EFFECT OF MACROECONOMIC VARIABLES ON PRICES OF RESIDENTIAL REAL ESTATE PROPERTIES IN KENYA

BY

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DECLARATION

This research project is my original work and has not been presented for examination in any other university.

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This Research Project has been forwarded for examination with my approval as the University supervisor.

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DEDICATION

This paper is dedicated to my lovely wife Christine and son Ryan, for their support, understanding and encouragement throughout the programme.To my parents for their unwavering love and support.

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LIST OF ABBREVIATIONS

AFDB	African Development Bank
CAHF	Center for Affordable Finance in Africa
CBK	Central Bank of Kenya
CPI	Consumer Price Index
DFM	Dynamic Factor Model
GDP	Gross Domestic Product
GOK	Government of Kenya
HARP	Housing –Adjusted Retail Prices
IMF	International Monetary Fund
KNBS	Kenya National Bureau of Statistics
MBA	Master's in Business Administration
MSc	Masters in Science
OLS	Ordinary Least Squares
Q1	Quarter One
Q2	Quarter Two
Q3	Quarter Three
Q4	Quarter Four
RPPI	Residential Property Index
SPSS	Statistical Package for Social Sciences
US	United States
TCLI	True cost of living index
UK	United Kingdom
VAR	Vector Auto Regression

ABSTRACT

Housing wealth is an important determinant of consumption and saving behavior of households and is often correlated with savings and better overall financial management. A family's investment decision in housing may have profound implications for all those within it and for the economy at large. The main aim of this study was to investigate empirically the effect of macroeconomic variables on the prices of residential real estate property in Kenya. The specific objectives of the study included: to determine the effects of lending rates on prices of residential real estate property in Kenya; to establish how rate of unemployment affects prices of residential real estate property in Kenya; to assess the effect of GDP growth rate on the prices of residential real estate property in Kenya, and; to determine effect of real inflation rate on the prices of residential real estate property in Kenya. The researcher employed descriptive research design. The current study employed descriptive statistics, Pearson's correlation analysis and ordinary least squares regression model. Data presentation after the regression and correlation analysis was through tables. Study results reveal that commercial banks' lending rates had a significant negative effect on housing price index. Unemployment was a significant predictor of residential housing prices. Unemployment rate had a significant positive effect on residential housing price index. Further findings from the study revealed that real GDP had a significant positive effect on residential housing prices in Kenya. Lastly, findings on the effect of inflation on prices of residential houses indicated that inflation has a significant positive influence on residential housing prices. The following recommendations are made after considering the study findings. First, the housing sector therefore needs some fiscal and policy measures to ensure that price movements reflect the economic situation of the country. Secondly, increase in interest rates should be managed though effective monetary and fiscal policies by the CBK. Lastly, in sustaining economic growth, policies should be put in place to control unemployment and inflation to a sustainable level.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Housing wealth is an important determinant of consumption and saving behavior of households and is often correlated with savings and better overall financial management. A family's investment decision in housing may have profound implications for all those within it and for the economy at large (World Bank, 2011). According to McLennan, et al. (1998), the expenses on housing cover approximately a quarter of the disposable income. According to the Kenya Constitution 2010, every citizen has a right to decent housing. The housing problem can therefore be viewed from both an economic as well as a social perspective.

The demand for housing in the Kenya is immense and driven by a growing population and urbanization (World Bank 2011). Growing prosperity has also increased the demand for larger and better quality housing. The price of houses however remains a key inhibitor in home ownership since most of the population cannot afford them. Formal sector mortgage financing will only resolve this issue for a fraction of the urban population, but other solutions are needed for the rural population and the urban poor. The factors that determine housing prices need to be critically assessed so that policy makers can have policy targeted towards them in order to lower the prices of houses.

1.1.1 Macro Economic Variables

A macroeconomic variable is a characteristic, trend or condition that comes from or applies to abroad aspect of an economy rather than a certain population. Common macroeconomic factors include gross domestic product, unemployment rate, inflation rate, money supply and interest rates.

Gross domestic product is one of the most important economic indicators. It refers to the total amount of goods and services a country produces within a specific period. GDP can be stated in two ways, real or nominal. Real GDP takes inflation into account unlike nominal which reflects only changes in prices. The nominal figure will be higher if inflation goes up from year to year, so it is not necessarily indicative of higher output values (Jeffrey,1985).Unemployment rate refers to the number of people from the available pool of labor who are unable to find work. When the economy has witnessed growth from period to period, which is indicated in the GDP growth rate, unemployment levels tend to be low. Rising GDP levels indicate higher output which means more laborers are needed to keep up with the higher levels of production.

Inflation refers to the rate at which prices rise. Inflation is either measured using the consumer price index or the GDP deflator. The CPI gives the current price of a selected basket of goods and services that is updated periodically. The GDP deflator is the ratio of nominal GDP to real GDP. Both CPI and GDP deflator tend to move in the same direction (Mitchell & Ray, 2013). Money supply refers to the entire stock of currency and

other liquid instruments in a country's economy at a particular time. An increase in money supply lowers interest rate which leads to lower interest rates translating into more investments. It also means that consumers have more disposable income leading to increased spending. Interest rate refers to the amount charged, expressed as a percentage of the principal, by a lender for use of an asset. It is charged as a compensation for loss on an asset's value. Since interest rate is the cost of borrowing money, it is affected by both demand and supply of money.

1.1.2 Residential Real Estate Prices

Residential real estate property price refers to a value that will purchase a defined residential real estate property. It is the consideration given for transfer of ownership of a real estate asset. The price of an asset is determined by the market through the forces of supply and demand. Aggregate demand refers to the total demand for goods and services in an economy at a particular price. Effective housing demand is the amount of housing for which the population is willing and able to pay (Xin & Lam, 2002). According to the law of demand, the higher the price, the lower the quantity demanded. Higher prices erode the purchasing power of disposable income.

Aggregate supply refers to total supply of goods and services produced within an economy at a given overall price level in a given time period. Normally, there is a positive relationship between aggregate supply and the price level. In the short run,

aggregate supply responds to higher demand (and prices) by bringing in more inputs into the production process and increasing utilization of current inputs. In the Long run, however, aggregate supply is not affected by the price level and is driven only by improvements in productivity and efficiency. The market price is the most probable price that the property would exchange for under competitive market conditions in which the forces of demand and supply are left to operate freely (Herzog, 1963).The major objective of the appraiser in real estate is to determine the fair value of the property. The buyer and the seller on the other hand are looking for the lowest and highest feasible price for it (Makena, 2012).

There are three approaches available for use in estimation of value for residential real estate properties (Brueggeman & fisher, 2005). They include the sales comparison approach, the cost approach, and the income approach. The cost approach assumes that the value of a property is the same as the replacement value of the property. This method requires an in-depth knowledge of construction and material costs. This method is not widely used. The Income capitalization approach determines the value of a property based on its income in comparison to similar properties. If the investor knows the capitalization rates prevailing in a certain market, he can divide the income generated from the property by the capitalization rate to arrive at an estimated sales value. The other widely used valuation technique is the sales comparison approach also known as the market approach. This method involves selecting properties with similar characteristics in

the same market which have recently been sold. The properties are then compared with the property in question and the appraiser deducts value from the subject property for deficiencies and adds value to the subject property for advantages.

1.1.3 Effect of Macro Economic Variables on Residential Real Estate Prices

In addition to money supply, there are other economic indicators, such as employment, GDP and mortgage interest rates, which can affect both housing prices and the construction of new properties. Interest rates and interest rate spreads are considered good indicators of economic activity and therefore assumed to contain information about property prices (Brooks & Tsolacos, 2001).The most obvious explanation is that when interest rates increase, people are discouraged from buying houses; therefore the demand for houses decreases. Several studies have shown that interest rates help explain a significant proportion of the variability in property returns (West & Worthington, 2006).Other studies which support this finding include Onder (2000), Bond and Seiler (1998) ,McLennan(1998), Makena (2012), Otwoma,(2013). Increased money supply results to inflationary pressures and can adversely affect real estate properties. High inflation results to high discount rates thus affecting investments. Allen and Gale (2000) attributes the Japanese bubble to the financial liberalization experienced during the 1980's and 1990's which resulted to expansion of credit. Property investment is regarded as an inflation hedge and the relationship between inflation and property prices is a

recurrent theme in literature (West & Worthington, 2006).Different views have been held with regard to this topic (Kearl, 1979; Hendershott, 1980; Feldstein, 1992; Poterba, 1992). In particular, Feldstein (1992) indicated that increasing inflation serves to reduce people's incentive to invest in real estate, which in turn lowers housing demand. On his part, Kearl (1999) argued that inflation causes nominal housing payments to rise, translating to a lower housing demand. Building activity is stimulated by higher employment growth (Smith and Tesarek, 2001; Sternlieb and Hughes, 2007), while Hartzel, et al. (1993) argued that certain regional employment characteristics play a significant role in investors' decisions, and thus, in the determination of housing prices. There exists a significant impact of GDP changes (and thus, of employment) on housing prices (Giussani, et al...1992).Higher national output leads to increased demand for labor necessary to support the increased output. This leads to increased disposable income on the side of the consumers which results to increased demand for goods and services, including housing.

1.1.4 Real Estate Sector in Kenya

Same as other countries in Africa, Kenya has a large housing gap which is growing every year and is increasingly prevalent in urban areas. The current annual housing deficit is estimated at 156,000 units per annum based on the population growth and urban migration taking place (Ministry of Housing, 2011). Average annual shortfall stands at around 35,000 units. The GOK goal of meeting the annual housing demand is made more

urgent by the bill of rights in the constitution of Kenya 2010 that provides for adequate housing of all Kenyans as a basic right. There is limited data on current levels of construction but according to the Ministry of Housing, it is 50,000 units a year. The deficit is largely filled by the growth in slum dwellings and continued self-construction of poor quality traditional housing (World Bank, 2011). The housing gap can only be partially financed by mortgages, while other solutions are required for lower income groups such as Housing Micro-finance and rental housing. However, the major factor affecting demand and supply of housing is price. It is therefore imperative to establish what drives price so that measures can be taken to make housing affordable to many.

The past decades have registered strong growth in most countries in Africa accompanied by sustained growth in the middle class. The continents middle class has reached 34.3% of the population in 2010 up from 26.2% in 1980(Africa Development bank 2011) In Kenya the middle class comprises 44.9% of the population. This, accompanied by rapid urbanization and growth in expenditure income has led to increased demand for various goods and services including housing. In Kenya, one third of the houses were inherited and only 1.5% of the house owners acquired it through credit (Finscope, 2009).In Nairobi, over 70% of the houses are permanent while only 54% of the houses in Mombasa are permanent. Traditional houses are more common in North Eastern (55%) but much less so on the coast and large cities.The real estate market in Kenya is characterized by information asymmetry with very little information centrally available.

It is highly heterogeneous consisting of various geographical and sectorial markets. This problem is accentuated by the fact that there is no central trading market for real estate property in Kenya. The Kenyan market as with many other African markets is characterized by a large demand and chronic undersupply of formal housing. This situation has a great impact on houses. Market expectations about housing are solutions are important and can drive costs upwards. The Market stakeholder structure can also determine housing supply and influence the prices as well. In Kenya there are only a few private developers who can afford to invest in medium to large scale housing developments. Lack of adequate supply of finance can also affect both the developer's ability to develop houses as well as the consumers' ability to purchase. This also pushes up the cost of borrowing which is a key determinant of housing prices (CAHF 2011). Another problem in the housing sector in Kenya revolves around land infrastructure and property rights. The infrastructure in most parts of the country is wanting while lack of master planning undermines the sustainability of housing developments, paving the way for informal settlements (World Bank 2011).

1.2 The Research Problem

Residential properties form a major component of investor's portfolio in Kenya. The real estate industry in Kenya contributes about 4.5 % of GDP (KNBS, 2011).This plus the fact that housing is a basic need and a right entrenched in the constitution makes real estate industry a key area of concern. Over the past years, the world real estate industry

has been undergoing drastic reforms due to liberalization of the financial markets, favorable interest rates, obsolescence of existing stock of housing, and a change in consumer norms on housing uses. The housing sector has also been a target of government fiscal and monetary policy aimed at achieving low inflation, low unemployment, and balanced growth (Apergis, 2003).

The annual housing demand in urban areas in Kenya is estimated at 150,000 units. On the other hand the supply is estimated at 40,000 units per year. This leaves a supply gap of 110,000 units a year. Delivery of houses to the poor is further exacerbated by the disparity and imbalance in housing demand mitigation among income groups. More than 80% of the houses produced are for high and upper middle income earners yet the highest demand is for low income and lower middle income earners (83%), (Hakijamii, 2013). The housing gap in Kenya can be attributed to high cost of financing (Mbuvi, 2006). Muli (2011) studied the relationship between house prices and mortgage credit in Kenya. He found that changes in prices are positively and significantly related to the long-term evolution of mortgage credit. Kagendo (2011) concluded that location and realtors were key factors affecting real estate prices in Kiambu County. He also found that agents played a key role in real estate price determination in Kiambu as many property owners bought their property through them.

Most studies around the topic in Kenya focus on a single macroeconomic factor or a specific region in the country. Otwoma (2013) studied the relationship between interest

rate and residential real estate prices. Makena (2012) studied effects of macroeconomic variables on residential real estate prices in Nairobi using five year data from 2007 to 2011. Muli (2011) studied the relationship between house prices and mortgage credit in Kenya. Under the price theory, the price of an asset should be determined by the forces of demand and supply. It is therefore important to understand the factors that influence demand and supply. The research sought to answer the question; what is the effect of macroeconomic variables on prices of residential real estate properties in Kenya?

1.3 Objectives of the Study

The main aim of this study was to investigate empirically the effect of macroeconomic variables on the prices of residential real estate property in Kenya.

The specific objectives of the study included;

i) To determine the effects of lending rates on prices of residential real estate property in Kenya

ii) To establish how rate of unemployment affects prices of residential real estate property in Kenya

iii) To assess the effect of GDP growth rate on the prices of residential real estate property in Kenya

iv) To determine effect of real inflation rate on the prices of residential real estate property in Kenya

1.4 Value of the Study

The findings from this study will be of importance to the stakeholders in the housing market, government and future researchers in the field of residential housing. The government and real estate stakeholders can use the findings from this study to guide policy and practice in the housing sector in Kenya and thus seek to improve housing demand in Kenya. Future researchers can use the limitations that will be encountered in the study to inform future research. This study therefore can be used by future researchers as a basis for further research in the housing sector.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The focus in this chapter is on literature relating to residential real estate pricing. We begin by looking at the various theories that have been developed around our area of study. This is followed by a review of empirical studies done around the topic.

2.2 Theoretical Review

2.2.1 User Cost Model

Tong Hun Lee and Keon Jin Chung (2007) used a single intertemporal consumption model to derive the user cost of owner-occupied housing in Korea which was later incorporated in the true costs of living index (TCLI). This theory compares the cost of owning and using a home with the cost of living in a rental house. The user cost comprises of out of pocket payments e.g Mortgage payments, Maintenance, taxes etc., capital variation, forgone investment opportunities among others. If rental cost is higher than the user cost, households would prefer to own (purchase) homes instead of paying rent. McFadyen and Hobart (1978) used a rate of return on the full value of the house rather than the equity capital in measuring the user cost for the Canadian CPI. In simulating the CPI for the U.S., Gillingham (1980) specified alternative user costs but without the unique opportunity cost of equity Capital. The Bank of England (Cunningham (1997) measured a user cost for the Housing Adjusted Retail Prices (HARP) of the UK.

2.2.2 The Prospect theory

This is a behavioral economic theory that describes the way people choose between probabilistic alternatives that involve risk, where the probabilities of outcome are known (Genesove and Mayer, 2001). According to the theory, people make decisions based on potential value of losses and gains rather than the final outcome. Gains and losses are examined from a reference point. The marginal value of gains or losses diminishes with the size of the gain or loss. Kyle, Hui & Xiong (2005) found out that sellers were willing to hold a risky project with a relatively inferior Sharpe ratio if the project is currently making losses, and intents to liquidate it when it breaks even. On the hand, the agent may liquidate a project with a relatively superior Sharpe ratio if its current profits rise or drop to the break-even point. The value function is steeper for losses than for equally sized losses. According to the theory sellers with potential losses (with reference to purchase price) are likely to set higher prices than sellers with potential gains. This loss aversion behavior means that the properties will take longer to sell in the market (Genesove and Mayer, 2001).

2.2.3 Game Theory

This is an optimality model taking into consideration not only the benefits less costs, but also the interaction between participants. The theory attempts to look at the relationships between participants in a particular model and predict their optimal decisions.Lingling Mu & Junhai Ma (2007) found out that a non-cooperative approach to decision making

between land owners and land developers resulted to higher prices than when a cooperative approach was used. While studying the unique property market in Hong Kong, Yue, Leung and Fung (2012) concluded a high price is the only Nash equilibrium in the model. They proposed a windfall tax aimed at lowering the housing price. The effect of the windfall tax is to shift the Nash equilibrium to a lower housing price.

2.2.4 Agency Theory

The agency theory defines the relationship between the principal and the agent. The two problems that agency theory addresses are: the problems that arise when the goals and desires of the principal or agent are in conflict, and the problems that arise when the agent and the principal have different attitude towards risk (Jensen & Meckling, 1976). According to Gene Marsh & Leonard Zumbano (1998) the evolving multifunction role of the real estate broker and the demands being placed upon brokers by both buyers and sellers is increasingly placing brokers in conflict with the laws governing their contact as agents. Because of different risk tolerances, the principal and agent may be inclined to take different actions. Agency problems can also result from inefficiencies and incomplete information. This problem exists in real estate market since most home owners engage brokers in the process of selling their real estate properties. According to Caples, Anna and Mishra (2010) the agency problem can be confirmed if the selling price or the time to sell the house is affected when the listing broker in a real estate transaction is also the selling broker.

2.2.5 Decision Theory

Decision theory is concerned with identifying the values, uncertainties and other issues relevant in a given decision, its rationality and the resulting optimal decision. Property acquisition and or development involve uncertainty. MacFarlan (1995) argued that it is important to include uncertainty in an analysis of the financial feasibility of a development or acquisition. He points out that most decision analysis has focused on variation around the anticipated or expected outcome. This does not take into account uncertainty and the range of all outcomes that can happen. A proper analysis should include an examination of the uncertainties in each of the variables that lead to that financial outcome such as rental, yield, costs and finance (Nick, French and Laura). A study by Roberts and Hennebery (2007) concluded that investors in Germany, UK and France followed a similar model, with investors setting a strategy, searching for properties, undertaking an analysis of market conditions and purchasing properties that fulfill that strategy.

2.3 Determinants of Real Estate Prices

According to Taltavull (2003), property prices depend on market characteristics such as vacancy level, land availability, construction supply elasticity to respond to high or low speed to changes in demand, as well as potential for economic growth, industrial and services. Property prices are also affected by region or geographic area in which they are located (Brueggeman and Fisher, 2008). They also argue that demand for real estate

properties is influenced by the nature of industries and businesses that are attracted to that area. At a macro level, several factors have been found to affect prices of real estate properties. The first determinant is interest rates. Interest rate is defined as the cost of borrowing money or capital. Egert and Mihaljek (2007) found out that real interest rate was an important determinant of house prices in Central and Eastern Europe.An increase in interest rates increases cost of borrowing. This leads to high mortgage repayments thus reducing the affordability and demand for housing. When interest rates increase, people are discouraged from buying houses; therefore the demand for houses decreases (West & Worthington, 2006).

The second factor is employment which is affected by the relative desirability of regions that attract businesses hence affecting the ability of households to earn income that can be used to purchase property. Relatively poorer households have less valuable non-housing assets, such as saving and shares, they are unable to pay their mortgage if members of the household become unemployed, and are therefore likely to be repossessed. This would both increase the supply of housing in these regions, and decrease demand, as households cannot access mortgages in the period after facing repossession. Becoming renters, households increase demand for renting but this does not increase the total demand for housing, or, therefore, the price of home ownership. Therefore the house price would fall by more in relatively poorer regions for the same given level of unemployment (Zhu Qingyu, 2010).According to Giussani,1992) there exists a significant impact of GDP

changes (and thus employment) on housing prices. Increased money supply results to inflationary pressures and can adversely affect real estate properties. Higher national output leads to increased demand for labor necessary to support the increased output. This leads to increased disposable income on the side of the consumers which results to increased demand for goods and services, including housing.

2.4 Empirical Review

Apergis (2003) used error correction vector autoregressive model to model the impact of macroeconomic variables on real housing prices within the European Union. Variance decompositions show that the housing loan rate was the variable with the highest explanatory power over the variation of real housing prices, followed by inflation and employment.Otrok and Terrones (2005) confirmed the existence of a great degree of comovement in macroeconomic aggregates (namely, real output, consumption, and residential investment), they found little evidence that macroeconomic aggregates are important sources of house price movements. They discovered a strong but delayed impact of US monetary shocks on housing price growth both in the US and internationally. Wenzel used a dynamic factor model (DFM) comprising seven variables – growth rate of real house prices, real stock prices, per capita output, per capita consumption, per capita residential investment, and differences of the short and long run long-term interest rates – for 13 countries during the 1981 Q1 to 2003-Q4 period. He then used the estimated factors to decompose the variance of each series attributable to the

latent factors. He later combined the DFM with a VAR to develop causal links. Kyulev (2008) used the fundamental model and the asset pricing approach to study the evolution of house prices in the United States of America from 1970 to 2008. He used real disposable income, construction cost, unemployment, real mortgage rate and average household size. In the asset pricing approach, Kyulev links real rents and interest rates. Both techniques show substantial overvaluation in the U.S housing market. He also concluded that housing prices can deviate from their equilibrium values for long periods of time.

Bilozor and Wisniewski (2011) used the rough set theory to study the relationship between the economic and financial situation of countries in the European Union and the overall economic situation of its real estate market. They used quarterly time series data for Italy and Poland for the period Q4-2002 to Q4-2010. Residential property price Indices (RPPI's) for all dwellings in the country per square meter (Q4 - 2000 index = 100) and data concerning 14 variables describing the economic condition of a given country. They concluded that there are certain key variables that affect real estate prices in the two countries. In the case of Italy, Consumption expenditure, national income, water, electricity, gas and other fuels were found to be key determinants of real estate prices. In the case of Poland, the most influential factors were increase in unemployment variable and population growth variable. The significant factors for Poland i.e. unemployment rate and population growth are characteristic of developing countries and

constitute a very important factor influencing the demand for real estate, and thus its price. In developed countries such as Italy, basic needs have already been met so demand is generated for the purpose of prestige and investment.Wenzel (2012) trended 30-year fixed mortgages during the boom period and when rates were collapsing in the United States against housing prices based on the Case-Shiller Index. He observed that during the boom period, housing prices went up while interest rates climbed whereas during the period when interest rates collapsed, housing prices also collapsed. He concluded that that there is no direct correlation between interest rates and housing prices. That one needs to look at the interest rate on relative terms, i.e. relative to price inflation.

Makena (2012) used regression analysis to study the determinants of residential real estate prices in Nairobi, Kenya. The study concluded that interest rate has a long run influence on price and may rise with tightening of liquidity conditions. The study also concludes that inflation has a significant explanatory power on real estate prices. Population growth and employment growth were also found to have a significant influence on housing prices. Interest rate had the biggest impact on housing prices. Otwoma, (2013) analyzed data from Kenya from the year 2000 to 2013 to understand the relationship between interest rates and residential housing prices. He observed that property prices displayed a high inverse relationship with interest rates in the period December 2000 to May 2003 and November 2011 to June 2013 when interest rates were high. That trend reversed in the period June 2003 to October 2011, a period when interest

rates were relatively low and stable. He attributed the inconsistency observed to buyer's expectations about the movement in interest rates.

2.5 Summary of the Literature Review

Brooks and Tsolacos (2001) concluded that high interest rates discourage people from buying houses, therefore the demand for houses decrease with increase in interest rates. Other studies have also shown that interest rates help explain a significant proportion of variability in property returns (West & Worthington, 2006), Onder (2000), Bond and Seiler (1998), Makena (2012), Otwoma (2013).High inflation results to high discount rates thus affecting investments. Allen & Gale attributes the Japanese bubble to the financial liberalization experienced during the 1980's and 1990's which resulted to expansion of credit. Feldstein (1992) concluded that increasing inflation serves to reduce people's appetite to invest in real estate thus dampening housing demand. Kearl (1999) argued that inflation causes nominal housing payments to rise, translating to a lower housing demand.

There exists a significant impact of GDP changes (and thus, employment) on housing prices (Giussani, 1992). Increased money supply results to inflationary pressures and can adversely affect real estate properties. However, Otrok and Terrones (2005) found little evidence that macroeconomic aggregates are important sources of house price movements. They discovered a strong but delayed impact of US monetary shocks on

housing price growth both in the US and internationally.Bilozor and Wisniewski (2008) while studying the determinants of house price movements in Europe found out that Macroeconomic factors had a strong impact on house price movements in developing counties e.g Poland. For developed countries like Italy, factors like water, gas, electricity among others had more influence. Wenzel (2012) also contradicts the findings that there exists an inverse relationship between housing prices and interest rates. His argument is that the relevant rate is the real rate of interest, that is, after inflation adjustment.

There exists varying views on the impact of macro economic variables on residential real estate properties. Most studies done in Kenya focuses on a single macroeconomic variable and there is need therefore to look at key macroeconomic variables collectively to determine their effect on housing prices.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the overall methodology that the researcher used to carry out the study. This includes the research design, target population, sample design, and data collection procedure. Data analysis procedure and presentation is also presented in this chapter.

3.2 Research Design

The researcher employed descriptive research design. A descriptive study is one in which information is collected without changing the environment (nothing is manipulated). Descriptive studies are conducted to demonstrate associations or relationships between naturally occurring variables in the world. Descriptive studies are usually the best methods for collecting information that demonstrate relationships and describe the situation as it exists (Cooper and Schindler, 2006). In this study available data from the macroeconomic variables of interest were related to property development to see the relationship between those variables and property development in Kenya. This study was based on secondary data that was obtained from Central Bank of Kenya, Kenya National Bureau of Statistics and property developers themselves.

3.3 Data Collection

The secondary data used in this study was obtained from Hass Consult, CBK, KNBS and World Bank database. The data was collected and edited before entering it into an excel worksheet. For purposes of this study, data on property prices and cost of renting was based on the Hass property Index. The data was considered systematic and reliable source available for the Kenyan market having been used in other researches for example by the World Bank. Quarterly data for each variable, that is, Property Index, real interest rate, Inflation rate, and real GDP.

3.4 Data Analysis

The current study employed descriptive statistics, Pearson's correlation analysis and ordinary least squares regression model. Ordinary least squares regression model was suited for this study as it is depicted to be a valid method where stable relationships are shown across a given variable over several periods. This method was successfully applied by Kanwal and Nadeem (2013) in their study on the impact of macroeconomic variables on the profitability of listed commercial banks in Pakistan.

Property index is a broad measure of the movement of residential house prices (Case & Siller, 2003). It measures changes in house prices from one period to another using the weighted repeat sales methodology. Same with any other index, it uses a base period to track changes of prices over time. This research used the Quarterly Hass property Index.

Interest rate is defined as the cost of borrowing money or use of asset (Brigo & Mercurio, 2006). This study used quarterly interest rates for the period 2000 – 2014 to study the impact of interest rates on residential real estate properties. Nominal interest rate was used for purposes of this study. It is measured as the monthly average percentage bank lending rate. This research used the quarterly interest rate.

Inflation is the general rate of increase in prices of goods and services. Inflation is measured by changes in consumer price index (CPI) which measures the retail prices of goods and services purchased by households (Liow, Ibrahim and Huang (2005). This research utilized the quarterly inflation rate.

Real GDP is a measure of value of economic output adjusted for price changes (inflation or deflation) (Chui and Chau, 2005). GDP growth is measured as the average percentage growth in a given period. This research utilized quarterly GDP data. Unemployment rate refers to the number of people from the available pool of labor who are unable to find work (Gordon & Barry, 1991). This research utilized the quarterly real GDP and quarterly unemployment rate.

3.4.1 Analytical Model

Ordinary least squares regression model that was used for empirical analysis is as follows:

$Y_t = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu_t$

Where;

Y_t = Property Index,

X_1 = Commercial Bank Lending Rate,

X_2 = Unemployment rate,

X_3 = Real Gross Domestic Product,

X_4 = Inflation rate,

α = is the unknown intercept for each period,

β_1, β_2, β_3 & β_4 = Proportionate change in dependent variable due to independent variables,

t = Q4 2000 - Q1 2014,

μ_t are individual-specific, time-invariant effects that may differ in the different periods and because we assume they are fixed over time, this model is called the fixed-effects model.

Data presentation after the regression and correlation analysis was through tables.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the analysis of data, findings and discussion of the findings. Section 4.2 presents data analysis while 4.3 presents findings from the study. Section 4.4 presents discussion of the findings.

4.2 Descriptive Statistics

The study sought to establish the descriptive statistics of the data collected. Results are presented in Table 4.1. These results indicate that average Housing price index had averaged 207.15 from Quarter 4 of 2000 and quarter one of 2014. The lowest index of 98.93 was in quarter 3 of 2001 while the highest index of 344.2 was in quarter 4 of 2013. On lending rates, the average for the period was 15.65%. The highest rates of 20.21 were observed in quarter 2 of 2012 while the lowest rates of 12.20 were observed in quarter 4 of 2004. On unemployment rate, the average rate was 23.88. The lowest unemployment rate was 12.7 in quarter 4 of 2006 while the highest rate of 40.06 was observed in quarter 4 of 2011. On inflation, the average rate for the period was 9.91. The highest rate of 16.83 was observed in quarter 1 of 2009 while the lowest rate of 4.03 was observed in quarter 4 of 2010.

Table 4.1: Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Median	Std. Deviation
Price Index	54	98.93	344.20	207.72	179.30	82.42
Lending Rate	54	12.20	20.21	15.65	14.62	2.58
Unemployment	54	12.70	40.06	23.88	23.72	7.91
Real GDP	54	1119361.00	2190009.00	1489138.83	1458168.00	280435.11
Inflation	54	4.03	16.83	9.91	9.62	3.96

4.3 Correlation Analysis

A correlation analysis was performed to establish the relationship between the variables under study. Pearson bivariate correlation coefficients were established for all the variables with findings as indicated in Table 4.5. The study results indicate that there was an insignificant positive correlation between commercial bank lending rates and residential housing price index ($r = 0.075$; $p > 0.05$). This reveals that rise in lending rates is expected to relate with increase in prices of residential prices through the relationship is not significant. Further, the results revealed that unemployment rate had a significant positive relationship with residential housing price index ($r = 0.595$; $p < 0.05$). This results indicates that rise in unemployment rate is expected to significantly relate with increase in prices of residential houses in Kenya. Further results indicate that real GDP had a strong positive relationship with residential housing price index ($r = 0.96$; $p < 0.05$). These findings indicate that growth in the economy which is indicated by increase in real GDP would be significantly related to increasing prices for residential houses. Lastly, study results revealed that inflation had a significant positive relationship with

residential housing price index ($r = 0.277$; $p < 0.05$). This indicates that rise in inflation is significantly related to increasing residential housing price index.

Table 4.2: Correlation Matrix

	1	2	3	4	5
1. Price Index	1				
2. Lending Rate	0.075	1			
3. Unemployment	.595**	.459**	1		
4. Real GDP	.960**	.041	.441**	1	
5. Inflation	.277*	.442**	-.019	-0.333*	1

4.4 Regression Analysis and Hypotheses Testing

The regression analysis was performed with the independent variables being capital Commercial banks' average lending rate, Real GDP, Unemployment and inflation rate. The housing price index which indicated the changes in residential housing price changes was the dependent variable. Results are as indicated in Tables 4.2 to 4.4.

The r-squared for the regression model was 0.966. The model therefore is explaining 96.6% of the change in housing prices using the four independent variables. These findings indicate that the four independent variables selected can explain 96.6% of the change in residential housing prices in Kenya.

Table 4.3: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.983	.966	.963	15.7895110

Analysis of variances in the regression model is presented in Table 4.3. The f-value was 348.816 which was significant at 1% level of significance indicating that the regression model provided some explanatory power and the overall model was significant. This indicates that real GDP, commercial banks lending rates, inflation and unemployment can be used to significantly predict residential housing prices in Kenya.

Table 4.4: Analysis of Variances in the Regression Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	347851.288	4	86962.822	348.816	.000
	Residual	12216.124	49	249.309		
	Total	360067.413	53			

The test of the statistical significance of the independent variables in the model was done using the t-test. Results are presented in Table 4.4 which indicates that commercial banks lending rates had a significant negative effect on housing price index (β = -3.53; t = -3.22; $p < 0.05$). These results indicate that rise in commercial banks lending rates is expected to lead to lower residential housing prices. The t-test also revealed that commercial banks lending rates are a significant predictor of residential housing prices in Kenya.

Regression results further indicated that unemployment was a significant predictor of residential housing prices. Unemployment rate had a significant positive effect on residential housing price index (β = 2.732; t = 7.735; $p < 0.05$). These findings reveal that

a rise in unemployment would be expected to lead to higher residential housing prices and vice versa.

Further findings from the study revealed that real GDP had a significant positive effect on residential housing prices in Kenya ($\beta = 0.000256$; $t = 27.699$; $p < 0.05$). This finding indicates that increase in real GDP, which indicates a growth in the economy, leads to increase in residential housing prices.

Further findings indicate that inflation has a significant positive influence on residential housing prices ($\beta = 1.402$; $t = 2.097$; $p < 0.05$). This indicates that rise in inflation rate is expected to push prices of residential houses higher and vice versa.

Table 4.5: Test of Significance of Independent variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-197.679	18.415		-10.735	.000
	Lending rate	-3.530	1.096	-.111	-3.220	.002
	Unemployment	2.732	.353	.262	7.735	.000
	Real GDP	.000256	.000009	.872	27.699	.000
	Inflation	1.402	.669	.067	2.097	.041

4.5 Discussion of Research Findings

Study results indicate that commercial banks' lending rates had a significant negative effect on housing price index ($\beta = -3.53$; $t = -3.22$; $p < 0.05$). These results reveal that rise

in commercial banks' lending rates is expected to lead to lower residential housing prices. The t-test also revealed that commercial banks lending rates are a significant predictor of residential housing prices in Kenya. The study results indicate that there was an insignificant positive correlation between commercial bank lending rates and residential housing price index ($r = 0.075$; $p > 0.05$). This further reveals that rise in lending rates is expected to relate with increase in prices of residential prices though the relationship is not significant. These findings are in contrast to the findings by West and Worthington (2006) who established that the most obvious explanation is that when interest rates increase, people are discouraged from buying houses; therefore the demand for houses decreases. This in turn leads to lower prices. Several other studies have shown that interest rates help explain a significant proportion of the variability in property returns. Other studies which do not support the finding of the current study include Onder (2000), Bond and Seiler (1998), McLennan et al. (1998), Makena (2012) and Otwoma (2013). However, the findings agree with results from a study by Wenzel (2012) who trended 30-year fixed mortgages during the boom period and when rates were collapsing in the United States against housing prices based on the Case-Shiller Index. He observed that during the boom period, housing prices went up while interest rates climbed whereas during the period when interest rates collapsed, housing prices also collapsed. Wenzel (2012) concluded that interest rates had a direct correlation with housing prices. This study however disagreed on some aspects with the study by Otwoma, (2013). Otwoma analyzed data from Kenya from the year 2000 to 2013 to understand the relationship

between interest rates and residential housing prices. He observed that property prices displayed a high inverse relationship with interest rates in the period December 2000 to May 2003 and November 2011 to June 2013 when interest rates were high. That trend reversed in the period June 2003 to October 2011, a period when interest rates were relatively low and stable. He attributed the inconsistency observed to buyer's expectations about the movement in interest rates. The major point of departure between the current study and that by Otwoma (2013) was that the current study did an analysis of the whole period form 2000 – 2014 while the study by Otwoma had divided the period into segments.

Study results further indicated that unemployment was a significant predictor of residential housing prices. Unemployment rate had a significant positive effect on residential housing price index ($\beta = 2.732$; $t = 7.735$; $p < 0.05$). These findings reveal that a rise in unemployment would be expected to lead to higher residential housing prices and vice versa. Further, the results revealed that unemployment rate had a significant positive relationship with residential housing price index ($r = 0.595$; $p < 0.05$). This results indicates that rise in unemployment rate is expected to significantly relate with increase in prices of residential houses in Kenya. This study disagrees with findings by Bilozor and Wisniewski (2011) who established that unemployment was a key factor in containing housing prices. The study established that high unemployment led to lower housing prices. The study findings however, agree to findings by Kyulev (2008) who

established that in some developing countries where there is unbalanced distribution of income, housing prices show an increasing trend even when unemployment is rising.

Further findings from the study revealed that real GDP had a significant positive effect on residential housing prices in Kenya ($\beta = 0.000256$; $t = 27.699$; $p < 0.05$). This finding indicates that increase in real GDP, which indicates a growth in the economy, leads to increase in residential housing prices. Further results indicate that real GDP had a strong positive relationship with residential housing price index ($r = 0.96$; $p < 0.05$). These findings indicate that growth in the economy which is indicated by increase in real GDP would be significantly related to increasing prices for residential houses. This finding agrees with finding from a study by Giussani, et al. (1992) who revealed that higher national output leads to increased demand for labor necessary to support the increased output. This leads to increased disposable income on the side of the consumers which results to increased demand for goods and services, including housing, thus leading to high prices for housing. The current study however, disagrees with findings by Otrok and Terrones (2005) who found little evidence that macroeconomic aggregates, such as GDP, are important determinants of house price movements.

Further findings indicate that inflation has a significant positive influence on residential housing prices ($\beta = 1.402$; $t = 2.097$; $p < 0.05$). This indicates that rise in inflation rate is expected to push prices of residential houses higher and vice versa. Lastly, study results

revealed that inflation had a significant positive relationship with residential housing price index ($r = 0.277$; $p < 0.05$). This indicates that rise in inflation is significantly related to increasing residential housing price index. This study disagrees with findings by Feldstein (1992) who indicated that increasing inflation serves to reduce people's incentive to invest in real estate, which in turn lowers housing demand. This reduction in demand leads to a reduction in prices. However, in the current study, rise in inflation is seen to affects housing prices positively. The current study also disagrees with a study by Kearl (1999) who established that inflation causes nominal housing payments to rise, translating to a lower housing demand and reduced housing prices.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the researcher presents the summary, conclusions and the recommendations made from the study findings. In section 5.2, summary of findings are presented. Section 5.3 presents conclusions made from the study findings while Section 5.4 presents recommendations made after considering the study findings. Section 5.5 presents suggestions for any further studies that may be done in relation to prices of residential housing in Kenya.

5.2 Summary of Findings

Study results reveal that commercial banks lending rates had a significant negative effect on housing price index ($\beta = -3.53$; $t = -3.22$; $p < 0.05$). These results indicate that rise in commercial banks lending rates would lead to a reduction in residential housing prices. Commercial banks lending rates are a significant predictor of residential housing prices in Kenya. The study results indicated that there was an insignificant positive correlation between commercial bank lending rates and residential housing price index ($r = 0.075$; $p > 0.05$) which points out that rise in lending rates is expected to relate with increase in prices of residential prices though the relationship is not significant.

Study results further indicated that unemployment was a significant predictor of residential housing prices. Unemployment rate had a significant positive effect on residential housing price index ($\beta = 2.732$; $t = 7.735$; $p < 0.05$). These findings reveal that a rise in unemployment would lead to higher residential housing prices and vice versa. Further, the results revealed that unemployment rate had a significant positive relationship with residential housing price index ($r = 0.595$; $p < 0.05$). This indicates that a period of increasing unemployment would be related with a rise in residential housing prices.

Further findings from the study revealed that real GDP had a significant positive effect on residential housing prices in Kenya ($\beta = 0.000256$; $t = 27.699$; $p < 0.05$). This finding indicates that increase in real GDP leads to rise in residential housing prices. Further results indicate that real GDP had a strong positive relationship with residential housing price index ($r = 0.96$; $p < 0.05$). These findings indicate that growth in the economy which is indicated by increase in real GDP would be significantly related to increasing prices for residential houses.

Lastly, findings on the effect of inflation on prices of residential houses indicated that inflation has a significant positive influence on residential housing prices ($\beta = 1.402$; $t = 2.097$; $p < 0.05$). This indicates that rise in inflation rate is expected to push prices of residential houses high and vice versa. Study results further, revealed that inflation had a

significant positive relationship with residential housing price index ($r = 0.277$; $p < 0.05$). This indicates that rise in inflation is significantly related to increase in residential housing price index.

5.3 Conclusion

The study makes the following conclusions. First, commercial banks lending rates have a significant positive effect on residential housing prices. Interest rates on mortgages, bonds, and other long-term debt are determined by two factors: inflation expectations and economic growth, which combine to set the supply and demand for credit. Mortgage rates only rise when the population feels good about buying houses. Inflation is pushing up residential home prices, and the economy is growing. The higher demand for housing pushes home prices up despite the higher interest rates.

Secondly, real GDP has a significant positive effect on residential housing prices. The direct of the economy which is signified by growth in GDP has increased demand for housing in Kenya which has led to increase in housing prices. Increase in real GDP has multiplier effects from changes in residential investment or housing wealth through the labor market, bank balance sheets, consumer confidence, and adjacent sectors such as furniture purchases. This creates a good economic environment which is reflected in the increased demand in housing and the resultant increase in prices.

Rise in unemployment levels in Kenya coincides with increase in residential housing prices. The claim that home prices will fall due to increasing unemployment is not supported by this study. However, rise in unemployment is expected to lead to lower demand for housing and hence resulting to reduced housing prices. However, in the Kenyan situation, unemployment is mostly among the youth who do not mostly participate in the buying of residential homes. The ones mostly affected by unemployment seek houses to rent but not to buy. This explains why rise in inflation does not lead to reduction in housing prices.

Lastly, inflation rates are significantly and positively related to housing prices. A rise in inflation leads to investors in housing to demand higher returns for their investments to cater for inflation which pushes prices higher.

5.4 Recommendations

The following recommendations are made after considering the study findings. First, the housing market is already showing signs of overheating. House prices have been indicated to rise much higher than inflation. Expensive house prices threaten the economy in various ways in that they make many areas unaffordable for working population causing shortages of skilled labour, they cause increased wealth inequality between home owners and renters, and may lead to an unsustainable boom in house prices which could lead to an eventual fall in prices. This could lead to corresponding bank losses and negative wealth effect. The housing sector therefore needs some fiscal

and policy measures to ensure that price movements reflect the economic situation of the country.

Secondly, though the study established a positive effect of interest rates on housing prices, this can be due to the skewed wealth distribution in the country which makes demand to rise even with increasing lending rates. Increase in interest rates should be managed though effective monetary and fiscal policies by the CBK. If interest rates rise it will have a significant effect on increasing the cost of mortgages which will lock out most of the middle and lower income classes from the housing sector. This will deter prospective home-buyers, but it may also force some existing home-buyers to sell.

Lastly, real GDP growth is good for the economy and its population. This indicates that the country through its various policy making agencies should have regulations and policies that would stimulate economic growth. In sustaining economic growth, policies should also be put in place to control unemployment and inflation to a sustainable level. This will ensure that the economy has a balanced growth in all the sectors including housing.

5.5 Limitations of the Study

The index used is tracked by an individual private entity and therefore any error in calculation is likely to affect the overall accuracy of the study results and the validity of the study findings. The index goes back to the year 2000.Data available over this duration

might not be enough to provide a concrete understanding of the relationship between macroeconomic factors and real estate prices.

Given the nature of the property market in Kenya, there is a lot of information which might not have been captured in the property index. The effect of the less formal settlements and data from the rural areas might not have been captured as well.

The study does not factor in sector specific factors e.g. land administration and other related infrastructure. To get a complete understanding of factors that influence residential property prices, all these factors need to be studied.

5.6 Suggestions for Further Research

The current study sought to establish the effect of macro economic variables affecting housing prices. This study established that all the four macroeconomic variables considered in the study had significant effects in determining housing prices. However, the macroeconomic variables are not the only determinants of housing prices in Kenya. There may be other variables which relate specifically to the housing and land sectors which may have an explanatory power on housing prices.

Control of housing prices is important to ensure that adequate and affordable housing is provided to the citizens of Kenya as per the constitution. It is therefore suggested that

other studies be conducted, to evaluate the sector specific factors explaining housing prices.

This study focused on residential real estate properties. However a complete study of the real estate sector is necessary to understand the effect of macro economic variables on real estate properties as a whole. This will also give insights as to whether some variables have more impact on residential real estate prices than commercial properties and vice versa.

REFERENCES

Allen, F., & Gale, D. (2000). Bubbles and crisis. *The Economic Journal*, *110* (460), 236-258.

AFDB, (2013).Africa Economic Brief: African Housing Dynamics*; Lessons from the Kenyan Market*.

Arnold, M. A. (1992). The Principal-Agent Relationship in Real Estate Brokerage Services. *Journal of the American Real Estate and Urban Economics Association, (20), 89-106.*

Apergis, N. (2003).Housing Prices and Macroeconomic Factors: Prospects within the European Monetary Union Vol.6

Atherton, E., French. N & Laura, G., (1997).Decision theory and Real Estate development: *A note on uncertainty*.

Baltagi, B., H. & Wiley, S. (2008). *Econometric Analysis of Panel Data* (Fourth edition.).

Brueggeman, W, B., & Porter, D.M., (2005).Rethinking Real Estate Finance. *Journal of Applied Corporate Finance* 3, (1), 39-50

Case, K. E., & Shiller, R. J. (2003). Is There a Bubble in the Housing Market? Brookings Papers on Economic Activity, 2003 (2), 299-342

Chui, L.H.T & Chau, K.W., (2005). An Empirical Study of the Relationship between Economic Growth, Real Estate Prices and Real Estate Investments in Hong *Kong*. *Surveying and built Environment* 16(2) 19-32

Cooper, D., & Schindler, P. (2006). *Business Research Methods*. (9th Edition). New Delhi: McGraw-Hill.

Cooper, D. R., & Schindler, P. S. (2003). Business Research Methods (7th edn).McGraw-Hill: New York.

Frank, P.S. & Gouskova. E., (2010). Mortgage Contract Decisions and Mortgage Distress: *Family and Financial Life-Cycle Factors*. *Journal of Business and Social Sciences*, 7 (9), 189-206

Gordon, H. & McCormick B., (1991).Housing markets, Unemployment and Labour Market flexibility in the UK. *National Bureau of Economic research 3*(100,189-205

Hakijamii, (2012).*Assessment of the realization of the Right to housing in Kenya.*

Jensen, C. M and Meckling, H. W., (1976).Theory of the firm: Managerial behavior, Agency costs and ownership structure. *Rochester Studies in Economics and policy Issues 1 (1979) PP 163-231*

Kagendo, D. (2011). The Determinants of real estate property prices: The case of Kiambu Municipality in Kenya. (*Unpublished MBA project). University of Nairobi*.

Kanwal, S. & Nadeem, M. (2013). The Impact of Macroeconomic Variables on the Profitability of Listed Commercial Banks in Pakistan. *European Journal of Business and Social Sciences*, 2 (9), 186-201.

Kenya Constitution 2010, 43(b)

Kenya National Bureau of statistics, (2011).Kenya facts and figures. Retrieved from http://www.knbs.or.ke

Klyuev, V. (2008). What goes up must come down? House prices dynamics in the United States. IMF Working Paper: International Monetary Fund 8(187).

Kylea, S.A., Hui, O. Y & Wei, X., (2005). Prospect theory and liquidation decisions. *Journal of Economic Theory* 129(2006)273-288 Retrieved from https://www.princeton.edu

Makena, J. S, (2012). Determinants of Residential real estate prices in Nairobi. *Unpublished Msc research project, University of Nairobi.*

Małgorzata, R.B., & Wiśniewski R., (2012). Effectiveness of real estate Markets versus efficiency of its participants. *European spatial research and policy* 19(1)

Marsh, A. G & Zumbano, V.L., (1998).*Agency Theory and the Changing Role of the Real Estate Broker*: Conflicts and Possible Solutions. *Journal of Real Estate research* 3(2) 151-164

Mbuvi, O., (2006). Factors influencing the development of secondary mortgage market in Kenya. *Unpublished MBA research project, University of Nairobi.*

McLennan & Fisher, (1998). Effectiveness of real estate Markets in Europe. European Journal of Science *2* (7)187-201

Muli, J. (2011). The Relationship between House Prices and Mortgage Credit in Kenya. (*Unpublished MBA project). University of Nairobi*

Otrok, C & Marco E. T., (2005). House Prices, Interest Rates and Macroeconomic Fluctuations: *International Evidence*.

Otwoma, F., (2013).The effect of interest rates on property prices in the Kenyan Real estate Market. *Unpublished Msc research project, University of Nairobi*

Tong, H. L & Keon J., (2007). *Measuring the User Cost of Owner-occupied Housing for the True Cost of Living Index. Munich Personal RePEc Archive 41785*

World Bank. (2011). *Developing Kenya's Mortgage Market*. Retrieved from http://siteresources.worldbank.org

Zhu, Q, (2010). *Regional unemployment and house price determination*. Hong Kong *Economic Journal 2010,pp. 605-630.*

APPENDICES

Appendix I: Raw data Collected

Year	Quarter	Index	CBLR	INF	GDP (m)	UNEMP
2000	4	100.00	19.87	13.07	1,147,988	24.60
2001	1	100.70	20.20	13.76	1,125,223	23.76
	2	101.87	19.34	14.61	1,127,786	21.71
	3	98.93	19.56	15.10	1,167,676	25.67
	4	105.87	19.57	15.34	1,175,559	25.40
2002	1	112.07	19.11	14.53	1,174,960	22.87
	2	118.80	18.54	13.24	1,119,361	23.68
	3	127.13	18.13	11.99	1,146,187	24.56
	4	130.60	18.24	10.89	1,193,239	26.20
2003	1	131.17	18.78	9.87	1,171,154	25.67
	2	132.67	17.61	9.36	1,133,560	24.76
	3	133.27	14.98	9.01	1,217,166	23.19
	4	137.63	14.10	8.61	1,251,376	25.10
2004	1	142.03	13.20	7.77	1,246,869	24.59
	2	144.10	12.46	8.95	1,186,445	19.21
	3	142.80	12.26	10.33	1,255,958	15.82
	4	140.00	12.20	11.73	1,315,299	17.10
2005	1	144.07	12.44	12.65	1,271,310	16.91
	2	149.00	13.11	14.49	1,266,330	15.69
	3	150.83	12.98	14.37	1,355,081	15.21
	4	151.27	13.02	10.92	1,391,924	14.88
2006	1	153.10	13.27	8.99	1,350,128	14.38
	2	156.27	13.75	7.02	1,346,165	13.67
	3	164.90	13.63	5.67	1,458,087	13.46
	4	171.37	13.89	6.15	1,456,660	12.70
2007	1	175.30	13.66	5.54	1,439,001	13.67
	2	178.07	13.28	4.54	1,455,601	14.19
	3	180.53	13.07	4.58	1,552,139	15.70
	4	184.60	13.32	4.40	1,555,442	15.40
2008	1	188.20	13.89	5.38	1,458,249	16.89
	2	198.77	13.99	8.63	1,495,282	17.08
	3	214.20	13.74	11.92	1,593,674	16.90
	4	229.90	14.44	15.22	1,555,617	17.10
2009	1	238.47	14.77	16.83	1,545,047	17.98
	2	244.97	14.88	15.92	1,509,369	19.61
	3	253.93	14.76	13.39	1,605,813	23.66
	4	267.33	14.80	10.30	1,610,094	27.20
2010	1	267.97	14.92	7.85	1,613,516	31.34
	2	268.37	14.48	5.87	1,581,621	35.91
	3	273.77	14.15	4.71	1,707,420	37.02
	4	287.70	13.89	4.03	1,721,361	37.30
2011	1	301.87	13.96	4.16	1,690,009	35.81
	2	309.97	13.90	6.01	1,739,210	37.71
	3	310.40	14.42	9.02	1,693,674	37.98
	4	306.30	17.92	12.78	1,755,617	40.06

2012	1	307.27	20.05	15.83	1,845,047	36.76
	2	313.67	20.21	16.29	1,809,369	34.32
	3	328.60	20.00	14.30	1,905,813	33.87
	4	335.17	18.32	10.70	1,910,094	32.19
2013	1	337.83	17.90	7.26	1,813,516	31.76
	2	343.37	17.43	5.04	2,081,621	25.65
	3	342.60	16.95	4.56	1,907,420	26.31
	4	344.20	16.96	5.39	2,021,361	25.61
2014	1	342.90	16.87	6.20	2,190,009	23.56

Appendix II: Property Developers Listed in Kenya

1. AMS Properties ltd
2. Casa Ozone
3. Chigwell Holdings Limited
4. Edenville
5. Greenspan Housing
6. One Red Hill
7. Runda View Apartments
8. Sahara Ridge
9. Superior Homes Kenya
10. Western Heights
11. Willmary Development

Appendix II: Property Agents Listed in Kenya

1. HassConsult Real Estate
2. Halifax Estate Agency Limited
3. Real Management
4. Dunhill
5. Ndatani
6. Colburn
7. Face-Saver Limited
8. Housing Finance
9. Karengata Property Managers
10. Fortress consulting
11. AMS Properties ltd
12. Realty Plus Ltd
13. Nextgen Mall
14. Muna Tree Estate
15. Superior Homes Kenya
16. Optiven Enterprises Ltd
17. Verity Management Limited
18. Property Link Africa
19. Coral Property Consultants
20. Mitini scapes

21. Blue Bay Cove

22. Swahili Dreams