EFFECT OF FLEXIBLE INTEREST RATES ON THE GROWTH OF MORTGAGE FINANCING IN KENYA

BY

LILIAN MUGUCHIA

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DECLARATION

STUDENT'S DECLARATION

This research project is my original work and has not been presented for examination to any other university.

Signature……... Date……..

Lilian Njeri Muguchia D61/63209/2010

SUPERVISOR'S DECLARATION

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

Signature……... Date……..

Dr. Aduda Josiah O.

DEDICATION

I would like to dedicate this work to my dear parents Josphat Muguchia and Naomi Nyambura for their sacrifice to see me through school, my brother Michael Mwangi for his motivation and encouragement and to my friend Joseph Mutemi for his patience, perseverance, moral support and encouragement during my study period.

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ABSTRACT

This paper attempts to find out the effect of flexible interest rates on the growth of mortgage financing in Kenya during the financial period 2007 – 2011 .The study found out that the flexible interest rates have a negative effect on mortgage financing in Kenya.

This study is significant as it will seek to understand the competitive environment of the banks and other financial institutions in the country as they seek to offer affordable housing to Kenyans. Financial distress in the past has caused many banks to collapse in the past which has impacted negatively on the entire economy of the nation. Commercial Banks have therefore had to diversify their income sources from traditional intermediation income generating activities to non-intermediation income generating activities.

The findings of this study conducted on 26 commercial banks in Kenya and the Housing Finance of Kenya relied on secondary data from annual reports of the banks. Regression analysis was mainly used to reveal that flexible interest rates charged by the financial institutions have a negative effect on mortgage financing. If banks charge a fixed rate of interest, it would be possible for investors to plan for a predictable amount of money to be repaid hence stability and increased level of borrowing.

The regression analysis conducted established a negative and significant relationship between flexible interest rates and mortgage financing. The other independent variables had mixed effects on mortgage financing. Inflation, non performing loans, liquidity ratio had negative effects on mortgage financing while money supply, gross domestic product, customer deposits, bank capitalization and bank size had positive effect on mortgage financing.

It is also evident from the study that without the diversification of income sources by commercial banks in Kenya most of them would have struggled with their objectives of maximizing shareholders wealth or eventually collapsed.

It is also evident from the study that without flexible interest rates, banks would not be able to lend since this is also affected by the cost of borrowing from the customers through deposits.

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LIST OF ABBREVIATIONS

CBK	-	Central Bank of Kenya
CBR	-	Central Bank Rate
FI	-	Financial Institutions
FRM	-	Fixed Rate Mortgage
ARM	-	Adjustable Rate Mortgage
GDP	-	Gross Domestic Product
MBS	-	Mortgage Backed Securities
NHC	-	National Housing Corporation
SACCOs	-	Savings and Credit Cooperative Societies

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Financial institutions play the important role in the economy of offering credit, which include mortgages. A mortgage is a loan secured by real estate property. Mortgages enable households and firms to acquire real property without paying the entire value of the purchase up front. Mortgage loans are characterized by size of loans, period of maturity, interest rates charged as well as the method of paying (Milani, 2010). In underwriting a mortgage loan, the real estate property is valued and the lenders usually require a down payment from borrowers, a requirement of lenders to contribute a portion towards the cost of the property. Mortgage loan repayment is akin to the standard bank loan of paying regularly the principal and interest over a set term. Depending on the size of the loan and the prevailing practice in the country the term may be short (10 years) or long (over 50 years).

Interest rates define the cost of credit in an economy. More specifically, it is the yearly price charged by a lender to a borrower in order for the borrower to obtain a loan. This is usually expressed as a percentage of the total amount loaned (Fisher, 1930). Interest rates are basically determined by the money supply, the rate of inflation, the time period of credit, and the central bank's monetary policy (International Monetary Fund, 2012). These factors influence the variability of interest rates. Generally, interest rates can be discounted for inflation or given as they are observed. They can also be seen as either short term or long term.

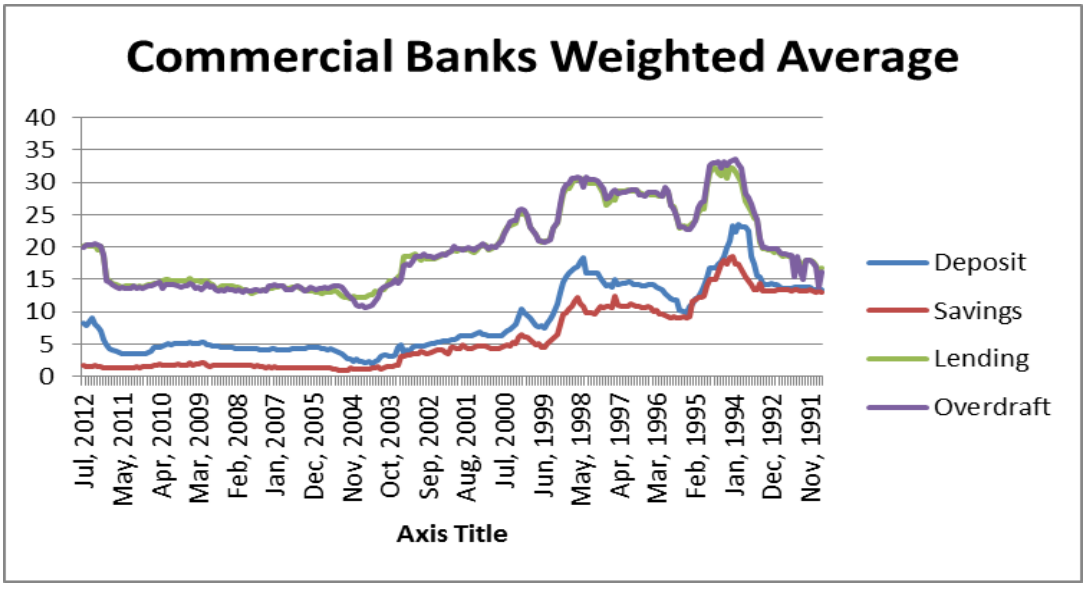
Mortgages represent long term loans and are thus more affected by factors such as prices in the bond market, the costs of longer-term deposits, and generally the competition for funds in the financial markets (International Monetary Fund, 2012). Interest charged on mortgage loans can either be floating/variable/adjustable or fixed. The flexible interest rate framework is usually based on an index or other base rate for establishing the interest rate for each relevant period (Milani, 2010).

1.1.1 Interest Rates in Kenya

Kenya adopted liberalized interest rates since 1991, allowing the market to determine the prevailing interest rates with the intention of creating an efficient allocation of credit (Mehran & Laurens. 1997; Ngugi, 2004). As expected, before liberalization, interest rates were fairly stable due to price and banking controls. However, the liberalization ushered in periods of variable interest rates depending on the prevailing market conditions (Ngugi, 2004).

In Kenya, interest rates are mainly driven by inflation – which affects the value of money; demand and supply of money through sale and purchase of government security in the open market; monetary policy and intervention by the government through setting the Central Bank Lending Rate; general economic conditions such as economic booms and slumps (Ngugi, 2004). Interest rates in the country have also been sensitive to the existing political atmosphere. For instance, the 2007/2008 post-election crisis caused a hike in the weighted average bank lending rates by 1.6 per cent (Ng'etich & Wanjau, 2011).

Figure 1.1: Annual Commercial Banks Interest Rates: Weighted Average



Source: Central Bank of Kenya

High interest rates have the negative effect of increasing the cost of borrowing and consequently limiting the level of aggregate investment and consumption and the overall economic growth in the country (Ng'etich & Wanjau, 2011). When the Central Bank's Monetary Policy Committee raised the CBR from 7 per cent to 18 per cent in order to curb the rising inflation in the country during the last half of the 2011, evidence suggests that the real economy slowed by 1.6 per cent to 3.5 per cent in just four months to April 2012 – even with the advent of rain, which is normally a catalyst to economic growth (Central Bank of Kenya, 2012).

Interest payments on variable mortgages in the country have been subject to general prevailing market interest rates. When the CBR rose in the second half of 2011, the mortgage lending rate increased on average from 14.7 per cent to 25 per cent (Central Bank of Kenya, 2012). This increase is thought to have dampened investments and innovation in the housing sector. The rising interest rates hiked interest payments on mortgage which increases likelihood of loan defaults and bank vulnerability, and cost-push inflation that makes housing more expensive (Parliament Budget Office of Kenya, 2012).

1.1.2 Mortgage Financing in Kenya

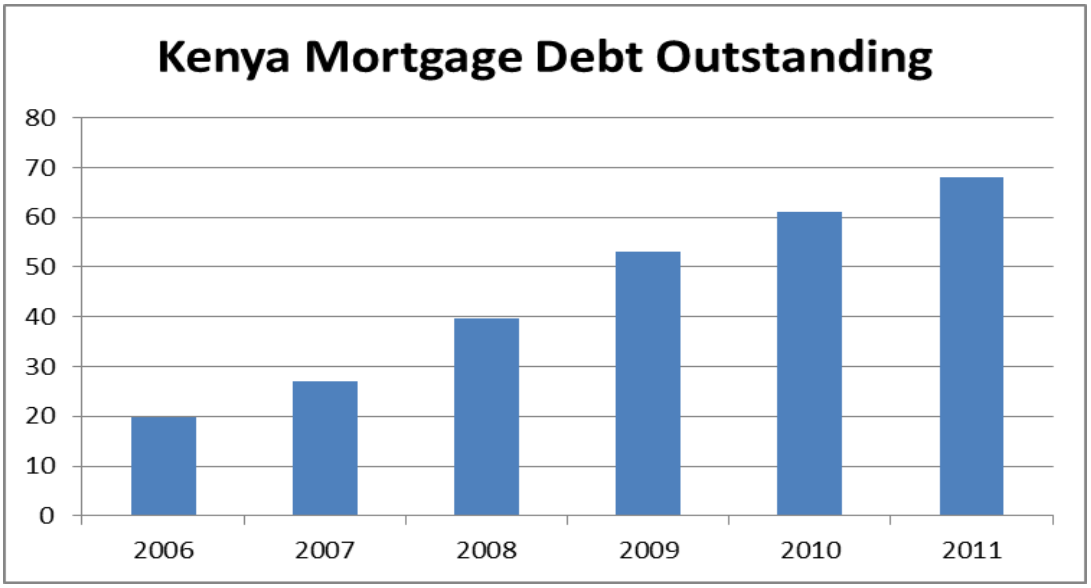
Housing finance system in Kenya is fairly well developed in terms of annual value and the number of mortgage loans transacted. In 2011, the country posted mortgage assets equivalent to 2.5 per cent of the GDP, ranking only below South Africa and Namibia in the sub-Saharan Africa (World Bank, 2011).

A 2011 World Bank Survey (World Bank, 2011) established that the size of the mortgage market in Kenya stood at Ksh. 61.4 million, comprising of 13,803 loans of an average size of Ksh. 4 million, shared among 35 lending institutions. These are mainly banks and the Housing Finance Company of Kenya, the only remaining mortgage finance company in the country. Kenya Commercial Bank is currently the largest mortgage lender. According to the survey, Kenya's mortgage market is still small, with mortgages representing only 15 per cent of total credit, but with a potential market size of Ksh 800 billion at the time of the study. Tapping this potential market would raise the mortgage

debt to GDP level from the current 2.5 per cent to 32.5 per cent, which is comparable to peers such as South Africa (World Bank, 2011)

Promoting mortgage financing in Kenya is necessary for availing means for housing provision, especially given that the country is facing acute housing. According to the Ministry of housing, housing gap in the country averages over 150,000 housing units annually. However, the development of mortgage financing is hampered by lack of access to long term funding, low levels of incomes, limited supply of mortgage-able property and credit risk - which is exacerbated by high interest rates (United Nations Human Settlements Programme, 2010; World Bank, 2011).

Figure 1.2: Kenya's Mortgage Finance Market



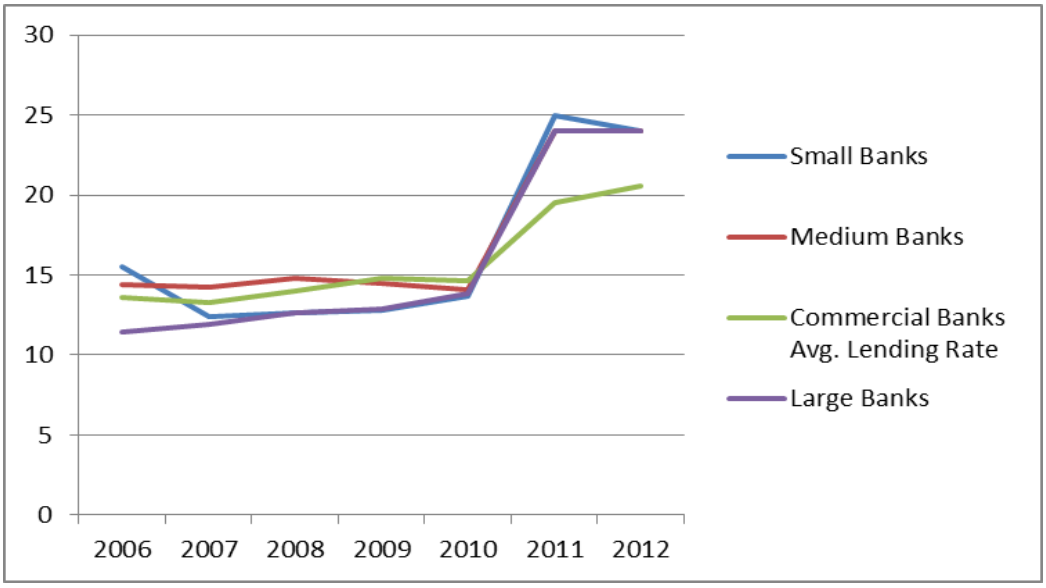
Source: Central Bank of Kenya

While mortgage lending rates were at the high of 20 per cent at the beginning of the last decade, they eased and stabilized at an average of 15 per cent in the last half of the decade. The inflationary pressure of the 2011 however pushed the rates to above 20 per cent.

As shown in figure 1.4, interest rates charged on mortgages are linked to the size of the bank, according to a Central Bank of Kenya survey (Central Bank of Kenya, 2010). The

fact that banks with larger market share are able to leverage their capital base and offer innovative products possibly explains this apparent link.

Figure 1.3: Mortgage Interest Rate by Bank Size vs Average Commercial Lending Rate



Source: Central Bank of Kenya, Mortgage Survey, November 2010, augmented with latest figures from Central Bank of Kenya

1.2 Statement of the Problem

Given the role of interest rates in the economy, several studies have been conducted. Interest rates affect the core operation of an economy in terms of production and consumption through transmission mechanism of inflation, exchange rates amongst other monetary variables. Accordingly, studies are legion explaining the effects interest rates have on various variables in the economy. In Kenya, these studies include Ng'etich & Wanjau (2011) who show the effects of interest rate spread on the level of non-performing assets among commercial banks in Kenya; Bett (2011), who studied the effects of lending interest rates on profitability of savings, credit and cooperative societies in Kenya. Studies have explored the relationship of interest rates and private sector investment, interest rates and mobilization of private savings, as well as the effects of interest rates on private firms' performance (Olweny & Chiluwe; 2012; Mwega, Ngola

& Mwangi, 1990). Intensive analysis of the implicit dynamics underlying the interest rate structure in the country also exist that give in depth understanding of stochastic properties to provide useful information about the effects of shocks and appropriate policy remedies (Caporale & Gil-Alana, 2010). The relationship between interest rates and growth of mortgage financing remains controversial in theory while empirical findings show positive, negative and even no relationship between the two variables.

While theory is biased towards the postulation that interest rates are inversely related to the amount of credit available in an economy, studies have shown situations when the levels of credit is independent of the official interest rates, especially characteristic of credit squeeze. A study by Martinez and Maza (2003) found out that housing prices and real income were positively related to mortgage credit while interest rates have a negative impact on the variation in short term mortgage credit. However, Gerlach and Peng (2005), examined the long and short term relationship between interest rates and mortgage credit with an application to the Hong Kong housing market, and found out that the increase in interest rates were positively and significantly related to growth in long term mortgage loans. This is unlike Mcclain and Nichols (1996) argument that there is no relationship between the interest rates and level of mortgage financing; only the income of a household determines the level of mortgage uptake as the higher the level of income, the higher the amount of savings and the loan repayment ability.

Mwega (2009) found out that Kenya experienced credit crunch in the period between 1993 and 2002 because formal lending institutions preferred less risky investments in government securities at the expense of small to medium size enterprises. Studies by Ngugi (2004), Oduor, Karingi and Mwaura (2011) have tried to illuminate the point that interest rates effect on the amount of credit to the economy is largely minimal. Instead the overall net credit available in Kenya's financial industry is influenced more by other factors such as information asymmetry between the borrowers and the lenders, value of the collateral used by the banks to secure the loans, central bank reserve requirements, direct credit controls on the banking system and perception of risk regarding the solvency of other banks within the banking system.

The relationship between flexible interest rates and the level of mortgage uptake in Kenya has never been investigated. Given that interest rates determine the cost of the mortgage, the variability of interest rates will therefore intuitively impact on the overall mortgage financing in an economy. This study seeks to contribute to the knowledge in this field by investigating this relationship in the Kenyan context.

1.3 Objectives of the Study

The main objective of the study is to examine how the flexible interest rates affect the growth of mortgage financing in Kenya. In order to meet the general study objective, several specific objectives were addressed. These are;

(i) To establish the theoretical relationship existing between flexible interest rates and mortgage financing
(ii) To examine the existing body of knowledge regarding the empirical relationship between flexible interest rates and mortgage financing
(iii)To establish the effects of flexible interest rates on mortgage financing in Kenya using Kenyan data

1.4 Significance of the Study

Interest rates underlie the macroeconomic stability of an economy. Accordingly, interest rates are used to influence the monetary policy and other aspects to achieve the desired macroeconomic framework. Therefore, a study on the relationship of interest rates and mortgage financing in Kenya will provide important insights towards achieving the macroeconomic targets of Kenya Vision 2030, the country's economic blueprint for long term growth in the country. Relevant government departments charged with responsibility of realizing economic growth targets of Kenya Vision 2030 will therefore find this study useful.

The Constitution of Kenya 2010 explicitly accords every Kenyan a human right to adequate and decent housing. Among the various strategies to be adopted by the government and the private sector towards the constitutional obligation of decent housing to all Kenyans is expansion of mortgage provision to as many Kenyans as possible.

Therefore, knowledge of the determinants of mortgage financing in the country would provide policy makers and industry players with a basis to make informed choices and policies.

The commercial banks that provide mortgage products will find the study useful for maximizing profits from mortgage financing. Banks could modify their products to tap niche mortgagee markets.

The researchers and scholars will find the study a useful reference for future studies and a benchmark for making conclusions in related studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses other studies that have been conducted in the area of study. The areas covered include the theoretical review (title theory and lien theory, arbitrage theory and traditional asset pricing theory), concept of mortgage financing, impact of flexible interest rates on mortgage financing, empirical review and the conclusion.

2.2 Theories Related to Mortgaging

2.2.1 “Title Theory" and "Lien Theory"

This is a theory existing in the US real estate market. The lien theory states that, a mortgage or a deed of trust will create a mortgage lien upon the title to the real property being mortgaged, while the mortgagor still holds both legal and equitable title. On the other hand the title theory states that, a mortgage is a transfer of legal title to secure a debt, while the mortgagor still retains equitable title. In title theory, the bank is treated as having transferred title to the mortgage, subject to the mortgagee’s duty to recovery if payment is made. The title is said to remain in the mortgagee until the mortgage has been satisfied and foreclosed. Although the mortgagee has the right of possession to the property, there is generally an express agreement giving the right of possession to the mortgagor. The mortgagee is said to hold the title for security purposes only. The mortgagor is given the right of possession (Buckley & Kalarickal, 2004).

Subject to the requirements of the recording laws of the state in which the land is located, this attachment establishes the priority of the mortgage lien with respect to most other liens on the property's title. Liens that have attached to the title before the mortgage lien are said to be senior to, or prior to, the mortgage lien. Those attaching afterward are said to be junior or subordinate. The purpose of this priority is to establish the order in which lien holders are entitled to foreclose their liens in an attempt to recover their debts (Buckley & Kalarickal, 2004). If there are multiple mortgage liens on the title to a property and the loan secured by a first mortgage is paid off, the second mortgage lien

will move up in priority and become the new first mortgage lien on the title. Documenting this new priority arrangement will require the release of the mortgage securing the paid off loan.

2.2.2 Arbitrage Theory

"Limits of Arbitrage" theories require that the marginal investor in a particular asset market be a specialized arbitrageur (Gabaix, 2005). Then the constraints faced by this arbitrageur such as capital constraints feed through into asset prices. It examines the mortgage-backed securities (MBS) market in this light, as casual empiricism suggests that investors in the MBS market do seem to be very specialized. It shows that risks that seem relatively minor for aggregate wealth are priced in the MBS market. A simple pricing kernel based on the aggregate value of MBS securities prices risk in the MBS market. A pricing kernel based on aggregate consumption or aggregate wealth implies the wrong sign for the price of MBS risk. Thus it claims that the evidence is consistent with the limits of arbitrage theories that require that the marginal investor is a specialized mortgage arbitrageur.

Limits to Arbitrage theory hypothesize that the marginal investor in a particular asset market is a specialized arbitrageur rather than a diversified representative investor. The relevant set of buyers is a smaller specialized pool of investors and the liquidations have large effects on prices. The theory posits that the marginal investor in a particular asset market is an investor who specializes in that market.MBS securities rise and fall in value based on the exercise of homeowners' prepayment options. When a homeowner prepays a mortgage, the MBS backed by the mortgage is called back at par. Depending on the interest rate environment, prepayment can either hurt or benefit the MBS investor. Thus, for an investor who specializes in the MBS market, prepayment risk represents a risk to the value of his portfolio. At the aggregate level, prepayments do not cause changes to aggregate wealth or the aggregate endowment, since for every MBS investor who is short a prepayment option, there is a homeowner who is long the prepayment option. Any observed covariance between aggregates and prepayments is due to some common economic factors driving both aggregates and homeowner prepayments (Gabaix, 2007)

2.2.3 Traditional Asset Pricing Theory

The theory assumes that the marginal investor in the mortgage-backed securities (MBS) market is the same as that in the broad US capital market (Gabaix, 2005). If the marginal investor is a specialized mortgage arbitrageur, then the relative valuation of assets within the MBS market will also reflect this investor's preferences. Asset pricing theory deals with the reason why some assets that can be understood as contingent commodities that transfer wealth across states of the world have higher prices or lower returns than others. In traditional asset pricing theory, the marginal investor in every asset market is the same broadly diversified representative investor.

2.3 Empirical Review

A mortgage is a security interest in form of a real property whereby the lender holds it like a loan's security. It is the transfer of an interest in property to a lender as security for a debt on condition that the interest will be returned to the owner when the terms of the mortgage have been satisfied.

Shin (2006) conducted a study on the choice of residential mortgage lending by Korean household to determine house hold of mortgage lender in the Korean market using data from 2004-2006 surveys on the same. It was evident that more Koreans intending to buy low and middle priced houses were more inclined to the banks due to flexibility in rates and a wider array of mortgage product. However the study failed to show significance of agents' mobility variable, risk averseness variable and expectation on future interest rate movement. The inclination managed may be the case in our country Kenya as at now, but the findings from the study indicates a negative relationship between the interest rates and level of mortgage uptake. Further the study discovered that, not everyone understood the rules or regulations governing the Korean housing affairs hence desirable data could not be obtained. Thus at the end of the study, it was worth to include in their recommendations that, it was necessary to educate the masses about mortgage product through government funding (Bernanke, 2004).

Warnock and Warnock (2005) views the sector of housing finance on the grounds of supply and demand. "Demand for housing finance is in a sense a derived demand that flows from the demand for housing, which in turn depends importantly on the rate of household formation and income levels. In addition, with housing costs typically being a multiple of annual income, housing is made affordable by spreading payments over time, so adequate housing finance must be longer term in nature" The study further says that, in primary market, deposit-taking institutions, such as banks can fund mortgages through deposits. However, because deposits are short term, if this is the only source of funds housing loans will tend to be short term or at variable rates. 10 Short-term loans, given that housing is expensive, are unattractive to potential borrowers. Potential borrowers might find variable rate loans attractive, but will likely not be able to gauge the substantial interest rate risk they are bearing (BIS, 2006). Thus variable rate loans may encourage the growth of mortgage financing.

Moss (2001) conducted a study on Housing Finance Systems in Four Different African Countries: South Africa, Nigeria, Ghana and Tanzania. The researcher says that the generic problem that eliminates low-income earners from the housing market is affordability. The gap between income and shelter cost is very wide. If the cost of constructing new houses is not within reach of low-income earners, then revitalizing the existing stock can be an alternative mechanism to improve housing. Incremental housing is implemented in South Africa and Ghana through micro-finance for housing. In Tanzania and Nigeria, it is almost non-existent because micro-finance is a fairly new concept. Micro-finance in certain quarters has been regarded as a successful instrument in lending to the poor for them to spend those loans on home improvements and expansions. One would have expected incremental housing to be at gross scale in Nigeria as retail bankers mostly lend on a short-term basis arguing that they have to meet withdrawal requests at the shortest notice. To them servicing transactions with low profit margins would not worth taking the risk. They argued that there is a negative relationship between interest rates and affordability to construct new houses.

Ndungu (2010) found that access to funds was the most important constraint in the growth of mortgage market. Other constraints which were found overlapping are low level of incomes, credit risk and high interest rates. Kenya's mortgage market is dominated by the large banks, comprising 90% of the outstanding loan assets portfolio. While Kenya's mortgage market is growing, the industry is dominated by the large banks indicating barriers to entry or high risk for medium and smaller banks. However, the growth rates indicate that the small sized banks have the fastest growth rate of 38% on average, followed by medium banks which are growing at 25% on average with large banks closely following at 24% on average. Thus there is a negative relationship between interest rates and mortgage growth in Kenya.

Lacko and Pappalardo (2007) highlights some of the additional costs that accompany the mortgage loans and the home buyers are not aware. The charges for the additional products and services sold with the loan include such as credit-life and disability insurance, they can substantially increase the cost of a mortgage. These products are often sold as optional add-ons which are not required for the loan. Consumers who fail to recognize the presence of such charges, or fail to recognize that the products are not required, but pay for them nonetheless, pay more for their loans than necessary and obtain products or services they may not have purchased if more fully informed. These costs make mortgage loans unaffordable hence a negative relationship between house prices and mortgage growth.

Gerlach and Peng (2005) examined the relationship between interest rates and mortgage credit with an application to the Hong Kong housing market. Their results show that the increase in interest rates are positively and significantly related to growth in long term mortgage loans.

Goodman and Thibodeau (2009) found out that interest rate increases were related to factors such as inelastic supplies of owner-occupied housing. Muth (1960) states that housing supply is supposed to be rigid in the short term and demand adjusts to the level of the housing stock available at the time as shown in the Hendry (1984) and Poterba (1984) contributions on the asset market approach. Mortgage finance is introduced into

the asset market approach through the cost of use equation since the mortgage loan interest rate may be regarded as an essential determinant of that cost.

Aoki (2004) states that introducing the housing stock as a loan collateral shows that a rise in housing prices increases the collateral value for consumers. This increase has a positive impact on consumption and also permits greater recourse to credit financing.

Ayuso and Restoy (2007) developed an inter-temporal asset pricing model to determine empirically the level of overvaluation of housing prices in Spain, United Kingdom and the United States. Their results suggest that part of the rise in housing prices in Spain since 1998 was not due to changes in interest rates but may be attributed to a correction for an earlier under pricing. However, in recent years the growth in house prices appears to be mainly due to substantial demand shocks. This study therefore indicates that there is no relationship between changes in interest rate and level of mortgage growth.

Gimemo and Martinez (2005) carried out an application of the empirical model developed by Gerlach and Peng (2005) to the Spanish case. Their results show that growing imbalances in mortgage finance market tend to bring down housing prices in the long run, whereas in the short term increases in mortgage finance appear to bring about a rise in housing prices.

2.4 Concept of Mortgage Financing

A mortgage is a written document that provides a lender with rights in real property as collateral for a loan. The loan itself is evidenced by a promissory note, which is a written promise to repay money on certain terms and conditions. Simply, people refer to the whole relationship with the real estate lender as a mortgage, technically, though, the reference should be to "mortgage loan interest rates." In some states, the security instrument is called a deed of trust. The property owner actually deeds the property to a third party, who holds the naked legal title in trust for the owner and will re-convey it when the debt has been paid in full. If there is a default and foreclosure, the trustee will convey the property to the successful bidder. Such states usually allow non-judicial fore-closures (Denman, 1968). In other states, the instrument called a mortgage creates only a

lien on real property. The borrower is called the mortgagor, and the lender is called the mortgagee. In order to fore- close, the lender usually has to obtain court permission to conduct a sale. These are called judicial foreclosures (Myers, 1977).

In a very few states, called hybrid states, the instrument called a mortgage transfers legal title to the lender itself. The title is extinguished when the debt has been paid in full. The lender may take advantage of non-judicial fore-closure. If foreclosure nets less money than is owed on the note with all interest and costs of collection, then the lender can usually sue the borrower in state court for the balance, called a deficiency. Exceptions occur if the note provided that it was nonrecourse, meaning without any personal liability by the borrower, or if state laws prohibit deficiency judgments for first mortgages on a consumer's principal residence. In some states, a debtor has a grace period after foreclosure within which to buy the property back for the amount of the winning bid price plus interest at the legal rate for that state. These rights of redemption may also be extended to junior lien holders and even unsecured creditors, who may wish to invest the money necessary for redemption because they believe they can sell at a profit and recoup their losses (Denise, 2007).

Mortgage loans are generally structured as long-term loans, the periodic payments for which are similar to an annuity and calculated according to the time value of money formulae. The most basic arrangement would require a fixed monthly payment over a period of ten to thirty years, depending on local conditions. Over this period the principal component of the loan would be slowly paid down through amortization. Lenders provide funds against property to earn interest income, and generally borrow these funds themselves for example, by taking deposits or issuing bonds. The price at which the lenders borrow money therefore affects the cost of borrowing. Lenders may also, in many countries, sell the mortgage loan to other parties who are interested in receiving the stream of cash payments from the borrower, often in the form of a security by means of a securitization. Mortgage lending will also take into account the perceived riskiness of the mortgage loan, that is, the likelihood that the funds will be repaid usually considered a function of the creditworthiness of the borrower that if they are not repaid, the lender will

be able to foreclose and recoup some or all of its original capital; and the financial, interest rate risk and time delays that may be involved in certain circumstances.

The two basic types of amortized loans are the fixed rate mortgage (FRM) and adjustable-rate mortgage (ARM) also known as a floating rate or variable rate mortgage). In some countries, such as the United States, fixed rate mortgages are the norm, but floating rate mortgages are relatively common. Combinations of fixed and floating rate mortgages are also common, whereby a mortgage loan will have a fixed rate for some period, for example the first five years, and vary after the end of that period. In a fixed rate mortgage, the interest rate, and hence periodic payment, remains fixed for the life or term of the loan. Therefore the payment is fixed, although ancillary costs such as property taxes and insurance can and do change. For a fixed rate mortgage, payments for principal and interest should not change over the life of the loan,

In an adjustable rate mortgage, the interest rate is generally fixed for a period of time, after which it will periodically either annually or monthly adjust up or down to some market index. Adjustable rates transfer part of the interest rate risk from the lender to the borrower, and thus are widely used where fixed rate funding is difficult to obtain or prohibitively expensive

2.5 Effect of Flexible Interest Rates on Mortgage Financing

Skyrocketing interest rates have affected mortgage uptake adversely. Consequently Housing Finance reported a drop of 38% in sales in the first quarter of 2012 to Kshs 2 billion as compared to kshs.3.3 billion which were posted the year 2011.However, the mortgage lender did post an 11% as a growth in the profit realized after tax of kshs.133.6 million as compared tokshs.120.1 million in the year 2011.Cost management and measures on credit risk can be viewed as some of the factors that the mortgage financier credits to this growth (Luesby, 2012). Some of the challenges have been high cost of funds, high cost of living and high inflationary pressure brought about by increase in the costs of goods as well as services. These challenges have brought about shift in the focus such that long term funding is preferred to offer affordable solutions to middle and lower income markets. So the focus in the market is anchored on risk management and

operational efficiency through various cost management initiatives. Borrowers, who had obtained mortgage loans at a low interest rate, are being forced to leave their plan of owning a home because of the high interest rates that have driven repayments beyond what they can manage.

The increase in interest rates that are charged on loans has led to a decline in the mortgage uptake in the country. Therefore prospective homeowners are forced to look into other ways of owning homes. Going back about two years ago, the commercial banks in Kenya and other mortgage providers used to charge an interest rate amounting to 14 per cent. Still this rate was unaffordable to many Kenyans. This situation is a bit worse presently with many of them charging between 19 % and 24 % placing them at a rank which is very high from a world's perspective (Luesby, 2012). During that period, she foresaw that the Kenyan population would face a high shortage in housing within the next 2 years leading to increase in house pricing. The impact will be felt more in the market comprising of the middle income earners which is the market that relies most on mortgage financing. This impact associated with the increased interest rates on the real estate sector lies squarely on the side of the supply.

For the investors in this sector in Kenya, cash flow is so smooth. Nonetheless, the market in Kenya has been very lucrative for foreign investors due to the high profit margins of 20-30% which surpasses that of the markets in the US and Europe (Hassanali, 2011). Big real estate companies of the international caliber have poured a lot of money in luxurious properties targeting wealthy Kenyans. Flexible interest rates are offered by banks because of market changes and also to hedge themselves against losses.

Flexible rates vary with time. When the interest rates decrease, it poses an advantage to the borrower since the repayment amount decreases thus a saving to the borrower. Conversely, when the interest rate goes up the repayment amount goes up thus posing an extra cost to the borrower. This reduces their repayment ability to the extent that the borrower may be unable to service the loan. However, the bank has an option to restructure the loan to a repayment that is affordable to the borrower but this increases the repayment period and the interest payable too. This ends up with adverse financial

implications to the borrower thus reducing the growth of mortgage financing in Kenya (Chiuri, 2003).

The uptake of mortgage in Kenya has slowed down significantly due to a continuous period of high interest that began in the second half of last year. Interest rates offered by the country's top mortgage financiers currently range from 19% to 28% which are very unattractive for new mortgages. The high rates have impacted heavily in the short term on both the supply of new homes and the mortgage uptake. Commercial banks hiked their interest rates late last year after the Central Bank of Kenya raised its benchmark lending rate to 18 per cent as part of measures to tame the run-away inflation (Kariuki, 2011).

Most middle income housing developers rely on construction finance which becomes difficult to access when the interest rates are high. Potential home buyers resort to renting or moving down the property ladder by buying homes they consider affordable with most shying away from mortgage loans (Hassanali, 2011). Housing finance institutions have shifted focus to long term funding of up to 25 years to deliver affordable solutions to middle to lower income target market. Mortgage borrowers, who had taken loans at low interest rates, get forced to abandon their plans of owning a home because of high interest rates that drive repayments beyond their reach. Increasing interest rates charged on loans has worsened mortgage uptake in Kenya and forced prospective homeowners to look for alternative ways of owning homes. Many borrowers have resulted to private developers where the installment will never be increased as in the case of mortgages and mutual agreements are made in writing. Installments may not be pegged in inflation rates like mortgages, but could be higher due to the short payment period. The situation has forced many borrowers to drastically raise their monthly installments to match the new interest rates.

The trend of buyers moving down the property ladder continues with more of them opting to delay purchases and instead rent houses they would have ordinarily bought. Developers have found it hard to escape the real impact of current government policies and economic trends on the housing market. The developers are retreating at speed. Very many building plans have been shelved, at least for the time being. Where construction is

underway, future phases have been postponed and current phases down-sized. The hiked interest rates accompanied by high land prices and rising steel costs, have eaten up the entire development profit, which could then see developers discounting homes to sell off quickly (Hassanali, 2011).

Thuranira (2011), however, states the high interest rates may not scare off all prospective investors because some of them buy homes through Sacco loans and employers' investment plans like the cash backed mortgage schemes where the employer places funds with the financing institutions. The interest rate in this case is usually lower and this may not affect the level of mortgage credit.

The theory of credit demand and supply as postulated by Balke and Zeng (2011) provides the determining factors of the credit output. The principal determinant of credit demand and supply is interest rates. There are also other factors that shift the demand for loans such as inflation rate, money supply in the economy, the GDP, non performing loans, liquidity ratio, customer deposit and bank capitalization. This theoretical basis is supported by empirical works by Essene and Apgar (2007) who argue that mortgage finance is as a result of the existing macroeconomic environment in the country which determine the operations of financial institutions. Leece (2008) theorized the significance of mortgage demand, mortgage choices and the nature of the economic environment in which macroeconomic factors such as inflation rates, GDP as well as bank operating factors such as customer deposits and liquidity ratios were found to be inter-related to mortgage financing.

2.6 Conclusion

The theoretical literature on effect of interest rates on mortgage loans is inconclusive. Empirical literature shows a negative relationship between the interest rates and mortgage loans both locally and internationally. The general literature shows that the rate charged by a lending institution depends on the central bank rate (CBR), the level of its operating costs and the credit risk. In Kenya, the increase in interest rates for the last one year by about 10.5% has had an adverse effect on the mortgage lending. This forms the

motivation of the study. It becomes important to establish the impact of changes in interest rates on growth of mortgage financing in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter introduces the design of the research, the population of the units to be studied, the sampling framework of the population, the data collection techniques and the type of the data, the analysis of the data as well as the data validity and data reliability.

3.2 Research Design

The research design used was a descriptive survey research. Mugenda and Mugenda (2003) describes descriptive research as a process of collecting data in order to answer questions regarding the current status of the subjects in the study. Mugenda (2003) defines a survey as an attempt to collect data from members of the population with respect to one or more variables. It was appropriate to use descriptive survey as it allows ascertaining the effect of interest rates on the level of mortgage uptake. The study focuses on financial institutions offering mortgage facilities in Kenya.

3.3 Population

A population is a well defined or set of people, services, elements, events, group of things or households that are being investigated (Ngechu, 2004). The target population for this study was financial institutions in the country offering mortgage services, including the Housing Finance Company of Kenya. According to the Central Bank of Kenya, 43 commercial banks were registered in Kenya in 2011.

3.4 Sample

A sample size should be chosen in a way that it gives a wide scope for the aim of the study (Ngechu, 2006). It should be in way such that it is not biased or skewed. The sample size should be representative of the whole targeted population. This study used a sample of 27 financial institutions comprising of 26 commercial banks and Housing Finance Company of Kenya.

3.5 Data Collection

There are many methods of data collection, according to Ngechu, (2004). This study used secondary data and therefore the relevant sources of the data deemed reliable were be consulted. These sources include financial newspapers, magazines, audited financial reports of financial institutions, journals, Central Bank of Kenya, statistical abstracts and economic surveys.

3.6 Data analysis

The model for this study is developed from Balke and Zeng (2011) who provide a simple model for understanding demand and supply of bank credit. Mortgage is a bank credit subject to demand and supply dynamics. Thus the demand for loans is given by; $L(r_L, X_L)$ **[1]**

where r_L is the interest rate on loans to borrowers while X_L represent the variables that shift the demand for loans.

The supply of loan-able funds is given by $S(r_S, X_s)$ **[2]**

where r_S is the interest rate on loans from ultimate lenders while X_s represents variables that shift the supply of loan-able funds.

At equilibrium and assuming perfect conditions in the financial markets,

$L(r_L, X_L) = S(r_S, X_s)$ and $r_L = r_S$. **[3]**

Fitting this postulation into our study model, the model can therefore be specified as follows;

$$MORT_{it} = \beta_0 + \beta_1 INTR_{it} + \beta_2 INFL_{it} + \beta_3 CBR_{it} + \beta_4 MSSP_{it} + \beta_5 GDP_{it} + \beta_6 NPL_{it} + \beta_7 LIQD_{it} + \beta_8 CDEP_{it} + \beta_9 CAPN_{it} + \mu_{it} \quad \textbf{[4]}$$

The model is based on the theory of bank credit as postulated by Balke and Zeng (2011).

Where;

$MORT_{it}$ is total mortgage loans lent out by bank i at time t, which is a one year period.

$INTR_{it}$ is the prevailing interest rate in the market at time t, which is a one year period.

$INFL_{it}$ is the prevailing rate of inflation in the economy at time t, which is a one year period

CBR_{it} is the Central Bank Lending Rate to commercial banks which ultimately determines the interest rates of mortgages

$MSSP_{it}$ is the money supply in the economy at time t, basically a one year period

GDP_{it} is the country's gross domestic product measured in one year period

NPL_{it} is the non performing loans for bank i at time t, which is a one year period

$LIQD_{it}$ represents the bank i's liquidity at time t, which is a one year period

$CDEP_{it}$ is the customer deposits at bank i at time t, which is a one year period

$CAPN_{it}$ represents the bank i's capitalization at time t, which is a one year period

μ_{it} represents the unexplained variations in the model

β represents the coefficients of the variables

3.7 Data validity

Data validation is a higher-level scientific-based process that determines the technical usability of the analytical data (Paul, 2000). The process ensures that data are valid, reasonable and sensible before any data processing is done. There is a wide variety of data validation methods. The data validation method in respect to the nature of this study

was used. This is guided by the design of the data collection tool, the questionnaire. After the data is input into the system, checks were done on the characters, consistency, data types, logic, presence and range. These checks ensured the best data is available for analyses as well also erase biasness.

3.8 Data reliability

Data reliability is a state that exists when data is sufficiently complete and free from error to be convincing for its purpose and context (Austin & Texas, 2004). Reliability has to do with data precision. It refers to a consistency of a measure. The reliability checks to be used are internal consistency reliability and inter-rater reliability. This goes on to verify the findings of the study thus making it appropriate for the study.

CHAPTER FOUR

PRESENTATION OF RESULTS AND FINDINGS

4.1 Introduction

This chapter presents the results of the estimation of the study model developed and used in chapter three. A brief explanation of the variables is given and presentation of the results and finally discussion of the findings.

A brief explanation of the variables used in the analysis is presented in table 1. The dependent variable is the annual mortgage loans by financial institutions. The expected relationship of the independent variables with annual mortgage loans is offered.

Table 1: Variables definitions and Measurements

Variable	Description	Measurement	Relationship
INTR	Weighted average of annual lending rate by commercial banks	Percentage	Inverse
INFL	Rate of annual increase of consumer price index	Percentage	Inverse
CBR	Mean annual rate at which CBK lends to commercial banks	Percentage	Inverse
MSSP	Broad money in the economy, also known as M3[1]	Kshs[2]	Direct
GDP	Annual Gross Domestic Product in constant prices	Kshs	Direct

[1] They are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.

[2] All the variables measured in absolute terms (Kshs) have been converted into natural logs before the estimation of the model

NPL	Annual non-performing loans registered by financial institutions	Kshs	Inverse
LIQD	Cash held by a bank as a proportion of deposits in the bank (annual average)	Ratio	Inverse
CDEP	Average annual customer deposits held by a bank	Kshs	Direct
CAPN	Average annual amount of a bank's core capital	Kshs	Direct

4.2 Descriptive Statistics

This section provides the basic features of the data in this study. It provides simple summaries about the sample and the measures.

Table 2: Summary Statistics of the Study Variables

Variable	**Observations**	**Mean**	**Std Dev**	**Min**	**Max**
Mortgage Amount	135	2,951,906	5,116,732	7,469	27,400,000
Interest Rate	135	15.398	1.621957	13.78	18.51
Inflation Rate	135	12.2	5.379813	4.1	19.7
Central Bank Rate	135	9.6	3.57909	6.75	16.5
Money Supply	135	1,090,000,000	241,000,000	778,000,000	1,440,000,000
GDP	135	2,426,923	346,167.4	2,085,435	3,024,782
Non-Performing Loans	135	1,309,579	1,498,139	1,567	7,538,099

Liquidity Ratio	135	0.2083704	0 .1866044	0	0 .73
Customer Deposits	135	29,500,000	42,600,000	56,198	259,000,000
Bank Capitalizatio n	135	12,300,000	16,600,000	541,132	88,700,000

The average mean of annual mortgage loan lent out by the sampled banks was Kshs 2,951,906,000. The level of dispersion in the amounts of mortgages loaned is substantial at Kshs 5,116,732,000. This is evident in the fact that while the lowest annual mortgage lent out by the financial institutions was Kshs 7,469,000, the largest was Kshs 27,400,000,000. This dispersion shows the differences in the capacity of the sampled financial institutions in offering mortgage loans as well as the growth of the mortgage industry during the study period. The mean commercial bank's lending rate is 15.4 per cent over the study period. The variability of the rates over the study period has been small at 1.6 per cent.

The summary statistics of the moderating variables in the model such as the rate of inflation, money supply, the economic activity, non-performing loans, liquidity ratio, customer deposits and bank capitalization were also provided. The common thread in all the observations is that financial institutions differ significantly in size, subsequently differing in the way flexible interest rates influence the amounts of mortgage loans advanced by financial institutions. Additionally, during the study period, significant changes occurred in the variables, presenting another dimension into the variability of the variables.

Thus, there is significant variability of the study variables across banks and time period of the study; which needs to be considered in the choice of the model estimation technique.

4.3 Diagnostic Tests for the Estimation Model

A clear advantage of panel data is that provide information and insights unattainable in time-series or cross-sectional data. Lee (2006) contends that panel data 'have the ability to control unobservable individual specific or time-specific effects which could be correlated with observed explanatory variables, thus ensuring consistent estimation for parameters of interest'. However, the consistency of parameter estimators and the validity of their economic interpretations as marginal effects crucially depend on the correct functional form specification of the linear panel data model. Other conditions worthy testing included endogeneity, heteroskedasticity, autocorrelation and unit root tests. These tests were duly carried out. The results are presented in appendices.

Interest rates were found to be highly correlated with the central bank lending rate and thus the latter was removed from the final estimation model. To ensure the correct specification, the estimation model was converted into log-log form. In the log-log model, the slope coefficients measure the elasticity of mortgage output with respect to various determinants (the independent variables) (Gujarati & Porter, 2009). In effect, the betas indicate the percentage change in mortgage output for a given (small) percentage change in the interest rates, inflation rates, economic growth and other variables. The size of the financial institution was factored into the estimation model given that the financial institutions are not homogeneous entities. Banks differ in size and the annual mortgage loans issued by banks as well as effects on interest rates were depended on the bank size. Thus, a threshold of mean mortgage output over the study period of Kshs. 100,000,000 was adopted to distinguish between small and big banks.

Converting equation 4 into a log-log format gives equation 5, representing the study variables converted into their natural logs.

$$LnMO_{it} = \beta_0 + \beta_1 LnTR_{it} + \beta_2 LnFL_{it} + \beta_3 LnCBR_{it} + \beta_4 LnMS_{it} + \beta_5 LnGDP_{it} + \beta_6 LnNPL_{it} + \beta_7 LnLQ_{it} + \beta_8 LnCD_{it} + \beta_9 LnCP_{it} + \mu_{it} \quad [5]$$

After correcting for various challenges found during the diagnostic tests, the model was further estimated using Stata® statistical program, keeping in mind to correct for further bias in the final results.

4.4 Model Estimation Results and Discussion

Table 3 provides the results of the study model estimated taking into account the panel data nature and corrected for the estimation challenges occasioned by panel data.

Table 3: Mortgage Financing Estimation Function

Variable	**Coefficient**
Constant	-29.56372*** (2.944529)
Interest Rate	-1.281285*** (0.1700117)
Inflation Rate	-0.0435118*** (0.0144797)
Central Bank Rate	Removed from estimation[3]
Money Supply	0 .0266093*** (0.0085427)
GDP	1.642774*** (0.1621114)
Non-Performing Loans	-0.1205938* (0.0662078)
Liquidity Ratio	-0.3623605*** (0.0759091)
Customer Deposits	0.022077 (0.0354641)

[3] The Central Bank Rate variable was dropped from the estimation model because it was found to be serially correlated with the interest rate. This is expected in Kenya where the Central Bank Rate determines the base lending rates by commercial banks in the country.

Bank Capitalization	0.2758681*** (0.0879716)
Dummy for FI Size	2.796256*** (0.0949945)
Dependent Variable	Natural log of annual mortgage loans by FI
R squared	0.6438
Sample size	Observations: 135, Number of Series: 12
The standard errors are in brackets. *, ** & *** indicates level of statistical significance at 10%, 5% and 1% respectively	

Apart from the coefficient of the customer deposits variable, all the coefficients of the other variables are statistically significant at 10 per cent level of confidence. An R squared of 0.6 indicates that most of the variations in the change of mortgage output among the financial institutions in Kenya can be explained by the factors in the study model. The adoption of the panel data increased the sample of observations to 1620.

4.5 Summary and Interpretation of Findings

Flexible Interest Rates on the Growth of Mortgage Financing

There is a strong negative relationship between interest rates and mortgage financing among the financial institutions in Kenya. Specifically, a percentage change in the weighted average lending rates among Kenya's financial institutions reduces the annual mortgage output by 1.3 per cent. These finding are consistent with the experience in relationship of interest rates and mortgage uptake in America as was established by Stiglitz (2010), who found a matched percentage changes in the long term interest rates and mortgage financing. McDonald & Thornton (2009) additionally found that, consistent with this study finding that interest rates fluctuations showed significant fluctuations in the subprime mortgage market in the European Union Countries.

These study findings have added value to the existing body of literature in the country by going further to statistically show the transmission mechanism in the financial markets, in relation to mortgage industry. Other studies, such as Parliament Budget Office of Kenya (2012), Bett (2011) and World Bank (2011) only show general effects of how interest rates influence other variables in the financial transmission mechanism without giving the specifics.

The other variables introduced to moderate the study model produced the *a priori* expectations in relation to mortgage financing. In order to effectively estimate the effect of interest rates on mortgage financing, inclusion of moderating variables was necessary.

Inflation Rates

The results show that inflation has negative relationship with mortgage output. All other factors held constant, a percentage increase in inflation rate reduces mortgage output by 0.04 per cent. This relationship is relatively weak. Inflation has likely effect of reducing the purchasing power of would be home-owners as well as increasing the price of housing materials, effectively reducing the number of mortgage-able property in the market at given time.

Money Supply

Results in this study indicate that increasing the supply of money in the economy increases the mortgage output by 0.03 per cent, holding other factors constant. The broad money includes the bank deposits and also indicates increased interaction of the banking sector with the money-holding sector, consisting of households, nonfinancial corporations and the general government sector. This indicates that the credit sector is growing. In this case, mortgage uptake increases with increase in the broad money supply, indicating that money supply has a positive effect on the mortgage financing. These findings are consistent with those by the European Central Bank, which found that loans grew in the same direction as money supply (European Central Bank, 2011).

Growth Domestic Product

The economic strength of an economy has significant effects on the level of credit being lent out as mortgage. In this study, it was found out that GDP has positive and strong relationship with the mortgage output, all other things held constant. According to this study, a percentage increase the economy's GDP increases mortgage output by 1.6 per cent, all other factors held constant. These findings are consistent with those supporting the fact that economic activity lays the framework for credit growth (Romer, 1992).

Non-Performing Loans

Technically, non-performing loans represent operational losses for the financial institutions. They thus impact negatively on the total output of a financial institution. A percentage increase in non-performing loans reduced mortgage output by 0.12 per cent, all other factors held constant. Evidence from the developed economy indicates that non-performing loans can potentially cause credit contraction (Caballero, Hoshi, & Kashyap, 2008).

Liquidity Ratio

Central banks impose conditions for credit supply through restrictions such as liquidity ratios, which require financial institutions to maintain a certain threshold of customer deposits and the money available for loans. Accordingly, stricter credit conditions limit the amount of mortgage loans financial institutions can make available to the customers. These study findings indicate that a percentage tightening of credit supply reduces the amount of mortgage output by 0.36 per cent holding all other factors constant. The relationship of liquidity ratio and mortgage financing is thus negative, but the relationship is relatively weak. These findings are consistent with those by the study by the Bank for International Settlements (2010) which found that higher liquidity ratios reduced the loans issued out, including mortgages.

Bank Capitalization

This variable indicates the core capital held by financial institutions, as indicated by shareholder equity and other sources of equity. Theoretically, a strong capital base in terms of core capital provides the liquidity for lending and thus, holding other factors constant, increases the mortgage output. This study results indicate a weak but positive relationship between bank capitalization and mortgage financing. Specifically, a percentage increase in bank capitalization increases mortgage financing by 0.28 per cent, all other factors held constant. These findings are consistent with the findings by African Development Bank (2009) which found that increased bank capitalizations increased the amount of loans available for firms and households.

The Size of Financial Institution

Introducing the dummy to cater for the size of financial institution in the model was appropriately supported by the fact the coefficient was not only statistically, but showed that larger banks were more likely to register higher mortgage output as compared to smaller banks all other factors constant. Specifically, bigger bank were likely to register higher mortgage output by 2.8 per cent. There is a positive and very strong relationship between bank size and the amount of loans granted, including mortgages.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This section concludes the study by highlighting the significance of the research and presenting the main argument fronted. Specific recommendations are also made in line with the objectives of the study. Finally, the limitations of the paper are given and areas of further research suggested.

5.1 Summary

Financial institutions play the important role in the economy of offering credit, which include mortgages. Mortgages enable households and firms to acquire real property without paying the entire value of the purchase up front. Interest rates define the cost of credit in an economy. Interest rates are basically determined by the money supply, the rate of inflation, the time period of credit, and the central bank's monetary policy.

High interest rates have the negative effect of increasing the cost of borrowing and consequently limiting the level of aggregate investment and consumption and the overall economic growth in the country. Promoting mortgage financing in Kenya is necessary for availing means for housing provision, especially given that the country is facing acute housing. The relationship between flexible interest rates and the level of mortgage uptake in Kenya has never been investigated. This study sought to contribute to the knowledge in this field by investigating this relationship in the Kenyan context. Findings of this study will provide important insights towards achieving the macroeconomic targets of Kenya Vision 2030.

Using a sample of 27 financial institutions comprising of 26 commercial banks and Housing Finance Company of Kenya, the study found out a strong negative relationship between interest rates and mortgage financing among the financial institutions in Kenya. Specifically, a percentage change in the weighted average lending rates among Kenya's financial institutions reduces the annual mortgage output by 1.3 per cent.

5.2 Conclusion

Loans represent an important source of revenue for the financial institutions such as banks and mortgage lending institutions. By offering mortgages, financial institutions intermediate by making households acquire homes through credit. The rate of interest on the principal loaned out is the price of credit in an economy. It is thus relevant that the relationship between the cost of credit, denoted by interest rates, and the amount of credit output, denoted by the mortgage financing is explored.

The connection between the rate of interest, especially when it is variable and the total mortgage financing as an input for financial institutions' production function is not well understood in the Kenyan context. Yet, the provision of mortgage is necessary for availing means for housing provision, especially at a time when the right to adequate and decent housing has been enshrined in the Constitution of Kenya. Additionally, interest rates affect the key sectors of the economy in terms of production and consumption through transmission mechanism of inflation, exchange rates amongst other monetary variables. Kenya has been experiencing fluctuations in overall market interest rates consequently affecting key production and consumption decisions in the economy.

This study hypothesized that variable interest rates had a significant effect on mortgage output among financial institutions in Kenya. The main objective was to establish whether this relationship existed as well as explore the nature of the relationship. Applying data on the adopted study model, we obtained results that were consistent with the *a priori* expectations. It was found that interest rates had significant negative effect on the mortgage output of the sampled financial institutions. Based on these results, inferences on the whole population of financial institutions in the country could be made.

Other moderating factors were also included in the study to ensure that the model was correctly specified and even to limit the stochastic errors inherent in such studies, especially studies with time element in them.

5.3: Study Recommendations

The twin issues of interest rates and mortgages are relevant to Kenyans because they affect core production and consumption decisions. The level of mortgage financing by financial institutions in Kenya is inversely related to the existing level of interest rates. Increase in interest rates decreases mortgage financing. Therefore, ensuring that financial institutions intermediate in the financial market by making mortgage financing available for housing provision among Kenyans, relevant government authorities should ensure that the monetary policy in the country achieves the goal of predictable interest rates that are consistent with greater mortgage financing.

Since financial institutions make profit by advancing loans to consumers, these study results should prompt them to reconsider adjusting their interest rates at every slight change in the central bank lending rate as this affects their loan portfolios and subsequently their productivity. This study therefore recommends to the financial institutions to promote fixed interest mortgage financing as it ensures stability of the revenue flows.

Finally, the moderating variables in the model cause for the recommendation that the success of mortgage financing in the country is interlinked to many factors such as inflation rate, money supply in the economy, the GDP, non performing loans, liquidity ratio, customer deposit and bank capitalization that need to be considered together as opposed to the current norm where mortgage financing is separately tied to different determinants. While the focus and scope of this study was to establish the relationship of interest rates and mortgage financing, it is imperative to note that the macroeconomic environment in which interest rates operate in the country is closely interlinked with other variables captured in this study as moderating variables. Thus, in order to achieve the Kenya Vision 2030, Millennium Development Goals and the Constitution of Kenya 2010 targets on housing, the right macroeconomic environment needs to be favourable targeting other factors such as inflation, reducing non-performing loans and achieving optimal credit controls.

5.4 Limitations of the Study and Areas for Further Research

Being a pioneering study in the area of interest rates and mortgage financing, the study did not benefit from the relevant literature in the local context on the subject, which therefore limits insights brought by synthesizing the existing local knowledge.

Inadequate technical, time and data capabilities limited the study analysis only to year and bank panels. This could have been extended to cover more observations.

However, the study could have been more insightful if the analysis could have disaggregated the mortgage loans per different income classes and also disaggregate the time variable into quarters or even monthly basis, since interest rates fluctuate even monthly.

This study was also limited that it only covered directly the effect of interest rates on the mortgages. It would have been better and provide the transmission mechanisms of interest rates into the real economy instead of a direct relationship.

5.5: Suggestions for Further Study

It is suggested in this study that the transmission mechanism of interest rates be factored in future studies to indicate the sequential effects of interest rates into the real economy. This would bring better results.

Additionally, a study that incorporates many data points would add value as it would increase the degrees of freedom in the analysis. This area is also suggested for further study.

The use of disaggregated analysis is suggested as the next frontier for research and analysis in this subject matter. It would be interesting to analyze a similar study but disaggregated for regions as well as bank specification.

Finally, a study that incorporates the spatial locations of banks and the geographical locations of the banks would provide the spatial element in the movement of mortgages in the country. This would be guided by the use of geographical information systems.

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APPENDICES

Appendix I: List of Commercial Banks in Kenya

1. African Banking Corporation Ltd.
2. Bank of Africa Kenya Ltd.
3. Bank of Baroda (K) Ltd.
4. Bank of India
5. Barclays Bank of Kenya Ltd.
6. CFC Stanbic Bank Ltd.
7. Charterhouse Bank Ltd - under - statutory management
8. Chase Bank (K) Ltd.
9. Citibank N.A Kenya
10. Commercial Bank of Africa Ltd.
11. Consolidated Bank of Kenya Ltd.
12. Co-operative Bank of Kenya Ltd
13. Credit Bank Ltd.
14. Development Bank of Kenya Ltd.
15. Diamond Trust Bank (K) Ltd.
16. Dubai Bank Kenya Ltd.
17. Ecobank Kenya Ltd
18. Equatorial Commercial Bank Ltd.
19. Equity Bank Ltd.
20. Family Bank Ltd
21. Fidelity Commercial Bank Ltd
22. Fina Bank Ltd
23. First community Bank Limited
24. Giro Commercial Bank Ltd.
25. Guardian Bank Ltd
26. Gulf African Bank Limited
27. Habib Bank A.G Zurich
28. Habib Bank Ltd.

29. Imperial Bank Ltd
30. I & M Bank Ltd
31. Jamii Bora Bank Ltd
32. Kenya Commercial Bank Ltd
33. K-Rep Bank Ltd
34. Middle East Bank (K) Ltd
35. National Bank of Kenya Ltd
36. NIC Bank Ltd
37. Oriental Commercial Bank Ltd
38. Paramount Universal Bank Ltd
39. Prime Bank Ltd
40. Standard Chartered Bank (K) Ltd
41. Trans-National Bank Ltd
42. UBA
43. Victoria Commercial Bank

Appendix 2: Data Set Used in the Study

BANK	Year	Mort(Ksh'000)	Intr(%)	Infl(%)	CBR(%)	MSSP(Ksh'000)	GDP(Ksh'M)	NPL(Ksh'000)	LQD(Ratio)	CDEP(Ksh'000)	CAPN(Ksh'000)	Size
BOA	2007	52842	13.78	10.50	8.75	777596000	2085435000	276909	0.008	5522637	5975493	0
BOA	2008	78898	14.87	16.20	9.00	901055000	2107589400	453600	0.003	13820055	21609367	0
BOA	2009	67025	14.85	10.50	7.00	1045657000	2366984200	543986	0.003	18796143	26878484	0
BOA	2010	254937	14.98	4.10	6.75	1271638000	2549825100	257806	0.004	19784311	35611760	0
BOA	2011	304512	18.51	19.70	16.50	1436877000	3024782200	379332	0.006	23986396	45574152	0
BBK	2007	6136000	13.78	10.50	8.75	777596000	2085435000	3232000	0.383	109097000	17564000	1
BBK	2008	6106000	14.87	16.20	9.00	901055000	2107589400	5872000	0.309	126408000	20463000	1
BBK	2009	4017000	14.85	10.50	7.00	1045657000	2366984200	5625000	0.227	125869000	24210000	1
BBK	2010	3196000	14.98	4.10	6.75	1271638000	2549825100	3783000	0.176	123826000	31465000	1
BBK	2011	3228000	18.51	19.70	16.50	1436877000	3024782200	3376000	0.246	124207000	29223000	1
EQT	2007	992000	13.78	10.50	8.75	777596000	2085435000	830000	0.120	31536000	14917000	1
EQT	2008	564000	14.87	16.20	9.00	901055000	2107589400	1648000	0.119	50334000	19580000	1
EQT	2009	2871000	14.85	10.50	7.00	1045657000	2366984200	4136000	0.142	69843000	22908000	1
EQT	2010	3946000	14.98	4.10	6.75	1271638000	2549825100	2859000	0.186	104431000	27204000	1
EQT	2011	5189000	18.51	19.70	16.50	1436877000	3024782200	2696000	0.034	144165000	34206000	1
COBK	2007	179584	13.78	10.50	8.75	777596000	2085435000	623105	0.227	2850629	747924	0
COBK	2008	549432	14.87	16.20	9.00	901055000	2107589400	694551	0.184	3278716	845692	0
COBK	2009	879008	14.85	10.50	7.00	1045657000	2366984200	591180	0.473	4881920	739960	0
COBK	2010	1551447	14.98	4.10	6.75	1271638000	2549825100	732918	0.375	8008438	896334	0
COBK	2011	2764441	18.51	19.70	16.50	1436877000	3024782200	813248	0.526	12010250	1189762	0
COOP	2007	2831570	13.78	10.50	8.75	777596000	2085435000	5843244	0.543	56198	6422705	1
COOP	2008	1248226	14.87	16.20	9.00	901055000	2107589400	7538099	0.244	67159	13549029	1
COOP	2009	1065305	14.85	10.50	7.00	1045657000	2366984200	4172700	0.251	92529	15318919	1

COOP	2010	2288889	14.98	4.10	6.75	1271638000	2549825100	3040113	0.287	129226	18401503	1
COOP	2011	9408119	18.51	19.70	16.50	1436877000	3024782200	3141384	0.329	144514	22621692	1
DTB	2007	5714957	13.78	10.50	8.75	777596000	2085435000	67639	0.067	29347307	26507930	1
DTB	2008	7617102	14.87	16.20	9.00	901055000	2107589400	136996	0.079	45853320	39079660	1
DTB	2009	7225655	14.85	10.50	7.00	1045657000	2366984200	165191	0.218	54885695	17984765	1
DTB	2010	9524929	14.98	4.10	6.75	1271638000	2549825100	150812	0.638	68604930	10259679	1
DTB	2011	15909316	18.51	19.70	16.50	1436877000	3024782200	179637	0.676	71297721	13248819	1
FBK	2007	607890	13.78	10.50	8.75	777596000	2085435000	409875	0.160	5965098	2008765	0
FBK	2008	747656	14.87	16.20	9.00	901055000	2107589400	467876	0.154	7404069	2243576	0
FBK	2009	890987	14.85	10.50	7.00	1045657000	2366984200	493516	0.192	10490293	2596085	0
FBK	2010	957580	14.98	4.10	6.75	1271638000	2549825100	302982	0.232	5240954	2986909	0
FBK	2011	1165843	18.51	19.70	16.50	1436877000	3024782200	733191	0.223	5712680	3259733	0
IMB	2007	15876	13.78	10.50	8.75	777596000	2085435000	418889	0.067	23625870	3758163	0
IMB	2008	16749	14.87	16.20	9.00	901055000	2107589400	1930125	0.055	28354657	4532774	0
IMB	2009	18007	14.85	10.50	7.00	1045657000	2366984200	1008659	0.074	37810794	6804381	0
IMB	2010	22854	14.98	4.10	6.75	1271638000	2549825100	1184405	0.056	45994961	8924256	0
IMB	2011	26791	18.51	19.70	16.50	1436877000	3024782200	1004454	0.062	85212904	11244472	0
KCB	2007	6264323	13.78	10.50	8.75	777596000	2085435000	718553	0.567	94400000	10045714	1
KCB	2008	17466635	14.87	16.20	9.00	901055000	2107589400	2672734	0.387	126700000	16186804	1
KCB	2009	20782526	14.85	10.50	7.00	1045657000	2366984200	6450068	0.375	162500000	17759927	1
KCB	2010	21107514	14.98	4.10	6.75	1271638000	2549825100	5996000	0.244	196974651	35280236	1
KCB	2011	27444090	18.51	19.70	16.50	1436877000	3024782200	5762000	0.332	259308849	39920045	1
NBK	2007	19127	13.78	10.50	8.75	777596000	2085435000	5466614	0.054	34721680	4615073	0
NBK	2008	10924	14.87	16.20	9.00	901055000	2107589400	2434520	0.043	34277654	5866836	0
NBK	2009	16211	14.85	10.50	7.00	1045657000	2366984200	1301757	0.047	41995446	7395712	0

NBK	2010	10302	14.98	4.10	6.75	1271638000	2549825100	1323904	0.045	46380597	7803883	0
NBK	2011	15607	18.51	19.70	16.50	1436877000	3024782200	1124938	0.057	50203718	8748201	0
BBAK	2007	75402	13.78	10.50	8.75	777596000	2085435000	690870	0.119	12980765	2097098	0
BBAK	2008	89377	14.87	16.20	9.00	901055000	2107589400	508007	0.139	15164904	1795051	0
BBAK	2009	90644	14.85	10.50	7.00	1045657000	2366984200	1022049	0.161	18053588	2176085	0
BBAK	2010	134345	14.98	4.10	6.75	1271638000	2549825100	512940	0.144	25800279	3471829	0
BBAK	2011	148610	18.51	19.70	16.50	1436877000	3024782200	1004960	0.153	28906540	4897209	0
CFC	2007	5670987	13.78	10.50	8.75	777596000	2085435000	2450986	0.062	66439087	7895489	1
CFC	2008	6436984	14.87	16.20	9.00	901055000	2107589400	2966000	0.076	73071678	7638435	1
CFC	2009	6787179	14.85	10.50	7.00	1045657000	2366984200	1580000	0.034	82534005	10539443	1
CFC	2010	7295747	14.98	4.10	6.75	1271638000	2549825100	1742050	0.005	10679889	85694598	1
CFC	2011	8881421	18.51	19.70	16.50	1436877000	3024782200	861523	0.012	2582019	74007134	1
CHB	2007	1809458	13.78	10.50	8.75	777596000	2085435000	276098	0.196	12908540	1980760	1
CHB	2008	2095406	14.87	16.20	9.00	901055000	2107589400	380876	0.330	11054987	1140957	1
CHB	2009	2170965	14.85	10.50	7.00	1045657000	2366984200	246255	0.311	10116828	1241159	1
CHB	2010	2212419	14.98	4.10	6.75	1271638000	2549825100	420048	0.433	16880006	1699566	1
CHB	2011	2746956	18.51	19.70	16.50	1436877000	3024782200	600543	0.111	24923911	3003052	1
CBA	2007	1766401	13.78	10.50	8.75	777596000	2085435000	74703	0.009	36101131	43327966	1
CBA	2008	1929547	14.87	16.20	9.00	901055000	2107589400	272119	0.013	48245739	32386263	1
CBA	2009	4076305	14.85	10.50	7.00	1045657000	2366984200	263290	0.011	57492717	40604597	1
CBA	2010	4915402	14.98	4.10	6.75	1271638000	2549825100	798777	0.012	65355881	75715280	1
CBA	2011	5973966	18.51	19.70	16.50	1436877000	3024782200	675098	0.005	68906543	88650987	1
CRBA	2007	163033	13.78	10.50	8.75	777596000	2085435000	335738	0.462	2656919	541132	0
CRBA	2008	197482	14.87	16.20	9.00	901055000	2107589400	341700	0.375	2773917	666180	0
CRBA	2009	224708	14.85	10.50	7.00	1045657000	2366984200	450980	0.584	2980654	856400	0

CRBA	2010	245107	14.98	4.10	6.75	1271638000	2549825100	500894	0.545	3258488	917775	0
CRBA	2011	392280	18.51	19.70	16.50	1436877000	3024782200	440337	0.726	3937417	964848	0
DBK	2007	247504	13.78	10.50	8.75	777596000	2085435000	194438	0.225	1591237	1108865	0
DBK	2008	375285	14.87	16.20	9.00	901055000	2107589400	407191	0.203	2200329	1228833	0
DBK	2009	563466	14.85	10.50	7.00	1045657000	2366984200	607659	0.369	3456097	1354289	0
DBK	2010	685926	14.98	4.10	6.75	1271638000	2549825100	785223	0.344	4094744	1453669	0
DBK	2011	802965	18.51	19.70	16.50	1436877000	3024782200	1145246	0.448	4158736	1561742	0
DUBA	2007	7469	13.78	10.50	8.75	777596000	2085435000	757040	0.250	999697	998698	0
DUBA	2008	11400	14.87	16.20	9.00	901055000	2107589400	876003	0.179	1278698	1395405	0
DUBA	2009	17996	14.85	10.50	7.00	1045657000	2366984200	967530	0.290	1458098	1723860	0
DUBA	2010	23602	14.98	4.10	6.75	1271638000	2549825100	1609774	0.345	1709876	2174989	0
DUBA	2011	31301	18.51	19.70	16.50	1436877000	3024782200	1876506	0.191	2890763	3933011	0
ECO	2007	1659251	13.78	10.50	8.75	777596000	2085435000	675309	0.226	7980980	1678549	1
ECO	2008	1135979	14.87	16.20	9.00	901055000	2107589400	708432	0.225	8341460	1742846	1
ECO	2009	894467	14.85	10.50	7.00	1045657000	2366984200	1311411	0.212	10818797	2148134	1
ECO	2010	1241272	14.98	4.10	6.75	1271638000	2549825100	1465480	0.123	16493841	4774656	1
ECO	2011	2140959	18.51	19.70	16.50	1436877000	3024782200	779752	0.231	16566403	3461079	1
ECBK	2007	267453	13.78	10.50	8.75	777596000	2085435000	890876	0.316	4689908	949887	0
ECBK	2008	305674	14.87	16.20	9.00	901055000	2107589400	900876	0.225	4906384	999800	0
ECBK	2009	346393	14.85	10.50	7.00	1045657000	2366984200	993590	0.181	4307696	1056730	0
ECBK	2010	422734	14.98	4.10	6.75	1271638000	2549825100	1198108	0.356	8036584	1025853	0
ECBK	2011	1016261	18.51	19.70	16.50	1436877000	3024782200	589038	0.055	9833985	1152015	0
FCBK	2007	127286	13.78	10.50	8.75	777596000	2085435000	203377	0.017	3298929	14876563	0
FCBK	2008	279487	14.87	16.20	9.00	901055000	2107589400	163072	0.012	5220177	29878292	0
FCBK	2009	389330	14.85	10.50	7.00	1045657000	2366984200	156449	0.021	4877242	16651326	0

FCBK	2010	568914	14.98	4.10	6.75	1271638000	2549825100	466831	0.022	7188890	22243490	0
FCBK	2011	782856	18.51	19.70	16.50	1436877000	3024782200	444831	0.022	8535525	23130872	0
FINA	2007	220987	13.78	10.50	8.75	777596000	2085435000	1265879	0.657	2008768	879760	0
FINA	2008	248180	14.87	16.20	9.00	901055000	2107589400	1332466	0.675	2246872	976117	0
FINA	2009	290564	14.85	10.50	7.00	1045657000	2366984200	1774216	0.696	3267793	992660	0
FINA	2010	298837	14.98	4.10	6.75	1271638000	2549825100	1619268	0.626	11590423	1336123	0
FINA	2011	778707	18.51	19.70	16.50	1436877000	3024782200	918345	0.619	12395095	1535533	0
IMP	2007	576987	13.78	10.50	8.75	777596000	2085435000	573773	0.346	9749898	1448668	0
IMP	2008	236790	14.87	16.20	9.00	901055000	2107589400	560674	0.297	11211236	1724662	0
IMP	2009	694710	14.85	10.50	7.00	1045657000	2366984200	663508	0.240	12862282	2041610	0
IMP	2010	1405964	14.98	4.10	6.75	1271638000	2549825100	776665	0.288	15839364	2262390	0
IMP	2011	2269846	18.51	19.70	16.50	1436877000	3024782200	829205	0.307	22963403	2999907	0
KREP	2007	387310	13.78	10.50	8.75	777596000	2085435000	1110065	0.018	3657453	18976500	0
KREP	2008	478816	14.87	16.20	9.00	901055000	2107589400	903670	0.014	3987087	25876940	0
KREP	2009	592170	14.85	10.50	7.00	1045657000	2366984200	951366	0.021	4768965	24387690	0
KREP	2010	668118	14.98	4.10	6.75	1271638000	2549825100	1236539	0.044	5454468	11414020	0
KREP	2011	918945	18.51	19.70	16.50	1436877000	3024782200	900874	0.053	6446016	13150430	0
MEBK	2007	22765	13.78	10.50	8.75	777596000	2085435000	1567	0.022	1786908	1077744	0
MEBK	2008	28796	14.87	16.20	9.00	901055000	2107589400	4576	0.023	1879765	1062402	0
MEBK	2009	30986	14.85	10.50	7.00	1045657000	2366984200	6750	0.025	2098764	1045067	0
MEBK	2010	34390	14.98	4.10	6.75	1271638000	2549825100	1750	0.026	2527249	1005964	0
MEBK	2011	50486	18.51	19.70	16.50	1436877000	3024782200	15757	0.037	2702760	1079887	0
NIC	2007	2218700	13.78	10.50	8.75	777596000	2085435000	967724	0.335	24805595	4286647	1
NIC	2008	3268893	14.87	16.20	9.00	901055000	2107589400	1031988	0.217	35238381	7783917	1
NIC	2009	3843675	14.85	10.50	7.00	1045657000	2366984200	1548270	0.264	39514275	7783917	1

NIC	2010	5184097	14.98	4.10	6.75	1271638000	2549825100	1570797	0.306	48492224	7783917	1
NIC	2011	7704030	18.51	19.70	16.50	1436877000	3024782200	1961277	0.388	66293053	10209174	1
VCBK	2007	238578	13.78	10.50	8.75	777596000	2085435000	7524	0.020	3429797	675987	0
VCBK	2008	303177	14.87	16.20	9.00	901055000	2107589400	10191	0.010	3581692	773741	0
VCBK	2009	375262	14.85	10.50	7.00	1045657000	2366984200	13740	0.012	4073233	924210	0
VCBK	2010	606736	14.98	4.10	6.75	1271638000	2549825100	14107	0.010	5876956	1102929	0
VCBK	2011	787292	18.51	19.70	16.50	1436877000	3024782200	12546	0.007	6785405	1345764	0
HFCK	2007	8963498	13.78	10.50	8.75	777596000	2085435000	2593354	0.088	8776826	10369255	1
HFCK	2008	11313477	14.87	16.20	9.00	901055000	2107589400	2096801	0.214	10063830	14294368	1
HFCK	2009	14495208	14.85	10.50	7.00	1045657000	2366984200	1815135	0.342	12219449	18654987	1
HFCK	2010	19503400	14.98	4.10	6.75	1271638000	2549825100	1467815	0.108	15943341	29325842	1
HFCK	2011	25222836	18.51	19.70	16.50	1436877000	3024782200	1579576	0.185	18674421	31972113	1

KEY:

BOA-Bank of America BBK-Barclays Bank EQT- Equity Bank of Kenya COB -Consolidated Bank CHB-Chase Bank

COOP-Cooperative Bank DTB-Diamond Trust Bank FBK-Family Bank of Kenya KCB-Kenya Commercial Bank CBA-Commercial Bank of Africa

IMB-I & M Bank NBK-National Bank BBAK-Bank of Baroda Kenya CFC-CFC Stanbic Bank DBK-Development Bank of Kenya

NIC-NIC Bank ECO-Eco Bank DUBA--Dubai Bank of Kenya CRBA-Credit Bank of Africa ECBK-Equatorial Commercial Bank

FINA-Fina Bank KREP-KREP Bank IMP-Imperial Bank MEBK-Middle East Bank of Kenya FCBK-Fidelity Commercial Bank

HFCK – Housing Finance Company of Kenya VCBK- Victoria Commercial Bank

Appendix 3: Model Estimation Results