MAKERERE UNIVERSITY

MAKERERE UNIVERSITY BUSINESS SCHOOL

THE EFFECT OF CENTRAL BANK RATE ON UGANDA'S COMMERCIAL BANK'S LENDING RATES

BY

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A DISSERTATION SUBMITTED TO MAKERERE UNIVERSITY BUSINESS SCHOOL (FACULTY OF GRADUATE STUDIES AND RESEARCH) IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A DEGREE

OF MASTER OF ARTS IN ECONOMIC POLICY AND MANAGEMENT

OF MAKERERE UNIVERSITY

AUGUST, 2023

PLAN A

DECLARATION

I declare that this dissertation entitled; "***The Effect of Central Bank Rate on Uganda's Commercial Bank's Lending Rate"*** is my original work and it has never been presented to any academic institution of higher learning for the award of an academic qualification.

Signature ..... Date: 01 SEPTEMBER 2023

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APPROVAL

This is to certify that this dissertation has been submitted for examination with our approval as supervisors.

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ACKNOWLEDGEMENT

I am extremely grateful to **Dr. Tomson Odongo and Dr. Anthony Olyanga** (my supervisors) who made this study a success through their guidance and generous contributions.

I'm especially humbled by the continuous support and encouragement from my family and friends. Special thanks go to Mr. Harod Besiga, my course mates and colleagues who in one way or the other contributed to the success of this study.

DEDICATION

I dedicate this study to my wife and children who have been a source of encouragement throughout the journey to complete this study.

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ABSTRACT

This study investigated the effect of Central Bank Rate (CBR) on Commercial bank's lending rates in Uganda. The study thus had a major objective of examining the effect of the central bank rate, on the commercial banks' lending rates, as a monetary policy stance in Uganda. The specific objectives of the study included establishing the short run and long run effects of central bank rate, Inflation and Exchange rate on commercial banks' lending rate. Employing the Vector Error Correction Model (VECM), the study used time series data that spanned a period of 127 months ranging from January 2012 to July 2022. The results of the study showed that, in the short run, commercial banks' lending rate is affected by central bank rate and exchange rate, with all having positive effects. Inflation was found not be significant in the short run thus not affecting the lending rate. In the long run however, only CBR and Inflation had a positive effect on commercial banks' lending rate while Exchange rate was observed to be insignificant and thus having no effect on the lending rate in the long run. The study recommends that the central bank should deliberately and effectively set the CBR that will influence moderate and affordable commercial banks' lending rates in order to boost credit accessibility.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This section presents the background of the study, the problem statement, the objectives, scope and significance of the study.

1.1 Background of the Study

Globally, monetary policies have often involved the use of different measures to regulate the value, supply, and cost of money in tandem with the expected level of economic activity. The common objective of such policies has been to achieve price stability, ensuring balance of payments, creation of employment and sustainable economic growth (Quartey, Owusu-Brown, & Turkson, 2017).

For Uganda's case, monetary policies have evolved since the full liberalization of the banking sector in 2005 from the use of direct instruments such as the Treasury bill market, to a market-based auction system through which interest rates were determined from a pre-determined interest rate. This was followed by the introduction of the treasury bonds market and the commencement of a new interest rate management regime that used monetary policy instruments with the Treasury bill interest rate as the anchor. These developments led to a reduction in the level of nominal interest rates from a high of 40 percent in 1992 to an average of 18.5 percent in 2022. The central bank rate (CBR) was then introduced in 2011 following the implementation of the inflation targeting monetary policy framework (ITL – Inflation Targeting Lite) (Nampewo, 2021).

The ITL monetary policy framework employs the policy interest rate this is called the Central Bank Rate (CBR) which is used as the operating target of monetary policy. The CBR is intended to guide short-end interbank interest rates, which in turn are expected to influence other interest rates in the economy, such as commercial bank deposit and lending rates. These are deemed to be fundamental for monetary policy transmission into prices and the real economy (Mugume., 2018).

The CBR is a signaling rate that is announced within the first week of every month by the BoU through its published Monetary Policy Statement. The key ingredient in setting CBR involves

evaluating the future projection for core inflation. The adjustment in CBR implies that if BoU forecasts inflation to rise in the future, then it will increase its CBR to signal Monetary Policy tightening. This is aimed at forestalling the eventuality of the foreseen higher inflation through managing inflation expectations, raising the cost of borrowing and contracting money supply in the economy, and the eventual reduction in aggregate demand to bring it into equilibrium with the supply side. As of August 2022, Bank of Uganda increased the Central Bank Rate from 8.5% in July to 9% and this is mainly because of; the higher inflation pressures from the external environment, dry weather conditions and exchange rate depreciation. The Annual headline and core inflation rose to 7.9% and 6.3% in July 2022 from 6.8% and 5.5% in June 2022. (BOU, 2022)

The growth of the private sector is highly reliant on an efficient and effective financial system to permeate the access to financing for investment and market liquidity. It is therefore imperative that domestic credit is readily available and affordable for the private sector players to accelerate aggregate demand and supply eventually leading to growth in the country's GDP. Affordability is in relation to the interest rate mechanism within the financial sector which directly affects the credit to the private sector. Realistically high lending interest rates act to suppress credit demand, thereby lessening investment and economic productivity.

Meanwhile, high deposit interest rates tend to increase consumer deposits, thereby increasing savings and allowing for greater investment levels that should encourage economic growth. This is where the government comes in to assist the private sector to regulate the macro-economic variables through the Central bank's supervisory arm in the financial sector by influencing the direction of the lending and deposit interest rates. This expected to be implemented through the monetary policy regime.

Since the onset of the inflation targeting lite (ITL) framework, the lending rates depict downward asymmetric behaviors with the policy rate, reflecting asymmetry of the monetary policy transmission mechanism, lagged response to monetary policy impulses, structural rigidities in the financial sector and higher risk aversion by commercial banks.

From an analysis of the behavior of the commercial lending rates against the policy rate movement in the past 10 years (2012 to 2022), it is seen that the weighted average lending rate

tends to respond faster when the policy rate is rising than when it is falling (Nampewo, 2021). This may then seem to indicate that the monetary policy regime is not as effective in influencing the consistently high and sticky commercial banks' lending rates.

In that respect, Bank of Uganda has consistently raised the CBR since July 2022 and it will continue to adjust the CBR upwards until inflation is firmly contained around the medium-term target of 5%. Mishkin (1995) emphasized the need for monetary authorities to be experts in monitoring and interpreting the effect of policy actions on an economy when conducting a monetary policy. This includes an in-depth knowledge on the monetary transmission mechanism (Lartey & Lawrencia, 2018).

The main motivation for this study is to fill the gap in the literature in respect to the effect of central bank rate on Uganda's commercial banks' lending rates. In addition, the outcome of this study could assist economists in predicting the future path of monetary policy as well as the monetary policy stance of Bank of Uganda.

1.2 Problem Statement

The growth of the private sector is highly reliant on an efficient and effective financial system to permeate the access to financing for investment and market liquidity. It is therefore imperative that domestic credit is readily available and affordable for the private sector players to accelerate aggregate demand and supply eventually leading to growth in the country's GDP. Affordability is in relation to the lending interest rate within the financial sector which directly affects the volume of credit to the private sector.

Since 2011 when the Bank of Uganda implemented the ITL monetary policy framework, monthly policy rates have been published through the Monetary Policy Statement (MPS), as a mechanism to signal an effect on the commercial banks' lending interest rates. The BoU therefore has continued to pursue the objective of maintaining macroeconomic stability by keeping the inflation low and stable at a medium-term inflation rate of 5%. This is necessary for ensuring low inflation expectations, which are important in the determination of lending rates.

Whereas the macroeconomic environment in the country has profoundly improved with extensive reforms in the financial sector culminating into increased competition within the banks and thereby reducing the average lending rates as a response to the marked reduction in inflation

and relatively low CBR, the lending rates have remained prohibitively high and have restricted many private sector borrowers from accessing the credit markets (Mugume & Rubastsimbira, 2019). However, the low CBR is not reflected in the commercial banks' lending rates in Uganda. Whereas the interbank money-market rates have tended to track the evolution of the CBR, the commercial banks' lending rates have been stickier, only responding partially to changes in the CBR, with lags (Nampewo, 2021). This study therefore focuses on addressing this problem by establishing the possible reasons why the lending rates are not moving concurrently with the CBR.

1.3 Purpose of the study

The study aims to examine the effect of the central bank rate, on the commercial banks' lending rates, as a monetary policy stance in Uganda.

1.4 Objectives of the Study

1) To examine the effect of central bank rate on commercial banks' lending rate in Uganda;
2) To examine the relationship between the inflation and the commercial banks' lending rates
3) To examine the relationship between the exchange rate and the commercial banks' lending rates.
4) To examine the causal relationship between the central bank rate on the commercial banks' lending rates in Uganda

1.5 Research Questions

1) What is the effect of central bank rate on commercial banks' lending rate in Uganda?
2) What is the relationship between inflation and commercial banks' lending rate in Uganda?
3) What is the relationship between the exchange rate and the commercial banks' lending rates in Uganda?
4) What is the causal relationship between the central bank rate and the commercial banks' lending rates in Uganda?

1.6 Scope of the study

This includes the time scope, geographical scope, and the subject scope. The details are indicated below.

1.6.1 Time Scope

The study period is designed to have coverage on relevant monthly data between 2012 and 2022. This time period is inferred due to; readily existing data from reliable sources and also in consideration to the period when the CBR was first introduced in Uganda. The research will be conducted in Uganda and include all banks' lending rates as at the time the study will conducted.

1.6.2 Geographical Scope

The study's geographical scope was Uganda.

1.6.3 Subject Scope

The study focused on the levels of downward stickiness of the monetary policy measures most importantly the Central Bank rate and how this may influence the commercial banks' lending interest rates.

1.7 Significance of the Study

i. The study will aid monetary authorities to enhance policies which will better influence the commercial banks in proactively responding to the monetary policy statement so as to achieve the objective of price stability, and boost consumer investment during the specific economic cycles;

ii. The study will contribute to knowledge by providing empirical evidence on the relationships amongst the interest rate channel, inflation and foreign exchange rate and the central bank rate as a monetary policy stance in Uganda;

iii. The commercial banks will also better understand the factors that contribute to economic growth and the effect of their lending rates on the economy. Market imperfections in the financial sector that are likely to influence the downward stickiness of the commercial banks' lending rates, will be discussed in this research study.

1.8 Conceptual Framework

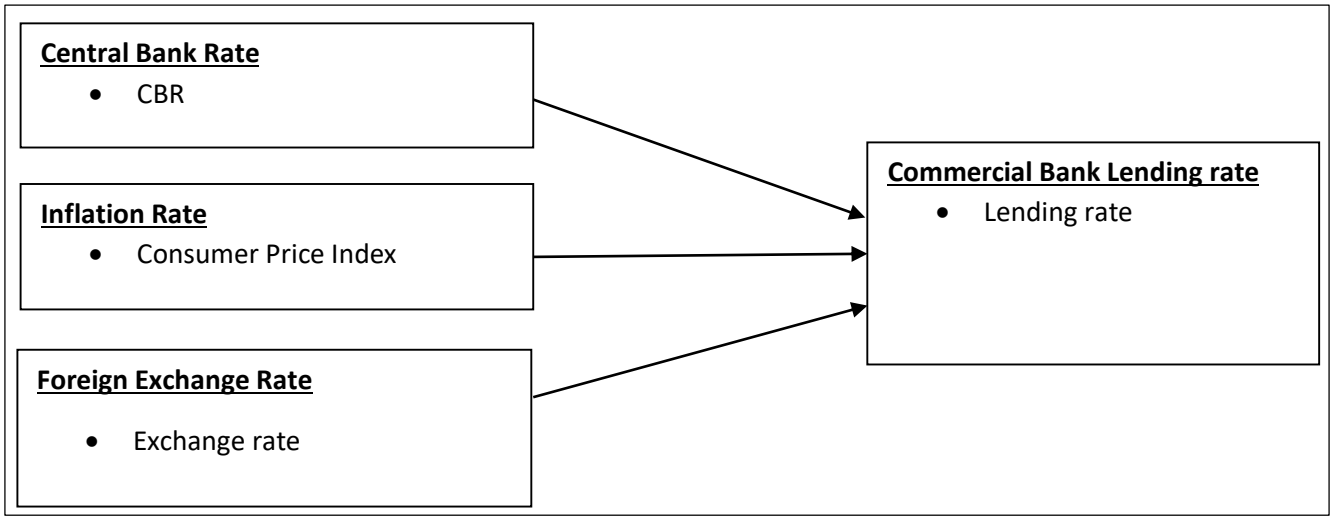
The conceptual framework below is to examine if there is a causal relationship between the central bank rate and the commercial bank lending rate. The lending rates can be triggered by various factors that are deemed to have implications for inflation or employment. These include demand-driven inflationary pressures that arise as a result of excess money demand in the

economy. The monetary authorities then use various instruments to conduct monetary policy operations in the inflation targeting monetary policy framework. Some monetary policy tools of operation include open market operations (OMO), the cash reserve ratio (CRR), the CBR and the forex.

At BOU, the CBR is the most frequently used instrument. The CBR is used to provide signals to the market of the monetary policy stance that the BOU is pursuing. Given the term structure of interest rates, the transmission mechanism is expected to be from the short-term rates to the long-term rates. It is thus expected that the CBR coordinates the movements of short-term rates which eventually affect the long-term rates such as the lending rate.

The long-term lending rates would affect credit to the private sector and that will lead to an increase in money supply. Credit to the private sector also affects investment demand in the real sector. Overall inflation is primarily influenced by changes in the prices of imported goods and services, productivity developments, excesses in money demand and price expectations.

Figure 1: Conceptual Framework



Source; (Were, Anne, Sichei, & Moses, 2013)

The above conceptual framework thus provides the conceptual model below;

BLR = f (CBR, INF, EXC) (1)

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical literature

The loanable funds theory according to the Neo-classical economist believe that time preference plays an important role in determining interest rate. Adoah (2015) stated the fact that the theory builds on the classical theory of interest rate, by laying more emphasis on money supply influencing savings and investment. The amount paid for loanable funds in the credit market depends on the supply and demand of funds. An upward adjustment in the supply of loanable funds or excess reserve results in a decline in the interest rate. The supply of loanable funds increases as a result of an increase in planned savings. This is due to an increment in expected income with a corresponding increase in rate of return as well. Reducing the money stock of hoarded funds when interest rates are high also increases the supply of loanable funds. The demand for loanable funds however is determined by an increase in firms' expenditure for purchase of new capital goods to increase inventory or for expansion. An individual desire to increase present consumption but constrained by budget also influences the demand for loanable funds. Therefore the magnitude and specific direction of a change in the demand and supply of loanable funds determines the resultant interest rate (Kamau, 2015).

The Keynesian's theory in his book Keynes (1936) "The General Theory of Employment, Interest and Money," proposed a purely monetary theory for interest rates. It also provided a solid foundation which formed the basis for developing a political and economic system. He was of the view that transmission mechanism of monetary policy included interest rates and investments. The interest rate channel is based on traditional Keynesian interpretation of the role of money in interest rates movement. When the Central bank embarks on an expansionary monetary policy, it subsequently leads to a decline in interest rate. This further translates to an increase in spending, aggregate demand and output and consequently decreases unemployment.

This theory is contrary to the monetarist view of expansionary monetary policy increasing mostly prices and not output hence its ineffectiveness. However unlike the monetarist who focused on full utilization of resources, Keynes theory was only a general theory which presupposes that the utilization of resources could either be low or high in quantity. He concluded that in certain instances, no strong automatic mechanism can move aggregate output or demand towards full employment levels. Keynes assumed that interest rate is the price at which the desire to hold wealth in cash is at an equilibrium with the supply of cash resources and the reward for parting with liquidity at the same time (Appelt, 2016). His liquidity preference theory, stated interest as a reward for substituting liquidity for another item for a specified period of time. Investors will always prefer short term financial securities to long term financial securities hence to encourage them to hold more long term securities, interest rate should be higher than for short term securities. This explicitly explained the theory of demand for money. While the supply of money was treated as a discretionary factor which depended on policies pursued by monetary authorities. In the credit market, banks influence interest rate by marking up their base rate and supply credit to credit worthy borrowers (Kamau, 2015). If these determinants are held constant, the Central Bank interest rate setting in the base money market will influence the credit markets interest rate. Therefore a free market according to Keynes does not necessarily ensure efficient allocation of resources but the state intervention prevent excessive savings which could lead to unemployment (Appelt, 2016).

The Loan Pricing theory explains the resultant effect of information asymmetry due to high interest rate set by banks. Interest rate set by banks is mostly not commensurate with the level of risk of individual borrowers. Stieglitz and Weiss (1981) elaborated the difficulty banks face in determining the type of borrower at the start of a banking relationship which will inform an appropriate forecasting of interest rate on loans. He therefore advised that in maximizing interest income, banks should inculcate information asymmetry problems in the market. Otherwise high interest rate will inevitably attract risky borrowers. The problem of moral hazard and adverse selection are most likely to arise if bank lending rates are high. High risky individuals are given loans at high rates who later develop moral hazard behaviour in their quest to get high returns on risky investments. This then may be a factor contributing to an increase in the non-performing loans recorded by banks. The high cost incurred by banks due to this theory may sum mount to the reason why changes in the policy rate is not reflected in banks' lending rate. Since banks may

want to recoup their losses at the existing rates. Stieglitz-Weiss phenomenon of endogenous loan default further explained the reduction in banks profit due to high loan default. Therefore banks will need some time to adjust their rates in response to fluctuations in policy rates.

2.2 Empirical Literature

2.2.1 The Effect of Central Bank Rate on the Bank Lending Rate

The above research questions were used to interpret empirical findings on the interest rate pass-through and adjustment process. Following the early work of Hannan and Berger (1991) and Neumark and Sharpe (1992) that focuses on interest rate adjustment in the USA banking industry, there has been a rapid growth of empirical studies that explore the degree of stickiness of interest rates and their asymmetric adjustment (Kwapil & Scharler, 2010; Liu, Margaritis, & Tourani-Rad, 2008; Marotta, 2009; Tai, Kun, & Har, 2012; Wang & Lee, Market volatility and retail interest rate passthrough. Economic Modelling, 2009). However, available evidence from this literature remains inconclusive. Firstly, most studies find slow and incomplete interest rate pass-through. Secondly, there are substantial differences in interest rates pass-through across countries and over time. Third, interest rates pass-through varies depending on the type of interest rate used. Fourth, studies that examine asymmetric adjustment, often finds evidence of asymmetric adjustments, but the evidence varies across countries and over time.

Kwapil and Scharler (2010) carried out a comparative analysis of the interest rate pass-through from money market rate to bank lending rates in the Euro area and the United States using monthly data and Engele Granger co-integration as well as autoregressive distributed lag (ARDL) method. They find that interest rate pass-through is faster in the United States compared to the European countries. Similarly, Wang and Lee (2009) employ asymmetric co-integration test in their study. They argue that there are differences in the degree of interest rates pass-through between deposits and bank lending rates in the United States and nine Asian countries. They discover an asymmetric adjustment in lending rates for three out of ten countries. Wang and Lee (2009) empirical findings show evidence of complete pass-through in the United States deposit rate, and that the lending rates in Hong Kong, Philippines, and Taiwan are rigid downward.

In Europe, Marotta (2009) investigated nine European countries and the UK. He confirmed presence of asymmetric adjustment in only France and Netherlands. Liu et al. (2008) applied

Engele Granger co-integration and autoregressive regressive distributed lag in New Zealand. They documented weak evidence of interest rate pass-through and short-term rate showed the highest degree of pass-through as well as faster degree of adjustment than long-term rates.

Turning to emerging markets, Tai et al. (2012) examined the effectiveness of interest rate pass-through from the money market rates to the retail rates in Asian countries. Their results revealed that there are no much differences between the money market pass-through rate into deposit and lending rates, but the money market rate pass-through into deposit rate was slightly higher than that of the bank lending rate. In addition, most Asian countries had slower adjustment rates, especially after the Asian 1997 financial crisis (Tai et al., 2012). In another study applied asymmetric error correction modeling was applied and the results showed very low and incomplete pass- through in all interest rates in Thailand, except the inter-bank rates where the pass-through was complete (Charoenseang & Manakit, 2007). Moreover, they did not find significant asymmetric adjustment, but short-term deposit rates and short-term lending rate were more rigid downward.

In Africa, the threshold autoregressive model (TAR) and momentum autoregressive model (M-TAR) with monthly data were used and the results indicate that asymmetric adjustment is present for the bank lending rates in Mauritius (Jankee, 2004). Specifically, the bank lending rates adjust slowly when there is an increase in the money market rates, but it adjusts faster when there is a decrease in the money market rates. In South Africa, while using Engele-Granger and error correction modeling to examine the interest rates pass-through the study was carried out, but focusing on the relationship between wholesale interest rate and money market rate, and did not explore the possibility of asymmetric adjustment in bank lending rates (De Angelis, Aziakpono, & Faure, 2005). In this study, we allow for asymmetric adjustment in South African bank lending rates.

In most previous studies (Payne & Waters, 2008; Tai, Kun, & Har, 2012; Wang & Lee, 2009) the bank lending rate tends to adjust faster when there is an increase than when there is a decrease in the policy rates. Put differently, bank lending rates exhibits downward rigidity with respect to a decrease in the money market rates. It's farther noted that the asymmetric money market rate pass through is determined by a number of factors such as adjustment costs, volatility and uncertainty conditions about the future market (Becker, Osborn, & Yildirim, 2012).

2.2.2 The Effect of Inflation Rate on the Bank Lending Rate

Evidence from the postwar period, from the United States and elsewhere, shows that the quantity theory on money continues to provide a reasonable description of the long run average relationships among interest rates, inflation rates, and money growth rates. In particular, the U.S.A inflation of the 1970s and 80s can be fully accounted for by money rates and the return to relatively low inflation rates in the 1990s can be explained by the correspondingly low average rate of money supply growth in that decade. The long run behavior of banks interest rates, in the U.S.A and elsewhere, can be understood in a similar way as the inflation rates (Fernando, Robert, Lucas, & Warren, 2001). Summers (2003), indicates that interest rate rises as inflation increases. Further, he states that with an increase in the interest rate equal to the increase in inflation, the real net interest cost to the firm falls substantially. This suggests that inflation may have an impact on the interest rates. Using CPI data from USA on a study entitled the relation between interest rates and inflation, it was found that inflation rises or falls slightly in advance compared to the interest rates rise or fall implying that interest rate can be partially predicted by inflation (Olga, 2010).

2.2.3 The Effect of Foreign Exchange Rate on the Bank Lending Rate

A study about the relationship between the rate of exchange variability on the financial performance of commercial banks in South Sudan from 2006 to 2015 was carried out using semi-annual data. The study discovered that there is a weak negative relationship between exchange rate variability and financial performance (Manyok, 2016). Similarly the impact of foreign exchange exposure on the firm's financial performance in Kenya was examined using a sample size of 38 firms but only the results of 32 firms were analyzed. The study showed that the rate of exchange significantly affects imports and exports. The author concluded that the unrealized foreign exchange gains or losses negatively affects the Net Income (Gachua, 2011).

The relationship between fluctuation in the exchange rates and the financial performance of multinational companies in Kenya was studied and concluded that there was positive relationship between the exchange rate fluctuations and financial performance of multinational corporations (Kipchirchir, 2011). This was caused by the difference between the trading currency and the financial reporting currency. Maina (2010) investigate the effect of exchange rate variability on investment in the subsector of electric power in Kenya. The author found out that when the

exchange rate was stable the investments were also high in the electric power sub-sector as compared to the periods of exchange rate fluctuations.

More investigation on the relationship among the real exchange rate, current account balance and real income in Kenya was carried out (Wanjau, 2014). From the independence of Kenya in 1963 to date, the country implemented three policies of exchange rate which are; fixed exchange rate, floating exchange rate and managed float policy (Mudida et al, 2012; Kiptui and Kipyegon 2008). This study was based on two theories namely; neo-classical elasticity approach and the balance of payment constraint. The first was to ascertain the impact of the real rate of exchange fluctuation on current account balance. The second was to ascertain the impact to which import growth rate is compatible with balanced economic growth. The first aim was tested regressing trade balance against the real exchange rate, degree of openness and government expenditure, foreign income and relative prices. To ascertain if Marshal-Lerner holds, the significance and the signage of real exchange coefficient rate was used. For the second aim, the elasticity of income was evaluated by using an import function and compared to theoretical income elasticity proposed in the balance of payment constraint model. The Autoregressive distributed lag (ARDL) was used to model the annual time series from the year 1980-2011. The study showed that the Marshall-Lerner conditions hold and J curve phenomena is supported by data. Furthermore, the rate of import growth is significantly higher than the level compatible with the long-run growth of Kenyan economy.

The study about impact of exchange rate fluctuations on the manufacturing sector of Nigeria from 1986-2005 was done using ARDL (Autoregressive Distribution Lag) through multiple regression analysis to analyze the impact of exchange rate volatility on the manufacturing sector. The authors found out that by using the ARDL model the exchange rate fluctuations have short run and long run relationship on the manufacturing sector's output (Tams-Alasia, Felicia, Okoye, & Ejemeyovwl, 2018). They argued that the exchange rate fluctuations negatively affected the manufacturing sector's output since the Nigerian manufacturing sector was highly depending on import of inputs and the capital goods were paid in foreign exchange of which the exchange rate was not fixed. This study found out that fluctuations in exchange rate and the performance have a statistically significant relationship and it concluded that exchange rate negatively affect manufacturing sector's output.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the methodology used to meet the objectives and hypothesis of the study. The chapter is divided into three sections namely, Research design and sources of data, Variables and their measurement, Econometrics Model and estimation technique.

3.1 Research Design

The study employed a longitudinal research design with a quantitative approach. The design helps to establish relationships between variables and allows the testing of the effects of variables against each other. This kind of research design facilitated a proper fulfilment of the objectives of the study.

3.2 Data Types and Sources

This study employed secondary data collected from Bank of Uganda website. The reason for using secondary data is that the variables studied are aggregated at national level and their data was already captured at the national databases. Time series data was used because the study focused on a single phenomenon over a given period of time. In order to get a good result from the regressed time series econometric model, the number of observations matters a lot. The higher the number of observation the better the result obtained, therefore this study used monthly data covering the period of 10 years (2012-2022) for the variation of exogenous and endogenous variables.

3.3 Specification of the Model

The main variables of interest are CBR as the independent variable and the Commercial bank lending rate as the dependent variable, following (Ghazali, Said, & Faisal, 2017), the effect of

CBR, Inflation rate and Exchange rate on Bank Lending rate in Uganda can be modeled as follows;

BLR = f (CBR, INF, EXC) (1)

To test the above relationship, the following estimation model has been used.

$$BLR = \beta_0 + \beta_1 CBR + \beta_2 INF + \beta_3 EXC + \mu \quad (2)$$

Where;

BLR = Commercial Bank Lending Rate

CBR = Central Bank Rate

INF = Inflation rate

EXC = Exchange rate

β_i = model parameters while μ = error term

3.4 Variables and Measurement

Commercial Bank Lending rate; It is described as the rate at which commercial banks lends to individuals. It is also the banks rate that usually finances the needs of the private sector. Every bank has specific variables and allocated percentage in deriving the formula for lending rates in general. That notwithstanding, the CBR is factored in calculating the base rate. The risk premium of each individual is then added to arrive at the lending rate. The average lending rates of all banks in Uganda was used as a proxy for the market lending rate.

Central Bank rate (CBR): This is the rate at which central banks lend money to banks. In the conduct of monetary policy, the Central Bank uses diverse tools. These tools are employed to stabilize prices in the economy and ensure economic growth. One may say the quest to prevent the occurrence of banking crises makes the central bank more robust in the operations. Therefore, the policy rate among other tools serves as a signaling rate for all other rates in the economy. Other countries in different jurisdiction however use different tools in their main monetary operations. Notable examples used include discount rates; repurchase rate and interbank rate among others, and the expectation is that the CBR has a positive effect on the lending rate.

Inflation; Consumer Price Index (CPI) was used as a proxy for Inflation in the study. Changes in the average general prices in the economy determines the health of the economy. It is the main target or goal of the central bank thus to ensure consistency in the equation it was included. Theories categorizes inflation to be either demand pull or cost push. Whichever the reason is, the study only sought to identify its effect on the lending rates. The expectation is that inflation rate has a positive effect on the lending rate.

Real Effective Exchange Rate Measures a country's price competitiveness relative to its trading partners. It was included in the study to show the relative competitiveness of the economy (in this case the value of the Uganda shilling per US $). The inclusion of the exchange rate in the model is justified by the works of (Moyo & Tursoy, 2020). The expectation is that depreciation of the exchange rate (Decrease in real effective exchange rate) can impact positively or negatively on the lending rate.

3.5 Estimation Techniques

The estimation techniques used include unit root test, cointegration test; Residual tests which include Normality test, Serial Correlation test and Heteroscedasticity test. It also includes the Vector Error Correction Model (VECM) and the Granger causality test to investigate the determinants of lending rate in Uganda and the causal relationship between CBR and lending rate in the period under the review. The details are indicated below;

3.5.1 Unit Root Test

It was important to test the order of integration of each variable in a model, to establish whether it is non-stationary and how many times the variable needed to be differenced to derive stationary series. Stationarity of each individual data series was estimated based on the assumption that the variables are either I (0) or I (1) series. The study employed Augmented Dickey Fuller (ADF) test and Phillips Perron test (1988). The ADF test was used in determining the order of integration of each variable in the model because it assumes the errors are statistically independent and have a constant variance. A unit root null hypothesis was tested against a stationary alternative. The stationarity test in the study used regressions of a time series data analyzed against a constant. These regressions can be expressed as follows;

$$Y_t = \alpha + \beta.t + \varepsilon_t \quad (3)$$

$$dY_i = a + \beta_t + \sum_{i=1}^{n} \lambda\, dY_{t-i} + \delta Y_{t-i} + \varepsilon_t \quad (4)$$

The stationarity of residuals (ε_t) have been tested. Lag length (p) of ADF (dY_{t-i}) and Phillips Perron equations have been selected using Akaik Information Criterion (AIC) and Bartlett Kernel respectively.

3.5.2 Co-integration Test

The next process after the stationarity is determined is to estimate the short and long run relationship of the variables. In a regression involving non-stationary variables, spuriousness can only be avoided if a Stationary co-integrating relationship is established between the variables. Therefore, if two or more variables can be linked together to form an equilibrium relationship spanning the long run, then even though the variables themselves may contain stochastic trends, they will nevertheless move closer over time and the difference between them will be stable. Therefore a test for co-integration, need to be run and the ADF unit roots test to be used to test for the stationarity of the residuals. If the residuals are stationary, then there is a proof for the presence of co-integration in the series used in the model (Adam, 1993; Perman, 1989).

3.6 Diagnostic tests

The study carried out the following diagnostic tests to ensure that the estimated model does not suffer from common econometric problems that could render its parameter estimates spurious.

3.6.1 Serial Correlation

Autocorrelation/Serial correlation is the relationship between a given variable and a lagged version of itself over various time intervals. Serial correlations are often found in repeating patterns, when the level of a variable affects its future level. Autocorrelation also known as serial correlation or lagged correlation and is used to determine the strength of relationship of a variable with its own past and present values, or in another words, it can be explained as correlation of the error term in the present with the error term in the past (Penzin & Oladipo, 2021). Autocorrelation can happen whether in the time series data or cross-sectional data. In order to test the autocorrelation problem, Breusch-Godfrey serial correlation Lagrange multiplier test was used to check for the presence of the problem. The LM test has a better explanation on the higher AR model which is the AR(2) and Durbin Watson h-test is biased for the autoregressive moving average models so it is a chance that the autocorrelation is underestimated in the first place (Roberto & Jodiney, 2019)

3.6.2 Normality test

Normality test was done to examine whether the error term in the estimated model is normally distributed in the model. The study employed the Shapiro-Wilk Test to check for the distribution of residuals in the model. The Ordinary Least Square (OLS) assumption is that the residuals should be normally distributed. The null hypothesis in the test is Normality. If the chi-square value, as well the skewness and kurtosis values are not significant at 5% significance level, the null hypothesis cannot be rejected, else it is rejected (Bal, Dash, & Subhasish, 2016).

3.6.3 Multicollinearity test

Multicollinearity exists if there is high correlation between independent variables. Correlations between the independent variables must not perfectly exceed 0.8 since any higher correlations are problematic (Schober, Boer, & Schwarte, 2018). The study used a pairwise correlation coefficients between the independent variables as well as the Tolerance value and Variance Inflation Factor (VIF). Tolerance value is an indicator of how much of the variability of the specified independent variable is not explained by the other independent variable in the model. If this value is very small (less than 0.2), it indicates that the multiple correlation with other variables is high, suggesting the possibility of Multicollinearity. VIF values above 10 indicate Multicollinearity.

3.6.4 Heteroscedasticity test

Heteroscedasticity refers to the state of systematic changes in the spread of residuals or error term of the model. The presence of residual variance in a model shows that the scattering of the model is dependent on at least one independent variable, this creates a scenario of deviation of the model from effective and actual results (Riya & Chetty, 2020). The Ordinary Least Square (OLS) assumption is that the variance of the residuals is constant. Therefore Heteroscedasticity test is done to examine whether the variance of the residuals is constant. The study used Breusch-Pagan test for Heteroscedasticity to examine whether the variance of the residuals was constant. The test examines the null hypothesis that there is no Heteroscedasticity (Iyke, 2019; Williams, 2020). The null hypothesis cannot be rejected if the p-value exceeds 5% significance level.

3.7 Model Estimation

The first objective was analyzed using Vector Error Correction Model and it can be explained as follows; the analysis of vector error correction model is carried out to determine whether there exist any short run or long run causal relationship within variables in the model specified. The presence of co-integrating relationship within endogenous variables is a necessary condition for estimating vector error correction model. Following (Tomson, 2014), the general form of the vector error correction model estimated in this study can be presented as follows;

$$\Delta X_t = \sum_{i=1}^{n} \beta t \, \Delta X_{t-1} + \sum_{i=1}^{r} Yi \, ECT_{t-1} + v_t \quad (5)$$

Where X_t is an nx1 matrix and n = 6 vectors of dependent variables, ΔX_{t-1}, β and γ are parameters, while V_t is a residual. Error correction mechanism is evidence in the Error Correction Term (ECT_{t-1}). There are as many error correction terms as there are co-integrating vectors (r). Parameter γ_i associated with ECT_{t-1} measures proportion of adjustment back towards equilibrium that can be completed within a single period. If parameter γ_i is not significantly different from zero then there is no error correction process working within the model. Parameter β_t on the other hand, indicates the presence of a short term lag from one variable to another and it measures short term adjustment back towards equilibrium.

3.8 Granger Causality Test

The second objective was analyzed using Granger Causality test, this can be indicated as follows. The Granger pair wise test was carried out in this study to estimate the causal relationship between Central Bank Rate and Commercial bank lending rate in the period under the study. Granger (1969), proposed a time series data technique to determine causal relationships between set of variables. Granger causal relationship is said to exist if variable X_t helps to improve forecast of another variable, say Y_t. Following (Tomson, 2014), the forecast of Y_t can be denoted as $Y_{t+h}|\Omega$ for optimum *h*–step at origin *t*, based on set of all relevant information in the universe (Ω_t). X_t is said to be Granger non-causal for Y_t if and only if;

$$Y_{t+h}\,\Omega = Y_{t+h}\,|\Omega/[X_{t,s}|x\leq t], h=1,2, \quad (6)$$

X_t can be non-causal for Y_t if removal of past information from X_t does not change optimal forecast horizon. In turn X_t Granger causes Y_t if (4) does not hold for at least one *h* and therefore a better forecast of Y_t can be obtained from some forecast horizon by including past information

on X_t in the information set. The optimum lag length in the Granger causality test can be determined by information criteria.

CHAPTER FOUR

PRESENTATION AND INTERPRETATION OF FINDINGS

4.0 Introduction

This chapter presents the results of study and their interpretations. Descriptive as well as inferential analyses are presented following the objectives of the study as earlier stated.

4.1 Pre-estimation diagnostic tests

Pre-estimation diagnostics are statistical tests carried out before model estimation to ensure that the selected variables are fit to be included in the model to be estimated.

4.2 Stationarity tests on the model variables

The study proceeded to conduct stationarity tests on model variables, using the Augmented Dickey Fuller (ADF) and Phillips Perron tests as the most commonly used stationarity tests in academic literature. The ADF test is based on establishing the presence of unit roots by testing the null hypothesis that a unit root is present in a given time series sample. If the test-statistic (t-statistic) within the ADF is lower than its associated critical value (at 5% significance level),

then the null hypothesis cannot be rejected. The study checked for unit roots at both the variables' levels and their first differences as presented in Table 4.1 below.

Table 4.1: Stationarity test results

Estimation period (Jan2012 - July2022)				
Variables	**ADF(level)**	**PP(level)**	**ADF(Difference)**	**PP(Difference)**
LR	-1.644892	-1.740906	-4.541791***	-16.56136***
CBR	-2.770256	-3.225417**	-3.042700**	-7.355956***
EXR	-1.817660	-1.471235	-8.147745***	-8.196154***
INF	-4.965890***	-7.408940***	-4.635729***	-6.479902***

Source: Researcher's computation using secondary data from Bank of Uganda Jan2012-july2022. ***, **Significance at 1% & 5% respectively

The results in table 4.1 indicate that while some variables (INF) and (CBR) are stationary in levels (integrated of order zero I(0)), other variables only become stationary after first differencing (LR, and EXR) (they are integrated of order one I(1)). These results thus indicate the variables under study have mixed orders of integration.

4.3 The test for Cointegration

The cointegration test has been carried out in this study to determine whether there exists any long run relationship within the variables in the model specified. The results for the cointegration test carried out in the study are presented in Table 4.2 below.

Table 4.2: Cointegration test results

Tress test of:	**Trace Statistics**	**Critical Values**
r ≤ 3	1.186210	3.841465
r ≤ 2	10.82749	15.49471
r ≤ 1	35.39870**	29.79707
r ≤ 0	95.57567**	47.85613
Maximum Eigen Value	**Max-Eigen Statistics**	**Critical Value**
Test of:		
r ≤ 3	1.186210	3.841465
r ≤ 2	9.641283	14.26460
r ≤ 1	24.57121**	21.13162
r ≤ 0	60.17697**	27.58434

** Indicates significance at 5% level. Source: Researcher's computation using secondary data from Bank of Uganda, Jan2012 – July2022

The results from Unrestricted Trace Statistics indicate that there are two cointegrating vectors at 5 percent level of significance. Similarly, the results from Maximum Eigen Statistics indicate the presence of two cointegrating vectors at 5 percent level of significance. Therefore the Johansen Cointegration test concludes that there exists long run relationship within variables in the model specified. Thus the study can proceed to estimate the Vector Error Correction Model (VECM) and the Granger Causality test indicated in the earlier chapter.

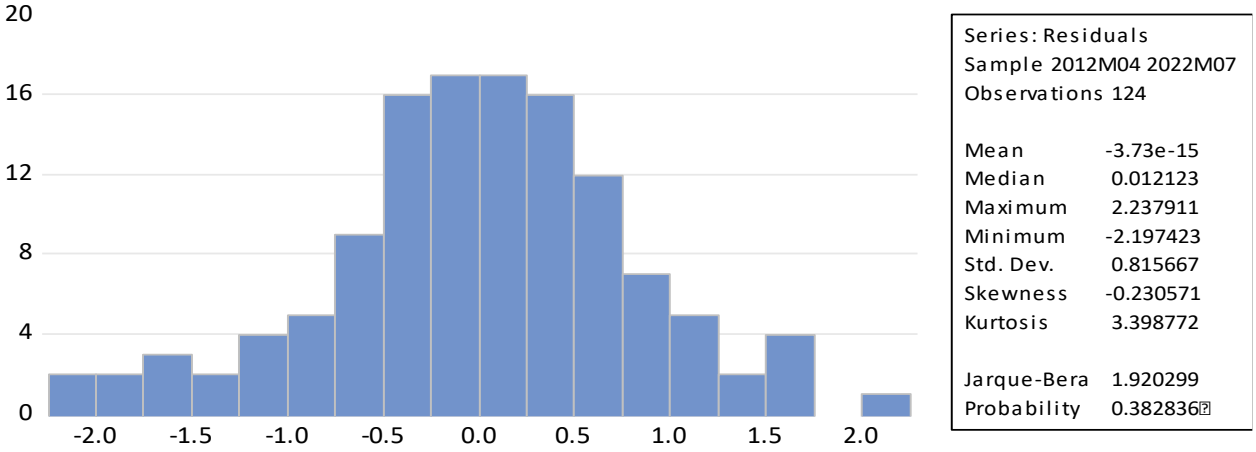
4.4 Residual Tests

Residual tests carried out in this study include; Normality test, Serial Correlation test and Heteroskedasticity test. The normality test has been carried out using histogram. The test for serial correlation has been carried out using LM serial correlation test while Heteroskedasticity test has been carried out in the study using Breusch-Pagan-Godfrey test. The details are indicated below.

4.4.1 Normality Test

Normality test has been carried out in this study to determine whether the data series estimated in the study are normally distributed or not. The result in the figure below displays a histogram and descriptive statistics of the residuals including Jarque-Bera statistic that test for normality. If the residuals are normally distributing, the histogram should be belled shaped and the Jarque-Bera statistic should not be significant. The reported probability in the table below indicates that the Jarque-Bera statistic exceeds the value under the null hypothesis. The study therefore does not reject the null hypothesis of a normal distribution.

Figure 2: Normality test



4.4.2 Serial correlation test

The study carried out the Breusch-Godfrey LM test for serial correlation. The null hypothesis under this test is *no serial correlation.* If the associated Prob. chi-square value is significant at 5% level of significance, then the null hypothesis can be rejected, else it is not rejected. The study observed that the prob. chi-square value (0.144) associated with the B-Godfrey test was not significant at 5% level. Thus, the null hypothesis could not be rejected. The study thus concluded that the model did not suffer from serial correlation. The results are presented in Table 4.3.

Table 4.3: Breusch-Godfrey LM Test for Serial Correlation

F-statistic	1.802153	Prob. F(2,110)	0.1698
Obs*R-squared	3.870675	Prob. Chi-square(2)	0.1444

Source: Researcher's computation using secondary data from Bank of Uganda

4.4.3 Heteroscedasticity test

The study carried out The Breusch-Pagan test to check for presence of Heteroscedasticity. The null hypothesis under this test is *no Heteroscedasticity*. If the prob. chi-square value associated with this test is not significant at 5% level of significance, then the null cannot be rejected, else it is rejected. This study observed that the prob. chi-square value (0.2002) was not significant at 5% level. Thus, the null hypothesis of the test could not be rejected. The study thus concluded that the estimated model did not suffer from heteroscedasticity. The results are presented in Table 4.4.

Table 4.4: Breusch-Pagan test for Heteroscedasticity

F-statistic	1.350591	Prob. F(12,114)	0.2004
Obs*R-squared	15.80790	Prob. Chi-square(12)	0.2002

Source: Researcher's computation using secondary data from Bank of Uganda

4.4.4 The test for multicollinearity

Multicollinearity is an econometric problem that exists whenever an independent variable is highly correlated with one or more of the other independent variables in a multiple regression equation. Presence of multicollinearity in a model undermines the statistical significance of the affected variables. To test for multicollinearity, this study generated the variance inflation factor (VIF) for each of the independent variables. The results are indicated as follows;

Table 4.5: VIF Results

Variable	VIF	1/VIF
CBR	3.02	0.330758
EXR	1.44	0.695427
INF	2.77	0.361012
Mean VIF	**2.41**	

Source: Researcher's computation using secondary data from Bank of Uganda 2012-2022

According to Suleiman (2019), VIF values need to be lower than 10 and tolerance values to be above 0.2 for there not to be a threat of severe multicollinearity in the model. From the results of Table 4.5, it is evident that the VIFs for all the variables are lower than 10 and all the tolerance values higher than 0.2. The study thus concluded that the variables could be included in the model together and not cause severe multicollinearity.

4.5 Determinants of Commercial Banks' Lending Rate in Uganda and the Causal Relationship between Central Bank Rate (CBR) and Commercial Banks' Lending rate in Uganda

This study basically uses the VECM to estimate the determinants of commercial banks' lending rate in Uganda in the period under review. The study also uses Granger pairwise test to investigate the causal relationship between Central Bank rate and Commercial Banks' Lending rate in the period under review. The details are indicated below.

4.5.1 Determinants of Commercial Banks' Lending rate in Uganda

The first analysis carried out in this study investigates the determinants of commercial banks' lending rate in the period under review. Specifically this examines the individual relationship between (CBR, Inflation, & Exchange rate) and Commercial Banks' Lending rate. The study uses Vector Error Correction Model (VECM) to determine whether there is any short run or long run causal relationship between the independent variables i.e CBR, INF & EXR and commercial banks' lending rate.

The presence of cointegrating vectors in the model specified implies that there exists long run error correction process working within the model such that any deviation from the long run equilibrium path would be restored by correction of equilibrium error back towards its long run relationship. The VECM results in this study are presented in the Table 4.6 below. The results in this table indicate the estimated parameters in each of the four versions of the VECM equations that are drawn from each column. The first row contains Error Correction Term (ECT) for each equation. The estimated parameters on ECT are presented in the first row and their standard errors are presented in the second row, while *t* ratios are presented in the third row.

Long run Equation;

$$\Delta(LR) = 0.04\Delta(CBR) + 0.12\Delta(EXR) + 0.27\Delta(INF) \quad (7)$$

The results for the long run relationship in the VECM estimates indicates that when the Central Bank rate increase by 1 percent Commercial Banks' lending rate increases by 0.04 percent keeping Inflation and Exchange rate constant. Similarly, in the long run, a 1 percentage increase in inflation leads to a 0.27 percentage increase in commercial banks' lending rate ceteris Paribas. Thirdly, in the long run, when Exchange rate increases by 1 percent, Commercial banks' lending rate increases by 0.12 percent. However this was found not to be statistically significant.

Table 4.6: Vector Error Correction Estimates

Error Correction:	D(LR)	D(CBR)	D(INF)	D(EXR)
CointEq1	**-0.058786**	**0.037976**	**0.271516**	**0.117546**
	(0.04696)	(0.01928)	(0.03739)	(2.51950)
	[-1.25188]	[1.96968]	[7.26187]	[0.04665]

D(LR(-4))	**-0.241405**	-0.070922	-0.002444	8.487366
	(0.10075)	(0.04137)	(0.08022)	(5.40586)
	[-2.39599]	[-1.71442]	[0.030461]	[1.570031]
D(CBR(-4))	**0.341272**	0.164953	0.040067	-15.53509
	(0.21982)	(0.08238)	(0.15975)	(10.7649)
	[1.70096]	[2.002441]	0.25081	[-1.44312]
D(INF(-4))	**-0.014479**	0.005983	-0.058207	6.050967
	(0.11385)	(0.04674)	(0.0903)	(6.10829)
	[-0.12718]	[0.128001]	[-0.64213]	[0.990621]
D(EXR(-4))	**0.003655**	0.001912	0.000436	0.002652
	(0.00172)	(0.00071)	(0.00137)	(0.0922)
	[2.12716]	[2.71048]	0.318801	[0.02877]
C	-0.129791	-0.056501	-0.076583	6.469813
	(0.09064)	(0.03721)	(0.07217)	(4.86300)
	[-1.43200]	[-1.51829]	[-1.06119]	[1.33042]

Researcher's VECM computation using secondary data from Bank of Uganda, Jan2012 – July2022

The short run equation;

$$\Delta(LR) = 0.34\Delta(CBR) + 0.003\Delta(EXR) - 0.014\Delta(INF) \quad (8)$$

The results for the short run relationship in the VECM estimates indicate that a 1 percentage increase in CBR by the Central Bank leads to a 0.34 percentage increase in the commercial banks' lending rate holding Inflation and Exchange rate unchanged. Similarly, a 1 percent increase in Exchange rate increases commercial banks' lending rate by 0.003 percent in the short run, holding CBR and Inflation constant. Also in the short run, a 1 percentage change increase in Inflation leads to a 0.014 percentage decrease in the commercial banks' lending rate. However this was found not to be statistically significant. Economically this can mean that in the short run Inflation does not influence changes in the commercial lending rate.

Following the results for the short run relationship in the VECM estimates in this study, it is therefore clear that Central Bank rate and Exchange rate significantly influence the changes in the Commercial banks' lending rate in Uganda in the period under review. The details are indicated in Table 4.6 above.

4.5.2 The Causal relationship between CBR and Commercial Banks' Lending Rate in Uganda

Subsequent to setting up the existence of long-run relationship amongst the variables using the VECM approach, the study investigates the direction of causality between Central Bank Rate and the Commercial Banks' lending rate. Presence of cointegration in data series envisages the existence of Granger causality, but cointegration does not indicate the direction of the causality relationship. The study investigated the causal relationships using the pairwise Granger causality test as indicated in the Table 4.7 below.

Table 4.7: Granger Causality test results

Null Hypothesis:	Obs	F-Statistic	Prob.
DCBR does not Granger Cause DLR	**122**	**2.48851**	**0.0473**
DLR does not Granger Cause DCBR		1.30750	0.2715
DINF does not Granger Cause DLR	122	1.26036	0.2898
DLR does not Granger Cause DINF		0.79159	0.5330
DEXR does not Granger Cause DLR	122	2.08084	0.0879
DLR does not Granger Cause DEXR		**2.52644**	**0.0446**
DINF does not Granger Cause DCBR	**122**	**7.11696**	**4.E-05**
DCBR does not Granger Cause DINF		1.74097	0.1459
DEXR does not Granger Cause DCBR	**122**	**5.01399**	**0.0009**
DCBR does not Granger Cause DEXR		1.87595	0.1195
DEXR does not Granger Cause DINF	122	1.12802	0.3469
DINF does not Granger Cause DEXR		0.98867	0.4168

Source: Researcher's computation using secondary data from Bank of Uganda.

The results of the granger causality test show that in equation one, the null hypothesis *CBR does not granger cause LR,* is rejected because the associated probability value of the F-statistic is found to be significant at 5% significance level. This implies that the central bank rate granger causes Lending interest rate. In the second equation, the null hypothesis *LR does not granger cause CBR* cannot be rejected because the associated probability value of F-statistic is not significant. This result implies that lending interest rate does not granger cause central bank rate. The results of this granger causality test show that there is a uni-directional causality running from central bank rate to lending interest rate.

Secondly, the results from Granger causal relationship in this study also indicate that there is causal relationship running from Exchange rate to CBR at 5 percent level of significance. Similarly, the study results indicate that Inflation granger causes CBR at 5 percent level of significance whereas Lending rate was established to granger cause Exchange rate at 5 percent level of significance.

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter of the study discusses the findings in the previous chapter and makes conclusions basing on the study objectives. The chapter also gives policy recommendations from the study findings.

5.1 Discussions

This study set out to achieve four major objectives that were to be achieved through hypothesis testing. The objectives of the study were to establish the determinants of commercial bank's lending rate in Uganda and to establish the causal direction of central bank rate and lending rate. Hypotheses were to be tested by looking at the associated p-values of the respective parameter estimates as specified in the empirical model in equation 1 of chapter three. The findings of the results are discussed as below;

5.1.1 The short run and long run effect of central bank rate on commercial banks' lending rate in Uganda

The study established that there is a significant effect of central bank rate on lending rate in Uganda both in the short run and in the long run. The nature of this effect is positive for both periods, implying that in Uganda, when the Central Bank Rate increases, the commercial banks' lending rate increases both immediately and afterwards. Further, the magnitude of the effect in the long run (0.34%) is greater than the short run magnitude (0.04%). This indicates that increases in central bank rate expectedly increase lending interest rates which increases the opportunity cost of funds at the disposal of banks. Interest rates or coupons on treasury bills equally see an upward trajectory when market interest rates begin to rise in order to attract investors to patronize government securities. Given that treasury bills are safer relative to lending to firms, it would take a higher interest rate (lending rate) for banks to lend to firms as opposed to putting the available funds in treasury bills. Increases in lending interest rates also increases the cost of overnight borrowing for banks that borrow to cover their positions or to on-lend to clients. Unsurprisingly therefore, monetary policy tightening through increase of central bank rate delivers an upward adjustment in the bank lending rates consistent with the theoretical prescription. The study results are consistent with those of Abdul-Aziz and Alagidede (2020) who established a positive and significant effect of the central bank rate on the lending rates.

5.1.2 The effect of inflation on commercial banks' lending rate in Uganda

Secondly this study examined the effect of inflation on commercial banks' lending rate, and the corresponding null hypothesis was that *inflation does not significantly affect commercial bank lending rate in Uganda.* The study established that inflation positively affects the lending rate only in the long run. This implies that when inflation rate increases the lending rate also

increases in the long run. Specifically, a percentage increase in inflation leads to a 0.27 percentage increase in lending rate in the long run.

5.1.3 The effect of exchange rate on commercial banks' lending rate in Uganda

Thirdly from the study results, it was established that exchange rate positively affects banks' lending rates only in the short at 5% significance level. A positive effect implies that when exchange rate increases, commercial lending rate increases and vice versa. This positive effect is associated with the exchange rate risk, where increase in exchange rate increases firm's probability of default (because their output is expected to be lower) leading banks in the short run to increase the lending rate being charged on loans. The results of the model specifically reveal that a percentage increase in the exchange rate leads to 0.004 percentage increase in the current lending rate in the short run keeping other factors constant. The observed results of the model are consistent with those of Bill and Hunter (2012), who found significant positive effect of exchange rate on banks' loan pricing.

5.1.4 The causal direction between central bank rate and commercial banks' lending rate in Uganda

Objective two of this study was to establish the causal direction between central bank rate and commercial banks' lending rates. The results indicated uni-directional granger causality running from central bank rate to lending rate. This revelation indicates that in Uganda, the causal relationship that exists between central bank rate and commercial banks' lending rate originates from the central bank rate, thus it is central bank rate that causes banks' lending rate. Since this study has already established that the relationship between the central bank rate and commercial lending rate is positive for Uganda, it is also now clear that the source of the "positivity" comes from central bank rate.

5.2 Conclusions

This study examined the effect of CBR, INF and EXR on LR in the Ugandan context using co-integration technique, Vector Error Correction model and granger causality analysis. The co-integration results indicated the existence of only two long-run equilibrium relationship among the study variables. The study established that central bank rate positively affects commercial banks' lending rate both in the short run and in the long run and that central bank rate granger

causes commercial banks' lending rate. The exchange rate was also found to have a significant positive effect on commercial banks' lending rate only in the short run. However inflation was found to have significant positive effect only in the long run. Therefore, the study concludes that monetary policy tightening through increase of central bank rate leads to an increase on the commercial banks' lending rates charged on loans in Uganda.

5.3 Policy Implication for the study

The study aims to provide a better understanding of the effectiveness of monetary policy specifically the central bank rate in influencing the commercial banks' lending rate. The study results suggest that central bank rate can be an effective monetary policy tool in Uganda by affecting commercial banks' lending rates that directly affects credit supply and real economic activity.

Given the significant increase in globalization over the past decade, the study results have important implications for corporate managers and institutional investors given that the later have recently become important participants, as syndicate members and investors in the syndicated loan market. Specifically the study results show that exchange rate exposure is of importance in determining firm's cost of capital and therefore on its investment decision.

5.4 Limitations of this study

The study is limited to effect of central bank rate, exchange rate and inflation to the commercial banks' lending rate, which are largely economic factors; it does not consider institutional factors in the determination of lending rates in Uganda.

The study also utilizes aggregate national data and therefore makes general conclusions. It does not look at individual bank data to ascertain how the different banks in Uganda determine their lending rates.

5.5 Possible areas for further research

Subsequent studies can consider examining the effect of institutional factors on lending rates in Uganda.

There is also a need to understand how the different banks in Uganda determine their lending rates.

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APPENDICES

Appendix One: Augmented Dickey-Fuller (ADF) Tests

AT LEVELS

Null Hypothesis: LR has a unit root
Exogenous: Constant
Lag Length: 6 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.644892	0.4566
Test critical values:	1% level	-3.485586	
	5% level	-2.885654	
	10% level	-2.579708	

*MacKinnon (1996) one-sided p-values.

AT 1st Difference

Null Hypothesis: D(LR) has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.541791	0.0003
Test critical values:	1% level	-3.485586	
	5% level	-2.885654	
	10% level	-2.579708	

*MacKinnon (1996) one-sided p-values.

AT LEVELS

Null Hypothesis: CBR has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.770256	0.0655
Test critical values:	1% level	-3.483751	
	5% level	-2.884856	
	10% level	-2.579282	

*MacKinnon (1996) one-sided p-values.

AT 1st Difference

Null Hypothesis: D(CBR) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.042700	0.0338
Test critical values:	1% level	-3.484653	
	5% level	-2.885249	
	10% level	-2.579491	

*MacKinnon (1996) one-sided p-values.

AT LEVELS

Null Hypothesis: EXR has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.817660	0.3705
Test critical values:	1% level	-3.483312	
	5% level	-2.884665	
	10% level	-2.579180	

*MacKinnon (1996) one-sided p-values.

AT 1st Difference

Null Hypothesis: D(EXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.147745	0.0000
Test critical values:	1% level	-3.483312	
	5% level	-2.884665	
	10% level	-2.579180	

*MacKinnon (1996) one-sided p-values.

AT LEVELS

Null Hypothesis: INF has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.965890	0.0001
Test critical values:	1% level	-3.483751	
	5% level	-2.884856	
	10% level	-2.579282	

*MacKinnon (1996) one-sided p-values.

AT 1st Difference

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.635729	0.0002
Test critical values:	1% level	-3.483751	
	5% level	-2.884856	
	10% level	-2.579282	

*MacKinnon (1996) one-sided p-values.

Appendix Two: Johansen Cointegration test Results

Series: LR CBR EXR INF
Lags interval (in first differences): 1 to 5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.391848	95.57567	47.85613	0.0000
At most 1 *	0.183777	35.39870	29.79707	0.0102
At most 2	0.076588	10.82749	15.49471	0.2223
At most 3	0.009755	1.186210	3.841465	0.2761

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.391848	60.17697	27.58434	0.0000
At most 1 *	0.183777	24.57121	21.13162	0.0157
At most 2	0.076588	9.641283	14.26460	0.2366
At most 3	0.009755	1.186210	3.841465	0.2761

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values