THE EFFECT OF INTEREST RATE VOLATILITY ON REAL ESTATE PRICES IN KENYA

BY

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NOVEMBER, 2013
DECLARATION

This research project is my original work and has not been submitted to any other university for academic award.

Sign…………………………..  Date…………………………

KIRUNGU NAOMI WAITHERA
D63/72855/2012

This project has been submitted with my approval as the appointed University supervisor.

Sign…………………………..  Date…………………………

DR. ADUDA JOSIAH
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PROJECT SUPERVISOR
DEDICATION

I dedicate this project to my father, Geoffrey Gicharu for his financial support and constant encouragement throughout my education. I also dedicate it to my classmate and friend Susan Ngacha who has been of constant help during my Msc. Degree program. God bless them abundantly.
I would like to express my very great appreciation to Dr. Josiah Aduda for his valuable and constructive guidance during the entire development of this research work. His willingness to give his time so generously is much appreciated. I would also like to express my gratitude to Mr. Mirie Mwangi for his advice and assistance in moderating my research proposal. 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. I am particularly grateful to Mr. Chirchir who tutored Real Estate finance, a subject that did inspire this research. I also acknowledge the help from all my classmates, specifically Winnie, Susan, Henry among others. Finally, I wish to thank my family and friends for their support and encouragement throughout my study. God bless.
ABSTRACT

In Kenya, interest rates are making mortgages even more unaffordable but demand for housing continues to outstrip supply. “Every six months or so, Kenya’s top mortgage financiers, organize bus tours of Nairobi’s developments. Participants stream onto buses that drive out to the developing zones of Nairobi. Such has been the pace of property development that some of the blocks of flats, townhouses and bungalows are still only served by undeveloped infrastructure like dirt roads.” Inflation which is a great determinant of interest rates has been a major challenge in the Kenyan economy. The inflation rate in Kenya was recorded at 6.67 percent in August of 2013. The rate averaged 11.67 Percent from 2005 until 2013, reaching an all-time high of 31.50 Percent in May of 2008 and a record low of 3.18 Percent in October of 2010. The objective of this study was to establish the effect of interest rates on real estate prices in Kenya. Descriptive study was undertaken. The population of this study consisted of all properties–standalone house/bungalows/cottages/villas, town houses/maisonettes and apartment constituted in the Hass Property Index. This study adapted a census study of all the properties in the Hass Property Index. Secondary data collection technique was employed, and was done through the analysis of data from the Hass Property Index and from the Central Bank of Kenya Monetary Policy Committee data base, all of which is publicly available. A simple regression model analysis was used. The study concluded that interest rates do influence real estate price in the Kenyan market. Average house prices had been on the rise for the 8 year period to 2012 and the lowest value for house prices was 15,070,019.00 in years 2009 and 2006 while the highest was 27,132,758.8767 in 2012. The study also concluded that the lowest interest rate value was 2.77 in 2011 while the highest was 18.52 in 2012. The study recommends that the Government should provide an enabling environment for higher economic growth rates so as to “put” more money into more pockets and ensure more people can afford mortgages/homes.
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ABBREVIATIONS

CAPM- Capital Asset Pricing Model
CMA- Capital Market Authority
GDP - Gross Domestic Product
KCB- Kenya Commercial Bank
KNBS- Kenya National Bureau of Statistics
MPC- Monetary Policy Committee
REITS - Real Estate Investment Trusts
ROE – Return on Equity
CHAPTER ONE

INTRODUCTION

1.1 Background of Study

In Kenya, interest rates are making mortgages even more unaffordable but demand for housing continues to outstrip supply. “Every six months or so, Kenya’s top two mortgage financiers, Housing Finance and KCB, organize bus tours of Nairobi’s developments. Gathering at the break of dawn on a Saturday, participants stream onto buses that drive out to the developing zones of Nairobi. Such has been the pace of property development that some of the blocks of flats, townhouses and bungalows are still only served by undeveloped infrastructure like dirt roads.” Maliti (2012). Questions have arisen whether this housing push currently experienced in Kenya is sustainable and this research aims at answering this.

Inflation which is a great determinant of interest rates has been a major challenge in the Kenyan economy. The volatile inflation rates makes millions of Kenyans review their spending habits and even postpone property investment when inflation rates are high. According to Sharpe (2010), “inflation is the rate of change in a price index over a certain period of time. Equivalently, the percentage change in the purchasing power of a unit of currency over a certain period of time”. Inflation reduces the disposable income available to consumers, with a reduced disposable income; investment in real estate is differed.
Inflation Rate in Kenya is reported by the Kenya National Bureau of Statistics (KNBS). The inflation rate in Kenya was recorded at 6.67 percent in August of 2013. Kenya inflation rate averaged 11.67 Percent from 2005 until 2013, reaching an all-time high of 31.50 Percent in May of 2008 and a record low of 3.18 Percent in October of 2010.

1.1.1 Real Estate Prices

In its broad sense, Real Estate is the term used to mean land and all things attached to it permanently. Real estate describes the extent to which rights and interests in real estates are owned. The real estate market and industry will be considered here to include land and improvements, their selling and rental prices, and the construction industry.

In Nairobi, there are two kinds of real estate purchases: cash purchases and mortgage purchases. In a World Bank- CBK baseline study of the mortgage market (2010), it reported that; “most property developments concentrated on the higher end of the market and that most people funded their housing projects using cash.” It also reported that “national demand of houses stands at 205,823 housing units per year with a supply of about 50,000 per year. It found there were only 13,803 mortgage accounts as of June 2010.” With such a huge gap in demand and supply of houses, for the vast majority of Kenyans, buying a house still remains a distant dream. This study helped several banks restructure their products. For instance after the study, CFC Stanbic Bank offered a 100% mortgage for properties worth between Kes. 3m and Kes.10m. It previously offered such loans only for properties more than Kes. 7m.
For mortgage buyers pricing refers to the rate of interest, fees, and other terms that lenders offer and that borrowers are willing to accept when mortgage loans are made. Mainly, there are two major types of interest rates charged on mortgage loans—Fixed interest rate mortgage loans where the payment to the lender is constant and Adjustable interest rate mortgage where the payment varies depending on the interest rate, which is more common.

In a study done by the World Bank through the CBK, the number of outstanding mortgage loans increased from 7,834 in 2006 to 13,803 in 2010. This is an actual increase of mortgages outstanding Kes. 19.5b to Kes.61.4b between 2006 and 2010. Showing that the demand for mortgages and in general the demand for property in Kenya has sustainably increased over the years.

The appreciation rate of real estate is also more than very high. For instance, the cost of buying a house in Karen, Nairobi increase by 7% between the 3rd quarter of 2010 and the 4th quarter of 2011” Hass consult property development manager Farhana Hassanali said in an interview with the African Journal.

The sustainability of such appreciation rates and the recent global house financing crisis has pegged the question ‘Will the bubble burst?’ to many investors and citizens of Kenya. This research aims to investigate what forces are behind property prices in Nairobi, and in specific what relationship does interest rates have on the property prices. – In doing so, answer the question: ‘Are the Kenyan Property Prices sustainable?’
1.1.2 Interest Rate Volatility

The Fisher Equation, an economic theory proposed by economist Irving Fisher, describes the relationship between inflation and both real and nominal interest rates. The Fisher effect states that the real interest rate equals the nominal interest rate minus the expected inflation rate. Therefore, real interest rates fall as inflation increases, unless nominal rates increase at the same rate as inflation.

The Central Bank of Kenya (CBK) Monetary Policy Committee (MPC) is responsible for the regulation of interest rates in Kenya. The benchmark interest rate in Kenya was last recorded at 8.50 percent in August 2013. Interest rates increased from to 6.25% in July 2011 to 18% in December 2011. “With such volatilities in interest rates, banks must renegotiate with their clients to reduce on their default risk exposure”. The director of mortgage business KCB - Joram Kiarie, said in an interview with the African Journal (March 2012).

The market rate of interest on mortgage loans is established by what borrowers are willing to pay for the use of funds over a specified period of time and what lenders are willing to accept in the way of compensation for the use of such funds.- Demand is driven by the demand for real estate. Supply is pegged on the return-risk considerations.
1.2 Research Problem

According to Stammers (2009), “interest rates, especially the rates on interbank exchanges and Treasury bills, have as profound effect on the value of income-producing real estate as on any investment vehicle. This is because interest rates influence on an individual's ability to purchase residential properties.” In Kenya, between July and December 2011, the CBK Monetary Policy Committee raised the central bank rates four times, from 6.25% to 18%. It is therefore expected that the demand for real estate will reduce over this period of time.

However, according to the Hass Consult web page, the cost of buying a house in Karen has increased by 7% between the 3rd quarter of 2010 and 4th quarter of 2011. In Ngong over the same period, the increase has been of 8%. There is clearly a gap in that the relationship between interest rates and property prices in Kenya. Interest rates are volatile yet property prices continue to rapidly increase.

Muthee (2012) sort to establish the relationship between economic growth and real estate prices in Kenya. He found out in his research that there is a significant correlation between Kenya’s house prices and GDP. Fundamentally this correlation is explained in the fact that, as house prices decline, individuals may be less likely to buy new houses for fear that prices will continue to decline. This then decreases demand for construction, mortgage lenders and activities directly or indirectly related to housing. Jumbale (2012) sort to establish the relationship between real estate prices and real estate financing in Kenya. The study concluded that changes in real estate prices are positively correlated to
the long-term evolution of real estate financing. The results suggested that real estate prices do affect the amount of real estate financing but the real estate prices are not triggered by the bank real estate lending; rather this lending evolves to the market prices. There is little empirical study on the relationship interest rate volatility has on real estate prices in Kenya. Moreover, the sustainability of such volatile rates considering the recent global house financing crisis.

1.3 Research Objective

The objective of this study was to establish the effect of interest rates on real estate prices in Kenya.

1.4 Value of the Study

1.4.1 Benefit to Property Investors in Kenya

The results of this study would help property investors make wise investment decisions. Insight into how interest rates affect property prices will help investors derive proper valuations for their investments bearing in mind the price drivers.

1.4.2 Benefit to Commercial Banks

This study would also help commercial banks in structuring of their mortgage products. Commercial banks having insight on the role interest rates play on property prices will enable them reduce their default risk as they results of the findings will improve their credit rating scores and also renegotiate with existing customers to reduce default risk. Though high inflation erodes disposable income and purchasing power, and so do interest
rates, Kenyans will continue to spend a substantial portion of their income to pay rent; and so we expect families to opt for less expensive home units that they can afford. Joram Kiarie, Director of Mortgage Business, KCB.

1.4.3 Benefit to the Real Estate Finance Field

This study will add to the general field of knowledge in real estate finance and also the broader finance field. Various theories about factors influencing pricing of real estate have been established and this study although only a fraction of the contribution, is a significant contribution.

1.4.4 Benefit to the Government

This study will help the Government of Kenya to understand the impact of interest rate volatility to property prices in Kenya and in so doing; help come up with appropriate monetary policies to regulate the real estate industry against the ever rising property prices. The Central Bank of Kenya (CBK) Monetary Policy Committee (MPC) that controls levels of interest rates in the country will realize the impact of its role in the broad Kenya property market.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction
A considerable amount of literature is available on the property market in Kenya. Different researchers and writers have written about different concepts that affect the property market. This chapter will give an insight on the various theories that affect real estate investment and interest rates. Recent empirical studies will be highlighted; as well as a more elaborate insight into interest rate volatility and property prices will be done.

2.2 Review of Theories
2.2.1 Asset Pricing Theory
“This theory addresses the questions as to why certain capital assets have higher expected returns than others and why the expected returns are different at different points in time.” Post (2005). Asset valuation applies to equity (including REITs or other forms of real estate ownership), debt (including mortgage-backed securities or other debt instruments collateralized by real estate), options, and loan serving rights.

In real estate, there is no CAPM-like approach to tell us how much ROE should exceed the expected return on some type of debt. This is because it is hard to measure a unique property’s returns over time to get correlation with the market.
2.2.2 Capital Structure Theories

In corporate finance, firm value is increased by picking the right mix of debt and equity. Modigliani and Miller argued that firms should use leverage. In real estate, the same applies. Increase value of equity is attained with proper use of debt/leverage. Real estate collateral permits money to be borrowed at low cost; having some debt financing reduces the cost of capital and also, it allows an equity investor to control a larger property base. It is important to note however that this positive leverage effect occurs only if the annual rate of return generated exceeds the annual cost of borrowing.

2.2.3 Portfolio Theory

This theory was discussed by Harry Markowitz and states that “risk can be reduced without reducing expected returns by combining assets with returns that do not have strong positive correlations.” Markowitz’s work was so important; it earned him a Nobel Prize in Economics, because it shifted the focus of risk measurement from reach security in isolation, to the contribution of each security to the risk of a diversified portfolio.

In real estate equity investments can be diversified in respect to property type, geographic location and lease terms. In real estate lending, risk can be diversified by holding mortgage backed securities and government guarantees. It is impossible to diversify away from systematic risks such as interest rates; however, it is possible to seek pools that are less subject to this risk.
2.2.4 Efficient Market Theory

“Theory that all assets are priced correctly and there are no ‘bargains’ is the market.” Post (2005). Markets are viewed informational efficient if you can use historical data (weak form), public data (semi strong form), or even private data (strong form) as a means of earning superior returns.

Real estate is not viewed as being traded in an efficient market, because of infrequently-traded assets, high transaction costs and also big players with specific knowledge of particular market may be able to earn greater than normal returns without violating some type of insider trading laws.

2.3 Review of Empirical Studies

Muthaura, (2012) from the University of Nairobi did a research on the relationship between interest rates and real estate investment in Kenya. The purpose of the study was to portray the relationship between interest rates and real estate investment with a focus of 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 house prices, most real estate retail borrowers and investors alike are forced to increase the house prices to cater for the cost of borrowing and to also break-even. 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 Rare (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.

Some have written about property prices, mortgage affordability and acceptability etc. For instance, Maliti (2011) in their study of the property market noted the following: interest rates dropped to the single digits from the previous year; the CBK further liberalized the banking sector, reducing cash ratios and licensing more mortgage financiers - as a result in 2011, 35 out of 44 banks offered mortgages; higher economic growth rates put more money into pockets making thousands of Kenyans qualify for the new mortgages that were largely advertised; the only property index in Kenya prepared by Hass Consult, reported in 2011 a small rise in the sale price of upmarket properties-the company’s composite index registers a 4.5% rise in the prices in 2011, with more flats sold than stand-alone houses. The next two following sections, will seek to gain insight on other studies that have been done on interest rates and property houses and also look at the theories that generally control the property market.

2.4 Real Estate Prices

In microeconomics, supply and demand is an economic model of price determination in a market. It concludes that in a competitive market, the unit price for a particular good will vary until it settles at a point where the quantity demanded by consumers (at current price) will equal the quantity supplied by producers (at current price), resulting in an economic equilibrium for price and quantity.
According to Wikipedia (2013), the four basic laws of supply and demand are: If demand increases and supply remains unchanged, a shortage occurs, leading to a higher equilibrium price. If demand decreases and supply remains unchanged, a surplus occurs, leading to a lower equilibrium price. If demand remains unchanged and supply increases, a surplus occurs, leading to a lower equilibrium price. If demand remains unchanged and supply decreases, a shortage occurs, leading to a higher equilibrium price.

The same basic principle governs the property market, the equilibrium being the market property rates. Real estate economics is the application of economic techniques to real estate markets. “It tries to describe, explain, and predict patterns of prices, supply, and demand” Sharpe (2010).

According to a lecture given by Chirchir, January 2013 determinants of demand in the property markets include: For apartments the number of household, age of persons in the household, size of the household, income, interest rates, home ownership, affordability, apartment rents, and housing prices all push the demand for apartments. He also identified the determinants of supply as follows; vacancy rates, interest rates, financing availability, age and combination of existing supply stock, construction costs and also land costs.

Muthee (2012) sort to establish the relationship between economic growth and real estate prices in Kenya. He found out that the correlation is explained in the fact that, as house prices decline, individuals may be less likely to buy new houses for fear that prices will
continue to decline. This then decreases demand for construction, mortgage lenders and activities directly or indirectly related to housing.

2.5 Interest Rates Volatility

The market rates of interest on mortgages loans is established by what borrowers are willing to pay for the use of funds over a specified period of time and what lenders are willing to accept in the way of compensation for the use of such funds. The determinants of mortgage interest rates as: Inflation expectations: “In economics, inflation is a rise in the general level of prices of goods and services in an economy over a period of time.” Wikipedia (2013). Real rate of interest is the minimum rate that must be earned by savers to induce them to divert the use of their resources from present consumption to future consumption. Nominal interest rate on any investment is partially determined by the real interest rate plus a premium for the expected rate of inflation.

\[(1 + \text{nominal rate}) = (1 + \text{real rate}) + (1 + \text{inflation rate})\]

Lenders are also concerned about various risks undertaken when making loans and investments: Default Risk, the risk that borrowers will default on the obligations to repay interest and principal. Interest Rate Risk, the uncertainty about what interest rate to charge when a loan is made. Prepayment Risk, the risk that the loan will be repaid when interest rates fall below the contract rate. Liquidity Risk, securities that can be easily sold and resold in well established markets will require lower premiums than those that are more difficult to sell. Legislative Risk, The changes in regulatory environment in which markets operate for instance laws affecting interest rates.
Thuo (2012) did a study on the effects of interest rates volatility on stock prices. The objective of his study was to establish the relationship between interest rates volatility and stock market returns in the Nairobi Securities Exchange. The study found that with an increase in interest rates, people tend to deposit their savings in bank accounts rather than investing in the stock market. He also found that increase in interest rates reduces the profitability of firms and thus stock prices go down.

Lilian (2012) investigated the effect of flexible interest rates on the growth of mortgage financing in Kenya. The main objective of her study was to examine how flexible interest rates affect the growth of mortgage financing on Kenya. Her study found that interest rates had significant negative effect on the mortgage output of the sampled financial institutions. The results of these two studies are consistent with the expectations.

2.6 Conclusion

The theoretical literature on how interest rates affect property prices is inconclusive. Empirical literature shows that increase in interest rate forces an increase in property prices to cater for the cost of borrowing. However, the studies don’t seem to incorporate property buyers who are cash purchasers – How increased inflation (which is a component of interest rate) affect their purchasing power. General studies indicate that there has been a steady increase in the demand for property in Kenya over time. This forms the motivation of the study. It becomes important to establish the impact of interest rates on property prices in Kenya; not just for mortgage but also for cash buyers.
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction
This chapter dealt with the research method that was adopted and the analysis of the data collected. This study entailed a descriptive survey design; the population that was the Kenya property market, sample design, data collection and analysis.

3.2 Research Design
In this study a descriptive survey was used. Descriptive study was undertaken in order to ascertain and be able to describe the characteristics of the variables of interest in a situation. “It used to explore causation in order to find underlying principles.” (Yin, 2009).

3.3 Population
A population is an entire group of individuals, events or objects having common characteristics that conform to a given specification (Mugenda & Mugenda, 2003). The population of this study consisted of all properties–standalone house/ bungalows/ cottages/ villas, town houses/ maisonettes and apartment constituted in the Hass Property Index.
3.4 Sample
Sampling is the process of selecting a sufficient number of the right elements from the population (Groves, 2010). This study adapted a census study of all the properties in the Hass Property Index. Efficiency was improved in a census, in that more information could be obtained by using the approach.

3.5 Data Collection
Data collection is gathering empirical evidence in order to gain new insights about a situation and answer questions that prompt undertaking of the research (Flick, 2009). Secondary data collection technique was employed, and was done through the analysis of information from the Hass Property Index and from the Central Bank of Kenya Monetary Policy Committee database, all of which are publicly available.

3.6 Data Analysis
The analysis of data used statistics to evaluate and identify the relationship between interest rates and property prices in Kenya. A simple regression model analysis was used. Lionel and Khalid (1995) indicate that regression analysis is used where a particular internal attribute measure may have a significant impact in a variant context.

The model employed was based on the simple regression model:
\[ Y = \beta X_1 + \epsilon \]
Translating the variables then indicates that the formula was applied as follows: Where:-

Y - Real Estate Price

$X_1$ - Interest Rates

$\beta$. Determines the relationship between the independent variable $X_1$ and the dependent variable $Y$

$u_i$ - Normally distributed error term

Real estate prices were determined as listed in the Hass property index which are quoted quarterly and started in 2004.

Interest rates were quoted as listed monthly in the Central Bank of Kenya Monetary Policy Committee data base.

The model was run using the SPSS model so as to determine the relationship between the two variables.

Since the data was secondary, the researcher did not collect any invalid or unreliable data and as such it was not necessary to conduct tests of validity and reliability.
CHAPTER FOUR
DATA ANALYSIS AND INTERPRETATION

4.1 Introduction
This chapter presents data analysis and interpretation. The objective of the study was to establish the effect of interest rates on real estate prices in Kenya. The population of the study consisted of all properties – standalone house/bungalows/cottages/villas, town houses/marionettes and apartment constituted in the Hass Property Index. Secondary sources were obtained from the Hass Property Index and from the Central Bank of Kenya Monetary Policy Committee.

4.2 Descriptive Statistics
Table 4.1: Annual averages for key statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>House Prices</th>
<th>Interest Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>15,392,460</td>
<td>8.60</td>
</tr>
<tr>
<td>2006</td>
<td>15,309,653.5</td>
<td>7.40</td>
</tr>
<tr>
<td>2007</td>
<td>16,709,972</td>
<td>6.45</td>
</tr>
<tr>
<td>2008</td>
<td>19,096,738.25</td>
<td>7.29</td>
</tr>
<tr>
<td>2009</td>
<td>20,350,973.75</td>
<td>7.48</td>
</tr>
<tr>
<td>2010</td>
<td>22,386,071.13</td>
<td>5.32</td>
</tr>
<tr>
<td>2011</td>
<td>24,624,678.24</td>
<td>3.78</td>
</tr>
<tr>
<td>2012</td>
<td>27,087,1,46.06</td>
<td>16.15</td>
</tr>
</tbody>
</table>
From the data sample, the average house prices have been on the rise for the 8 year period to 2012. However, the data from the central bank on the interest rates depict a variation and inconsistency.

**Table 4.2: Descriptive statistics for House Prices**

<table>
<thead>
<tr>
<th>Year</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>15210303.00</td>
<td>15682819.00</td>
<td>15521791.0000</td>
<td>269808.26760</td>
</tr>
<tr>
<td>2006</td>
<td>15070019.00</td>
<td>15284622.00</td>
<td>15189757.6667</td>
<td>109442.50201</td>
</tr>
<tr>
<td>2007</td>
<td>16282188.00</td>
<td>16684129.00</td>
<td>16437352.6667</td>
<td>216064.02980</td>
</tr>
<tr>
<td>2008</td>
<td>18201965.00</td>
<td>19414782.00</td>
<td>18712929.3333</td>
<td>628538.01454</td>
</tr>
<tr>
<td>2009</td>
<td>19996447.00</td>
<td>20725803.00</td>
<td>20385243.3333</td>
<td>367062.83616</td>
</tr>
<tr>
<td>2010</td>
<td>21996091.70</td>
<td>22798383.30</td>
<td>22423767.6667</td>
<td>403769.11978</td>
</tr>
<tr>
<td>2011</td>
<td>24195700.87</td>
<td>25078221.63</td>
<td>24666144.4333</td>
<td>444146.03176</td>
</tr>
<tr>
<td>2012</td>
<td>26615270.96</td>
<td>27586043.79</td>
<td>27132758.8767</td>
<td>488560.63195</td>
</tr>
</tbody>
</table>

The findings as depicted in table 4.3 shows that the lowest value for house prices as 15,070,019.00 in year 2009 and 2006 while the highest as 27,132,758.8767 in 2012. Additionally a high standard deviation is an indication of variation in house prices. However a consistent rise in the values from 2005 depicts that the demand for real estate in Kenya has been on the rise for the last 8 years.
Table 4.3: Descriptive statistics for Interest Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>8.54</td>
<td>8.64</td>
<td>8.600</td>
<td>.05292</td>
</tr>
<tr>
<td>2006</td>
<td>7.06</td>
<td>7.72</td>
<td>7.3967</td>
<td>.33020</td>
</tr>
<tr>
<td>2007</td>
<td>6.30</td>
<td>6.57</td>
<td>6.4533</td>
<td>.13868</td>
</tr>
<tr>
<td>2008</td>
<td>7.12</td>
<td>7.44</td>
<td>7.2933</td>
<td>.16166</td>
</tr>
<tr>
<td>2009</td>
<td>7.36</td>
<td>7.67</td>
<td>7.4800</td>
<td>.16643</td>
</tr>
<tr>
<td>2010</td>
<td>4.59</td>
<td>5.98</td>
<td>5.3200</td>
<td>.69764</td>
</tr>
<tr>
<td>2011</td>
<td>2.77</td>
<td>5.08</td>
<td>3.7800</td>
<td>1.18199</td>
</tr>
<tr>
<td>2012</td>
<td>13.77</td>
<td>18.52</td>
<td>16.1533</td>
<td>2.37504</td>
</tr>
</tbody>
</table>

From the findings, the lowest interest rate value was 2.77 in 2011 while the highest was 18.52 in 2012. In addition the standard deviation from 2005 to 2010 was below 0, indicating slight variation in interest rates. On the other hand 2011 and 2012 depicted high standard deviation, implying high variation. The variability in interest rates indicates that the financial market in Kenya is quite unstable and unpredictable.

4.3 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.
A value of 0 indicates that there is no association between the two variables. A value greater than 0 indicates a positive association, that is, as the value of one variable increases so does the value of the other variable. A value less than 0 indicates a negative association, that is, as the value of one variable increases the value of the other variable decreases. Pearson’s Correlation Coefficient was carried out and the results obtained are presented in table 4.6 below.

Table 4.4: Pearson’s Correlation Coefficient Matrix

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Estate Price</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Interest Rates</td>
<td>0.363**</td>
<td>1</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.05 level (2-tailed).

4.3.3 Relationship between Real Estate Price and Interest Rates

The findings revealed a significant positive relationship between real estate price and interest rates ($r = .363**$, P-value < 0.05), thus, implying that interest rates influences real estate price in the Kenyan market.

4.4 Regression Analysis

Regression analysis is the statistical technique that identifies the relationship between two or more quantitative variables: a dependent variable, whose value is to be predicted, and an independent or explanatory variable (or variables), about which knowledge is available. The technique is used to find the equation that represents the relationship
between the variables. Regression analysis is used to understand the statistical dependence of one variable on other variables. The technique can show what proportion of variance between variables is due to the dependent variable, and what proportion is due to the independent variables. The relation between the variables can be illustrated graphically, or more usually using an equation. The study adopted a simple linear regression guided by the following model:

\[ Y = \beta X_1 + u \]

Where:

- \( Y \): Real Estate Price
- \( X_1 \): Interest Rates

\( \beta \): Determines the relationship between the independent variable \( X_1 \) and the dependent variable \( Y \)

- \( u \): Normally distributed error term

**Table 4.5: Model Summary**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.363(^a)</td>
<td>.132</td>
<td>.101</td>
<td>2.57967</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), IR
In this case, the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) $R^2$ equals 0.132, that is, interest rates explain 13.2% of the variance in real estate prices.

Table 4.6: ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>28.277</td>
<td>1</td>
<td>28.277</td>
<td>4.249</td>
<td>.049</td>
</tr>
<tr>
<td>Residual</td>
<td>186.331</td>
<td>28</td>
<td>6.655</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>214.609</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), IR

b. Dependent Variable: Real Estate Price

In this case, the significance value of the F statistic is 0.049 indicating that the predictor variable (interest rates) explains a variation in real estate prices and that the overall model is significant.
Table 4.7: Coefficient

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>-10.738</td>
<td>6.853</td>
<td>-1.567</td>
</tr>
<tr>
<td>IR</td>
<td>0.631</td>
<td>0.074</td>
<td>.056</td>
<td>8.527</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Real Estate Price

### 4.4.1 Regression equation

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

\[ ROA = -10.738 + 0.631 \text{ IR} + e_t \]

Regression analysis reveals the extent to which interest rates significantly predicts the real estate prices. The supremacy in prediction is determined by a beta coefficient of 0.631. The findings suggest the house prices are greatly affected by interest rates as regulated by the Central Bank of Kenya (CBK).

### 4.5 Summary and Interpretation of Findings

This study examines how interest rate volatility affects the real estate prices in Kenya. From the findings, the average house prices have been on the rise for the 8 year period to 2012. However, the data from the central bank on the interest rates depict a variation and inconsistency. From house prices, the lowest value for house prices as 15,070,019.00 in years 2009 and 2006 while the highest as 27,132,758.8767 in 2012. However a consistent rise in the values from 2005 depicts that the demand for real estate in Kenya has been on the rise for the last 8 years.
Descriptive statistics for interest rates indicate that the lowest interest rate value was 2.77 in 2011 while the highest was 18.52 in 2012. On the other hand 2011 and 2012 depicted high standard deviation, implying high variation. The variability in interest rates indicates that the financial market in Kenya is quite unstable and unpredictable.

From the regression analysis, the findings suggest the house prices are greatly affected by interest rates as regulated by the Central Bank of Kenya (CBK). One of the market fundamentals are interest rates and these are mostly regulated by government. A good explanation of the impact of a rise or fall in interest rates would be that an increase in the interest rates means that prices tend to fall or increase at a slower rate. This is because it is more expensive to borrow and indirectly people have less to spend. (Dixit, A., 1993) This is seen as the economy slows down and prices increase less or even decrease. The changes in interest rate will not be immediately reflected in the prices. Normally it takes a couple of months before this is reflected in prices of both consumer goods and the property market. Not only are people affected by recent changes to house prices but the t-1 period also becomes important to house buyers as they are influenced by recent nominal interest rates changes rather than real figures.

With the decrease in nominal rates and the recent development in real estate products the ability to buy a house dramatically increases. Although the amount of floating real estate prices has made the property market more volatile. Some of these financial products, such as fixed rate, led to homeowners defaulting at the end of their term as interest rates had risen sharply (He, & David 1995). This was one of the reasons for the start of the
credit crunch. Inflation is the sustainable increase of goods and services. Inflation is measured in an annual percentage rate and shows the purchasing power in comparison to previous years. The rate of inflation has thus an effect on real estate prices. The higher the rate of inflation the higher the increase in real estate prices, until at some point the prices reach such levels that people can no longer afford to buy.

Another factor is the growth in GNP or economic growth. There is an expectation that when national income increases, this inevitably leads to higher real estate prices. Higher GNP makes it easier for people to buy property which in turn leads to more demand in the market which indirectly stimulates property prices. Research conducted by Gregory Sutton (Explaining Changes in property Prices) with regard to property price increases in the US, UK, Canada, Ireland, the Netherlands and Australia (1995-2001) shows that a 1% increase in GNP is associated with a 1% - 4% rise in house price after 3 years (World Bank Institute’s 2008).

GNP and interest rates not only affect property prices, but it would appear that the stock market may also contribute to fluctuations in property prices. In the same study, Sutton suggests the existence of a positive relationship between changes in equity and house prices. The model shows that an increase in share prices in Canada, Ireland and the United States reflect 1% increase in house prices after 3 years. For The Netherlands and Australia this was a 2% increase and in the UK 5% (World Bank Institute’s 2008).
However these results were only tested in 6 countries over a period of 7 years. To get a more reliable picture and in order to be able to use this data for this thesis, more countries worldwide should be adopted and the research conducted over a longer period. This would establish as to whether the rise and fall of equity prices really is related to fluctuations in property prices.

It is a task of government to regulate factors such as interest rates and fiscal policies which can positively influence the wider economy as well as the real estate market. The main reason for monetary policy is price stability. This means that prices do not increase too rapidly (Inflation) or decrease too rapidly (deflation). If prices move by just less than 2% per annum over the medium term there is price stability (Evans, 1990). This is important for consumers as well as entrepreneurs; they have to have trust in the value of their currency. When people lose faith in the currency, high increases and decreases of prices will lead to uncertainty and undermine the economy. Price stability is therefore a prerequisite for a healthy economy.

There are a few tools to regulate price stability. Every country applies this in its own way. In some areas, such as the European Union, a wider scope of price stability is emphasized by strong regulation. The most effective tool for regulation is to adjust interest rates.

(Dedigama, et al 2009) Monetary policy has implications for the housing market. House prices are affected by the regulation of interest rates. If a government raises the interest rates it means house prices become more expensive. This in turn leads to more people
entering the rental sector as opposed to buying a property. It is interesting for property buyers to know if a government plans to make adjustments in the interest rate in the short or long term.

During the credit crunch when many financial markets are in a state of collapse, new fiscal policies are being applied to them. According to (World Economic Outlook 2009, Policy Challenges) are interest rates in advanced economies to be lowered or remain near the zero bound and Central banks try to find new ways to ease credit conditions and provide liquidity. It is always important to compare interest rates with house prices. In the last 20 years property prices in worldwide have greatly increased as interest rates have declined. Individuals have reacted to low interest rates and innovative financial products to buy larger houses and in many cases, second homes. They have seen their investments rise to unprecedented levels. Different countries used different types of mortgage products as well as fixed and variable interest rates. The conclusion is that variable rates make for a more volatile housing market.
CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This chapter presents summary of findings, conclusion and recommendations. The aim of the study was to examine the effect of interest rate volatility on real estate prices in Kenya. The empirical literature shows that increase in interest rate forces an increase in property prices to cater for the cost of borrowing. However, the studies don’t seem to incorporate property buyers who are cash purchasers – how increased inflation, (which is a component of interest rate) affect their purchasing power. General studies indicate that there has been a steady increase in the demand for property in Kenya over time. This forms the motivation of the study. It becomes important to establish the impact of interest rates on property prices in Kenya; not just for mortgage but also for cash buyers.

From the findings, the average house prices have been on the rise for the 8 year period to 2012. However, the data from the central bank on the interest rates depict a variation and inconsistency. From house prices, the lowest value for house prices as 15,070,019.00 in years 2009 and 2006 while the highest as 27,132,758.8767 in 2012.

Descriptive statistics for interest rates indicate that the lowest interest rate value was 2.77 in 2011 while the highest was 18.52 in 2012. On the other hand 2011 and 2012 depicted high standard deviation, implying high variation.
5.2 Conclusions

The aim of the study was to examine the effect of interest rate volatility on real estate prices in Kenya. The study concluded that the average house prices had been on the rise for the 8 year period to 2012. On the other hand, the study concludes that the lowest value for house prices was 15,070,019.00 in years 2009 and 2006 while the highest was 27,132,758.8767 in 2012. However a consistent rise in the values from 2005 depicts that the demand for real estate in Kenya has been on the rise for the last 8 years.

The study also concluded that the lowest interest rate value was 2.77 in 2011 while the highest was 18.52 in 2012. On the other hand 2011 and 2012 depicted high standard deviation, implying high variation. The variability in interest rates indicates that the financial market in Kenya is quite unstable and unpredictable.

The findings revealed a significant positive relationship between real estate price and interest rates thus, implying that interest rates do influence real estate price in the Kenyan market.

Due to the high demand for houses, the property market in Kenya will continue to be strong. The property market is a good store of value and also a great source of rental income in addition to capital gains. Due to the high demand and despite the volatile interest rates Kenyan families will opt for less expensive home units that they can afford, or alternatively purchase a piece of land and construct. Though high inflation and interest rates erodes disposable income and purchasing power, and so do interest rates, Kenyans will continue to spend a substantial portion of their income to pay rent.
5.3 Policy Recommendations

The Government should ensure political stability which is one of the factors that affect bonding social capital which is essential in boosting the real estate investment in Kenya. The employees in the financial institutions that give out mortgages in Kenya should be trained further to enhance their knowledge on the real estate product so that they are competent enough to answer customer specific queries and requests.

Banks that offer mortgages should ensure promptness of the authorization and approval process of mortgage loans and appropriateness of the approval process. The government should implement policies that reduce on the interest rates that financial institutions charge on mortgages. A law should be passed where Kenyans can’t build their own homes unless they go through real estate developers like it is done in the developed countries. This will reduce on the risk of non-occupancy where developers have got stuck with houses because an ordinary Kenyans thinks it cheaper to build their own house rather than purchase the expensive homes from real estate developers.

To the financial analysts, it is important to realize the need to sensitize their clients to do more investment in real estate because there is demand for housing. Further, they need to let financial banks realize that real estate investment is not exhausted financing so that they can open up possibilities for their client who would like to venture in the same.
5.4 Limitations of the study

This study had several limitations. First, it is possible that the nature of data 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 data 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 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.

Correlations among the variables may be causing unanticipated results despite the efforts at identifying potential multi collinearity problems.

Finally, the time limitation for this study could not allow in-depth analysis more effects of interest rate volatility on real estates in Kenya. At the same time the findings were based on a relatively small sample that may have influenced the nature of results that were obtained.
5.5 Recommendations for Further Research

The time limitation for this study could not allow in-depth analysis more effects of interest rate volatility on real estates in Kenya. At the same time the findings were based on a relatively small sample that may have influenced the nature of results that were obtained. There is need therefore to expand on the sample size and carry out similar research in other real estate companies in order to draw conclusions and provide information that is sufficient for policy development.

Some big names in Kenya’s corporate world and also some individuals are taking a long term view in terms of investments. For instance British American Investment Company, a big shareholder in the Equity Bank group and Housing Finance, is focusing more on real estate. It’s therefore recommended for a study to be done on the impact the increase number of participants in the real estate market has on the industry.

It has become increasingly vital for buyers entering the property market at a time when the supply of new homes is suddenly contracting and even being suspended, to choose solid and reliable developers with strong guarantees. This is following instances like when Government ordered the house razed that were constructed on property belonging to Kenya Airport Authority meant for future expansion. A study needs to be done on the impact such instances have had on the industry.
REFERENCES


APPENDIX I: INTEREST AND PRICE DATA

Monthly data on interest rates

<table>
<thead>
<tr>
<th>Month/Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
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<tbody>
<tr>
<td>JANUARY</td>
<td>8.26</td>
<td>8.23</td>
<td>6.00</td>
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<td>8.46</td>
<td>6.56</td>
<td>2.46</td>
<td>20.56</td>
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<td>FEBRUARY</td>
<td>8.59</td>
<td>8.02</td>
<td>6.22</td>
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<td>7.55</td>
<td>6.21</td>
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<td>6.90</td>
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<td>5.98</td>
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<tr>
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<tr>
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</tr>
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<td>8.98</td>
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<td>2.21</td>
<td>16.14</td>
<td>9.80</td>
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<tr>
<td>DECEMBER</td>
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<td>5.73</td>
<td>6.87</td>
<td>8.59</td>
<td>6.82</td>
<td>2.28</td>
<td>18.30</td>
<td>8.30</td>
</tr>
</tbody>
</table>
### Hass Property Index prices (KES)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Hass House Prices (KES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q 1 2005</td>
<td>15,682,819</td>
</tr>
<tr>
<td>Q 2 2005</td>
<td>15,672,251</td>
</tr>
<tr>
<td>Q3 2005</td>
<td>15,210,303</td>
</tr>
<tr>
<td>Q4 2005</td>
<td>15,004,467</td>
</tr>
<tr>
<td>Q 1 2006</td>
<td>15,070,019</td>
</tr>
<tr>
<td>Q 2 2006</td>
<td>15,214,632</td>
</tr>
<tr>
<td>Q3 2006</td>
<td>15,284,622</td>
</tr>
<tr>
<td>Q4 2006</td>
<td>15,669,341</td>
</tr>
<tr>
<td>Q 1 2007</td>
<td>16,282,188</td>
</tr>
<tr>
<td>Q 2 2007</td>
<td>16,345,741</td>
</tr>
<tr>
<td>Q3 2007</td>
<td>16,684,129</td>
</tr>
<tr>
<td>Q4 2007</td>
<td>17,527,830</td>
</tr>
<tr>
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<tr>
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<td>18,522,041</td>
</tr>
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<td>Q3 2008</td>
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</tr>
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<td>Q42008</td>
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<td>Q3 2009</td>
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<td>Q4 2009</td>
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