AN EMPIRICAL STUDY OF THE RELATIONSHIP BETWEEN CENTRAL BANK KATE (CBR) AND COMMERCIAL BANK LENDING RATES IN KENYA

BY

ENOS OTIENO AUCH
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DECLARATION

This project is my original work and has not been presented for a degree in any other university.

Signature---------- Date 24/11/09

Enos Otieno Auch

This project has been submitted for examination with my approval as university supervisor.

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Lecturer. Department of Accounting

School of Business. University of Nairobi

DEDICATION

This work is dedicated to my mother Mary Aueh. Sister Jane, beloved wife Evelyn and children; Frank, Stacy and Phillip for their unswerving love and support.

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ABSTRACT

The study contained in this report investigated the nature of relationship between CBR and commercial bank lending rates. We analyzed data to establish whether the CBR is an effective monetary policy tool. The data used was obtained from the CBK and covered the period June 20()6 (when the CBR was introduced) to August 2009. The general approach was to use the lending rates and CBR to determine the nature of correlation between the variables, and then use regression to determine the extent of the relationship.

The T and P Values were used to test the significance of the overall model with confidence levels of 80.4%. 85.1%, 98.5% and 99.5%. The decision criterion for rejection of the null hypothesis was at the level where the P-Valuc is less than the T' Value (significance level).

The results from the study showed that changes in savings, deposit, overdraft, 91 day T bill. CBR and lending rates were found to have strong positive correlation. However change in savings rate did not show any statistical significance in determining lending rates at all the significance levels tested, while changes in 91 day T bill rates were statistically significant at 85.1%. 80.4%. and 99.5% confidence levels, but not at 98.5%.

The findings of the study arc consistent with other studies done by Cook and Hahn (1989) who found that the response to increments in the target rate was positive and significant at all maturities, but smaller at the long end of the yield curve. Our findings showed correlations of between 0.822 and 0.990. The correlation coefficients for overdrafts are higher than those for lending, which have maturities of between 3 and 6 years. Similar findings were also documented by Poole et al. (2002), Ellingsen and SorderstrGm (2003), lillingsen. Soderslrom and Masscng (2004), Gurkaynak, Sack and Swanson (2005), Beechcy (2007) among others.

Given the strong positive correlation among the changes in CBR. lending, savings, deposit, overdraft and 91 day Treasury bill rates, the CBK should put more reliance on

the CUR to achieve its monetary policy goals of price stability, low inflation and low unemployment. When announcing a change in CBR. the CBK should include a target lending rate that the commercial banks should strive to achieve within a specified time period. This will help the CBK achieve lower lending rates by managing trading around the target rate. This was ably demonstrated by Selva and Oscar (2004), in their study of the response of term rates to U.S. Fed announcements.

We therefore recommend further research on this area to guide the CBK in determining the target lending rate for a given period as well as a the amount by which the CBR should increase to cause a given target change in lending rates.

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LIST OF ABBREVIATIONS

Abbreviation	Full Name
CAPM	Capital Asset Pricing Model
CBK	Central Bank of Kenya
CRR	Cash Ratio Reserve
CBR	Central Bank Rate
Fed	Federal Reserve Rate
FX	Foreign Exchange
FOMC	Federal Open Market Committee
MPAC	Monetary Policy Advisory Committee
MPC	Monetary Policy Committee
Rcp°s	Repurchase Agreements
U.K	United Kingdom
U.S	United States of America

CHAPTER ONE

1.0 INTRODUCTION

1.1 An overview

This chapter introduces the area of study, with a highlight of the background, the statement of the problem, objectives of the study and concludes with the segments of the society who will find the study useful. The chapter builds the broader monetary policy framework of the Central Bank of Kenya, and shows how the CUR connects to the Central Bank of Kenya (CBK) monetary policy instruments, and concludes with a global perspective to show how the Federal Reserve (Fed) has performed in the United States of America.

1.1.1 Background of the study

The Central Bank of Kenya (CBK) formulates and conducts monetary policy with the aim of keeping inflation low and stable, thereby contributing to favorable macroeconomic environment for sustainable economic growth and employment creation. Low and stable inflation facilitate higher levels of domestic savings and private investments and therefore leads to better economic outcomes including improved economic growth, higher real incomes and increased employment opportunities. As movements in the general price level arc influenced by the amount of money in circulation, the Central Bank of Kenya operates in a way that restricts the growth of the total money stock to a level that is consistent with a predetermined economic growth target There are four major tools the Bank uses to implement monetary policy, these are; Open Market Operations. Standing Facilities. Reserve Requirements and Foreign Kxchange Market Operations (CBK, 2008).

In Open Market Operations, the CBK implements monetary policy by controlling money supply through repurchase agreement (or repos) by selling Treasury bills and other eligible securities and uses reverse repos to inject liquidity by buying Treasury bills and other eligible securities from commercial banks. As a lender of last resort, the CBK uses Standing Facilities to provide secured loans to commercial banks on an overnight basis at a nitc knuwn as the Central Bank Rate (CBR). l"he CBK also uses Reserve Requirements *hich is the proportion of commercial banks' deposits to be held as cash (CRR) at the

CBK in accordance with the law. An increase in CRR reduces the capacity of commercial banks to extend credit.

1.1.2 The Official Central Hank Kate and Market Interest Kates

When central banks change interest rates, strictly speaking, the rate that they change is the 'refinancing' rate, the rate at which liquidity is made available to the banking sector. It is only in the market for reserves that the central bank is the monopoly supplier, and only in that market can it determine price directly (Dale and lialdane, 1993, p.3). The way in which a change in the official rate is eventually communicated to the behaviour of nominal income (the transmission mechanism of monetary policy) varies to some degree, between countries, doubtless, because it depends to some degree, on institutional differences between economies (Britton and Whitley. 1997). Selva and Oscar (2004) studied the response of term rates to U.S. Fed announcements. They concluded that the announcement effect of the changes in the target atTccts the monetary transmission mcchanism in two ways; (I) by increasing the effectiveness by which the Federal Reserve (Fed) manages federal funds trading around the target rate, and (2) by regimenting the formation of expectations and the price discovery process of nominally risk free Treasury securities.

In the United Kingdom, a change in interest rates works mainly through demand, with a small cITect coming directly through import prices. The link between interest rates and demand are provided by wealth effects, the exchunge rate, the cost of credit, and the incentive trade present for future consumption, Manscal and Howells (2002). The first link in the chain, in all monetary regimes, is the link between official rates and market rates. It is not the rate at which the central bank supplies liquidity to the domestic banking system that changes demand pressure. It is how agents react to changes in the rate on loans charged by banks, to changes in asset values that flow from a different rate of discount, to changes in the rate that they cam on their savings, and so on. All monetary regimes that use interest rates as the operating target must naturally assume a fairly ready link between official and market rates.

In the study conducted by Mariscal and Howclls (2002) on Central Hanks and Interest Rates, it was found that since the 1970s, the evolution of monetary policy in most countries has seen a steady increase in market orientation. This has meant the removal of direct controls, reduction in reserve requirements, increasing emphasis on interest rates as an operating target, and a shortening of the maturity of rates directly involved. They also state that the central banks role in monetary policy has been rcduced to the setting of a very short term official rate of interest, which indicates the price at which the central bank will make liquidity available to the banking system. However, it is changes in market rates that affect behaviour, and so the ability of the central bank to influence anything at all depends, first, on the interaction between official and market rates.

1.1.3 Capital Auct Pricing Model and Financial Market Friction*

In the context of capital asset pricing model (CAPM), this study defines lending rates as the rate of return at which the owners of capital are willing to advance crcdit to borrowers alter taking into account all the risks associated with the borrowing. The utility maximizing investor balances the amount of risk he is willing to bear, given the tradeoIT between risk and expected return. The fundamental assumption made is that all prices reflcct all available public information. DeGennaro el al.. 2007 identified five primary categories of market friction which can diston asset return and make it not perfectly reflect the risk return trade off, namely transaction costs, taxes and regulations, asset indivisibility, nontraded assets, agency and information problems. Significant market frictions translate to bigger beta in the Required Return equation;

$R_s - R_f + B(R_m . R_f)$.

where R_f is the risk free rate, R™ is the market expected return and B (beta) is the measure of systematic risk and incorporates both the volatility of the investment and the correlation of the investment with the market.

Transaction costs. Transaction costs include costs of trade and the opportunity cost of capital. The cost of trade includes postage, telephone charges, computer power and other similar real expenditures of resources. Opportunity cost of time includes search costs, the hmc to gather information and the lime to make the trade itself. Minimizing these costs

represent a profit opportunity. Vaynnos (1998) finds that realistically small transaction costs have negligible effects on asset returns, and mainly affect the portfolio balancing frequency.

Taxes and regulations. Regulations are used loosely to encompass laws passed by legislative bodies as well as rules imposed by government agencies and banking industry itself. Taxes and regulatory costs may be explicit or implicit. The corporate income tax is explicit. Other taxes arc implicit, such as capital requirements that banks must meet (Buser, et al., 1981). In this case, the statute authorizing the capital requirement does not refer to them as taxes, and the banks do not send funds to the government to discharge the liability. But these requirements still increase the cost of doing business.

Asset indivisibility. If assets were indivisible, then investors could not hold arbitrarily small portions of each asset. This practice would permit all investors, even those with little to invest, to hold the market portfolio of all investable assets. This means that almost all investors must decide whether to hold the smallest traded unit of an asset or to omit it from their portfolios. Combined with trading costs, which usually have a fixed component, asset indivisibility makes it harder for investors of limited means to begin investing because their portfolios tend to lie farther below the capital market line (DcGcnnaro et al., 2007).

Nontrxded assets. Becker, (2005) reports that human capital now makes up at least 70 percent of all wealth in economically more advanced nations. I his enormous capital slock tends to drive workers away from holding market portfolio. The present value of investor's labor income cannot be traded, yet they constitute an important part of the investor's overall portfolio.

Agency and information problems. The separation of ownership and control brings incentive problems and financial contracts cannot handle them at zero costs. Tkac (2004) •hows that investors and investment advisors have inherent conflicts (maximum returns against maximum profits) and it is difficult for these types of conflicts to just vanish, '^perfect information can lead to inaccurate credit decisions, in turn meaning that lenders

miss some good loans and make some bad loans. The key point is (hat collecting more information about individual lenders would solve this problem, but only at a cost, and at some point the necessary information is simply not worth collecting. At least some part of die financial market friction remains.

1.2 Statement of the problem

Since the 1970's, the central banks of various countries have increasingly relied on interest rates, to the almost complete exclusion of monetary or reserve aggregates, both as sources of information for determining policy and as operating instruments for conducting policy. The best documented cases of reliance on interest rates as a means of monetary control are provided by the Fed. For example, when announcing its policy action on March 25, 1997, the Federal Open Market Committee (FOMC) stated that it had "decided today to tighten money market conditions slightly, expecting the federal funds rate to rise 1/4 percentage point to around 5-1/2 percent." (Economic Research Data, 1997). This explicit charactcri/ation by the FOMC of a monetary policy action in terms of a change in the overnight federal funds rate is just one signal of the current preeminence of interest rates in the conduct of monetary policy.

This latest shift in the conduct of policy from money to interest rates has been spurred by two developments: first, the breakdown of traditional relationships between money and economic activity largely brought on by innovations in payment and transactions technologies; second, the increasing sophistication of financial markets and central banks regarding information about the future as embedded in financial instruments (including, for example, the emergence of derivatives and inflation-indexed debt). Few central banks of major industrial nations such as United Kingdom and Japan still make much use of credit controls or other attempts to directly regulate the flow of funds through financial markets and institutions.

Instead, banks restrict themselves to interventions that seek to control the interest rate in an •nter-bank market for central-bank balances. The CBR is such tool used by the Central ^•nk of Kenya to control the overnight lending to the commercial banks. The rate is

intended to convey the sentiments of the ccntrul bank on the direction the bank expects market interest rates to take. If the rate is consistently falling, the central bank expects market rates to fall. But is this always the case? The Monetary Policy Committee (MFC) in its 22*[1] July 2009 meeting noted that whereas inflation had declined, market liquidity was noted to be sustaining rather than stimulating growth. "In fact, commercial bank lending rates have not declined" (CBK, 2009), which implies that with each downward change in the CBR, the CBK expected the lending rates to follow in the same direction, leading the researcher to question whether the CBR is really an effective monetary policy tool or whether it is just a rate used by the CBK to provide overnight lending to the commercial banks.

While several studies have been done in the U.S. and U.K. among other developed countries in regard to the movements of the official central bank rate and market rates, no such study has been done locally to provide any empirical relationship between the CBR and market lending rates in Kenya. Without knowledge of how changes in CBR connects with market rates, it is almost impossible to know what changes in official rates is necessary to achieve given results. This study, therefore, aims at bridging the knowledge gap in the nature of relationship between CBR and commercial banks lending rates nnd establishes whether an increase or drop in CBR will cause similar change in lending rates.

1J Objective of the study

The broad objective of the study is to determine whether the Central Bank of Kenya Rate is an effective monetary policy tool in influencing the market interest rates that commercial banks charge to borrowers.

Specific objective of the study will be;

To determine the relationship that exists between Central Bank of Kenya Rate and commercial banks lending rates.

1.4 Justification of the study

f h e finding!* of the study will be of importance to the following, namely; Central Hank of Kenya, commercial banks, borrowers, economists and academicians

The Central Bank of Kenya may find the study useful in formulating appropriate monetary policies so us to achieve stability in the financial market. The policies regarding the rates of interest charged on overnight lending to commercial banks can therefore be formulated taking into consideration their effects on lending rates to the public.

Commercial banks will find the study helpful in regard to how Central Bank's monetary policies impact on their operations. Changes in CBR affects the direction the commercial bank interest rates will take and generally makes any move by commercial banks in the opposite direction to be met with public complaints, particularly when it is in an upward direction. Understanding the CBR may also help commercial banks anticipate the direction future CBR changes will tukc and therefore avoid unnecessary monetary policy shocks.

Borrowers will get insight of how the Central Bank of Kenya lending rates is likely to influence commercial banks lending rates and how this is likely to affect their borrowing. Understanding the relationship between monetary policy and market interest rates is of utmost importance to bond traders, borrowers and central bank. Unanticipated changcs in monetary policy strongly affect interest rates of almost all maturities, representing recurrent opportunities for traders to win or lose money (Tore, et al. 2001).

Hie effect of monetary policy on the real economy is one of the discipline's controversial topics that are of utmost importance to acadcmicians as il adds into the existing body of knowledge. Economists and practitioners may also find the study useful as il provides an opportunity for further engagement with the bond holders in need of information on likely luture direction on monetary policy stances.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Interest rates play an important role in the economy. The key to using interest rates to help economic management is the effect that interest rates have on demand. If the central bank-feels that inflationary pressures are rising in the economy, it will increase the rate of interest to dampen down the growth of aggregate demand. Demand falls when interest rates are raised through their effect on the components of aggregate demand, made up of the following spending model: Consumption + Investment + Government expenditure + (Exports - Imports)[1]

Consumption and invesunent will fall when interest rates are raised, which makes it more expensive to borrow money. As a result of the level of borrowing and therefore aggregate demand falling, the inflationary pressures in the economy have been reduced. The USA Federal Reserve Hoard define Monetary policy as the process by which the government, central bank, or monetary authority of a country controls (i) the supply of money, (ii) availability of money, and (iii) cost of money or rate of interest, in order to attain a set of objectives oriented towards the growth and stability of the economy.

2.2 Theoretical Framework

Using CAPM as a guide, this study seeks to determine the relationship between Central Bank Rate (CBR) and commercial bank lending rates. What would be the impact of a change in CBR and what sort of impact would make for the most effective conduct of monetary policy? By doing so. the study attempts to assess the extent to which Central Bank policymakers are justified in using the CBR as monetary policy tool in achieving desirable market interest rates. Whereas CAPM assumes that lending can be done at the rtsk free rate, and that all investors have the same information, in real life, investors do •djust for systematic risk or economic risk that cannot be diversified away as well as for "un systemic risk, such as different hurdle rates for different time horizons, different

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magnitudes of investments, different risks or new ventures, inflation and cost reduction projects (White cl al. 1998). The range of interest rates that have been advocated span from a low of 0% to the highest current or prospective financing rate including an adjustment for risk. Finance (capital asset and arbitrage pricing theory) has foe used on the relationship between risk and the rate of return that should be required for every investment. Although generally discredited, some users have advocated and used 0% as an interest rate for public projects. The justification is that the projects are funded from taxes without project specific borrowings. Also the projects are believed to be very long lived, so that the rate of time preference is close to zero (Grant, et al, 1990).

For projects funded by debt, the required rate of return expected by the owners of capital (interest rates to borrowers) will factor all risks plus rewards to the owners of capital. Hi us as stated earlier, the required rate of return is a factor of risk free rate plus a risk premium, represented by:

Required Rate of Return = R_f + B(Rm- Rr).

Research indicate that because of difficulty in obtaining advance knowledge on private information held by central banks, it may take longer for banks to react to this type of information. The existence of perceived private information has been documented by Romer and Romer (2000) who suggested that this is actually as a result of superior data processing abilities at the Federal Reserve rather than earlier access to data. Likewise, small companies may take longer to react to public policy pronouncements by the central bank. As a result, the usual method of estimating CAPM betas for a company (ordinary least squares regression) leads to beta estimate that underestimates the risk. In a journal of Portfolio Management article, researchers found that using a multiple regression technique on returns, and also the lagged returns, corrects much of this bias; the correct beta must be estimated by adding the beat on returns and the beta on lagged returns together (Ibbotson, Kaplan, and Peterson 1997).

2.3 Review of Empirical Literature

Precisely what rate a central bank decides to operate on is a matter of local choice and will reflect the structure of national money markets and bank's portfolio preferences, Mariscal and Howells (2002). The Fed uses instrument (Taylor) rule to guide monetary policy in setting the Fed. The Taylor rule models the actual federal funds rate as a function of inflation, unemployment, and the gap between potential and actual Gross Domestic Product. Taylor (1993). The CBR on the other hand is based on the average of the interbank and repo rates plus a margin to be determined and announced by the CBK every eight weeks.

Empirical studies have provided statistical evidence to show that monetary policy affects market interest rates, and (hat on average this relationship is positive: an increase in the central bank rate leads to an increase in the interest rates of all maturities. There are some exceptions to this rule. For example, on a number of occasions in 1994 when the Fed announced an increase in its target rate, interest rates on long maturities fell.

There is an extensive amount of literature which studies the response of interest rules to changes in the central bank monetary policy stance. The methods and findings of this empirical research can be grouped in two categories. On the one hand there have been a number of studies using single equation models with daily data that find unanticipated changes in federal funds rate can have a statistically significant and sizeable effect on long-term interest rates. Cook and Hahn (1989), Kuttncr, (2001), Cochrane and Piazzesi (2002), Poole et al. (2002), Ellingsten and Sorderstrom (2003), Ellingsen, Soderetrom and Masseng (2004), Gurkaynak, Sack and Swanson (2005), Bccchcy (2007). On the other hand, a number of studies using Vector Auto Regression (VAR) with weekly or monthly data find that structural shocks to the federal funds rate do not have a large eficct on long-term interest rates and sometimes this effect is statistically insignificant. Moreover, what little effect federal fund innovations do have on long-term interest rates begins to disappear after W9. Edelberg and Marshall (1996), Evans and Marshall (1998), McMillan (2001). ®[erun]'ent and Froyen (2006). Herumcnt and Froycn (2009). These two groups of studies, therefore, come to different conclusions on the monetary policy's influence on long-term •merest rates.

Giirkaynak. Sack and Swanson (2003) presented empirical evidence on the excess sensitivity of long-term interest rates. The three scholars noted that in standard macroeconomic models, short-term interest rales tend to return relatively quickly to a deterministic steady state after a macroeconomic or monetary policy shock, so that these shocks only have transitory effects on the future path of interest rates. As a result, one would expect only a limited response of long-term interest rates to these disturbances. Putting this prediction in terms of forward rates, one would expect virtually no reaction of long-term forward rates to these shocks. They provided empirical evidence to show that the U.S. Treasury market appears to contrast significantly with these predictions. In particular, the long-term forward rates have a tendency to move significantly in response to the unexpected components of monetary policy decisions and a number of macroeconomic data releases, which they referred to as *excess sensitivity.* However, results from real forward rates computed from inflation-indexed U.S. Treasury debt showed that those rates do not respond to macroeconomic and monetary policy surprises, which indicate that the excess sensitivity of nominal forward rates derives from their compensation for expected inflation. As noted by Skinner and Jeronimo Zcttelmcyer (1995), who studied interest rate response to monetary policy over long periods in four major economies, the fraction of such abnormal tesponses is considerable in all countries.

Cook and Hahn (1989) examined how yields on Treasury securities reacted to changes in target Fed funds rates between 1974 and 1979. Using just those days on which there was a change in the target, their procedure was to regress one-day changes in Treasury bills, notes and bond rates on changes in federal funds rate target. They found that the response to increments in the target rate was positive and significant at all maturities, but smaller at the long end of the yield curve. Their work was followed by a large number of studies, including Roley and Sellon (1998a, 1998b), Kuttncr (2001), Poole and Raschc (2000), [p]oolc, Rasche and Thornton (2002), Hamilton (2008). These studies developed further •nslysis either focusing on more or recent periods or introducing improved specifications or 'tthniques. A consistent result emerges from this literature: interest rates systematically fespond to policy actions or policy related information, implying that these actions arc not ^•ng fully anticipated.

Roley and Sellon (1989a) and Kultncr (2001) pointed to the need to distinguish between the expected and unexpected elements of monetary policy announcements. Kuttner argued that bond yields set in forward-looking markets should respond very differently to anticipated elements of monetary policy. If the market anticipates much of the target changes occurring on day J, then those expectations would have been incorporated into long-tern) rates on day </-/. Therefore little change should be observed on the day of the target change. On the other hand, a surprise in the target rate will lead to a change in the long-term rates. To isolate the unanticipated component of the target change. Kultncr used the spot-month 30-day Federal Funds Futures contracts as a measure of expected Fed policy. Under this perspective, changes in the futures rate on day d arc used as a measure of the unexpected change in the target rate on day *J.* Regressing the change in the interest rate on the unexpected and expected component* of the target rate change, Kuttner found a small and statistically insignificant response to the anticipated piece, while the response to the unanticipated component was large and highly significant. In fact, for the surprise component, the coefficients obtained were larger than those reported by Cook and Hahn.

Poole and Rasche (2000) argued that monetary policy should be conducted in such a way that the market can predict policy actions. In other words, the interest rates futures market can be used as a tool to measure the efficiency of the monetary transmission. If the market was able to perfectly anticipate the central bank policy decisions, then market interest rate- should adjust in response to information innovations, but not to the central bank's announcements of monetary policy decisions. Bernoth and von Hagcn (2004) analyze three aspects of the predictability of interest rates in the European Monetary Union (EMU): the efficiency of the Euribor interest rates futures market, the impact of monetary policy announcements on the volatility of Euribor future rates, and the effect of ECU policy announcements on the prediction error contained in Euribor futures rates. They find that Euribor futures rates with a forecast horizon of up to four months arc unbiased and efficient Predictors of future spot rates, and that the patterns in volatility indicated that market Participants correctly anticipated the direction of interest rates changes intended by the ECB hut there was uncertainty about the timing.

2.4 Commercial Hunk Lending Rules

The Kenyan hanking sector was liberalized in the mid 1990s and has since experienced increased competition in the industry. There were 43 commercial Banks in Kenya as at 31" December 2008 with a combined balance sheet of Kshl, 184 billion from Kshs 328.4 billion in 1997. However, the story of Kenya's banking sector remains the same where 14 players control more than 83% of the market, and the remaining 29 banks left to share a paltry 17% of the market. According to the 2008 banking survey, three players, Barclays bank. Standard Chartered Bank and Kenya Commercial Bank have maintained their dominance in the Kenya's banking sector, controlling between 40% and 50% of the sector throughout the past ten years. But other players arc coming up and claiming their stake in the market, most notable among them being CFC Stanbic Bank whose market share has grown from 1.68% in 1997 to 7.03% in 2008 in terms of total asset following the merger between CFC and Stanbic Banks. Worth noting also is Equity Bank which entered the market as a commercial bank in 2004 with a market share of 1.17% but now claims 6.52% us at the end of 2008. Other banks that have realized significant market growth include CBA (2.83% to 4.23%) and l&M Bank (1.59% to 3.10%) among other*.

The oligopolistic nature of the banking industry in Kenya has meant that interest rates have remained higher. To show how important interest rates are to economic growth, the Kenya Bankers Association (KBA) and CBK formed a Joint Task Force in 2007 to enhance the communication of bank charges and lending rales, (Bank Supervision Annual Report 2008, ppl8). The intended effect is to increase mass acccss to information, and eventually force banks to lower lending interest rates as well as the premium. The premium, commonly known as the spread, is the difference between the deposit (savings) rate and the loan lending rate. Commercial bank average lending rates increased from 13.32% in 2007 to 14.80% in December 2008. The overall deposit rale also rose from 4.33% to 4.84% over the ttnie period. Consequently, the interest rate spread increased from 8.99% in December 2°07 to 9.96% in December 2008, (CBK 2008). The size of banking spreads serves as an "wlicator of efficiency in the financial sector because it reflects the costs of intermediation banks incur (including normal profits).

2.4.1 Factors Affecting Commercial Hunks Lending Kates

The factors that determine the level of commercial bank lending rates are important concerns to policy makers, the banking industry and the public at large. According to Yoon and Stanley, (2002), the effects of uncertainties on lending (investment) decisions are due to several reasons, namely default risk, interest rate changes, correlation between investment costs (input price) and output price, degree of irreversibility (e.g.. substantial loss in default). Since both assets and liabilities are sensitive to interest rate changes, Yoon und Stanley (2002) argue that a major source of uncertainly in investment decisions (e.g.. loan decisions) is interest rate changes. Yoon and Stanley, (2002) show empirical evidence consistent with the prediction that the greater the uncertainty is, the lower the loan activities arc.

Inflation has an effect on the level of market interest rates. The Central bank's policy direction to achieve its mandate of maintaining price stability has a marked influence on the interest rate level. When there is too much liquidity in the system, there is more pressure for inflation to rise. To curb inflationary pressures arising from excess liquidity in the system, the Central bank will have to increase its key policy rates, i.e., overnight borrowing rate or reverse repurchase rate and overnight lending rate or repurchase rate. By increasing its key policy rates, the Central bank is sending a signal to the market that the general level of interest rates will be on an uptrend (CBK, 2008).

The fiscal policy stance may also influence the direction of interest rates. A government that incurs a fiscal deficit needs to finance its existing budgetary requirements by borrowing from the domestic market or from abroad. The higher the fiscal deficit is. the stronger the demand to borrow. This exerts upward pressure on domestic interest rates, particularly if the government borrows from a relatively less liquid domestic market, in which case the government competes with private investors for limited funds.

Financial institutions incur cost in extending their services. Domestic commercial banks charge a mark-up over their costs. Interest rates will tend to be high when intermediation $^{Co*'}$ is high, Vayanos (1998). Included in the intermediation costs are administrative costs

and central hank reserve requirements. Other factors that could influence the interest rates include the maturity period of the financial instrument and the perception of risks associated with the instrument. Those with longer-term maturity and with higher probability of incurring loss carry higher interest rates. The lack of intermediation could also affect interest rate movement. For instance, with their larger holdings of non-performing assets, banks are more cautious in their lending activities. This would tend to induce an increase in interest rates.

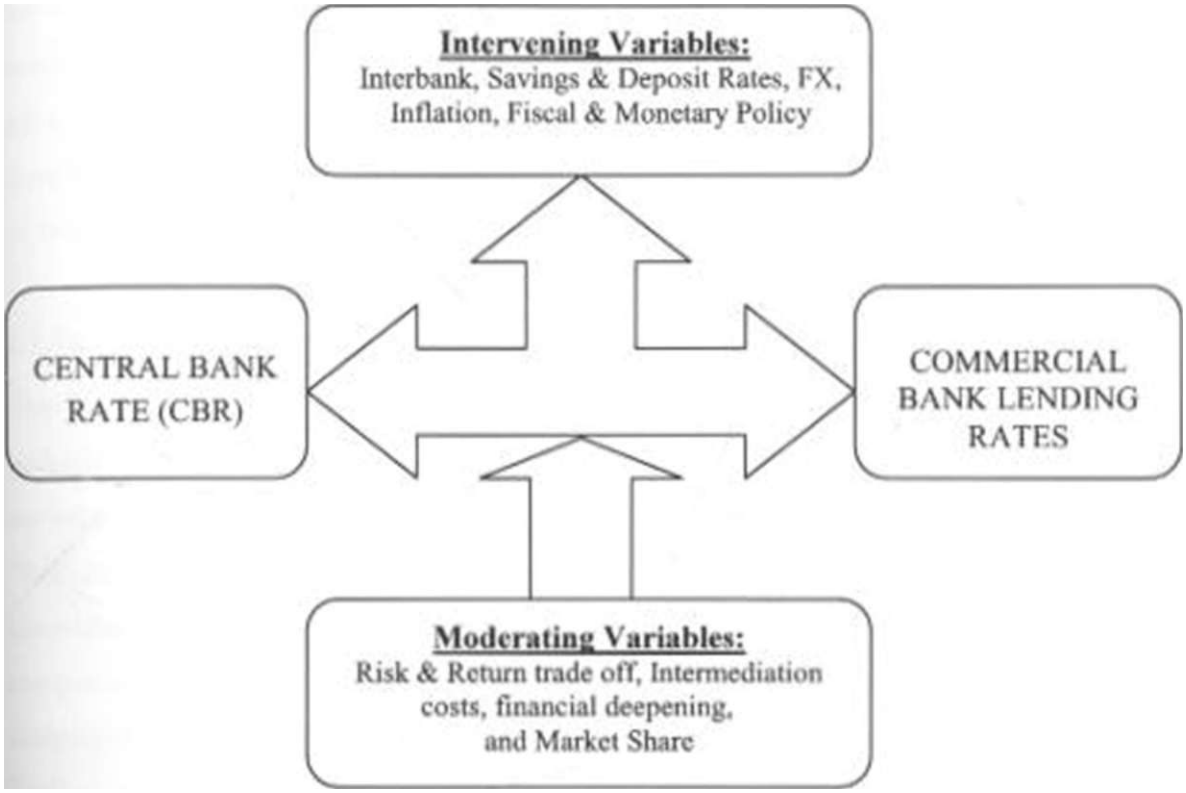
2.5 1-BRged Variables

Economists have shown that regression equations that use time series data often contain lagged variables. The reactions to economic agents, such as consumers or investors, to changes in interest rate are never spontaneous. The changes arc likely to be distributed over time; and positions of equilibrium, if they arc ever attained, arc likely to be approached gradually. The slowness to respond may be due to two factors. In the first place, there will be time delays in the transmission and the reception of the information upon which the agents base their actions. In the second place there will be costs entailed in the process of adapting to the new circumstances; and these costs are liable to be positively related to the speed and to the extent of the adjustments. For these reasons it is appropriate to make some provision in econometric equations for dynamic responses which are distributed over time.

Economists have focused on testing for stochastic trends in time scries data and have studied the implications of the trends on statistical inferences. Researchers indicate that many macroeconomic time series such as interest rates and inflation may be characterized having stochastic trends and that if the variables in a regression contain stochastic trends, then inlerence with distribution tests can be highly misleading, as has been forcefully demonstrated by Granger and Newbold (1974) and Phillips (1986). To redress the [w]cakncsses of using standard regression models in analyzing time series data, various past nudics have used Vector Auto Regression (VAR) models or multiple regression techniques [0,1] returns that also use lagged variables. Selva and Oscar (2004) introduced Lagged Reserve Accounting (LRA) in their analysis and observed that virtually all uncertainties had eliminated using the same sets of data.

This study will likewise use lagged variables of the first order in a multiple regression equation to analyze the effects of changes of CBR on market interest rate. This is done by including one lagged values of the dependent variable (AR_t) on the right hand side of the equation to stand in the company of the other explanatory variables.

2.6 Conceptual framework of the study



The CBR is set using the Repo and interbank rates. It is used to price government Treasury Bills as well as overnight lending to commercial banks. The intervening variables represent the legal, regulatory and external environment with which the commercial banks interact. These include interbank, savings & deposit rates, foreign exchange market, inflation, fiscal «ul monetary policies and other legal and compliance requirements having a bearing on cost and or interest rates. The latest move by the central bank to lower the threshold for investing in Treasury bills has had the effect of increasing the interest rates paid by commercial banks on customer deposits in order to continue attracting more deposits from toe public.

the change m bill or bond rate on the day of (lie CBR change

Moderating variables on the other hand arc firm specific factors which the bank can use to increase its competitiveness in the market. These include risk and return trade off. intermediation costs, financial deepening, and market share among others. Financial deepening reduces ovcrreliance on interest income and diversifies sources of income thus reducing risk. Low default rate can also be achieved by using more prudent credit processing procedures to weed out un-crcditworthy clientele. Good risk return trade oft" will see more banks managing their risk exposures thus generating more room for reduction in interest rates. Bigger players who command a larger market share can easily mitigate adverse effccts of policy pronouncements by marginally adjusting interest rates with no significant lose in market share, as well as reduction in marginal costs by taking advantage of economies of scale.

2.7 Summary of Literature Review and its link with this research

The literature review has presented in detail how interest rates arc used by monetary authorities to influence spending and control inflation. Also covered is how owners of capital are rewarded using CAI'M to determine the optimal pricing for their investments. Thus lenders will only lend if the interest rates are able to compensate for any risks associated with lending. We have also seen that in real life, investors are not only compensated for systematic risks that cannot be diversified away, but they are also compensated for non systematic risks as a result of market imperfections. Thus actual lending rate is at the risk free rate plus a risk premium.

We have also seen that there are no hard rules on the calculation of the official central bank rate or CBR. Taylor rule can be used to determine the rate as well as pure judgmental approaches. From studies done on the relationship between official central bank rate and target rate, there has been established statistical evidence to show that monetary policy affects market interest rates, and that on average this relationship is positive: an increase in the central bank rate leads to an increase in the interest rates of all tWurities

^ methods and findings of this empirical research can be grouped in two categories. On

the one hand are studies using single equation models with daily data that find unanticipated changes in federal funds rate can have a statistically significant and sizeable effect on long-term interest rates. On the other hand arc studies done using multiple regression or Vector Auto Regression (VAR) models which find that structural shocks to the federal funds rate do not have a large effect on long-term interest rates and sometimes this effect is statistically not significant. This is consistent with findings of Gurkaynak. Sack and Swanson (2003) who noted that in standard macroeconomic models, short-term interest rates tend to return relatively quickly to a deterministic steady state after a macroeconomic or monetary policy shock, so that these shocks only have transitory effects on the future path of interest rates. The findings of Cook and Hahn (1989) found that the response to increments in the target rate was positive and significant at all maturities, but smaller at the long end of the yield curve.

In a perfect market scenario, market participants arc able to predict with reasonable accuracy the intensions of the central bank, such that by the time the central bank announces changes in the official rate, the market interest rates had already adjusted thus one would not see any visible change in the lending rate immediately after CBR change. Thus only unexpected changes will be followed by market adjustments. Kuttner (2001) found a small and statistically insignificant response to the anticipated piece, while the response to the unanticipated component was large and highly significant. Similar findings were found in the United Kingdom and presented in studies done Bernoth and von Hagen (2004).

The literature review has also presented the banking industry in Kenya to enable a clear understanding in the context of oligopolistic completion where four big banks control about 50% of the entire market, thus making it difficult for forces of supply and demand to control interest rates.

The last section of the literature review has lagged variables so that the reader can •PPfeciate at an early stage the need to use a variation of the regression equation to

analyse time scries data given that responses to CBR changes arc not spontaneous, but are spread over time. Thus the researcher tries to eliminate bias in the data and improve the reliability of the findings.

From the researches done, this study seeks to establish the nature of the relationship between CBR and commercial bank lending rates, and whether the relationship is consistent with findings of researches done in developed countries.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter deals with research design and explains the research procedures that were followed in conducting the study. It includes the description of the research tools, data collection and analysis procedures. The chapter is presented under the following headings: introduction, research design, and the population, sampling techniques, research instruments, data collection and data analysis.

3.2 Research Design

The study is of an empirical nature, aimed at determining whether there is a relationship between Central Bank Rate changes and Commercial Bank lending rates. All the data were obtained from the Central Bank of Kenya, which by law, has information relating to interest rates charged by all commercial banks operating in Kenya.

33 Population

The population of interest in this study was the Central Bank of Kenya and the licensed Commercial banks in Kenya. Of particular interest was the overnight lending activities of the Central Bank and the rate used to achicvc this, also known as the CBR. The other activities that were considered were deposit, savings, 91 day Treasury bill rates and overdraft rates. The relationship between lending rates and all these variables were considered alongside the relationship between CBR and commercial bank lending rates.

3.4 Data Collection

Secondary data was used in the study. Monthly interest rates charged by all commercial banks were collected from the central bank from year 2000 to 2009. Specifically the following data was collected:

1) Weighted Average savings rates from January 2000 to August 2009
2) Weighted Average deposit rates from January 2000 to August 2009
3) Weighted Average overdraft rates from January 2000 to August 2009

5) Weighted Average lending rates from January 2000 to August 2009

6) Central Bank Rate from June 2006 to August 2009

The data was collected from published reports and official website of the CBK.

3.5 Data Analysis Approach

The rates were weighted by market share of each bank to get the market rate of interest for each variable. The data was then analyzed using lagged multivariate regression model to show movement of market lending rate to changcs in the CBR, deposits & savings, overdraft, and 91 day Treasury bill rates.

The response of lending rates to changes in the independent variables was estimated using the lagged multiple regression equation:

$AR, = bi + b\text{^}ACBR,., - biAD,.i + b_4AS,.i + bjAOd,.i + b*ATB,.|\text{-»} n,$

Where:

ACBR,.i is the change in CBR in period t-l

AR, is the change in market rate on the day of the CBR.i change,

ADi.i is the change in deposit rate in period (•!

AS,.i is the change in savings rate in period t-l

AOd,.| is the change in overdraft rate in period t-l

ATB,.i is the change in 91-Day Treasury bill rate in period t-l

b, is the intercept, or change in market lending rate with Zero (no) change in the independent variables

b2, b_3. b<, bj. and b* arc the slope (beta) coefficients for CBR. deposits, savings, overdraft and 91 day T-Bill respectively being the expected changc in R, for a 1 unit change in each of the independent variables

p, is the error term for the ith observation.

The independent variable was regressed on itself with a lag of one period to take care of lags experienced in responses to CBR changes. For example. AR, in period 1 will be assumed to have been caused by ACBR,.|.

The other variables namely savings, deposit, overdraft rate and 91 day Treasury bill rates were introduced to simulate real life scenario. Banks do borrow money from savings left with them by depositors. They also borrow from fixed term deposits as well as from the CBK. Thus the lending rates will be affected by other variables, not just the CBR. The analysis of these other variables therefore made the findings more credible.

An important assumption underlying this regression is that movements in the CBR will cause movements in the other market rates and not the reverie.

The researcher sought to establish the nature of the relationship between R, and CBR. savings, deposits, overdraft and 91 day Treasury bills by calculating the correlation coefficient of the each variable against lending rate, then used multiple regression analysis to determine the extent of the relationship aided by a computer on Statistical Package Social Sciences (SPSS).

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CHAPTER FOL K

4.0 DATA ANALYSIS

4.1 Introduction

Monthly commercial bank lending interest rates were collected from the published reports of the Research Department, Central Hank of Kenya and from the Central Uank of Kenya website (www.cbk.org.ke). The rates were computed from all the licensed commercial banks and weighted by market share (see appendix 2 for market share *as* at 31st December 2008). Table 9 summarizes deposit, savings. 91 day Treasury bill rates, overdraft and lending rates from June 2006 to August 2009;

Given that the CBR was introduced in June 2006, the period January 2000 to May 2006 was dropped from the data set because the 91 day Treasury bill rates could not be used as a proxy for CBR. due to the strong negative correlation between absolute CBR and the 91 day Treasury bill rates. The data for the period June 2006 to August 2009 resulted to 39 data points.

The data analysis was based on a one period lag as per appendix 4. We used descriptive statistics to determine the precision of estimated parameters on the relative values (rate of change) of the variables. ITic coefficients from the correlation analysis were either rejected or accepted using T and P-Values.

We also used the relative values of the variables to come up with the regression equation whose coefficients were tested for statistical significance at various confidence levels using the model;

$$W." b, + bjACBR,., + bjAD, I + b4AS,.,+ b_5AOd_H + MTBH + JI_($$

typothesis testing was done to cither reject or accept the null hypothesis at 80.4%, 85.1%, and 99.5% confidence levels.

4.2 Data Analysis

Regression analysis tells us how one variable is related to another by use of an equation having known values that can then be used to estimate unknown value of the remaining variable (Lagan 1990). Also related to Ous is correlation analysis which tells us the degree to which two variables arc related (the strength of the relationship. Levin (1987) summarizes it thus; regression und correlation analysis will show us how to determine both the nature and strength of a relationship between two variables.

Before the regression equation was developed, we established the relationship among the variables by running a correlation test using absolute relative values of the independent variables. Regression equations were then formulated using the coefficients derived from the statistical package SPSS. This method enabled us to determine the strength of the relationship among the variables under study.

4.2.1 Correlation coefficient, r,

Correlation coefficient is used to measure the strength of the relationship between two or more variables. It shows how closely the two variables can move together. It indicates how well the regression line explained the variation in the values of the dependent variables. The sign and the absolute value of a correlation coefficient describe the direction and magnitude of the relationship between two variables. Correlation coefficient expresses the strength of the relationship as a quantity between negative one to positive one (1< r >-1). The greater the absolute value of a correlation coefficient, the stronger the linear relationship. The strongest linear relationship is indicated by a correlation coefficient of -I or I. The weakest linear relationship is indicated by a correlation coefficient equal to zero. A positive correlation means that if one vanable gets bigger, the other variable tends to get bigger. A negative correlation means that if one variable gets bigger, the other variable tends to get smaller. Correlation coefficient of zero does not mean zero relationship between two variables; rather it means zero linear relationship. It is possible for two variables to have zero linear relationship and a strong curvilinear relationship at the same tune.

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4.2.2 Procedure used in the lest of significance of the correlation Coefficients

The correlation coefficients were tested for significance using P-Values. (P-Value is the smallest level of significance for which the null hypothesis can be rejected). Wc therefore looked at the results from the data analysis to find out if the variables have any linear relationship with cach other. The procedure involved the following four steps:

Step 1: Calculate T-valucs. Where T values are not given, we calculated the same by dividing the DilTerence of the Means with the Standard error of the Difference.

Step 2: Wc formulated the hypothesis for each variable;

Null Hypothesis Ho: r - 0 (for savings rate)
The alternative hypothesis: I li: r ^ 0 where r is correlation for saving and lending

Null Hypothesis Hr>: r - 0 (for deposits rate)

The alternative hypothesis: H|: r / 0 where r is correlation for deposits and lending

Null Hypothesis H_0: r = 0 (for Overdraft rate)

The alternative hypothesis: H i: r / 0 where r is correlation for overdraft and lending

Null Hypothesis H_0: r - 0 (for 91 Day T bill rate)

The alternative hypothesis: H_t: r / 0 where r is correlation for 9IDT bill and lending rate

Null Hypothesis H_0: r - 0 (for CUR)
The alternative hypothesis: Hi: r / 0 where r is correlation for CBR and lending

Step 3s We then compared the P- values with the T values for significance. If the P-Value is less than the significance level, the null hypothesis is rejected else null hypothesis cannot be rejected.

Step 4: Rejection or acceptance Criteria: A big T value and small P-Valuc indicate that the independent variable is statistically significant. Thus the variables arc statistically significantly different from 7ero and the null hypothesis is rejected otherwise the null hypothesis is accepted and vice versa.

4.2.3 Procedure used in the lest of significance of the regression Coefficients

The coefficients in the regression equation were also tested for significance using P-Values. (P-Value is the smallest level of significance for which the null hypothesis can be rejected). We therefore looked at the results from the data analysis to find out if each variable in the regression equation statistically significant. The procedure involved the following four steps:

Step 1: We formulated the hypothesis for each variable;

Null Hypothesis Ho: b= 0 (for savings rate or Asavings rate)
The alternative hypothesis: Hi: b/ 0 where b is coefficient for savings or Asavings

Null Hypothesis Ho: b= 0 (for deposits rate or Adeposits rate)
The alternative hypothesis: Hi: b* 0 where b is coefficient for deposits or Adeposits

Null Hypothesis Ho: b= 0 (for Overdraft rate or ^overdraft rate)
The alternative hypothesis: Hi: b* 0 where b is coefficient for overdraft or Aoverdraft

Null Hypothesis H_0: b- 0 (for 91 Day T bill rate or A9I DT bill rate)
The alternative hypothesis: H_t: b* 0 where b is coefficient for 91 DT bill or A91 DT bill

Null Hypothesis Ho: b= 0 (for CBR or ACBR)
The alternative hypothesis: H>: b* 0 where b is coefficient for CBR or ACBR

Step 2: We then compared the P-valucs with the T values for significance. If the P-Valuc is less than the significance level, the null hypothesis is rejected else null hypothesis cannot he rejected.

Step 3: Rejection or acceptance Criteria: A big T value and small P-Valuc indicate that the •dependent variable is statistically significant. Thus the variables arc statistically "gnificantly different from zero and the null hypothesis is rejected otherwise the null hypothesis is accepted and vice versa.

4.3 Presentation of findings

(able I

RF.Sri.TS FROM DESCRIPTIVE ANALYSIS ON INTEREST RATES

Variable	N	Mean	Median	TrMean	StDev	SE Mean
Deposit	39	4.5141	4.3659	4.4977	0.3754	0.0601
Savings	39	1.6279	1.6536	1.6191	0.2112	0.0338
Lending	39	13.9250	13.793	13.920	0.5860	0.0940
Overdraft	39	13.6210	13.478	13.609	0.3530	0.0560
91-DTbil	39	7.1230	7.280	7.118	0.7200	0.1150
CBR	39	9.0130	8.750	9.029	0.7120	0.1140

Variable	Min	Max	Q1	Q3
Deposit	4.0376	5.2800	4.2145	4.861
Savings	1.2667	2.1319	1.4225	1.714
Lending	12.8710	15.0900	13.5350	14.326
Overdraft	12.9550	14.4100	13.3540	13.907
91-DTbil	5.7280	8.5880	6.5260	7.550
CBR	7.7500	10.0000	8.5000	10.000

The mean, median, standard deviation and standard error of the estimate have been calculated for each of the variables as shown.

Savings had the lowest mean and median at 1.6279 and 1.6536 respectively. All the variables have low standard error and standard deviations due to the closeness of the values to the mean. The dispersion is not very wide as evidenced by the variance between the values in I" Quarlilc and $3^{,J}$ quartilc. The maximum and minimum values indicate the relative disparity of rates for each vurtable for the period under study. The variables do not have very wide dispersions.

(able I

RF.SILTS FROM CORRELATION ANALYSIS OF ABSOLL TK KATES

	Deposit	Savings	Lending	Overdraft	91-Day Tbill
	0.787	1.000			
	0.000	0.000			
	0.857	0.541	1 000		
	0.000	0.000	0.000		
Overdraft	0.419	0.010	0.661	1.000	
	0.008	0.953	0.000	0.000	
91-Day Tbill	0.622	0.664	0.420	0.031	1.000
	0.000	0.000	0.008	0.851	0.000
	-0.760	-0.762	-0.512	-0.040	-0.603
	0.000	0.000	0.001	0.807	0.000
T Valuo	-22.485	-8.106	-9.143	-0.348	-5.289

Cell Contents Pearson correlation
P-Value

The variables have been correlated against each other to determine how one affects the other. Savings, deposits and lending rates have shown very strong positive correlation Deposit rate has a strong positive correlation against savings, lending. 91 day T bill rates but weak positive correlation against overdraft rale at 41.9%. Likewise the correlation between lending and 91 day T bill is positive but weak at 31%. The CBR has strong negative correlation against deposit, savings, lending rate, overdraft and 91 day Treasury bill rates, although the correlation between CBR and overdraft is weak at negative 4%.

T-Values were calculated for CBR against all the other variables to test for ihe strong **negative** correlation. All the P-Valucs were positive and thus larger than their T values, 'bus the variables are statistically not significantly different from zero and the null hypothesis was accepted.

l a b k 3

RESULTS FROM DESCRIPTIVE ANALYSIS INTEREST RATES CHANCES

Variable	N	Mean	Median	TrMean	StDev	SE Mean
A Deposit	39	-0.1120	0.0310	0.0100	0.8100	0.1300
ASavings	39	-0.0325	0.0074	-0.0016	0.3012	0.0482
Al ending	39	-0.3540	-0.0680	0.0070	2.3780	0.3810
AOverdraft	39	-0.3530	-0.0250	-0.0070	2.2460	0.3600
A9l-Day T bill	39	-0.1690	0.0510	0.0040	1.2200	0.1950
ACBR	39	-0.2500	0.0000	-0.0290	1.2620	0.2020

Variable	Min	Max	01	Q3
ADeposit	-5.0000	0.2930	-0.0430	0.0580
ASavings	-1.6500	0.4434	-0.0285	0.0436
ALending	-14.7600	0.5460	-0.1540	0.1540
AOverdraft	-13.9000	0.5430	-0.1590	0.2070
A9I-Day T bill	-7.2500	0.7710	-0.24(H)	0.2720
ACBR	-7.7500	0.2500	0.0000	0.0000

The changes in the rates were calculated by taking a one period lag (.|for each variable. The results indicate a negative mean reduction in the average rates of change over the period for all variables. The variance or standard deviation is. however, higher in the analysis of changes to the rates compared to the standard deviation for analysis of the absolute rates, for all variables as per table below;

ASavings still has the lowest mean and median at -1.6500 and 0.4434 respectively. The variables have low standard error and but higher standard deviations due to the wide dupersions in the changes. This is reflected better by looking at the maximum and minimum changes for all the variables.

(able I

RESULTS FROM CORRELATION ANALYSIS OF RELATIVE RATF.X

0.910 0000	1.000 0.000			
0.990 0.000	0.884 0.000	1 000 0 000		
0.984 0.008	0.874 0.000	0.996 0.000	1.000 0.000	
0.948 0.000	0.822 0.000	0.953 0.008	0.955 0.000	1.000 0.000
0.968 0.000	0.881 0.000	0.973 0.000	0.967 0.000	0.941 0.000
7.446	18.278	2.554	2.686	4.826

Pearson correlation
IP-Value
Basod on correlation with CBR

rhc changes in the rates for each variable have been correlated against each other to determine how one affects the other. The findings show very strong positive correlation for all the variables.

The test for significance show that the variables are statistically significantly different from zero and the null hypothesis is rejected.

Table S

RESULTS FROM REGRESSION ANALYSIS WITH ABSOLUTE RATES AT 85.1% CONFIDENCE LEVEL

Predictor	**C'ocf**	SE **Cocf**	**I**	**P**	**Significance**
Constant	0.47500	2.04400	0.23	0.818	NS
Deposit	1.33030	0.26610	5.00	0.000	S
Savings	-0.07460	0.38220	-0.20	0.847	NS
Overdraft	0.51470	0.15850	3.25	0.003	S
91-DTbil	-0.03158	0.07588	-0.42	0.680	NS
CBR	0.08660	0.09850	0.88	0.386	S

S 0 2422	R-Sq = 85.1%	R-Sq(adj) = 82.9%

KEY:

S : • Significant

NS : - Not Significant

The regression equation that predicts the lending rate. R,. given savings, deposit, overdraft. 91 day T bill rates and C'BR was obtained from SPSS at 85.1% confidence level as below;

R, * 0.48 • 1.33 Deposit • 0.075 Savings + 0.515 Overdraft - 0.0316 91-Day Tbill + 0.0866 CBR

The null hypothesis assumption was that none of the predictor variables had any significant association with the lending rate. And the alternative hypothesis assumption was that at least one predictor variable had significant association with the lending rate.

The results of the regression have been tested to ascertain the level of significance and the results show that the constant, overdraft and deposit rates are not statistically significant in determining the lending rate when tested at 85.1% confidence level.

Tabic 6

RESULTS FKOM REGRESSION ANALYSIS WITH ABSOLUTE RATES AT 80.4% CONFIDENCE LEVEL

Predictor	(ocf	SF. (ocf	1	P	Significuncc	1
Constant	4.9170	1.71900	2.86	0.007	S	
Deposit	1.9440	0.21200	9.17	0.000	S	
Savings	-0.6093	0.39030	-1.56	0.128	NS	
91-DTbil	-0.0607	0.08527	-0.71	0.481	NS	
CBR	0.1838	0.10620	1.73	0.093	S	

S = 0.2741 R-Sq - 80.4% R-Sq(adj) 78.1%

KEY:

S : • Significant

NS : - Not Significant

Regression equation when overdraft rates are dropped is given by;

$R_, = 4.92 + 1.94$ Deposit • 0.609 Savings - 0.0607 91 -DTbill + 0.184 CBR

The null hypothesis assumption was that none of the predictor variables had any significant association with the lending rate. And the alternative hypothesis assumption was that at least one predictor variable had significant association with the lending rate.

The results of the regression have been tested to ascertain the level of significance and the results show that savings and 91 day Treasury bill rates arc not statistically significant in determining the lending rate when tested at 80.4% confidence level.

(able I

RKSl I TS FROM REGRESSION ANALYSIS WITH RELATIVE RATES AT

99.?% CQ,NFH>lyNCE LFVF,L

Predictor	C ocf	SE (ocf	T	1'	Significancc
Constant	0.01976	0.02896	0.68	0.500	S
ADeposit	0.88280	0.25380	3.48	0.001	S
ASavings	-0.17800	0.24370	-0.73	0.470	NS
AOverdraft	0.68181	0.08015	8.51	0.000	S
A91-DTbi	-0.04428	0.08230	-0.54	0.594	NS
ACBR	0.18918	0.09605	1.97	0.057	S

S = 0.1726	R-Sq-99.5%	R-Sq(adj) = 99.5%

KEY:

S : - Significant

NS : - Not Significant

The regression equation is given by;

AR, - 0.01V8 • 0.883 ADcpwit • 0.178 ASavinga + 0.682 ^Overdraft- 0.0443 A91-DTbill * 0.189 ACBR

To test for statistical significance of each of the variables, the Null hypothesis is formulated thus;

Ho: d = 0 (coefficient for Adeposit. Asavings, A91day T bill. Aovcrdrafi and. ACBR)

The alternative hypothesis:

Hi: d where d is Acoefficient for respective variable

The null hypothesis assumption was that none of the changes in predictor variables had any significant association with the change in lending rale. And the alternative hypothesis assumption was that change in at least one predictor variable had significant association with the change in lending rate.

results of the regression have been tested to ascertain the level of significance and the "Suits show that Asavings and A9I day Treasury bill rates are not statistically significant in ining the change in lending rate when tested at 90.5% confidence level.

(able I

RESISTS FROM REGRESSION ANALYSIS WITH RELATIVE RATES AT 98.5% CONFIDENCE LEVEL

Predictor	t'ocf	SF. C oil	T	P	S
Constant	0.00709	0.05091	0.14	0.890	NS
ADeposit	2.35400	0.32690	7.20	0.000	S
ASavings	-0.64590	0.41800	-1.55	0.132	NS
A9l-DTbi	0.12650	0.14050	0.90	0.374	S
ACBR	0.39040	0.16390	2.38	0.023	S

S = 0.3038 R-Sq - 98.5% R-Sq(adj) - 98.4%

KEY:

S Significant

NS : - Not Significant

Regression equation when Aoverdraft rates are dropped is given by;

AR, -0.0071 • 2.35 ADeposit - 0.646 ASavings 0.126 A9l-DTbill + 0.390 ACBR

To test for statistical significance of each of the variables, the Null hypothesis is formulated thus;

Ho: d ^ 0 (coefficient for Adeposit, Asavings. A9lday T bill. and. ACBR)

The alternative hypothesis:

Hi: d where d is Acocfficicnt for respective variable

The null hypothesis assumption was that none of the changes in predictor variables had any significant association with the change in lending rate. And the alternative hypothesis assumption was that change in at least one predictor variable had significant association with the change in lending rate.

The results of the regression have been tested to ascertain the level of significance and the results show that the constant and Asavings rates are not statistically significant in determining the change in lending rate when tested at 98.5% confidence level.

4.4 Summary and Interpretation of Findings

The correlation analysis of the variables showed the following results:

i) When the variables were tested for association in the absolute values, savings, deposit, overdraft, 91 day T bill and lending rates were found to have strong positive correlation, however, they were all negatively strongly correlated to CBR. This negative correlation with CBR was found to be statistically not significant.

ii) When the rate of change in the variables was tested for association, all variables were found to have strong positive correlation that was found to be statistically significant.

The results from regression analysis indicate that;

i) savings and 91 day T bill rates arc not statistically significant at 85.1% significance level

ii) When overdraft rates dropped from the regression equation, again savings and 91 day T bill rates arc found not to be statistically significant at 80.4%

The regression equation was changed to estimate the change in lending rates caused by change in each variable and these were the results:

i) changes in savings and 91 day Treasury bill rates showed no statistical significance at 99.5% confidence level

ii) When overdrafts were dropped from the equation and the variables regressed at 98.5% confidence level, the constant and changes in savings rates showed no statistical significance in predicting a change in lending rate.

We can therefore relate the above results to other researches that have been done in **ihc** past. Cook *nd Hahn (1989) while examining how yields on Treasury securities reacted to changes in target [F]ed funds rates between 1974 and 1979 found that the response to increments in the target rate was Positive and significanl at all maturilies. but smaller at the long end of the yield curve, This is

consistent with our findings which show a strong positive correlation for all variables under study, that is; 91 day Treasury bill, CBR. savings and deposit rates, overdraft nnd lending rates. Our findings showed correlations of between 0.822 and 0.990. The correlation coefficients for overdrafts are higher than those for lending, which have maturities of between 3 and 6 years. Similar findings were alio documented by Poole ct al. (2002), F.llingsten and Sorderstrom (2003), Ellingsen, Soderstrom and Masscng (2004). Giirkaynak. Sack and Swanson (2005), Beechey (2007) among others.

CHAPTER FIVE

5.0 SUMMARY AND CONCLUSIONS

5.1 Conclusion and Implications

The research revealed that there is strong positive correlation between change in lending rates (dependent variable) on one hand and changes in savings, deposit, overdraft. 91 day T bill rates and the CBR on the other hand(independent variables). The positive correlation means that when there is a change in one or all of the independent variables, the lending rate is expected to change in the same direction.

The regression equation provided the quantity of change cxpcctcd in each independent variable to cause a given change in the dependent variable. The coefficients of the regression equation provide the rate of change for each of the variables. However, savings rates were found to be statistically not significant to cause a change in lending rate when studied at different confidence levels. This can be explained by the low levels of interest rates earned by savings which averaged between 1.3% per annum and 1.9% per annum between 2006 and 2009. The policy change by the CBK in January 2009 to reduce the Treasury bill bid threshold to Kshs 100.000 from Kshs I Million in cxpcctcd to have a positive impact on interest rate paid on savings by the commercial bonks a> they try to retain savings.

In conclusion, we state that there is a strong positive correlation between the lending rate and the CBR which was the subject of the study. However, other variables also infiucncc the lending rate as seen in sections above. This is consistent with the findings of Cook and Hahn (1989). Poole et al. (2002). Ellmgsicn and Sorderstrdm (2003). tllingsen. Sodcrstrom and Masseng (2004). (iQrkaynak. Sack and Swanson (2005). Beechcy (2007) among others.

Given the strong positive correlation among the changes in CBR. lending, savings, deposit, overdraft and 91 day Treasury bill rates, the CBK should put more reliance on the CBR to achieve its monetary policy goals of price stability, low inflation and low unemployment. When announcing a change in CBR. the CBK should include a target lending rate that the commercial banks should strive to achieve within a specified time period. This will help the

CBK achievc lower lending rales by managing trading around the target rate. This was ably demonstrated by Selva and Oscar (2004), in their study of the response of term rates to U.S. Fed announcements.

5.2 Limitations of the study

The study was limited in the sense that it only looked at the relationship between Central Bank Rates and commercial banks lending rates, excluding micro financial institutions and other lenders within Kenya. Therefore the study may not be able to reflect situations in other countries.

The study also did not look at all the loan maturities available in the market. The lending rates ore normally stratified to suit dilTercnt groups and sub groups M> that different hurdle rates arc applied for different time horizons, different magnitudes of investments, different risks or new ventures, inflation and cost reduction projects. Big multinational corporations will access credit at discounted rates as opposed to small companies. Likewise retail investors will puy for credit at the highest lending rates available in die market due to the perceived risks. All these parameters were not isolated, and instead, a single lending, deposit, and overdraft rate was used

The research findings showed that savings is not statistically significant to affect lending rates. This finding is only limited to the period under study. If the interest rates paid on savings were to increase significantly, this particular finding may no longer remain valid. Thus the finding should be used in extrapolating future savings rates with extreme caution.

5J Suggestions for further research

This study may be viewed as a starting point for several other studies related to it because so far no other research have been done in Kenya related to it.

The following areas may be of importance:-

1) A study on the amount by which the C'BR should increase to cause a given target change in lending rates
2) A study incorporating the entire banking industry, including non bank financial institutions

3) A study on the lending interest rates paid by big multinationals
4) A study on interest rates and business failure
5) A study on how the CBK determines the CBR
6) A study on the effectiveness of the CBR as a monetary policy tool in Kenya.
7) A study involving the correlation of CBR to lending rates of each individual bank Kenya.

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APPENDICES

APPENDIX 1: ANNUALIZED WEIGHTED AVERAGE INTEREST RATES

	W KK.II 1KD AVERAGE RATES %						U •
YEAR	IXpMll	S..log.	Und Kale	**Ovrr** Jr»fl	**9I-D»y** Hull	(MR	u - » — • *
	4.2	I J	**IJJ**	IJ.7	U	9.9	• » « iuu
1007	4 J	I J	**IJ-.'**	13-*	t J	**9**.2	* ^
2*08	4.6	1.7	14.0	IJ.S	7.7	**S.9**	
2 W	S.I	1.9	I4JI	13.9	7.5	1 1	loot MO 7 MO* MO*

The average annual rates were calculated from monthly weighted interest rates. The weights were based on market share commanded by each bank in each of the years under study.

APPENDIX 2: CHANCES IN THE CENTRAL BANK RATE SINCE JUNE 2006

1) \ 1 E	RA1 L (PI RC 1 M»	U TIIORITY
June 2,2006 (start)	9.75	Monetary Policy Advisory Committee (MPAC)
August 3, 2006	10.00	
June 15. 2007	8.50	
'August 8,2007	8.75	
June 6. 2008	9.00	Monetary Policy Committee (MPC)
December 1.2008	X 50	
January 30, 2009	8.50	
March 20, 2009	8.25	
[Mav21,2009	1 8.00	
|July 22,2009 |	7.75	

Source: Central Bank of Kenya

The CBR was introduced in June 2006 and is set by the Monetary Policy Committee (MPC). The MPC was formed vide Gazette Notice 3771 on 30th April 2008 replacing the hitherto Monetary Policy Advisory Committee (MPAC). The MPC is an executive decision making organ of the CBK, unlike its predecessor, the MPAC which was advisory. Commercial Banks facing liquidity needs may also rediscount their Treasury bills holdings at the CBR.

APPENDIX 3 CNT'D: INTEREST RATES SCHEDULE

		COMMERCIAL BANKS' WEIGHTED AVERAGE INTEREST RATES (%)		%	%
YEAR	MONTH	Lending	Overdraft	91-Day Tblll	CBR
2000	JAN	25.14	25.91	20.30	0.00
	FEB	25.39	25.67	14.84	0.00
	MAR	23.76	24.09	11.28	0.00
	APR	23.44	24.00	12.44	0.00
	MAY	23.40	23.93	11.22	0.00
	JUN	23.11	22 86	10.47	0.00
	JUL	22.39	22.09	9.90	0.00
	AUG	21.23	20.93	9.25	0.00
	St I'	20.57	20.58	10.36	0.00
	OCT	20.22	19.94	10.65	0.00
	NOV	19.79	20.10	11.17	0.00
	DEC	19.60	19.7 i	12.90	0.00
	rsmtsn	22J4	22.4V	12.07	0.00
2001	JAN	2<07	20. lit	14.76	0.00
	m	20.13	20.48	14.36	0.00
	MAR	20.19	20.12	14.97	0.00
	APR	19.56	19.89	12.90	0.00
	MAY	19.20	19.52	10.52	0.00
	JUN	19.26	19.65	12.07	0.00
	JUL	19.71	19.98	lift?	0.00
	AUG	19.54	19.71	12.84	0.00
	SEP	19.44	19.63	12.39	0.00
	OCT	19.77	19.80	11.63	0.00
	NOV	19 44	19.83	11.50	0.00
	DEC	19.49	20.04	11.01	0.00
	FAlllXTHU	19.67	19.90	12.73	0.00
2002	1 JAN	19.30	19.31	10.85	0.00
	FEB	19.18	19.19	10.61	0.00
	MAR	18.86	18.78	10.14	0.00
	APR	18.69	18.88	10.01	0.00
	MAY	18.54	18.73	9.04	0.00
	JUN	18.38	1846	7.34	o.oo
	JUL	18.12	18.32	8.63	0.00
	AUG	18.12	18.56	8.34	0.00
	SEP	18.14	18.52	7.60	0.00
	OCT	18.34	18.89	8.07	0.00
	NOV	18.05	18.56	8.30	0.00
	DIC	18.34	18.56	8.38	0.00
	AVERAGE		1*773-	-8.94	0.00

APPENDIX 3 CNT'D: INTERESTRATES SCHEDULE

		COMMERCIAL BANKS' WEIGHTED AVERAGE INTEREST RATES (%)		%	*
YEAR	MONTH	lending	Overdraft	91-Day Tbill	CBR
2003	JAN	19.02	18.52	8.38	0.00
	FFB	18.83	17.81	7.77	0.00
	MAR	18.49	17.26	6.24	0.00
	APR	18.57	I7_27	6.25	0.00
	MAY	18.52	17.18	5.84	0.00
	JUN	15.73	14.93	3.00	0.00
		15.30	14.43	1.54	0.00
	AUG	14.81	14.96	1.18	0.00
	SEP	14.82	14.31	ii	0.00
	OCT	14.75	14.13	! on	0.00
	NOV	14.07	14.02	1.2*	0 00
	DEC	13.47	13.74	1.46	0 00
	AVERAGE	16.36	15.71	3.73	0.00
2004	JAN	13.48	13.30	1.58	000
	FEB	13.01	12.30	1.57	0.00
	MAR	13.12	11.65	1 59	0.00
	APR	12.67	11.08	2.11	0.00
	MAY	12.55	10.79	2.87	0.00
	JUN	12.1?	10.72	2.01	0.00
	JUL	12.31	11.10	1.71	0.00
	AUG	1TT9	10.81	2.27	0.00
	SEP	12.27	10.95	2.75	0.00
	OCT	12.39	11.85	3.95	0.00
	NOV	11.97	12.21	506	0.00
	DF.C	12.25	12.69	8.04	0.00
	AVERAGE	12.53	11.62	2.96	0.00
2005	JAN	12.12	13.14	826	0.00
	FEB	12.35	13.82	8 59	0.00
	MAR	12.84	14.03	8.63	0.00
	APR	13.12	14.00	8.68	0.00
	MAY	13.11	13.94	b e	0.00
	JUN	1309	13.83	S Ml	000
	JUL	13.09	13.54	8.59	0.00
	AUG	13.03	13.81		0.00
	SEP	12.83	13.50	S 5*	0.00
	OCT	12.97	13.56	8.19	0.00
	NOV	.2.93	13.33	7.84	0.00
	DEC-	13.16	13.67	8.07	0.00
	AVERAGE	lift*	13.68	8.44	0.04)

APPENDIX 3 CNT'l): INTERNST RATES SCHEDULE

		COMMERCIAL BANKS' WEIGHTED AVERAGE INTEREST RATES (%)		%	%
YEAR	MONTH	Lending	Overdraft	91-Day Thill	C BR
2IXJ6	JAN	13.20	13.81	8.23	000
	FEB	13.27	13 34	8 02	0.00
	MAR	I 3 i i	13.26	7 60	000
	APR	13.51	13.81	702	000
	MAY	13.95	14.02	7.01	000
	JUN	13.79	13.78	(i M J	9.75
	JUL	13.72	13.48	5.89	9.75
	AUG	13 64	13.43	5.96	10.00
	sri-	13.54	1342	6.45	10.00
	OCT	1401	13 94	6.83	10,00
	NOV	13.93	13.96	641	10.00
	DEC	li.74	1391	5.73	1000
	AVERAGE	IJ.hJ	13.68	6.81	5.79
2007	1 \s	15 78	1-1 ! 1	6.00	1000
	FEB	13.64	14.05	6.22	1000
	MAR	13.56	li.95	632	1000
	APR	13.33	13.26	6.65	10.00
	MAY	13 38	13.35	6.77	10,00
	JUN	13.14	13.20	6.53	8.50
	JUL	13.29	1334	652	8.50
	AUO	13.04	13.39	7.30	8.75
	SEP	12.87	13.26	7.35	8.75
	OCT	13.24	13.29	7.55	8.75
	NOV	13.39	13.43	7.52	8.75
	DEC	13.32	12.96	6.87	8.75
	AVERAGE	13.33	13.47	6.80	9.23
200X	JAN	13.78	13.41	6.95	875
	FEB	13.84	13.26	7.28	8.75
	MAR	1406	13 48	6.90	8.75
	APR	13.91	13 46	7.35	8.75
	MAY	14.01	13.53	7.76	8.75
	JUN	14.06	1330	7.73	9.00
	JUL	13.90	1*46	8.03	900
	AUG	13.66	13.11	8.02	9.00
	SEP	13.66	13.43	M	900
	OCT	14.12	13.91	7.75	900
	NOV	1433	13.85	8.39	9.00
	DFC	14.87	1439	8.59	8.50
	AVFRAGF	14.02	13.55	7.70	8.85
2009	JAN	14.78	13 84	8.46	8.50
	FEB	14.67	13 46	7.55	8 50
	MAR , —	14.87	13.78	7.31	8.25
	APR	14.7,	13.66	7.34	8.25
	MAY	14.85	14.13	7.45	800
	AVERAGE	14.78	13.77	7.62	8.30

		WEIGHTED AVERAGE RATES						CHANGE IN RATT.S WITH A ONE PERIOD LAG					
		m i ^ * i n : 7 i r r m » •											DCBR
iun-06	JUS	4JJ	127	13.79	13.78	6.60	9.75	(004)|	0.06	(0«)	(030)	(0.70)1	
JuW»	JUL	431	1.32	13.72	13.48	5.89	9.75	(0.231	ow	(008)		006;	025
Au,-06	AUG	401	1.41	I3A4	I3.4J	5.96	10.00	H	(005)	(010)	(001)	050	·
Sfl* \,t	SEP	4CM	136	13.54	13.42	6.45	10.00	0.07	(001)	0.47	032	037	-
Ocl-06	o *a*	4.11	135	14.01	1394	683	1000	004	0.02	(0«)	0.02	H	
Nov-Ot	NOV	41$	1.37	1393	1396	641	10.00	(0051	(0.02)	(0.19)	(OOS>	(0.69)1	·
Dcc-06	DEC	411	135	1374	13.91	5.73	H M	0.24	007	004	021	027	·
J«-07	JAN	435	1.42	13.78	14.11	600	1000	(O.li)	(0011	(014)	(007)	0.22	
FcM7	FEB	421	141	1364	14.05	622	10.00	4002M	002	lOOSI	(010)	0.09	·
MV-OT	MAR	4.19	L43	1) 4	13.95	632	l0 M	(0081	(t o n	(023)	(0 69)	0.33	·
Apc-OT	APR	4.11	US	13.33	1326	6.6}	10.00	0.03	022	005	009	013	·
Ml *07	MAY	4.14	137	p u t	1335	6.77	taoo	0.W	(0.031	(WJ|	(016)	(025J	(150)
Ja-07	JUN	4.11	134	13.14	1329	633	1.50	0.15	Oil	0.14	0.15	(0.00)	·
Jul 07	JUL	4.J3	165	13.29	1334	652	154	<0.021	(0.061	(024)	; w	0.77	025
A«|47	AUG	431	160	l3 W	1339	730	875	Q03	0.07	(017)	(0.13)	0.05	-
S<p47	SEP	434	1,67	1217	1326	7.35	875	(00T)	(0 03)1	037	002	020	·
*0*4(1*	OCT	427	1.64	1324	13-29	735	875	006	001	0.15	015	(003J	·
N«-07	NOV	4.33	165	13.39	13.43	732	175	(001|	003	(0.07)	(041)	10.65)	·
Dec-07	DEC	432	IAT	13.32	12.96	6.87	8.75	005	0.04	0.46	0.46	008	·
AlA-OS	JAN	4J7	1.72	13.78	1341	6.95	875	(0.00)	(0.011	006	(016)	033	
Fab-M	FEB	4.37	1.70	1314	1326	7.21	175	0.06	OOI	022	023	(038	·
M»-0«	MAR	443	1.72	1406	1341	6*>	175	(0.02)	(OOI)	10.15)	(0.021	0.45	·
	APR	4.41	171	13.91	1346	735	8.75	OAS	0.01	0.10	0.0!	0.42	·
	MAY	44$	1.71	1401	1353	7.76	8.75	002	(0.01	004	(024)	(O.OI)	025
	*JN	441	1.70	1406	1330	7.73	900	0.06	(0 03)	(015)	017	030	·
M48	JUL	454	167	13.90	13.46	863	900	0.11	001	(0 24)	(035)	(001)	·
	AUG	4.65	I6X	13.66	13.11	802	9.00	(003)	005	000	031	(032)	·
S«|Mtt	SEP	4.62	1.73	1366	13.43	7.69	9.00	003	0.01	0.46	0.41	006	·
IXT-M	o a	« J	1.74	14.12	1391	7.75	900	021	(0.13)	021	(006)	064	·
Noi-flU	NOV	486	1.61	1433	13.85	839	900	0.03	0.04	035	054	019	(0.50)
Dec-08	DEC	4.89	1.65	14.87	14.39	839	150	029	0.44	(0.09)	(035)	(0.12)	
Jio-09	JAN	5.19	210	14.78	1314	146	830	004	0.04	(0.12)	(031)	(0.92)	·
FtW*	FEB	523	2.13	1467	1346	735	830	1014)	(0.23)	020	032	(024)	(0.25)
Mir-W	WAR	5.09	190	14X7	1371	731	825	0.03	OOI	(016)	(012)	003	·
Apr-09	APR	5.12	1.91	14.71	13(6	734	825	(0 03)	(023}	013	047	Oil	(0.25)
Mn-09	MAY	5.10	167	1485	1413	7.45	800	018	0.41	024	0.21	(0.12)	·
Jul>49	JUNE	528	1(8	1509	1441	733	8,00	(019)	(0.41)	(030)	(0.47)	(Oil)	(025)
JJ-W	JULY	5.09	1.67	1479	I3.W	722	7.75	(0.0*1	(002)	(003)	(004)	003	·
Aug49	AUGUST	5.00	165	14.76	13.90	725	7.75	(5.W)	*m*	(1476)	(1390,	*m*	(7.751

APPENDIX 5: LIST OF COMMERC IAL BANKS AND RESPECTIVE MARKET SH ARE AS AT 31st DECEMBER 2008

Nome	Market Share (%)
1. African Banking Corporation Ltd.	0.56
2. Bank of Africa Kenya Ltd.	1.04
3. Bank of Baroda Kenya Ltd.	1.55
4. Bank of India	1.02
5. Barclays Bank of Kenya Ltd.	14.26
6. CFC Stanbic Bank Ltd.	7.03
7. Charterhouse Bank Ltd.*[3]	0.00
8. Chase Bank (K) Ltd.	0.87
9. Citibank N.A Kenya	4.02
10. City Finance Bank Ltd.	0.05
11. Commercial Bank of Africa Ltd.	4.23
12. Consolidated Bank of Kenya Ltd.	0.39
13. Co-operative Bank of Kenya Ltd.	7.09
14. Credit Bank Ltd.	0.31
15. Development Bank of Kenya Ltd.	0.55
16. Diamond Trust Bank (K) Ltd.	3.51
17. Dubai Bank Kenya Ltd.	0.14
18. Ecobank Kenya Ltd.	0.89
19. Equatorial Commercial Bank Ltd.	0.37
20. Equity Bank Ltd.	6.52
21. Family Bank Ltd.	0.88
22. Fidelity Commercial Bank Ltd.	0.37
23. Fina Bank Ltd.	0.83
24. First Community Bank Ltd.	0.27
25. Giro Commercial Bank Ltd.	0.50
26. Guardian Bank Ltd.	0.47

[1] Chajtcrfaotme accounts not published

APPENDIX 5 CONT'D: LIST OF COMMERCIAL BANKS AND RESPECTIVE MARKET SHARE AS AT 31st DECEMBER 2008

27. Gulf African Bank Ltd.	0.42
28. Habib Bank A.G Zurich	0.55
29. Habib Bank Ltd.	0.38
30. Imperial Bank Ltd.	1.13
31. Investment & Mortgages Bank Ltd.	3.10
32. Kenya Commercial Bank Ltd.	14.76
33. K-Rep Bank Ltd.	0.69
34. Middle Fast Bank (K) Ltd.	0.28
35. National Bank of Kenya Ltd.	3.61
36. National Industrial Credit Bank Ltd.	3.61
37. Oriental Commercial Bank Ltd.	0.19
38. Paramount Universal Bank Ltd.	0.22
39. Prime Bank Ltd.	1.68
40. Southern Credit Banking Corporation Ltd.	0.44
41. Standard Chartered Bank (K) Ltd.	8.38
42. Trans-National Bank Ltd.	0.29
43. Victoria Commercial Bank Ltd.	0.38
Non Banking Financial Institutions (NBFis)	%
44. Housing Finance Ltd.	1.21
45. Savings and Loan (K) Ltd.	0.98

Source: Central Bank of Kenya. Bank Supervision Annual Report, 2008

APPENDIX 6: SPSS OUTPUT

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Results for: DATA FOR ANALYSIS2.xls

Descriptive Statistics: Deposit, Savings. LendR, Odraft. 91-DTbill, CBR

Variable	N	Mean	Median	TrMean	StDev	SE Mean
Cepoait	39	4.5141	4.3659	4.4977	0.3754	0.0601
Saving*	39	1.6279	1.6536	1.6191	0.2112	0.0338
UndR	39	13.925	13.793	13.920	0.586	0.094
Odrart	39	13.621	13.478	13.609	0.353	0.056
91-DTbil	39	7.123	7.280	7.118	0.720	0.115
CBR	39	9.013	8.750	9.029	0.712	0.114

Variable	Minimum	Maximum	01	03
Deposit	4.0376	5.2800	4.2145	4.8610
Savings	1.2667	2.1319	1.4225	1.7140
LendR	12.871	15.090	13.535	14.326
Odrart	12.955	14.410	13.354	13.907
91-DTbil	5.726	8.S88	6.526	7.550
CBR	7.750	10.000	8.500	10.000

Correlations: Doposit, Savings, LendR. Odraft, 91-DTbill. CBR

	Deposit	Saving*	UndR	Odraft	91-DTbil
Savings	0.787 0.000				
LendR	0.857 0.000	0.541 0.000			
Odraft	0.419 0.008	o.oio 0.953	0.661 0.000		
91-OTbil	0.627 0.000	0.664 0.000	0.420 0.008	0.031 0.851	
CBR	-0.760 0.000	-0.762 0.000	-0.512 0.001	-0.040 0.807	

Ceil Content*: l o.nrson correlation
P-Value

Descriptive Statistics: dDoposit, dSavings, dLendR, dOdratt, d91-DTbill, dCBR

Variable	N	Mean	Modian	TrMcan	8tDev	SK Mean
dDapoait	39	-0.112	0.031	0.010	0.810	0.130
dSovinqa	39	-0.0325	0.0074	-0.0016	0.3012	0.0482
dLendR	39	-0.354	-0.068	0.007	2.378	0.381
dOdraft	39	-0.353	-0.025	-0.007	2.246	0.360
d91-DTbl	39	-0.169	0.051	0.004	1.270	0.195
dCBR	39	-0.250	0.000	-0.029	1.262	0.202

Variable	Minimum	Maximum	Q1	Q3
dDepooit	-5.000	0.293	-0.043	0.058
dSavings	-1.6500	0.4434	-0.0285	0.0436
dLendR	-14.760	0.546	-0.154	0.154
dOdraft	-13.900	0.543	-0.159	0.207
d91-DTbi	-7.250	0.771	-0.240	0.272
dCBR	-7.750	0.250	0.000	0.000

Correlations: dDeposit, dSavings. dLendR, dOdraft, d91-DTbill, dCBR

	dDepoalt	dS.wing3	dlendR	dOdraft	d91-DTbi
dSavlngn	0.910 0.000				
dLendR	0.990 0.000	0.864 0.000			
dOdraft	0.984 0.000	0.874 0.000	0.996 0.000		
d91-DTbi	0.948 0.000	0.822 0.000	0.953 0.000	0.955 0.000	
dCBR	0.968 0.000	0.681 0.000	0.973 0.000	0.967 0.000	0.941 0.000

Cell Content*: r《arson correlation
P-Value

Regression Analysis: LondR versus Deposit, Savings,...

The regression equation is
LnndR - 0.48 · 1.33 Deposit - 0.075 Saving* 》0.515 Odraft - 0.0316 91-DTblll
· 0.0866 CBR

Predictor	Coef	SE Coef	T	*9*
Con《t ont	0.475	2.044	0.23	0.818
Deposit	1.3303	0.2661	5.00	0.000
Savings	-0.0746	0.3822	-0.20	0.847
Odraft	0.5147	0.1585	3.25	0.003
91-DTbtl	-0.03158	0.07588	-0.42	0.680
CBR	0.08660	0.09850	0.88	0.386

8 - 0.2422 H-Sq - 85.1% R-Sqlad-j) - 82.9*

Analysis ol Variance

Source	DF	S3	MS	t	9
Regression	5	11.,0956	2.2191	37„84	0.000
Residual Error	33	1.,9354	0.0586		
Total	38	13..0311			

Source	DF	Seq SS
Deposit	1	9.5784
Savings	1	0.6073
Odraft	1	0.8503
91-DTbil	1	0.0143
CBR	1	0.0453

Unusual Observations

Obs	Deposit	1-endR	Fit	SE Fit	Residual	St He31d
16	4.34	12,.5706	13.4738	0.0665	-0.6033	-2.59R

R denotes an observation with a largr standardized residual

Regression Analysis: LondR vorsus Doposit, Savings, 91-DTbill, CBR

The regression equation is
LrndR - 4.9? * 1.94 Deposit - 0.609 Savings - 0.0607 91-DTblll · 0.184 CBR

Prcdictor	Coef	SE Coef	T	P
Conatant	4.917	1.719	2.86	0.007
Deposit	1.9440	0.2120	9.17	0.000
Savings	-0.6093	0.3903	-1.56	0.128
91-DTbl1	-0.06070	0.08527	-0.71	0.481
CBR	0.1838	0.1062	1.73	0.093

S - 0.2741 R-Sq - 80.4% R-·Sq(ftdj) · 78,1%

Analysis of Variance

Source	DF	SS	KG	F	I
Regression	4	10.4774	2.6194	34.87	0.000
Residual Error	34	2.5537	0.0751		
Total	38	13.0311			

Source	DF	3《q SS
Depoalt	1	9.5784
Savings	1	0.6073
91-DTbil	1	0.0667
CBR	1	0.2250

Unusual Observations

Obs	Deposit	lendR	Fit	SE Fit	Rosidual	St Resid
16	4.34	12.9706	13.4945	0.0749	-0.6239	-2.37R

R denoten an observation with a large standardized residual

Regression Analysis: dLendR versus dDeposit, dSavings,

The regression equation is
dLendR - 0.0196 · 0.883 dDeposit · 0.178 dSavinga 》 0.682 OOtlrafi
- 0.0443 d91-D7bl11 》 0.189 dCBR

Predictor	Coef	SE Coef	T	P
Constant	0.01976	0.02896	0.68	0.500
dDeposit	0.8628	0.2538	3.48	0.001
dSavings	-0.1780	0.2437	-0.73	0.470
dOdraft	0.68181	0.06015	8.51	0.000
d91-DTbi	-0,04428	0.08230	-0.54	0.594
dCBR	0.18918	0.0960S	1.97	0.057

S · 0.1726 R-Sq - 99.5* R-Sq<adjl – 99.50

Analysis of Variance

Source	DF	SS	MS	r	p
Regression	5	213.878	42.776	1435.96	0.000
Residual Error	33	0.983	0.030		
Total	38	214.861			

Source	DP	Seq SS
dDeposit	1	210.576
dSavinga	1	0.355
dOdraft	1	2.831
d91-D7bl	1	0.000
dCBR	1	0.116

Unusual Observations

Oba	dDeposit	dLendR	Mt	SE Kit	Residual	St Reald
12	0.04	-0.2321	-0.3236	0.1367	0.0914	0.87 X
16	-0.07	0.3658	-0.0303	0.0386	0.3961	2.35R
39	-5.00	-14.7600	-14.7229	0.1720	-0.0371	-2.58RX

R denotes an observation with a large standardized residual
X donotes an observation whose X value gives it large influence.

Regression Analysis: dLendR versus dDeposit. dSavings. d91-DTbill. dCBR

The regression equation la
dLendR - 0.0071 · 2.35 dDnpoolt - 0.646 dSavlr.ga · 0.126 d91-DTbill
* 0.390 dCBR

Predictor	Cool	SE Coef	T	P
Constant	0.00709	0.05091	0.14	0.690
dDeposit	2.3540	0.3269	7.20	0.000
dSavings	-0.6459	0.4180	-1.55	0.132
d91-DTbl	0.1265	0.1405	0. 90	0.374
dCBR	0.3904	0.16.19	2.38	0.023

3 - 0.3038 R-Sq - 98.5% R-·SqladJ) - 98.4%

Analysis *of* Variance

Source	DF	88	MS	F
Regression	4	211.722	52.931	573.41

Residual Error	34	3.136	0.092
total	38	214.861	

Source	S*q SS
ddeposit	210.576
•'Savings	0.355
d!>l-DTbi	0.268
<3C8B	0.524

Unuaual Olinorvatior.a

<*>»	dOBpo.lt	dLandR	Tit	SE Fit	ftc3ldual	St RP31<1
″		-0.2321	-0.5045	0.2377	0.2724	1.44 X
″ J9	0-03	0.5465	-0.1099	0.1012	0.6564	2.29R
	-5.00	-14.7600	·14.6403	0.3023	-0.1197	-3.92RX

* = S = S S