of CBR which is defined as the lowest rate of interest charged on loans to commercial banks by the CBK and is the base for all monetary policy operations. CBR is determined by the MPC and its movement in direction and magnitude signals the monetary policy stance. A reduction of the CBR shows an easing of monetary policy and a desire for market interest rates to move downwards. Lower interest rates leads to an increase in the demand for credit which further spurs economic activities leading to growth (Central Bank of Kenya Monetary Policy Statement June 2013). Thirdly, CBK uses CRR which is the share of a commercial bank’s deposit liability which must be deposited at CBK at no interest. A reduction of the CRR improves commercial banks’ liquidity thus enabling them to expand credit. An increase in CRR reduces liquidity and could also dampen demand-driven inflationary pressures. Lastly, CBK uses discount window operations where it provides short-term loans to commercial banks on an overnight basis at punitive rates, therefore making commercial banks seek funding in the market and using CBK funding only as a last resort. The discount rate is set by the Central Bank to reflect the monetary policy objectives of the time (Central Bank of Kenya Monetary Policy Statement June 2013).

1.1.2.1 Central Bank Rate

CBR is defined as the lowest interest rate that a Central Bank can charge on loans extended to commercial banks. CBR in Kenya is reviewed by MPC and consequently announced every two months. The movements of CBR both in direction and magnitude usually signal the prevailing monetary policy stance (CBK, 2013).
CBR was introduced in Kenya in June 2006 at an initial rate of 9.75, prior to which CBK operated under a monetary policy framework that included monetary aggregates targets that were consistent with a given level of inflation and economic growth. To date, CBK still uses a monetary programme that targets monetary aggregates. Monetary aggregate targeting has however been criticized as only being effective where there is a stable demand for money relationship dependent on the overall economic activity and price level of a country – which may not be the case in Kenya (KIPPRA 2006).

Several countries have used the CBR as a tool of monetary policy. For instance the US Federal Reserve has always maintained a low interest regime (Mbotu, 2010). Furthermore, in August 2002, the Bank of Japan abandoned providing liquidity in the market in an attempt to maintain CBR close to 0%. Instead the target was raised to around 0.25% because signs of economic recovery had surfaced (Nagayasu, 2003). Some studies have also shown that in the Euro area, shifts in the policy rate are not entirely passed through to retail lending rates (De Bondt et al., 2005). For example, large Italian Banks which have easy access to non-deposit fund raising are able to protect their lending from monetary policy shocks (Gambarcorta, 2003).

1.1.3 Monetary Policy Transmission Mechanisms

Monetary policy transmission mechanisms explain how policy induced changes in the nominal stock or the short-term nominal interest rates have an impact on the economy. For instance the MPC changes the CBR from time to time to signal the monetary policy stance it is following (Were et al., 2013). The first monetary policy transmission channel is the interest rate channel where CBR influences other short-term rates and long-term interest rates, like the lending rate. As a result of increased lending rates, firms reduce their investment expenditures while households also cut spending on consumption of durables.
due to the higher cost of borrowing. This leads to a fall in aggregate demand and consequent lower inflationary pressures (Mishkin, 1995).

The second channel is the exchange rate channel where when domestic interest rates rise relative to foreign interest rates, equilibrium in the foreign exchange rate market would require gradual depreciation of the domestic currency (Ireland, 2005). This expected future depreciation calls for appreciation of the domestic currency initially, making foreign-produced goods cheaper than home-produced goods. This leads to a decrease in net exports and a consequent fall in total demand. The rise in domestic interest rates above foreign interest rates also attracts capital inflows leading to an appreciation, and depending on the magnitude of FDI, also has implications for aggregate output. This means that the precise effect of a change in the official rate on exchange rates may therefore be uncertain (Were et al., 2013).

The third monetary policy transmission mechanism is the credit channel which works in two ways: first it affects the bank lending channel, and second, it affects firms’ and households’ balance sheets. When CBK reduces money stock, commercial bank’s reserves fall, hence reducing lending by banks. The reduction in money stock also leads to a fall in households’ and firms’ assets and equity prices, leading to a reduction in the net worth of borrowers. Banks then need to screen and monitor borrowers to avoid adverse selection and moral hazard. All these reduce the amount of lending that commercial banks are able to give hence reducing domestic demand leading to a fall in total demand and eventually output (Were et al., 2013).

The fourth is the asset price channel where monetary policy shocks result in fluctuations in assets prices. A monetary policy easing can boost equity prices making equity relatively more attractive to bonds (since interest rate fall) and by improving firms’ earnings outlook a
result of more spending by households, leading to a consequent rise in output and prices (Agha et al., 2005).

1.1.4 Lending Rates and Evolution of Monetary Policy

Lending rate, also interchangeably referred to as interest rate, is the fee that a borrower must pay to a lender to make up for the opportunity cost that the lender incurs in releasing and therefore not holding the borrowed funds. The various types of lending rates in Kenya are flat rate interest which is based on the principal amount borrowed so that the interest charged remains constant until the term of the loan expires, and reducing balance interest rate which is based on the interest payable based on the principal balance remaining at each time interval, so that as the funds owing are repaid and decrease, so does the interest charged reduce. Fixed rates are interest rates that do not change throughout the term of the loan while Variable interest rates change during the term of the loan (Naheed et al., 2009).

During the first decade after independence, the Kenyan government did not actively impose monetary policies; rather it stamped its legitimacy by merely being a lender of last resort to commercial banks. Almost all economic activities including the banking sector were covered by general and widespread controls, hence monetary policy was only used frugally as a tool of economic management. No intervention was necessary in an environment of 8% GDP growth and below 2% inflation rate. The government mainly relied on direct controls, setting limits on the amount of credit that financial institutions could lend. The CBK also relied on moral suasion, enlisting support from commercial banks through regular meetings to explain the thrust of moral policy initiatives. Eventually, the government was forced to come up with fiscal and monetary policies to restrain rising inflation and stunted economic growth (Kinyua, 2000).
The 1970s came with increased domestic credit which in turn led to higher imports and the reduction in net capital inflows, which the CBK combated by enforcing a minimum cash ratio of 5% on commercial banks and a liquidity ratio requirement of 12.5%. Commercial and non-bank financial institutions were also compelled to reduce their lending for financing imported consumer durable goods between July and October 1971. These measures led to a decline in domestic credit to 12.2% in 1971/72 from 30.2% in 1970 (Kinyua, 2000). In 1971, credit to the private sector had only risen by 5%. This brought about fears that economic growth was likely to slow down in the coming years, hence prompting CBK to instruct commercial banks to increase their lending to the private sector by no more than 12% for the whole of 1972. CBK also directed that the agricultural sector, small African enterprises and exporters be given priority access to loans. All this was an aggressive attempt to maintain the growth momentum.

By 1985, the government had realized that all the economic difficulties the country faced were structural in nature. It therefore called for structural reforms in the economy, which were to complement the existing stabilization measures. 1986 saw reform measures meant to enhance the effectiveness of monetary policy put in place; for example treasury bonds were introduced and the cash ratio for commercial banks was reintroduced at 6% in the same year. Open Market Operations were introduced in July 1991. However despite all this, the fluctuations in the growth of domestic credit and money supply persisted, expanding faster than expected between 1987 and 1991 reflecting the effect of expansionary monetary policy, making the government resort to more borrowing from the banking system to finance its growing budget deficits, thus making the CBK task of managing monetary policy even more difficult. In addition, commercial banks misreported their credit extension operations and credit guidelines were rarely observed because there were no sanctions to enhance compliance. However the 1990s brought with them liberalization of the economy
where interest rate controls were relaxed and the exchange rate system was made flexible (Kinyua, 2000).

1.1.5 Current Monetary Policy framework

The MPC has been seen to implement a gradual tightening of monetary policy in a bid to stabilize inflation and the exchange rate by setting the CBR rate at 7% in September 2011 and raising it further to 18% in December of the same year. This was meant to prompt banks to raise their interest rates thus reducing extension of credit to the private sector. In March 2012, commercial banks increased their lending rates from 15.21% to 20.34% (Monetary Policy Statement November, 2013).

In the second half of the fiscal year 2012/2013, commercial banks’ lending and deposit rates declined gradually reflecting improved liquidity conditions in line with the monetary policy stance that the MPC had intended. Average commercial banks’ lending rates decreased from 18.15 percent in December 2012 to 16.97 percent in June 2013 (Monetary Policy Statement December, 2012).

1.2 Statement of the problem

The biggest challenge Kenya is facing is the persistent increase in lending rates where the cost of borrowing has been rising incessantly. This has a negative effect on investment because the higher cost of borrowing discourages investors from borrowing capital. Availability of affordable credit for investment and consumption usually leads to an increase in the overall rate of economic activity and consequently economic growth, while higher cost of borrowing stunts economic growth.

The general consensus in Kenya is that commercial banks have been reluctant to reduce their lending rates even when the CBR is at an all-time low. While the CBK has expended
much effort to influence money supply by implementing various policies to curb inflation, there has been a general uproar this has not been felt on the ground because commercial banks have failed to respond in equivalence, especially where falling of rates is concerned. This study seeks to establish whether this is indeed true, and to measure the responsiveness of commercial bank’s lending rates to changes in the monetary policy stance, specifically the CBR.

Several studies have been done in relation to commercial banks in Kenya. Gitonga (2010) studied the relationship between interest rate risk management and profitability of commercial banks while Edwin (2010) studied the challenges faced by CBK in combating money laundering. Few studies that have been conducted on the relationship between monetary policy and lending rates in Kenya one of them being a study by Mbotu (2010) who studied the impact of the CBR on Kenyan commercial banks’ lending rates. There is limited information around the concept of the effectiveness of monetary policy in reducing lending rates. This study therefore seeks to investigate whether there is an existence of a long run relationship between monetary policy and lending rates, thereby examining how monetary policy affects lending rates in Kenya and consequently offering the policy implication.

1.3 Objectives of the study

The objectives of the study were:

1. To establish the responsiveness of commercial banks’ lending rates to monetary policy in Kenya

2. To determine if monetary policy transmission mechanisms have a significant relationship to commercial banks’ lending rates in Kenya.
3. To determine the effect of economic growth and inflation on lending rates in Kenya.

1.4 Research Questions

This study sought to answer the following research questions:

1. What is the contribution of monetary policy to lending rates in Kenya?
2. What is the relationship between monetary policy transmission mechanisms and commercial banks’ lending rates in Kenya?
3. What is the effect of economic growth and inflation on lending rates in Kenya?

1.5 Justification and Significance of the Study

The findings of the study will be beneficial to commercial banks in understanding how they can contribute to economic growth by responding to monetary policy like they are supposed to. It will also be beneficial to the local citizens in understanding why commercial bank’s lending rates fluctuate the way they do, and whether the CBK is fully responsible for this change all of the time. This will help them make the wisest borrowing decisions. The government will also get an insight into the effect of monetary policies on the lending behaviour of commercial banks. This study will also be beneficial to researchers and scholars as it will form a basis for further research.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section contains a literature review which this study will be anchored on. It also evaluates different studies as presented by different scholars in relation to the topic at hand. The section ends with a summary of the entire literature review.

2.2 Theoretical Literature Review

This section reviews some of the theories surrounding the factors that influence the determination of lending rates as well as the contribution of monetary policy to the changes in lending rates. The purpose of this section is to examine the corpus of theory that has accumulated in regard to the topic of this study.

2.2.1 Keynesian vs. Monetarist Views

Keynesians believe that monetary policy transmission mechanisms are interest rates and investment. On the other hand the monetarists believe that monetary policy affects prices (interest rates included), but not real GDP or unemployment. Keynesians believe that an expansionary monetary policy will decrease interest rates, increase spending, increase aggregate demand and output and therefore decrease unemployment. But monetarists believe that expansionary monetary policy will affect mostly prices, not output. This would raise inflationary expectations and actually increase nominal interest rates. Monetarists do not believe in the effectiveness of expansionary policy, unless the economy is below full employment (State University of New York at Oswego 2014).
2.2.2 Classical theory

The classical theory of interest says that interest rate is determined by the supply of capital. This supply of capital depends on savings and the demand for capital for investment. The classical theory is based on the assumption that there is a direct relationship between the rate of interest, savings and direct relationship between interest and investment. The classical economists believed that high interest rates would lead to a high rate of savings and that investments would increase with a fall in interest rate (Satija, 2009). The classical economists referred to saving only out of current income. This theory assumed that savings was only demanded for investment, and regarded interest as a function of saving and investment, \( r = f(S,I) \) (Satija, 2009).

2.2.3 Loanable Funds Theory

This theory is also known as the Neo-classical theory of interest and was developed by Knut Wicksell. Loanable funds’ includes saving out of current income, bank credit, dishoarding and disinvestments. Bank credit is considered an important source of funds for investment. In this theory, demand for funds arises for investment and hoarding wealth. Here the rate of interest is a function of four variables, i.e., \( r = f(I,S,M,L) \) where \( r \) is the rate of interest, \( I = \) investment, \( S = \) saving, \( M = \) bank credit and \( L = \) desire to hoard or the desire for liquidity (Satija, 2009).

Determination of interest rates under the loanable funds theory depends on the availability of loans which is based on the net increase in currency deposits, the amount of savings made and the willingness to enhance cash balances and opportunities for the formation of fresh capital (Bibow, 2000). An increase in the supply of loanable funds leads to a fall in the interest rate. Demand for loanable funds emanates from the demand for final goods and services which are generated from the use of capital that is financed by the loanable funds (Bernanke and Blinder, 2000).
2.2.4 Liquidity Preference Theory
According to Keynes, interest is the reward for parting with liquidity for a specified period of time. Keynes believed people have liquidity preference for the transaction motive, precautionary motive and speculative motive. Speculative demand for money does not exist where there are assets that dominate money. Keynes also believed that the amount of money held for speculative motive had a negative relationship with the rate of interest. Keynes was of the view that the rate of interest was determined by liquidity on the one hand and the supply of money on the other (Satija, 2009).

2.2.5 Loan Pricing Theory
Stiglitz and Weiss (1981) declared that banks are not in a position to set high interest rates in order to achieve the maximum interest income. This is because banks consider the possibility of the existence of adverse selection and moral hazard among their customers because it is challenging to predict the type of borrower at the beginning of the banking relationship. High interest rates tend to induce adverse selection problems by attracting high risk borrowers (Chodecai, 2004). It is therefore common to find that interest rates set by banks may not tally with the risk of borrowers.

2.3 Critique of Theoretical Literature
The loanable funds theory is considered an improvement of the classical theory of interest. However it has been criticized for assuming that savings is a function of the rate of interest; it ignores the influence of the changes in the level of investment on employment, income and on savings (Satija, 2009). Critics also say that Keynes over-emphasized the liquidity preference factor in the theory of interest and that it is only when a person has savings that the question of parting with liquidity arises (Satija, 2009).
2.4 Empirical Literature Review

Several studies suggest the presence of a bank lending channel of monetary policy in several countries. The bank lending channel refers to the fact that changes in monetary policy influence the amount of loans disbursed by financial institutions. Aban (2013) investigated the relationship between loan growth and monetary policy. The use of panel ordinary least squares method results showed that the loan growth of small banks is responsive to movements in monetary policy thus suggesting that the bank lending channel is present in the Philippines. The study found that increasing policy rates results in a decrease the supply of loans in small banks, and that smaller banks are more sensitive to monetary policy contractions than big banks. The paper also presented that bank characteristics, especially asset size, can have influence in the existence of the bank lending channel. Smant (2002) however insists that the fact that a bank credit channel is an integral part of monetary transmission is debatable. Smant (2002) argues that the existence of the credit channel as evidenced by several empirical results can have different unrelated interpretations.

Nguyen (2012) studied the responsiveness of Vietnamese commercial banks to counter cyclical monetary policy. The study used Perron’s (1997) endogenous unit root test function with the intercept, slope and the trend dummy to test the hypothesis that the Vietnamese lending – discount rate has a unit root. The study found that the asymmetrical response of Vietnamese commercial banks to countercyclical monetary policy was competitive and that the monetary authority was mostly successful in using its monetary policy instruments to achieve its laid down objectives. The study interpreted this as the result of graft maximizing behavior of commercial banks that operate in a dishonest atmosphere. As a solution to this, the study recommended a strong political will and commitment by the authorities to
reforming the current system while ensuring that frequent checks and balancing of the political environment as well as the banking system was in place.

Moinescu and Codirlasu (2011) investigated the interaction between credit to the private sector and GDP growth in the new EU member states. The analytical framework was based on the financial accelerator theory with feedback effects from the banking book quality, while the empirical component consisted of econometric models based on panel data regressions using annual data. The central variable was the change in private sector credit flow in percent of GDP. One of their econometric findings was that the persistence of a credit flow weaker than potential growth and excessive financing are associated with high levels of non-performing loans ratio two years later.

Aristei and Gallo (2012) used a Markov-switching vector autoregressive model to determine the interest rate pass-through between interbank and retail bank interest rates in the Euro area specifically during the financial crisis. Monthly data for the period 2003 (1) – 2011 (9) was employed. The results showed that during financial distress, banks reduced their degree of pass-through from the interbank rate. Interest rates on loans to non-financial firms showed more responsiveness to changes in the interbank rate than loans to households, both in times of high volatility and in normal market conditions.

Maana and Tiriongo (2011) found that monetary policy press releases were a sure way of directing the movement and direction of short term interest rates. They used an exponential generalized autoregressive conditional heteroskedastic model to investigate the responsiveness of interbank interest rates and the 91 day Treasury bill rates to policy announcements. They specifically discovered that announcements with loose policy inclination tend to be more effective compared with tight inclination. Maana and Tiriongo
Mohsin (2011) used bank-type monthly data to estimate the impact of discount rate on weighted average lending and deposit rates in Pakistan. The study used panel data technique followed by the Pedroni panel cointegration test to check for a long-run relationship between the discount rate and lending and deposit rates. The findings were that banks typically pass on 16 percent of the cost of the discount rate to their customers. The study found that monetary policy effectiveness in Pakistan is limited and that there is a noteworthy lag in its completeness.

Georgievska et al. (2011) found that lending rates are largely determined by bank size and market share. Deposit rates and non-performing loans were found to affect lending rates to a lesser extent. Domestic policy rate and the foreign interest were also found to have a significant effect on the determination of lending rates.

Olokoyo (2011) used ordinary least square estimation, unit root test and cointegration test to investigate the determinants of Nigeria’s commercial banks’ lending behavior. The study found that commercial banks should work on building their deposit base as this would enhance their lending performance. The study also recommended that banks should focus on mobilizing more deposits as this will enhance their lending performance. Banks were also advised to formulate solid financial plans.

2.5 Summary of the Literature Review

The theoretical review gave a number of factors as the determinants of interest rates. The Keynesians and monetarists regarded monetary policy as a factor that determines interest rates, while the classical theory suggests that interest rate is a function of savings and investment, \( r = f(S, I) \). In the loanable funds theory, the rate of interest is a function of
interest \((r)\), savings \((S)\), investment \((I)\), bank credit \((M)\) and the desire to hoard \((L)\). The liquidity preference theory was of the view that interest rate is determined by money supply and liquidity.

Several studies suggest the presence of a bank lending channel of monetary policy in several countries. The bank lending channel refers to the idea that monetary policy affects the amount of loans that financial institutions are able to give to their customers. Most of the studies also found that the effectiveness of monetary policy in such countries as Nigeria, Pakistan and the Philippines is wanting and that there is a significant lag in its completeness. One of the studies suggested that persistent credit flow weaker than potential growth is associated with high levels of non-performing loans. Most of the studies in the empirical review used cointegration and time series analysis, hence this study also used the same in its research analysis.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction
This section entails specification of the model which involves structuring of the model, estimation techniques which are the tests to be done on the model, statistical tests which are the tests for the regression model, and data source and type which shows where the data will be generated from.

3.2 Specification of the Model
The study used OLS to estimate a functional model where lending rates were treated as the dependent variable while the independent variables were monetary policy, specifically CBR. This is because the main focus of the study was to determine the effect of monetary policy on lending rates and to establish whether lending rates are actually responsive to monetary policy. CBR represented monetary policy in the model because CBR is the instrument that mostly influences commercial banks’ lending rates directly among all the other instruments of monetary policy. The model was also expanded to include additional independent variables specifically monetary policy transmission channels. These include the Credit channel which is represented by credit to the private sector, Exchange Rate channel represented as nominal exchange rate and Asset Price Channel. For consistency inflation and economic growth were included in the model because these are the targets of monetary policy.

The functional relationship of the empirical model appeared as follows:

\[ LR = f ( CBR, CPS, NER, AP, In, Gr) \]………………………………………..(1)
Where:

\[
\begin{align*}
LR &= \text{Commercial banks’ lending rates} \\
CBR &= \text{One of the instruments of monetary policy which was specifically chosen to represent monetary policy because CBR is the instrument that mostly influences commercial banks’ lending rates directly among all the other instruments of monetary policy} \\
CPS &= \text{Credit to the private sector} \\
NER &= \text{Nominal Exchange Rate} \\
AP &= \text{Asset Price} \\
In &= \text{Inflation} \\
Gr &= \text{Economic Growth}
\end{align*}
\]

This paper focused on the effect of monetary policy on commercial bank’s lending rates. The variables CPS, NER, AP were included in the model because they are the transmission mechanisms of monetary policy; hence it was imperative to explore how these transmission mechanisms affect lending rates. Inflation and economic growth were also included in the model for consistency because these are the targets of monetary policy. When economic growth is high, demand for money is also high since greater economic activity means that there is more need for cash to finance projects. Higher demand in turn drives up lending rates. On the other hand, slower economic growth reduces the demand for money since individuals and businesses are less likely to take out loans to finance projects and purchases. Lower demand for loans may lead to a fall in lending rates.
3.2 Estimation Techniques

The time series analysis tests that were performed on the model included the following:

3.2.1 Correlation Analysis

Spearman’s rank coefficients were used to show the relationship between various pairs of variables. The significance of the relationships was further investigated to show whether the pairs of relationships were significant. The study thereafter employed VIF to confirm if correlation between variables was high enough to yield misleading results.

3.2.2 Normality Test

To fulfil the requirements of OLS, Shapiro Wilk test was used to investigate whether the variables were normally distributed or not.

3.2.3 Heteroscedasticity Test

The study used the residual plot method to investigate whether there was variation of the residuals across all the observations under the study. Considering the residual plot method is too subjective, the study further employed Breusch-Pagan/Cook-Weisberg test for heteroscedasticity.

3.2.4 Autocorrelation

Autocorrelation leads to bias and thus spurious estimates. To test for this, the study used Breusch-Godfrey Langrage Multiplier test for autocorrelation. Serial correlation usually implies that there is correlation between stochastic random error terms of the subsequent time periods. Autocorrelation can be remedied through the use of robust standard errors.

3.2.5 Linearity

Linearity is another assumption of OLS that was tested. The study used two plots where the plot of the dependent variable against its fitted values and the plot of the estimated residuals against their fitted values were analysed.
3.2.6 Stationarity and Unit Root Test

In order to check for stationarity of the data, the study employed ADF. ADF was chosen here because it is usually not affected by autocorrelation as opposed to other tests. If the exogenous data was run through ADF test and happened to be stationary at level, the data would be assumed to be affecting the model in the short run. On the other hand, if the data was found to contain unit root and required first difference in order to be stationary, then the variable in question would have been deemed to have a long run relationship with the dependent variable and would therefore require a cointegration test to be conducted.

3.2.7 Cointegration test

Establishment of the existence of long run or short run relationship between the lending rates and the respective explanatory variables was necessary. The Engel Granger test was used to test for cointegration.

3.4 Data Type and Source

This study used quarterly time series secondary data from the period of June 2006 to March 2014 of commercial bank’s lending rates, CBR, credit to the private sector, nominal exchange rate, asset price, inflation and economic growth. This study focused on lending rates in general as charged by different banks where data relating to commercial banks’ weighted average interest rates that correspond to each bank’s market share in loans and advances was used. The data was collected from the CBK and World Bank. The data used began from June 2006 because CBR was first introduced in June 2006. Quarterly data was therefore used to avoid the problem of limited degrees of freedom.
CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 Introduction
This chapter explores whether there is an existence of a long run relationship between monetary policy and lending rates and thereafter examines how monetary policy affects lending rates in Kenya. This chapter utilizes both tables and graphs to illustrate the descriptive and regression results. Quarterly time series data containing variables under study for the period 2006-2013 was used.

4.2 Descriptive Statistics
Lending rates (LR), Central Bank Rate (CBR), credit to the private sector (CPS), Exchange Rates (NER), Asset Price (AP), Inflation Rate (In) and Economic Growth (Gr) were summarized through computation of mean, standard deviation, minimum and maximum. The mean values show the averages for all variables under the study while the standard deviation is a measure of dispersion that indicates variability in the measures.

From Table 4.1, it was revealed that all variables had 31 observations for the entire period of study whereby lending rates had an average of 15.38% with a small standard deviation of 2.28% which fluctuated between the lows of 12.87% and the highs of 20.34% whereas the CBR oscillated within 6% and 18% but maintained a mean of 9.47%. Inflation rate showed a standard deviation of 5.41% from its mean of 8.74% which was close to its minimum value of 2.19% compared to its maximum value of 18.93% implying that most years had low inflation rates.
Table 4.1: Summary Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR</td>
<td>31</td>
<td>15.38194</td>
<td>2.276457</td>
<td>12.87</td>
<td>20.34</td>
</tr>
<tr>
<td>CBR</td>
<td>31</td>
<td>9.467742</td>
<td>3.231835</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Log CPS</td>
<td>31</td>
<td>11.80097</td>
<td>0.354893</td>
<td>10.8</td>
<td>12.19</td>
</tr>
<tr>
<td>NER</td>
<td>31</td>
<td>78.33671</td>
<td>8.448579</td>
<td>63.303</td>
<td>96.357</td>
</tr>
<tr>
<td>Log AP</td>
<td>31</td>
<td>3.615806</td>
<td>0.0843317</td>
<td>3.44</td>
<td>3.75</td>
</tr>
<tr>
<td>In</td>
<td>31</td>
<td>8.742258</td>
<td>5.409799</td>
<td>2.19</td>
<td>18.93</td>
</tr>
<tr>
<td>Log Gr</td>
<td>31</td>
<td>11.5271</td>
<td>0.1775424</td>
<td>10.6</td>
<td>11.65</td>
</tr>
</tbody>
</table>

Where LR = lending rates, CBR = Central Bank Rate CPS= Credit to the Private sector, NER = Exchange rate, AP=Asset price, In = Inflation rate and Gr = Economic Growth

4.3 Trend analysis

In this section, the study shows the trend of the data used for the analysis. The data used included Lending Rates, CBR, Credit to the Private sector (CPS), Nominal Exchange Rate (NER), Asset Price (AP), Inflation Rate (In) and economic growth represented by GDP.

4.3.1 GDP Levels

Figure 4.1 shows that GDP as per the first quarter of 2006 was Ksh 302795 million. This fluctuated to Ksh 295111 million in the second quarter but later assumed an upward trend. By the last quarter of 2013, GDP was reported at Ksh 442235 million, down from Ksh 444840 million which was reported in the 3rd quarter of the same year.
4.3.2 Commercial Banks’ Lending Rates

On commercial banks’ lending rates trend as represented in Figure 4.2, statistics showed that the average lending rate in the 3rd quarter of 2006 was 13.63%, and 13.89% in the last quarter of the same year. The rates rose to 14.44% in the last quarter of 2008 and 14.88% in the second quarter of 2009. 2012 registered the highest lending rates by commercial banks: in the first quarter, the rate was 20.05%, the second quarter rate 20.21%, while the 3rd quarter rate was 20.00%. In the last quarter of 2013, lending rates had reduced to 16.95%. 
Figure 4.2 Commercial Banks’ Lending Rates

4.3.3 Lending Rate, Exchange Rate and Inflation Rate

Figure 4.3 shows lending rate, exchange rate and inflation rate from the second quarter of 2006 to the fourth quarter of 2013. The data shows exchange rate was low at Ksh 73.405 per US dollar in the second quarter of 2006; in the third quarter of 2011, the rate rose to Ksh 96.357 per US dollar but later reduced to Ksh 85.488 per US dollar in the last quarter of 2013. Lending rates have also changed significantly during the duration. For instance in the second quarter of 2006, lending rate was at 13.79%, rose to 20.3% in the second quarter of 2012 but later reduced to 16.99% in the last quarter of 2013. Inflation rates have also fluctuated with time; for instance in the second quarter of 2006 the rate was 6.6%, in second quarter 2012, the rate rose to 10.09% while in the fourth quarter of 2013 the rate reduced to 9.52%.
The results in Figure 4.3 above shows that, the amount of Credit to the Private Sector in the second quarter of 2006 was Ksh 428936 million which further rose to Ksh 519457 million in the 4th quarter of 2007. Credit to the Private Sector continues to have an upward growth all through the five year period to register at Ksh 1555586 million in the last quarter of the year 2013.
4.4 Correlation analysis

The study explored the spearman’s rank correlation coefficients which were used to illustrate the relationship between various pairs of variables (pairs of dependent and independent variables and between pairs of independent variables). Correlation coefficients greater than zero were considered as positive relationship while coefficients less than zero as an indicator of an inverse relationship. Further, the significance of the relationship was investigated to show whether the pairs of the relationships (correlations) were significant. It was revealed that most of the coefficients were less than the threshold of the absolute value of 0.6 beyond which multicollinearity\(^1\) was to be suspected. However, some of them had high correlation but the relationship was found to be significant. Table 4.2 shows that most of the relationships were positively correlated except a few which were negatively correlated. The negative correlation coefficients included the coefficients of lending rates

\(^1\) Multicollinearity arises when a given pair of independent variables exhibits high correlation (through correlation coefficient). Failure to account for this bias, we could have wrong signs of the coefficients and even spurious standard errors.
and asset price, credit to the private sector and asset price, exchange rates and asset price, asset price and inflation rates and finally asset price and economic growth with 0.5391, 0.2773, 0.4539, 0.3701 and 0.3240 respectively. The correlation coefficients for other pairwise comparisons are presented in Table 4.2.

Table 4.2 Spearman’s rank correlation matrix

<table>
<thead>
<tr>
<th>Variables</th>
<th>LR</th>
<th>CBR</th>
<th>CPS</th>
<th>NER</th>
<th>AP</th>
<th>In</th>
<th>Gr</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBR</td>
<td>0.3629</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0448)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPS</td>
<td>0.7926*</td>
<td>0.2566</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0000)</td>
<td>(0.1634)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NER</td>
<td>0.6901*</td>
<td>0.0518</td>
<td>0.7549</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0000)</td>
<td>(0.7821)</td>
<td>(0.0000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP</td>
<td>-0.5391</td>
<td>0.1722</td>
<td>-0.2773</td>
<td>-0.4539</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0018)</td>
<td>(0.3544)</td>
<td>(0.1310)</td>
<td>(0.0103)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In</td>
<td>0.2017</td>
<td>0.0901</td>
<td>0.0868</td>
<td>0.1087</td>
<td>-0.3701</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.2766)</td>
<td>(0.6298)</td>
<td>(0.6423)</td>
<td>(0.5606)</td>
<td>(0.0404)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gr</td>
<td>0.5362</td>
<td>0.0445</td>
<td>0.6630*</td>
<td>0.7108*</td>
<td>-0.3240</td>
<td>0.1026</td>
<td>1.0000</td>
</tr>
<tr>
<td></td>
<td>(0.0019)</td>
<td>(0.8121)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(0.0753)</td>
<td>(0.5828)</td>
<td></td>
</tr>
</tbody>
</table>

*Shows pairs with high Correlation.

NB: The Figures in parenthesis indicate the significance.
The study further conducted the Variance Inflation Factors (VIF) which was used to confirm if the correlation between variables was high enough to yield misleading results. In this case, values of VIF greater than 10 and values of $1/VIF$ less than 0.10 imply multicollinearity. Table 4.3 presents the Variance Inflation Factors:

**Table 4.3: Variance Inflation Factors**

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>$1/VIF$</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER</td>
<td>1.61</td>
<td>0.622560</td>
</tr>
<tr>
<td>AP</td>
<td>1.59</td>
<td>0.627308</td>
</tr>
<tr>
<td>CP</td>
<td>1.44</td>
<td>0.696048</td>
</tr>
<tr>
<td>IR</td>
<td>1.31</td>
<td>0.762854</td>
</tr>
<tr>
<td>CBR</td>
<td>1.22</td>
<td>0.818896</td>
</tr>
<tr>
<td>Gr</td>
<td>1.05</td>
<td>0.951107</td>
</tr>
<tr>
<td>Mean VIF</td>
<td>1.37</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3 shows that various relationships established did not exhibit multicollinearity.

**4.5 Normality test**

The study conducted Shapiro wilk test to explore whether the specific variables were normally distributed or not and later showed the distribution of the residuals or random error term which is a requirement of the ordinary least squares. This was presented in Table 4.4.
Table 4.4 Shapiro-Wilk Test for Normal Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>W</th>
<th>Probability&gt;z</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR</td>
<td>31</td>
<td>0.81534</td>
<td>0.05210</td>
</tr>
<tr>
<td>CBR</td>
<td>31</td>
<td>0.79063</td>
<td>0.62013</td>
</tr>
<tr>
<td>CPS</td>
<td>31</td>
<td>0.80897</td>
<td>0.00008</td>
</tr>
<tr>
<td>NER</td>
<td>31</td>
<td>0.96032</td>
<td>0.29749</td>
</tr>
<tr>
<td>AP</td>
<td>31</td>
<td>0.95846</td>
<td>0.26543</td>
</tr>
<tr>
<td>In</td>
<td>31</td>
<td>0.86059</td>
<td>0.00086</td>
</tr>
<tr>
<td>Gr</td>
<td>31</td>
<td>0.39768</td>
<td>0.00000</td>
</tr>
<tr>
<td>Residuals</td>
<td>31</td>
<td>0.85204</td>
<td>0.05156</td>
</tr>
</tbody>
</table>

Table 4.4; shows that all variables were normally distributed except for credit to the private sector, inflation rates and economic growth since their p-values were more than 5%. Therefore the study failed to reject the null hypothesis of normality. On the other hand, the p-value of the residuals or error term is greater than 5% implying that although some of the variables were not normally distributed, the random error terms follows a normal distribution.

**4.6 Heteroscedasticity test**

This is the variation of the residuals across all the observations under study. The study used the residual plot method (residuals square against its fitted values) to test for its presence. However this method is too subjective as it relies on observation which led the study to further employ Breusch-Pagan/Cook-Weisberg test for heteroscedasticity. These were
presented in Table 4.5 and Figure 4.5 respectively. It was revealed that the p value of 0.9544 was greater than 0.05 significant levels implying that the study failed to reject the null hypothesis of homoscedasticity.

**Table 4.5 Breusch-Pagan test for Heteroscedasticity**

<table>
<thead>
<tr>
<th>Variables: Fitted values of Lending Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>chi2(1) = 0.0</td>
</tr>
<tr>
<td>Prob &gt; chi2 = 0.9544</td>
</tr>
</tbody>
</table>

Ho: Constant variance

**Figure 4.5: Residuals squared against fitted values**

From Figure 4.5, it was revealed that the plot exhibited a systematic pattern which implied that there was constant variance as expected.
4.7 Autocorrelation

Presence of serial correlation implies that there is correlation between stochastic random error terms of the subsequent time periods. Autocorrelation leads to bias and thus spurious estimates. To this effect, the study employed Breusch-Godfrey Langrage Multiplier test for autocorrelation. The use of robust standard errors also serve as a remedy for autocorrelation. As can be observed from Table 4.6, the p-value of 39.55% was greater than 5% hence the study failed to reject the null hypothesis of no serial correlation.

Table 4.6: Breusch-Godfrey LM test for Autocorrelation

<table>
<thead>
<tr>
<th>lags(p)</th>
<th>chi2</th>
<th>df</th>
<th>Prob &gt; chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.722</td>
<td>1</td>
<td>0.3955</td>
</tr>
</tbody>
</table>

H0: No serial correlation

4.8 Linearity

To ascertain linearity which is one of the assumptions of OLS, the study utilized two plots where the plot of the dependent variable against its fitted values and the plot of estimated residuals against their fitted values are used. Figure 4.6 showed that the scatter plots were symmetrical around 45 degree line. Moreover, the plot did not exhibit a bowed pattern implying that the relationship between the independent variables was linear through the β coefficients. This implied that the model did not make systematic errors when making unusually large or small predictions.
Figure 4.6: Lending Rate against its Fitted Values

Figure 4.7 showed that the scatter plots were fairly distributed on the upper and lower quadratics or on the left and right side of the 45 degree line which implied that linearity condition had been adhered to.

Figure 4.7: Estimated residuals against its fitted values
4.9 Unit Root Test
Unit root tests are used to detect non stationarity in the study variables. If variables are non-stationary, their statistical properties tend to change over time, a characteristic which leads to spurious estimates. Therefore, if variables are found to be non-stationary, either successful lagging is applied until the bias is eliminated or they are differenced. In our case, we undertook the first differences which rendered non stationary variables into stationary. The null hypothesis in this case was that the variable under consideration is non-stationary, that is has a unit root. The Ordinary Least Squares needs time series variables to be stationary since time series variables are constant over the analysis of time and have very low trend to change. To this effect, the study employed the Augmented Dickey fuller Unit Root Tests to determine whether the variables were non-stationary. The test results are in Table 4.7.

Table 4.7: Dickey-Fuller test for unit root

<table>
<thead>
<tr>
<th>Variable</th>
<th>P Value at lag (0)</th>
<th>P Value at lag (0) After First Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR</td>
<td>0.6285</td>
<td>0.0008</td>
</tr>
<tr>
<td>CBR</td>
<td>0.2852</td>
<td>0.0002</td>
</tr>
<tr>
<td>CPS</td>
<td>0.0005</td>
<td>-</td>
</tr>
<tr>
<td>NER</td>
<td>0.7444</td>
<td>0.0002</td>
</tr>
<tr>
<td>AP</td>
<td>0.5126</td>
<td>0.0001</td>
</tr>
<tr>
<td>In</td>
<td>0.3880</td>
<td>0.0370</td>
</tr>
<tr>
<td>Gr</td>
<td>0.0000</td>
<td>-</td>
</tr>
</tbody>
</table>

H₀: Variable has Unit Root
Table 4.7 shows that credit to the private sector and economic growth were stationary without any differencing while lending rates, central bank rate, exchange rate and inflation rate were stationary after first differencing. The model is therefore expressed as shown below;

\[ DLR_t = \beta_0 + \beta_1 DCBR_t + \beta_2 CPS_t + \beta_3 DNER_t + \beta_4 DAP_t + \beta_5 Dln_t + \beta_6 Gr + \epsilon_t \ldots \ldots \] (2)

Where:
DLR = first differences of lending rates,
DCBR = first differences of Central Bank Rate
CPS= Credit to the Private sector,
DNER = First difference of Annual exchange rate,
DAP= first difference of Asset price,
Dln= first difference of Inflation rate and
Gr=Economic Growth

\( \beta's \) are the coefficients to be estimated

\( \epsilon_t \) is error term at time t.

The above model is now stationary implying it can be estimated after verifying all assumptions of OLS. If two or more variables are integrated of the same order and their differences have no clear tendency to increase or decrease then this will suggest that their differences are stationary. However, from Table 4.7, it was revealed that these variables were not integrated of the same order which implied that the study could not have proceeded to determine the long run relationship (cointegration). The study therefore regressed variables integrated of order one I(1), which included Central Bank Rate (CBR), Exchange Rates (NER), Asset Price (AP) and Interest Rates (IR).
4.10 Cointegration test

Establishment of the existence of long run or short run relationship between the lending rates and the respective explanatory variables was necessary since most of the variables were integrated of order one except for credit to the private sector and economic growth. The Engel Granger test was used to test for cointegration. Having established stationarity, the study used a stationarity equation without those variables integrated of order zero, to generate the residuals and the first differences of the residual. The first differences, lagged values and lagged values of the first differences were included in the regression as model regressors (successive regression). The hypothesis tested in this case was that; $H_0$: There is no Cointegration and $H_1$: There is Cointegration. Table 4.8 shows the results;

<table>
<thead>
<tr>
<th></th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
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<tbody>
<tr>
<td>uhat</td>
<td></td>
<td></td>
<td></td>
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<td>L1.</td>
<td>-0.0006768</td>
<td>0.0136795</td>
<td>-0.05</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>LD.</td>
<td>0.1820169</td>
<td>0.1897597</td>
<td>0.96</td>
<td>0.346</td>
<td>-.2073379</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.5713718</td>
</tr>
</tbody>
</table>

Number of Observations = 29
F( 2,  27) = 0.46
Prob > F = 0.6360
R-squared = 0.0330
Adj R-squared = -0.0387
Root MSE = 1.1392

The results in the Table 4.8 showed that the p-value of 0.6360 was more than 0.05 (significance level). Therefore, we fail to reject the null hypothesis of no cointegration which implied that there was no long run relationship between lending rates and Central Bank Rate, Exchange Rates, Asset Price and Interest Rates. These variables have a short run relationship.
4.11 Specification of the Model

Before estimating the model, the study carried out Ramsey Reset test using powers of the fitted values of the first difference of lending rates in estimating whether the model had omitted variables. It was shown that the p-value of 0.0003 was less than the significance level of 0.05 as shown by Table 4.9. This implied that there were omitted variables which influence lending rates.

Table 4.9: Ramsey RESET test for variable omission

<table>
<thead>
<tr>
<th>RESET test using powers of the fitted values of DY</th>
</tr>
</thead>
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<tr>
<td>F(3, 21) = 9.75</td>
</tr>
<tr>
<td>Prob &gt; F = 0.0003</td>
</tr>
<tr>
<td>H₀: The model has no omitted variables</td>
</tr>
</tbody>
</table>

The study confirmed that lending rates is influenced by more than those stated variables. These may either be other fiscal policies or even other monetary policies like money supply.

4.12 Lag determination

The selection of lags was conducted on study variables. It was found that the maximum number of lags were four based on AIC, BIC, HQIC and SBIC criteria as shown in Table 4.10.
4.13 Estimation of the Error Correction model

Among the core objective of this study were to estimate the responsiveness of commercial banks’ lending rates to monetary policy in Kenya, to determine whether monetary policy transmission mechanisms have a significant relationship to commercial banks’ lending rates in Kenya and lastly, to explore the effect of economic growth and inflation rate on lending rates in Kenya.

The estimated short run model includes the first lag of the error correction term despite the fact that the variables which were integrated of order one I(1) were not cointegrated as per the Engle-Granger test. The result that the ECM is highly significant suggested that the prior test used was weak. A long run relationship was established from the ECM. Table 4.11 illustrates the estimates of the ECM.
Table 4.1: Results for the Error Correction model

| Variables | Coefficients | Std. Err. | z    | P>|z| |
|-----------|--------------|-----------|------|-----|
| D_LR      | -0.004666    | 0.00151   | -3.09| 0.000|
| ECT       |              |           |      |     |
| L1.       | -0.004666    | 0.00151   | -3.09| 0.000|
| LR        |              |           |      |     |
| LD.       | 0.345557     | 7.55067   | 0.05 | 0.963|
| L2D.      | -0.016498    | 7.71380   | -0.00| 0.998|
| L3D.      | 0.787953     | 6.04091   | 0.13 | 0.896|
| DCBR      | 0.395784     | 0.07254   | 5.46 | 0.000|
| LD.       | 0.052845     | 0.01751   | 3.00 | 0.001|
| L2D.      | 0.073547     | 0.01961   | 3.75 | 0.000|
| L3D.      | -0.236045    | 1.72589   | -0.14| 0.891|
| CPS       | 0.275931     | 0.23192   | 1.19 | 0.246|
| LD.       | -0.358244    | 0.18002   | -1.99| 0.035|
| L2D.      | 0.591276     | 17.29437  | 0.03 | 0.973|
| L3D.      | 0.766129     | 10.20261  | 0.08 | 0.940|
| DNER      | -0.022682    | 0.03686   | -0.62| 0.542|
| LD.       | 0.0057105    | 0.82204   | 0.01 | 0.994|
| L2D.      | 0.0422126    | 0.01811   | 2.33 | 0.012|
| L3D.      | -0.0006706   | 0.17312   | -0.00| 0.997|
| DAP       | -2.657861    | 2.00283   | -1.33| 0.198|
| LD.       | -10.02665    | 36.85243  | -0.27| 0.786|
| L2D.      | 4.04864      | 33.59827  | 0.12 | 0.904|
| L3D.      | -3.50845     | 28.34603  | -0.12| 0.901|
| DIn       | -0.097417    | 0.02649   | -0.37| 0.716|
| LD.       | 0.068589     | 0.03117   | 2.22 | 0.023|
| L2D.      | 0.126763     | 0.04416   | 2.87 | 0.002|
| L3D.      | 0.008876     | 0.39627   | 0.02 | 0.982|
| Gr        | -0.23092     | 0.32146   | -0.72| 0.480|
| LD.       | 1.101966     | 4.34895   | 0.25 | 0.800|
| L2D.      | 1.254957     | 10.31345  | 0.12 | 0.903|
| L3D.      | 1.372939     | 15.47118  | 0.09 | 0.929|
| Constant  | 0.096997     | 0.53774   | 0.18 | 0.857|

R-Squared: 0.7817
chi2: 14.32239
P>|chi2|: 0.0073
Table 4.11 shows that out of all the variables, only CBR was highly significant in explaining changes in lending rates in the current period. The coefficients of the first and second lag of the central bank rate, the first and second lags of inflation rates, second lag of exchange rates and first lag of credit to the private sector were highly statistically significant since their p-values were less than 0.05 and none of their confidence intervals included zero.

On the same note, it was found that 78.17% of the variations in commercial banks’ lending rate have been explained by Central Bank Rate (CBR), Credit to the private sector (CPS) Exchange Rates (NER), Asset Price (AP), Inflation Rates (In) and Economic growth (Gr). The rest of the variations were captured by the error term which represented factors not captured in the study, for example discount rates (Mohsin, 2011) and political atmosphere (Nguyen, 2012).

The model is as expressed below;

\[
DLR_t = 0.097 - 0.0047ECT_t & - 1 + 0.396DCBR_t + 0.053DCBR_t & - 1 + 0.074DCBR_t & - 2 - 0.358DCPS_t & - 1 + 0.0422DNER_t & - 2 + 0.069DIn_t & - 1 + 0.127DIn_t & - 2 \ldots \ldots \ldots \ldots \ldots \ldots 3)
\]

Where DLR = first differences of lending rates,

ECT\(_{t-1}\) = Error correction term at the first lag

DCBR\(_{t-1}\) = the first lag of the first differences of Central Bank Rate

DCBR\(_{t-2}\) = the second lag of the first differences of Central Bank Rate

DCPS\(_{t-1}\) = the first lag of the first difference of the credit to the private sector

DNER\(_{t-1}\) = the first lag of the first difference of Annual exchange rate

DNER\(_{t-2}\) = the second lag of the first difference of Annual exchange rate

DIn\(_{t-1}\) = the first lag of the first difference of Inflation rate

DIn\(_{t-2}\) = the second lag of the first difference of Inflation rate
The above estimation shows that the dynamic stability was illustrated by the negative error correction term as -0.0047. This represents the speed of adjustment to the long-run equilibrium that affects short run movement by the dependent variable. Also the negative sign agrees with the theory which indicates the backward move to equilibrium and the coefficient is less than the unit in absolute terms.

From the model above, it was found that the speed of adjustment was slow at 0.47% which implies that it can take quite a long time to return back to equilibrium in the long run. The first and second lags of CBR were positive and statistically significant at 95% confidence interval. This implied that there was a short run effect from CBR to lending rates with respect to these terms. However, the third lag of CBR was not significant. In order to determine their joint effect, the study conducted Granger causality tests. The results revealed that the lagged terms of CBR jointly cause lending rates to increase in the short run. In addition, the second lag of exchange rates was positive and statistically significant at 5% significant level implying that a unit increase in exchange rate led to an increase in lending rates in the short run. However, the other lagged terms of exchange rates were not statistically significant. It was further revealed that there was a significant short run effect from the first and the second lagged term of inflation rates. The first and second lagged term of inflation rates demonstrated a positive and statistically significant relationship with lending rates while the third lag term was not statistically significant. Unlike the effect of inflation rates, the first lag of the credit to the private sector had a short run negative effect on lending rates whereby a unit increase in credit to the private sector caused a significant reduction in lending rates.
4.14 Further discussion of the results

As suggested earlier in the beginning of this study, commercial banks’ lending rates affect the availability of affordable funding for investment and consumption. These two key elements consequently have been termed as crucial in determining the overall rate of economic growth in an economy. It is suggested that if lending rates are high, people tend to shy away from borrowing. This study concentrated on exploring the factors determining commercial banks’ lending rates with a key focus on the monetary policy represented by the CBR.

It was revealed that there is a significant positive relationship between commercial banks’ lending rates and CBR. This implies that as the central bank rate increases, lending rate also increases. This finding concurs with the suggestions made by Maana and Tiriongo (2011) who found that monetary policy determined the direction of the movement of short term interest rates. They further argued that these monetary policies also have signalling power. It was also found by Aristei and Gallo (2012) that interest rates on loans to non-financial firms attracted more responsiveness to changes in the interbank rate than loans to households, both in times of high volatility and in normal market conditions.

Considering Aban (2013) who investigated the relationship between loan growth and monetary policy in Philippines, it was revealed that increasing policy rates results in a decrease of the supply of loans in small banks, which implies higher lending rates are instituted, and that smaller banks are more sensitive to monetary policy contractions than big banks. This blends well with our positive relationship between CBR and lending rate.

On the other hand, Georgievska et al. (2011) found that domestic policy rate and the foreign interest were also found to have a significant effect on the determination of lending rates. Therefore CBR is a significant factor determining lending rates.
Exchange rate channel represented as nominal exchange rate was also found to be highly significant with a positive relationship with lending rates. It means that as exchange rate increase, it increases commercial bank lending rates. The rate of inflation was also found to be highly significant with a positive relationship with lending rates. It means that as inflation increases, commercial bank lending rates also increase. Inflation adversely affects the value of money over time; when inflation is present, borrowers receive money that is worth more than the money that is paid back. Hence lenders tend to compensate themselves for the loss of purchasing power over the time that the control over the money is transferred to the borrower, by including inflation rate in the stated interest rate. Hence as the rate of inflation increases, so does commercial banks’ lending rate.
CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter is a synthesis of the entire thesis and contains a summary of findings, discussion of the findings, conclusions arrived at and policy recommendations. The conclusions and recommendations focused on addressing how monetary policy affects commercial bank’s lending rates.

5.2 Summary and conclusions of the study

The study findings showed that there was a highly significant long run relationship between commercial banks’ lending rates and CBR, exchange rates, asset price, credit to the private sector, economic growth and inflation rates. The results also indicated that an increase in CBR, exchange rate, and inflation cause lending rates to increase in the short run while an increase in credit to the private sector cause lending rates to fall in the short run. A statistically significant relationship was also established between lending rates, exchange rate, CBR, credit to the private sector and inflation rate. The study also showed insignificant relationship between lending rates and asset prices as well as economic growth in short run.

Based on the results and findings, the study concludes that bank lending behaviour is indeed influenced mainly by CBR, credit to the private sector and inflation.
5.3 Policy Recommendations

The study recommends that CBK should consider lowering CBR, which in turn could lead to a decrease in lending rates. The government should also consider streamlining the economic environment in which commercial banks operate, in order to help curb fluctuation in CBR which is an indication of the monetary policy stance and therefore ensure stable rates of borrowing. Stability of the lending sector reduces uncertainty which normally leads to non-performing loans. CBK implementing effective monetary policies that cushions borrowers will help curb speculative borrowing that affect lending behaviour by commercial banks.

The government through the central bank should also put in place measures to control sporadic changes in exchange rates. This will ensure that commercial banks’ lending rates remain stable and favourable.

Commercial banks and the CBK should also work hand in hand through close consultation and cooperation so that changes in the monetary policy stance are taken into account by commercial banks in their loan pricing decisions. They should consider striking a balance between covering the costs associated with lending while simultaneously maintaining a good banking relationship with their borrowers, always keeping in mind that low cost of borrowing tends to lead to an increase in economic activities that spur economic growth.

The main mandate of the CBK is to control inflation. This is done by raising CBR which increases lending rates and leads to a fall in credit to the private sector as depicted from this study’s results. A fall in credit to the private sector however leads to a fall in demand in the economy hence leading to a fall in inflation. In as much as CBK may succeed in controlling inflation in this case, there exists a trade-off between growth and inflation. The main conclusion
of this study is that CBR as an instrument of monetary policy is indeed an effective tool as it increases lending rates and relieves demand pull pressures on the economy. This could however conflict with the promotion of economic growth.
REFERENCES


### APPENDICES

#### Appendix I: Raw Data

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<tr>
<th>Duration</th>
<th>Lending Rates %</th>
<th>CBR %</th>
<th>Credit to Private Sector Ksh Millions</th>
<th>Exchange Rate Ksh Monthly Average Exchange Rates(\text{vs-a-vis USD})</th>
<th>Asset Price - NSE Index</th>
<th>Inflation Rate %</th>
<th>GDP Ksh Million</th>
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