

**EFFECTS OF MORTGAGE PRICING VOLATILITY
ON REAL ESTATE RETURNS TO MORTGAGE
FIRMS IN KENYA**

BY:

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**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF
DEGREE OF MASTER OF SCIENCE IN FINANCE, SCHOOL OF
BUSINESS, UNIVERSITY OF NAIROBI**

OCTOBER 2014

DECLARATION

This research project is my original work and has not been submitted for the award of a degree in any university.

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This research project has been submitted for examination purposes with my approval as the University Supervisor.

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DEDICATION

I dedicate this research work to my wife Phylis and my daughter Shanel for their never ending support as well as to my father Casmil and my mother Modester for their moral support.

ACKNOWLEDGEMENTS

I hereby express my sincere thanks to Dr. Josiah Aduda for his valuable and constructive guidance during the entire development of this research work. His willingness to create time out of his very busy schedule is highly appreciated. I am also very appreciative to Mr. Mirie Mwangi for his valuable assistance as a very competent, passionate and devoted moderator.

I would like to acknowledge the role played by the department of Accounting and Finance as well as all my lecturers in the Msc. Finance degree program not forgetting the help from all my workmates at KCB Savings and Loans especially Mr. Titus Muchai for creating flexibility in the busy work environment which granted me conducive atmosphere to complete my coursework as well as the project. Finally but not least, I wish to thank my family and friends for their support and encouragement throughout my study. God bless.

ABSTRACT

Financing is a very important component of investing in real estate. In general, when investors desire to obtain financing, they usually pledge, or hypothecate, their ownership of real estate as a condition for obtaining loans. In Kenya, it is estimated that 234,000 new housing units are required every year yet only 20,000-30,000 units per year are currently being produced and a mere 20% of these are affordable to low and moderate income families. The mortgage market in Kenya has increased from 7,600 in 2006 to over 20,000 homes in 2013 but hikes in interest rates has slowed down mortgage uptake. The prevailing high interest rates as a result of a stringent monetary policy being pursued by CBK as an effort to fight high inflation has dampened the mortgage market further. The population of the study comprised all the forty-four commercial banks and one mortgage finance company registered with the central bank. The study used secondary data collected from the Central Bank of Kenya, Kenya National Bureau of Statistics and Banks published financial statements starting 2009 – 2013. The data obtained was analyzed using multiple linear regression technique. The study established that there existed a positive relationship between mortgage pricing volatility and real estate returns. Interest rates volatility affects a bank's underlying economic value. The value of a bank's assets, liabilities is affected by a change in rates because the present value of future cash flows. Generally the interest rate risk is the exposure of a bank's financial condition to adverse movements in interest rates. Accepting this risk is a normal part of banking and can be an important source of profitability and shareholders' value creation. However excessive interest rate risk can pose a significant threat to a bank's earnings and capital base. The study recommends that commercial banks in Kenya should assess their clients and charge interest rates accordingly, as ineffective interest rate policy can increase the level of interest rates and consequently Non-performing Mortgages. Mortgage firms should also apply rigorous policies on loan advances so as loans are awarded to those with ability to repay and mitigate moral hazards such as insider lending and information asymmetry.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF ABBREVIATIONS	viii
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background of the study	1
1.1.1 Mortgage Pricing Volatility	2
1.1.2 Real Estate Returns	4
1.1.3 Mortgage Pricing Volatility and Real Estate Returns	5
1.1.4 Mortgage Firms in Kenya	6
1.2 Research Problem	7
1.3 Research objectives.....	9
1.4 Value of the Study	10
CHAPTER TWO: LITERATURE REVIEW.....	11
2.1 Introduction.....	11
2.2 Review of Theoretical Literature	11
2.2.1 Loanable Funds Theory	11
2.2.2 Prospect Theory.....	13
2.2.3 Structural Inflation Theory	13
2.2.4 Classical Theory of Interest Rate	14
2.2.5 Efficient Markets Hypothesis	15
2.3 Review of Empirical Studies	16
2.3.1 Review of past studies on Real Estate Investment Markets	16
2.4 Conclusion from Literature Review.....	20
CHAPTER THREE: RESEARCH METHODOLOGY	21
3.1 Introduction.....	21
3.2 Research Design.....	21
3.3 Population of Study.....	21

3.4 Sampling Design.....	22
3.5 Data Collection Methods	23
3.6 Data Analysis Tools and Techniques.....	23
CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION	25
4.1 Introduction.....	25
4.2 Data Collection	25
4.3 Response Rate.....	25
4.4 Data Validity.....	26
4.5 Descriptive Analysis	26
4.5.1 Interest Rate Volatility and Real Estate.....	28
4.5.2 Correlation Analysis.....	29
4.6 Regression Analysis.....	30
4.6: Regression Analysis of the Variables	31
4.6.1 Regression equation	31
4.7 Summary and Interpretation of Findings	32
CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND	
RECOMMENDATIONS.....	36
5.1 Summary	36
5.2 Conclusions.....	37
5.3 Policy Recommendations.....	37
5.4 Limitations of the Study.....	38
5.5 Recommendations for Further Research.....	39
REFERENCES.....	41

LIST OF ABBREVIATIONS

ARM	Adjustable Rate Mortgage
CBK	Central Bank of Kenya
CBR	Central Bank Rate
CMA	Capital Markets Authority
CPI	Consumer price index
GDP	Gross Domestic Product
HFCK	Housing Finance Corporation of Kenya
KBRR	Kenya Banks 'Reference Rate
KCB	Kenya Commercial Bank
KNBS	Kenya National Bureau of Statistics
NSE	Nairobi Securities Exchange
RBA	Retirement Benefits Authority
RBI	Reserve Bank of India
REIT	Real Estate Investment Trust
RSA	Rate Sensitive Asset
RSL	Rate Sensitive Liability
S & L	Savings and loans
SACCO	Savings and Credit Co-operatives
SPSS	Statistical Package for Social Sciences

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Financing is a very important component of investing in real estate. In general, when investors desire to obtain financing, they usually pledge, or hypothecate, their ownership of real estate as a condition for obtaining loans. The mortgage interest is the price paid by borrowers to finance their real estate needs hence influences the consumer behavior in the real estate industry (Crowley, 2007).

In Kenya, it is estimated that 234,000 new housing units are required every year yet only 20,000-30,000 units per year are currently being produced and a mere 20% of these are affordable to low and moderate income families (Giddings 2007). Government has estimated a housing need of 190,000 dwellings per year in Kenya's urban areas though it is not clear what assumptions underlie this estimate (Ministry of Housing, 2011). Government further estimates that formal production by the public and private sectors is not more than 30,000 units per year and concludes that the annual deficit of more than 120,000 housing units is met by slum housing. In Nairobi, with a population of around 3 million people, nearly 60% of households live in slum areas. A recent survey of these settlements showed that 73% of households live below the poverty line (Giddings, 2007).

The mortgage market in Kenya has increased from 7,600 in 2006 to 20,000 homes in 2012 but hikes in interest rates has slowed down mortgage uptake. The prevailing high interest rates as a result of a stringent monetary policy being pursued by CBK as an effort

to fight high inflation has dampened the mortgage market further. The macroeconomic environment in 2011 and 2012 had a profound impact on mortgage lenders. As the central bank raised its rates to 18 percent, mortgage loans rose up to 25 percent in the first half of 2012, from an average of 14 percent the previous year. Interest rates on mortgages have been as high as 32%. This has resulted to interest payable on loans to amount to the initial principal sum advanced within a few years. For long-term borrowing as in the cases of real estate development this is not sustainable nor does it encourage borrowing (Ndungu, 2013).

The state has played a very minimal role in provision and stabilizing of housing financing notwithstanding the fact that housing is a basic human right. Following the liberalization of the banking sector in 1991, interest rates were only technically deregulated as the relevant Banking Law was not amended. This resulted to the lenders charging whatever they deemed adequate to meet their profit maximization goals. The mortgage industry in Kenya has seen the introduction of products such as the fixed rate mortgages that are available for 10-20 years. Further, the RBA in 2009 moved to allow pension contributors to use up to 60% of the contributions to secure a mortgage which is seen as a great innovation that can leverage assets worth more than 290 Billion and increase access for lower earning individual who have accumulated substantial pensions.

1.1.1 Mortgage Pricing Volatility

The Mortgage price is the interest charged by the mortgage firms on the money advanced to real estate investors. The interest rate that the lender charges is a percent of the total amount loaned (Kimberly Amadeo, 2012). An interest rate is the rate at which interest is paid by borrowers for the use of money that they borrow from a lender. Specifically, the

interest rate (I/m) is a percent of principal (P) paid a certain amount of times (m) per period (usually quoted per annum).The Kenya mortgage market offers Adjustable Rate Mortgages (ARMs) and since lending is the core business of MFIs their balance sheet mainly consists of Rate Sensitive Assets (RSAs) and Rate Sensitive Liabilities (RSLs).

The Monetary Policy Committee (MPC) of Central Bank of Kenya (CBK) sets the base lending rate for commercial banks and other Mortgage Financial institutions. The monetary policy is a tool used by CBK to control inflation. In July 2014 the MPC through a press statement and circular to all banks introduced the Kenya Banks' Reference Rate (KBRR) at 9.13 percent which remains in force till the next review in Jan 2015. Since October 2011 CBK has increased the Central Bank Rate (CBR) from 7% to 18% in an effort to tame runaway inflation and stabilize the weakening shilling. Consequently commercial banks have increased their lending rates from low figures of 11% to about 25%.

The periodic reviews of the base lending rate, CBR or KBRR exposes mortgage lenders to uncertainty of their real estate finance returns. Assessment of historical data reveals that the level of non-performing assets is highest when interest rates are at highest. Also it shows a drastic drop in new mortgage applications. Generally, high interest rates make the cost of credit too high for borrowers while Low interest rates are beneficial to borrowers as their returns are boosted. The mortgage monthly payment amounts are determined (in part) by the interest rate on the mortgage (which is volatile) sometimes goes high and beyond the repayment abilities of borrowers exposing MFIs to risk of default, and discourages uptake of new mortgages by lowering credit affordability among potential borrowers.

1.1.2 Real Estate Returns

Returns on real estate finance investment are defined in terms of the interest rate spread, size of the mortgage/loan book and the level of nonperforming mortgages/loans. The average commercial bank lending rates and deposit rates maintained an upward trend between December 2010 and December 2011. Commercial banks average lending rate increased from 13.87 percent in December 2010 to 20.04 percent in December 2011, with an annual average of 15.05 percent. Over the same period, the average interest rate paid by banks on deposits increased from a 3.59 percent in December 2010 to 6.99 percent in December 2011. Consequently, the interest rate spread widened to 13.06 percent in December 2011 from 10.28 percent in December 2010 reflecting the increase in the lending rate CBK, (2011).

Interest rates volatility affects a bank's underlying economic value. The value of a bank's assets, liabilities, and interest-rate-related, off-balance-sheet contracts is affected by a change in rates because the present value of future cash flows, and in some cases the cash flows themselves, is changed. A bank can alter its interest rate risk exposure by changing investment, lending, funding, and pricing strategies and by managing the maturities and re-pricings of these portfolios to achieve a desired risk profile. From an earnings perspective, a bank should consider the effect of interest rate risk on net income and net interest income in order to fully assess the contribution of noninterest income and operating expenses to the interest rate risk exposure of the bank (Machiraju .H.R, 2008)

Therefore, Real Estate returns assessment and economic value perspective focus on how future changes in interest rates may affect a bank's financial performance. When

evaluating the level of interest rate risk it is willing and able to assume, a bank should also consider the impact that past interest rates may have on future performance. In particular, instruments that are not marked to market may already contain embedded gains or losses due to past rate movements. These gains or losses may be reflected over time in the bank's earnings.

1.1.3 Mortgage Pricing Volatility and Real Estate Returns

Mortgage pricing volatility is the mortgage interest rate volatility and is a major risk in the Mortgage Finance Market in Kenya. Volatility of interest rates can have adverse Effects on a bank's earnings from Real Estate Financing. In the earnings perspective, the focus of analysis is the Impact of changes in interest rates on accrual or reported earnings. This is the traditional Approach to interest rate risk assessment taken by many banks. Variation in earnings is an important focal point for interest rate risk analysis because reduced earnings or outright Losses can threaten the financial stability of an institution by undermining its capital adequacy and by reducing market confidence. The component of earnings that has traditionally received the most attention is net interest income (i.e. the difference between total interest income and total Interest expense). This focus reflects both the importance of net interest income in banks' overall earnings and its direct and easily understood link to changes in interest rates (MachirajuR.H, 2008).

Generally the interest rate risk is the exposure of a bank's financial condition to adverse movements in interest rates. Accepting this risk is a normal part of banking and can be an important source of profitability and shareholders' value creation. However excessive interest rate risk can pose a significant threat to a bank's earnings and capital base.

Changing in interest rates affect a bank's earning by changing its net interest income and the level of other interest sensitivity income and operating expenses. Changes in interest rates also affect the underlying value of the bank's assets, liabilities and off-balance sheet instruments because the present value of future cash flows change when interest rate change. For instance when Interest rates charged on customers is increased, customers are financially stressed and as a result the bank experiences an increase in number of defaulters which consequently has an adverse effect on the quality of the Loan book.

1.1.4 Mortgage Firms in Kenya

According to the World Bank Report 2013, Mortgage lending is predominantly done by banks in Kenya. Of the 45 banks and one Mortgage Finance Company in the Kenyan banking system, 25 of them have mortgage portfolios of differing sizes. Some of the lenders have just one or two loans on their books which may be to staff members or special customers and other banks are much larger players who see mortgages as a major business center.

There are two types of lenders which can be authorized by the Central Bank of Kenya. These are ordinary banks, which have the right to engage in mortgage business and mortgage companies. The Housing Finance Company of Kenya (HFCK), which still has a small government investment (7 percent), is the sole remaining Mortgage Finance Company at present. There are no major differences in the regulations applying to the two types of institutions and they each compete on a level playing field. The largest lender in Kenya is now Kenya Commercial Bank (KCB) following its acquisition of Savings & Loans, which remains as a mortgage subsidiary of KCB. Overall the two

largest lenders control over half the Mortgage Finance market and only 9 banks (6 large, 2 medium and 1 small bank) have a mortgage portfolio exceeding Ksh 1 billion (World Bank Report, 2011).

KCB and HFCK have just demonstrated through their Rights Issue and Corporate Bond issue that they have the capacity and scale to tap the market on their own. Especially in the case of HFCK this is now essential if it is to grow. For other lenders, issuing a bond for housing purposes is less realistic as they may not be large enough to justify the costs of an issuance or have a portfolio large enough to warrant it. Given this split, a twin approach may be justified, with KCB and HFCK potentially looking to develop a mortgage funding instrument with some credit risk transfer, whilst the sector as a whole looks into establishing a simpler mechanism which can be accessed by all.

1.2 Research Problem

Monetary Policy Committee (MPC) of Central Bank of Kenya (CBK) sets the base lending rate for commercial banks and other Mortgage Financial institutions. The monetary policy is a tool used by CBK to control inflation. In July 2014 the MPC through a press statement and circular to all banks introduced the Kenya Banks' Reference Rate (KBRR) at 9.13 percent which remains in force till the next review in Jan 2015. Since October 2011 CBK has increased the Central Bank Rate (CBR) from 7% to 18% in an effort to tame runaway inflation and stabilize the weakening shilling. Consequently commercial banks have increased their lending rates from low figures of 11% to about 25%.

The periodic reviews of the base lending rate, CBR or KBRR exposes mortgage lenders to uncertainty of their real estate finance returns. The Kenya mortgage market offers Adjustable Rate Mortgages (ARMs) and since lending is the core business of MFIs their balance sheet mainly consists of Rate Sensitive Assets (RSAs) and Rate Sensitive Liabilities (RSLs). Investment decisions by MFIs whether short-term or long-term are basically about interest rates and the associated risk management. Assessment of historical data reveals that the level of non-performing assets is highest when interest rates are at highest. Also it shows a drastic drop in new mortgage applications.

The CBK in September 2013 cautioned Mortgage Firms against high exposure as a result of lending more to the real estate sector. This alert is a wakeup call to developers to seek for substitute financing routes and if implemented by developers, the level of business may decline for Mortgage Firms. Kenya views banks as the quickest and most effective lender as developers continue to troop to banking halls for credit. Among the reasons experts give for preference on bank lending by developers is the interest banks have always had on the sector. The lender of last resort forecasts that the high exposure by banks to the sector may cause instability for commercial banks should there be a price degeneration and wide default rate.

The Kenya Financial Sector Stability Report launched in Aug 2013 by the regulator, shows that real estate accounted for Sh194.9 billion of the Sh1.45 trillion in gross loans and advances made by banks. However, the Central Bank results rank construction and building and personal or household loans differently. But given that individuals divert personal loans to developments, the country could be looking at Sh267 billion, several billions more going to the real estate sector.

Real Estate Investment Trusts (REITs) for now remains the highly anticipated alternative financing source for developers. REITs offer developers the possibility to raise funds from the public and later pay it back with interest. The public, in this case, will be investors, earning returns on shares bought. Home Afrika is one of the real estate companies keen to seize this opportunity. The company is planning set up two REITs at the Nairobi Securities Exchange (NSE). These may just be the alternative avenues to provide answers to developers looking for tones of money to actualize their dreams of mega projects.

My research seeks to assess the impact of interest rate volatility risk on the real estate returns and adds value the pool of research findings .All Mortgage Firms have committed significant amounts of funds to finance real estate in anticipation of good returns. The returns come in form of interest charged on the funds which changes from time to time. Future interests on the existing mortgages are uncertain (at risk). This poses questions such as; will the future interest vary? To what extend? How will this variations impact on the returns from real estate? What proportion of funds should be invested in real estate? What measures should be taken in risk management? My research seeks to provide reliable answers to these questions.

1.3 Research objectives

The general objective of this study is to investigate the effects of Mortgage Pricing Volatility on Real Estate Returns to Mortgage Firms in Kenya. Specifically the study seeks to establish how Adjustable Rate Mortgages (ARMs) affect Returns to Mortgage Firms.

1.4 Value of the Study

This survey aims at providing timely, accurate and reliable information to various interests in the real estate industry. This includes but not limited to real estate developers, financiers, regulators, policy makers, the tax authority, the central government and urban and rural planners. Real estate developers need to be highly informed because huge amounts of funds are invested in real estate hence any wrong decisions taken can lead to huge losses. Funds should be invested optimally to fetch maximum returns to the developers. They need know how to go about available investment opportunities, availability and cost of finance, the effects of inflation, environmental and demographic factors, management expertise and risk factors such as unobserved property defects and legal liability among others.

Real estate financiers need expatriate risk management skills and tactical long term investment strategy that defeats the market dynamics. This research alerts them to keen on variation of interest rates which is often beyond their control. However, with proper planning about future inflation and management of interest rate variations it's possible to make high returns to shareholders, while maintaining the existing customer base and even spearheading growth. The regulators, policy makers and central government can still find alternative ways of controlling inflation. Through the fiscal policy the government can control inflation by adjusting its expenditure. The gap between demand and supply of housing needs in urban Kenya is very wide and with high growth rate of urban population the situation may worsen. Kenya Revenue Authority in 2013 introduced tax in real estate. The income tax targets property owners who earn rental income. The rental income is affected by interest rates fluctuations which directly impacts on the cost of credit for financing real estate. Therefore, the tax body on its future income tax collections should expect the effect of interest rate fluctuations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examines past literature on real estate investment decisions as influenced by the level of interest rates. The first section reviews theories advanced regarding behavioral finance such as Loanable funds theory, prospect theory, disposition effect theory, classical theory of interest and the efficient markets hypothesis (EMH). The second section is a review of past empirical studies and general literature on the effect of interest rates volatility on the real estate returns.

The third section deals with a review of past studies on real estate investment markets and interest rates volatility. The final section draws the conclusions on literature review.

2.2 Review of Theoretical Literature

This section discusses the theories advanced in the field of real estate finance. In particular, a review is done on the Loanable funds theory, prospect theory, structural inflation theory, Classical Theory of interest rate and efficient markets hypothesis (EMH)

2.2.1 Loanable Funds Theory

Loanable funds theory assumes that interest rates are determined by supply of loanable funds and demand for credit. In loanable funds theory the demand of loanable funds originates from domestic business, consumers, governments and foreign borrowers. While the supply is generated by domestic savings, dispersion is through banking system and foreign lending. With these factors determining long-term interest rates, short term

interest rates are decided by financial and monetary conditions in the economy. The many factors considered in loanable funds theory mean that equilibrium will be reached only when each of the factors is in equilibrium.

Previous researchers conducted many studies that were useful for households, policy makers, home buyers and sellers. Mortgage rate is one of the key components of housing affordability index, and the rise in mortgage rate decreases the index and vice versa (McGibany and Nourzad, 2004). Households are very sensitive to changes in interest rates, in the countries with variable mortgage rates like Sweden, because of their greater indebtedness in the past two decades (Debelle, 2004). Similarly, interest rates, income and expected prices are determinants of house price (Vries and Boelhouwer, 2005).

Specifically, banks may be insensitive to changes in monetary stance owing to risk aversion. There are strong policy implications; it is argued, for instance, that in East Asia raising interest rates exacerbated economic decline and, rather than contributing to exchange-rate stability, may have induced capital flight as default risk increased, lowering risk-adjusted expected returns. A link between low interest rates and house price bubbles is especially tenuous. Standard theory says that low interest rates should increase house values (or the value of any long-lived asset, for that matter). Consequently, the observation that house prices rise when interest rates fall is not by itself evidence that low interest rates cause bubbles. To make this case, one would have to argue house prices tend to overreact to interest rate reductions, i.e., that appreciations are larger than warranted by fundamentals.

2.2.2 Prospect Theory

The prospect theory was developed by Tversky and Kahneman in 1979. The theory contradicts expected utility theory upon which Standard finance is based. According to Jordan and Miller (2008), Prospect theory is an alternative to classical, rational economic decision making. Prospect theory emphasizes that investors tend to behave differently when they face prospective gains and losses; investors are much more distressed by prospective losses than they are happy about equivalent gains, and a typical investor considers the pain of losing one dollar to be twice the pleasure received from the gain of one dollar.

Investors have been found to respond in different ways to identical situations, depending on whether they are presented in terms of gains or in terms of losses. Investors seem to be willing to take more risk to avoid loss than they are to make an equivalent profit. The tendency of investors to be risk-averse regarding gains but risk-seeking regarding losses is the essence of prospect theory. When an investor has the choice between a sure gain and a gamble that could increase or decrease the sure gain, the investor is likely to choose the sure gain. But when faced with a choice between a sure loss and a gamble which could increase or decrease the sure loss, investors are more likely to take the gamble (Jordan & Miller, 2008).

2.2.3 Structural Inflation Theory

About 40 years ago, the concept of structural inflation entered in economic discussion and research. It is related to the effect of structural factors on inflation. Structural analysis attempts to recognize how economic phenomena and finding the root of the permanent

disease and destruction such as inflation that evaluates lawful relationship between the phenomena. In the economic structural factor causes, supply increase related to demand-push, even if abundant unemployment production factor is impossible or slow.

Avgouleas (2008) reasoning of less developed countries, till the time not successful to change in the form of lagging behind structure or not to make attempt for immediate self-economic growth or should compromise with the inflation that is very severe sometimes. This inflation giving the structural improvement, results as a cost in fact that is given for immediate economic growth. Structuralism, even the group that does not fine necessary for changing the present policy foundation for eradicating inflation, with the control of inflation through government intervention in the market structure and also, by adopting decisive plans for justly division of inflation pressure there is no opposition and in fact stress is done on these arrangement (Aglietta and Deusy, 1995)

2.2.4 Classical Theory of Interest Rate

According to the classical theory, interest, in real terms, is the reward for the productive use of capital, which is equal to the marginal productivity of physical capital. In a money economy, however, as physical capital is purchased with monetary funds, the rate of interest is taken to be the annual rate of return over money capital invested in physical capital assets (Keynes, 2001). According to Keynes (2001), true classical theory of interest rate is the savings investment theory. Basically, the theory holds the proposition based on the general equilibrium theory that the rate of interest is determined by the intersection of the demand for and supply of capital. Thus, an equilibrium rate of interest is determined at a point at which the demand for capital equals its supply.

2.2.5 Efficient Markets Hypothesis

Modern finance is built upon the Efficient Markets Hypothesis (EMH). EMH is the notion that securities' prices already reflect all available information. The EMH argues that competition between investors seeking abnormal profits drives prices to their "correct" value, so that any arbitrage opportunities disappear as soon as they arise.

Behavioral finance assumes that, in some circumstances, financial markets are informational inefficient (Ritter, 2003).

A market is said to be efficient with respect to some information if that information is not useful in making investors to earn excess positive return (Jordan & Miller, 2008). The market is not efficient if some investors have access to insider information leading to insider trading and their ability to earn excess positive returns than other investors. Statman(1999) states that market efficiency is at the center of the battle of standard finance versus behavioral finance versus investment professionals. He argues that the term "market efficiency" has two meanings. One meaning is that investors cannot systematically beat the market and Statman concurs with this. The other meaning is that security prices are rational implying that they reflect only "fundamental" or "utilitarian" characteristics, such as risk, but not "psychological" or "value-expressive" characteristics, such as sentiment. Statman strongly disagrees with this second meaning.

According to EMH, it is very difficult for investors to consistently beat the market (earn positive excess return) over a long period of time. The excess return is the difference between the earnings of a particular investment and the earnings of other investments with similar risk. A positive excess return means that an investment has out-performed

other investments of the same risk (Jordan & Miller, 2008). Odean (1999) states that excessive trading in retail brokerage accounts could result from either investors' overconfidence or from the influence from brokers wishing to generate commissions.

Excessive institutional trading could also result from overconfidence or from agency relationships. He cites a study by Dow and Gorton (1997) which shows that money managers, who would otherwise not trade, do so for the mere reason of signaling to their employers that they are earning their fees and are not "simply doing nothing".

2.3 Review of Empirical Studies

2.3.1 Review of past studies on Real Estate Investment Markets

Muthaura, (2012) from the University of Nairobi did a research on the relationship between interest rates and real estate investment in Kenya. "The study seeks to investigate how house prices are affected by the cost of borrowing."Muthaura(2012).The study stated that real estate is a large investment which requires huge capital that most ordinary Kenyans cannot raise, therefore they turn to banks to finance this cost of construction or purchase. The cost of borrowing in all banks is driven by the real interest rate which is fuelled or largely accommodates inflation. Inflation is the key driver of interest rates. The banks are highly supervised and are under the obligatory role of the Central bank of Kenya which determines the base lending rate accommodating all factors in the economy, based on this the bank can then come up with their own mortgage rates or borrowing rates a few basis points from the Central Bank lending rate.

The research problem was analyzed through the use of the simple user cost model. The target population of this study was all 35 mortgage lending banks in Kenya as at November 2010, from which a sample of 18 was drawn to analyze the research problem. Data for the purpose of the study was collected using data collection forms to 18 mortgage lending banks that have been running the mortgage product from 2007-2011. Study findings indicated that indeed interest rates affect returns from mortgage finance, most real estate retail borrowers and investors alike are forced to increase the house prices to cater for the cost of borrowing. The following recommendations are made. Firstly, the government should play a more active role in control of interest rates through the Central bank of Kenya frequent bank supervisions as most commercial banks are out to fleece lenders and stabilize inflation through the implementation of tough monetary policies. Secondly, the property market should be controlled through a house pricing index to protect the rights of both the owners and the investors. Thirdly, the Capital Market Authority (CMA) should continuously review the investors.

According to Omengo (2012), high interest rates in Kenya are hurting real estate investment. Interest is a cost to the developer of real estate as it is to the end buyer. Since October 2011 the CBK has increase the Central Bank Rate (CBR) from 7% to 18%. Consequently commercial banks increased their lending rates from low figures of 11% to about 25%. High interests in Kenya will mean that ongoing projects will cost more when finally delivered. This will be due to high costs of materials, labor and most importantly the cost of construction money. Halting or delaying work in progress would only escalate costs further. Developers will therefore want to pass the increased costs to buyers in the form of higher prices. New investors will shy away from real estate

investment resulting in low investment. High interest rates also translate into expensive mortgages. Any mortgage calculator on the interest will show you that an increase from 11% to 25% on a 20 year mortgage plan translates into 100% increase in the monthly installment. For existing customers, commercial banks will restructure their loans to ease their increased burden due to high interest rates. This would be by lengthening the repayment periods and subsidizing the higher liability rather than increase monthly repayments.

Hoesli (2010) of the University of Geneva carried out a research on The Interest Rate Sensitivity of Real Estate. This study yielded a contribution to a better understanding of the interest rate sensitivity of real estate and should enable a more sophisticated interest rate risk management, especially for insurance companies and pension funds. This was achieved by modeling the whole life of a typical but simplified office investment property, based on a representative and exclusive data set for the Swiss investment real estate market. The interdependencies between interest rates, inflation, office market rents, current rent paid and expenses were modeled empirically. A Monte Carlo simulation was performed that explicitly incorporate the uncertainty of the underlying stochastic processes, of their interdependencies and of modeling uncertainties, thus providing an indication of the final estimate's uncertainty. Results showed that the interest rate sensitivity of a typical office property is 13.1%, with a standard deviation of 7.8%. The risk premium, the state of the macroeconomic environment, the degree of rotation of the interest curve and the remaining lifetime of the property were found to be the prime determinants of interest rate sensitivity.

Olweny (2011) sought to establish the link between the level of interest and the volatility of interest rates in Kenya using the Treasury bill rates from August 1991 to December 2007. The main variable for the study was the short term interest rate series. In Kenya, this is the Central Bank three month Treasury bill rate. The interest rate volatility was studied using the general specification for the stochastic behavior of interest rates which is tested in a Stochastic Differential Equation (SDE) for the instantaneous risk free rate of interest as earlier defined by Chan. The study applied the monthly averages of the 91-day T-BILL rate for the period between August 1991 and December 2007 which were obtained from the Central Bank of Kenya. The results of the study were consistent with the hypothesis that the volatility is positively correlated with the level of the short term interest rate as documented by previous empirical studies. The key findings revealed that there exists a link between the level of short-term interest rates and volatility of interest rates in Kenya.

In a study to investigate the factors influencing mortgage uptake Kenya, guided by several specific objectives but in relation to this current study the objective to examine the extent to which interest rate influence mortgage financing in Kenya is more specific to the research now. A descriptive survey was employed in this study. This study targeted 238 staffs in selected department in Housing finance Corporation, Kenya. Stratified random sampling method was conducted to capture the various levels of staffs and management. The study concluded that interest rate setting on mortgage debt; government instruments and fiscal measures are the major policies that govern mortgage financing (Aguko, 2012).

2.4 Conclusion from Literature Review

In general the Empirical findings show a positive relationship between the two variables interest rate (mortgage price) volatility “the X” and the Real Estate Returns, “the Y”. High interest rates in Kenya are hurting real estate investment .The results of Olweny 2011 show that volatility is positively correlated with the level of the short term interest rate as documented by previous empirical studies. The key findings revealed that there exists a link between the level of short-term interest rates and volatility of interest rates in Kenya.Muthaura, 2012 found out that the increase in interest rates were positively and significantly related to growth in long term mortgage loans. He Further gives two recommendations; the government control of interest rates through the CBK and property market Prices through a house pricing index and a continuously review the investors by CMA.

According to Hoesli, 2010 interest rate sensitivity of real estate of a typical office property is 13.1%, with a standard deviation of 7.8%.Aguko (2012) concludes that interest rate setting on mortgage debt; government instruments and fiscal measures are the major policies that govern mortgage financing. He brought out that interest rates effect on the amount of credit to the economy is largely minimal. (Omengo2012) shows a negative relationship between flexible interest rates and mortgage financing. Global studies have explored the relationship between interest rates and mortgages extensively and they are based on different contextual conditions hence the diversity of findings. Locally empirical study in the relationship between interest rates and mortgages is not covered widely specifically relating to the types of interest rates: fixed and variable, hence there is a large gap to be covered in terms of knowledge and empirical studies.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design used in this study, the population of the study, sampling design (sample size and sampling technique), data collection methods, data analysis tools and techniques, and finally data validity and reliability.

3.2 Research Design

This study used the descriptive research design. A descriptive study is concerned with finding out who, what, where, when, or how much (Cooper & Schindler, 2006). This research is descriptive because it is concerned with discussing mortgage interest rates (the ‘what’) and its influence on real estate returns (the ‘who’) in the real estate financing in Kenya. Both primary and secondary sources of data have been used in this research.

3.3 Population of Study

According to Mugenda and Mugenda (2003), a population refers to a complete set of individuals, cases or objects with some common observable characteristics, which differentiate it from other populations. The target population of this study is the real estate Financiers in Kenya. The accessible population of this study consists of Mortgage financing Banks who have active in real estate finance between the years 2009 and 2013. According to World Bank Report 2013 KCB and HFCK combined control over 70% of the Mortgage Market Share. Other Banks in the Industry include Standard Chartered Bank, Cooperative Bank of Kenya and Barclays Bank of Kenya.

These Banks according to Central Bank Statistics transacted over 95 percent of new mortgages during the period hence the findings can be assumed to apply to the entire population. The accessible population of this study was obtained from information contained in the Central Bank of Kenya commercial Banks Directory, which enlists the commercial banks offices are located within Nairobi.

3.4 Sampling Design

A sample is a sub-set of a particular population. Sampling design encompasses sampling technique and sample size. This study used simple random sampling technique. This was considered appropriate because the population of the study was considered highly homogeneous. The Slovin's formula (cited by Ellen) was used to determine the appropriate sample size of 5 respondents from the accessible population of 5 which is a census. The formula is stated as follows:

$$n = N / (1 + Ne^2)$$

Where n = Number of samples, N = Total population, and e = Error tolerance and in this case $n=N$ **Source: Ellen, S. (<http://www.ehow.com>)**Slovin's formula allows a researcher to sample the population with a desired degree of accuracy, and gives the researcher an idea of how large his sample size needs to be to ensure a reasonable accuracy of results (Ellen). The confidence level used by the researcher was 90% implying 0.1 margin error.

3.5 Data Collection Methods

Data was collected mainly through secondary sources. Secondary sources include; sample bank's financial reports, central bank reports, economic journals, and statistical publications available in research firms. The type of data collected include; data on size of the market over the past five years, data on mortgage rates in the market over the market, data on other factors affecting mortgage financing, and data on non-performing mortgage loans and their types.

3.6 Data Analysis Tools and Techniques

Collected data will be analyzed using statistical tools and have been presented by use of tables and charts. SPSS and Ms-Excel will be used to generate the tables and charts. Frequencies and percentages will be used to display results of findings. An appropriate real estate investment model is adopted from Levitt and Syverson (2008). The dependent variable in this case the real estate returns will be influenced by variations in the independent variable in this case mortgage interest rates volatility.

Multiple linear regression models will be used in measuring each variable and this model helped in bringing out the effects of interest rates volatility on real estate Returns to Mortgage Firms. The regression model is of the form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu$$

Where,

Y is the Real Estate Returns measured by dividing annual Net interest Income, by the Mortgage Loan Book.

β_0 is a constant, the value of Y when all Xs are zero

X1 is the lending interest rate volatility measured by changes in interest rates (absolute value of annual changes in interest rates)

X2 is the inflation rate as measured by the Consumer Price Index (CPI)

X3 is the Gross Domestic Product (GDP) as provided by the Kenya National Bureau of Statistics

β_1 – β_2 are the regression co-efficient or change introduced in Y by each X

μ is the random error term accounting for the of all other variables that affect mortgage loans returns but not captured in the model

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents data analysis and interpretation. The objective of the study was to establish the effect of interest rate volatility on mortgage default rate in Kenya. Data was collected for all the banks. Secondary data was collected from the Central Bank of Kenya, Central Bureau of Statistics and Banks published financial statements starting 2009 – 2013

4.2 Data Collection

Data used is secondary data obtained from CBK, Banking Supervision Unit and Kenya National Bureau of Statistics. The data relates to all Mortgage Firms operating in Kenya between 2009 and 2013.

4.3 Response Rate

Response rate was 100% since the entire data was availed by CBK. However, the data obtained from CBK banking supervision relates to all commercial banks in Kenya with no extracted data about Mortgage Firms. I managed to get data from HFCK and KCB S&L Mortgage Centre which purely relates to mortgage finance in Kenya

4.4 Data Validity

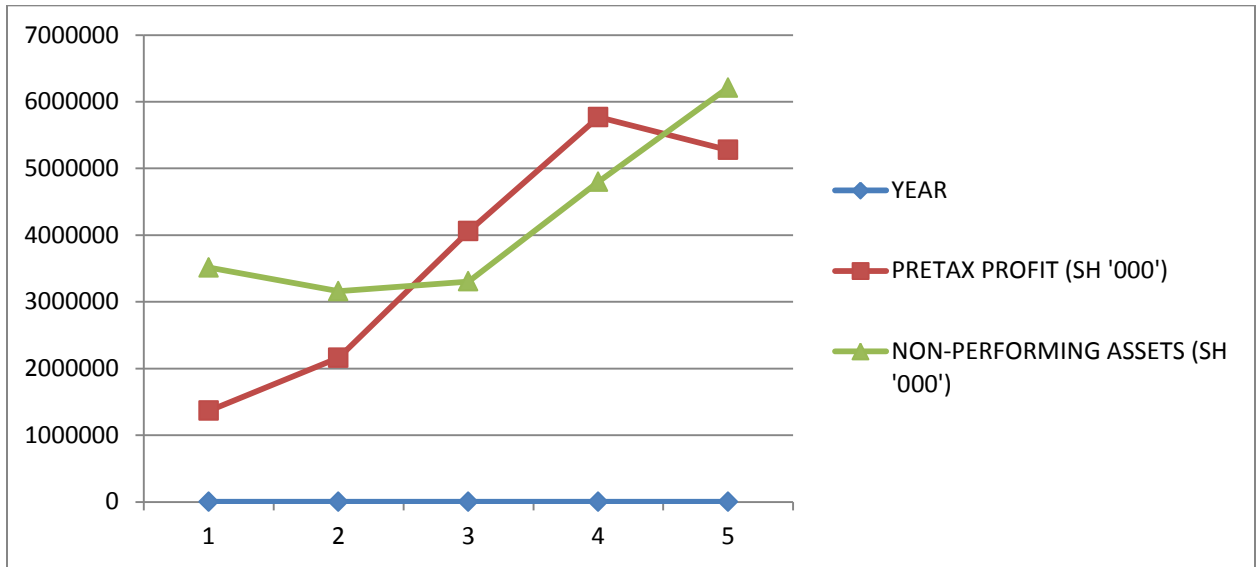
The data is valid since it has been obtained from reliable sources, CBK the regulator and supervisor of Mortgage firms. The findings of this research are assumed to be valid to the entire Kenya Mortgage Finance Industry

4.5 Descriptive Analysis

Table 4.1 below shows pre-tax profits, gross non-performing mortgages and interest rates fluctuations for mortgage firms in Kenya, 2009-2013

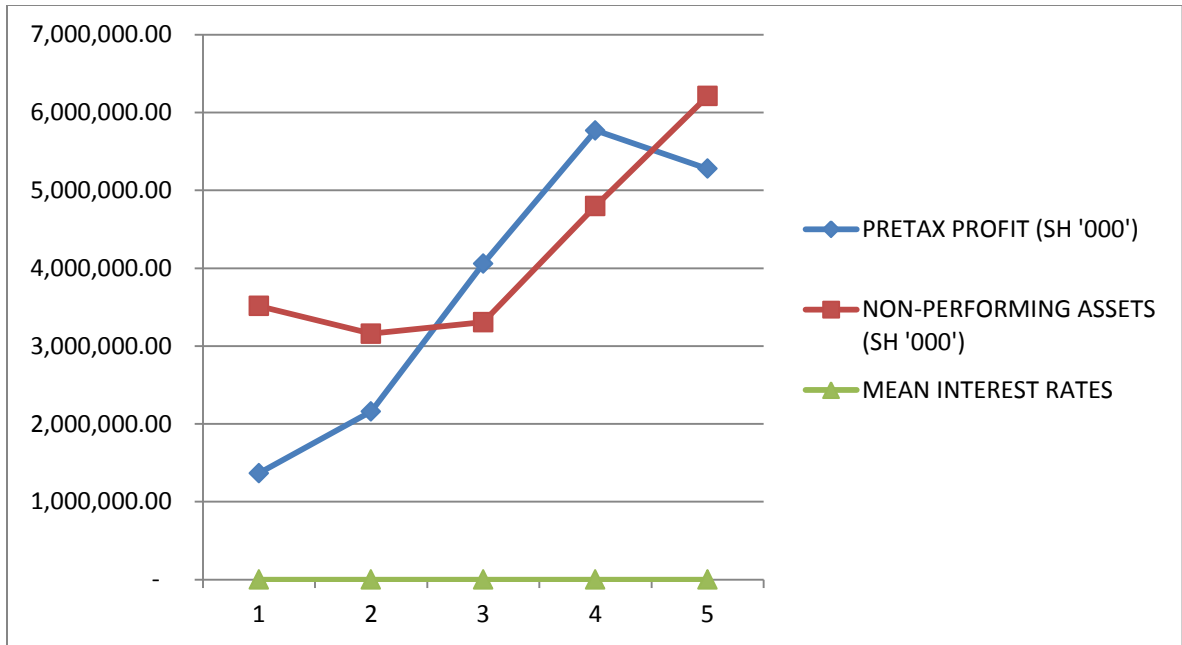
YEAR	PRETAX PROFIT (SH '000')	NON-PERFORMING ASSETS (SH '000')	MEAN INTEREST RATES	INTEREST FLUCTUATIONS
2009	1,366,919.28	3,514,102.90	15.0%	0%
2010	2,159,607.00	3,158,585.45	14.3%	1%
2011	4,058,915.04	3,305,915.42	15.0%	5%
2012	5,767,464.22	4,798,439.21	20.8%	6%
2013	5,276,158.86	6,210,777.79	16.0%	0%

Table 4.1



Graph 4.2

From the results, the lowest interest rate value was 15% in 2009 while the highest was 20.83% in 2012. The highest variation in interest rates was witnessed in 2012 Mortgages was priced at 20.83% and Non Performing Mortgages hit the all time high. The unpredictability in interest rates is an evidence of instability in financial markets as these rates are determined by the central bank. Profitability was highest at the greatest uncertainty depicting a risk-return relationship that is a positive correlation as it is graphically shown in figure 4.2 below.



Graph 4.3

4.5.1 Interest Rate Volatility and Real Estate

Mortgage interest rates (pricing) volatility indeed affect real estate returns to mortgage firms in Kenya according to my research findings. The returns are influenced by the interest rate margin between deposit rates and the mortgage rates. High interest rate margins results in highest returns up to a certain level where it leads to high level of non-performing Mortgage due to high default rate. Whenever CBK increases its base rate Mortgage Finance Firms also increase their lending rates. The largest fluctuations were recorded in the year 2012. Coincidentally, profit was very high too. This conforms to the risk return relation. Fluctuation of interest is a risk and where risk is high, returns are also high

TABLE 4.4 Descriptive statistics for Real Estate Returns

PRINCIPAL INTEREST RATES, 2009-2013

YEAR	2009	2010	2011	2012	2013
Mean Mortgage Rates (%)	14.76	13.87	20.04	22.64	16.98
Mean Deposit Rates (%)	4.84	3.59	6.99	6.8	6.65
Loan interest Spread (Returns) (%)	9.92	10.28	13.05	15.84	10.33
Std. deviation of interest rates	0.1622	0.6964	1.0976	2.3752	1.8412

According to the findings, the average real estate returns to mortgage firms in Kenya was 9.92 percent in 2009 and rose to its highest in 2012.

4.5.2 Correlation Analysis

To quantify the strength of the relationship between the variables, the study used Karl Pearson's coefficient of correlation. The Pearson product-moment correlation coefficient (or Pearson correlation coefficient for short) is a measure of the strength of a linear association between two variables and is denoted by r . The Pearson correlation coefficient, r , can take a range of values from +1 to -1. The Pearson's coefficient was used to verify the existence or non-existence of linear correlation between and among the variables. The findings are presented as follows;

Table 4.7 Pearson correlation coefficient matrix

	Interest Rates	Inflation Rate	GDP	Real Estate Returns
Interest Rates	1			
Inflation Rate	.386**	1		
GDP	0.13	.361**	1	
Real Estate Returns	0.293**	.363**	0.34	1

Results from table 4.7 above reveal that there is a significant positive relationship between **Interest Rates (pricing) volatility** and real estate returns ($r = .293^{**}$, P-value < 0.01). This implies that **Interest Rates** influence returns to mortgage firms in Kenya.

The findings also disclosed a significant positive relationship between Inflation Rate and mortgage returns rate ($r = .363^{**}$, P-value < 0.01). Thus, implying that inflation rate influences mortgage default rate in Kenyan real estate market. The findings indicated a positive relationship between GDP and mortgage default rate ($r = .3401$) thus, depicting that growth in GDP has no significant effect on mortgage default rate.

The results in table 4.6 above indicate that there was a significant positive relationship between

Interest Rates and Inflation Rate ($r = .386^{**}$, P-value < 0.01). A significant negative relationship was observed between inflation rate and GDP ($r = -.361^{**}$, P-value < 0.01). This implies that a rise in inflation rate has negative effect on GDP.

4.6 Regression Analysis

The data obtained was analyzed using multiple linear regression technique.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu$$

Where,

Y is the Real Estate Returns measured by interest rate Margin between deposit rate and mortgage rate

β_0 is a constant, the value of Y when all Xs are zero

X1 is the lending interest rate volatility measured by changes in interest rates (absolute value of annual changes in interest rates)

X2 is the inflation rate as measured by the Consumer Price Index (CPI)

X3 is the Gross Domestic Product (GDP) as provided by the Kenya National Bureau of Statistics

$\beta_1 - \beta_2$ are the regression co-efficient or change introduced in Y by each X

μ is the random error term accounting for the of all other variables that affect mortgage loan returns but not captured in the model

4.6: Regression Analysis of the Variables

4.6.1 Regression equation

Based on regression coefficients results the regression equation can be written as follows;

$$Y = .457 + .179 X1 + 0.298 X2 + 0.281 X3 + e$$

Regression analysis reveals the extent to which Interest Rates, significantly predicted the mortgage default rate. Results in Table 4.6 above indicated that the combination of Interest Rate inflation Rate and GDP significantly predicted or explained up to 19% of the variance mortgage returns. In addition, inflation rate was a better predictor of mortgage default rate (beta =

0.298). The above results suggest that Interest Rates, Inflation Rate and GDP greatly influences mortgage default rate in Kenya real estate market.

4.7 Summary and Interpretation of Findings

This study examines how interest rate volatility affects mortgage default rate in Kenya. From the findings, averages for mortgage default rate for all the banks as obtained from the financial statements reflects an upward rise over the 5 year period, with the highest being 0.65 in 2012. In other words, the default rate has risen from 41 to 65% over a period of 5 years. In addition, the standard deviation depicts minimal variation in default rates in different commercial banks.

This agrees with Saunders and Cornett (2010) who identified models for assessing the default risk of individual loan holders and categorized them under qualitative and quantitative models. The borrower's reputation involves the borrowing-lending history of the applicant. Leverage is the ratio of debt to equity. It affects the probability of its default because large amount of debt increases borrower's interest charges and pose a significant claim on its cash flows. As with leverage, a volatile earning stream increases the probability that the borrower cannot meet fixed interest and principle charges. Collateral on the other hand is required to back to back up the loan.

Oduori (2012) also observed that the Central Bank Rate and the Credit Loss Ratio have been the most significant determinants of interest rate spreads amongst commercial banks in Kenya. Treasury Bill Rate and Market Structure have also contributed to spreads. He also indicated that many of the factors commonly believed to be critical determinants of interest rate spreads may not in fact have been relevant to the size of the interest rate spreads. In his study he inferred that inflation, bank interest rate and cost to income ratio were insignificant in determination of interest rate spreads in the short term.

Further, the lowest interest rate value was 7.29 in 2009 while the highest was 16.15 in 2012. On the other hand 2011 and 2012 depicted high standard deviation, implying high variation in interest rates. The unpredictability in interest rates is an evidence of instability in financial markets as these rates are determined by the central bank. Kau et al (1993) also established that as the index rate varies, so does the monthly payment amount on the mortgage.

This is the opposite of the fixed-rate mortgage (FRM) which sets the rate of interest charged over a set term and the payments do not alter. Although the amount of principal and interest paid each month varies from payment to payment, the total payment remains the same which makes budgeting easy for borrowers. The main advantage of a fixed rate loan is that the borrower is protected from sudden and potentially significant increases in monthly mortgage payments if interest rates rise. The downside to fixed rate mortgages is that when interest rates are high, qualifying for a loan is more difficult because the payments are less affordable.

On the other hand, the mean values for inflation rate have been on the rise since 2008 rising from 92.4 to 132.5. It is also evident that there has been a consistent rise in inflation rate as the standard deviation is so small depicting minimal variability. This agrees with Gaitho (2010) who carried out an investigation on the causes of non-performing loans in Kenya and found out that the main causes of NPL were the national economic downturn which lead to depression for business in general; reduced buying ability of consumers; insider lending; and owner concentration; inadequate procedures of credit risk assessment and credit management; misuse of loans; and legal delays.

Akahenge,2011 also carried out research on the determinants of NPL among commercial banks in Kenya and he established that poor credit analysis by banks, sources of income, interest rates charged by banks, loan repayment period, staff turnover and other behavioral aspect like morality of individual were the major causes of loan default which resulted in NPLs in banks. Further, Kinyura (2011) carried out a research on the determinants of lending rates of commercial banks in Kenya and found out that the cost of funds (loan) was determined by taxation policies, core liquid asset requirement, transaction cost, CBK and its regulatory role, management fees and staff costs. The research further revealed that interest rates were majorly influenced by inflation, demand for loans, foreign exchange rates and other macro and micro economic environmental factors.

It is also evident that the growth in GDP is consistent with minimal variability. From the averages, it is clear that mortgage default rate rose with increase in interest rates, inflation rates and GDP. It thus appeared in tandem with every increase in predictor variable. The findings also disclosed a significant positive relationship between Inflation Rate and mortgage default rate ($r = .363^{**}$, $P\text{-value} < 0.01$). Thus, implying that inflation rate influences mortgage default rate in Kenyan real estate market. The findings indicated a positive relationship between GDP and mortgage default rate ($r = .3401$) thus, depicting that growth in GDP has no significant effect on mortgage default rate. This findings agree with Ongweso (2005) who studied the relationship between interest rates and non performing loans and found out there existed a positive relationship between the level of interest and non-performing loans, whereby an increase in interest rates increased

nonperforming loans, a test of significance however revealed a weak relationship between the two.

Tenant and Folawewo (2007) also examined the macroeconomic and market determinants of interest rate spreads in low and middle income countries. In their paper, market determinants are captured using three variables – the structure and development of the banking sector (proxied by the bank/GDP ratio and real per capita/GDP); proscribed reserve requirements (proxied by the ratio of reserves to deposits) and the impact of the market size (proxied by the annual percentage in the CPI), extent of government dependence on the domestic banking sector for financing of its deficit (proxied by public sector borrowing as a percentage of total loans) and the Treasury Bill rate. The implication of their findings is that many of the factors commonly believed to be critical determinants of interest rate spreads may not be as relevant as perceived.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The aim of the study was to examine the effect of interest rate volatility on real estate returns to mortgage firms in Kenya. The Empirical literature shows that increase in interest rate forces an increase in real estate returns to mortgage firms in Kenya to some level beyond which default rate wipes out any further incremental returns. From the findings, averages for mortgage default rate for the all the banks as obtained from the financial statements reflects an upward rise over the 5 year period. In other words, the default rate has risen from 41% to 65% over a period of 5 years. The unpredictability in interest rates is an evidence of instability in financial markets as these rates are determined by the central bank.

It is also evident that there has been a consistent rise in inflation rate as the standard deviation is so small depicting minimal variability. The growth in GDP is consistent with minimal variability. From the averages, it is clear that mortgage default rate rose with increase in interest rates, inflation rates and GDP. It thus appeared in tandem with every increase in predictor variable. Thus, implying that inflation rate influences mortgage default rate in Kenyan real estate market. The findings indicated a positive relationship between GDP and mortgage default rate thus, depicting that growth in GDP has no significant effect on mortgage default rate.

5.2 Conclusions

The study concludes that averages for real estate returns to mortgage firms in Kenya obtained from the financial statements reflects an upward rise over the 5 year period. In addition, the standard deviation depict minimal variation in interest rates in different commercial banks.

The study further concludes the lowest interest rate value was 7.29 in 2009 while the highest was 16.15 in 2012. On the other hand 2011 and 2012 depicted high standard deviation, implying high variation in interest rates. The unpredictability in interest rates is an evidence of instability in financial markets as these rates are determined by the central bank. On the other hand, the study concludes that the mean values for inflation rate have been on the rise since 2009 rising from 92.4 to 132.5. It is also evident that there has been a consistent rise in inflation rate as the standard deviation is so small depicting minimal variability.

5.3 Policy Recommendations

Since cost of loans does influence default rate, which in turn affects returns to Mortgage firms in Kenya the study recommends that Mortgage firms in Kenya should assess their clients and charge interest rates accordingly, as ineffective interest rate policy can increase the level of interest rates and consequently default rate. Given that the type of interest rates charged on loans (fixed and floats) dictates on the ability and flexibility of borrowers to repay loans, the study recommends that Mortgage firms in Kenya should have a mixed interest rate policy to suit borrowers repayment abilities and purpose of mortgage whether commercial or residential.

The central banks should apply stringent regulations on interest rates charged by banks so as to regulate the number of mortgage default rate. Mortgage firms in Kenya should also apply rigorous policies on loan advances so as mortgages are awarded to those with ability to repay and mitigate moral hazards such as insider lending and information asymmetry. The firms should also enhance periodic/regular credit risk monitoring of their mortgage loan portfolios to reduce the level of default rate. Since Mortgage loan interest payments constitute one of the main factors of periodic household cash outflows, the study recommends that households should choose between different fixed credit and interest terms when they take out mortgage loans or when loans are renegotiated.

On the other hand, households should pay attention to the changes in mortgage interest rates and how the relationship between interest rates for different terms changes over time. The study recommends that banks' should care about the margins on mortgage loan since it's one of banks' major lending activities. Banks should apply efficient and effective credit risk management that will ensure that loans are matched with ability to repay, no or minimal insider lending, loan defaults are projected accordingly and relevant measures taken to minimize the same.

Also it should be mandatory for all banks and mortgage firms to make full disclosure of interest rates charged on loans and mortgages in their annual financial reports. This will ensure that banks and mortgage firms charge reasonable interest rates to borrowers.

5.4 Limitations of the Study

This study had several limitations. First, it is possible that the nature of data from the financial statements that was available at CBK banks Supervision department was

impacting the results in an unanticipated manner or limits the power of the tests to detect associations. This may have been created by variation of statistical figures illustrating the key variables measurements. It is possible that the statements did not indicate low or high interest rates.

A control variable is a variable that is held constant in a research analysis. The use of control variables is generally done to check observed relationship between two variables if a direct one or indirect with intervening. The banks were reluctant to give information their financial statements easily because of the suspicion that their information would fall in the hands of wrong persons.

In addition, time and resources allocated to this study could not allow the study to be conducted as deeply as possible. The study did not use control variable specifications as specified by Richardson et al (2002). It is thus possible that lack of inclusion, cause alterations in interpretation. Finally, correlations among the variables may be causing unanticipated results despite the efforts at identifying potential multi-collinearity problems.

5.5 Recommendations for Further Research

This study examined the effect of interest rate volatility on mortgage real estate returns to mortgage firms in Kenya over a period of 5 years. There is a need for further studies to carry out similar tests for a longer time period..

A similar study should also be carried out in other financial institutions for example Building Societies and SACCO's. In addition, more variables depicting interest rate volatility should be adopted to uphold the study's findings that indeed interest rate volatility influences mortgage returns.

Further research should also be conducted on other factors that influence default rate for example unemployment and negative home equity. Research on alternative sources of funding in the real estate market that are least affected by interest rate like the Real Estate Investment Trusts in the capital market would offer invaluable information to the real estate developers.

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