THE RELATIONSHIP BETWEEN INTEREST RATES AND SUPPLY OF HOUSING IN NAIROBI COUNTY

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NOVEMBER, 2016

DECLARATION

Student's declaration

I declare that this study is my original work and has not been handed in by any other student or to any other university.

Signature ……..…..……. Date ……..……..

WAKHANU GRACE NALIAKA

D61/72845/2014

Supervisor's declaration

This study has been submitted for examination purposes with my authorization as the university supervisor.

Signature …….……. Date …….……..

Dr. Lishenga Josephat

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DEDICATION

To my loving parents, Mr. and Mrs. Wakhanu, for the effort they put in laying a firm foundation of hard work towards education and training me to be a resilient individual in order to achieve goals in life.

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TABLE OF CONTENTS

DECLARATION ..... **ii**

ACKNOWLEDGMENT ..... **iii**

DEDICATION ..... **iv**

LIST OF TABLES ..... **ix**

LIST OF FIGURES ..... **x**

LIST OF ACCRONYMS ..... **xi**

ABSTRACT ..... **xii**

CHAPTER ONE: INTRODUCTION **1**

1.1 Background of Study 1

1.1.1 Interest Rates 3

1.1.3 Relationship between Interest Rates and Supply of Housing 10

1.1.4 Supply of Housing in Nairobi 10

1.3 Research Objective 14

1.4 Importance of the Study 15

CHAPTER TWO: LITERATURE REVIEW **16**

2.1 Introduction 16

2.2 Theoretical Review 16

2.2.1 Liquidity Preference Theory 16

2.2.2 Loanable Funds Theory 17

2.2.3 Modern Portfolio Theory (MPT) 18

2.3 Determinants of Housing Supply 19

2.3.1 Inflation 19

2.3.2 Gross Domestic Product (GDP) 20

2.3.3 Interest Rates 20
2.4 Empirical Studies 21
2.4.1 Global Studies 21
2.4.2 Local Studies 22
2.5 Literature Review Summary 24
2.6 Conceptual Framework 25
CHAPTER THREE: RESEARCH METHODOLOGY 26
3.1 Introduction 26
3.2 Research Design 26
3.3 Population 26
3.4 Data Collection 27
3.5 Data Analysis 27
3.5.1 Linear Regression Equation 27
3.5.2 Test of Significance 28
CHAPTER FOUR: RESULTS OF ANALYSIS AND DISCUSSIONS 29
4.1 Introduction 29
4.2 Descriptive Statistics 29
4.2.1 Trend Analysis 30
4.3 Correlation Analysis 31
4.3.1 Correlation between Housing Supply and Interest Rates 31
4.3.2 Correlation between Housing Supply and Quarterly GDP Rates 31
4.3.3 Correlation between Housing Supply and Inflation 32
4.4 Regression Results 33
4.5 Summary and Interpretations of the Findings 35

CHAPTER FIVE: SUMMARY, CONCLUSION AND POLICY IMPLICATIONS 38

5.1 Introduction 38

5.2 Summary 38

5.3 Conclusion 39

5.4 Policy Implications 40

5.5 Limitations of the Study 41

5.6 Suggestions for Further Research 41

REFERENCES 43

Appendix I: Data Collection Letter 52

Appendix II; Data Used 53

LIST OF TABLES

Table 4.1 Descriptive Statistics.....29

Table 4.2 Correlation between Housing Supply and Interest Rates.....31

Table 4.3 Correlation between Housing Supply and Quarterly GDP Rates 32

Table 4.4 Correlation between Housing Supply and Inflation.....32

Table 4.5 Model Summary.....33

Table 4.6 Analysis of Variance.....34

Table 4.7 Regression Coefficients 34

LIST OF FIGURES

Figure 4.1 Trend Analysis 30

LIST OF ACCRONYMS

AFDB	-	African Development Bank
CAFA	-	Center of Housing Finance in Africa
CAHF	-	Centre for Affordable Housing in Africa
CBK	-	Central Bank of Kenya
CBR	-	Central Banking Rate
CDC	-	Commonwealth Development Corporation
EABS	-	East Africa Building Society
HFCK	-	Housing Finance Company of Kenya
HFIs	-	Housing Finance Institution HFIs
MPT	-	Modern Portfolio Theory
NPV	-	Net Present Value
NHC	-	National Housing Corporation
NCCU	-	National Housing Corporation Union
NBIFs	-	Non-Banking Financial Institutions (NBIFs)
S&L	-	Savings and Loan Kenya Ltd
SACCO	-	Savings and Credit Co-operative Societies
USAID	-	United States Agency for International Development

ABSTRACT

This project set out to identify the relationship that existed between interest rates and supply of housing in Nairobi County over the period between 2010 and 2015. To attain the study objective, data covering the period between 2010 and 2015 was acquired from the central bank quarterly reports and Hass consult house sales survey reports. This data was cleaned and organised in a manner that made it possible for analysis by SPSS version 20. The study was undertaken using the quarterly average house sales in Nairobi county, quarterly average lending rates, quarterly GDP rates and quarterly inflation rates data using correlation and regression analysis. The study employed various techniques including trend analysis and multiple regression analysis. Statistical tests for significance were done at 95% confidence level. Regression analysis was done considering heteroscedasticity errors to analyse the relationship between interest rates over the study period. The results indicated by the R square value was 0.041 showed that there was variation of 4.1% in the supply of houses in Nairobi County as a result to changes in inflation rates, GDP growth rate and lending rates at 99% confidence interval ($p<0.01$). The R value, the correlation coefficient, indicates the existence of and nature of the relationship between the variables under study. The results demonstrated that there existed a positive correlation between the variables under study as revealed by the R value of 0.203. The implication of the findings is that interest rates have a little but significant relationship with the supply of housing in Nairobi County. As a result, alteration in the interest rates will have an effect on the unit house sales thus the supply of housing. This study findings compels the government to give price subsidies and tax exemptions or allowances on construction materials to companies engaged in housing construction. This would guarantee increase in house supply to meet the ever increasing demand for housing. Additionally, financial support programmes that will enable supply of affordable shelter to residents of Nairobi County should be put in place. Also, sound macroeconomic environment complemented by the right fiscal and monetary policies to be implemented to ensure growth in income which will result in not only increased supply of housing but also the ability of residents to afford the housing. Further, the government through mandated state bodies should establish measures to maintain sustainable inflation rates. Low inflation rates results in increased housing supply by making products, in this case building material, more affordable which in turn translates to reduced cost of construction and acquisition of new houses.

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Housing is a major aspect of need demanded by human beings. It's also a key sector in the economy due to the impact it creates on a given country's fluctuations in output and inflation (AFDB, 2011). A research by The African Development Bank (AFDB) found that the African continent is experiencing a population boom coupled with strong economic growth rates that were registered in the past decades. In Kenya, 44.9% of the population has been accompanied by rapid urbanization and high demand for housing whose supply is not met since most people living in urban areas have a high demand for houses (AFDB, 2011).The Kenyan market has a wide gap between demand and supply of formal housing thereby affecting the prices of houses.

According to Finscope (2009), a third of houses in Kenya were inherited and just over 1.5% of houses were obtained via credit since it's so expensive to finance housing property. Over 70% of houses in Nairobi are permanent and owned by a few rich people leaving the rest of population in slums. Comparing Nairobi County to other counties, Nairobi has more permanent houses than the rest of the counties. For example most houses in Coastal region and North Eastern are semi-permanent (Finscope, 2012).

Kenya has a larger housing gap in Africa due to an increasing rural urban migration with Nairobi city leading being the capital city of Kenya. This rural urban migration has led to mushrooming of slums hence poor quality housing. One of the strategies in place to bridge a housing gap is mortgages financed by commercial banks.

However this is only affordable by high income groups who are better placed to afford the high interest rates charged by banks. Other solutions especially for low income groups such as low interest loans offered by housing microfinance and cheaper rental housing should be put in place (World Bank Report, 2011).

Everyone wants to live in a good house but most people can't afford due to mortgage access which has either higher interest rates or not accessible to some people especially in the rural areas. Rural areas have no viable market given that residents are low income earners coupled with high costs of developing a distribution network.

Most of the people who can't access mortgages from financial institutions unfortunately form a larger part of population in both urban and rural areas thus contributing to a high demand for housing which is in short supply in Kenya. This poses a great challenge in housing supply for low income earners (World Bank Report, 2011).

One of the challenges facing Kenya population especially in urban centers like Nairobi city is poor living conditions as was captured in the Integrated Urban Development Master Plan for Nairobi County enshrined in vision 2030. Nairobi County is expected to have a population of about 5 million people by the year 2030 at a per annum growth rate of 4.3%. The private sector has taken over housing projects since the central and local administration has failed to provide basic urban facilities. This profit centred sector provides housing for the upper-middle income earners thus encouraging increase of slums (UN-HABITAT, 2011).

According to CAHA, housing is a major need of the population which has led to government involvement in form of social accommodation projects. As a result, housing is not being seen as an economic growth opportunity but rather as a social welfare problem (CAHF 2011).

Acquiring finance in today's mortgage market is a complicated process as it entails many procedures including seeking the best provider and comparing interest rates since high interest rates tend to increase cost thus reducing supply of housing. Borrowers are also thought to feel obliged to use their social networks for information and assistance when making decisions concerning mortgages (Pittman, 2008).

The supply of housing is determined by interest rates in a way that a rise in interest rates influences the cost of borrowing thus discouraging the potential buyers and as a result the demand of housing falls making the supply to decrease. On the other hand when interest rates decrease, cost of housing goes down hence a rise in demand for houses (Igan etal., 2011).

Inflation /GDP rates greatly affect the supply of housing in that when the inflation is high, purchasing power will reduce hence an increase in cost of living standards making most people not to afford housing thus leading to low demand for housing (AmosWEB, 2012).

1.1.1 Interest Rates

According to Amadeo (2012) interest is the charge at which the borrower pays back the lender for the use of the borrowed money, normally expressed as a proportion of the principal for a one year period. It's the percentage charged or compensated for use of money i.e. it is levied when the funds are being borrowed and paid when its being loaned thus makes interest rates to be referred to as cost of borrowing.

Interest rate can also be referred to the annual charge for lending funds which is specified as a fraction of the amount borrowed.

There's a complex link between interest rates and housing in that when the interest rates are low, mortgage payments will be too low hence making the market affordable for homebuyers and vice versa.

High Interest rates means that there are few individuals and enterprises able to afford loans thus reducing the amount of credit offered to fund expenditure which entirely slows the consumer demand (Amadeo, 2012). The impact of high interest rates is that fewer borrowers are able to meet eligibility for loan which eventually results to an increase in supply of housing while on the other hand low interest rates have the reverse consequence on the economy. These rates allow more people to purchase homes thus reducing the supply in housing since the number of houses in the market reduce thus increasing their costs.The overall expense incurred in borrowing will be affected by any change in interest rates i.e. higher interest rates have a propensity to shrink expenditures while lower interest rates are thought to result in increased expenditure (Amos, 2012).

The CBK cut its benchmark interest rate to 10.5 % at its May 2016 meeting because the exchange rate was stable and inflation was expected to decline further in months that were to follow (CBK, 2016). Interest rates in Kenya have risen since 2011 after the Central Bank of Kenya (CBK) increased the Central Banking Rate (CBR) from 7% to 18% in an attempt to curb the run-away inflation and steady the dwindling shilling (Omengo, 2012).

Obongo (2015) opines that the expansion in the mortgage market was expected to decelerate but this was transitory because of an increase in interest rates. The Central Bank of Kenya's MPC raised the CBR from 8.50% to 10% in June the same year in order to stem the shilling's decline against the dollar. The mortgage sector had

expected the thrust in growth registered in 2014 to be continuous in 2015 but the dwindling of the shilling meant that interest rates will go up reminiscent to the situation in 2011 when interest rates went up.

The CBK deputy governor by then reported that the emergent aggregate demand pressures and the unrelenting unpredictability in the global foreign exchange markets together with the projected recovery in international oil prices had repercussions for inflationary expectations. The government thus resolved to enhance its tightening resolve by raising the CBR rate. The area of focus on the relationship of interest rates and supply of housing to be specific is mortgage interest rates. Mortgage interest rates are the compensation a borrower pays a lender for money used to purchase property. According to Ngugi (2016), the CBK governor confirmed that the weighted average mortgage interest rate reported by most institutions in Africa in general was 14.07 % in 2010 and this measures up positively to the average lending rate of 14.64% in Kenya. These mortgage rates are consistent with commercial bank lending rates given that the higher risk premiums are linked with mortgages (Ngugi, 2016).

According to Ngugi (2016), the peak mortgage interest rate accounted in 2010 was 18.50% while the least was 6.50 %. When inflation rates plunge it results in harmful consequences. For instance banks tend to show downward resistance preferring to boost their margins than reduce their lending rates. Mortgage rates were expected to have plummeted to their lowest levels yet as is the case in many advanced economies. The nonexistence of a strong connection to capital market funding and the absence of consumer price flexibility imply that banks are able to lend at rates which are significantly higher than their cost of funds. The intricacy with such a high interest

margin for term finance is that it has to be additional to the capital market rate as established by the yield curve. Amid long term funds presently costing in excess of 12% which would signify mortgage rates is closer to 20% (Ngugi, 2016).

Lenders have the ability to pool funds and partially use their capital, deposit bases and other sources of funds with an aim of realizing a lower cost of funds. However, the net interest margin has to decrease if financial access is to improve in the long run**.** In the last quarter of 2015, housing Finance and Family Bank had the lowest loan rates while Middle East Bank and Guaranty Trust Bank were the most expensive.

The process of introducing cheap credit in banks is meant to promote competition and transparency in pricing of loans and reign in on high interest. In the personal loans category of between one and five years, K-Rep Bank at 25.7 % offered the most expensive credit as at mid-December 2015 while Consolidated Bank was second charging 25.4 % interest as 15th December 2015.The lender with the third cheapest personal loans is Middle East Commercial Bank at 24.2%. UBA Bank takes the number four slot at 24.1 per cent on personal loans. Guaranty Trust Bank charged 23.7 % interest (Omengo, 2012).

Igan et al., (2011) argued that an increase in interest rates influences the cost of borrowing, thus discouraging the prospective buyers and as a result the demand of housing drops. Conversely, when interest rates decline for example supply of money grows then the user cost of housing decreases hence a rise in demand for houses. According to Andrews (2010) there's a negative association between house prices and loan interest rate which also depends on the competitiveness in the banking sector.

An increase in the demand for goods and services which is generated by rapid creation of money cannot be matched by increase in supply. In such scenarios the excess demand raises the price thus leading to inflation. High interest rates affect individuals and institutions demand for financial assets and credit whereby higher interest rates tend to increase prices and inhibit the growth in credit (Todaro, 2009).

According to Barksenius (2012), both domestic and international interest rates have an impact on residential houses of which are divided into four types i.e. treasury bill rate, real interest rates, mortgage rates and long term interest rates. Nominal and real interest rates always reflect the status of the current and future investment opportunities.

According to Chetty (2007), the Net Present Value (NPV) and value of waiting is affected by an alteration in the rate of interest. The effect on the value of waiting is stronger when the interest rate is lower than that on the NPV and vice versa making the investment to reduce when the interest rates are low but amplifies when the interest rates are high.

1.1.2 Supply of Housing

According to Centre for Affordable Housing in Africa (CAHF) and Center of Housing Finance in Africa (CAFA), supply of houses is a crucial aspect in the today world. The bargaining power of participants in the industry can be extended by elevating the prices or dropping the quality of purchased goods and services. The higher the growth rate, the higher the rate of urbanization hence higher demand for housing.

The ministry of housing estimate in 2011 to the market was 50,000 units generating a 156,000 units deficit that led to an addition of 2,000,000 units backlog of which in 2012, 85,000 units were added to this accumulation (CAFA, 2011; CAHF, 2012).

According to Anyamba (2004), a building plan with empty spaces had been left out in 1973 so the National Housing Corporation (NHC) had to fill this space in Nairobi West Madaraka estate. NHC also demolished bungalow houses belonging to Kenya Railways to put up flats with 30 housing units per flat so as to increase housing supply in Nairobi County. This was meant to maximize land space and profits since all this has led to emergence of high raised flats. There are implications in supply of housing population wise and price wise.

The populations that have not been catered for or can't afford high housing prices are left with no choice but to resort to self-built and informal housing which transforms into slums in the city areas. Over 30% of Kenya's population lives in slums; Nairobi with 1 million out of 3.2 million with a 3% residing in permanent house walls with water and electricity. Price wise, houses built in the outskirts of Nairobi tend to fetch higher prices compared to those built in Nairobi town. Increase in prices leads to opportunities in profit making in that those with enough cash buy houses on toss the property at the end of construction phase since there will be null risks or a couple of years later where rates grow well above inflation (World Bank, 2011).

According to The Fin Access Survey (2009), Kenya home possession levels are soaring as compared to economies in Europe and North America but just with a difference between owner-ship in sub-urban and city areas.

Approximately 69% of most people live in their own personal houses but this is considerably dissimilar in urban and rural areas which are at 18% and 82% respectively. Those who don't own homes are either renters or lodgers. The survey found out that a third of house-owners got inherited their homes while just

about 1.5% purchased their homes via credit. Approximately half of Nairobi-based home owners purchased their houses while in other regions it's projected to be at 2%. Those prepared to provide their home as security to borrow money are at 33.6% and 17.3% in Nairobi and North Eastern respectively.

According to Ochieng (2007), Kenya is growing in size and population hence provision of urban services is not at pace with the demand. The Kenyan government responded to this urban growth projections especially in Nairobi city by using the Kenya Vision 2030 project to redefine Nairobi Metropolitan region and create a world class city.

National Housing Corporation Union (NCCU) and Pamoja Trust are corporations which are also involved in housing delivery for socio-economic disadvantaged groups.

Kenya has been experiencing an increasing and uneven economic growth since 1964. A growth rate of 0.12% which was the worst was experienced in 2001 but recovered to 7% in 2007. In 2003, the Kenyan government and UN-HABITAT reached an agreement to improve slums and settlements which are informal in Nairobi. Supply of infrastructure by the government is to be set up to implement this project. The Civil Servants Housing Scheme Fund which targets to civil servants by providing loan facilities, constructing housing unit for sale and leasing and acquiring funds for implementation of the above.

Kenya informal Settlements Improvement Project is a program spearheaded by the World Bank to improve conditions in informal settlements by enhancing tenure security and improving off-site infrastructure (Shelter Afrique, 2013).

1.1.3 Relationship between Interest Rates and Supply of Housing

This research was meant to show if there exists a correlation between interest rates and supply of housing. According to Atchison Consultants report (2013), there has been complex links between interest rates and housing prices which in turn affect the supply of houses. Low interest rates stimulate housing markets since mortgage payments are lowered making the houses more affordable for the homebuyers.

This indicates the rapport between mortgage interest rates and prices of houses which rise when interest rates fall. This relationship was observed until the 2007 financial crisis where interest rates fell sharply as well as housing prices thus breaking this relationship temporal. This financial crisis was due to the credit freeze that started with the collapse of loan market since it had been a shock to financial markets that turned into economic stress.

Interbank lending rates froze since banks struggled to maintain liquidity thus leaving borrowers without access (Ming, 2013). Basing on the demand and supply theory, housing products and services are established by demand and supply mechanisms available in the market. In this case, housing supply is inelastic making it to be expensive to be afforded by most people. Economic conditions affect prices of houses which in turn affect the supply. This has become a major concern to the government and individuals since depending on the economy of a country, housing supply will be high or low (Selim, 2009).

1.1.4 Supply of Housing in Nairobi

The housing market in Nairobi County is unique compared to other Counties in Kenya. The County governments came into existence following the declaration of the Kenya Constitution in 2010 which created 47 Counties in Kenya (The

Constitution of Kenya, 2010). Out of the 47 Counties in Kenya, Nairobi County is unique since the Kenyan Capital City of Nairobi is in the County. Consequently, the housing market is highly constrained due to overcrowding, congestion and spatial challenges. Nairobi County has an estimated population of more than 3 million people as per the last census of year 2009 as per the Kenya National Bureau of Statistics Web.

With the high rate of rural urban migration and the fact that Nairobi is the metropolitan city, Nairobi County faces special problems of housing which include: overcrowding, pollution, congestion, poor planning, insecurity and infrastructural challenges among others. Nairobi contributes about 50% of Kenya's GDP with housing being a key factor. Nairobi has been considered to be largely multi-ethnic compared to other counties in Kenya thus being a major labor market in Kenya. It is projected that more than 25% of Kenya's urban inhabitants live in Nairobi (Oundo, 2011)

Private developers and contractors dictate housing development in most urban areas with the administration playing more of an enabling function. The private sector, a profit motivated sector, has over intensified its efforts in providing accommodation for the high income and those preordained for the middle income are never reasonably priced for the targeted faction.

Middle income earners have thud been forced to occupy housing meant for low-income earners, subsequently pushing them out into slums and substandard settlements and as a result causes a housing shortage for the low and middle income. Housing has become a problem in Nairobi County especially for low and middle Income housing estates. This has occurred at along with an increasing population and insufficiency of land for housing and other amenities leading to a housing shortage and farther to construction of informal dwellings (Matindi, 2007).

According to Okeyo (2013), the demand for housing in Nairobi has grown over the last years which has led to high rent for a single self-contained house in most estates especially for the high-end neighborhoods such as Westlands, Kileleshwa and Kilimani. A one-bedroom house in these areas costs up to Kshs.14,000.00 while those renting a three-bedroom housein a gated community pay more than Kshs.22,000.00.

The rise in housing sector is an indication that Nairobi's property market has finally matured. Murungi (2010) gave an example of a three bedroom flat in Kilimani or Hurlingham which was sold at a price of Kshs.3.5m to Kshs.4.0m some few years ago.The same houses in 2010, they were sold between Kshs.7.0m to Kshs.8.5m while an acre of serviced land in Hurlingham area rose from Kshs.18.0m to Kshs.40.0m over the last four years. In Nairobi's South B and SouthC areas, houses that were selling for Kshs.4.0m in 2004 are now selling at Kshs.7.5m (Murungi, 2010).

1.2 Research Problem

The demand for houses has immensely gone up in the last decade but their supply has been insufficient. Generally, real estate to a great extent relies on investment from loaned finances. In general, real estate value is exaggerated by the cost of financing and as a result it impacts on the number of units demanded and the ability to afford (Leah, 2012). Housing affordability problem in Kenya is a major challenge especially for the low income earners who either the houses built are too expensive for their affordability with the average mortgage loan or the mortgage payment rates are too high for their affordability. This has caused many Kenyan families to spend

in excess of 30-35% of their earnings on housing. Such families are considered to be cost laden and may have trouble managing to pay for other requirements such as provisions, clothes, transport and health care (Hurt, 2010).

There are related studies conducted to show the link connecting interest rates and cost of housing in Kenya. For instance, a study conducted by Akumu (2014) on the relationship between selected macro-economic variables and residential housing property returns in Kenya concluded that most variations in house prices follow development of roads, public facilities, supply of electricity and water. The results show that GDP, public debt and money supply are positively related with returns in house prices in Kenya. As expected there is a negative correlation among rental income, inflation, exchange rate and interest rates and house prices.

Another study conducted by Ngochoch (2013) on relationship between cost of finance and demand for housing units in Nairobi county which concluded that demand for purchase of housing units is negatively affected by the high cost of finance arising from high interest rates; legal, appraisal and ledger fees on stamp duty, title search, insurance policy, credit check fees loans, making it expensive. Besides, banks load closing cost on loan products making their financial products unaffordable to most customers (Ngochoch, 2013).

Muthaura (2012) studied the relationship between interest rates and real estate investment in Kenya and found out that real estate investments will continue to be pricy unless the government comes in from time to time to control interest rates and factors that contribute to rising interest rates such as inflation, mainly fueled by consumption of goods which are normally taxed heavily.

According to Kariuki (2013), high interest (mortgage) rates negatively affect both the home buyers and rental property buyers since they cause the land lords to increase the rents so as to offset the high mortgage repayments causing people who cannot afford the high rents to turn to informal settlements for their housing needs (World Bank, 2011).

Most people in urban areas can access loan facilities to buy houses while those in rural areas can't force them to live in slums. The high level of unaffordability of housing has led to the low demand for housing hence low supply of houses especially for the low income earner as property developers have concentrated their efforts on the middle and high income market segment where there is sufficient demand of housing (Economic and Social Rights Centre, 2012).

Although interest rates affect the supply of housing, this relationship has never been investigated in terms of how levels of interest rates relate to the cost of houses as a ratio of Gross Domestic Product (GDP).

This study hence seeks to ascertain the levels of interest rates in relation to the GDP and how this has impacted on supply of housing in Nairobi County to bridge the gap of housing supply between high interest rates and low and low interest rates. The question the researcher is asking is; what is the relationship between interest rates and the supply of housing in Nairobi County?

1.3 Research Objective

The general objective of the study was to ascertain the relationship between interest rates and supply of housing in Nairobi County.

1.4 Importance of the Study

This study will benefit homeowners and commercial real estate investors since mortgages are considerably expensive and only the fully established developers and high-income earners afford them. In Kenya, the property market is wide open for all investors i.e. its most people's dream to own their own home.

For this to be successful real estate, investors need to understand the relationship that exists between interest rates and the supply of residential houses more so how to manage these interest rates using the monetary policy.

To the financial analysts, this study is intended to help them when giving counsel their clients in making financial choices. It would also rouse other researchers to conduct similar studies on the effects of interest rates on the supply of property in other counties in Kenya.

The real estate agents and real estate brokers would also benefit from this study by knowing how real estate purchase patterns to help them advice their clients who in this case are sellers and buyers.

This business people would also profit since they would be able to make knowledgeable picks in the real estate property venture, know what aspects to consider, available investment choices, timing of investment and how investing in the right manner.

In conclusion, the outcome of this paper will also help other academicians who would be looking for information as they use the results attained in furthering of their studies thus serving as a revelation to them in relation to trends of real estate property value.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviews literature on the relationship between interest rates on the supply of housing by highlighting the trends related to the study topic. It included study areas, theoretical approaches and findings. It outlined some of the gaps identified. This section provided support to the study current study and also provided main reference points for the research being carried out.

2.2 Theoretical Review

There are numerous theories in this study that enlighten on how interest rates influence financial system and supply of houses and how they can be utilized to predict prospect changes. The theories covered include liquidity preference theory, loanable funds theories, Portfolio theory and real estate. Each one of these theories formulates suppositions concerning the behavior of characteristics of the economy and focuses on the behaviors of other aspects as predictors of the existing interest rates.

2.2.1 Liquidity Preference Theory

According to Obondy (2013), this theory was first developed by Keynes (1936). Liquidity is the expediency of holding cash. The liquidity preference theory was developed as a short-term theory aimed at providing policymakers with significant theoretical evidence in explaining near-term changes in interest rates.

Keynes refers to the rate of interest as a payment for the use of limited resource i.e. money in terms of cash balances. Also interest rates can be referred to the price that must be paid to money holders to give up a perfect liquid asset. Even if money's yield

is typically low or even non-existent, companies and individuals always favour holding money for conducting daily business as a preventative measure against future need for cash. In fixed-income securities such as government bonds, investors long to hold money adjacent to falling asset prices (Loyford, 2014).

Keynes believed there were three motives to holding money i.e. transactions motive (where money is held for the current transactions), precautionary motive (money held for the unforeseen) and speculative reason (money held to exploit future alteration in rate of interest). Speculative motive is where money demand is inversely related to the interest rate. Holding money is one way of guarding against uncertainty hence Liquidity preference framework decides equilibrium interest rate in terms of supply and demand for money. One of the assumptions that Keynes had on this theory is that money pays no interest and there are only two kinds of assets for storing wealth i.e. money and bonds implying that total wealth in the economy is equivalent to the total quantity of bonds plus money in the economy which is equivalent to the quantity of bonds supplied plus the quantity of money supplied. The quantity of bonds and money that people demand is also equal to the total amount of wealth equivalent to what the available resources can allow (Loyford, 2014).

2.2.2 Loanable Funds Theory

The loanable funds theory is based on the assumption that interest rates are determined by supply and demand of loanable funds and credit respectively. It argues that demand for and availability of credit determines the risk free rate. Demand for loanable funds is made up of credit demands from domestic ventures, borrowing in the domestic saving, government, consumers and dishoarding of money balances. The interest rate is determined by demand and availability of loanable funds thus the demand for loanable funds must intersect the supply for loanable funds to attain an equilibrium interest (Loyford, 2014).

According to Njongoro (2013) the loanable funds market draws together savers, borrowers, lending institutions for firms and availability of money in commercial banks. Savers supply loanable funds for buying bonds by transferring their money to the organization issuing the bond which can be a business organization or government. Borrowers in return then demand loanable funds when an institution sells a bond. This is due to demanding loanable funds/financial assets which consist of household savings and sometimes bank loans (Njogoro, 2013).

The demand for loanable funds derives from domestic business, consumers, governments and overseas borrower while the supply is generated by domestic savings, dispersion of money balances and money creation in the banking system and foreign lending. There are factors which determine long-term and short term interest rates determined by financial and monetary conditions in the economy. This will eventually mean that equilibrium can only be reached when each factor is at equilibrium. Any change in interest rates, income and expected prices affect households sensitively (McDonald and Stokes, 2013).

2.2.3 Modern Portfolio Theory (MPT)

According to Bruggerman & Fisher (2008), every investor will consider adding real estate investment vehicles in an existing portfolio returns only if it will lead to an increase in expected portfolio returns while at the same time the portfolio risk is lowered or maintained. MPT tries to model benefits of establishing diversification tactics for investment in portfolio.

This is a theory where an investor structures the portfolio at the beginning of a period having in mind an objective of maximizing the anticipated return of the portfolio or minimizing the risk subject to an acceptable anticipated return. Once

the securities are increased in a portfolio, the anticipated return and standard deviation change in specific means based on the way the securities varies with each other. Investing in real estate companies help reduce the total risk in portfolio which eventually improving overall efficiency in allocation of assets (Feldman, 2003).

2.3 Determinants of Housing Supply

2.3.1 Inflation

This is a sustained increase in the general price level of goods and services in an economy over a given time period. Inflation replicates a decrease in the purchasing power per unit of money. According to the Bureau of Labour Statistics, 30% of housing covers inflation. When the inflation is high, purchasing power will reduce hence an increase in cost of living standards making most people not to afford housing which in turn will affect the supply of housing as the demand will be low (AmosWEB, 2012).

According to Muriuki (2013), when prices fluctuates, interest rates raise and vice versa. In the year 2012, when the current president Uhuru Kenyatta was the finance minister, Kenya planned to slash inflation to 5% by the end of 2014/15 financial year using severity measures to diminish its budget shortage together with the tight monetary resolve. Statistics show inflation rose for 13 consecutive months to peak at 19.72%, before lessening to 18.93%. The shilling deprecated against the dollar for most of the year 2012 mainly due to an expanding trade gap which was triggered by worldwide fluctuation in fuel prices leading to higher inflation rates in the African region. Muriuki (2013) stated that if there is a decline in cost of fuel, then the cost of inflation will decrease significantly.

2.3.2 Gross Domestic Product (GDP)

According to the Kenya National Bureau of Statistics (2016), GDP is the monetary worth of all the finished goods and services produced within a country's borders in a specific time period. GDP growth rate in Kenya averaged to 1.27% from 2005 to 1.40% in the first quarter of 2016.

The real estate sector has rapildly grown to become the forth biggest contributor to Kenya's economy. In 2013, Kenya's GDP had doubled to 10.6 % from the previous 4.9%. The analysts expected the changes to foresee future investment decisions to project how banks and firms will be probable to put up their money in property investment market. This was expected to shift the focus of Kenyan banks from consumer lending to home loans and financing to purchase land and carry out construction (Herbling, 2016).

The rate of demand for housing is dependent on income. Higher economic growth accompanied by increasing incomes means that people will have the ability to spend more on houses thus increasing demand. A decrease in income means that majority of people would not have the ability to afford houses let alone rent them. Further, declining income levels means that consumers will spend less, cutting on companies income which would eventually result to retrenchments leading to falling behind in mortgage payments and home repossessions for those who lose their jobs (Wagura, 2013).

2.3.3 Interest Rates

This is the rate expressed as a proportion of the principal amount borrowed that a borrower has to pay back to the lender for using the borrowed funds over a given time period normally a year. It's the percentage charged or paid for use of money i.e. it's charged when the money is being borrowed and paid when its being loaned thus makes interest rates to be referred to as cost of borrowing (Amadeo, 2012).

High interest rates tend to raise cost of mortgage payments hence lowering demand for buying a house. Furthermore, high interest rates make it more viable to rent property rather than buy it. A person's ability to purchase a house is highly influenced by fluctuations in interest rates. This is because fall in interest rates reduced the cost of obtaining mortgage to buy a home and thus creates a higher demand for housing. On the other hand a rise in interest rates influences the cost of borrowing thus discouraging the potential buyers. As a result, the demand of housing will fall making the supply to decrease and vice versa (Igan etal., 2011).

2.4 Empirical Studies

2.4.1 Global Studies

A study was conducted in USA whereby the recent trends in housing were analysed in terms of households' mortgage decisions focusing particularly on the choice between fixed rate mortgages and adjustable-rate mortgages. Using a simple model, they present evidence that this decline in the ARM (Adjustable Rate Mortgage) share can largely be accounted for by factors that explain mortgage choice in earlier periods measures of the relative borrowing costs for a fixed-rate and adjustable-rate mortgages (Moench, Vickery & Aragon, 2011).

Many researchers in the world have demonstrated that interest rates boost a very strong control on prices of housing hence determine the supply. A study was conducted in Hong Kong in inflationary periods was lower interest rates went together with higher house prices while during deflationary period lower interest rates wasn't accompanied by high interest rates (Wong et al., 2003).

According to McCord et al. (2011), ceasing regulation of mortgage market contributes to a rise in house price thus driving the relationship between mortgage finance and affordability of houses. In developed countries, it was found to have lower interest rates and decreasing credit constraints of mortgage loans. Most households with variable mortgages were sensitive to small modifications in interest rates because of their influence on income and asset prices.

A study was done in Sweden on the impact of interest subsidy on single and multifamily houses where it increased the house supply. The study showed that subsidy has no effect in house construction in areas with high demand though the effected was reflected in areas with low demand of houses which the interest rates contributed a lot especially with multifamily houses (Warsame et. al 2010).

There's an interrelationship between supply of housing and house price. A study was conducted in New Zealand where data was from 73 administrative regions. It was concluded that high housing supply elasticity help in containing price changes caused by housing demand shocks (Grimes and Aitken, 2010).

2.4.2 Local Studies

According to Leah (2012), due to demographic growth and rapid urbanization, Africa is known to increase housing demands in urban areas making it difficult to meet supply of housing. In Nairobi County alone, the cost of constructing houses has been on the rise which has resulted to the final house prices the consumer pays.

The effect of flexible interest rates and the outcome show a negative relationship between flexible interest rates and mortgage financing. He argued that if banks charge a fixed rate of interest, it would be possible for investors to plan for a predictable amount of money to be repaid hence stability and increased level of borrowing (Njongoro, 2013).

According to CAFA (2011) and CAHF (2012), Kenyan population growth was estimated to 4.2% p.a as of 2012 which led to an increase in demand for housing at 206,000 units annually out of which 82,000 units were in urban areas.

In 2011 formal accommodation was 50,000units creating a shortfall of 156,000 units which actually added up to 2 million units that was existing backlog of which 85,000 units that was added to the same backlog in 2012.

According to World Bank (2011), the deficit in formal housing has implications in that if most populations are not catered for or can't afford because of the prices have to twirl to informal housing i.e. self-built of which later translates to slums in urban areas. Over 30% of Kenya's population lives in slums according to population census done in 2009. Over 1 million out of 3.2 million live in slums with only 3% living in permanent houses in Nairobi alone.

Mortgage interest rates will establish affordability alongside the maturity. A study was conducted in Uganda which revealed that Interest rates range between 16-23% depending on the intention of the mortgage. The owner of the mortgage usually takes the lower rate and it increases as one tends towards commercial mortgages. These rates are normally high and this can be attributed to the lack of long term local funding (Kibirige, 2006).

A comparable study was also done in Egypt and mortgage lending rate revealed that the mortgage rate equals to 14% with a margin of 4% over the main lending rate, leaving mortgage companies with only 1.5% which will be further decreased when attempting to securitize the mortgage loan and provide other guarantees (Hassanein and Barkouky, 2008).

According to Nzalu (2012), the fact that interest rates play an integral part in real estate as most purchases of real estate property tend to be acquired on a mortgage basis. The cost of servicing a loan decreases with a declining interest rate environment which clearly allows households to take a bigger mortgage within their current income budgetary constraints boosting the demand for and price of housing.

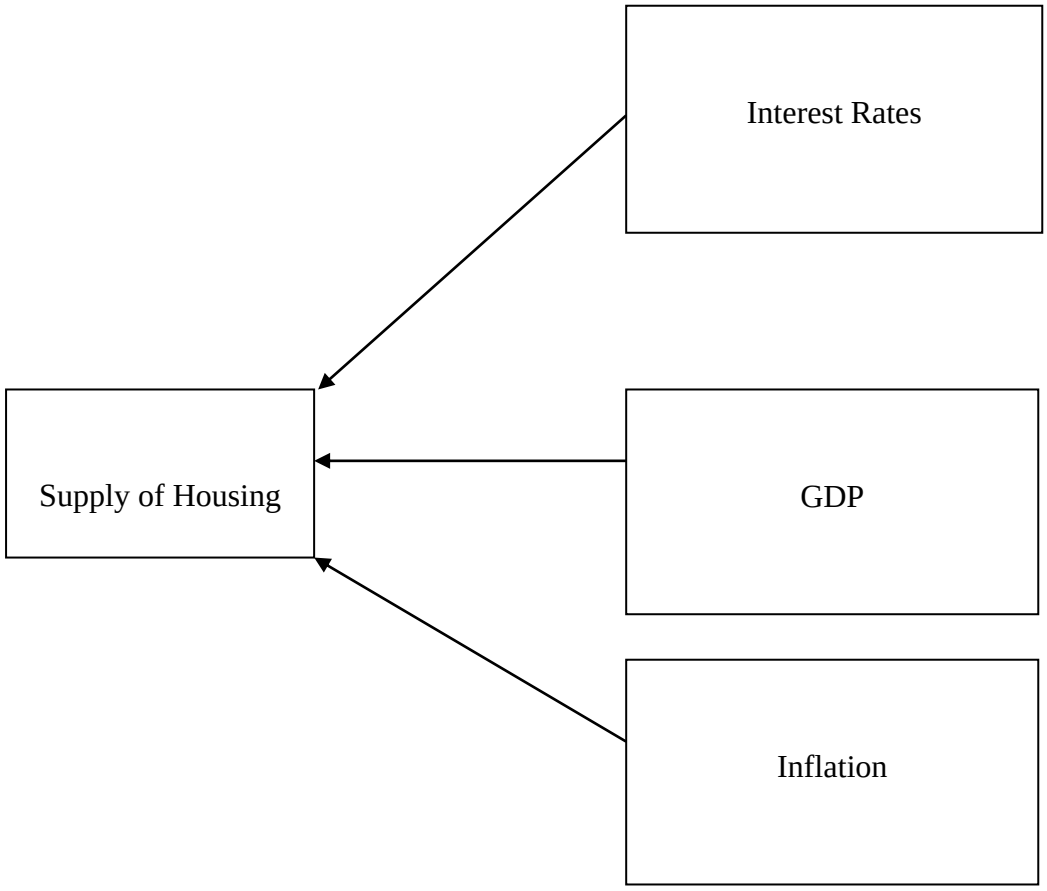
2.5 Literature Review Summary

Studies have been done on the relationship of interest rates on supply of housing which still is controversial as some of the theories are generalized rather than being specific. From the empirical studies done, the relationship of interest rates and supply of housing shows a positive and also negative relationship. For instance the study conducted by Njongoro (2013) shows a negative connection between interest rates and supply of hosing. Global studies have explored the relationship between interest rates and housing extensively and they are anchored in different contextual conditions hence the diversity of findings.

Locally empirical study in the relationship between interest rates and housing supply is not covered widely specifically relating to the fixed and variable type of interest rates. This creates a gap which needs to be covered on empirical studies.

2.6 Conceptual Framework

Dependent variable **Independent variables**



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology and research design that was used to carry out the study. The chapter also reveals the study's target population, the data used by the study as well as the means of data collection employed by the study. Further, the chapter discusses how this data was analyzed detailing the models and statistical tools that was used in the analysis and their justification.

3.2 Research Design

A descriptive research design was be used in a way that quantitative data was be collected and analyzed to describe the current trend on the relationship between supply of housing and interest rates in order to describe possible behavior, attitudes and characteristics (Mugenda & Mugenda, 2003).

3.3 Population

Zikmund et al, (2010) describe a population as any comprehensive group for example, of populace, products, sales territories, companies, stores, or group of people that share some common prerequisite attribute(s). Beck and Polit (2003) refer to the term population as the cumulative or entirety of those meeting the requirements of a group with set of specifications. The target population for this research was all 44 licensed commercial banks that offer mortgage as at December 2015. A census was conducted for all 44 commercial banks for 6 years that is from 2010 to 2015.

3.4 Data Collection

The study used secondary data acquired from quarterly reports of Central Bank of Kenya, Hass consultant Ltd house sales survey reports, Kenya National Bureau of statistics and financial reports from banks. This information related to supply of housing, banks' lending interest rates, GDP rates, and inflation rates. The data was collected using a data collection sheet.

3.5 Data Analysis

Quantitative Data was examined with the aid of Statistical Package for Social Sciences (SPSS) version 20. The linear regression model was used in explaining the relationships between dependent variables and the independent variable.

3.5.1 Linear Regression Equation

The model used in modeling the relationship between the two variables by fitting the below regression linear equation

$Hs = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$

Hs - Supply of housing measured by the number of house units sold per quarter in Nairobi County.

A - constant

β_1, β_2 and β_3 - regression coefficients representing transformation in the dependent variable, as a result of change in X_1, X_2 and X_3 respectively.

X_1 – Quarterly lending interest rates measured by commercial banks' weighted average interest rates.

X_2 - Quarterly GDP rates

X_3 - Quarterly inflation rates

ε - Error term

3.5.2 Test of Significance

Analysis of variance (ANOVA) is a statistical model used to scrutinize the differences among group means and their linked procedures for instance "variation" among and between groups. ANOVA was first introduced by statistician and evolutionary biologist Ronald Fisher. ANOVA was used in this study to test the significance of the regression model where the statistical significance of the relationship between variables was established.

CHAPTER FOUR

RESULTS OF ANALYSIS AND DISCUSSIONS

4.1 Introduction

This study set out to study the existence of and the nature of the relationship between interest rate on supply of housing in Nairobi County. The first part of this section examines descriptive statistics of the data. Examination of relationship between house supply and lending rates are presented in the next segment. The last segment examines of the multiple regression results considering hetroskedasticty. The analysis was conducted using (SPSS) version 20.

4.2 Descriptive Statistics

Table 4.1 below outlines the descriptive statistics. Specifically the study variables' mean, standard error of estimate and standard deviation are revealed in the table below.

Table 4.1 Descriptive Statistics

	N	Mean	Std. Error	Std. Deviation
Units Sold	24	2045	77.41	379.23
Lending Rates	24	16.4842	0.38	1.86
GDP	24	6.0000	0.38	1.86
Inflation	24	7.7917	0.67	3.37

Source: Research Data 2016

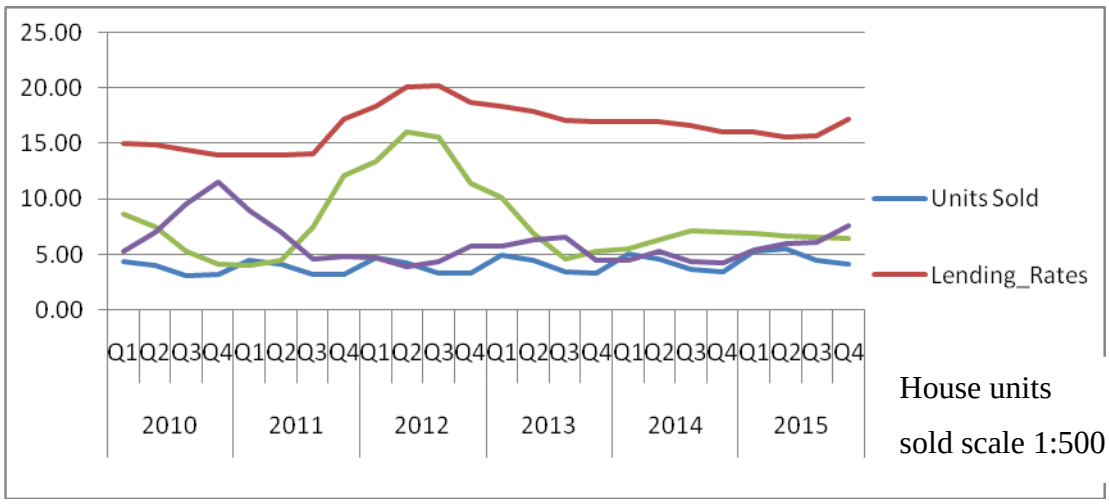
Table 4.1 above indicates that the number of observations used were 24 for each variable representing the 24 quarters covered by the study. The results also show that the average number of house units sold in a quarter is 2045 with a standard deviation of 379.23, variance of 143818.29. The average lending rate for the period covered

was 16.48% with a standard deviation of 1.86 and variance of 3.444 while the mean GDP growth rate was 6% with a standard deviation of 1.86 and variance of 3.476. The average rate of inflation during the period was 7.79% with a standard deviation of 3.37 and variance of 11.389.

4.2.1 Trend Analysis

The researcher sought to establish the trends among the variables considered by the study. The results presented in figure 4.1 below show that quarterly lending rates, GDP growth rate and average number of units sold were stable during the study period. However, inflation rate was unstable over the study period. Inflation rates slowed down in 2010 before skyrocketing between the last quarter of 2010 and the third quarter of 2012 from which it slowed down to under 5% in the third quarter of 2013. It however remained stable afterwards.

Figure 4.1 Trend Analysis



Source: Research Data 2016

4.3 Correlation Analysis

Before running the model the researcher conducted some diagnostic tests in order to see whether there is any contravention of the classical linear regression hypothesis. The researcher conducted a test of co-linearity using the Pearson Correlation test and the results are presented in below.

4.3.1 Correlation between Housing Supply and Interest Rates

The results in table 4.2 below show that there existed a positive link between house unit sales and lending rates (N=24, r= 0.047, p=0.827). It is evident correlation between unit sales and lending rates was less than 0.8 implying that there is no evidence of severe multicollinearity.

Severe multicollinearity occurs if the correlation coefficient is greater than 0.8 and that violates the assumptions of classical linear regression. The regression results imply that an increase in interest rates would result in an increase in housing supply holding other factors constant.

Table 4.2 Correlation between Housing Supply and Interest Rates

		Units Sales	**Lending Rates**
Units Sales	Pearson Correlation	1	0.047
	Sig. (2-tailed)		0.827
	N	24	24

Source: Research Data 2016

4.3.2 Correlation between Housing Supply and Quarterly GDP Rates

Table 4.3 below shows that there was negative correlation between house units sold and GDP growth rates (N=24, r= -0.142, p=0.508). Again the correlation between unit sales and GDP growth rates was less than 0.8 further implying that there is no

evidence of severe multicollinearity and thus no violation of the assumptions of classical linear regression. Negative correlation implies that a movement in GDP rates would result in movement in housing supply but in the opposite direction.

Table 4.3 Correlation between Housing Supply and Quarterly GDP Rates

		Units Sold	GDP Growth Rate
Units Sold	Pearson Correlation	1	-0.142
	Sig. (2-tailed)		0.508
	N	24	24

Source: Research Data 2016

4.3.3 Correlation between Housing Supply and Inflation

The results further shows that there was negative correlation between units as sold and inflation rated as indicated by r result of -0.028 and p result of 0.89. The negative regression result shows that an increase in levels of inflation would result in a reduction in housing supply.

Table 4.4 Correlation between Housing Supply and Inflation

		Units Sold	Inflation Rates
Units Sold	Pearson Correlation	1	-0.028
	Sig. (2-tailed)		0.895
	N	24	24

Source: Research Data 2016

4.4 Regression Results

This section discusses regression analysis used by the researcher to investigate the relationship between interest rates and the supply of housing in Nairobi County. Ordinary Least Square method was adopted to approximate the relationship between Interest rates, GDP growth rates and inflation rates and the supply of houses in Nairobi County. The results of the multiple regression results are shown below.

Table 4.5 Model Summary

M	R	R^2	Adjusted R^2	Std. Error	Sig.
1	0.203[a]	0.041	-0.103	0.79633	0.00835
a. Predictors: (Constant),					
b. Dependent Variable: Units Sold					

Source: Research Data 2016

The adjusted R square value of 0.041 indicates the variation in the dependent variable (supply of houses measured by number of house units sold) resulting from changes in the independent variable (Inflation rates, GDP growth rate and lending rates).

From the findings in table 4.5 above the R square value was 0.041 which indicated that there was variation of 4.1% in the supply of houses in Nairobi County as a result to changes in Inflation rates, GDP growth rate and lending rates at 95% confidence level. The results showed that there existed a positive correlation between the variables under study as revealed by the R value of 0.203. The R value indicates that the variables covered in this model explained 20.3% of the change in housing supply. The remaining 79.7% can be attributed to factors not covered in this model as well as random error.

Table 4.6 Analysis of Variance

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.543	3	0.181	0.286	0.00835[b]
	Residual	12.683	20	0.634		
	Total	13.226	23			
a. Dependent Variable: Units Sold.						
b. Predictors: (Constant), Inflation Rates, GDP Growth Rate, Lending Rates.						

Source: Research Data 2016

ANOVA is used for investigation of variances or evaluation of two or more variables. The ANOVA results in table 4.6 above indicate that the model had an F-ratio of 0.286 (DF 3, 20).

The f statistic measures how different the means are relative to the variability within each sample. It means that the overall regression model is statistically significant and is useful for prediction purposes at 95% significance level as shown by Sig. f value of 0.00835. This further indicates that the independent variables are statistically significant in predicting supply of houses.

Table 4.7 Regression Coefficients

	B	Std. Error	**t**	**Sig.**
(Constant)	4.354	2.398	1.816	0.084
Interest Rates	0.039	0.146	0.269	0.017
GDP Growth Rate	-0.087	0.112	-0.772	0.45
Inflation Rates	-0.050	0.079	-0.630	0.036
a. Dependent Variable: Units Sold				

Source: Research Data 2016

The table 4.7 above shows coefficients of regression model. Table 4.6 shows the values of regression coefficients to include in the regression equation. The regression equation takes the form of;

$Hs = 4.354 + 0.039X_1 - 0.087X_2 - 0.05X_3$

The regression equation above indicates that keeping all the variables in the model constant, unit house sales would be 4.354. However a percentage increase in interest rates would result to increase in unit house sales by 3.9%.

A unit change in GDP growth rates would lead to inverse change in house unit sales by 8.7% and a unit change in inflation rates would lead to inverse change in house unit sales by 5%. The study further revealed that the interest rate over long term was statistically significant to affect the sales, as all the values were less than 0.05%.

4.5 Summary and Interpretations of the Findings

The study made use of secondary data in exploring the relationship between interest rates and supply of housing in Nairobi County. Secondary data was sourced from the central bank of Kenya quarterly reports and house sale survey reports by Hass Consult. The mode F-value which is significant at 1% level indicates that the model adopted by the research did not suffer from meaningful bias. The positive value of the coefficient of determination (R^2) indicates that an adjustment in interest rates is accounted for by the explanatory variables. This invariably means that there exists a weak positive correlation between the interest rates and house unit sales in Nairobi County.

To establish the relationship that existed between the interest rates and the supply of housing in Nairobi County as specified in the research question, the study employed various techniques including trend analysis and multiple regression analysis.

Statistical tests for significance were done at 95% confidence level, therefore the benchmark for the p - value was 0.05. The results indicated by the R square value was 0.041 showed that there was variation of 4.1% in the supply of houses in Nairobi County as a result to changes in Inflation rates, GDP growth rate and lending rates at 95% confidence interval. The results showed that there existed a positive correlation between the variables under study as revealed by the R value of 0.203.

The study found that there existed significant relationship between supply of housing and all the three other variables employed by the study. Firstly, the study established that there existed a positive relationship between interest rates and supply of houses. This shows that an increase in interest rates would result in an increase in supply of houses.

Secondly, there was a negative relationship between housing supply and GDP growth rates. This indicates that an increase in GDP growth rates results in reduction in supply of housing in Nairobi County. This could be attributed to the increased spending power by households as due to the increased per capita rates which translate in more of them preferring to construct themselves rather than buy or acquire mortgage. Lastly, there also was a negative relationship between housing supply and inflation rates. This implies that an increase in inflation rates will reduce the supply of housing in Nairobi County. This can be attributed to the notion that inflation increases the cost of products in the market for instance construction material which results in increases cost of acquiring property and constructing houses which in turn reduces the number of houses supplied to the market. High inflation rates also reduce the number of houses demanded and thus, assuming there is normal supply-demand relationship, results in reduced supply of housing.

The implication of the findings is that interest rates have a little but significant relationship with the supply of housing in Nairobi County. As a result an alteration in the interest rates will affect the unit house sales thus the supply of housing. Lower interest rates provide an incentive to borrow as the cost of repayment will be much lower compared to when interest rates are higher. At lower interest rates house buyers are usually extra willing to go for mortgages than at higher lending rates. Higher interest rates typically mean a drop in demand for housing since buyers will have a higher payment on the same property.

It can therefore be concluded that the movements of relative interest rates and average house sales are positively correlated. Further, the regression analysis results affirm that there exists clear defined positive relationship between lending rates and supply of housing in Nairobi County.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1 Introduction

This section exhibits a rundown of the research project aimed at examining the relationship between interest rates and the supply of housing in Nairobi County. The study addressed the various aspects of supply of housing, interest rates and macroeconomic factors. This chapter presents the major findings as well as recommendations derived from the findings. It is structured into summary, conclusion, recommendations and shortcomings of the study as well as areas for supplementary study.

5.2 Summary

This project set out to identify the relationship that existed between interest rates and supply of housing in Nairobi County over the period between 2010 and 2015. To attain the study objective, data covering the period between 2010 and 2015 was acquired from the central bank quarterly reports and Hass consult house sales survey reports. This data was cleaned and organised in a manner that made it possible for analysis by SPSS version 20. The study was undertaken using the quarterly average house sales in Nairobi county, quarterly average lending rates, quarterly GDP rates and quarterly inflation rates data using correlation and regression analysis. The study employed various techniques including trend analysis and multiple regression analysis. Statistical tests for significance were done at 95% confidence level.

Regression analysis was done considering hetroskedasticty errors to analyze the relationship between interest rates over the study period. The results indicated by the R square value was 0.041 showed that there was variation of 4.1% in the supply of

houses in Nairobi County as a result to changes in Inflation rates, GDP growth rate and lending rates at 95% confidence interval. R value represents the correlation coefficient which indicates the existence of and nature of the relationship between the variables under study. The results showed that there existed a positive correlation between the variables under study as revealed by the R value of 0.203.

The implication of the findings is that interest rates have a little but significant relationship with the supply of housing in Nairobi County. As a result an alteration in the interest rates will have an effect on the unit house sales thus the supply of housing.

5.3 Conclusion

The study set out to determine the relationship between interest rates on the supply on housing in Nairobi County and found a slight positive correlation between lending rates and supply of housing. Hence there was significant increase in the sales index matching with the drop in the mortgage interest rates. At lower interest rates house buyers are usually extra willing to go for mortgages than at higher lending rates. Higher interest rates typically mean a drop in demand for housing since buyers will have a higher payment on the same property. It can therefore be concluded that the movements of relative interest rates and average house sales are positively correlated. Further, the regression analysis results affirm that there exists clear defined positive relationship between lending rates and supply of housing in Nairobi County.

The study found that there existed significant relationship between supply of housing and all other variables i.e. interest rates, GDP growth rates and inflation rates in the study. An increase in interest rates would result in an increase in supply of houses. At lower interest rates house buyers are usually extra willing to go for mortgages than at higher lending rates and vice versa. Higher interest rates typically mean a drop in demand for housing since buyers will have a higher payment on the same property

An increase in GDP growth rates results in reduction in supply of housing in Nairobi County. This could be attributed to the increased spending power by households as due to the increased per capita rates which translate in more of them preferring to construct themselves rather than buy or acquire mortgage. Higher inflation rates will reduce the supply of housing in Nairobi County. Low inflation rates results in increased housing supply by making building materials in this case more affordable which in turn translates to reduced cost of construction and acquisition of new houses.

5.4 Policy Implications

It is recommended that the government should give price subsidies and tax exemptions or allowances on construction materials to companies engaged in housing construction. This in turn would guarantee increase in house supply to meet the ever increasing demand for housing. The high cost of housing as reflected on the final price to the consumer is itself a constraint to providing affordable housing to the city dwellers majority of who are lower and middle income earners. Financial support programmes that will enable supply of affordable shelter to residents of Nairobi County should be put in place.

The study also found that there existed a relationship between supply of housing and GDP growth rates and inflation rates which are important macroeconomic indicators. It is therefore recommended that sound macroeconomic environments complemented by the right fiscal and monetary policies are implemented to ensure growth in income which will result in not only increase in supply of housing but also the ability of residents to afford the housing. This will further unleash the private sector capital and know-how for urban and housing sector infrastructure as well as affect the level of aggregate demand and supply in the economy.

The study further found that there was an inverse relationship between inflation and supply of housing. Therefore it is highly recommended that the government through mandated state bodies put measures in place to maintain sustainable inflation rates. Low inflation rates results in increased housing supply by making products, in this case building material, more affordable which in turn translates to reduced cost of construction and acquisition of new houses.

5.5 Limitations of the Study

Analysis in this research was restricted by available data. The study used only secondary data from central bank of Kenya's quarterly reports and Hass consult house sales survey. In some instances data sets were incomplete especially on number of households; however, statistical methods were employed to extrapolate.

There were also limitations on variables where some factors that affect supply of housing were omitted. Housing loans, availability of alternative investments, tax levels, level of urbanization, age profile and land prices affect supply of housing although they were not covered by this study.

Future studies on supply of housing including the factors not considered in this study, subject to data availability should be undertaken.

5.6 Suggestions for Further Research

This study recommends further study in the following study areas. The current study only explained 20.3% of variation on supply of housing and thus another study exploring the other variables that explain the remaining 79.7% of variation on supply of housing is highly recommended. Further studies could as well examine the relationship between affordability of housing and mortgage financing.

One could also explore existence of expected risk of house supply fall as a result of changes in long run interest rates. The effect of changes of in mortgage rates on household incomes would also be crucial. Lastly, a similar research to the current one using a larger number of variables and or in a different setting is highly recommended.

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APPENDIX I: DATA COLLECTION LETTER

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS

Telephone: 020-2059162
Telegrams: "Varsity", Nairobi
Telex: 22095 Varsity

P.O. Box 30197
Nairobi, Kenya

DATE 30/08/2016

TO WHOM IT MAY CONCERN

The bearer of this letter WAKHANU GRACE NALIAKA

Registration No. D61/72845/2014

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
30 AUG 2016
P.O. Box 30197 - 00100, NAIROBI

PATRICK NYABUTO
SENIOR ADMINISTRATIVE ASSISTANT
SCHOOL OF BUSINESS

APPENDIX II:; DATA USED

		Units Sold	Lending Rates (%)	Inflation Rates (%)	GDP Growth Rate (%)
2010	Q1	2218	15	9	5.3
	Q2	2004	15	7	7
	Q3	1541	14	5	9.5
	Q4	1599	14	4	11.5
2011	Q1	2282	14	4	9
	Q2	2068	14	4	7
	Q3	1599	14	7	4.6
	Q4	1587	17	12	4.8
2012	Q1	2363	18	13	4.7
	Q2	2112	20	16	3.9
	Q3	1631	20	15	4.4
	Q4	1653	19	11	5.7
2013	Q1	2515	18	10	5.7
	Q2	2255	18	7	6.3
	Q3	1739	17	5	6.5
	Q4	1671	17	5	4.5
2014	Q1	2571	17	6	4.5
	Q2	2303	17	6	5.3
	Q3	1858	17	7	4.4
	Q4	1735	16	7	4.3
2015	Q1	2646	16	7	5.4
	Q2	2786	16	7	6
	Q3	2248	16	7	6.1
	Q4	2099	17	6	7.6
	Mean	**2045**	**16**	**8**	**6**
	Std div.	**379.22**	**1.85**	**3.44**	**1.86**

(Source, Hass consult quarterly property report, Central bank of Kenya survey reports, 2010-2015)