THE EFFECT OF MACRO – ECONOMIC FACTORS ON THE DEVELOPMENT OF REAL ESTATE SECTOR IN KENYA

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DECLARATION

I declare that this research project is my original work and has not been submitted for an award of a degree in this or any other university or institution.

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DEDICATION

This research project is dedicated to my parents: Prof. Evaristus M. Irandu and Mrs. Esther W. Makunyi and my siblings: Serah, Benson and Cynthia Irandu.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA: Analysis of Variance

CBK: Central Bank of Kenya

CEE: Central and Eastern Europe

CPI: Consumer Price Index

GDP: Gross Domestic Product

KNBS: Kenya National Bureau of Statistics

MPT: Modern Portfolio Theory

OECD: Organization for Economic Cooperation and Development

QTM: Quantity Theory of Money

REITs: Real Estate Investment Trusts

SPSS: Statistical Package for Social Sciences

UN: United Nations

VIF: Variance Inflation Factors

ABSTRACT

This study assessed the effect of the macro - economic factors on the development of the real estate sector in Kenya. The objective of the study was to determine the effect of the the macro - economic factors on the development of the real estate sector in Kenya. The study employed a descriptive research design. Secondary data was collected from the websites of Central Bank of Kenya, Kenya National Bureau of Statistics and reports from Hass Consultants (a real estate firm) for the quarterly periods between 2007 – 2016. Data was presented using tables and graphs. The study applied a multiple regression model to establish the relationship between the independent and dependent variables. Diagnostic tests were conducted on the data collected to determine if they were suitable for multiple linear regression. The study used the regression coefficients to test the magnitude of the dependent variable to the macro-economic factors: inflation rate, interest rate, money supply growth rate and GDP growth rate and control factors: capital and credit growth rate. The coefficients that corresponded to inflation rate, GDP growth rate, Capital and Credit growth rate were positive indicating a positive relationship between them and the development of the real estate sector in Kenya while the coefficients of interest and money supply growth rate were negative indicating a negative relationship between them and the development of the real estate sector in Kenya. It was concluded that GDP and capital had a significant influence on the development of the real estate sector while inflation rate, interest rate, money supply growth rate and credit growth rate had an insignificant influence on the real estate sector. Kenya faces a great housing shortage therefore, the development of the real estate sector is vital for the success of the economy. It was noted that the macroeconomic factors fluctuated across the period thus affecting the development of the real estate sector. These factors also have an influence on the stability and efficiency in the economy. It is recommended that policy makers control the fluctuations of the macroeconomic factors by formulating various monetary and fiscal policies that will moderate the volatility being experienced in the economy.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Kahr (2015) defined real estate as land and any physical improvements on the land such as buildings, fencing, landscaping, water wells, roads, utility systems and any other structure on it. Real estate has surface, mineral and title rights. These title rights can be leased, bought or sold while others can be transferred either individually or collectively. According to Harvey (1981), real estate can be defined as land, resources or goods that are immovable. Ling and Archer (2008) noted that real estate is not only a tangible asset but also a bundle of intangible rights or privileges that offer ownership and use of the site and improvements. Makena (2012) notes that investing in real estate needs a lot of research and analysis of variables because it requires heavy capital outlay and takes time before the investor can start enjoying the returns. Though real estate investment is expensive compared to stocks and bonds and takes longer for investors to recoup their capital, it still attracts investors.

Real estate has several characteristics that include: durability, immobility and heterogenous. Buildings can last for decades and the land underneath it is indestructible. The real estate property is very unique in the locations, buildings and types of financing. This creates a difficult situation when determining the prices. The unique attributes also create information asymmetry and substitutability is restricted. These unique characteristics make real estate different from the other traditional investment vehicles (Mbugua, 2010). According to Olsen (1969), the real estate market is divided into three

segments: residential, commercial and industrial. Hassan (2016) stated in his research that in Africa, changes in real estate property markets have led to a growing interest in studying the relationship between macroeconomic variables on the performance of real estate properties.

1.1.1 Macro – Economic Factors

O'Sullivan and Sheffrin (2003) stated that the macro-economic variables influence the real estate sector. These variables include interest rates, money supply, foreign exchange rates, inflation levels and GDP. Khalid et al.(2012) noted that the factors have an impact on populations and not individual citizens and are very important to the national economy as a whole. These factors influence the performance of an economy and include interest rates, inflation levels, and Gross Domestic Product (GDP).

The available monetary assets in an economy at a certain time period is the money supply or money stock (Cummings, 2010). Liow, Ibrahim and Huang (2006) noted that it is a broad measure of money in an economy. Blanchard (2000) defined inflation as the persistent rise in the prices of goods and services available in an economy over a certain length of time. It is the sustained rise in the prices of a variety of products (Gallagher, 2011). For Loyford and Molonge (2014), inflation is the general price level increase as a result of volume of money and credit compared to the available goods and services.

Brigo and Mercurio (2006) noted that borrowers pay for the use of money lent at a higher rate than the amount borrowed. The rates of interest are used to compute the charge. For Keynes (1936), the rates of interest are a representation of the cost of borrowing the

capital for a period. Cheruiyot (2015) noted that interest rate is the cost that the borrower pays the lender for the borrowed finances for an agreed period of time. Chomba (2009) stated that GDP is the primary measure of an economy's performance. Peng and Hudson – Wilson (2002) defined GDP as a measure of overall economic activity. Liow et al. (2006) described GDP as the market value of the entire amount of final goods and services that are produced in a country for a length of time. Wheeler and Chowdhury (1993) defined GDP as the entire total market value of all the final goods and services that are produced in a nation in a given year. It can also be described as the final value of the services and goods that are produced in the boundaries of a country within a particular period.

The monetary bases such as M1 and M2, are the standard measures of money supply. They can be described as the total amount of currency in circulation and reserve balances. According to Blanchard (2000), the rate of inflation rate will account for the various changes in the average price level as it is based on a price index. Liow et al. (2006) showed that the level of inflation in an economy is arrived at by measuring the changes in the Consumer price index (CPI). The index is a measure of the prices of retail of those goods and services that are purchased by households in the economy. Wheeler and Chowdhury (1993) noted that GDP is arrived at by adding total consumer, investment, government spending and exports less the value of imports. The amount of interest to be paid is determined by a specified percentage for a particular period of time.

1.1.2 Development of Real Estate Sector

The real estate describes ownership rights known as real property, land and any improvements whch are attached to it permanently (Brueggeman and Fisher, 2008). The number of housing units built annually in an economy can explain the real estate sector's development. The housing sector as stated by the centre for affordable housing is one of the backbone sectors in the construction industry and determines not only its success and failure but is also important in the economy of many developed countries. Real estate sector in Kenya has been growing rapidly over the years.

The supply of housing according to the UN-Habitat is the main objective of real estate developers and their main achievement would be to meet the demand in their respective markets. Housing shortages prevail across the globe. According to the ICA report, the shortage of housing in India in 2007 was approximately 40.65 million units while Pakistan in 2008 had an annual housing shortfall of 270,000 units . Byaruhanga (2001) noted that the housing deficit was 270,000 units. Alder and Munene (2001) found out that Kenya has a housing deficit in both the urban and rural areas with the urban areas experiencing a shortage of 127,700 units while the rural areas experienced a housing shortage of 303,600 units.

1.1.3 Relationship between Macro – Economic Factors and the Real Estate Sector

According to Cheruiyot (2015), increase in interest rate impacts negatively on the real estate market because when the rate increases, the cost of borrowed money increases. On the other hand, low interest rates encourage prospective real estate investors to enter the

market since obtaining finance is more affordable. Harris (2001) noted that interest rates influence both the prices and construction of houses. Blanchard (2000) stated that dynamics in interest rates can have a great influence on one's property purchasing power because their fall will cause a decrease in the mortgage prices. The lower cost of mortgages will increase the demand for the real estate property. High interest rates result to higher costs of financing which in turn has the effect of lowering the demand and real estate prices. The real estate markets are heavily influenced by the rates of interest and should be closely monitored.

According to Keynes (1936), higher interest rates cause a relatively higher rise in the cost of borrowing funds. Investors suffer as a result of the high mortgage repayments which reduces the affordability of real estate property. The demand of real estate property also experiences a decline as the financing options are too expensive. Konana (2011) stated that the owners of homes have a keen interest and closely monitor the fluctuating interest rates since they have a significant impact on the prices of real estate. Rates of interest have an influence on the availability of funds and also on the demand for real estate investment. The inflow and outflow of capital has a great impact on both the supply and demand. The effect is felt on the property prices which rise and fall based on the level of demand and supply. It was noted in the African Economic Brief that interest rates are a major factor since most housing is financed primarily through debt. Therefore, the source of funding for real estate developers is a major determinant of the cost of construction and consequently the supply of real estate.

Brueggeman and Fisher (2001) explained that investors consider the impact of inflation on their investment returns before decision making. The borrowers have to compensate the lenders for the effects of inflation which erode the value of their investments during the period when the loans are outstanding. The lenders therefore ensure that inflation is factored in when computing the amount of interest payable resulting to high interest commitments. Ong (2013) stated that during inflation, prices in the economy increase causing an increase in the cost of raw materials for building which drives the cost of real estate properties up. Kearl (1979) conducted a study on the impact of inflation on housing investment and noted that inflation has an effect on house prices. Inflation results to an increase in nominal housing payments thus lowering the demand for housing. All investors when making decisions are concerned with how inflation will affect investment returns, more so mortgage firms, who have long term investments. Increasing inflation reduces the incentive of people to invest in real estate thus lowering the demand for houses. When inflation rate increases, most of the prices of consumer products increase which reduces the disposable income to be allocated towards property investment which suppresses the demand for property. The level of inflation at any given period of time will have an effect on the housing sector. He found that increased inflation has a negative effect on the desire of investors to focus their finances on the housing sector thus lowering the demand for housing.

Brueggeman and Fisher (2008) did a comparison on the performance of the sector of housing and the CPI. They established that the returns that accrue for real estate investment are significantly higher than the rise in inflation. A positive correlation between the performance of the housing sector with inflation is desirable as it indicates

that the asset is an inflation hedge. Geoffrey (2011) showed that real estate offers investors with a hedge against inflation because real estate income normally increases rapidly in an inflationary economy enabling the investor to maintain the same income. According to the study of Omare (2014), inflation influences the levels of interest rates. A high rate of inflation will result to high interest rates as the lenders demand for higher compensation to protect the value of their investments. The rise in the interest rates covers the decreased purchasing power of the money that they will receive in the future once the payment period for the loan has lapsed.

Blanchard (2000) indicated that high rates of inflation increase the prices of houses. Barro (1996), in his research on inflation and growth, cited that business and households are thought to perform poorly when inflation is high and unpredictable. Quigley and Raphael (2004) added that increase in inflation will result to an increase in nominal interest rates. This offsets any increases in nominal wages. Housing prices also increase making housing less affordable. Hassan (2016) stated that the expected inflation or deflation is critical when making decisions with regards to housing. This is because the cost of obtaining funds for real estate is a major determinant of the demand for housing.

Liow et al. (2006) noted that GDP per capita is an important factor of the standard of living of a country. The value of real estate is affected by the overall performance of a given economy. Low GDP reduces purchasing power of citizens hence demand for real estate and consequently the house prices decline. On the other hand, when the level of GDP rises, the purchasing power will also rise. This has the effect of raising the demand for real estate which in turn causes the prices of houses to increase. For Ziering and

McIntosh (1999) when the economy is sluggish, people will tend to shy away from investing in the real estate sector. However, if the economy is vibrant, then more investors will be willing to put their money in real estate market. In addition, an increase in real estate investment boosts the aggregate demand which leads to economic growth. It is important as it has a positive relationship with the activities of the macroeconomy and the prices of houses.

Nzalu (2012) noted that GDP and the level of investment in real estate have a direct relationship. A rise in the investment creates a positive wealth effect. Real estate contributes to the GDP of an economy through the money that is spent on housing services and residential investments. People can re-mortgage against their property which increases the real estate value thus increasing consumer spending. The demand for housing will result to a rise in the investment in the housing industry which enables the growth rate of the GDP to rise. According to Pettinger (2013), income influences the demand for houses. As people with higher incomes have the ability to spend more money on houses, this results to an increase in the demand for houses. This raises prices and developers are required to supply more houses. The demand for housing is income elastic thus an increase in incomes results to more income being spent on the houses. During periods of recession in an economy, the incomes will decline hence people are unable to purchase houses thus reducing the demand. Peng and Hudson – Wilson (2002) noted that a change in real GDP implies a change in real economic growth which may directly impact on the housing property market. A rise in economic growth will lead to a rise in the demand for property which in turn results to a rise in house prices and housing property returns.

Barkham (2012) noted that an increase in the level of money supply will lead to a decline in the velocity of circulation causing a rise in the real income hence affecting the real estate market positively. Therefore, it can be concluded that velocity changes in response to any changes in the level of money supply. The increase in the level of money supply available in the economy causes inflation and house prices to rise. When this happens, it causes greater uncertainty in the levels of inflation in the real estate market adversely impacting it. Liow et al. (2006) noted that the rise in the level of money supply will cause a rise in higher inflation uncertainty.This has a significant negative impact on the real estate market. An inflationary environment may arise when the economy is experiencing excessive growth in the level of money supply and this might have a negative effect on the investments. On the other hand, according to Baffoe-Bonnie (1998), a spontaneous rise in the money supply will have an effect of reducing interest rates, and all factors constant, the costs of housing services will decline. This will also result to an increase in the quantity demanded of the housing services as well as the prices of the housing units.

1.1.4 Real Estate Sector in Kenya

Kenya's real estate market is well diversified in terms of income, geography and types. There is a clear segmentation of high, middle and low income. The main property types include retail, office, residential, industrial and special properties mainly found in cities, towns and urban centres. The retail sector in Kenya has been on an exponential growth with several malls opening up in various parts of the country. The growth in the retail submarket is driven by increased urbanization and a growing middle class with enhanced

purchasing power. The office market in Kenya has experienced increased supply due to the growth of the services sector (Okumu, 2017).

Investor confidence has increased in the commercial property of the Kenyan real estate sector. The Real Estate Investment Trust (REITs) market was launched in 2013 by the Nairobi Securities Exchange as a result of the increased demand for real estate. The REITs market is highly regulated. This investment vehicle is very important since it enables collective investment in the real estate property where both types of investors: the retail and corporate, pool their collective funds and invest in real estate projects (Muia, 2017). The real estate market is facing extreme under-supply especially in housing for the lower segment of the population. Real estate prices have been increasing as the middle and low income segments of the residential market have been having a huge supply deficit.

1.2 Research Problem

O'Sullivan and Sheffrin (2003) established that macro-economic variables influence the real estate sector. These variables include interest rates, money supply, inflation levels and GDP. Ouma (2015) noted that the degree to which macro-economic variables affect the real estate sector varies and understanding the relationship is important in making decisions related to investment and formulation of policies so as to progress the sector. Positive and negative relationships have been found to have an effect on the real estate sector.

Alder and Munene (2001) found out that Kenya has a housing deficit in both the urban and rural areas with the urban areas experiencing a shortage of 127,700 units while the rural areas experienced a housing shortage of 303,600 units. A high rise in the number of units of housing will reduce the housing shortage experienced in the country. Okumu (2016) notes that while the low income segment of the market still has a huge supply deficit, sections of middle income segment market are operating at surplus in both sale and rental sub-markets.

Golob, Bastic and Psunder (2012) noted that the relationship between decreasing interest rates, higher prices and the increase in real estate transactions is positive. The declining economic growth results in declining real estate transactions. Makena (2012) found that inflation had the least effect as compared to population growth and interest rates. Swazuri and Lucian (2012) suggested that inflation and GDP growth had little effect on rental value trends in Tanzania from his study between 2003 and 2009. Nzalu (2012) identified that GDP, variation in interest rates and growth in inflation were found to have an influence on the real estate sector. Muli (2012) suggested that the growth in GDP was the highest contributor to the increased rise in the real estate sector. GDP is a statistically significant determinant in the high rise of the real estate sector. Inflation growth and interest rates correlated negatively to real estate investments, unlike GDP which had a positive relation; population had an insignificant effect.

Different researchers have established varying relationships between the macro-economic factors and the real estate sector. The conflicting findings show the existing gaps in the factors of macroeconomic variables that affect real estate sector. Limited studies have

also been done on the development of the real estate sector with the major focus being on growth and prices. This study therefore aimed to fill the gap by evaluating the effect of the macro – economic factors on the development of real estate sector in Kenya. What was the effect of macro-economic factors on the development of real estate sector in Kenya?

1.3 Research Objectives

The general objective of the study was to determine the effect of macro – economic factors on the development of real estate sector in Kenya.

The specific objectives of the study were:

a. To determine the effect of inflation rate on the development of the real estate sector in Kenya.
b. To examine the impact of interest rate on the development of the real estate sector in Kenya.
c. To determine the effect of money supply growth rate on the development of the real estate sector in Kenya.
d. To examine the impact of GDP growth rate on the development of the real estate sector in Kenya.

1.4 Value of the Study

Real estate is a major area of discussion in research and the study will provide relevant knowledge in the real estate sector and will be very important to the Researchers. The study seeks to contribute to the already existing body of knowledge in the field of real estate and will add to the literature on the effects of macro-economic factors on the development of real estate in the country. They will also find this research useful because the findings will contribute towards the theoretical discussion concerning the relationship of macro-economic factors and real estate investment. The Researchers will benefit from the data collected and information gathered will be a source of secondary data in their studies. The findings will form a platform for further research as they can adopt a different research methodology or extend the period of analysis. The study will provide important data for the purpose of comparative study in future researches.

The study will enable potential real estate investors or those seeking to expand in the real estate sector to make informed choices since it will provide useful insight into the effects of macro-economic factors on the development of real estate sector. It will enable them understand the market dynamics and make valuable projections. Individuals seeking to own their own homes will also benefit in understanding the market forces and make the best purchase. The study will be significant to policy makers involved in charting policy directions in the economy. The monetary and fiscal policy formulators at the Central Bank of Kenya and the National Treasury will benefit because they will be able to investigate the macro-economic factors in this study and factor them in accordingly to realize a desired level of real estate industry performance. The findings will be a

guideline to the Government in formulation and development of policies and approaches that are concerned with the real estate sector of the economy. It will provide knowledge to the policy makers in the government who will be interested in identifying 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. A rise in the level of investment in real estate in the country is likely to increase the level of revenue for government through taxation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on the theoretical review and empirical review from the previous researchers and scholars who have researched on the factors that have an influence on the real estate sector. The study establishes the theoretical framework of the study: the effect of macro - economic factors on the development of real estate.

2.2 Theoretical Review

A theory, as per Mbugua (2010), is a statement or groups of statements that have great reasoning and are supported by evidence that aims to give an explanation on the phenomena. The theories covered herein are: - modern portfolio theory, quantity theory of money and decision theory.

2.2.1 Modern Portfolio Theory

Markowitz (1952) is credited with the introduction of the Modern Portfolio Theory (MPT). It suggests that investments should not be considered in isolation but in terms of their contribution to the portfolio. The theory is built on the idea that an investor who is risk adverse should be able to come up with a portfolio that will maximize expected returns given a certain level of market risk. On the other hand, an investor is able to build a portfolio with the lowest possible risk based on a given level of desired expected return (Firstenberg et. al. 1988). This theory seeks to maximize returns from a portfolio through

careful choice of the ratios of assets. As investment initiatives are a risk-return trade-off and riskier assets tend to have higher returns, the theory is thus a form of diversification since it explains how to select an efficient portfolio with the lowest possible risk.

Kahr (2015) stated that the real estate market faces high inefficiencies characterized by the complexity of individual properties, inability to sell short, as well as high transaction cost which require active investment management. According to Luus (2003), research in the real estate property market is important because this market is considered as a component of the basic pillars among cash, bonds and equity of any well-diversified portfolio. This arises from the idea that investors are more at ease when owning a tangible fixed asset compared to "paper" assets. Hassan (2016) noted that generally in terms of the risks and returns, the real estate investment outperforms stocks and bonds. The assets in the real estate sector are not only a good inflation hedge but also offer excellent potential diversification for portfolio investors. This therefore proves that real estate is an under-utilized asset class. Hartzell (2011) noted that there have been differing opinions in regard to the portfolio allocation within the real estate portfolio. In recent times, the real estate securitization such as the emergence of REITs, has greatly transformed how investors view real estate making it one of the best investment options. Hishamuddin et al. (2003) found out that REITs are very important and including them in the investment portfolio can greatly contribute to high returns at the same level of risk.

2.2.2 Quantity Theory of Money

The quantity theory of money (QTM) concept was developed in the 16th century. This was as a result of an increase in inflation which was caused by gold and silver inflows

that came from the Americas into Europe and were being minted into coins. Henry Thornton made two assumptions in 1802 that: a rise in the amount of money will result to high inflation and that an increase in the level of money supply does not result in an increase in the level of output in the economy. However, Keynes (1936) challenged the theory in the 1930s, when he stated that increases in money supply leads to a decline in the velocity of circulation and that real income increased. He noted that velocity was influenced by a change in money supply. The theory explains the relationship between prices, output and money that is used to study inflation. Lucas (1980) presented two implications of the theory; a given level of change in the amount of money will bring about an equal change in both the inflation rates and nominal interest rates.

Therefore, it is evident that money supply has an effect on the inflation rate. In addition, inflation has a significant impact on interest rates, which further affects the real estate prices. When inflation rate is high, the cost of purchasing land and building houses rises as lenders increase interest rates to reduce inflation. Buying a house when the rate of inflation is high, the investor will spend more money due to increased prices as a result of increased interest rates. Real estate is generally viewed as a good investment when it comes to inflation because of two major reasons. First because it will rise with the inflation rate and second because it is a leveraged asset (Keynes, 1936).

2.2.3 Decision Theory

Peterson (2009) presented decision theory which is the study of how an investor arrives at a rational choice through use of various models of judgment. Real estate market indices are dynamic and can change at any given time which explains why a real estate investor

is faced with unending uncertainties. Kusiluka (2009) noted that a developer has to balance an investment portfolio which includes real estate by cost cutting and delivering a structure that meets the market demands. In addition, a real estate investor has to deal with many risks that do not occur frequently. This means that probabilities cannot be readily calculated; neither can it be assessed by recurrence of risks, such as the frequency of failure. Decision makers in real estate market are forced to rely on subjective estimates in both assessments of probability and impact.

For Graff and Webb (2007) in real estate investment projects, both qualitative and quantitative factors influence the decisions of an investor. Risk cannot be eliminated altogether in the real estate investments, hence, the need for investors to make informed decisions so as to maximize their returns. Understanding the effects of macro-economic variables on investment in real estate sector and how they affect an investor's portfolio will enable the investor make an informed decision. Real estate appraisers should have knowledge of various relevant decision models used in real estate development decision-making.

Jensen (1976) pointed out that a relevant real estate decision model or system that provides real estate investors with comprehensive data and sensitivity would minimize development and investment risks. Hence, the relevance of decision theory to real estate investment and development decision cannot be overemphasized. Kahr (2015) showed that since the major objective of a firm is to maximize its value, it is imperative for investors to have adequate knowledge on how decisions relating to real estate affect the value of their company. The emphasis should not only be on maintaining the value of the

company at the highest level but also create value for shareholders, attain growth in the capital and maintain a desired stream of income from the real estate sector.

2.3 Determinants of the Development of Real Estate Sector

The following factors have been found to have a significant impact on the development of the real estate sector: financial factors, housing demand, demographics and government policies.

2.3.1 Financial Factors

A major challenge in the real estate industry is financing. The real estate sector requires investing large capital outlay in order to allow construction of property (Kihoro, 2013).The real estate industry has been characterized by relatively high levels of interest rates and rigid financing conditions because of limited financing. Kitavi (2013) noted that the availability and cost of mortgage loans can be a great influence to the demand and supply of the real estate market. When mortgage loans are available, this has an effect on both the developers of the real estate market and end consumers.

The availability of credit influences real estate. An increase in credit supply, ensures that the process of obtaining loans becomes easier. The availability of the money creates an active real estate market. A decrease in the credit supply causes illiquidity and decline in prices of the real estate property. According to Mwathi(2013), the performance of the real estate property market and banking are highly correlated more so when it comes to pricing. There exists a significantly close relationship between the prices of property and bank credit since bank financing is the main source of funding for real estate. The real

estate sector is capital intensive. If the prices of property decline, the banks that deal with real estate property or any form of property related lending businesses will be negatively affected. The rise and fall in the performance of the real estate sector has a great impact on the performance of banks.

2.3.2 Housing Demand

Demand for real estate is inversely proportional to its supply. The valuation of property increases as the supply or availability of real estate decreases. Economic indicators influence property demand thus increasing prices. It is very critical for all the investors to consistently monitor the sensitivity of real estate performance to the changes in the economy. This is because if the housing market is experiencing a rise in demand, the prices will rise whereas when there is a fall in the demand, the prices will also decline (Nguyen, 2017).

The demand for real estate is responsive to any changes in the prices but when compared to any other investments, it is rather inelastic (Kihoro, 2013). In the housing market, the law of supply and demand is highly applicable. The law is important as it defines the equilibrium price of the property. The prices of houses rise when there is high demand and limited supply. The process of the properties decline when there is low demand and an abundant supply of houses (Kimmons, 2016).

2.3.3 Demographics

The components of a population that include age, race, gender, income, migration patterns and population growth can be described as demographics. The continuous

changes in the demographics of a nation can significantly influence the trends in the real estate market (Nguyen,2017). The growth in population drives housing, employment, educational needs, commerce and real estate needs. Growing population increases demand for residential properties. Changes in population are the key drivers for demand of real estate which increases the price. Demographics can influence the prices of property and the demand for property. Monitoring demographics enable investors and buyers to predict desirable real estate investments and anticipate market trends (Mansor, 2012).

Mankiw and Weil (1989) studied the demographic patterns on the real price of housing where they found that demographics are important in the fluctuation of real estate prices. People who have ages between 20 and 30 are the ones who push the demand for houses higher and higher. Ohtake and Shintani (1996) replicated the study using Japanese data and identified that demographics had insignificant influence on the house prices. The conclusion was that housing prices were price elastic and demographic shifts only influence the prices of houses in the short run.

2.3.4 Government Policies

Government policies have a great impact on the real estate sector in terms of prices and the demand for property. The demand for real estate can be greatly boosted when the Government offers incentives such as tax credits, exemptions from taxes and deductions. Subsidies for house buyers can also help to enhance the demand of real estate property (Nguyen, 2017). The real estate businesses have to adhere to the laws that the

Government has put in place . These laws include planning regulations, land permits, title deeds and registration rules for businesses (Kihoro, 2013).

According to Njoroge (2016), taxes, dues and regulations can either be obstructive or positive for enhancing the growth of the real estate market. The high taxes normally cause lower disposable income which reduces the ability for investors to purchase real estate property. Various government regulations and taxes can significantly have an influence on the cost and quality of usage of property for the current owners of real estate, developers and potential buyers. The Government enforces taxes based on the incomes which sometimes are prohibitive to interested investors.

2.4 Empirical Studies

Some of the empirical studies carried out both internationally and locally include:

Egert and Mihaljek (2007) conducted a study on the determinants of the prices of houses in Central and Eastern Europe (CEE). The panel technique method was used where the data was grouped into two main panels which consisted of eight transition economies of CEE (1993-1998) and 19 OECD countries (1975-1994). The data was collected for 27 countries and analyzed in quarterly periods. The significant factors that were found to affect the prices of houses in both CEE and OECD countries included housing credit, demographic factors, real rates of interest and GDP per capita. It was also established that though the effect was stronger in CEE as compared to OECD countries, the dynamics of house prices were also influenced by demographic factors and developments of labour markets.

Golob, Bastic and Psunder (2012) did a study on the factors that have an impact on the real estate market: Case Slovenia. Data collection was done using a structured survey questionnaire. Descriptive and correlation analytical research methods were used. A statistical computer software was used to analyze the data the primary data covering the period 2007 to 2009. They concluded that a positive correlation existed amongst the decreasing rates of interests, rise in prices and increasing transactions in the real estate. A decline in the performance of the economy was also identified to have a significant influence on the decrease in real estate transactions.

Theuns (2012) undertook a study on the economic variables that have an effect on the residential property market in South Africa: The developer's perspective for the period 2006 - 2012. Secondary data was collected from reports and publications. The study adopted both qualitative and quantitative methods. The variables researched on included household disposable income, consumption, debt ratio, GDP and CPI Inflation. By employing linear regression analysis, he found that GDP contributed to 69% in the changes that took place in the house price index. The rates of inflation, household disposable income, consumption, and debt ratio contributed to 25%.

Sibanda and Mhlanga (2013) conducted a study on the interaction between property returns and the macro-economy: Evidence from South Africa. They used vector autoregressive models to determine the interactions between macroeconomic and financial variables on the South African economy. Secondary data was obtained from the first quarter of 1994 to the third quarter of 2011. The findings showed that in the short run, the growth in house prices is influenced mainly by short-term interest rates and

inflation levels while in the long-run, it is majorly affected by household debt/disposable income followed by inflation. The conclusion was that the changes in disposable income have a positive impact on property returns in the short run and a decline in the long run. Short-term interest rates variations have a small negative impact on property returns while inflation impacts negatively on property returns in the short term but positively in the long run.

Swazuri and Lucian (2012) researched on rental value trends in commercial real estate investments in Tanzania. They reviewed the historical trend of rental value movements over time of five selected commercial properties owned by two pension funds from 2003 to 2009 relative to inflation and GDP by use of Pearson correlation coefficient, Analysis of variance (ANOVA), regression analysis and Granger causality tests. The study suggested that inflation and GDP growth had little effect on rental value trends. Rental prices were expected to be stable or change marginally in the short term to medium term.

Muli (2012) carried out a study on the assessment of the factors affecting the growth in real estate investment in Kenya. Both the quantitative and descriptive research designs were used in the study. He conducted an investigation on the growth of GDP, rates of interest, rates of inflation and growth in population. Real estate and renting businesses formed the target population. The data was collected from Economic Surveys and Kenya Statistical Abstracts. The analysis of data was done by use of the Statistical Package for Social Sciences (SPSS) software where he obtained both descriptive statistics and a regression model. It was established that GDP growth, growth in inflation and interest rate variation were significant determinants of real estate growth with values of 83%,

78% and 75% respectively. He also noted that the growth in population was the least contributor to the investment in real estate at 29%. The variables were also found to only explain up to 70% of the variations in the growth of real estate investment.

Muthee (2012) did a study on the relationship between the growth in the economy and real estate prices in Kenya. A descriptive research design was adopted. Secondary data was collected from the Kenya National Bureau of Statistics (KNBS), Central Bank of Kenya (CBK) and Hass Property Index. A multivariate regression analysis was used. The dependent variable was GDP while independent variables were interest rates and real estate letting prices. Data was collected from 2005-2010. He concluded that a direct relationship existed between the variables where a quarterly change in housing prices yielded a quarterly change in GDP.

Mbugua (2010) undertook a study on the macro-economic determinants of the supply of houses in the real estate industry in Kenya. Descriptive correlation research design was used. The population of the study was all the new houses that were constructed in Kenya annually. Secondary data was used. The real estate firms such as Hass Consultant provided the data on the new houses built annually and the levels of prices of houses in Kenya. The rates of interest were obtained from the CBK. The researcher used data from the annual economic surveys and statistical abstracts for the period between 1987 -2012 from the KNBS to obtain the GDP growth. Analysis of data was done using the SPSS. A regression model was used to determine the relationship of inflation, rate of interest and GDP growth rate. He made a conclusion that a positive relationship existed between the supply of houses in the real estate sector, the price levels and the GDP growth. A rise in

the rates of interest has a significant effect on lending which in turn affects the supply of the houses.

Makena (2012) did an investigation on the determinants of the residential real estate prices in Nairobi. She used cross sectional research with a time series approach. A quantitative approach was followed to investigate the determinants. Secondary data was collected from the CBK, KNBS and the Hass Consulting Ltd. SPSS was used to measure the determinants between 2007 and 2011. A multivariate regression was done to establish the relationships. She evaluated the influence on the interest rates, inflation rates, money supply, rates of employment and growth in population on the prices of houses. She found out that interest rates had the most significant and long run effect on real estate property price which may rise with the tightening of liquid conditions related to stricter macroeconomics. It was concluded that increased employment growth contributed more to increase in property prices followed by population growth and the level of money supply while inflation contributed the least.

Juma (2014) studied the effect of the macro-economic variables on the growth in real estate investment in Kenya. The study adopted a descriptive research design and used secondary data on growth in annual real estate investments from Hass Consultants. The data for the effects of variables was obtained from CBK and KNBS. The variables studied were average annual exchange rate, average annual growth in diaspora remittances, average annual growth in money supply, average annual growth in GDP and average annual rate of inflation for the period 2000 - 2013. The data obtained was analyzed using excel spread sheets and SPSS. Regression analysis was conducted to

establish inferential statistics. He concluded that a strong positive relationship exists between the growth in real estate and each of the following variables; exchange rate fluctuations, growth in diaspora remittances, growth in money supply, inflation and GDP Growth.

2.5 Conceptual Framework

It describes the relationship that exists amongst the variables.

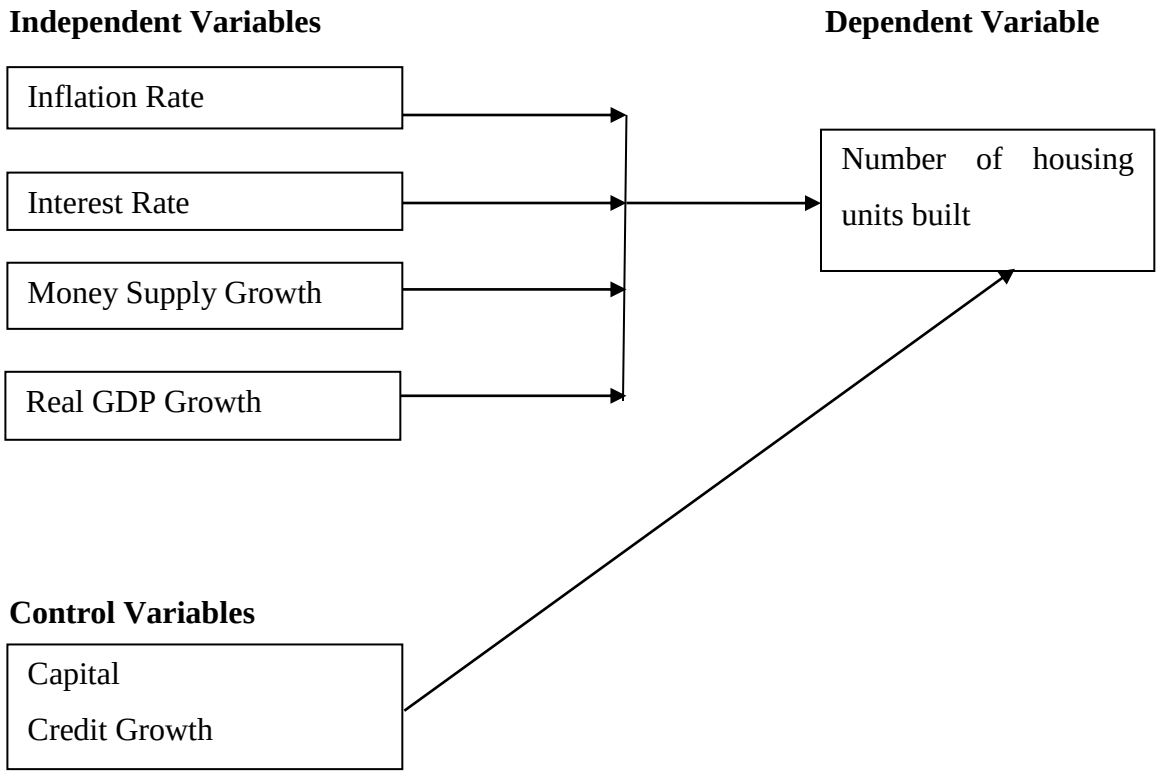


Figure 2.1: Conceptual Framework

Source: Author (2017)

2.6 Summary of Literature Review

The literature reviewed shows that there are a number of factors that determine investment in real estate. Both local and foreign authors have studied on the determinants of real estate investments which have conflicting findings. Internationally, Golob, Bastic and Psunder (2012) identified that a positive correlation exists among interest rates, higher prices and the increasing real estate transactions. Declining economic growth results in declining real estate transactions. Swazuri and Lucian (2012) suggested that inflation and GDP growth had little effect on rental value trends in Tanzania from his study between 2003 and 2009. Locally, Muli (2012) identified the importance of GDP to the growth in real estate and has a positive relationship. Interest rate variation and growth in inflation correlated negatively to real estate investments and were found to be statistically significant determinants of real estate growth. Population growth had an insignificant effect.

Makena (2012) noted that the level of money supply will ensure that the economists and financial analysts understand the real estate market better and its influence on prices of real estate while inflation had the least effect as compared to population growth and interest rates. Juma (2014) identified a strong positive relationship between real estate growth and exchange rate fluctuations, growth in diaspora remittances, growth in money supply, inflation and GDP Growth. The conflicting findings show the existing gaps in the factors of macroeconomic variables that affect real estate. Limited studies have been done on the development of the real estate sector. This study aimed to fill the gap by

evaluating the effect of the macro – economic factors on the development of the real estate sector in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter explains the methodology and procedures that were used for data collection and analysis in this study. It describes the research design, the data collection methods and instruments that were employed. It explains the methods of data analysis including the analytical model that was employed and presentation of results.

3.2 Research Design

A research design according to Kothari (2004) is the arrangement of conditions for the purpose of collection and data analysis. It is a detailed outline on how the research was undertaken and specifies the methods and procedures used to collect and analyze the data (Gall et al. 2006). A descriptive research design was adopted for determining the effect of macro – economic factors on the development of real estate sector in Kenya. It is applicable where the aim of the study is to portray characteristics and provide a description of a group of people, community, population, event or situation (Mugenda and Mugenda, 1999).

3.3 Data Collection

Collection of data is the process of gathering and systematically measuring information of interest to enable one to answer the research questions (Jensen,1976). According to Ngechu (2004), data collection can be done in various ways. The researcher obtained

secondary data for the period 2007 – 2016 for all the variables in this study. Karoki (2013) stated that the secondary data is most applicable when a researcher is interested in determining the relationship that exists between variables. The data for the independent factors- interest rates and level of money supply and control variables – capital and credit growth were obtained from the website of CBK. The data for the growth in real GDP together with inflation rate was obtained from the website of KNBS. The development of real estate sector (dependent variable) was measured by the aggregate number of housing units built quarterly and the data was obtained from reports by real estate firms such as Hass Consultants and the website of KNBS.

3.4 Data Analysis

Saunders, Lewis and Thornhill (2009) indicated that data collected must be processed so as to obtain information that is more meaningful. For meaningful information to be obtained, Mugenda and Mugenda (2003) noted that the data collected should be cleaned, coded and properly analyzed. SPSS was used as an analysis instrument. The study included descriptive statistics. The researcher used a multivariate regression analysis to establish the relationship between the dependent variable (Development of Real Estate Sector) , the independent variables which were the macro-economic factors namely inflation rate, interest rate, money supply growth and Real GDP growth and the control variables which were capital and credit growth.

The analytical model of the study was depicted by the following regression model:

$$\text{Log } Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + e$$

Where; Y = Dependent Variable (Development of Real Estate sector). It was measured using the aggregate number of housing units built quarterly for the ten year period 2007-2016.

$\beta 0$ = Y-intercept (This was the constant term).

$\beta 1 – \beta 6$ = Regression Coefficients

The coefficients $\beta 1$ to $\beta 6$ were used to measure the sensitivity of Y (the dependent variable) to the unit change in the independent and control variables (X1, X2, X3, X4, X5 and X6). The coefficients explained the amount of change in Y associated with a unit change in X.

X1 = Inflation Rate - It was measured by the percentage average of the quarterly CPI.

X2 = Interest Rate - It was measured by the percentage average of the quarterly lending rates as indicated by CBK.

X3 = Money Supply Growth - It was measured by the percentage change of the average quarterly monetary base (M3).

X4 = Real GDP Growth – It was measured by the percentage average of the quarterly Real GDP growth rate in Kenya.

X5 = Capital – It was measured by the percentage average of the quarterly deposit rates as indicated by CBK.

X6 = Credit Growth – It was measured by the percentage change of the average quarterly domestic credit growth rate in Kenya.

e = Is the error term in the model that was assumed to be associated with the Variables. It measured the goodness of the model and captured the effect of all other unexplained variables in the model that affected the development of real estate sector but were not captured in the model.

3.5 Diagnostic Tests and Tests of Significance

Diagnostic tests were conducted on the data collected to determine its suitability. The tests included linearity, normality, multicollinearity and homoscedasticity. Linearity was tested using correlation coefficient (r). Normality was tested using kurtosis and skewness. Multi-colinearity was tested through the Variance Inflation Factors (VIF) and tolerance. Levene's test was used to test for homoscedasticity. Tests of significance were carried out using Analysis of Variance (ANOVA). The study findings were then presented in form of graphs and tables.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The Chapter presents the analysis, findings and interpretations of the study. The research sought to establish the effect of macro – economic factors on the development of real estate sector in Kenya. The descriptive statistics were used to describe the data and inferential statistics were used to determine the relationship between the number of housing units built with the interest rate, money supply growth, inflation rate and GDP growth rate. The control variables included capital and credit growth.

4.2 Data Collection

The Researcher obtained secondary data for the quarterly periods between 2007 – 2016 from Central Bank of Kenya, Kenya National Bureau of Statistics and Hass Consultants Reports. The data was organized in excel spreadsheets and SPSS version 16 used as an analysis instrument. The analysis was done using multiple linear regression and correlation. The data was then presented in form of graphs and tables.

4.3 Descriptive Statistics

The section discusses the descriptive statistics of the data obtained. It comprises the mean, standard deviation, variance, minimum and maximum values. All the variables had a positive mean. Credit growth rate had the highest mean of 17.748% with a maximum value of 30.4% and a minimum of 2.7%. Growth in money supply had an average of

16.230%, interest rate 15.785%, inflation rate averaged 8.317%, GDP growth rate averaged 5.382%, while capital averaged 5.745%. Housing units had the lowest mean of 3.115 with a maximum of 3.5 and a minimum of 1.9. Credit growth rate varied the most followed by inflation rate, money supply growth rate, GDP growth rate, interest rate, capital and housing units as shown by their corresponding standard deviations in Table 4.1 below. The findings implied that credit growth rate had the highest variability over the ten year period hence changed frequently.

Table 4.1: Descriptive Statistics

	N	**Min**	**Max**	**Mean**	**Std. Deviation**	**Variance**
Inflation Rate (%)	40	2.7	19.2	8.317	4.5322	20.541
Interest Rate(%)	40	13.1	20.2	15.785	1.9946	3.978
Money Supply Growth Rate (%)	40	6.0	24.8	16.230	4.2112	17.734
GDP Growth Rate (%)	40	.2	11.6	5.382	2.0898	4.367
Capital (%)	40	3.4	8.5	5.745	1.4306	2.047
Credit Growth Rate (%)	40	2.7	30.4	17.748	6.0174	36.209
Housing Units (Log)	40	1.9	3.5	3.155	.3137	.098
Valid N (listwise)	40					

Source: Research Findings

4.3.1 Test of Normality

Normality was tested using Skewness and Kurtosis as shown in Table 4.2. The acceptable level for normality is $\pm$ 1.96.

Table 4.2: Measures of Normality

	N	Skewness			Kurtosis		
	Statistic	**Statistic**	**Std. Error**	**Level**	**Statistic**	**Std. Error**	**Level**
Inflation Rate (%)	40	1.035	.374	2.767	-.039	.733	-.053
Interest Rate (%)	40	.648	.374	1.733	-.484	.733	-.660
Money Supply Growth Rate (%)	40	-.238	.374	-.636	.290	.733	.396
GDP Growth Rate (%)	40	-.030	.374	-.080	1.560	.733	2.128
Capital (%)	40	.019	.374	0.051	-1.246	.733	-1.700
Credit Growth Rate (%)	40	-.123	.374	-.329	.591	.733	.806
Housing Units (Log)	40	-1.683	.374	-4.50	5.147	.733	7.022
Valid N (listwise)	40						

Source: Research Findings

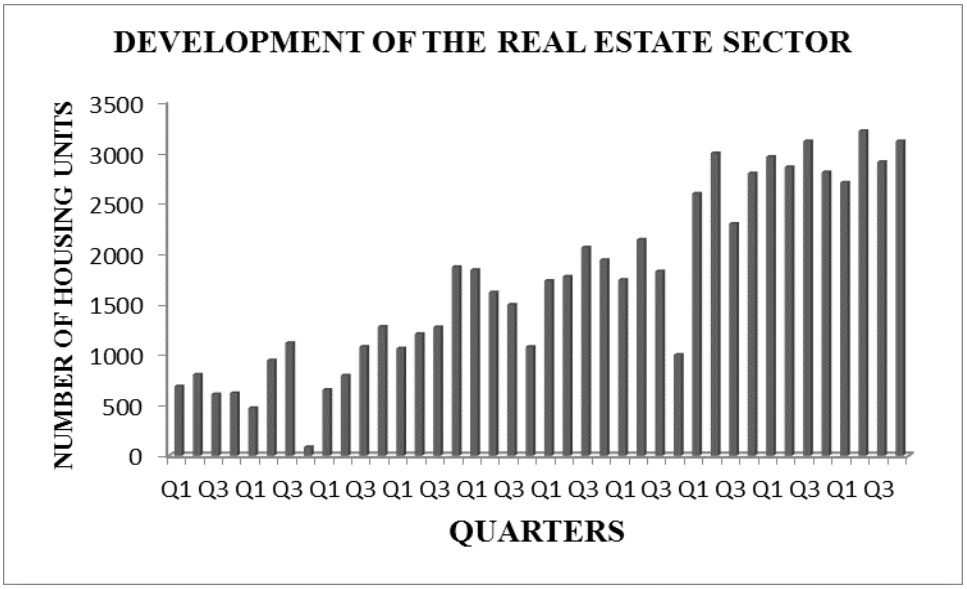
Interest rate had a skewness level and kurtosis level of 1.733 and -.660, money supply had a skewness level of -.636 and kurtosis level of .396, credit growth rate had a skewness level of -.329 and kurtosis level of .806 while capital had a skewness level of .051 and kurtosis level of -1.700. These variables all had skewness and kurtosis levels within the acceptable limits of $\pm$ 1.96. Inflation rate had a skewness level of 2.767 with a kurtosis level of -.053 while GDP had a skewness level of -.080 and a kurtosis level of 2.125. This indicated that inflation rate had a positively skewed and lowly peaked

distribution while GDP was negatively skewed with a moderately peaked distribution. The depature from normality for the variables was not extreme, however, housing units had a skewness level and kurtosis level of -4.50 and 7.022 respectively. It was negatively skewed with a highly peaked distribution which suggested that the departure from normality was too extreme.

4.3.2 Development of Real Estate Sector

The development of the real estate sector was measured by the number of housing units that were built quarterly during the period 2007 – 2016. From the data obtained, it was noted that the housing units built fluctuated during the period of study with quarter 4 of 2008 having the lowest number of housing units.

Figure 4.1: Housing Units Built Quarterly

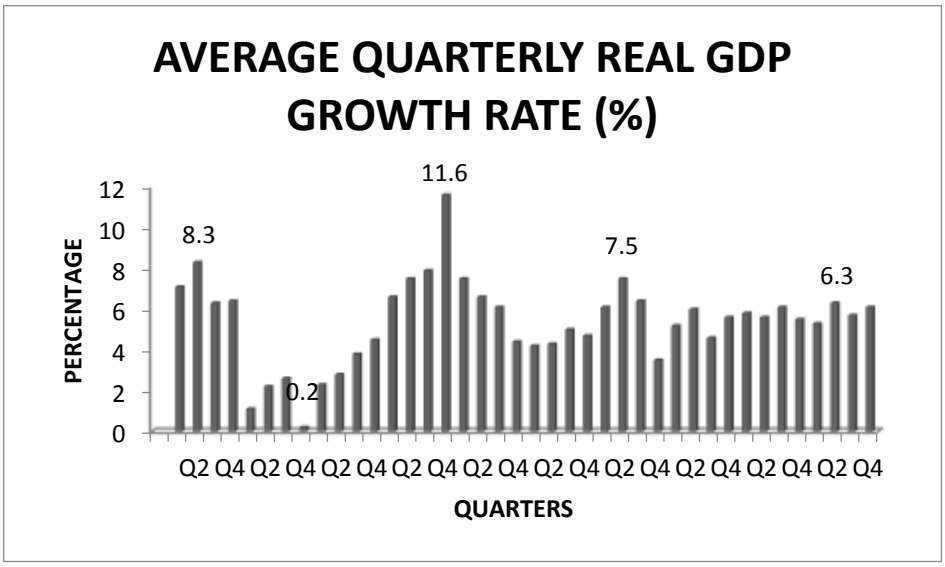


Source: Kenya National Bureau of Statistics

4.3.3 Real GDP Growth

The study sought to determine the quarterly average growth in GDP during the ten year period. The country's GDP rates have been fluctuating with the lowest at 0.2% in quarter 4 of 2008 and the highest at 11.6% in quarter 4 of 2010.

Figure 4.2: Real GDP Growth

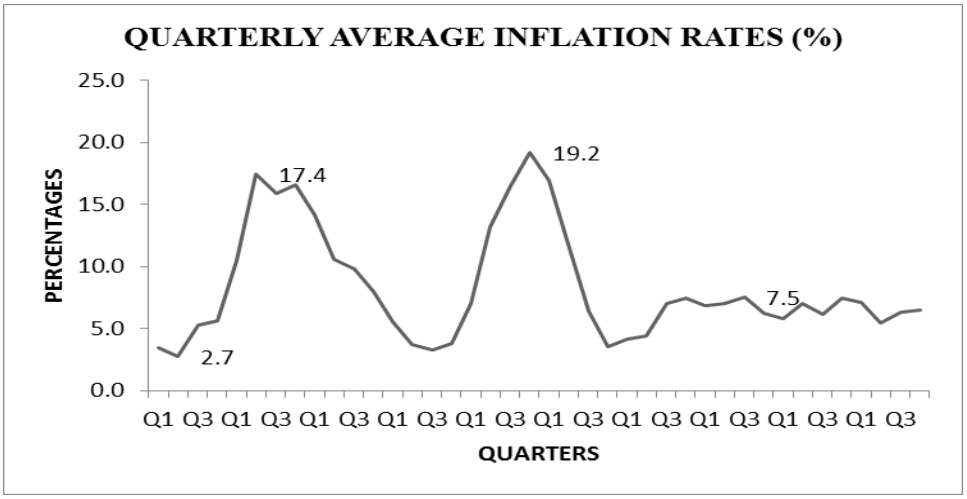


Source: Kenya National Bureau of Statistics

4.3.4 Inflation Rate

The study established that the inflation rates in the quarterly period under review (2007-2016) have been fluctuating with the highest rate being 19.2% and the lowest rate being 2.7% as shown in Figure 4.3 below.

Figure 4.3: Inflation Rates

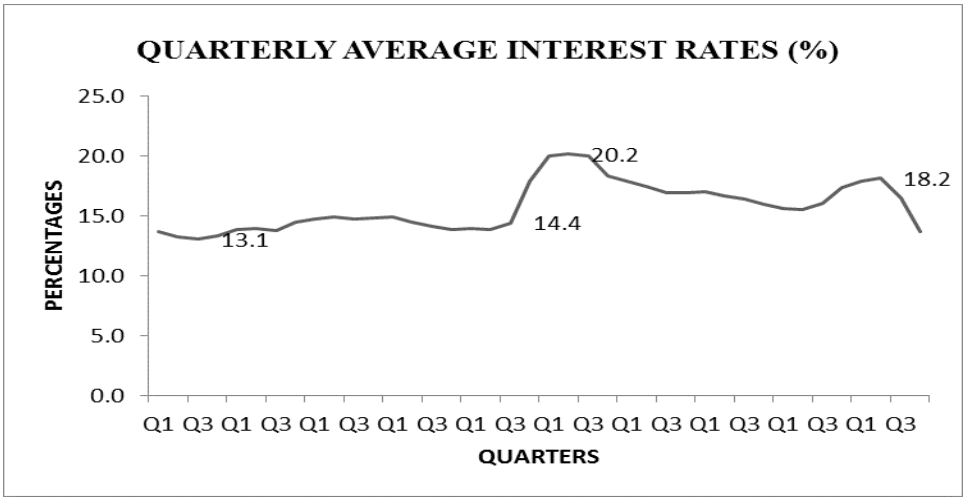


Source: Kenya National Bureau of Statistics

4.3.5 Interest Rate

The interest rates were measured using the quarterly average lending rates. The findings of the study were that the rates fluctuated across the period 2007 – 2016 with a range of between 13.1% to 20.2 % as shown in Figure 4.4.

Figure 4.4: Interest Rates

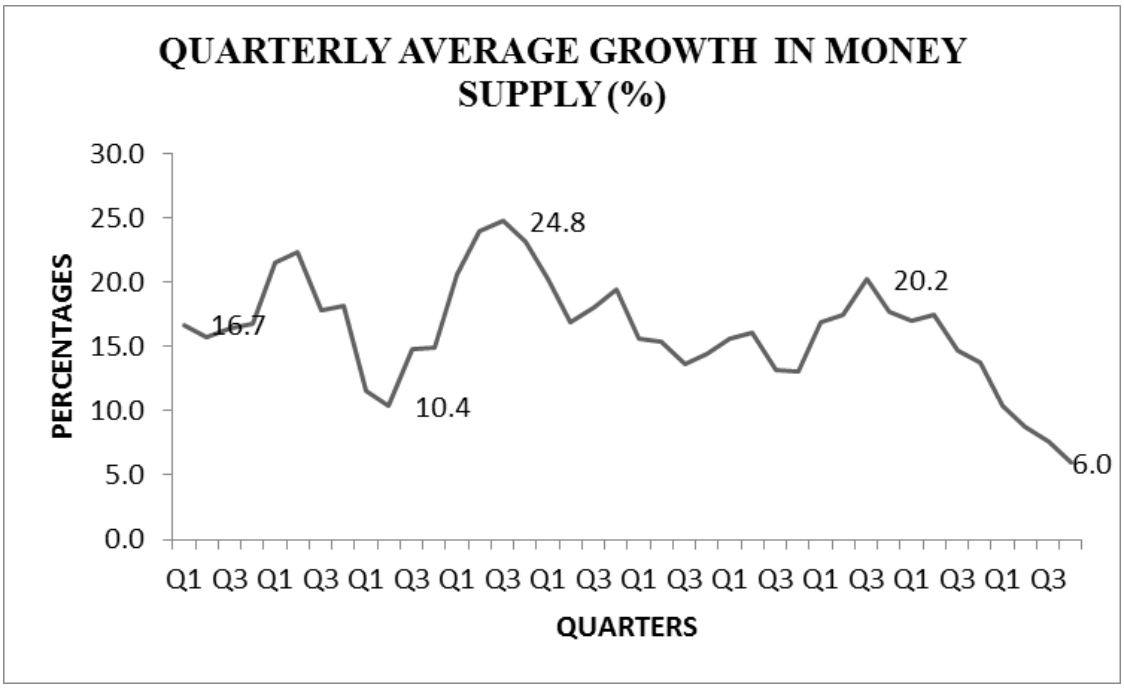


Source: Central Bank of Kenya

4.3.6 Money Supply Growth

The growth rate of money supply was measured using the average quarterly monetary base M3. The findings of the study were that the rates fluctuated across the period 2007 – 2016 with the highest being 24.8% in quarter 3 of 2010 while the lowest being 6.0% in quarter 4 of 2016. This is shown in Figure 4.5 below.

Figure 4.5: Money Supply Growth



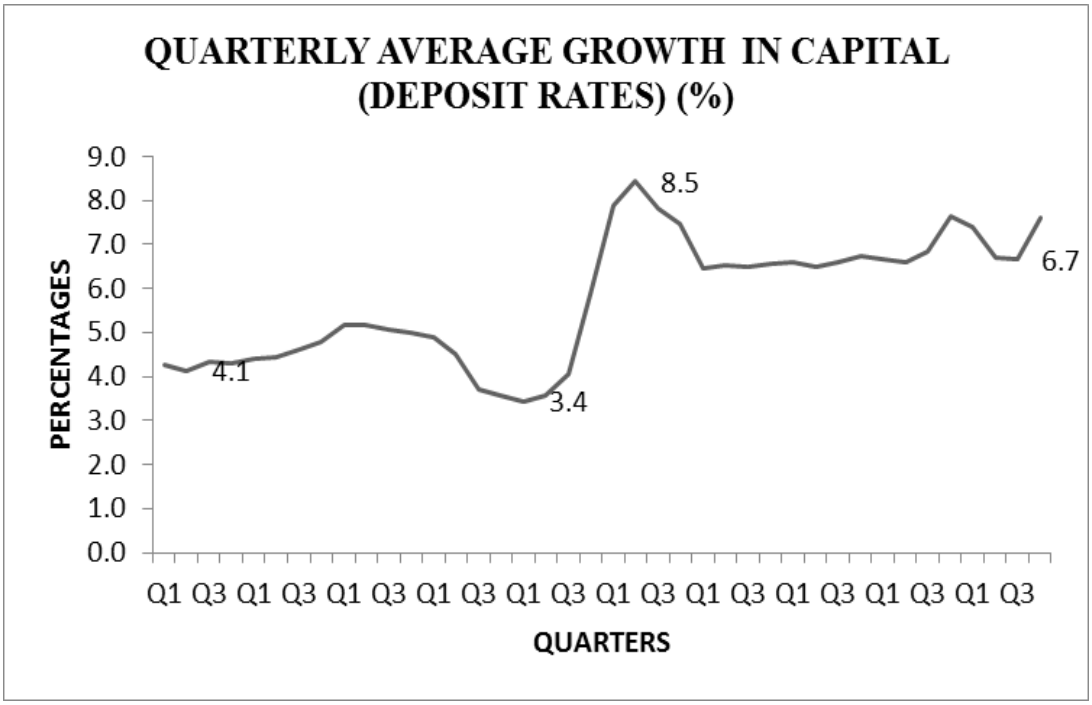
Source: Central Bank of Kenya

4.3.7 Capital

The growth rate of capital was measured using the average quarterly deposit rates. The study established that the deposit interest rates in the quarterly period under review

(2007-2016) have been fluctuating with the highest rate being 8.5% and the lowest rate being 3.4% as shown in Figure 4.6.

Figure 4.6: Capital

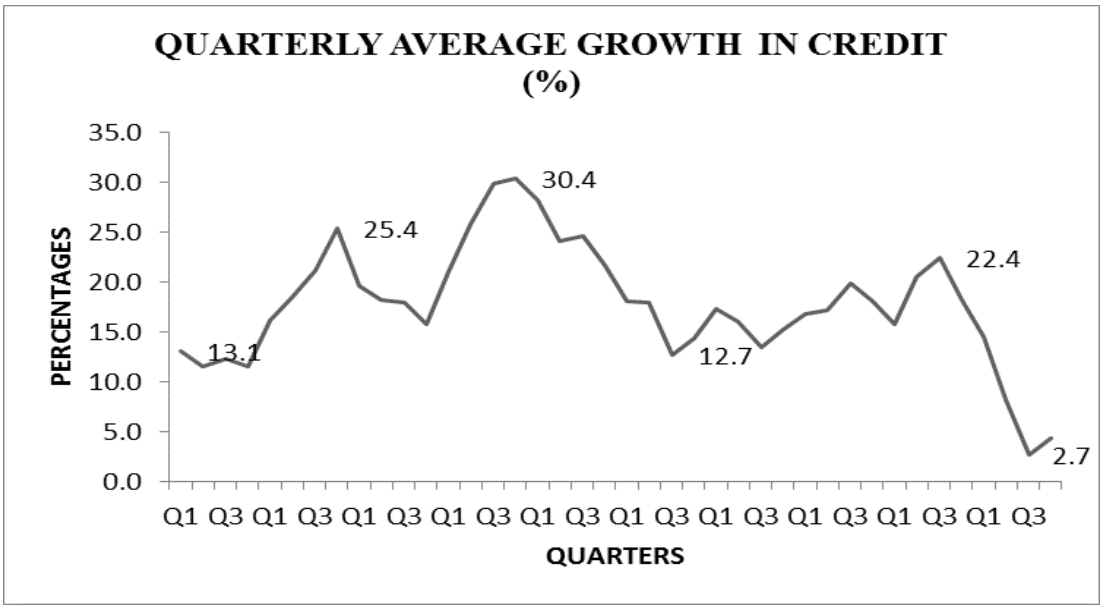


Source: Central Bank of Kenya

4.3.8 Credit Growth Rate

The credit growth rate was measured using the average quarterly domestic credit. The findings of the study were that the rates fluctuated across the period 2007 – 2016 with the highest being 30.4% in quarter 4 of 2010 while the lowest was 2.7% in quarter 3 of 2016 as shown in Figure 4.7.

Figure 4.7: Credit Growth Rate



Source: Central Bank of Kenya

4.4 Correlation Analysis

The study sought to determine the correlation analysis. This section discusses the tests of multicollinearity, tests of homogeneity of variances and the correlation matrix. The results from the analysis are illustrated below.

4.4.1 Tests of Multicollinearity

Tolerance and Variance Inflation Factor tests were conducted on the independent variables to test for multicollinearity. A tolerance value of less than 0.1 indicates multicollinearity. The results indicate a tolerance level of .422, .234, .368, .454, .175 and .362 for inflation rate, interest rate, money supply growth rate, GDP growth rate, capital and credit growth rate respectively hence no multicollinearity.

A VIF of 10 indicates multicollinearity. The results obtained show VIF levels of 2.372, 4.281, 2.718, 2.203, 5.723 and 2.763 for inflation rate, interest rate, money supply growth rate, GDP growth rate, capital and credit growth rate respectively. The Researcher noted that all the independent variables had a VIF greater than 1 but less than 10 therefore there was no multicollinearity amongst the variables.

Table 4.3: Tolerance and VIF Tests

Model		Collinearity Statistics	
		Tolerance	**VIF**
1	(Constant)		
	Inflation Rate	.422	2.372
	Interest Rate	.234	4.281
	Money Supply Growth Rate	.368	2.718
	GDP Growth Rate	.454	2.203
	Capital	.175	5.723
	Credit Growth Rate	.362	2.763

Source: Research Findings

4.4.2 Test of Homogeneity of Variances

Levene's test was conducted to determine whether there was homogeneity in the variances across the independent variables.

Table 4.4: Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Inflation Rate	6.013	7	30	.000
Interest Rate	3.726	7	30	.005
Money Supply Growth Rate	2.849	7	30	.021
GDP Growth Rate	3.395	7	30	.009
Capital	7.376	7	30	.000
Credit Growth Rate	5.384	7	30	.000

Source: Research Findings

The levene statistic obtained for the variables were 6.013, 3.726, 2.849, 3.395, 7.376 and 5.384 for inflation rate, interest rate, money supply growth rate, GDP growth rate, capital and credit growth rate respectively.

The significance level was 0.05. A *p* value of Levene's test lower than the significance level indicates a difference between the variables. Table 4.5 explains the *p* values and F statistic obtained for the independent and control variables. Inflation rate, GDP growth rate and capital had *p* values of .006, .007 and .028 respectively which were less than 0.05 hence the variances were significantly different. The *p* values obtained for interest rate, money supply and credit growth rates had *p* values of .072, .123 and .162 respectively which were greater than 0.05 hence the variances were not significantly different.

Table 4.5: Equality of Variances

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Inflation Rate	Between Groups	401.984	9	44.665	3.357	.006
	Within Groups	399.113	30	13.304		
	Total	801.098	39			
Interest Rate	Between Groups	58.493	9	6.499	2.017	.072
	Within Groups	96.658	30	3.222		
	Total	155.151	39			
Money Supply Growth Rate	Between Groups	237.208	9	26.356	1.740	.123
	Within Groups	454.436	30	15.148		
	Total	691.644	39			
GDP Growth Rate	Between Groups	84.494	9	9.388	3.282	.007
	Within Groups	85.824	30	2.861		
	Total	170.318	39			
Capital	Between Groups	34.265	9	3.807	2.507	.028
	Within Groups	45.554	30	1.518		
	Total	79.819	39			
Credit Growth Rate	Between Groups	456.663	9	50.740	1.593	.162
	Within Groups	955.496	30	31.850		
	Total	1412.160	39			

Source: Research Findings

4.4.3 Correlation Matrix

Pearsons correlations analysis was conducted to determine the correlation amongst the variables. The analysis was undertaken at 95% confidence interval and a confidence level of 0.05 (2-tailed). The correlation coefficient indicates the strength of the relationships

amongst the variables. The correlation relationship between the variables of study is explained in Table 4.6 below. Interest rate, GDP growth rate and capital were found to have a positive relationship with the number of housing units built annually with correlation coefficients of .419, .473 and .516 respectively. Inflation rate, money supply growth rate and credit growth rate were found to have a negative relationship with the number of housing units built annually with correlation coefficients of -.366, -.249 and -.198 respectively. The most significant correlation was between housing units and inflation rate at the 0.05 significance level.

The study established the relationship amongst the variables. Inflation rate had a positive relationship with interest rate, money supply growth rate and credit growth rate of .039, .064 and .254 respectively. Inflation rate had a negative relationship with GDP growth rate and capital of -.657 and -.072 respectively. GDP growth rate had a positive relationship with money supply growth rate and a negative relationship with interest rate at .168 and -.113 respectively. Credit growth rate had a positive relationship with GDP growth rate and money supply growth rate at .107 and .747 respectively and a negative relationship with interest rate and capital at -.213 and -.473 respectively. Interest rate and capital had a positive correlation at .841 and a negative correlation at -.555 and -.181 with money supply growth rate and GDP growth rate respectively. The most significant correlation was between interest rate and money supply growth rate at the 5% level of significance.

Table 4.6: Correlation Matrix

Pearson Correlation

		Inflation Rate	Interest Rate	Money Supply Growth Rate	GDP Growth Rate	Capital	Credit Growth Rate	Housing Units
Inflation Rate	Correlation	1						
	Sig.							
	N	40						
Interest Rate	Correlation	.039	1					
	Sig.	.810						
	N	40	40					
Money Supply Growth Rate	Correlation	.064	-.325*	1				
	Sig.	.696	.041					
	N	40	40	40				
GDP Growth Rate	Correlation	-.657**	-.113	.168	1			
	Sig.	.000	.488	.299				
	N	40	40	40	40			
Capital	Correlation	-.072	.841**	-.555**	-.181	1		
	Sig.	.660	.000	.000	.265			
	N	40	40	40	40	40		
Credit Growth Rate	Correlation	.254	-.213	.747**	.107	-.473**	1	
	Sig.	.114	.187	.000	.513	.002		
	N	40	40	40	40	40	40	
Housing Units	Correlation	-.366*	.419**	-.249	.473**	.516**	-.198	1
	Sig.	.020	.007	.122	.002	.001	.221	
	N	40	40	40	40	40	40	40

****** Correlation is significant at the 0.01 level (2-tailed).

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

Source: Research Findings

4.5 Regression Analysis

The Researcher conducted regression analysis where the development of the real estate sector was regressed against the four independent variables (Inflation Rate, Interest Rate, GDP Growth Rate, Money Supply Growth Rate) and the two control variables (Capital and Credit Growth Rate).

4.5.1 Model Summary

The study sought to investigate the nature of the relationship that exists between the factors. The results are as explained in Table 4.7. The correlation coefficient obtained of 78.6% showed that a strong linear relationship existed between the dependent and the independent and control factors.

Table 4.7: Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.786[a]	.618	.548	.2109

Source: Research Findings

a. Predictors: (Constant), Inflation Rate, Interest Rate, GDP Growth Rate, Money Supply Growth Rate, Capital and Credit Growth Rate

b. Dependent Variable: Development of the Real Estate Sector

The coefficient of determination (R^2) was 61.8%. The adjusted R square was 54.8% which meant that the independent and control variables used in the study contributed to 54.8% of the development of the real estate sector in Kenya. The regression model did not explain 45.2% of the other variables that had an effect on the development of the real estate sector.

4.5.2 Analysis of Variance (ANOVA)

ANOVA statistics was computed to determine how significant the selected regression model was in predicting the relationship that existed between the factors under investigation. The results obtained are shown in Table 4.8 below.

Table 4.8: Analysis of Variance

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.372	6	.395	8.892	.000[a]
	Residual	1.467	33	.044		
	Total	3.839	39			

Source: Research Findings

a. Predictors: (Constant) Inflation Rate, Interest Rate, GDP Growth Rate, Money Supply Growth Rate, Capital and Credit Growth Rate

b. Dependent Variable: Development of the Real Estate Sector

The F critical value at 5% level of significance is 2.39. The F calculated was 8.892. The F calculated of 8.892 was greater than the F critical value of 2.39 which implied that the overall model was significant. The *p* value for significance was 0.000 which is smaller than 0.05. The relationship that existed between the independent and control variables and the development of the real estate sector in Kenya was therefore significant.

4.5.3 Coefficients

The results of the analysis established the model coefficients and corresponding statistics as described in Table 4.9 below.

Table 4.9: Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std.Error**	**Beta**	**t**	**Sig.**
1 (Constant)	1.942	.390		4.977	.000
Inflation Rate	.010	.011	.147	.887	.382
Interest Rate	-.035	.035	-.225	-1.010	.320
Money Supply Growth Rate	-.001	.013	-.016	-.091	.928
GDP Growth Rate	.104	.024	.696	4.356	.000
Capital	.189	.056	.862	3.349	.002
Credit Growth Rate	.003	.009	.062	.348	.730

Source: Research Findings

When other factors were constant (Interest Rate, Money Supply Growth Rate, Capital, GDP Growth Rate, inflation rate and Credit Growth Rate), the development of the real estate sector was 1.942. Holding other factors constant, a unit increase in inflation rate , GDP growth rate, Capital and Credit growth rate will lead to a .010, .104, .189 and .003 increase in the development of the real estate sector respectively. The study further established that a unit increase in interest rate and money supply growth rate will lead to a -.035 and -.001 decrease in the development of the real estate sector respectively.

As per the model, the *p* values of the GDP growth rate of .000 and capital of .002 were less than 0.05 hence were individually statistically significant in predicting the development of the real estate sector. The *p* values of the interest rate, money supply growth rate, inflation rate and credit growth rate were .320, .928, .382 and .730 respectively and hence greater than 0.05. They were therefore individually statistically insignificant in predicting the development of the real estate sector. The multi – linear regression equation was:

$$\text{Log } Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + e$$

Where; Y = Dependent Variable (Development of Real Estate sector) , X1 was the Inflation Rate , X2 was the Interest Rate , X3 was the Money Supply Growth , X4 was the Real GDP Growth, X5 was Capital , X6 was Credit Growth while e was the error term in the model that was assumed to be associated with the Variables. The coefficients of regression were used in determining the model below which excluded the insignificant variables:

$$\text{Log } Y = 1.942 + 0.104X4 + 0.189X5 + e$$

4.6 Discussion of Research Findings

The study indicated that each of the variables: development of the real estate sector, interest rate, money supply growth rate, interest rate and GDP growth rate under investigation fluctuated across the period 2007 - 2016. The control variables included capital and credit growth rate. The coefficients that corresponded to inflation rate, GDP growth rate, capital and credit growth rate were positive. This indicated that a positive relationship existed between the development of the real estate sector in Kenya and those factors while the coefficients of interest rate and money supply growth rate were negative indicating a negative relationship between the development of the real estate sector in Kenya and those factors.

The study found a positive relationship between GDP growth rate and housing units. This was supported by Mbugua (2010) where he found out that a positive relationship existed between the supply of houses in the real estate sector, the price levels and the GDP growth. The findings on interest rates and inflation in this study supported the suggestion of Sibanda and Mhlanga (2013) that short term interest rates variation have a negative effect on property returns while inflation impacts it positively in the long run. However, in the short run, they noted that inflation impacts negatively on property returns. The research findings of the study were inconsistent with the findings of Muli (2012) which stated that growth in inflation, interest rate variation and GDP growth were significant determinants of real estate growth. In this study, only GDP growth and capital were found to be significant determinants in the development of the real estate sector.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The Chapter presents the summary of the findings, conclusions and recommendations in relation to the objectives of the study. It provides the limitations of the study and recommendations for further research.

5.2 Summary of Findings

The general objective of the study was to determine the effect of the macro – economic factors on the development of the real estate sector in Kenya. The study adopted a descriptive research design and applied a multiple regression model on the secondary data collected for the quarterly periods between 2007 - 2016. The data was obtained from the websites of Central Bank of Kenya, Kenya National Bureau of Statistics and reports from the real estate firms - Hass Consultants. SPSS version 16 was used as an analysis instrument. The data was then presented using tables and graphs.

The dependent variable (the development of the real estate sector) was measured using the number of housing units. The independent variables (inflation rate,money supply growth rate, interest rate and GDP growth rate) were measured using the percentage average of the quarterly CPI, percentage average of the quarterly lending rates, percentage change of the average quarterly monetary base (M3) and percentage average of the quarterly real GDP growth rate respectively. The control variables selected were capital and credit growth rate which were measured using the percentage average of the

quarterly deposit rates and percentage change of the average quarterly domestic credit growth rate respectively.

Below is the summary of the findings in accordance with the specific objectives:

1. **To determine the effect of inflation rate on the development of the real estate sector in Kenya**

The study established that inflation rate had a positive effect on the development of the real estate sector in Kenya. This implied that an increase in the rate of inflation increased the number of housing units built, therefore enabling the development of the real estate sector.

2. **To examine the impact of interest rate on the development of the real estate sector in Kenya**

The study established that interest rates had a negative effect on the development of the real estate sector in Kenya. This implied that an increase in the rate of interest decreased the number of housing units built thus affecting real estate development negatively.

3. **To determine the effect of money supply growth rate on the development of the real estate sector in Kenya**

The study established that money supply growth rate had a negative effect on the development of the real estate sector in Kenya. This implied that an increase in the money supply growth rate decreased the number of housing units built negatively affecting the real estate sector.

4. **To examine the impact of GDP growth rate on the development of the real estate sector in Kenya**

The study established that GDP growth rate had a positive effect on the development of the real estate sector in Kenya. This implied that an increase in the GDP growth rate increased the number of housing units built thus enabling the development of the real estate sector in Kenya.

5.3 Conclusion

The findings indicated that the objective of the study was achieved. The coefficients that corresponded to inflation rate and GDP growth rate were positive which showed that a positive relationship existed between them and the development of the real estate sector in Kenya. The coefficients of interest and money supply growth rate were negative indicating a negative relationship between them and the development of the real estate sector in Kenya.

The ANOVA statistics indicated a smaller *p*- value of 0.000 than $\alpha = 0.05$ while the F calculated of 8.892 was greater than the F critical value of 2.39. This showed that there was a significant relationship that existed between the factors and the development of the real estate sector in Kenya. The *p*- values of the GDP growth rate and capital were less than $\alpha = 0.05$ hence were found to be statistically significant individually while those of interest rate, money supply growth rate, credit growth rate and inflation rate were greater than 0.05 therefore were not found to be statistically significant individually in predicting the relationship of the variables.

The regression model obtained was therefore: Log Y = 1.942 + 0.104X4 + 0.189X5 + e

This model could therefore be explained as the development of the real estate sector was influenced by GDP growth rate and capital holding other factors constant. The other factors of inflation rate, money supply growth rate, interest rate and credit growth rate were insignificant and therefore, did not form part of the model.

5.4 Recommendations

Kenya faces a great housing shortage therefore, the development of the real estate sector is vital for the success of the economy. The study recommends that the Central Bank of Kenya and other regulators in the market should put in place policies that will ensure control of macro-economic variables such as interest rates and inflation rate through various monetary and fiscal policies so as to moderate the volatility being experienced in the economy. The control of interest rates would help in the reduction of the cost of borrowing which would make investment in real estate affordable. Investors will thus increase the supply of housing. This may lead to a reduction in the prices thereby increasing the demand and reducing the housing shortage. The interest rate cap was introduced in 2016. From the study, the growth in credit and the level of money supply in the economy significantly dropped during that period. The Regulators should therefore put policies that contribute to the growth and not the decline in the economy.

The control of inflation would ensure that the prices of properties are stable since investors would not incur higher costs. The investors will therefore not pass over the costs to the buyers of properties by increasing the prices of their properties. The

Government should fast track the availability of low cost but good quality housing to the citizens by providing more incentives such as subsidies and tax credits to the real estate developers. This will encourage them to channel their resources to the rural areas which will increase the number of housing units across the country.

The Government should aim to grow the country's GDP since it has a positive influence on the real estate sector. This will also ensure that the citizens have increased purchasing power to afford the real estate property of their choice. The political stability in the economy played a major role in influencing the growth in the GDP. During the periods of political uncertainty, the GDP significantly dropped. The negative effect of political uncertainties on the GDP of an economy should be evaluated. The Government should therefore ensure that political stability is maintained so that the GDP of the economy increases which has a positive effect on the development of the real estate sector and possibly other sectors. This will enhance stability and efficiency of the economy.

5.5 Limitations of the Study

The resources allocated were inadequate to conduct a study on all other macro – economic factors. The study was therefore limited to only four macro – economic factors: interest rate, GDP growth rate, money supply growth rate and inflation rate. Two control variables were used: capital and credit growth rate. These factors were used to establish the effect on the real estate sector whereas there may exist many other different factors that might have an influence on it. This could be shown by the results obtained where only 54.8% of the development of the real estate sector could be explained by the factors

in the study while 45.2% of the development of the real estate sector remained unexplained by the regression model.

The study used secondary data which was already in existence unlike primary data which has first - hand information. Possible inherent errors during the recording and organization of the results might have existed in the results.The period of the study was 2007 – 2016 where many changes could have occurred in the country that the study did not account for. The changes included two general elections in 2007 and 2013, the introduction of capital gains tax in 2015 and interest rate cap in 2016. The changes may have affected the outcome of the study.

The study was also undertaken within a short period of time. During this period, the researcher also had official duties at the workplace which were highly involving and was also undertaking part time studies. The researcher had to balance between the research and official work and school engagements. This was overwhelming and resulted to the exhaustion of the researcher which could have had an effect on the input of the study. However, the reseacher endeavoured to conduct the study within the specified period of time.

5.6 Suggestions for Further Research

The study focused on only four macro-economic factors interest rate, money supply growth rate, inflation rate and GDP growth rate to determine the effect on the real estate sector in Kenya. The researcher recommends that other factors should be investigated. The factors may include but should not be limited to foreign exchange rates, diaspora

remittances, demand for housing, foreign direct investment, infrastructure development and government influence. Research can also be done to determine the specific factors that influence the variables such as the determinants of inflation rate, interest rate or GDP growth rate. A further study can be conducted on the relationship amongst the variables to determine their effect with each other.

Further research can be done on the effect of micro – economic factors on the development of the real estate sector. The study only investigated the real estate sector. Further research can be conducted on the effect of macro – economic factors on the performance of other sectors such as the insurance and banking sector. The study was generalized to the entire country. It would be important to conduct a study on the factors that influence the growth of different sectors in various counties of Kenya.

Kenya currently faces a great housing shortage. Researchers can therefore conduct studies on the effect of macro- economic variables on the supply of houses in Kenya. Research can also be carried out on the impact of macro – economic factors on the prices of the real estate sector in Kenya and other regional markets. Capital gains tax was introduced in 2015. A study should therefore be carried out on the effect of capital gains tax on the growth of the real estate sector. The interest rate cap came into effect in 2016. A study can be conducted on the impact of the interest rate cap on the growth in the domestic credit.

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APPENDICES

Appendix 1: Data used in the study

YEARS	QUARTERS	INDEPENDENT VARIABLES			
		INFLATION	INTEREST RATE	MONEY SUPPLY GROWTH RATE	GDP GROWTH RATE
		%	%	%	%
2007	Q1	3.4	13.7	16.7	7.1
	Q2	2.7	13.3	15.7	8.3
	Q3	5.3	13.1	16.4	6.3
	Q4	5.6	13.3	16.8	6.4
2008	Q1	10.5	13.9	21.5	1.1
	Q2	17.4	14.0	22.3	2.2
	Q3	15.9	13.7	17.8	2.6
	Q4	16.6	14.4	18.1	0.2
2009	Q1	14.1	14.8	11.5	2.3
	Q2	10.6	14.9	10.4	2.8
	Q3	9.8	14.8	14.8	3.8
	Q4	8.0	14.8	14.9	4.5
2010	Q1	5.5	14.9	20.6	6.6
	Q2	3.7	14.5	24.0	7.5
	Q3	3.3	14.2	24.8	7.9
	Q4	3.8	13.9	23.2	11.6
2011	Q1	7.0	14.0	20.2	7.5
	Q2	13.2	13.9	16.9	6.6
	Q3	16.5	14.4	18.0	6.1
	Q4	19.2	17.9	19.4	4.4
2012	Q1	16.9	20.1	15.6	4.2
	Q2	11.8	20.2	15.4	4.3
	Q3	6.4	20.0	13.6	5.0
	Q4	3.5	18.3	14.5	4.7
2013	Q1	4.1	17.9	15.6	6.1
	Q2	4.4	17.4	16.1	7.5
	Q3	7.0	17.0	13.2	6.4

	Q4	7.4	17.0	13.1	3.5
2014	Q1	6.8	17.0	16.9	5.2
	Q2	7.0	16.7	17.5	6.0
	Q3	7.5	16.4	20.2	4.6
	Q4	6.2	16.0	17.7	5.6
2015	Q1	5.8	15.6	17.0	5.8
	Q2	7.0	15.6	17.5	5.6
	Q3	6.1	16.1	14.7	6.1
	Q4	7.4	17.4	13.8	5.5
2016	Q1	7.1	17.9	10.4	5.3
	Q2	5.4	18.2	8.8	6.3
	Q3	6.3	16.5	7.6	5.7
	Q4	6.5	13.7	6.0	6.1

Source: Kenya National Bureau of Statistics and Central Bank of Kenya

Appendix 2: Data used in the study

YEARS	QUARTERS	CONTROL VARIABLES		DEPENDENT VARIABLE
		DEPOSIT RATE	CREDIT GROWTH RATE	LOGARITHM OF HOUSING UNITS
		%	%	
2007	Q1	4.3	13.1	2.8
	Q2	4.1	11.5	2.9
	Q3	4.3	12.3	2.8
	Q4	4.3	11.5	2.8
2008	Q1	4.4	16.2	2.7
	Q2	4.5	18.4	3.0
	Q3	4.6	21.1	3.0
	Q4	4.8	25.4	1.9
2009	Q1	5.2	19.6	2.8
	Q2	5.2	18.2	2.9
	Q3	5.1	17.9	3.0
	Q4	5.0	15.7	3.1
2010	Q1	4.9	21.0	3.0
	Q2	4.5	25.8	3.1
	Q3	3.7	29.8	3.1
	Q4	3.6	30.4	3.3
2011	Q1	3.4	28.2	3.3
	Q2	3.6	24.1	3.2
	Q3	4.0	24.6	3.2
	Q4	5.9	21.6	3.0
2012	Q1	7.9	18.1	3.2
	Q2	8.5	17.9	3.2
	Q3	7.8	12.7	3.3
	Q4	7.5	14.3	3.3
2013	Q1	6.5	17.3	3.2
	Q2	6.5	16.0	3.3
	Q3	6.5	13.5	3.3
	Q4	6.6	15.3	3.0
2014	Q1	6.6	16.8	3.4
	Q2	6.5	17.2	3.5
	Q3	6.6	19.8	3.4

	Q4	6.7	18.0	3.4
2015	Q1	6.7	15.7	3.5
	Q2	6.6	20.5	3.5
	Q3	6.8	22.4	3.5
	Q4	7.7	18.2	3.4
2016	Q1	7.4	14.5	3.4
	Q2	6.7	8.2	3.5
	Q3	6.7	2.7	3.5
	Q4	7.6	4.4	3.5

Source: Kenya National Bureau of Statistics and Central Bank of Kenya