DETERMINANTS OF DEMAND FOR MORTGAGE FINANCE

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Abstract

The main objective of this study was to ascertain the main determinants of demand for mortgage finance in order to solve the problem of less than desired uptake of mortgage finance. The study was guided by the following specific objectives: to determine whether personal disposable income determines demand for mortgage finance, to determine whether interest rates determines demand for mortgage finance and to determine whether price of housing determines demand for mortgage finance. Mortgage penetration in the Kenyan market remains low, currently standing at 4.3% of the GDP compared to developed nations, which usually are above 50%. Recently, the demand for mortgaged financed housing in Kenya has risen steadily. If we are to see the uptake of mortgages increase from 22,000 as per the last official figures to 100,000 World Bank (2011), we need to focus on several aspects. Today, the funding of mortgages is done primarily through bank deposits making the industry vulnerable to shifts in short-term market liquidity. The impact of this cannot be underestimated with the interest rates in the market moving in October 2011 from an average of 14% to 24 % leaving many mortgage takers in distress after their mortgage payments doubled. Although this position has improved slightly, we require a long term and sustainable solution to funding of mortgages to give a lasting solution to this challenge. This study targeted secondary data from the Kenya National Bureau of Statistics, Central Bank of Kenya annual bank survey. Data was analyzed using E views version 6. The study established that there is a strong relationship between demand for mortgage finance and price of housing, interest rates and disposable income. Therefore there is

reason to ascertain the determinants of demand for mortgage finance. The study further revealed that affordable home ownership is still a pipe dream for most Kenyans. The high land prices and high cost of infrastructure coupled with the high initial capital requirements and relatively low income levels keep most homes out of reach for most Kenyans. The study recommended a number of policies including government intervention and flexibility of financial institutions to accommodate more customer needs hence increasing mortgage uptake.

Keywords: Mortgage finance, personal disposable income, interest rate, price of housing

INTRODUCTION

The African continent is experiencing an economic boom. Alongside the strong economic growth rates registered in the past decades, empirical evidence has shown that the African middle class has been growing too. According to recent research by the African Development Bank, the continent's middle class has reached 34.3% of the population in 2010, up from 26.2% in 1980 AfDB (2011). In Kenya, the middle class composes 44.9% of the population. This phenomenon has been accompanied by rapid urbanisation and strong growth in consumption expenditure and demand for certain types of goods and services. Housing demand has not, and will not, remain unaffected by these changes. As the middle class grows, so do cities which today host one out of four Africans.

UN-Habitat estimates that African cities become home to over 40,000 people every day UN-Habitat (2011). Most of the world's largest cities with population growth rates above 5% are in Africa. Such trends forebear immense strains on affordable urban housing, and exert a strong push on its demand.

Across the continent, housing is more than often divided in between the formal-built and the informal-built types. The former is the focus on this study, and refers to housing units built by developers, on serviced land, with property titles. The latter usually refers to housing built by individuals, often in an incremental manner, on land which is not always serviced and where titles are not always available. One third of the houses in Kenya were inherited and only 1.5% of house owners acquired it through credit Hass Consult (2012).

Price-wise, according to the Centre for Affordable Housing Finance in Africa, the cheapest new-built in Kenya costs USD 22,350 in 2012, with prices being much higher in Nairobi and other large cities. Continent-wise, a developer's survey ran by the Center for Affordable Housing Finance in Africa suggested that house prices range from USD 10,000 in Mali to over USD 100,000 in the Gambia, or even over USD 200,000 in Kinshasa, DRC CAHF

(2012). This only adds to the fact that it may be cheaper in the long-run to build houses in Kenya.

Statement of the problem

Whereas there various factors that affect mortgage demand it is not clear how these affect the demand in Kenya. This is because existing literature is commodity as to how the various factors affect mortgage demand. In the last few years the demand for properties built for the residential property market in Kenya has increased to a record high, this being very evident from the rise in supply to meet this high demand. However, the high end market seems to be able to have easier access to finances to purchase these properties owing to the fact that they are wealthy. The middle class has the desire to own a home but little or no access to the finances to do so. Mortgage finance is one of the financial devices that make it easy for buyers to purchase properties. So the question would be, how many people can access mortgage financing? What is needed to access mortgage financing? Financial institutions have set up mortgage loan departments which provide loans upon demand for as low as 12.3% interest per annum. This therefore confirms that supply is not a problem but demand is. Mortgage finance is readily available from housing finance institutions, commercial banks and Savings and Credit Cooperative Societies but there aren't enough customers to take up the loans. This study was intended to bring to light the factors behind acquiring mortgage finance and whether financial institutions and the government can work around them in order to increase uptake of mortgage finance. This increase will lead to overall increase in home-owning Kenyans. Several factors have been mentioned in previous studies that determine this demand such as availability and prices of rental housing, cost of acquiring a new home, age, gender, ontological security, personal income and availability of mortgage loans. This study explored the role of several factors that have contributed to the demand for these properties.

Objectives of the study

General objective

To evaluate the major determinants of demand for mortgage finance.

Specific objectives

i. To determine the effect of mortgage lending interest rate on demand for mortgage finance.
ii. To determine the effect of levels of personal income on demand for mortgage finance.
iii. To establish the effect of credit risk on demand for mortgage finance.

Research questions

i. What is the effect of lending interest rates on demand for mortgage finance?

ii. What is the effect of level of personal income on demand for mortgage finance?

iii. What is the effect of credit risk on demand for mortgage finance?

Justification of the study

It is expected that this study will add to the body of knowledge in existence in the property market which will be beneficial to academicians. It will also provide a basis for further research in the field. Thus it will make a contribution to the literature on determinants of demand for mortgage finance. Investors seeking to join or expand in the real estate sector will be able to make informed evaluation as to what is driving the changes in demand for housing and thus be able to make sound decisions. Individuals seeking to own their own homes will also benefit in understanding the market forces and make the best buy. Financing institutions will find this study useful in regard to shifts in housing demand since this affects the long term evolution of real estate financing. The government and regulatory bodies will benefit in knowing how government policies on issues like taxation affect the sector and hence formulate appropriate regulatory framework for enhancing the growth of the sector

Scope of the study

This study used secondary data obtained from the Central Bank of Kenya annual survey to present a model for Kenya's demand for mortgage finance function, with an aim of generating a better understanding of the factors that determine its demand in Kenya both in the short run and in the long run. The model is estimated over the period 2011– 2015.Annual data from 2011 to 2015 levels of income, mortgage lending interest rate, and credit risk is used to estimate the model.

LITERATURE REVIEW

Theoretical literature

Theory of Demand

Classical economics presents a relatively static model of the interactions among price, supply and demand. Demand refers to the quantity of a commodity that consumers are willing and able to purchase at any given price over a period of time. Economic theory holds that demand consists of two factors: *taste* and *ability to buy*. Taste, which is the desire for a good, determines the willingness to buy the good at a specific price. Ability to buy means that to buy a good at specific price, an individual must possess sufficient wealth or income. Both factors of demand

depend on the market price. When the market price for a product is high, the demand will be low. When price is low, demand is high. At very low prices, many consumers will be able to purchase a product.

However, people usually want only so much of a good. Acquiring additional increments of a good or service in some time period will yield less and less satisfaction. As a result, the demand for a product at low prices is limited by *taste* and is not infinite even when the price equals zero. As the price increases, the same amount of money will purchase fewer products. When the price for a product is very high, the demand will decrease because, while consumers may wish to purchase a product very much, they are limited by their *ability to buy* Whelan and Msefer (1994).

The curve below shows a generalized relationship between the price of a good and the quantity which consumers are willing to purchase in a given time period.
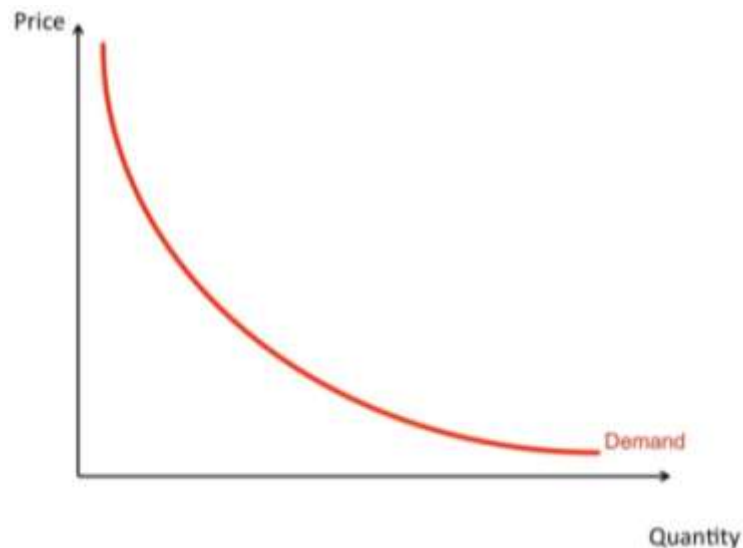

Figure 1. Demand Curve

Theory of Supply

Supply on the other hand is the quantity of a given commodity that a producer is willing to sell at a given price over a specific time period. Supply differs from "existing stock" or the "amount available" in that it is concerned with amounts actually brought to the market. At higher prices, more of the commodity will be available to the buyers. This is because the suppliers will be able to maintain a profit despite the higher costs of production that may result from short-term expansion of their capacity.

Whelan and Msefer (1994) postulate that supply is defined as how much of a good or service is offered at each price. When price increases, the willingness and ability of sellers to

offer goods will increase. In a real market, when the inventory is less than the desired inventory, manufacturers will raise both the supply of their product and its price. The short-term increase in supply causes manufacturing costs to rise, leading to a further increase in price. The price change in turn increases the desired rate of production. A similar effect occurs if inventory is too high. Classical economic theory has approximated this complicated process through the supply curve.

The supply curve shown below slopes upward because each additional unit is assumed to be more difficult or expensive to make than the previous one, therefore requires a higher price to justify its production.
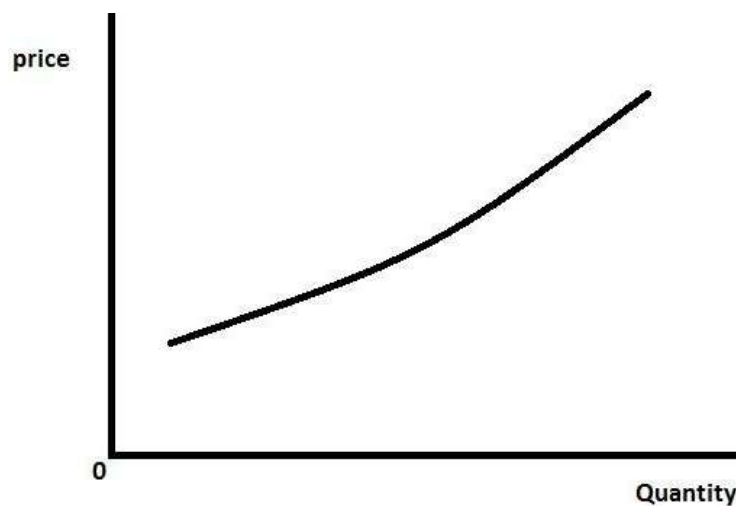

Figure 2. Supply Curve

At high prices, there is more incentive to increase production of a good. This graph represents the short-term approximation of classical economic theory.

Prospect Theory

The prospect theory states that people value gains and losses differently and as such will base decisions on perceived gains rather than losses. Value is assigned to gains and losses rather than to final assets, and probabilities are replaced by decision weights. In particular, people underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty. In addition, the value function is normally concave for gains, convex for losses depicting diminishing marginal value and is generally steeper for losses than for gains. Decision weights are generally lower than the corresponding probabilities for events which are most probable but higher for those that are less probable (Kahneman & Tversky, 1979).

Thus a house seller with a potential loss would be expected to set a higher reservation price than one with a prospective gain. Examining seller behaviour in Boston housing found evidence that loss aversion explained the behaviour of condominium sellers in their choices of asking prices and in their decisions as to whether to accept an offer or not (Genesove & Mayer, 2001).

User Cost Model

According to the User Cost model, to a homeowner, the cost of using and owning one unit of housing in a given period is the user cost. The cost is made up of the opportunity cost (forgone after-tax returns of housing equity on alternative assets), out of pocket expenses (mortgage interest payments, maintenances, taxes etc.) and value variation (depreciation and capital losses). When the user cost of owner- occupied housing is lower than rental price, households would prefer to purchase houses instead of renting and liquidity constraints are likely to be the main deterrence from home ownership (Rosen, 1979).

Efficient Market Hypothesis

The State of the economy is influenced by various forces and the capital market is no exception. Efficiency of the market generates fast responses to the economic factors that surround any investment. Furthermore, market players are increasingly focusing on the real estate industry as the safe mode of investment.

Fama (1991) observed that a market is efficient if it adjusts rapidly to fully reflect all available information, processes the information rationally in that the information is not ignored and systematic errors are not made. In an efficient market, information is quickly reflected in the market prices hence giving no opportunity for abnormal profits. In our context, it means that the values of real estate and the growth in the sector will be a perfect reflection of all the information available at any one time.

Empirical Literature

AfDB (2013) examined the real estate market in Kenya in 5 dimensions. These are: the gap between supply and demand, access to finance, construction technologies and related costs, capacity to develop real estate and land infrastructure, properties and infrastructure above ground. The analysis highlighted the main impediments that explain the dynamics of housing and provided a background on which it is possible to frame the participation of the private sector in the sector. From this, the main conclusions and recommendations include:

Use of alternative construction solutions: the market must be educated to accept different construction solutions that are more suitable for costs to reach medium / low income

segments. For example, more investment in prefabricated homes can be more profitable and drastically reduce construction time.

Support of local government: to allow the effective provision of external infrastructures and services (for example, the development of basic infrastructure, water and sanitation, etc.) Necessary to support real estate development.

Adequate financing system to facilitate the supply of mortgage loans: the banking system is not yet able to offer the long-term financing necessary for the housing sector. In addition to providing long-term loans, alternative financing schemes such as "urban leasing" agreements could be implemented in collaboration with local financial institutions, for example.

Capacity building of the local bank: strengthening mortgage underwriting skills and stimulating competition in the sector. This should also include microfinance providers with products suitable for the housing sector, especially given the role that these institutions can play with respect to home loans. A key challenge is the banking activity of those working in the informal sector.

Provision of capital for developers: this will limit the excessive debt of real estate development debt. Private equity funds can be an interesting way to go.

Technical assistance: both developers and contractors will increase their ability to provide housing units in larger quantities in order to benefit from economies of scale.

During the 2008–2010 global property meltdown, Kenya was warned it was facing similar dire straits but these predictions never scared off investors. However, the Kenyan property market continued to thrive on low interest rates. In 2011, there were again predictions by financial analysts that there was a looming property bust in Kenya and therefore the likelihood of slowdown in the sector. This was because in 2011 and beginning of 2012, interest rates had increased from a low of 14% to more than 24%. This time most real-estate players were in agreement that the boom time in the sector was over and hard times beckoned, courtesy of the high interest rates.

According to a report by Hassconsult (2012) the overall sales asking prices rose by 5.1 per cent in September 2012. This was seen with the sharpest increase rise in prices being for apartments. This is up by 3.6 per cent on the previous quarter. The stand-alone houses prices went up by 3.4 per cent. Price rises were more moderate for town houses. This is as a result of mortgages becoming more affordable with the interest rates from most financial institutions falling from about 24% to 19% and 18%. This increased buying has also offered relief for developers, many of whom were becoming seriously stretched. The return to more normal levels of buying has come as a return to life for the sector Hassconsult (2012)

According to Reader (2011) the effects of road construction on property values is great. Both in the positive and the negative, road construction can have a large effect on property values. For this reason road construction is often very controversial and politically charged. Another study done by Casey (2001) found out the following impacts of highways on property values: That these highways provide substantial benefits to highway users, in terms of reduction in travel time, increased access to outlying locations and reduction in vehicle operating costs. Secondly, these access benefits accrue to property owners in the form of aggregate increases in property values.

The road construction can also have a negative impact on property values. This effect, according to Casey (2012) was seen on single family residences. The key factor here is the increasing volume of traffic, leading to environmental pollution. It has however positive impact on multifamily residential and commercial properties, where proximity to the road is one of the most important factors.

According to World Bank, (2011), Kenya's real estate finance system has grown rapidly in recent years both in terms of loan value and loan amount. The market has gone through the initial phase of "germination" and enters its next phase of development. Now the requirements must be considered to ensure continued growth. The mortgage market is the third most developed in sub-Saharan Africa with a mortgage equivalent of 2.5% of Kenya's GDP. Only Namibia and South Africa have a higher ranking, with Botswana slightly smaller.

Mortgage financing is one of the key issues that must be addressed on the road to mortgage market development. The lenders have described this as the biggest obstacle to market development. The major banks began to have liquidity constraints and had to face the maturity mismatch caused by long-term loans. Kenya benefits from a large investor base that comes from its well-developed sector of pensions, insurance and mutual funds. Companies are increasingly turning to capital markets for capital and debt financing. More recently, the major banks have turned to the markets (World Bank, 2011).

In Kenya, some of the mortgage lenders have designed mortgage products that would encourage Kenyans to save from the early years of employment with a view of accumulating enough savings that would enable them mobilize the mortgage finance Housing Finance (2011). The Retirement Benefits Regulations (2009) provides for policies that would entice Kenyans to access mortgage finance. Such policies include the use of accumulated pension funds to act as security for mortgage borrowing. According to Nabutola (2004), by its nature, housing in Kenya represents major investment requiring substantial capital outlay. In the majority of housing projects, the developer whether as a corporate or an individual has to borrow. The main constraints to affordable housing in the urban areas are: land, finance, building materials and

regulatory framework. For someone to qualify for mortgage finance the following criteria is considered; high eligibility criteria, proof of adequate and dependable income, requirement for provision of marketable satisfactory collateral with proof of ownership, predetermined payment periods and amounts.

Himmelberg, Mayer and Sinai (2005) assessed the high prices of housing in the United States and concluded that conventional metrics such as the rate of house price growth, the price-rent ratio and the price / income ratio can be misleading because they do not take into account the time series of real long-term interest rates. Long-term and predictable differences in long-term growth rates of housing prices in local markets. These factors are particularly important in recent years because house prices are theoretically more sensitive to interest rates when rates are already low and even more sensitive in cities where the rate of long-term housing price growth is high.

Home ownership

Home ownership is a form of ownership of a house in which a person, called occupant of the owner, occupant of the owner or owner of the house, owns the house in which he lives. This house can be a house, an apartment, a condominium or a housing cooperative. In addition to providing accommodation, the owner's occupation also functions as a property investment. It is an American concept that emanated in the1940s Chevan (1989). The proportion of Americans owning their homes nearly doubled in the period between 1940 and 1980. Carliner (1974) He suggested that the decision to own or rent a family depends on four factors: household income, the relative price of renting and housing occupied by the owners, the stability of the demand for family housing and the type of accommodation desired. Income can be measured directly. The relative price of housing occupied by the owner depends on the rates of income tax and the conditions of the loan, which at any time are functions of family income. Therefore, its effect on property rates can not be measured in a cross-cutting analysis that is independent of the effect of income. However, they change over time regardless of income. The stability of housing demand in a home can not be directly observed. However, differences in this stability partly explain why different ages and marital groups have different rates of ownership. The more often a family expects to move, the less likely it is to buy. The fixed costs of buying and selling houses, both in terms of time and money, make it inconvenient to own if the house is expected to move within a few years. The home will have this expectation if it anticipates a change in its size, income, work, marital status or tastes in the near future. The final factor determining property rates is the family's preference for apartments or single-family homes. Although the

choice between single-family and multi-family structures affects the choice of possession, the rent and stay in apartments are not equivalent Carliner (1974).

Quigley and Raphael (2004) published in the journal Economic Perspectives an article entitled "Housing is not convenient? Why is it not cheaper?" In the article, they postulated that the concern of public opinion regarding the accessibility of housing comes from two factors: First, housing is the largest item of expenditure in the budgets of most households and individuals. A quarter of income for housing costs, while poor and poor families usually spend half of their income in housing. These high proportions suggest that small percentage changes in house prices and rents will have a major impact on non-residential consumption and household welfare. Secondly, many large metropolitan areas in the United States have experienced recent and well-publicized increases in house prices and rents for two thirds of US households owning homes, there is little evidence that housing has become less affordable in recent years. For a third of US families. Who are the tenants, the percentage of income that the average tenant devotes to housing has increased only modestly.

According to Rossi and Weber (1996) owning a home is more characteristic of married-adult household with several earners and with householders who are not migrants from another region. The study strongly relates home ownership to age and socioeconomic status. For all household, ownership starts at 30 percent for householders under 31 years age, peaks at 76.7 percent among those 61-70 and then declines slightly to 68.5 percent for those71 and over. Boddy, (1975) wrote on the structure of mortgage finance in UK. Building society finance played a major part in the economic recovery after the 1930s by financing house purchase and thus stimulating residential construction and boosting effective demand.

Grange and Pretorius, (1999) studied trends to home-ownership in Hong Kong. They suggested that despite clear and severe affordability constraints, private decisions to own a home were motivated primarily by investment/strategic considerations; in particular, exceptionally higher turns on housing investment, but also as an important vehicle for retirement savings, further encouraged by the favourable user cost of housing capital. This does not entirely remove the question of causality, however: the fact that families have often made quite extra ordinary investment returns on homes is not evidence that this motivated them to buy—families may have bought homes for the ontological security it provided, and high returns may have been coincidental. Yet several further factors suggest that this is not so.

Households in the public sector have not systematically availed themselves of opportunities to buy homes, despite the fact that many public tenants have relatively high incomes, and could have afforded it to a greater extent than it occurred.

RESEARCH METHODOLOGY

Research Design

Research design refers to the structure, or approach used in a research in order to achieve the desired research objectives. This study analyzed the relationship between demand for mortgage finance, mortgage lending interest rates and negative economic factors that affect borrowing across 30 banks for the period 2011 to 2016. Panel data regression technique which involves combination of both cross sectional and time series data was used in this research study. Further, the study involved using quantitative data obtained from the CBK annual survey on banks. Quantitative research method involves a numeric or statistical approach to research design.

Data and Variables Considered

The research investigated the 30 mortgage lending banks for the period 2011 to 2016.This was due to availability of data for analysis for the chosen variables. The data set was annually based and variables under consideration are based on theoretical postulations and authentic empirical supports. To find out those fundamental factors that define observed differences among the 30 banks, the following variables and proxy variables were used: Total number of mortgage accounts (TMA) as a proxy for demand for mortgage finance, mortgage lending interest rate (IR) and non-performing loan mortgage accounts (NPMA) as a proxy for mortgage borrowing obstacles (levels of income and credit risk). It is worth noting that the proxies chosen are due to availability of data for most of the banks. Balanced panel data analysis approach was used in the analysis.

Target Population

The study was carried out for 30 Kenyan banks offering mortgage finance. The banks are listed on appendix 1. The target population was chosen as to help show the real practical situation, to provide comparisons that exist within the 30 banks and help to answer such questions as: which set of variables significantly influence the borrowing of mortgage loans.

Sample and Sampling Technique.

Sample size was the 30 banks selected by simple random sampling because of heterogeneity i.e. it is one of the regional integrations that exist in Africa and also based on the availability of data for the study.

Research Instruments and Data Collection

The research involved panel regression study and used secondary annual data from the Central Bank of Kenya annual banks survey. The data was analyzed and conclusions drawn regarding the mortgage sector performance. This was due to the fact that the objective of the study was to examine the effects of interest rates on mortgages and the negative economic factors influencing mortgage debt on mortgage demand finance.

This research involved the use of secondary data. Annual data on total number of mortgage accounts (TMA), mortgage lending interest rate (IR) and non-performing loan mortgage accounts (NPMA) were obtained from the Central Bank of Kenya annual banks survey for the period 2011 to 2015. This was processed in E-views for further analysis.

Data Analysis methods

The data collected was analyzed with the use of E-views software. Balanced panel data analysis which involves estimating Pooled regression model and Random Effects Model were used to investigate the existing relationship among variables. Tables and graphs were used in presentation of the data. The outcomes were interpreted and elaborated guided by the objectives of the research study to ensure that the research met the set objective.

RESULTS AND DISCUSSION

Descriptive Analysis

Table 1: Individual Sample Descriptive Statistics

	TMA	IR	NPMA
Mean	674.7600	20.38667	40.23333
Median	170.5000	21.65000	7.000000
Maximum	7007.000	26.70000	594.0000
Minimum	1.000000	13.00000	0.000000
Std. Dev.	1369.904	3.954416	99.15579
Skewness	3.088769	-0.531612	3.880226
Kurtosis	11.78298	1.933243	18.41648
Jarque-Bera	720.6424	14.17760	1861.829
Probability	0.000000	0.000834	0.000000
Sum	101214.0	3058.000	6035.000
Sum Sq. Dev.	2.80E+08	2329.973	1464949.
Observations	180	180	180

Where TMA in table 1 denotes the total number of active mortgage accounts , IR denotes the mortgage lending interest rates and NPMA denotes the non-performing loan mortgage accounts.

Table 1 depicts individual variable descriptive statistics for the Kenyan banks. According to the table, The total number of active mortgage accounts is an average of 674 accounts. The maximum number of accounts was 7007 held by KCB bank in 2015 while the minimum was 1 held Victoria Commercial Bank. Median number of mortgage accounts is 170. Following the standard rule of skewness i.e if it falls between -0.5 and 0.5 the the data are approximately symmetric, if it is between (1 and 0.5) it is moderately inclined to the right, between (-1 and -0.5) is moderately skewed to the left, -1 or 1 being highly skewed to the left and highly skewed to the right respectively. TMA had a symmetry of 3.08 around its mean (which is beyond 1) meaning that it is highly skewed to the right with kurtosis (peakedness) of 11.78.It's JB probability (720.6 which is greater than 0.05) is an indication that TMA is normally distributed.

According to the same table 1, IR was found to have an average of 20.38% in the region.The maximum was 26.7% by Transnational bank while the Barclays bank was lending at a minimum of 13%. Median of IR was 21.65%, standard deviation or spread of IR was 3.95. Further, IR accross the banks was moderately skewed to the left (-0.53) with kurtosis of 1.93 indicating that the distribution was clustered around the mean and is normally distributed (it's JB value of 14.18 is more than 5%). The same table depicts that 180 observations were analyzed. Further,the non-performing loan mortgage accounts (NPMA) had a mean of 40.2 accross the banks, and a median of 7. Housing Finance Corporation had maximum NPMA of 594 while 13 banks had a minimum of 0. The standard deviation which measures spread was 99.15. NPMA was moderately skewed to the right (3.88) with kurtosis of 18.41 which is greater than 3 implying that that the distribution is leptokurtic.It's Jarque-Bera probalility value of 1861 which is greater than 0.05 is also an indication that the distribution is normally distributed.

Correlation Analysis

Table 2: Correlational Matrix.

	TMA	IR	NPMA
TMA	1.000000		
IR	-0.460592	1.000000	
NPMA	0.915168	-0.345592	1.000000

Table 2 is important as it shows the strength of association between variables. It shows

correlation of variables that will be regressed (Empirical specification). Two independent variables with a high correlation of above 0.75 is an indication that the variables are closely linked and may cause multicolinearity problems if they are regressed in the same model. According to table 2, the highest correlation that exists is between NPMA and TMA which is 0.91, however the variables are independent and dependent respectively therefore no multicolinearity problems.

Panel Regression

Balanced panel data regression was carried out. Both REM and PRM which are methods for panel data analysis were regressed. Random effects model posits that the bank-specific effects (random effects) are uncorrelated with the explanatory variables. On the other hand, the pooled regression model   estimates were calculated from each bank across time. Table 3 and table 4 show the summary of the estimated regression results.

Random Effects Model versus Pooled Regression Model

Table 3: Regression Results for REM

Dependent Variable: TMA
Method: Panel EGLS (Cross-section random effects)
Date: 09/06/17   Time: 00:31
Sample: 2011 2016
Periods included: 6
Cross-sections included: 30
Total panel (balanced) observations: 180
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2349.364	454.3983	5.170274	0.0000
IR	-96.50281	21.65103	-4.457192	0.0000
NPMA	7.276726	0.545779	13.33274	0.0000
	Effects Specification			
		S.D.	Rho	
Cross-section random		446.3944	0.8199	
Idiosyncratic random		209.1845	0.1801	

Weighted Statistics				Table 3...
R-squared	0.549298	Mean dependent var	138.4018	
Adjusted R-squared	0.543166	S.D. dependent var	354.3046	
S.E. of regression	239.4728	Sum squared resid	8430040.	
F-statistic	89.57882	Durbin-Watson stat	1.345762	
Prob(F-statistic)	0.000000			

Unweighted Statistics			
R-squared	0.764226	Mean dependent var	674.7600
Sum squared resid	65926815	Durbin-Watson stat	0.457427

Table 4: Regression Results for PRM

Dependent Variable: TMA

Method: Panel Least Squares

Date: 09/06/17   Time: 00:17

Sample: 2011 2016

Periods included: 6

Cross-sections included: 30

Total panel (balanced) observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1355.022	241.8484	5.602772	0.0000
IR	-56.77607	11.34454	-5.004706	0.0000
NPMA	11.86114	0.452430	26.21654	0.0000

R-squared	0.861185	Mean dependent var	674.7600
Adjusted R-squared	0.859296	S.D. dependent var	1369.904
S.E. of regression	513.8582	Akaike info criterion	15.34157
Sum squared resid	38815389	Schwarz criterion	15.40178
Log likelihood	-1147.618	Hannan-Quinn criter.	15.36603
F-statistic	455.9802	Durbin-Watson stat	0.719836
Prob(F-statistic)	0.000000		

According to Table 3, to find out the determinants for demand for mortgage finance, random effects model comprising of (TMA, IR and NPMA) was regressed. Random effects Model

generated from the estimation depicted a positive relationship between TMA and the independent variable NPM. However IR was found to be negative with coefficient of -96.5 and significant in influencing TMA. This means that when IR increases by 1 unit, number of residential houses bought drop by 96 units. R squared for the model was 54.9% meaning the variables in the model explain only 54.9% of the variations in demand for mortgage finance and 45.1% are unexplained by the model. Durbin Watson of 1.3 < 2.5 also implies that the random effects model has no autocorrelation.

As shown in Table 4, the Pooled Regression estimation for the model showed constant term (c) and NPMA to be positive. IR had a negative coefficient of -56.8. This implies that a unit change in lending interest rate will cause a decrease in demand for housing of 56 units. It's worth noting that the pooled regression model had an R squared of 86.1% which is more than the r squared for the random effects model. The adjusted R squared (0.859) for the PRM was also greater than the adjusted r squared for REM (0.543). DW for the pooled regression model was 0.71 < 2.5 hence still there was no serial correlation. From the pooled regression model results, we can deduce that it is a better fit compared to the random effects model since 86.1% of the variations in TMA are explained by the independent variables in the model, only 13.9% are unexplained.

CONCLUSION AND RECOMMENDATIONS

The problem with this study was to determine the determinants of mortgage financing demand and how more middle income Kenyans would access mortgage finance. Access to decent and affordable homes has been identified as one of the social pillars of economic growth. The study therefore to establish secondary options for home ownership and how to undercut the current challenges. In this regard, the main objective of the study was to examine the determinants of mortgage finance in Kenya for the period 2011 to 2016 by means of Panel Regression Model using yearly data for a period of 6 years. In order to achieve the main stated objective, the following research questions were tested:

i.   What is the effect of the active interest rates on the mortgage loan application?

ii. What is the effect of the level of personal income on the demand for mortgage financing?

iii. What is the effect of credit risk on the mortgage loan application?

The current interest rates are high making mortgage payments twice as expensive as renting the same properties. On the investor's side, the total returns on a mortgage buy are less the cost of the mortgage. This in turn has caused mortgage financed houses to Earn at current

prices, even when they are rented. Without urgent financial intervention, the scarcity of affordable housing will worsen and home ownership will remain a "dream" for many Kenyans Despite having about 32 mortgage lenders in the market in a country of 43 million people, we have only about 121,440 mortgages. The demand for mortgages is still relatively low because Kenya is an economy based on agriculture and most of the rural citizens live in their own homes. It is also important to take into account high interest rates, which discourage potential lenders. The high interest rates in the market have become the biggest obstacle to home ownership with commercial banks offering mortgages at an average rate of 20.6%, the most expensive with 26.7% and the cheapest with 13.0%. Initial costs expensive during recruitment a mortgage is also a hindrance.

Policy Recommendations

The study would like to recommend that an acceptable property Index in Kenya be established, as it would be key to the development of the mortgage financing market, as well as to broaden the scope of pension plans in promoting the development of the mortgage projects. Studies should also be done to establish the factors, which influence the policy implementation towards mortgage interest rates. Banks ought to be open and willing to help researchers in the study of such crucial topics as well as aid in data collection as they will benefit from the findings of such involving studies. From the study, banks or real estate financiers should also be willing to find an avenue to encourage citizens to undertake mortgage either by lowering the rates and offering user friendly rates and promotions towards people intending to acquire such mortgages. Banks and real estate financiers should also undertake social responsibility activities to enlighten the society on the mortgage facilities available and which facilities would be suitable to mortgage beneficiaries. Financial institutions must examine all the four factors and strive towards making their money affordable to homeowners. The government can strive to ensure investors in housing enjoy mortgage relief and proper market information dissemination especially on interest rates and property prices. This may be achieved through development of a property price index to provide the investors with knowledge on anticipated returns on investment and interest rate capture mechanism in the market.

Financiers should find ways of making the process of acquiring mortgage finance less cumbersome at the point of receiving credit applications. Most times the customer is taken through a long protracted process to provide documentation which seems as though the financier disproves everything that the customer says. The process is not standard and neither is the documentation requested standard, at this stage it appears to be analysis paralysis. When finally the customer gets the facility, the security perfection process is long and protracted.

The government needs to encourage home buyers by subsidizing costs of housing for its employees. They can also offer tax breaks to home owners at the point of income deductions making it favourable for buyers to service their loans. The government can also play a big role in sensitizing private sector employers to partner with financiers to offer mortgage loans at a lower rate.

Avenues and incentives can be provided for private sector involvement in the provision of affordable quality houses. More housing could be built in areas where land prices remain affordable. This will in turn reduce the cost of acquiring the houses

The central bank in conjunction with the government can put stringent measures to ensure that banks do not quote too high mortgage lending rates as stipulated by the central bank.

Areas of Future Research

This research could be extended by further research to investigate possibilities of values of real estate going down and as result the risk of mortgages going 'under water' and Kenya facing the same fate as the USA in the year 2009.

As more time series data become available coupled with structural changes in the economy, one should continue to consider whether there are fundamentally several determining factors in the demand for mortgage financing in Kenya. Future research should take into account modeling with more possible alternative determinants of mortgage demand finance.

APPENDICES

Appendix 1: List of banks

Housing Finance Corporation	Diamond trust Bank
Kenya Commercial Bank	Prime Bank
CFC Stanbic Bank	NIC Bank ltd
Standard Chartered Bank	Guardian Bank
Barclays Bank	Paramount Bank
Equity Bank	Bank of India
National Bank of Kenya	Transnational Bank
Commercial Bank of Africa	Jamii Bora Bank
Consolidated Bank	Victoria Commercial Bank
Development Bank	Oriental Bank
Ecobank ltd	Fidelity Bank
Cooperative Bank of Kenya	Family Bank
I&M Bank	Bank of Baroda
ABC Bank ltd	

Gulf African Bank

Chase Bank

Bank of Africa

Appendix 2: Total Mortgage Accounts per bank

	2011	2012	2013	2014	2015	2016
HFC	4932	5235	5402	5840	5993	6018
KCB	4073	5091	5343	5914	7007	7023
CFC	1210	1340	1441	1678	1684	1691
STANCHART	1251	1480	1385	1652	1885	1897
BARC	939	1021	1064	933	977	984
EQTY	682	702	1091	1351	1684	1697
NBK	154	221	214	404	401	414
CBA	452	516	352	438	465	476
CONSO	302	566	523	299	297	305
DEV BNK	276	579	529	634	513	520
ECOBNK	391	302	254	170	164	169
COOP	289	398	439	483	643	665
I&M	171	293	320	407	366	379
ABC	100	103	137	86	143	151
GULF	95	145	178	109	94	99
CHASE	169	163	156	176	348	418
BOA	39	143	113	116	127	127
BARODA	52	127	54	57	80	96
FAMILY	87	214	71	399	586	654
FIDEL	34	28	19	70	58	58
DTB	35	50	47	60	58	54
PRIME	22	31	36	33	35	35
NIC	37	133	178	188	285	305
GUARD	8	16	19	30	25	22
PARAMNT	40	23	18	26	30	33
BOI	37	38	21	17	20	25
TRANSNT	17	49	18	26	25	25
JAMIIB	158	184	309	277	334	348
VCB	8	7	2	1	2	1
ORIENT	5	5	5	3	2	3

Appendix 3: Number of non-performing loans Mortgage Accounts per bank

	2011	2012	2013	2014	2015	2016
HFC	310	396	594	558	525	538
KCB	204	282	291	300	341	356
CFC	9	24	36	13	97	99
STANCHART	32	30	16	25	24	24
BARC	14	6	13	75	50	59
EQTY	6	10	37	33	48	52
NBK	18	15	44	70	60	65
CBA	11	21	11	84	15	18
CONSO	4	28	36	37	54	67
DEV BNK	9	45	56	80	80	80
ECOBNK	39	30	42	30	22	27
COOP	1	33	50	75	50	50
I&M	0	4	3	8	9	12
ABC	1	10	10	10	8	9
GULF	1	1	4	3	4	4
CHASE	29	17	15	53	15	17
BOA	0	1	5	3	17	19
BARODA	4	4	3	3	2	2
FAMILY	1	3	0	5	19	23
FIDEL	0	1	4	7	9	11
DTB	0	0	0	1	5	7
PRIME	0	0	0	0	0	0
NIC	0	0	2	7	21	26
GUARD	0	0	0	0	0	0
PARAMNT	0	0	0	1	1	1
BOI	0	0	0	0	1	1
TRANS	0	2	3	0	0	0
JAMIIB	70	6	1	44	25	25
VCB	0	0	0	0	0	0
ORIENT	0	0	0	0	0	0

Appendix 4: Average Mortgage lending interest rate

HFC	15.2
KCB	15.9
CFC	14
STANCHART	13.4
BARC	13
EQTY	24
NBK	16
CBA	15.2
CONSO	25
DEV BNK	24
ECOBNK	22.7
COOP	23.9
I&M	14.5
ABC	22
GULF	16.7
CHASE	20
BOA	22
BARODA	21.2
FAMILY	24.5
FIDEL	23.3
DTB	21.6
PRIME	19.9
NIC	21.1
GUARD	23.4
PARAMNT	24
BOI	23
TRANSNT	26.7
JAMIIB	20
VCB	21.7
ORIENT	23.7

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