

**MACROECONOMIC DETERMINANTS OF SUPPLY OF HOUSES
IN REAL ESTATE INDUSTRY IN KENYA**

BY

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FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF
MASTERS IN BUSINESS ADMINISTRATION DEGREE IN THE
UNIVERSITY OF NAIROBI**

2013

DECLARATION

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

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Date: _____

MBUGUA SAMUEL MWAURA

D61/61414/2010

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

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SUPERVISOR

LECTURER, UNIVERSITY OF NAIROBI.

DEDICATION

To my dear wife Veronicah and our daughter Elaine for your love, support and encouragement. You prayed for me. This is the reason I stayed away late and deprived you the precious moments you all deserved. May the Lord almighty bless you abundantly.

To my mom Jacinta Mbugua and dad Paul Mbugua who have been inspirational in my endeavor to pursue knowledge and excel in things I do in life. You have given the drive and discipline to take any task with enthusiasm and determination. To this I say thank you and God bless you.

ACKNOWLEDGEMENT

It is with great humility that I thank God Almighty who renewed my strength at every single stage of doing this study.

From the initial stages to the final stage of this project, I owe immense debt of gratitude to my supervisor Dr. J. L. Lishenga for his indispensable support and invaluable professional guidance towards this project. His constructive criticism, encouragement and patience have been instrumental to the completion of this project in time. Many thanks too to all my lecturers in the School of Business for giving me the extra impetus to go through the programme.

Finally, I tried to draw a list of all persons to recognize and a few pages would not be sufficient beside I would hate to overlook anyone and am only human....thus I cease to rake my mind and leave it to God to acknowledge by way of blessing all who have had a positive role in this work.

TABLE OF CONTENTS

DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
ABSTRACT	viii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background to the Study.....	1
1.2 Statement of the Problem.....	5
1.3 Objectives of the Study.....	8
1.4 Research Questions.....	9
CHAPTER TWO	11
LITERATURE REVIEW	11
2.1 Introduction.....	11
2.2 Theoretical review	11
2.3 Determinants of the Supply of Houses in the Economy	14
2.4 Empirical Evidence on Determinants of Supply of Houses in Kenya	17
2.5 Summary of the review	21
2.6 Conceptual Framework.....	21

CHAPTER THREE	23
RESEARCH METHODOLOGY	23
3.1 Introduction.....	23
3.2 Research Design.....	23
3.3 Population	24
3.4 Data Collection Instruments and Procedure	24
3.5 Data Analysis	25
CHAPTER FOUR.....	28
DATA ANALYSIS, RESULTS AND DISCUSSION.....	28
4.1 Introduction.....	28
4.2 Study Findings	28
CHAPTER FIVE	34
SUMMARY, CONCLUSION AND RECOMMENDATIONS.....	34
5.1 Introduction.....	34
5.2 Summary of the Findings.....	34
5.3 Conclusions.....	35
5.4 Recommendations.....	35
REFERENCES.....	37
APPENDICES	39
Appendix I: Inflation Rates.....	39
Appendix II: Overall Weighted Lending Rate.....	40
Appendix III: Gross Domestic Product (GDP) Values.....	41
Appendix IV: Value of New Houses Supplied.....	412

LIST OF TABLES

Table 2.1 Real Estate Sector Contribution to GDP.....	16
Table 2.2 Real Estate Growth Rate.....	16
Table 4.1 Model Summary	32
Table 4.2 Coefficients Results	33

LIST OF FIGURES

Figure 2.1 Conceptual Framework	22
Figure 4.1 Average Annual Inflation	29
Figure 4.2 Overall Weighted Lending Rate	29
Figure 4.3 GDP (in Percentage).....	30
Figure 4.4 Value of New Houses Supplied.....	31
Figure 4.5 Trend Line	31

ABSTRACT

The purpose of the study was to investigate the determinants of supply of houses in real estate sector. Specifically, the study sought to establish whether inflation (price level changes), growth rate in Gross Domestic Product (GDP) and interest rate offered by financiers affect the supply of real estate in the market. The study adopted descriptive correlational research design. The target population consisted of all the new houses constructed in Kenya annually. Secondary data was used. The data collected included, data on new houses built annually and price levels of houses in Kenya was obtained from the real estate firms, data for interest rate was obtained from the Central Bank of Kenya (CBK) while data for growth of GDP was obtained from the yearly economic surveys and the statistical abstracts between from Kenya Bureau of statistics. The study adopted the regression model to analyze the data. The data was analyzed using statistical software specifically, SPSS version 18 and presented in form of tables and graphs. The study found a positive and significant relationship between supply of houses in real estate sector in Kenya and the price levels and growth in GDP. It was concluded that growth of GDP, price levels and interest levels have an influence on supply of houses. An increase in interest rates affects lending and thereby affecting the supply of the houses. The researcher recommends that the government should streamline the various real estate policies also establish a housing loan guarantee scheme run by existing government housing corporations to assess risks in some real estate development and also encourage financiers to lend more and at affordable interest rates.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

This section is a brief overview of the problem the researcher aspires to tackle.

1.1.1 Theoretical background

Real estate can be defined as the land and its permanent improvements. According to Harvey (1981), real estate refers to a particular type of good, land or resources that is not physically movable. Although real estate is a tangible asset, it can also be viewed as a bundle of intangible rights or privileges associated with the ownership and use of the site and improvements (Ling & Archer, 2008)

The main participants in real estate markets are: Owner-users who are both owners and tenants. They purchase houses or commercial property as an investment and also to live in or utilize as a business. We have owners who are pure investors. They do not consume the real estate that they purchase. Typically they rent out or lease the property to someone else. Renters on the other hand are pure consumers. Developers are people who prepare raw land for building, which results in new products for the market while renovators supply refurbished buildings to the market. The last participants are facilitators. This group includes banks, real estate brokers, lawyers and others that facilitate the purchase and sale of real estate.

Real estate has several unique characteristics that affect its value. The first one is durability. A building can last for decades or even centuries, and the land underneath it is practically indestructible. Because of this, real estate markets are modeled as a stock/flow market. About 98% of supply consists of the stock of existing houses, while about 2% consists of the flow of new development. The stock of real estate supply in any period is determined by the existing stock in the previous period, the rate of deterioration of the existing stock, the rate of renovation of the existing stock, and the flow of new development in the current period. The effect of real estate market adjustments tend to be mitigated by the relatively large stock of existing buildings.

Real estate are heterogeneous. Every unit of real estate is unique in terms of its location, the building, and its financing. This makes pricing difficult and creates information asymmetry, and greatly restricts substitutability. To get around this problem, economists, beginning with Muth (1960), define supply in terms of service units; that is, any physical unit can be deconstructed into the services that it provides. Olsen (1969) describes these units of housing services as an unobservable theoretical construct. Housing stock depreciates, making it qualitatively different from new buildings. The market-equilibrating process operates across multiple quality levels. Further, the real estate market is typically divided into residential, commercial, and industrial segments. It can also be further divided into subcategories like recreational, income-generating, historical or protected, and the like.

It is both an investment good and consumption good. Real estate can be purchased with the expectation of attaining a return thus an investment good or with the intention of

using it hence a consumption good, or both. These functions may be separated with market participants concentrating on one or the other function or combined in the case of the person that lives in a house that they own. This dual nature of the good means that it is not uncommon for people to over-invest in real estate that is, to invest more money in an asset than it is worth on the open market.

Real estate are also immobile. Real estate is locationally immobile. Consumers come to the good rather than the good going to the consumer. This being the case, there can be no physical marketplace. This spatial fixity means that market adjustment must occur by people moving to dwelling units, rather than the movement of the goods. These unique characteristics make real estate different from the other traditional investment vehicles.

1.1.2 Contextual background

In Kenya real estate market in both rural and urban is characterized by a mismatch between demand and supply of assets. If we consider the residential submarket as an example, which is a major part of the overall real estate first the annual supply of residential units fall short of demand estimated at 200,000 units. Secondly, for the new units being supplied, the actual price set by market is way above what the majority of buyers and tenants are willing and able to pay. This has resulted into burgeoning of slums and related social ills including insecurity and poor standards of living. As a result ownership of residential structures in Kenya is way out of reach to majority of its citizens. The real estate market is characterized by a number of weaknesses including low supply, financial and regulatory constraints.

Real estate growth is the sustained increase in the number of houses being constructed or supplied in the market. Over the past few years there has been a rapid increase in the number of houses being built in the country. Economic survey(2009) indicates that the building and construction sector recorded a growth of 8.3% in 2008 compared to 6.9% in 2007. This was not only the highest growth for the sector since 1998 but also the highest recorded across the sectors in 2008.

The developers of real estates in Kenya do not use their personal savings as the only source of finance given that real estate development requires heavy financing, which may go way beyond what an individual or organization has accumulated as savings over time. In this regard therefore, developers always turn to the lenders of housing finance in order to compliment their inadequate finances. Interest rates charged on mortgages and construction loans is therefore of paramount importance in analyzing the supply of houses in real estate

The government housing policy objectives for the private sector were stated in the 1989-1993 development plans. These were; to increase home ownership for low income earners, to provide long-term mortgage funds to the purchasers of houses and enhance the private sector capacity to plan, develop and finance low cost housing for the low income families and individuals which has not been the case.

Kenya country report (2010) records that the government in consultation with other stakeholders has continued to formulate various policies to guide and enhance access to housing and thereby increase the quantity of real estate available with considerable

degree of success. This has given way to a more pragmatic strategy of enabling other actors to get involved in this sector.

Ayogu (1995) records that Kenya's housing sector has evolved from being controlled by the government and its agencies as suppliers of housing to the current situation where concrete efforts have been made to involve the private sector. Consequently, the number of public buildings completed annually has decreased from 167 units in 1994 to 99 units in 1996 a 40% decline. Comparatively, reported completions of new private residential buildings in main towns over the same period increased from 1062 units in 1994 to 1434 units in 1996 an increase of 35%. Therefore the private sector both formal and informal remains the largest producer of housing units in the country. Lately in the 2000s, Public Private Partnerships (PPP) has been embraced as an approach to provision of housing pursuant to Millennium Development Goals (MDGs). The 5th session world urban forum (Kenya country report) indicates that the housing policy adopted by the government in June 2004 is intended to bridge the shortfall in housing stock arising from demand that far surpasses supply particularly in urban areas. This has not been achieved yet.

A few studies have been done on housing supply but they largely touched on the aspect of price of houses. It is the intention of this study to fill this gap by evaluating the determinants of supply of houses in real estates.

1.2 Statement of the Problem

Real estate growth is the sustained increase in the number of houses being constructed or supplied in the market. Despite the fact that quantity supplied of real estate has increased,

this supply is still too far below the quantity demanded in the market. Central Bank Governor Prof. Njuguna Ndung'u (2010) at the forum for growing real estate through finance argues that housing is a major thrust of the Vision 2030. He continues to note that housing lies at an estimated annual demand of 150,000 units while the supply is barely at 35,000 leaving a gap of 115,000. Aritho (1990) further argues and considers housing as the major problem in urban areas. He notes that; 'Housing is the greatest thorn in the flesh of the town folk. And if you think the problem can get better, think again'. Kenya's National Development Plan of 2002 – 2008 reaffirms that indeed shelter and housing are basic needs and there is need for adequate supply.

Mulei (1990) addressed the issue of isolating the provision of shelter with other aspects of urban life. He notes that both production and consumption of houses are closely linked to income groups. His concern is that the overall investment in housing in the country is discouraging since only 3 per cent of the GDP is invested in housing less than half of which is in modern dwellings. In order to solve the problem he suggests that housing has to be examined within the development process as a whole. A weakness of his work is its descriptive nature and the failure to appreciate some of the efforts done by the government and private sector to solve the problem.

Along the same lines Aritho (1990) consider housing as the major problem in urban areas aside with infrastructure. He notes that; "Housing is the greatest thorn in the flesh of the town folk. And if you think the problem can get better, think again". The article sites the major causes which have enhanced the problem such as rural-urban migration and high natural rate of population in urban areas. The weakness with Aritho's work is that it is

alarmist and is only an analysis of the housing conditions in urban areas and does not offer a solution to the problem.

Kariuki (1993) has sought the real factors underlying the level of supply for houses in the Kenyan housing market. This supply is what Syagga (1994) defines as real estate development which according to him is similar to any other industrial or manufacturing process where a particular commodity is produced in response to a given demand. He established among others the main factors affecting the supply for housing and names them as availability and cost of credit (interest rates) together with return on housing investment.

In Kenya several studies have been made on housing including on the estimation of elasticity of substitution based on the cob-Douglas production function. Based on this production function, researchers have tried to estimate the elasticity of substitution for houses and to find out if it is significantly different from one. Wiscousin and Rydell (1976) have estimated it to be 0.5. In a study of new multi-family housing, Fountain (1977) found an elasticity of 0.57 a figure that is less than one. Fountain tested for non-constant returns to scale, but could not reject the assumption that the production function exhibits constant returns to scale.

Investment in real estate has therefore attracted the attention of researchers. Muendo (2001) sums it up and broadly categorizes investment into autonomous and induced. Induced investment results from recent increases in demand while new interventions and public overhead investments principally influence autonomous investment.

The problem which many researchers are concerned with is the problem of housing and what can be done to increase output of houses. Each writer has his own way of explaining the problem and how best it can be solved. The studies have limitations of their own. However, a general consensus is that measures need to be taken to provide adequate products to meet demand in the real estate sector.

A few studies have been done on factors affecting housing supply and it is the intention of this study to fill this gap by evaluating the determinants of supply of houses in real estate by posing the questions: Does growth of national income affect the level of real estate supplied in the market? Do the interest rates offered by financiers affect the level of real estate supplied in the market? How do the interest rates offered by financiers affect the level of real estate supplied in the market? Although the problem that was addressed in this study is similar to that of other studies, an attempt to explain in terms of the variables that determine housing supply by employing econometric technique would yield more precise results.

1.3 Objectives of the Study

1.3.1 General Objective

The broad objective of this study was to investigate the determinants of supply of houses in real estate sector. By and large, this study established the factors affecting the supply of housing in the country with considerable attention being paid to the determinants that needs to be considered to increase the supply of real estate in the market

1.3.2 Specific Objective

Based on the problem stated above the objectives of this study were:

- i. To establish the effect of price level of a houses on the quantity supplied
- ii. To establish the effect of growth rate in GDP on real estate development.
- iii. To find out whether interest rate offered by financiers affect the supply of real estate in the market.

1.4 Research Questions

The study sought to answer the following questions

- i. How do the price levels of houses have an effect on quantity supplied of houses?
- ii. How does growth of national income affect the level of real estate supplied in the market?
- iii. How do the interest rates offered by financiers affect the level of real estate supplied in the market?

1.5 Significance of the Study

The findings of this study were of interest to the following parties:-

The policy makers in the government who would be interested in knowing the determinants of supply of houses in real estate development and what ought to be done to increase the quantity of housing in the market despite the rapid growth in this sector. This would enable them to formulate appropriate policies that would see adequate quantities of housing being supplied in the market.

Practitioners both in public and private sectors and potential investors would gain a greater appreciation of the determinants of supply of real estates and how they affect the quantity of houses at the market place.

Most importantly, the study would give an insight to deduce knowledge to inform stakeholders in the academic world. This would form a basis for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of related literature on the subject under study presented by various researchers, authors and scholars. Specifically the following subsections were included; 2.2: Theoretical review; 2.3: Determinants of the supply of houses in the economy; 2.4: Empirical Evidence and 2.5: Summary of the review.

2.2 Theoretical review

A theory is a reasoned statement or groups of statements which are supported by evidence meant to explain phenomena. The theories covered herein are:-

2.2.1 Theory of Demand and Supply

The theory of demand and supply is of paramount importance in the analysis of the housing market and in determination of the level of housing supply. Harvey (1996) highlights that individuals and specialist development companies and financial institutions usually carry out private sector development and particularly the supply of real estate. He further argues that the factors affecting supply of houses are cost of credit, expected returns and cost of producing new units

The housing market is therefore an elaborate interplay between developers seeking to maximize profits on one hand and consumers seeking satisfaction at minimal costs on the

other hand (Okumu, 1998). This theory suggests that quantity supplied of houses is a function of among other things prices of houses. That is, as returns from houses increase, suppliers of housing will seek to supply more. Dasso (1989) argues that land and space will tend to go to that use paying the owner the highest returns or giving the greatest value. Along the same lines, Chege (1999) argues that indeed a developer must determine whether the real estate project will generate sufficient returns to cover the costs of production and leave some reward to him.

2.2.2 Property Investment Theory

In the property investment theory, capital market theory is of great relevance given that mortgage is one of the important assets in this market. The capital market theory has evolved from complexity to simplicity.

Harry Markowitz developed the Markowitz portfolio in 1950s. His contributions showed that every asset could be described in terms of its mean and standard deviations of returns and those diversifications depended on the way returns moved relative to each other. He developed a complex algorithm which estimated the proportion of funds to be invested in each asset in order to maximize returns. Markowitz was able to show that a Markowitz portfolio would actually increase in risk as more assets were added.

The Sharpe model is another breakthrough in property investment theory and was developed in 1960 as an extension of Markowitz portfolio. This model simplified the calculation of expected returns and gave rise to what has become known as capital market theory. This developed from recognizing that the opportunity to lend or borrow at the risk

free rate would enable portfolios to be constructed which lay outside the efficient frontier as defined by the opportunity set.

2.2.3 Economic Theory

The theory of investments is another important explanation of the huge level of investments flowing into the housing sector. Economic theory analysis emphasizes four major factors that determine investment behavior which translates to supply in the market.

The Neoclassical theory of investments assumes that the desired stock of capital is equal to the value of output deflated by the price of capital. The variables included in this case are interest rate, depreciation rate, output and changes in capital gains.

In the Accelerator theory of investment, the desired stock of capital is assumed to be proportional to output allowing for variation in capacity utilization. Basically the main variable is income /output such that if there is an increase in output, more investment flows are expected.

The Expected profits theory of investment assumes that the desired capital stock of capital investment is proportional to the market value of the firm. The determinant of investments is therefore profits.

In the liquidity theory of investment the optimal capital stock is assumed to be proportional to liquidity which is defined as profits after taxes and depreciation .If net income rises, investments are expected to increase. This net income traces its origin from the determinant factor GDP.

2.3 Determinants of the Supply of Houses in the Economy

2.3.1 Price

Price represents the amount of value the market has assigned, fairly or unfairly, to a good or a service. Pricing is the determination of the price at which stock or asset will sell or the yield at which bonds will sell as new issues.

The real estate values (prices levels) determined by interaction of user markets and capital markets becomes a guide to real estate builders, developers and conversion specialists. When market prices exceeds the cost of production, these producers are more inclined to build, thereby simultaneously adding to the supply of space and the stock of investable real estate markets.

Scott (2003) stated that value is subjective rather than an objective term. The forces influencing the values of a property includes its environment and physical characteristics, social standards, economic influences and political or government regulations. The price of a specific property at a point in time is a random variable reflecting the heterogeneity, uncertainty and limited information of buyers and sellers. Heterogeneous assets refer to assets with different characteristics from each other such as real estates.

Researchers and practitioners have found out that hundreds of factors might affect prices in various situations. Moreover, properties trade infrequently perhaps once every 5-10 years for the average house, Lancaster (1966).

There are three models of estimating prices used by valuers. The first approach is income model which uses the discounting cash flows expected from a property over a specific

time. The second one is cost model also known as the summation method where the value of the property is estimated by summing the land value and the cost to reconstruct any improvements less depreciation of these improvements.

The third model is the comparable sales approach also known as inferred analysis method. This approach looks at the price or price per unit area of similar properties being sold at the market place. The basic assumption is therefore that a property is worth what it will sell for, in the absence of undue stress and if reasonable time is given. It is the most prevalent method in residential property market, concerning general trends and projections and enjoying the principle of substitution, Kummerow (2002).

2.3.2 Gross Domestic Product (GDP)

Gross domestic product (GDP) is the market value of all officially recognized final goods and services produced within a country in a given period of time. Kenya's economy posted a GDP of 5.9%, 6.3%, 7.1%, 1.7%, 2.5% and 3.6% from 2005 to 2010 respectively. The growth was mainly supported by activities in tourism sector and resilience in the building and construction industry (GOK 2010).

Kenya's real estate sector posted an average GDP of 5.2% from 2005 to 2010 respectively. The table below provides the annual contribution rates to GDP.

Table 2.1 Real Estate Sector Contribution to GDP

2005	2006	2007	2008	2009	2010	Average
5.6%	5.4%	5.3%	5.2%	5.1%	4.8%	5.2%

Source: Government of Kenya (2011); Kenya National Bureau of Statistics

2.3.3 Interest on Mortgages and Construction Loans

An interest rate is the rate at which interest is paid by borrowers for the use of money that they borrow from a lender. Specifically, the interest rate is a percent of principal paid a certain amount of times per period usually quoted per annum. The base lending rates are set by CBK which is the custodian of all commercial banks in Kenya. Better government regulation and proper investment vehicles enhanced the availability of capital are said to be some of the factors that put Kenya ahead of the rest of East African community countries in terms of property investment hence boosting its GDP. The property prices rose by 30% from 2004 to 2009. Annexed below is the real estate growth rate that averaged at 3.5% between years 2005 and 2010.

Table 2.2 Real Estate Growth Rate

2005	2006	2007	2008	2009	2010	Average
3.4%	3.9%	3.5%	3.7%	3.0%	3.2%	3.5%

Source: Deloitte Touché Tohmatsu (2011); Kenya National Bureau of Statistics

The building sector however recorded a slowed growth of 4.5% in 2010 compared to growth of 12.4% in 2009. Loans and advances from the commercial banks to

construction sector grew by 7.3% from Kenya shillings 30.4 billion to 32.6 billion in 2010. This demonstrates how interest rates impacts on supply of houses in real estate.

Commercial banks have been competing with each other in providing mortgage products. The interest rates charged by lenders on mortgages and construction loans has also been a major boost towards a stable economy that offered investors higher returns due to high demand of housing (Daily Nation 29.03.2011).

2.4 Empirical Evidence on Determinants of Supply of Houses in Kenya

Bower (1965) in his study of commercial construction attempted to discover and explain patterns in the rate of commercial construction (building) in the United States. The main findings of his study were that price levels (rent) and vacancy rate were directly and inversely related to investment in housing respectively. (Review of Economics and Statistics, 1965.pp 268).The construction of buildings amounts to real estate development and in its broadest meaning it is generally taken to mean combining land and improvements on it to produce a complete operational property (Dasso, 1989)

Wai and Wong (1982) in their paper on determinants of private investment in developing countries attempted to explore a modified version of the flexible accelerator theory of investment. The main hypothesis they tested is that private investment in less developed countries depends on government, the change in bank credit to the private sector, the flow of foreign capital to private sector and actual capital stock lagged one year. Their empirical results using time series data indicate that all the coefficients of explanatory variables are significant and are of expected signs. When each explanatory variable is tested and treated as the only explanatory variable, its impact is significant for most of the

countries. Abott (1987) goes further to define investment as an addition to a stock of capital over time. A major limitation of this study is that it is a general research on investment rather than being specific to a certain sector.

Mulei (1990) addressed the issue of isolating the provision of shelter with other aspects of urban life. He notes that both production and consumption of houses are closely linked to income groups. His concern is that the overall investment in housing in the country is discouraging since only 3 per cent of the GDP is invested in housing less than half of which is in modern dwellings. In order to solve the problem he suggests that housing has to be examined within the development process as a whole. A weakness of his work is its descriptive nature and the failure to appreciate some of the efforts done by the government and private sector to solve the problem.

Aritho (1990) consider housing as the major problem in urban areas aside with infrastructure. He notes that; "Housing is the greatest thorn in the flesh of the town folk. And if you think the problem can get better, think again". The article sites the major causes which have enhanced the problem such as rural-urban migration and high natural rate of population in urban areas.

Kariuki (1993) has sought the real factors underlying the level of supply for houses in the Kenyan housing market. This supply is what Syagga (1994) defines as real estate development which according to him is similar to any other industrial or manufacturing process where a particular commodity is produced in response to a given demand. He established among others the main factors affecting the supply for housing and names

them as availability and cost of credit (interest rates) together with return on housing investment.

Yahya and Nzioki (1993) in their study of informal settlements in Kenya noted, among other things, that slums have been growing in Nairobi and other major cities in Kenya at a rate faster than the urban population growth which was 10% in 1994. Worse still was the fact that 60% of the urban population lives in poor shelter which was an indication of poor policy and planning. There was therefore need for more participation by the private sector in the provision of housing in Kenya.

According to Njihia (2010), Kenya has a well developed construction industry. Quality engineering, building and architectural design services are readily available. This industry is very important to the Kenyan economy. It accounts 4.5% of the country's GDP (Gross Domestic Product). This being the case it is fundamental that factors that determine or affect the supply of houses in real estate be evaluated.

The fifth session World Urban Forum (Kenya Country Report) indicates that the housing policy adopted by the government in June 2004 is intended to bridge the shortfall in housing stock arising from demand that far surpasses supply particularly in urban areas.

A report by Central Bank of Kenya (CBK) in conjunction with World Bank indicates that investment in real estate sector grew to 61 billion shillings as of May 2012, compared to 19 billion shillings five years ago. In addition the number of mortgages taken up by individuals and organizations grew from 7,834 to 13,803 over the same period, a demonstration of the great potential and growing interest in the sector.

Syagga (1994) argued that the property market deals in heterogeneous commodities that prevent standardization of the product and its price. Due to these differences, there is a great difficulty in disseminating market information. Muthama (2012) evaluated the effects of investor psychology on real estate market prices in Nairobi, Kenya. Wanjohi (2012) looked into the application of heterogeneous asset pricing model in the residential real estate market in Kenya citing that the differences in prices as the positive or negative due to hedonic characteristics between the properties. Also, Gitonga (2003) studied the performance of real estate markets. The case of central business district of Nairobi

Morris (2010) reports that investors' interest in residential real estate development has indeed continued to soar, with the latest reports indicating that monies flowing into the sector over the last five years have more than tripled. In addition the number of mortgages taken up by individuals and organizations grew from 7,834 to 13,803 over the same period, a demonstration of the great potential and growing interest in the sector. This makes the interests charged on construction loans and mortgages a vital determinant of supply in the sector.

Researchers and practitioners have found out that hundreds of factors might affect supply in various situations. Moreover, properties trade infrequently perhaps once every 5-10 years for the average house, Lancaster (1966). This market adjustment process is subject to time delays due to length of time it takes to finance, design and construct new supply and also due to relatively slow rate of change in demand. This demand continues to be inelastic as the population size increases.

2.5 Summary of the review

In general the literature review indicates that the primary determinants of housing supply are the real interest rates (cost of credit) and expected returns. Empirical studies have been done to ascertain importance of these factors either through cross section analysis or time series analysis. In Kenya research has concentrated more on low income group housing and the methodology has been surveys. Most of the studies are based on descriptive analysis of field data. The problem which many researchers are concerned with is the problem of housing and what can be done to increase output of houses. Each writer has his own way of explaining the problem and how best it can be solved. The studies have limitations of their own. However, a general consensus is that measures need to be taken to provide adequate products in the real estate sector. A few studies have been done on factors affecting housing supply and it is the intention of this study to fill this gap. Although the problem that will be addressed in this study is similar to that of other studies, an attempt to explain in terms of the variables that determine housing supply by employing econometric technique will yield more precise results.

2.6 Conceptual Framework

This is a research tool intended to assist the researcher to develop awareness and understanding of the situation and scrutiny and to communicate it. This shows the relationship between the dependent and independent variables.

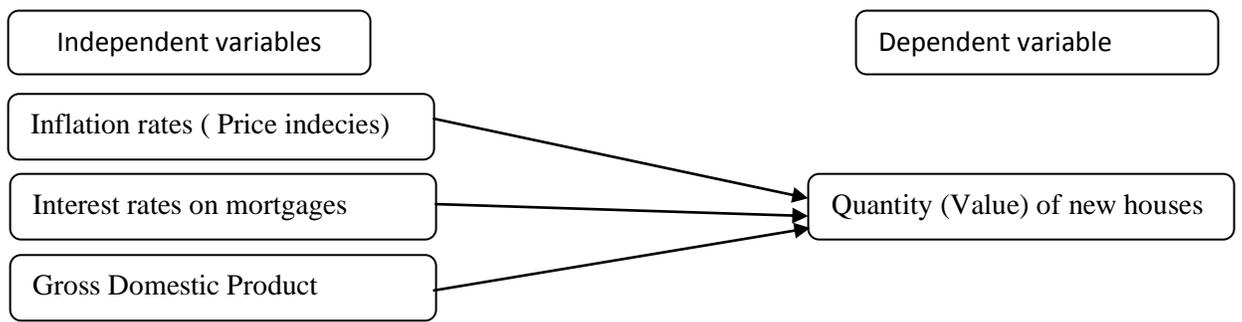


Figure 2.1 Conceptual Framework

SOURCE- Author (2013)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The formidable problem that follows the task of defining the research problem is the preparation of the research design. Decisions regarding what, where, how much, by what means concerns an inquiry or a research study constitute a research design. (Kothari 2004)

This chapter sets out various stages and phases that were followed in completing the study. It involves a blue print for the collection, measurement and analysis of data. Specifically the following subsections will be included; 3.2: Research design; 3.3: Target population; 3.4: Data collection instruments and procedures; 3.5: Data analysis; 3.5.1: Conceptual model and 3.5.2: Analytical model

3.2 Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Claire et al 1962).

This study adopted descriptive correlational research design, which according to Kothari (2004), is used when the researcher wants to establish the relationship between two or more variables. The researcher uses theories or at least hypothesis to account for forces that cause certain phenomenon to incur. In descriptive as well as in diagnostic studies, the researcher must be able to define clearly, what he wants to measure and must find

adequate methods of measuring it along with a clear definition of ‘population’ he wants to study. Since the aim is to study. Since the aim is to obtain complete and accurate information in the said studies, the procedure to be used must be carefully planned.

3.3 Population

Population is defined as an entire group of individuals, events or objects having common observable characteristics (Mugenda & Mugenda, 1999). Target population is the population to which the researcher wants to generalize the results of the study. The population of this study consisted of all the new houses constructed in Kenya annually.

3.4 Data Collection Instruments and Procedure

The study used secondary sources of data. The secondary sources of data involved gathering data that has already been collected before. It involves collection and analysis of published material and information from internal sources (Kombo & Tromp, 2006). In this study the researcher will make use of secondary time series data for the last 15 years (1987-2012). Data on new houses built annually and price levels of houses in Kenya was obtained from the real estate firms e.g. Hass consultant, data for interest rate was obtained from the Central Bank of Kenya (CBK) while data for growth of GDP was obtained from the yearly economic surveys and the statistical abstracts between 1987 and 2012 from Kenya National Bureau of Statistics.

3.5 Data Analysis

3.5.1 Conceptual Model

$$y = a (P, GD, r)$$

$$a = \textit{Constant} \tag{1}$$

$$y = \textit{Value of new houses supplied annually}$$

$$P = \textit{Price index of houses annually.}$$

$$GP = \textit{Annual Growth rate in GDP}$$

$$r = \textit{Interest rates (Mortgages and construction loans)}$$

The independent variables in this study are price levels of houses (indecies), interest rates on mortgages and the annual GDP. Dependent variable was the value of houses annually.

The price levels of houses are expected to have a positive relationship with the value of new houses supplied (Demand and supply theory) with developers supplying more as price levels increase.

According to capital market theory (Sharpe model 1960) interest rates are expected to have a negative relationship with the value of houses supplied given that increasing interest rates increase the cost of borrowing discouraging investors or other people to take loans for real estate development.

Growth of the economy on the other hand had a positive relationship with quantity of houses supplied given that much of the robust growth in real estate has been experienced when the Kenyan economy started experiencing substantial growth rates in GDP.

3.5.2 Analytical Model

This study borrowed the supply theory model. This model has been chosen taking into consideration the availability of data. The study hypothesizes that the increase in new houses in Kenya is determined by growth in GDP, changes in price levels alongside falling interest rates charged on mortgages and construction loans. The following modified supply function was then be assumed for multiple regression using ordinary least squares (OLS) method :-

$$Q_{HS} = \beta_0 + \beta_1 GP + \beta_2 P + \beta_3 r + e \quad (2)$$

Where:-

Q_{HS} = *Value of new houses supplied annually.*

β_0 = *Intercept*

P = *Price index of houses annually.*

GP = *Annual Growth rate in GDP*

r = *Interest rates (Mortgages and construction loans)*

e = *Error term.*

The model was estimated using balanced data estimation. Asteriou (2006) suggests that panel data models are more efficient as they control the chance of biased results by providing more degrees of freedom on pooling data. The models are used in three

specifications: common constants; allowing for fixed effects and allowing for random effects.

In the first attempt, the model was estimated using a system of Ordinary Least Squares (OLS), with period seemingly unrelated regressions, which is expected to be simultaneously correct for both cross-section heteroscedasticity and autocorrelation. Next, the researcher assessed the appropriate stochastic assumptions of the regressors on components of the error term. This is very crucial for the estimation of the parameter β . The numerous variables highlighted in the regression equation suggest that cross-section specificity will affect results of panel estimation. To test whether this is so, the researcher included cross-section fixed effects and conducted the F and Chi-square redundant fixed effect tests. Where results suggest that fixed effects are not redundant, the researcher assumed the panel regressions with fixed effects.

The data was analysed using statistical software specifically, SPSS version 18 and presented in form of tables and graphs.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

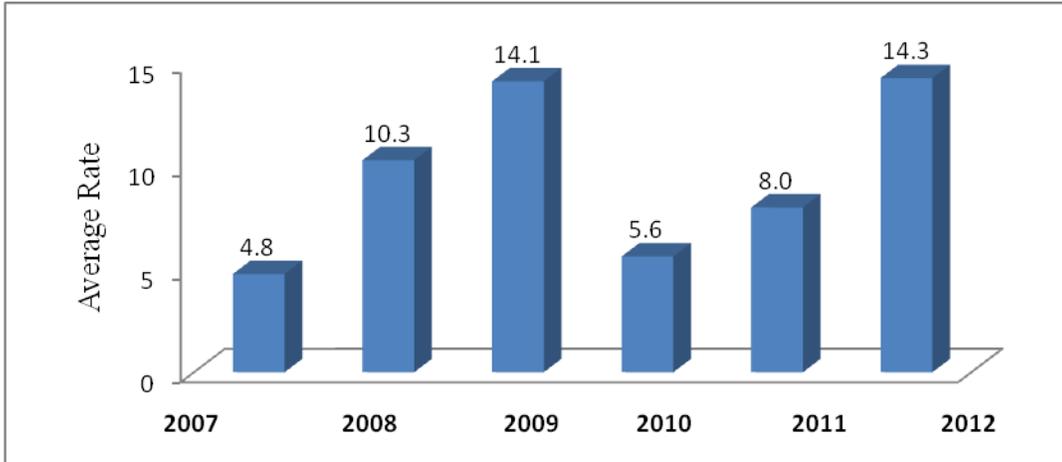
4.1 Introduction

This chapter presents the findings of the study based on the data collected from the field. The study sought to investigate the determinants of supply of houses in real estate sector. The study sought establish whether price level, growth rate in GDP and interest rate offered by financiers affect the supply of real estate in the market.

4.2 Study Findings

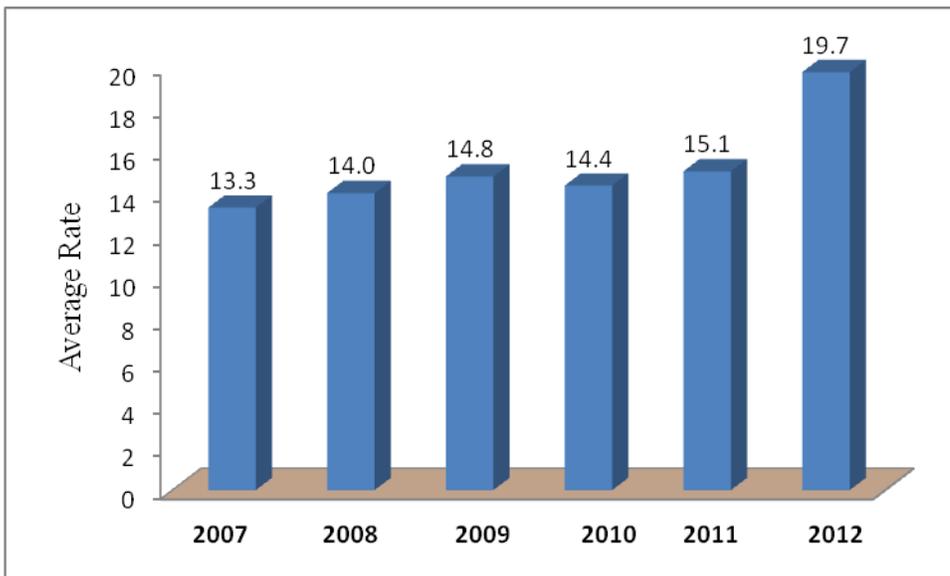
This section presents the findings of the study. The study used the secondary data which for a period of five years starting from 2007 to June 2012. The analysis adopted both descriptive and inferential analysis. In inferential analysis, a regression analysis was adopted to establish the form of relationship between supply of houses and price level, growth rate in GDP and interest rate

Figure 4.1 Average Annual Inflation



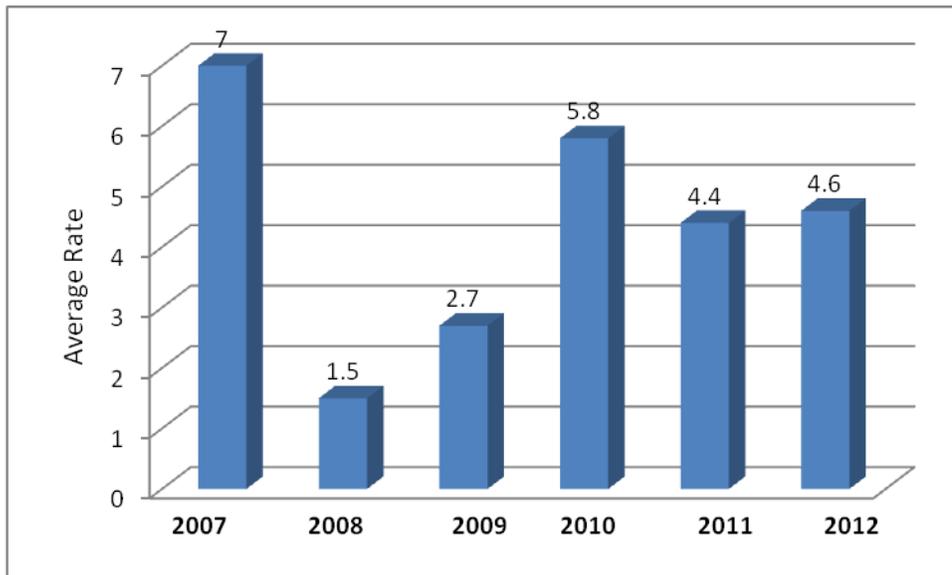
The study found out that the inflation rates in the last five years have been fluctuating. In 2007, the rate was at 4.8 while in 2009 it rose to 14.1. The inflation rate was highest in the year 2012 at a rate of 14.3. It is believed that the changes in the inflation rates influenced the supply of houses in the country.

Figure 4.2 Overall Weighted Lending Rate



On the lending rate, figure 4.2 shows that the interest rate has been in an increasing rate in the last 5 years. In 2007 the lending rate was at 13.3 percent, rose to 14.8% in 2009 while in 2012 it was highest at 19.7%. The interest rates are also believed to have an influence on the supply of houses in the country.

Figure 4.3 GDP (in Percentage)



A review of the GDP in the last 5 years shows that the country's GDP rates have been fluctuating. In the year 2005, the country's GDP was high at 7% but in 2008 it was low at 1.5%. In the year 2010, the rate rose to 5.8% but in 2012, the GDP rate decreased to 4.6%.

Figure 4.4 Value of New Houses Supplied

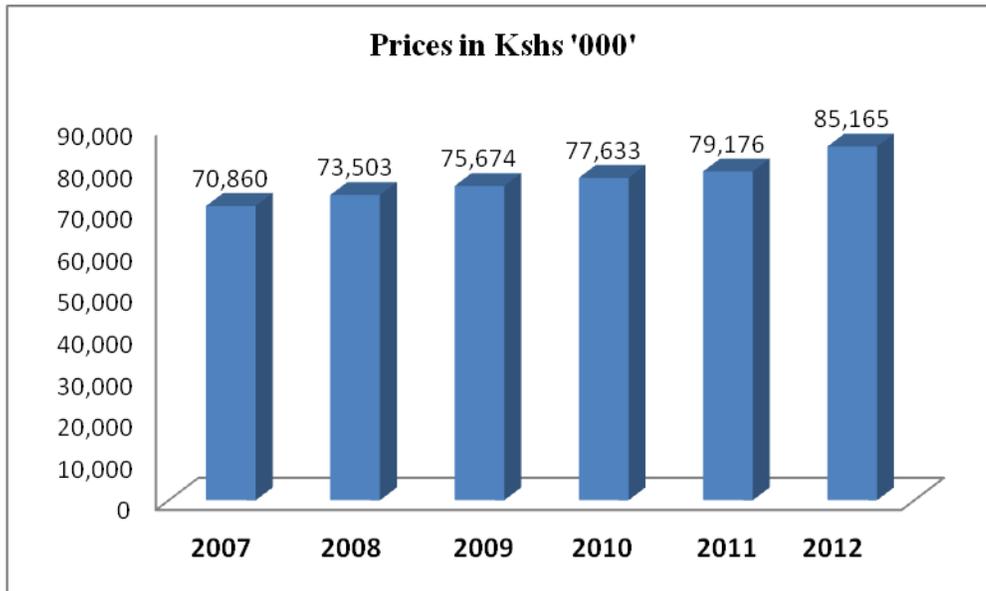
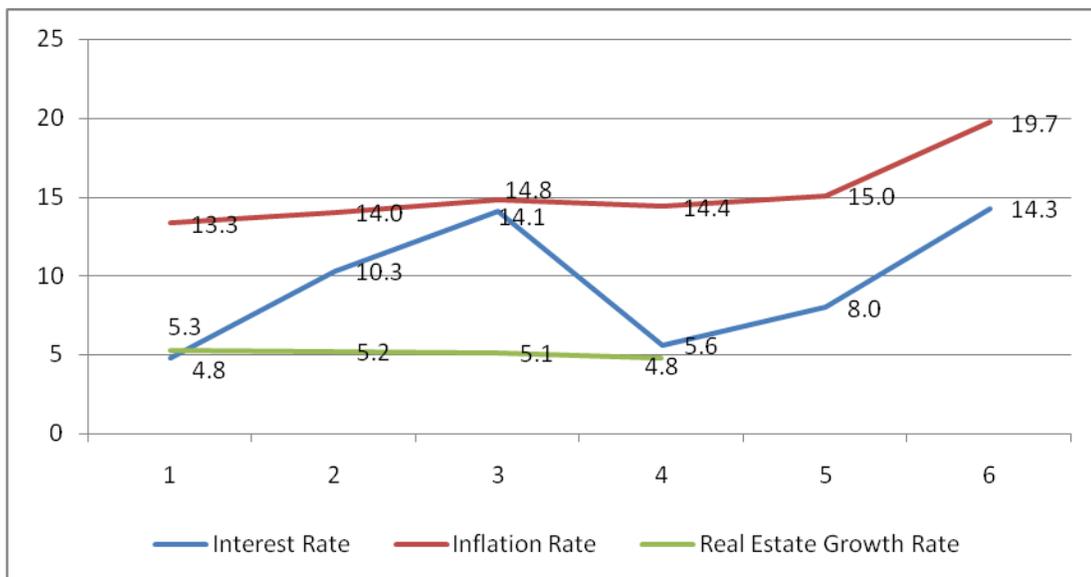


Figure 4.4 shows that the supply of houses has been in the increase in the last 5 years. In 2007, the value was at 70,860 (in ksh 000), in 2009 it was at 75,674 while in the year 2012, the value rose to 85,165.

Figure 4.5 Trend Line



4.2.2 Regression Analysis

Multiple regression model was used to establish relationship between price level, growth rate in GDP, interest rate and the supply of real estate in the market. The model took the following form.

$$Q_{HS} = \beta_0 + \beta_1 GP + \beta_2 P + \beta_3 r + e$$

Table 4.1 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.934(a)	0.872	0.680	2.809865

a Predictors: (Constant), GDP, Interest, Inflation

Adjusted R^2 is called the coefficient of determination and tells us how the supply of houses in the real estate in Kenya varied with price level, growth rate in GDP, interest rate. The value of adjusted R^2 is 0.680. This implies that, there was a variation of 68.0% of supply of houses (dependent variable) with the independent variables (Price level, growth rate in GDP, interest rate).

Table 4.2 Coefficients Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	45.377	9.118		4.977	0.003
	Price Levels	-0.506	.740	-0.419	-0.684	0.004
	Interest	2.567	1.004	1.184	2.556	0.005
	GDP	0.605	1.140	0.244	0.530	0.049

a Dependent Variable: Supply of Houses

From the data in the above table 4.2, there is a positive relationship between supply of houses in real estate sector and the predictor factors- interest rate and growth in GDP.

The following regression equation was established.

$$Q_{HS} = 45.377 - 0.506P + 2.567r + 0.605GP$$

From the above regression model, holding price level and growth in GDP and interest rate constant, supply of houses in the real estate sector would be 45.377. It was further established that a unit increase in growth rate in GDP would cause an increase in supply of houses by a factor of 0.605, a unit increase in interest rates would cause an increase in supply of houses by a factor of 2.567. However, a unit increase in price level would cause a decrease in supply of houses by a unit of 0.506. The study further shows that there is a significant relationship between supply of houses and price level ($p= 0.004<0.005$), interest rates ($p= 0.005$), growth in GDP ($p= 0.049<0.005$).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter is a synthesis of the entire report and contains summary of findings, conclusions arrived at, the recommendations and the suggestions for further study.

5.2 Summary of the Findings

The findings show that the supply of houses has been in the increase in the last 5 years. It was also established that the inflation rates in the last five years have been fluctuating; whereby in 2007, the rate was at 4.8 while in 2009 it rose to 14.1. The inflation rate was highest in the year 2012 at a rate of 14.3. On the lending rate, figure 4.2 shows that the interest rate has been in an increasing rate in the last 5 years. In 2007 the lending rate was at 13.3 percent, rose to 14.8% in 2009 while in 2012 it was highest at 19.7%. The interest rates are also believed to have an influence on the supply of houses in the country. On the growth of GDP the study found out that the GDP rates have been fluctuating whereby in 2005, the country's GDP was high at 7% while in 2012, the rate was at 4.6%.

In the regression analysis, the study found out that there was a positive relationship between supply of houses in real estate sector and the predictor factors- interest rate and growth in GDP and a negative relationship with price levels. It was also established that a unit increase in growth rate in GDP would cause an increase in supply of houses by a factor of 0.605, a unit increase in interest rates would cause an increase in supply of

houses by a factor of 2.567. However, a unit increase in price level would cause a decrease in supply of houses by a unit of 0.506. There is a significant relationship between supply of houses and price level ($p= 0.004 < 0.005$), interest rates ($p= 0.005$), growth in GDP ($p= 0.049 < 0.005$).

5.3 Conclusions

The study established a positive and significant relationship between supply of houses in real estate sector in Kenya and the price levels. It can be concluded that there is greater value in relation to price that creates significant demand for a real estate. Hence pricing can influence the supply of houses. Real estate's price is however also determined by costs, demand conditions, competition, legal and political issues.

It can also be concluded that growth of GDP and interest levels have an influence on supply of houses. While growth in GDP was found to have a positive relationship with supply, interest rates were found to have a negative relationship. This implies that any increase in growth domestic product would increase the supply of houses while an increase in interest rates will affect lending and thereby affecting the supply of the houses.

5.4 Recommendations

The researcher recommends that the government should streamline the various real estate policies in different ministries into a single guide and to set up a separate real estate division within the ministry with the objective of running a single window clearance of all required paper work and clearances. Also the government should establish a housing

loan guarantee scheme run by existing government housing corporations to assess risks in some real estate development and the applicant's credit scores then giving guarantees to the developers and financiers so as to encourage financiers to lend more and at affordable interest rates.

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APPENDICES

Appendix I: Inflation Rates

Months	Year 2007	2008	2009	2010	2011	2012	2013
January	6.08	4.69	16.56	8.64	3.93	15.10	8.20
February	5.55	5.32	16.87	7.88	4.05	15.93	7.24
March	4.99	6.13	17.07	7.03	4.49	16.45	6.33
April	4.69	7.32	16.72	6.32	5.20	16.50	5.61
May	4.47	8.70	15.93	5.85	5.96	16.40	4.96
June	4.46	9.86	15.11	5.43	6.88	15.97	4.56
July	4.57	10.83	14.35	5.03	7.88	15.27	.
August	4.60	11.92	13.42	4.69	9.00	14.33	.
September	4.57	13.02	12.41	4.40	10.18	13.29	.
October	4.48	14.13	11.42	4.12	11.49	12.04	.
November	4.45	15.25	10.24	4.02	12.82	10.67	.
December	4.27	16.27	9.24	3.96	14.02	9.38	.

Source: Central Bank of Kenya (CBK)

Appendix II: Overall Weighted Lending Rate

Months	Year 2007	2008	2009	2010	2011	2012	2013
January	13.78	13.78	14.78	14.98	14.03	19.54	18.13
February	13.64	13.84	14.67	14.98	13.92	20.28	17.84
March	13.56	14.06	14.87	14.96	13.92	20.34	17.78
April	13.33	13.91	14.71	14.58	13.92	20.22	17.87
May	13.38	14.01	14.85	14.44	13.88	20.12	17.45
June	13.14	14.06	15.03	14.39	13.91	20.30	16.97
July	13.29	13.90	14.79	14.29	14.14	20.15	17.02
August	13.04	13.66	14.76	14.18	14.32	20.13	.
September	12.87	13.66	14.74	13.98	14.79	19.73	.
October	13.24	14.12	14.78	13.85	15.21	19.04	.
November	13.39	14.34	14.85	13.95	18.48	18.74	.
December	13.32	14.87	14.76	13.87	20.04	18.15	.

Source: Central Bank of Kenya (CBK)

Appendix III: Gross Domestic Product (GDP) Values

YEAR	GDP (%)
2000	0.6
2001	4.7
2002	0.2
2003	2.8
2004	4.6
2005	5.9
2006	6.3
2007	7.0
2008	1.5
2009	2.7
2010	5.8
2011	4.4
2012	4.6

Source: Kenya Bureau of Statistics

Appendix IV: Value of New Houses Supplied

Year	Prices in Kshs. '000'
2007	70,860
2008	73,503
2009	75,674
2010	77,633
2011	79,176
2012	85,165