THE RELATIONSHIP BETWEEN HOUSE PRICES AND MORTGAGE CREDIT IN KENYA

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DECLARATION

I declare that this research project is my original work and has not been presented for a degree in any other university.

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This research project has been presented for examination with my approval as the University Supervisor.

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DEDICATION

I dedicate this study to the Almighty God. He has been my source of wisdom and strength without him I would not have made it.

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ABSTRACT

During the last number of years, many countries have experienced sharp rises and drops in housing prices parallel with the world's economic and financial turmoil. This paper studies the relationship between property prices and mortgage lending in Kenya. Although the close empirical relationship between the evolution of mortgage lending and housing prices is well established in the literature, the direction of causation is less clear from a theoretical standpoint. This is an important topic for three reasons. First, swings in property prices have been extremely large and frequent in Kenya and secondly, under the current currency regime, monetary policy cannot be used to guard against asset price swings. The dramatic increase in lending during this period has been broadly blamed for these market dynamics. However, the empirical relationship between mortgage credit and housing prices remains largely unexplained.

The research will employ a quarterly database from 2006 to 2010. A dynamic econometric model will be employed to assess the relationship between housing prices and credit. To investigate this relationship the study will formulate a multiple regression equation and in doing so the research seeks to answer one key question: Has the dramatic increase in mortgage credit caused the booms in the housing sector in Kenya or is it the housing prices that have affected the mortgage market. This approach provides an opportunity to study the major determinants of mortgage debt and house prices in the Kenyan market.

Using regression analysis models, the study finds that housing prices affect mortgage credit rather than conversely. The study concludes that the changes in housing prices are positively and significantly related to the long-term evolution of mortgage credit. This result suggests that the evolution of housing prices is not triggered by bank mortgage lending and that banks just accommodate mortgage financing to the evolution of house prices. From the findings and conclusion the study recommends that in order to maintain the prices of housing at relatively stable levels there is a need for the players in the industry to control various factors that affect housing prices which include disposable income, real interest rate after tax, real household debt, housing turnover and housing stock.

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ABBREVIATIONS

CBK	Central Bank of Kenya
GDP	Gross Domestic Product
GOK	Government of Kenya
NSE	Nairobi Stock Exchange
PLR	Property Lending Rates
HFCK	Housing Finance Company of Kenya

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

In many countries, house price fluctuations which have been witnessed by the several booms and busts over the past two decades have been associated with financial instability. The degree to which such house price booms and busts have led to financial instability differs between countries because of the important differences in countries' housing systems and the role that the government plays. The recent financial crisis has led to accelerated housing defaults in the U.S as well as in other countries, with millions of residential properties having negative equity mortgages with the outstanding loan balances being greater than the property value (Burnside, Craig, Martin, Eichenbaum, and Sergio Rebelo, 2011)

Property prices in the Kenyan market have not been spared by the crisis being experienced. The Hass property index has been tracking property prices in the 'upper and middle' sectors of the Kenyan property market and has seen the average price in this sector rise from Ksh 15 million in 2006 to Ksh 20 million in 2010. This has led to a compound annual growth rate of 7.5%. The average value of a property has increased from Ksh 6.83 million in 2001 to over Ksh 19 million in 2010. This is a tripling in value and an annual average compound growth rate of around 12.5%. Neither of the issues facing the Kenyan economy like political instability seems to have had a significant impact on the real estate market. The consistent growth can partly be explained by the lack of supply in housing which helps keep prices rising and the growing access to credit (Hass Consult 2010)

Housing price represents the major investment required for one to own a house. It is the cost of owning a real estate which encompasses land along with improvements to the land such as buildings. Customers in the housing market enjoy the services by either renting or owning a house which can be classified as a highly durable consumer good as well as an investment. This implies that home ownership is preferable due to the smooth   consumption of housing services as compared to the price risk of rental services. Studies show that 32 percent of household wealth is invested in the form of primary residences. However, the fraction of households wealth held as houses varies significantly between the poor and the rich. Most

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home owners finance their purchases by putting a down payment requirement with a mortgage financier and the house equity serves as collateral for a loan (Diaz and Luengo-Prado 2002).

A mortgage is a loan advanced to finance the purchase of real estate, usually with specified payment periods and interest rates. The borrower (mortgagor) gives the lender (mortgagee) a lien on the property as collateral for the loan (www.investorwords.com). Overall mortgage lending by banks for real estate purposes represents the major type of lending at present in Kenya. This includes lending for commercial property and other real estate linked activities, as well as lending to private households. The boom in lending however does point towards a readjustment in lending. The fall in lending for building and construction also suggests that the real estate lending is more to purchase land for speculative purposes than for engaging in new construction. Given the rapid rate of growth in real estate prices, this should be a major reason why many Kenyans are opening up to mortgage credit (World Bank 2011).

Many economies around the world have reacted differently towards the cyclical downturn of the entire economy. The general performance of the housing markets in these economies seems to have greatly contributed to the different reactions. In particular, house price changes in some countries appear to have increased both private consumption and residential construction and thereby helped to offset weaknesses elsewhere in their economies. Therefore, institutional set-ups in housing and mortgage markets play an important role not just for overall economic efficiency and real incomes but also for the propagation of shocks and the ability of monetary policy to respond effectively to them (Catte, Girouard, Price and Andre, 2004)

Since house purchases typically involve household borrowing, house prices are likely to be strongly driven by credit conditions and household leverage. Several studies have shown that households can borrow only a fixed multiple of their net worth. This assumption of a fixed "leverage ratio" implies that a positive or negative shock to income (or net worth) is amplified by an expansion, or contraction, in borrowing capacity, in turn influencing house prices. Positive shocks to household income translate into larger house price increases where

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prevailing leverage ratios are higher and smaller increases in countries where such leverage ratios are lower. Leverage and lending standards more broadly can evolve in a cyclical manner, resulting in powerful swings in house prices. Relaxing lending standards in good times drives up both credit and house price growth while a tightening of standards puts downward pressure on house prices. A number of studies of the recent housing boom in the United States show that rapid growth in credit to prime and subprime borrowers was associated with a sharp deterioration in lending standards that in turn fueled house price appreciation (Kiyotaki and Moore, 1997)

Bank lending has been closely correlated with property prices in both developed and developing economies in the past decades. From a theoretical perspective, there exists potentially a two-way causality between bank lending and property prices. On the one hand, property prices may influence both demand and the availability of bank credit via various wealth effects. This is mainly related to the role of asymmetric information in credit markets which gives rise to moral hazard or adverse selection problems. In these models, the borrowing capacity and credit demand of households and firms are affected by changes in prices of properties, which are often used as collateral for bank lending. Furthermore, property prices affect banks' capital position and thus lending capacity, both directly through valuations of their holdings of real estate assets and indirectly via changes in non-performing loans. The latter may rise as falling property prices affect the solvency and, potentially, the willingness to repay of households and corporate borrowers. On the other hand, credit conditions may also affect asset valuations, as increases in credit availability may expand the demand for a (temporarily) fixed supply of properties (Bernanke and Gertler, 1989).

Property price increases can directly drive the demand for credit up, as purchasers will require more financing to acquire property. Higher property prices tend to stimulate economic activity through wealth effects, thereby encouraging investment and consumption spending and, as a result, indirectly increasing the demand for credit. The existence of agency costs and informational asymmetries highlights the relevance of collateral constraints on the amount of borrowing that agents can obtain and thereby providing another causal link between property prices and credit (Bernanke and Gertler, 1989).

Gerlach and Peng (2005) identified a supply-side influence of property prices on credit. Fluctuations in house prices does affect the capital position of banks directly through the valuation of their real estate investments or indirectly through the effect of property prices on non-performing loans. The increased availability of credit, on the other hand, will raise the demand for property. Given that in the short run the supply of housing is relatively constant, this tends to drive the prices up. Availability of credit can also affect property valuations indirectly, as it will encourage investment and consumption spending, increasing economic activity and creating expectations for future income flows from assets, thus boosting valuations.

1.2 Statement of the Problem

The close empirical relationship between the evolution of property prices and credit aggregates has been well established, mainly in the policy-oriented literature. What is much less clear is the direction of causality between these two variables. Price increases drive the demand for credit up with increased amount of funding being needed. Most housing purchases are financed by credit thus affecting prices through liquidity effects.

An examination of the long and short-term relationship between house prices and mortgage credit on the Hong Kong Housing market showed that the increases in house prices were positively and significantly related to growth in long-term mortgage debt. The housing have crises been believed to be caused by the rapid mortgage credit growth in many countries (Gerlach and Peng, 2005).

A study by The World Bank (2011) on mortgage lenders shows that increases in property prices has led to increased borrowing in order to cash in on the high valuations. It shows that increased mortgage lending has led to high property prices with increased spending capability from mortgage financing.

Macoloo (1994) examined the building costs in Kenya and found out that the high building costs had an impact on the house prices as developers tried to maintain their profit taking opportunities. Therefore, for Kenyans to be able to afford the highly priced houses they needed more financing from the mortgage lenders which in return increased the outstanding debt.

Murugu (2003) did a study on the perceived quality of service in the Kenyan mortgage sector and found no known local study has ever been conducted on the effects that the mortgage market has on other financial sectors, hence the research gap. This study sought to fill this existing research gap by conducting a study with the aim of explaining the relationship between house prices and mortgage credit in Kenya as well as the direction of causality.

1.3 Objectives of the Study

To determine the relationship between house prices and mortgage credit

1.4 Significance of the Study

The findings of this study will be useful to different groups of the Kenyan population as explained below.

1.4.1 Property buyers

Property buyers will benefit from the study by learning how property prices react to the mortgage market variables like interest rates. Buyers will benefit from such information when making their real estate investment decisions.

1.4.2 Mortgage Lenders

Mortgage financing firms can use this study to improve on their policies in regard to how much financing to advance to borrowers depending on their property valuations used as collateral. This study will also assist the firms in coming up with strategies on how to react to house price fluctuations.

1.4.3 Government

This study will help the regulators to understand the effects of house price fluctuations and come up with appropriate policies to regulate the housing markets hedging the economy against the ever rising prices. The government should normalize the functioning of the mortgage market by taking action to return mortgage rates to what they would otherwise be if the mortgage market were functioning normally.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter brings up relevant literature required to find answers and connect to our research objective. First, a review of theories that guide this study will be presented to give the research a firm theoretical base. Then, empirical studies done on this research topic will be looked at which will make it easier to understand the research area.

2.2 Review of Theories

2.2.1 Dynamic Gordon Growth Model theory

The Dynamic Gordon growth model brings out the theoretical framework that links house prices to real interest rates and thus a linkage to mortgage rates because the movements in the primary conventional mortgage rate are highly correlated with movements in long-term real interest rates. The model states that the real interest rates do determine the intrinsic value of assets in a free market. The standard Gordon Growth Model states that Asset price = Dividend / (interest rate – Dividend growth rate). For the housing market, the model would be interpreted as House price = Rent / (Interest rate – Rental growth rate). This model shows a convex relationship between house prices and real interest rates and thus a convex relationship between house prices and mortgage rates as well. The lower the level of the mortgage rate, the greater is the elasticity of house prices to changes in mortgage rates and the greater the level of mortgage debt outstanding. A more accurate version of the Gordon Growth Model as applied to housing requires further adjustments for factors like risk, taxes, depreciation, and mortgage rates (Gordon, 1962)

The expected future returns to housing assets can further be split into the sum of expected future risk-free rates of rental income and expected future premium paid to housing over the real risk-free rate. This model is known in the finance literature as the dynamic version of the Gordon growth model. The approach is equivalent to assuming that house prices are the discounted sum of housing rents, where the growth rate of housing rents and required return

to housing can vary over time. It is precisely this variation over time in expected required returns and expected growth rate of housing rents that yields changes in relative house prices, enabling us to study the factors responsible for time-series changes to housing valuations (Campbell and Shiller 1988a, 1988b).

2.2.2 User Cost Model

When analyzing the determinants of tenure choice, each of these considerations has to be taken into account. Renters purchase housing services in the market and the cost they incur is the rental price of housing. For homeowners, the cost of using and owning one unit of housing in a given period is known as the user cost, defined in a similar way to the user cost of capital from the Neoclassical theory of investment. The user cost is made up of the opportunity cost (forgone after-tax return of housing equity on alternative assets), out-of-pocket expenses (mortgage interest payments, maintenance costs, local housing taxes, etc.) and value variation (depreciation and capital losses associated to house price fluctuations). When the user cost of owner occupied housing is lower than the rental price of housing services, households would prefer to purchase houses instead of renting and wealth (liquidity) constraints are likely to be the main deterrence from home ownership (Rosen, 1979).

The user cost model can help explain how differences in expected appreciation rates of house prices across different metropolitan areas can make house prices more sensitive to changes in mortgage rates. A simple regression of the log (price-rent ratio) on the log (inverse of the user cost) suggests that variation in the after-tax real interest rate is an important component of explaining the price-rent ratios across metropolitan areas. Thus house prices in the recent boom appear to be particularly sensitive to changes in the after-tax cost of owning a home. Increases in house prices are accompanied by increases in mortgage debt levels suggesting that house prices reflect changes in the user costs to an appreciable degree (Mayer and Sinai, 2007).

The objective factors affecting user cost can be captured via an adaptation of Jorgenson's user cost of capital concept. All things being equal, the user cost of housing will decrease as

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housing assets appreciate, will decrease as the cost of the renting alternative measured by imputed rents increase and will increase as mortgage costs increase. This can be summarized as: $C_h = U - P_h - P$, where P_h is the price of housing, C_h is the expected capital gain in terms of house price inflation, P is the net imputed rent, U is the mortgage interest cost (Jorgenson, 1963).

2.2.3 Efficient Market Hypothesis

In his seminal article, Fama (1970) defined an efficient market as one in which market prices fully and instantaneously reflect all relevant information. Under the condition that new information arrives randomly in the housing market, the current price of a housing asset is an unbiased predictor of its future value. Numerous studies have tested the efficient market hypothesis in various housing markets in the United States and other countries. The consensus in this literature is that both house prices and excess returns exhibit systematic short-run and long-run serial positive correlations indicating the fact that the housing market is not informationally efficient.

In conventional analyses of housing demand assuming a risk-free world of complete information, and homogenous / rational agents, the user cost of housing is identified as a key variable determining individuals' decisions to own housing assets. User cost is a simple measure of the relative cost of housing assets, expressed in terms of real interest rates, imputed rents and capital appreciation (or depreciation). However, in a world of uncertainty and institutional change, the influence of the user cost of housing on decisions will be overwhelmed by other factors, generating destabilizing and volatile patterns in housing demand. Inefficiency and instability in housing markets can be understood in terms of the violations of the assumptions of perfect housing markets. Given uncertainty, financing constraints and irreversibility of decisions housing market will be characterized by volatility at a microeconomic level. This instability will be transmitted to the macro-economy as buyers, sellers, lenders and borrowers interact, and affect each other's decisions regarding housing investment. Individuals do not behave independently with their housing (and mortgage) choices and are affected by social forces, conventions and herding tendencies, thus

depreciation expectations in house prices will lead to a decline in mortgage debt as borrowers require less financing for the lowly priced houses (Baddeley, 2005)

Housing assets are both consumption goods and investment assets. In mainstream analysis, rational agents operating in a risk-free world of perfect information and reversible decisions, respond to the factors affecting their housing investment / consumption decisions in a methodical way. The consumption component of a house purchase is a function of the discounted stream of imputed rents, reflecting not only future consumption plans but also the fact that housing assets are used as a hedge against future rent rises. The investment component will be affected by expectations of capital gains and losses in housing assets resulting to either increased mortgage borrowing if gains are expected and decreased mortgage borrowing if capital losses are expected (Pain and Westaway, 1997).

Adapting a Modigliani-Miller (MM) assumption of financing neutrality, i.e. by assuming that the type of financing used for an asset purchase does not affect its value, this model is completed because, in an MM world, financing vehicles and constraints will not affect decision-making when capital markets are perfect. However, this baseline model will be distorted by political and institutional change and by housing market complexities.

2.2.4 Prospect Theory

This theory states that people value gains and losses differently and, as such, will base decisions on perceived gains rather than perceived losses. Thus, if a person were given two equal choices, one expressed in terms of possible gains and the other in possible losses, people would choose the former. Many housing purchasers make their decisions based on the possible gains that they anticipate in the investment. Kahneman and Tversky (1979) "Analysis of decision under risk" indicate that in making choices between risky outcomes people behave in a risk averse manner no matter how small the amount at stake are. The weights are, according to Kahneman and Tversky (1979) determined by a function of true probabilities which gives zero weight to extremely low probabilities and a weight of one to extremely high probabilities. That is, people behave as if they regard extremely improbable events as impossible and extremely probable events as certain. However, events that are just

very improbable are given too much weight; people behave as if they exaggerate the probability. Events that are very probable are given too little weight; people behave as if they underestimate the probability. The Kahneman-Tversky weighting function may explain observed overpricing of out-of-the money and in-the-money options which have overly affected the housing market with properties being overpriced. People are choosing to cash in on the sky-rocketing prices in anticipation of a higher rise of the same in the future. They are able to invest in the housing sector through mortgage financing which increases their capability to afford such investments. Through the housing being overpriced, some purchasers use this imbalance in the market to buy properties for speculation thus making the prices more high.

2.3 Review of empirical studies

According to a study by Goldman Sachs in the Global Economics Weekly (2007), house prices boomed in many parts of the world between 1997 and 2007. The study analyzed house prices in different countries including the United States, European countries such as Britain, France, Ireland, and Spain, Germany, Japan, Australia, South Korea and China. The study showed that a rise in real house prices was accompanied by a secular decline in real mortgage rates in the early 2000s. As real mortgage rates dropped more quickly in 2002, house prices demonstrated a commensurate rise. House prices in the various European countries continued growing after 2005 even as real mortgage rates began rising. Many blamed mortgage market excesses such as the growth of sub-prime lending for the sharp increase in United States house prices in the 2000s as well as the sudden decline in house prices after 2007.

The extreme use of leverage at household level (subprime loans) and mortgage-backed securities in the United States housing market may have led to a more sudden collapse in mortgage lending in the United States relative to much of Europe. Data from Australia, South Korea, and China show how house prices grew rapidly when interest rates fell in 2002 and 2003.German and Japanese real mortgage rates fell with much of the rest of the world. However, local economic conditions played a crucial role in holding down house price appreciation. In Germany, the strong construction boom after the reunification of the two German states combined with slow population growth, led the country to have an oversupply

of housing. More relevant to today's conditions, Japan was in the middle of a more than decade-long economic slump. Even with low interest and mortgage rates, over-leveraged banks and underwater mortgages for many consumers led the country's housing market to be in a constant state of decline (Mayer, Pence, and Sherlund 2008)

According to Case and Shiller (2008), the meltdown in mortgage markets has substantially raised mortgages rates relative to their historical relationship to interest rates. They conducted a study analyzing the role of credit markets in mortgage prices and thus in house prices in the United States housing market. The study showed that the spread between the interest rate on the average 30-year conforming mortgage and the 10-year Treasury bond had widened enormously in the last few years. In fact, while the yield on the 10-year Treasury bond had fallen by nearly 1.5 percent in the past 2 years, the average rate on a conforming mortgage had fallen by about 0.5 percent. Problems in the entire economy combined with the broader credit crunch were responsible for the increase in the spread between mortgage rates and Treasury securities.

Nonetheless, the increase in mortgage spreads has had catastrophic consequences for housing affordability and has driven house prices down well below what their fundamental value would be with a normally functioning mortgage market. As a result of higher mortgage spreads, the imputed rent-to-rent ratio increased by about 10 to 17 percent, with the in the markets that were most sensitive to changes in interest rates. It also leads to a drop in demand associated with higher mortgage rates that pushed house prices down. Their calculations showed that house prices were expected to fall another 4 to 15 percent to reach their new fundamental level with higher mortgage spreads.

Gyourko et al. (2006) conducted a study of the overall price of housing in the cyclical markets (superstar cities) in the US. While previous empirical evidence suggested that real house prices in "superstar cities" grew at a real rate of about 2 percent above the national average, real house prices in other metropolitan areas were more closely related to the construction costs. Their study showed that for the cyclical cities, real house prices were about 10 to 20 percent above their 21-year average. This suggested that house prices were about where they should be given that the underlying reasons for the long-term real growth

of house prices in these superstar cities still persisted, including limited supply and growing demand due to income growth. With real interest rates much lower than than they were in the previous year's suggested that house prices were actually a bit cheap in some of these markets--or at least would be cheap if mortgage spreads were at historic levels. In the steady markets, house prices had fallen most of the way to their previous levels, although Chicago and Denver exhibit a slight upward trend in real house prices. Given that these two markets had experienced demand growth and had some constraints on building, house prices were bound to rise with time. Real construction and materials costs had also gone up over this time period, so some real appreciation of house prices was warranted.

Gerlach and Peng (2003) examined the long and short-term relationship between housing prices and mortgage credit on the basis of approximation of the co-integration relations between both aggregates. With an application to the Hong Kong housing market, their results showed that the increases in housing prices are positively and significantly related to growth in long-term mortgage loans but credit is not found to significantly affect housing prices. Bank lending was closely correlated with property prices in that property prices influenced both demand and the availability of bank credit via various wealth effects. This was mainly related to the role of asymmetric information in credit markets which gave rise to moral hazard or adverse selection problems. The borrowing capacity and credit demand of households and firms are affected by changes in prices of properties, which are often used as collateral for bank lending. Furthermore, property prices affect banks' capital position and thus lending capacity, both directly through valuations of their holdings of real estate assets and indirectly via changes in non-performing loans. The latter may rise as falling property prices affect the solvency and, potentially, the willingness to repay of households and corporate borrowers. On the other hand, credit conditions may also affect asset valuations, as increases in credit availability may expand the demand for a (temporarily) fixed supply of properties. They also find that the direction of causation goes from housing prices to private sector debt both in the long run and in the short run.

In a study by Hofmann (2003) on the interaction between housing prices and credit has recently finds that changes in property prices affect private sector borrowing in the long run

when analyzing a panel comprising quarterly data for 20 countries (Norway included) covering the period 1985-2001. He also reports that results for the short run adjustment, where he finds that the causality goes in both directions. The long run results are further corroborated in Hofmann (2004) where separate regressions in real credit to the private sector, gross domestic product (GDP) (as a broad measure of economic activity) and the short-term real interest rate as a measure of financing costs are first studied for each country. When extending the analysis to include real property prices in the regression, Hofmann finds strong support for one co-integrating vector for all countries, which (through the significance of the loadings) can be interpreted as determining credit in the long run for those countries where a high share of loans are secured by real estate.

These results are supported by Brissimis and Vlassopoulos (2009) in a single country study for Greece, for quarterly data specific to the housing market covering the period 1993-2005. Using multivariate co-integration techniques they find, based on a co-integrated relationship identified as a mortgage loan equation, that housing prices do not adjust to disequilibria in the market for housing loans. Hence, in a long run perspective the causation does not run from mortgage lending to housing prices. In the short run they find evidence of a contemporaneous bi-directional dependence.

Fitzpatrick and McQuinn (2007) look at the interaction between housing prices and mortgage credit in Ireland between 1981 and 1999. They analyzed co-integration within a single equation framework by adopting the Engle-Granger approach (Engle and Granger, 1987). A uni-equational approach is used to specify the error correction models for housing prices and debt before estimating them jointly by three stage least squares (3SLS). They show that the two variables are mutually dependent in the long run, as well as in the short run and the interaction are found to go in both directions.

Oikarinen (2009) uses quarterly data for Finland (the sample is 1975 to 2006) to explore the mutual dependence between housing prices and borrowing. A Johansen analysis supports the existence of only one co-integrating vector and the direction of causation is found to be from household borrowing to housing prices in the long run. An impulse response analysis shows

that the interaction between housing prices and credit grew to become important only after 1987, i.e. after the Finnish credit market was considered fully deregulated.

Making use of quarterly data for the period 1984-2009, Gimeno and Martinez- Carrascal (2010) study the interaction between housing prices and household borrowing in Spain. A multivariate co-integration analysis shows that the two variables are interdependent in the long run, i.e. that housing prices affect mortgage credit in the long run, and vice versa. Further, the loading factors imply that disequilibrium in the credit market leads to adjustments in both markets, while only housing prices error correct to disequilibrium constellations in the housing market. They do not report results on the short run dynamics, and they are therefore not able to study the dynamics of the system.

According to a study on housing demand in Kenya by Mbogua and Nganga (1973) and Chana (1984), the projected housing demand during the period 1986-2001 indicated that about 348,000 housing units were needed to meet housing demand. This meant an annual rate of 23,000 housing units. However, during the period between 1992-1997 for example, annual housing production from both the public and private sector averaged 1142 houses per year (GOK, 1992- 1997). To meet their own housing needs in the face of unaffordable house prices and rents, most urban residents in Kenya are opting to develop their own housing by mortgage credit due to the an unstable housing market existing which is characterized by high property prices. Many homeowners are opting for loans in order to purchase houses before the prices increase to unaffordable levels.

Studies specific to Kenya suggest that Kenya's outdated 1968 Building Code that is currently in operation does not allow the inclusion of newer construction technology that is instrumental to the provision of low cost buildings. The building code requires contractors to adhere to what is now costly and time consuming building measures that are not in use in developed countries. This raises the cost of construction as well as house prices as developers try to maintain their profit taking opportunities. Therefore, for Kenyans to be able to afford the highly priced houses they need more financing from the mortgage lenders which in return increases the outstanding debt (Macoloo, 1994).

A study on property prices in Kenya shows that the growth in prices for apartments which are priced at a lower level than houses have seen rapid growth in the last 2 or 3 years. Over the 10 year period, the average growth rate for apartments has been just 7.8% but between 2008 and 2010 prices have almost double for smaller apartments. During the same period, the mortgage debt outstanding has more than tripled as households borrowing capacity increases with increase in house valuations. Households are using their homes as collateral to access more financing for further investments in the real estate market (Hass Consult, 2010)

A survey on mortgage lenders showed that an increase in property prices led to an increase in mortgage lending as more and more people borrow to purchase properties for speculative purposes. In Kenya, the strong property rights, the ability to use land and property as collateral is the basis for a strong collateral lending system. Being able to provide collateral can be the basis for a loan to purchase houses or land to anticipate income inflows form the price appreciations. The increases in both mortgage credit and house prices have had an accelerator effect on the whole economy by increasing household spending /consumption capabilities (World Bank, 2009).

2.4 Housing Price and Mortgage Credit

Explaining the relationship between new mortgage credit and house prices is a classic problem in housing market theory. Intuitively, one would expect that, in the long-run, production and price would be in equilibrium; however, this notion has not been adequately proven by research. Goodman (1998) and DiPasquale and Wheaton (1994) indicate that, as a rule, the relationship between the house prices and the new mortgage credit leads to weak analyses on an aggregated level. In a study of the determinants of house price developments, Boelhouwer and De Vries (2001) concluded that it is impossible to design a national model, which includes a significant role for building costs or new production and the notion that the causal relationship between the house prices and the new mortgage credit can only be proven with databases at a low level of scale (region, neighborhood) is widely quoted and paraphrased.

Theoretically, prices are assumed to develop within a neo-classical economic structure in which the core concepts are supply and demand, market forces, and the equilibrium price. In neo-classical economic theory, the variation in the house price is the result of the disequilibrium between supply and demand, in which the demand for housing services is a function of demographic factors, income, interest rates and the housing stock, and the supply is a function of the price of land, building costs and credit conditions. However, at the national level, we can discern strong connections between only the price and the demand-oriented factors. At micro level it is the quality of the housing that appears to be the primary instrument in determining the price. The causality between the house price developments and the new mortgage credits is difficult to express in statistics and there are two schools of thought in the international literature, which appear to be at odds with each other with regard to the influence of the supply on price (Chen, 1998).

The first claims that, in many cases, price equilibrium develops in the existing housing stock, implying that new supplies scarcely have any effect or none at all on price developments. This applies particularly to countries, such as The Netherlands, with a strongly regulated housing and house-building market and where building land is scarce. The international housing market literature also emphasizes how small the influence of the supply (of the new construction) may be on price development in the existing stock, so that the development of aggregated house prices stands largely under the influence of household incomes, mortgage interest rates, and the lag in house prices (Abraham and Hendershott, 1996; Hort, 1998; Malpezzi, 1999).

The second approach sees the housing market as supply-based and attaches heavy significance to new housing supplies. It can be assumed that, in the long term, house price development will be determined by production costs in a well-functioning housing market. When prices rise through (temporary) scarcity, building contractors react to this favorable situation by adding attractively-priced newly-built housing to the stock. This extra supply of new housing depresses prices, so that a new equilibrium on the housing market is created. It is implicitly assumed here that the housing market operates as a supply market. House prices function as a trigger, inducing rapid movement towards the equality of housing supply and demand. Since building a house takes from one to three years, fine-tuning problems can arise

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so that severe short-term price mutations may occur. With mounting demand, several years may elapse before the required supply is available. Since some housing is already in production, for a period of one or two years more housing is added to the stock than the market requires and as a result, the price of existing owner-occupied housing falls further. The idea behind this supply-directed approach is that in the long term the price of newly-built housing follows the production costs. The factors which determine the costs of new building (including land and construction costs) mark the starting point for new price equilibrium (Abraham and Hendershott, 1996; Hort, 1998; Malpezzi, 1999).

2.5 Conceptualization of Housing Price Dynamics

2.5.1 The real estate market

In their book entitled *Urban Economics and Real Estate Markets*, DiPasquale and Wheaton (1996) presented a framework depicting the long-run equilibrium of the real estate market. The four-quadrant framework seeks to take account of the various impacts of the broader economy on the real estate market, and its corresponding movement towards long-run equilibrium.

The DiPasquale-Wheaton framework shows that starting with a certain level of stock (in the northeast quadrant), the property market determines rent which is then translated into a corresponding property price by the asset market (in the northwest quadrant). These asset prices, in turn, generate new construction (in the southwest quadrant) which in the property market eventually yields a new level of stock (in the southeast quadrant). The combined property and asset markets are in equilibrium when the starting and ending levels of stock are the same.

2.5.2 Private housing and the macro economy

From the DiPasquale-Wheaton framework depicting how the real estate market functions, it is readily observed that any movement in gross domestic product (GDP), prime lending rate (PLR) and the supply of new private housing is bound to have an impact on the private residential market, and in particular, private housing prices. As an economy expands, national income rises and the outcome should be a greater demand for housing space. For a

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given level of housing space, rents must therefore rise if the demand to use space is to be equal to the available space. These higher rents then lead to greater house prices, which in turn generate a higher level of new construction eventually leading to a greater stock of space associated with new market equilibrium. Demand for housing has been widely studied, and it has been shown that income is an important determinant of residential price movements, which in turn depend on the economic wellbeing of the country. Thus, adjustments to the stock of housing (i.e. new construction) occur only slowly over time and often with lags. Such housing stock adjustments respond to the prices determined by the market's short-run equilibrium (DiPasquale and Wheaton, 1996).

Economic theory suggests that interest rates and house prices are inversely related. Generally, reduced interest rates tend to increase housing demand, and therefore push up house prices. This effect is, however, softened by a similar increase in the supply of housing in response to higher house prices and lower construction financing costs, i.e. interest rates. Thus, interest rates influence house prices through the demand for, and supply of private housing. The development of new housing is expected to be positively related to private housing prices since developers, in general, undertake a commitment to start a project based on an estimate of what demand will be at the project's completion. Increases in residential prices serve as a signal to developers that the demand for housing is good and, therefore, the developer increases the supply of housing. There is, however, a delay - a "time to build" problem - inherent in the development of new housing units because of the nature of the industry requiring detailed plans, approvals from the competent authorities, financing, and the structures have to be constructed. Overall, new construction should have a positive effect on returns (on prices) in the short run (McCue and Kling, 1994).

Topel and Rosen (1988) explain the dynamics in the housing model with reference to the adjustment process of demand and supply in the housing market to exogenous shocks. It pays to build ahead of anticipated demand when there is rising supply price in order to distribute costs over an extended interval of time. For instance, an anticipated transitory increase in future demand causes bubble-like price and investment responses. House prices increase immediately in a rational market, and this signals increased construction activities prior to the time the change occurs. Rental prices fall during this phase because of accumulating stock.

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At the point at which demand actually jumps up, rational agents anticipate its transitory nature, so price starts falling and construction turns around. After the shock has passed, the housing stock is too large and must be worked down to its steady-state level. Further reductions in price reduce investment below steady-state values, while price and investment gradually rise back to steady-state levels. Rising supply price spreads investment and price responses both backward and forward from the time anticipated shocks occur.

A study on market factors affecting house prices showed that there is a strong response of housing prices to changes in both the real rate of interest and expected inflation, and the hypothesis that nominal rates of interest affect housing investment cannot be rejected. Using a supply-determined model of housing investment, they have found that short-run supply is less elastic than long-run supply. However, the differences between the two converge within a period of one year. This rapid convergence is supported by the feature of the construction industry whereby labor and other resources are widely used in all sectors of the economy. Thus, the pronounced cyclical movement in the construction industry promotes certain adaptability and built-in flexibility in the organization of the industry that all resource movements do respond quickly to changing economic conditions (Topel and Rosen, 1988).

2.6 Conclusions

Housing prices have been the main focal point of economic and social debate in recent times in many developed countries. The rise in housing prices in the Kenyan case has been one of the most striking issues in the economy. There are many factors affecting housing prices, although the influence of any of these factors and the possible interactions between them require a long-term analysis of these influences over time. Amongst these factors, and with the advent of the financial crisis, the relationship between mortgage financing and prices has concentrated a big deal of attention in this context. Various empirical studies were examined to analyze the relationship between mortgage financing and housing prices in Kenya. The results show that housing prices have a cyclical behavior and there are long-term corrections of the deviations from market equilibrium level that are related to interest rates and corrections in housing demand and supply. However, housing prices are not found to be explained by changes in mortgage credit. It is the changes in housing prices that is positively and significantly related to the long-term evolution of mortgage credit. This result suggests

that the evolution of housing prices is not triggered by bank mortgage lending and that banks just accommodated mortgage financing to the evolution of house prices.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents a detailed idea of how the research was conducted. These describe and justify the methods that were used to answer the research question. This included the research design, the population, and sample data collection methods and data analysis.

3.2 Research Design

The causal study design was employed in this research. Causal research aims to suggest causal linkages between variables by observing existing phenomena and then searching back through available data in order to try to identify plausible causal relationships. It was concerned with determining cause and effect relationship and to understand which variable is dependent and which is independent (Ross, 2005). This research design was the best in explaining if two variables are related and if they vary together with the help of enough information or data for testing cause and effect relationship. It aims to explore the relationship between house prices and mortgage lending in Kenya and the empirical evidences that help answer the research objective. Along with house prices, this empirical exercise attempts to approximate the relationship between mortgage financing and the actual market valuation of houses which is approximated through the relationship between the asset price and the rental revenues as a house price-rents ratio (P/R).

3.3 Population

The population in this research is the aggregate mortgage debt levels and house prices in the Kenyan mortgage as well as housing market. This represents the total mortgage debt outstanding to date according to the CBK and the entire house price data that was available at the ministry of housing.

3.4 Sample

In this research, quarterly data is used which comprises the period 2006 to 2010. This period was selected due to availability of data from Hass Consult Limited which is a period that the company has detailed published data on property prices in Kenya. Prior to this period, the available data is not detailed and did not have any consistency thus not reliable for the study. Moreover, the Kenyan financial market has experienced a rapid growth in the housing finance sector in the last five years with property prices increasing at a very rapid rate. The quarterly average data is used from the researchable five year period selected which is the most recent data for both the property prices and mortgage debt levels.

3.5 Data Collection

Secondary data was collected from Government sources. Data on disposable income, interest rates and household debt will be sourced from the CBK. House prices, housing stock and housing turnover was sourced from Ministry of Housing.

3.6 Data analysis

In this research a dynamic econometric model was employed to assess the relationship between housing prices and credit. To investigate this relationship the study formulated multiple regression equation and in doing so the research seeks to answer one key question: Has the dramatic increase in mortgage credit caused the booms in the housing sector in Kenya or is it the housing prices that have affected the mortgage market. This approach provides an opportunity to study the major determinants of mortgage debt and house prices in the Kenyan market. As the above empirical evidence indicates, it seems plausible that the direction of causality is bi-directional and in order to determine whether mortgage debt has caused the booms in the housing market, the research develops a model where housing price is a function of household debt and other endogenous variables while household debt is a function of various factors that affect debt demand thus affecting housing prices as the affordability of housing majorly depends on availability of funds through mortgage borrowing in Kenya. A pair of equations describing what determines real housing prices and real household debt at the aggregate level in long run equilibrium are considered.

$$D = \beta_0 + \beta_1\,H + \beta_2\,R + \beta_3\,YH + \beta_4\,TH \qquad (1)$$
$$PH = \beta_0 + \beta_1\,YH + \beta_2\,D \qquad (2)$$

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In (1) and (2) PH denotes real housing prices, YH represents real disposable income for the household sector, R is the real interest rate after tax, D is real household debt, H is the housing stock and TH is housing turnover. The equations are not estimated simultaneously because the research seeks to determine the direction of causation and to establish a relationship but not to solve the equations.

Equation (1) defines household debt as a function of the housing stock, the interest rate, disposable income and the housing turnover. The credit equation is an extended version of Fitzpatrick and McQuinn (2007) credit model where they studied the mortgage credit as a function of disposable income and housing supply and demand. The specification is augmented by the housing stock and the housing turnover as possible explanatory variables. Instead of just considering the direct effect of housing prices on credit, the research looks at the value of the housing investment, which is the product of housing stock, disposable income invested in housing and housing turnover (demand and supply). The reason for this is that it is the value the investment in the house that determines the collateralizable net worth and not simply the housing prices.

Equation (2) presents housing prices as a function of disposable income and household debt. It is an inverted demand equation for housing services, and expresses market clearing prices for any housing stock with the given household income and available housing financing. This methodology is borrowed from the seminal contribution by Hendry (1984). The equation describes housing prices as an increasing function of disposable income and household debt, while a greater supply of housing financing is expected to push housing prices up.

With the indirect relationship between housing prices and the other endogenous variables as well as the time period considered, there are no significant lags in this analysis. Since the data frequency is quarterly, quarterly dummy variables are included to control the seasonality of the data. The final estimations correspond to a filtered restricted model where the house prices and mortgage credit are independently measured.

4.0 DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the research findings to determine the relationship between house prices and mortgage credit. The study was conducted on the data for Q1 to Q4 for year 2006 to year 2010, this period was chosen because of the availability of the data, the study conducted multiple regression analysis in order to determine the model proposed in chapter three , scatter diagram was draw to determine the nature of the relationship between the real housing price and real household debt and the researcher further performed correlation analysis to determine the strength of the relationship between the study variables.

4.2 Regression Analysis

$$D = \beta_0 + \beta_1\ H + \beta_2\ R + \beta_3\ YH + \beta_4\ TH \qquad (1)$$

Table 4.1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.981[a]	.962	.955	98136.87815

From the findings in the above table , the adjusted R^2 known as coefficient of determination shows that the variation in household debt with changes in housing stock, the interest rate, disposable income and the housing turnover. From the above table there was 95.5% variation in household debt with changes in housing stock, the interest rate, disposable income and the housing turnover. R is the correlation coefficient which shows the strength of relationship between the household debt and housing stock, the interest rate, disposable income and the housing turnover. From the data there was a strong correlation between household debt and housing stock, the interest rate, disposable income and the housing turnover as shown by correlation coefficient of 0.981. The above table shows that there is a very strong correlation

between household debt and housing stock, the interest rate, disposable income and the housing turnover in the Kenyan market. The endogenous variables accounted for 95.5% changes in the household debt which means that they are major determinants of levels of household debt in the Kenyan case.

Table 4.2: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.943E12	3	1.314E12	136.482	.000[a]
	Residual	1.541E11	16	9.631E9		
	Total	4.097E12	19			

From the ANOVA statics in the above table , the study confirms that the processed data, which are the population parameters, had a significance level of 0 which is less than 0.05 an indication that the data is ideal for making a conclusion on the population's parameter. This shows that the data sampled represents the population.

Table 4.3: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	-1.036E7	6730144.381		-1.539	.143
	real interest rate after tax R	-14783.828	64336.600	-.025	-.230	.821
	real disposable income (YH)	380.251	213.937	.493	1.777	.095
	housing turnover(TH)	93.708	57.578	.514	1.628	.123

The equation (1) was regressed and the above coefficients were derived and used in coming up with the model below:

$$D = -1.0367E7 - 14783.828\ R + 380.251\ YH + 93.708\ TH$$

According to the model, holding real interest rate after tax , real disposable income , housing turnover and housing stock to a constant zero, household debt would stand at -1.036E7, a unit increase in real interest rate after tax would lead to decrease in household debt by a factors of 14783.828, a unit increase in real disposable income would lead to increase in household debt by a factor 380.251 , further unit increase in house turnover would lead to increase in household debt by factors of 93.708. In developing the above model housing stock was excluded.

Table 4.4: Model Summary

$$PH = \beta_0 + \beta_1\ YH + \beta_2\ D \qquad (2)$$

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.972[a]	.946	.939	5.08317E5

The adjusted R^2 /coefficient of determination from the above analysis show that the variation in housing prices with changes in real disposable income and real household debt. From the above table there was 93.9% variation in housing prices with changes in real disposable income and real household debt. The correlation coefficient shows the strength of relationship between the housing pricing real disposable income and real household debt and it is evident that there was a strong positive correlation between housing pricing, real disposable income and real household debt as shown by a correlation coefficient of 0.972. This results show that housing prices in the Kenyan housing market are largely influenced by the level of financing available as well as the level of household disposable income.

Table 4.5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.640E13	2	3.820E13	147.833	.000[a]
	Residual	4.393E12	17	2.584E11		
	Total	8.079E13	19			

From the ANOVA statics in the above table , the processed data, which are the population parameters, had a significance level of 0 which is less than 0.05 and indication that the sampled data is ideal for making a conclusion on the population's parameter.

Table 4.6: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	-2.909E7	2.665E7		-1.092	.290
	real disposable income (YH)	1145.897	911.613	.335	1.257	.226
	real household debt (D)	2.854	1.182	.643	2.414	.027

The data was regressed and the coefficients in table above were obtained and also used in coming up with the model below:

PH = - 2.909E7 + 1145.897YH + 2.854 D

According to the model holding real disposable income and real household debt to a constant zero , housing price would stand at would stand at   -2.909E7 , a unit increase in real disposable income would lead to increase in housing price by a factors of 1145.897, a unit increase in real household debt would lead to increase in housing price by a factors of 2.854 .

The study further sought to establish the regression equation between the housing price and real disposable income, real interest rate after tax, real household debt, housing turnover and housing stock. The results are shown in the tables below.

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.983[a]	.967	.958	4.22259E5

The adjusted R^2 (coefficient of determination) tells us the variation in housing price with changes in real disposable income, real interest rate after tax, real household debt, housing turnover and housing stock. From the above table there was 95.8% variation in housing price with changes in real disposable income, real interest rate after tax, real household debt, housing turnover and housing stock. R is the correlation coefficient which shows the strength of relationship between the housing pricing and real disposable income, real interest rate after tax, real household debt, housing turnover and housing stock as shown by correlation coefficient of 0.983.

Table 8: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.811E13	4	1.953E13	109.525	.000[a]
	Residual	2.675E12	15	1.783E11		
	Total	8.079E13	19			

From the ANOVA statics in the above table , the processed data, which are the population parameters, had a significance level of 0 which is less than 0.05 and indication that the data is ideal for making a conclusion on the population's parameter.

Table 4.9: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	3.792E7	3.103E7		1.222	.240
	real disposable income (YH)	855.919	1007.302	.250	.850	.409
	real interest rate after tax R	-457356.998	277280.837	-.175	-1.649	.120
	real household debt (D)	1.610	1.076	.363	1.497	.155
	housing turnover(TH)	829.930	267.464	1.025	3.103	.007

The coefficient table in table above was also used in coming up with the model below:

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PH = 3.792E7 + 855.919 YH - 457356.998R +1.610D + 829.930TH

According to the model holding real disposable income, real interest rate after tax, real household debt, housing turnover and housing stock at zero , housing price would stand at -3.792E7. A unit increase in real disposable income would lead to increase in housing price by a factor of 855.919, a unit increase in real interest rate after tax would lead to decrease in housing price by a factor of 457356.998, a unit increase in real household debt would lead to increase in housing price by a factor of 1.610 whereas a unit increase in housing turnover would lead to increase in housing price by a factor of 829.930. In developing the above model housing stock was excluded as it is largely represented by housing turnover.

Figure 4.1: Scatter diagram of real house price versus real household debt
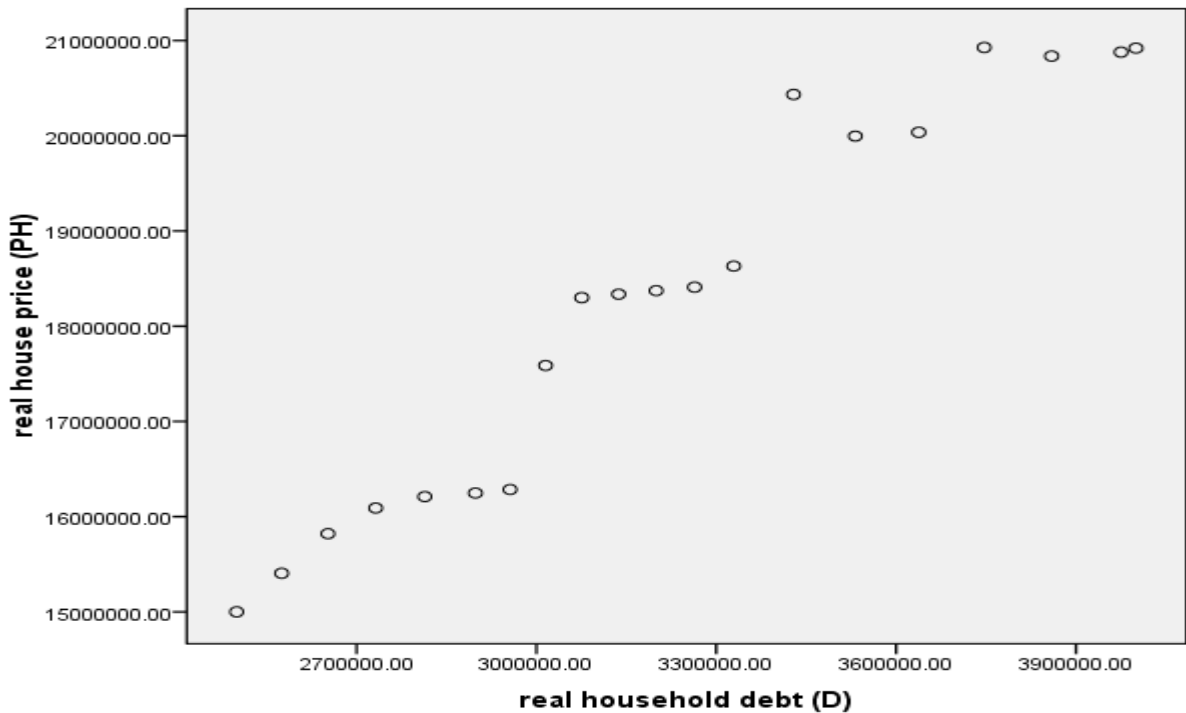
In order to determine the nature of the relationship between the housing price and real household debt, the research developed a scatter diagram of real house price versus real house hold debt , from the results displayed in the figure above, the study found that there was a linear relationship between real house price and real household debt.

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4.3 Correlations Analysis

Table 4.10: Correlations

		real house price (PH)	real disposable income (YH)	real interest rate after tax R	real household debt (D)	housing stock (H)	housing turnover(TH)
real house price (PH)	Pearson Correlation	1	.963**	.832**	.970**	.977**	.920**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	20	20	20	20	20	20
real disposable income (YH)	Pearson Correlation	.963**	1	.854**	.977**	.884**	.984**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	20	20	20	20	20	20
real interest rate after tax R	Pearson Correlation	.832**	.854**	1	.853**	.889**	.819**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	20	20	20	20	20	20
real household debt (D)	Pearson Correlation	.970**	.977**	.853**	1	.977**	.911**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	20	20	20	20	20	20
housing stock (H)	Pearson Correlation	.977**	.884**	.889**	.977**	1	.980**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	20	20	20	20	20	20
housing turnover(TH)	Pearson Correlation	.920**	.984**	.819**	.911**	.980**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	20	20	20	20	20	20

In order to determine the strength of the relationship between the various independent and dependent variables, the researcher conducted a Pearson product moment correlation. From the finding in the table above, the study found that there was strong correlation coefficient between real house price and real disposable income as shown by correlation factor of 0.963,

this strong relationship was found to be statistically significant as the significant value was 0.000 which is less than 0.05. The study also found strong positive correlation between real house price and real interest rate after tax as shown by correlation coefficient of 0.832; this too was also found to be significant at 0.001 levels. Association between real house price and real household debt was found to have positive relationship as shown by correlation coefficient of 0.970; this was significant at 0.001 levels. Housing stock and house turnover was found to have positive correlation coefficient of 0.977 at 0.001 level of significance and real house price were found to have positive correlation with a coefficient of 0.920 and this was significant at 0.001 levels.

4.4 Summary and Interpretation of findings

The study established the following regression equation on the various factors that affects the household debt;

$$D = -1.0367E7 - 14783.828 \ R + 380.251 \ YH + 93.708 \ TH$$

According to the above equation the study revealed that holding real interest rate after tax, real disposable income, housing turnover and housing stock to a constant zero, household debt would stand at -1.036E7, a unit increase in real interest rate after tax would lead to decrease in household debt by a factor of 14783.828, a unit increase in real disposable income would lead to increase in household debt by a factor 380.251 and further unit increase in house turnover would lead to increase in household debt by a factor of 93.708. In developing the above model housing stock was excluded. This shows that there is positive association between household debt and real disposable income and housing turnover but real interest rate after tax was found to be negatively associated with household debt.

Adjusted R^2 (coefficient of determination) tells us that the variation in household debt with changes in housing stock, the interest rate, disposable income and the housing turnover, which is 95.5%. This means that housing turnover, housing stock, the interest rate and disposable income accounted for 95.5% changes in the household debt. R is the correlation coefficient which shows the strength of relationship between the household debt and housing stock, the interest rate, disposable income and the housing turnover. From the data

there was a strong correlation between household debt and housing stock, the interest rate, disposable income and the housing turnover as shown by correlation coefficient of 0.98.

In order to determine the relationship between housing price and disposable income and real household debt, the study established the following regression:

PH = - 2.909E7 + 1145.897YH + 2.854 D

According to the model, holding real disposable income and real household debt to a constant zero, housing price would stand at -2.909E7, a unit increase in real disposable income would lead to increase in housing price by a factor of 1145.897 and a unit increase in real household debt would lead to increase in housing price by a factor of 2.854. The study found that housing price was positively influenced by real disposable income and household debt. From the findings there was 93.9% variation in housing price with changes in real disposable income and real household debt. A 0.972 correlation coefficient shows that there was a strong positive correlation between housing pricing, real disposable income and real household debt.

The study further sought to establish the regression equation between the housing price and real disposable income, real interest rate after tax, real household debt, housing turnover and housing stock. The established regression equation was:

PH = 3.792E7 + 855.919 YH - 457356.998R +1.610D + 829.930TH

According to the equation holding real disposable income, real interest rate after tax, real household debt, housing turnover and housing stock , housing price would stand at would stand at -3.792E7 and a unit increase in real disposable income would lead to an increase in housing price by a factor of 855.919, a unit increase in real interest rate after tax would lead to decrease in housing price by a factor of 457356.998, a unit increase in real household debt would lead to increase in housing price by a factor of 1.610 whereas a unit increase in

housing turnover would lead to increase in housing price by a factor of 829.930. In developing the above model housing stock was excluded.

From the results there was 95.8% variation in housing prices with changes in real disposable income, real interest rate after tax, real household debt, housing turnover and housing stock. The correlation coefficient which shows the strength of relationship between the housing pricing and real disposable income, real interest rate after tax, real household debt, housing turnover and housing stock was 0.983. In order to determine the nature of the relationship between the housing price and real household debt, the research developed a scatter diagram of real house price versus real house hold debt and the study found that there was a linear relationship between the two.

CHAPTER FIVE:

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

According to the study housing booms and busts have been associated with the financial crisis that has been experienced by many countries in the world. The recent experiences in several countries are examples of unsustainable housing booms that have turned into busts, causing output losses and banking crises. Given that housing busts weaken household and financial sector balance sheets, housing-linked recessions are more severe. The dramatic increase in mortgage credit has been blamed for the housing crisis. However, the relationship between housing prices and mortgage credit market needs to be highly investigated in order to understand which between the two variables affects the other for better policy planning. This paper analyses the relationship between housing prices and mortgage credit in Kenya, to determine whether mortgage lending has led to the booms and busts in the housing sector or it's the booms and busts that have affected the mortgage market.

A study on property prices in Kenya by a Kenyan real estate firm has shown that the growth in prices for apartments which are priced at a lower level than houses have seen rapid growth in the last 2 or 3 years. Over the 10 year period, the average growth rate for apartments has been just 7.8% but between 2008 and 2010 prices have almost double for smaller apartments. During the same period, the mortgage debt outstanding has more than tripled as households borrowing capacity increases with increase in house valuations. Households are using their homes as collateral to access more financing for further investments in the real estate market.

Various empirical studies that were examined to analyze the relationship between mortgage financing and housing prices in Kenya shows that housing prices have a cyclical behavior and there are long-term corrections of the deviations from market equilibrium level that are related to interest rates and corrections in housing demand and supply. However, housing prices are not found to be explained by changes in mortgage credit. It is the changes in

housing prices that is positively and significantly related to the long-term evolution of mortgage credit.

The result of the study suggest that the evolution of housing prices in Kenya has not been triggered by bank mortgage lending and that banks just accommodated mortgage financing to the evolution of house prices. Long and short-term estimates also confer an important role on interest rates as a housing price correction mechanism. The study also shows that other major factors do affect the mortgage market such as the household disposable income and supply and demand of housing.

5.2 Conclusion

From the findings on the correlation analysis the study found that there was strong positive correlation between real house price and real disposable income and the study also found strong positive correlation between real house prices and real interest rate after tax. The association between real house price and real household debt was found to have positive relationship, house turnover and housing price were found to have positive correlation while real house price and house stock were found to have positive correlation as well.

From the above findings the study concludes that the factors that affect the household debt are housing stock, housing prices, the interest rate, disposable income and the housing turnover. The study also found that there is positive association between household debt and real disposable income and housing turnover but real interest rate after tax was found to be negatively associated with household debt. It shows that factors that affect housing pricing were disposable income, real interest rate after tax, real household debt, housing turnover and housing stock. The study further concludes that there is a positive association between housing prices and household debt, housing turn over and real disposable income but housing price was found to have negative association with real interest rate after tax.

The study concludes that the changes in housing prices are positively and significantly related to the long-term evolution of mortgage credit. This result suggests that the evolution of housing prices is not triggered by bank mortgage lending and that banks just accommodate

mortgage financing to the evolution of house prices. Though the study shows a bi-directional causality it concludes that the mortgage market does not really affect housing price changes rather changes in housing prices do affect the amount of mortgage outstanding debt.

5.3 Policy recommendations

From the findings and conclusion the study recommends that in order to maintain the prices of housing at relatively stable levels there is a need for the players in the industry to control various factors that affect housing prices which include disposable income, real interest rate after tax, real household debt, housing turnover and housing stock. The government should normalize the functioning of the entire financial market by taking actions to return mortgage rates to what they would otherwise be if the mortgage market were functioning normally. The CBK should consider exploring more prescriptive rules which would set some minimum standards for mortgage loans in terms of both loan to value and payment to income. Additionally, control standards could be set which would ensure a uniform calculation and disclosure of terms and conditions, rates, fees and charges on properties in Kenya which would stabilize the housing market.

Some of the special characteristics of the housing market that set it apart from other asset markets like a prevalence of small investors, the absence of derivatives and short-selling, the heterogeneity and indivisibility of the traded asset, and low transaction frequency tend to create some degree of inertia in price movements and to exacerbate informational problems. They may also make it easier for prices to be driven by expectations that depart from fundamentals. Several studies have documented a tendency of house price expectations to be of the extrapolative kind. For these reasons, supervisory authorities must continue to ensure that the prudential framework is also resilient, by discouraging excessive risk-taking on the part of lenders and monitoring the possible emergence of financial fragilities in balance sheets in situations where asset prices may be subject to large corrections.

CBK and other interested parties should be encouraged to collect and publish regular mortgage market data as well as house prices data. This would be an important instrument for

both market development as well as market monitoring. CBK should take lead in collecting this information and making it available to the market on a regular and timely basis.

5.4 Limitations of the study

The study involved the collection of secondary data from different government and private entities. There being only one private firm that has collected data on house prices made it the only source of the secondary data on house prices. Data from many different entities would have enabled comparison and thus providing strong credibility and confirmation of data accuracy.

There lacked enough local studies on the relationship between the mortgage market and housing prices which is a key sector in the Kenyan financial market. The study relied heavily on international studies which provided insightful data and knowledge on the relationship of the two variables. The Kenyan government should encourage more studies in this direction as the housing market is one of the fastest growing markets as every Kenyan strives to own a home. The mortgage lending banks and firms should be highly involved in such studies.

Due to lack of data from the previous years prior to 2006, the study was only carried out for five years. The available data only cover the five year period which is a relatively short period. Availability of more data would have enabled a broader study which would have been more reliable in making generalization regarding the entire housing market.

5.5 Suggestions for further studies

The area of housing prices and the mortgage market is vast and very little research has been done especially in the Kenyan context. The mortgage lending firms should conduct more studies on this issue which would be advantageous in their strategic plans.

One area of research would be the potential re-design of the fiscal structure and the impacts that this may have on the housing market. The imbalance between supply and demand has led to increasing house prices over the last ten or so years, and a good proportion of potential

first-time buyers are now priced out of the market. Whilst moves to encourage these first-time buyers (such as recent changes to thresholds on stamp duty) may have positive long-term effects in reducing housing wealth inequality across the generations, the short term effects will be continued instability in the housing market until actual policy changes catch-up with expected policy changes.

Future research focusing on specific elements of housing transaction costs such as brokerage fees, search costs and effects of non price factors in mortgage lending will provide findings that will better characterize the role of those particular items of transaction costs in home purchase and mortgage lending.

Area of study would be the effects of land policies in Kenya to the mortgage market. This study would show how old a new land policies were affecting the housing market and would assist in coming up with sound policies to govern land issues.

Additional research is needed to more fully understand the role of regional housing and labor markets in generating regional variations in the mortgage market.

REFERENCES

Abraham, J.M., Hendershott, P.H. (1996), "Bubbles in metropolitan housing markets", *Journal of Housing Research*, Vol. 7 No.2, pp.191-207.

Baddeley, M.C. (2003) Investment: Theories and Analysis, London: Palgrave Macmillan.

Baddeley, M.,.(2005): Housing Bubbles, herds and frenzies: Evidence from British Housing Markets, Gonville & Caius College, Cambridge UK CEPP POLICY BRIEF NO. 02/05, May 2005

Bernanke, B. and M. Gertler (1989), Agency Costs, Net Worth and Business Fluctuations, American Economic Review, 79(1): 14-31.

Boelhouwer, P.J., de Vries, P. (2001), "House price development and the fiscal treatment of home-ownership", *Housing and Urban Development in New Europe*, Polish Academy of Science, Institute of Geography, Warsaw, (Pultusk, 25-06-2001), pp.1-13.

Brissimis, S. N. and T. Vlassopoulos (2009). The Interaction between Mortgages Financing and Housing Prices in Greece. *Journal of Real Estate Economics*, 39, 146.164.

Burnside, Craig, Martin Eichenbaum, and Sergio Rebelo (2011) "Understanding Booms and Busts in Housing Markets," NBER Working Paper 16734 (Cambridge, Massachusetts: National Bureau of Economic Research).

Campbell, J., Shiller, R., 1988a, The dividend-price ratio and expectations of future dividends and discount factors, Review of Financial Studies 1 (3), 195-228.

Campbell, J., Shiller, R., 1988b, Stock prices, earnings and expected dividends, *Journal of Finance* 43 (3), 661-676.

Case, Karl E. and Robert J. Shiller. 1989. "The Efficiency of the Market for Single Family Homes", *American Economic Review* (March 1989), 79(1): 125–37.

Catte . P., Girouard. N., Price. R., and Andre C., (2004): "The contribution of housing markets to cyclical resilience," André *OECD Economic Studies No. 38, 2004/1*

Central Bank of Kenya, World Bank, "Mortgage Finance in Kenya": Survey Analysis, October 2010

Central Bank of Kenya, FSD Kenya, FinAccess National Survey, June 2009

Chen, M-C. (1998), "House price dynamics and granger causality: an analysis of Taipei new dwelling market", *Journal of the Asian Real Estate Society*, Vol. 1 No.1, pp.101-26.

Chana T.S. (1984): Nairobi: Dandora and other projects: in low income Housing in the Developing World. *The role os Sites and services and Settlement upgrading.* Edited by Geoffrey K. Payne. John Wiley and Sons Ltd.

Claessens, Stijn, M. Ayhan Kose, and Marco E. Terrones, 2008, "What Happens During Recessions, Crunches and Busts? IMF Working Paper 08/274 (Washington: International Monetary Fund).

Diaz, A., and M. J. Luengo-Prado (2002): Durables and the Wealth Distribution, Manuscript, Universidad Carlos III de Madrid.

DiPasquale, D., Wheaton, W.C. (1994), "Housing market dynamics and the future of housing prices", *Journal of Urban Economics*, Vol. 35 pp.1-27.

Fama, Eugene F. 1970. Efficient Capital Market: *A Review of Theory and empirical Work.. Journal of Finance 25:383-420*

Fitzpatrick, T. and K. McQuinn (2007). House Prices and Mortgage Credit: Empirical Evidence for Ireland. The Manchester School , 75, 82.103.

Gerlach, S. and W. Peng (2003): "Bank lending and property prices in Hong Kong",

Gimeno, R. and C. Martínez Carrascal (2005): "The interaction between house prices and loans for house purchase," mimeograph.

Gimeno, R. and C.Martínez-Carrascal (2010). "The relationship between house prices and house purchase loans": The Spanish case. *Journal of Banking and Finance,* 34, 1849.1855.

Goldman Sachs, (2007). Global Economics, commodities and Strategy research. Paper No. 181, pp 1-36

Goodman, J.L. Jr (1998), "Aggregation of local housing markets", *Journal of Real Estate Finance and Economics*, Vol. 16 No.1, pp.43-53.

Gordon, Myron J. 1962. The Investment, Financing and Valuation of the Corporation. Homewood, Ill.: Irwin.

Gyourko, Joseph, Christopher Mayer and Todd Sinai. 2006. "*Superstar Cities,"*NBER working paper no. 12355.

Government of Kenya (GOK) (1997) "A Development Strategy For Nairobi Informal Settlements". *Prepared by The Nairobi Informal Settlements Coordination Committee*. Nairobi.

Hass Consult, (2010). The Hass property index: Quarter One Report 2010

Hendry, D. F. (1984). Econometric Modelling of House Prices in the United Kingdom. In Hendry, D. F. and K. F. Wallis (eds.), Econometrics and Quantitative Econometrics, chap. 8, 211.252. Blackwell.

Hofmann, B. (2003). Bank lending and property prices: Some international evidence.

Jorgenson, D.W. (1963), 'Capital Theory and Investment Behaviour', *American Economic Review*, 53, pp. 247-59.

Kiyotaki, N. and J. Moore (1997), "Credit Cycles," *Journal of Political Economy*, 105(2): 211-48.

Macoloo, G., (1994), The changing nature of financing low income urban housing development in Kenya, *Housing Studies, Volume 9, Issue 2, pages 189-281.*

Malpezzi, S. (1999), "A simple error correction model of house prices", *Journal of Housing Economics*, Vol. 8 pp.27-62.

Mayer, Christopher and Todd, Sinai. (2007). "Housing and Behavioral Finance," paper presented at the Federal Reserve Bank of Boston Conference on Behavioral Economics, September 25.

Mayer, Christopher. (2007). Commentary on "Understanding Recent Trends in House Prices and Home Ownership." presented at the Federal Reserve Bank of Kansas City Conference at Jackson Hole, August 31.

Mayer, Christopher, Karen Pence, and Shane Sherlund. 2009. "The Rise in Mortgage Defaults," *Journal of Economic Perspectives*, forthcoming.

Mbogua J.P. and Nganga A.J. (1973): Nairobi-Metropolitan Growth Strategy. Volume 1 Main Report. *The Nairobi Urban Study Group*. Town Planning Department, Nairobi.

Muellbauer, J. & Murphy, A. (1997), 'Booms and Busts in the UK Housing Market', *Economic Journal*, 107(445), pp. 1701-1727.

Murugu, A. N (2003), ' The perceived quality of service in the mortgage sector. The case of HFCK'

Oikarinen, E. (2009). Interaction between housing prices and household borrowing: The Finnish case. *Journal of Banking and Finance*, 33, 747.756.

Pain, N. and Westaway, P. (1997) Modelling structural change in the UK housing market: a comparison of alternative house price models *Economic Modelling*, 14, pp. 587-610.

Rosen, H. S. (1979): "Housing Decisions and the U.S. Income Tax: An Econometric Analysis," *Journal of Public Economics*, pp. 1–24.

Shiller, Robert. 2007. "Understanding Recent Trends in House Prices and Home Ownership." Paper presented at the Federal Reserve Bank of Kansas City Conference at Jackson Hole, August 31.

Nabutola, W. (2004), "Affordable Housing in Kenya": A Case study of Policy on Informal Settlements, Land Administration and Housing Issues in Informal   Environments, 3rd FIG Regional Conference, Jakarta, Indonesia.

World Bank, (2011) "Developing Kenya's Mortgage Market", Policy Research Working Paper, March, 2011.

CEPP Policy brief No. 02/05 pp 3-33 *HKIMR Working Paper No.12/2003* (June 2003), 1–11

APPENDICES

Appendix I: Raw Data

		real house price (PH)	real disposable income (YH)	real interest rate after tax R	real household debt (D)	housing stock (H)	housing turnover(TH)
2006	Q1	15000000	32457	12.1	2500000	10016	7705
	Q2	15405000	32493	12.2	2575000	10517	8090
	Q3	15820935	32561	12.3	2652250	11042	8494
	Q4	16089891	32629	12.5	2731818	11595	8919
2007	Q1	16210000	32698	13.3	2813772	12174	9365
	Q2	16247283	32767	13.5	2898185	12783	9833
	Q3	16284652	32835	14.1	2956149	13422	10325
	Q4	17587424	32904	13.4	3015272	14093	10841
2008	Q1	18300000	32973	13.6	3075577	14798	11383
	Q2	18336600	33376	14.1	3137089	15538	11952
	Q3	18373273	33449	14.4	3199831	16315	12550
	Q4	18410020	33523	14.0	3263827	17131	13177
2009	Q1	18630940	33597	13.7	3329104	17473	13441
	Q2	20433480	33671	14.0	3428977	17823	13710
	Q3	19996447	33745	14.3	3531846	18179	13984
	Q4	20036440	33819	14.1	3637802	18543	14264
2010	Q1	20927083	33893	14.2	3746936	18913	14549
	Q2	20836364	33968	14.3	3859344	19292	14840
	Q3	20878037	34043	14.4	3975124	19678	15137
	Q4	20919793	34435	14.6	4000000	20032	15409