# EFFECT OF MORTGAGE FINANCING ON PERFORMANCE OF THE RESIDENTIAL REAL ESTATE INDUSTRY IN KENYA

BY

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# DECLARATION

This research project is my original work and it has not been presented and submitted to any in university or college for examination.

Signed… ~~~~~~~~~~~~~~~~ Date. November 23, 2020

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**Reg No: D61/5587/2017**

This research project has been submitted for examination with the authority and approval as the university supervisor.

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# DEDICATION

I dedicate this project to God for His grace during the study period.

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# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF ABBREVIATIONS/ACRONYMS

**ARM** -     Adjustable Rate Mortgage

**CBK** -     Central Bank of Kenya

**GDP** -     Gross Domestic Product

**IMF** -     International Monetary Fund

**NPL** -     Non-Performing Loans

**PIERT** -     Public Interest Economic Regulation Theory

# ABSTRACT

In housing investment, the mortgage loans, and real estate financing issue is of great importance as it plays a vital role in ensuring a transaction is possible and profitable. African economies are waking up to the fact that mortgages are becoming an attainable reality for transformational potential home ownership. Home ownership has become a significant measure of economic health in USA and Australia with almost 63% and 45% of homeowners acquiring their homes through mortgages respectively. This is adequate attestation of the significance mortgage financing plays in developing the real estate sector to be a productive contributor to the national income. The objective of this research was to determine the effect of mortgage financing on the performance of the residential real estate industry in Kenya. It also aimed at reviewing the increasing body of theoretical and empirical studies that have endeavoured to examine the range of magnitude and relations between financing and real estate performance. The target population was all the 42 licensed commercial banks and the sole licensed mortgage housing company. Secondary sources of data were employed. Longitudinal data was utilized, data was collected over a varying time periods the macro-economic phenomena of mortgage financing and performance of the residential real estate industry. The research employed inferential statistics, which included correlation analysis and multiple linear regression analysis so as to establish the effect of mortgage financing on performance of the residential real estate industry. Mortgage financing was disaggregated into the various drivers of mortgage financing which entailed; number of mortgage loan accounts, outstanding mortgage loans amounts, mortgage interest rates, and mortgage risks. The study findings were that only the non-performing mortgages ratio has a significant association with the performance of residential real estate. They have a significant negative association. Additional findings were that mortgage financing does not significantly impact on performance of the residential real estate sector and thus it cannot be utilized to significantly predict performance of the residential real estate sector. Final findings were that no components of mortgage financing had a significant effect on performance of the residential real estate sector. Policy recommendations were made to the National Treasury and the Ministry of Housing and Urban Development to formulate other strategies and policies to enhance the government's affordable housing component of the Big 4 agenda with minimal consideration of mortgage financing. Further recommendations were made to the treasury to regulate the mortgage interest rates so as to enhance the residential real estate performance. Recommendations were made to the real estate practitioners not to concentrate on mortgage financing as the sole financing solution to customers. Recommendations were also made to the commercial bank and mortgage providers not to rely on solely on mortgage financing as the main product offering because other sources of finance are being sought to develop the industry and optimal earnings are not likely to be earned from the product offering. Final recommendations were made to the residential real estate developers to scale up their operations when the mortgage interest rates are low because they are more likely to make more sales.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the Study

In housing investment, the mortgage loans, and real estate financing issue is of great importance as it is plays a vital role in ensuring a transaction possible and profitable. African economies are waking up to the fact that mortgages are becoming an attainable reality for transformational potential home ownership. In many of these economies however, housing finance remains underdeveloped in spite of the appreciation of its social and economic importance (Masika, 2010). The low lending levels shows the small number, which is able to access mortgages due to the simple reason of affordability and availability as stated by Noppen (2012). In a distinct comparison, mortgage lending in developed countries is at an all-time high, to encourage increased home ownership. Continuous efforts are being made to extend mortgage opportunities to the ordinary people (Brueggeman & Fischer, 2008). According to UN-Habitat (2011), home ownership has become a significant measure of economic health in USA and Australia with almost 63% and 45% of homeowners acquiring their homes through mortgages respectively. This is adequate attestation of the significance mortgage financing plays in developing the real estate sector to be a productive contributor to the national income.

This study was founded on two theories, which comprise of the Simulation Theory and the Public Interest Economic Regulation Theory (PIERT). The Simulation Theory, which was proposed by Laibson (1998), investigates the degree that markets are able to help provide housing finance throughout a number of countries. The second theory, which the study was based on, is The Public Interest Economic Regulation Theory (PIERT) introduced by Arrow (1985) which provides a solution to the issue of affordability. The PIERT suggest that the government should intervene in the housing market by ensuring that the housing resources are optimally and efficiently allocated.

The Kenyan housing sector is largely constrained as a result of congestion, overcrowding and space problems (KNBS, 2016). This clearly shows that the real estate market has failed to achieve the anticipated target even though there is demand for mortgage and housing finance. The greater part of the low income earners is preferring staying in the cheaper houses (State Department of Planning, 2016). According to Marcum and Goddard (2012), the Kenyan real

estate sector encountered a greater expansion during the period 2002 to 2007 as the cost of mortgage financing was low during that time worldwide and this encouraged home ownership. The Central Bank of Kenya (CBK) through offering low interest rates was able to promote lending and this made commercial banks to be excited on issuing loans. However, the global financial crisis that had a great impact on the global economy in the year 2007 and 2008 brought this down.

### 1.1.1 Mortgage Financing

Mortgage financing denotes a real estate's loan, and it encompasses that the real estate is held a security of the accrued loan (Xudong, 2008). The notion of mortgage financing involves the procedure through which an individual or an organization purchases a house or a commercial property without having made the total payment upfront. Nevertheless, the purchaser or buyer is required to raise some capital, whereas the funding entity raises a portion of the finance of the planned project (Kuria et al., 2013). Mortgage repayment is the method of paying the loan and it may be via scheduled payments, prepaying though resale, foreclosure or delinquency (Kabiringe, 2006). Mortgage risks on the contrary denotes the likely negative happenings that either or both the borrower and lender are exposed to (Lewis & Neave, 2008).

The government in partnership with the real estate developers have endeavoured to achieve bridging of housing deficits by means of using mortgages in helping in the commencement and development of their projects (Zhu, 2006). More so, potential homeowners through mortgage financing are now having the ability to buy properties by scheduling methods of repayment and on the other hand, the mortgage financing acts as a stream of income for the lenders (Xudong, 2008). In addition, the government is able to generate revenue from interest rates charged on real estate's through taxation of the interest income (Kioko, 2014).

Mortgage financing in this study included aspects such as; number of mortgage loan accounts, outstanding mortgage loans amounts, mortgage interest rates, and mortgage risks. The measure for outstanding mortgage loan amounts is the total value outstanding or the outstanding mortgage loans to the Gross Domestic Product (GDP) ratio for cross country comparisons (Saravanan, 2007). The measure of mortgage risks is the default rate or Credit risk denoted by the loan loss provision coverage ratio (Xudong, 2008).

2

**1.1.2 Performance of the Real Estate Industry**

Real estate comprises of land and all property, which is permanently appended to it consisting of all the immovable for example houses, buildings and natural resources (Brueggeman & Fischer, 2008). According to MBAA (2002), commercial real estate assets are constantly bought, sold, developed, and redeveloped. This makes real estate investment to be among the most lucrative and important business activities. Most of the people nowadays are realising the need of owning homes across the world and others are actually purchasing homes in their early ages as they consider it a valuable investment (Merrill et al., 2006). Nonetheless, the problem of home ownership has been occasioned by shortage of land with people being issued with fake title deeds, and government interference that has seen demolition of people's homes (Messah, 2011). There are a number of factors that determines real estate markets performance and they include; demand for housing, inflation, interest rates, transaction cost not to mention others. Notwithstanding, there other mediating factors for example, personal income, age and other demographic traits if the buyers that to a large extent affect the real estate's market performance (Loyford & Moronge, 2014).

For the overall growth and development of any country, the performance of real estate is of great significance. This is because it adds into creation of employment, growth, and expansion of commercial banking and eventually leads to the capital markets development. Above all, it expands the prosperity of households by offering better shelter and assisting in creation of personal wealth that can be utilized in generation of more wealth. In this manner, the real estate investment gives shelter to people as well as improves the distribution of income through the country by availing employment opportunities (Masika, 2010). With the real estate market having huge transaction numbers and prices in the recent past, it has been found to be of great importance as it has largely impacted the gross domestic product and also have had a positive impact of the economy as a whole (Cazan, 2015).

The real estate market performance is measured by the rate of return from the capital investment needed during the commencement, development and maturing of the estates. This is the tracked price changes of real estate (Onyejiak et al., 2014). Performance measures can also be reaching set targets of housing units needed, which is a function of such factors as the rate of new household's formation, number of obsolete units, and the number of housing units that are required to relieve over- crowding. It can also be measures by housing supply, which

is a function of is, the number of new housing units produced and existing units that have to be rehabilitated or up-graded to acceptable standards so as to be released into the housing market or to be allocated for occupation (Kiriko, 2013).

### 1.1.3 Mortgage Financing and Performance of the Real Estate Industry

With the real estate market having huge transaction numbers and prices in the recent past, it has been found to be of great importance as it has largely impacted the gross domestic product and also have had a positive impact of the economy as a whole. Regardless of this great performance, majority of the real estate projects continue to linger because they fail to attain the expected returns. This is to a large extent due to the huge capital investment that is needed in the commencement, development and the maturing of the estates (Cazan, 2015). Henceforth, the fund sourcing ends up being an achievement to many willing business people. Mortgage financing targets figuring out this funding issue encountered by the real estate market developers, which are as a result of various limitations for example, economic instability and severe measures enforced by majority of financial institutions (Onyejiak et al, 2014). This is through arrangement of mortgage financing, which are to be paid sometime in the future. Okonkwo (1997) affirms one of the vital input required for housing production is finance. Thus, the degree of financing is directly associated with the degree of development of real estate market.

Mortgage financing is a significant enabler of the real estate marker growth whereby homeowners is offered the opportunity to buy real estate properties at affordable prices (Abdelgalil, 2005). Garmaise and Moskowitz (2003) discovered existence of a notable correlation amongst information and the real estate properties prices. Mortgage holders obtain close by properties, maintain a strategic distance from brokers as they are informed parties in sales transactions and furthermore consider their past salary patterns. Choice on the method of funding is incredibly influenced by the information that mortgage holders have.

Mortgage financing therefore is a significant feature of real estate market. It involves the procedure through which an individual or an organization purchases a house or a commercial property without having made the total payment upfront. Because of availability of collateral, many institutions have emerged and still they are emerging in order to offer the mortgage financing services (Kitavi, 2013). One of the essential inputs required for housing production

4

is finance. Thus, the degree of financing is directly associated with the degree of development of real estate market. However, a key challenge is that because of too much reliance on the normal mortgage financing it is proving quite hard in developing and financing large real estate simultaneously (Wambui, 2013).

According to Marcum and Goddard (2012), the Kenyan real estate sector encountered a greater expansion during the period 2002 to 2007 as the cost of mortgage financing was low during that time worldwide and this encouraged home ownership. The CBK through offering low interest rates was able to promote lending and this made commercial banks to be excited on issuing loans. However, the global financial crisis that had a great impact on the global economy in the year 2007 and 2008 brought this down. A crash emerged as investors in real estate industry were left holding properties with no one purchasing them because the interest rates on mortgages were too much high such that it was impossible for people to afford the mortgages as they did before.

### 1.1.4 Residential Real Estate Industry in Kenya

In Kenya, the real estate industry account for 2.5% of the total GDP and it has continued to increase annually at an estimated rate of 34% (World Bank, 2015). This trend has been observed not only in Kenya but also in the globe. For example, in the United Kingdom, the mortgage prices have been on the rise though the buying prices has continued to stagnate at 13% which has implied that it is cost effective compared to renting (Loyford & Moronge, 2014). As indicated by the Hass Consult Property Index and Management (HCPIM) (2013) report, in 2004, the average value of a property was Ksh.8 Million and the same property in the year 2012 was valued at and Ksh.30 Million. This is an indicator of the drastic growth in the real estate industry. This growth in Kenya is favoured by higher returns at a minimum cost (Loyford & Moronge, 2014). The HCPIM (2013) report credits the growth of the real estate sector to the improved regulations by the government as well all the appropriate investment vehicles enriched with capital availability. It further says that this factors have placed Kenya ahead of other as far as property investment is concerned. The stability of the Kenyan economy entices investors besides it having a higher return because of the housing demand being on the rise (Loyford & Moronge, 2014).

Like most of the other developing countries in Africa, Kenya's housing sector has experienced severe housing shortages relative to demand. While demand has been rising consistently over the years, supply has been slow to respond, meeting only approximately between 0.1% and 2.2% of the actual demand (Gachuru, 2005). Since independence, the Kenya government through planned public housing initiatives have put forth attempts to develop houses to increase the supply and manage the shortfall. Consequently, the housing deficit was contained at 60,000 units per year until the 1980's (Chirchir, 2006). Through the years, the deficit has continued to accumulate. Currently, an estimated 750,000 and 1,500,000 households in urban areas and rural areas correspondingly are in need of housing (Republic of Kenya, 2004). The projected present urban housing needs are 150,000 units per year while the production rate of new houses is estimated at only 20,000- 30,000 units annually, meaning there is a housing shortage of over 120,000 units per year.

The main providers of mortgages in Kenya are the Housing Finance (HF) Limited, the Kenya Commercial Bank (KCB), CFC Stanbic Bank, Standard Chartered Bank (SCBK) and the Barclays Bank of Kenya (BBK) Limited. According to the CBK annual reports of 2011 and 2012, Housing Finance (HF) Limited was the mortgage market leader both in terms of value of mortgage loans and number of customers in 2011. In 2012, Housing Finance (HF) maintained the lead in terms of number of mortgage customers, but Kenya Commercial Bank (KCB) led in terms of the value of mortgages outstanding (CBK, 2013).

Contrary to expectations, a report by CBK (2018) shows that the high level of activities in the real estate property sector is at variance with the low level of borrowing to finance the sector. Since independence, Kenya has slightly fewer than 20,000 mortgage accounts notwithstanding the fact that several banks offer mortgage lending. This suggest that the thriving real estate sector could be the main beneficiary of money laundering and other related activities in the country particularly considering the discrepancy between the rate of mortgage uptake and the rate at which properties are on the increase all over the city. However, the Regent Management Reports (2018) contends that the high interest rates that keep on changing can be attributed to the low mortgage uptake as most of Kenyans perceive borrowing from Savings and Credit Cooperatives (SACCOS) as cheaper and slowly build their homes or alternatively negotiate with a developer to pay an upfront 50 % deposit and pay the remainder in the future at a more friendlier way.

**1.2 Research Problem**

There was a high demand in housing in the late 1990s going to the 2000s resulting from low rates of mortgage finance. As such, people with low income could afford to obtain mortgage to build houses and others could afford to build expensive homes since mortgage loans was easily accessible (Sirota, 2003). This continued to 2007 when there was a financial crisis that affected the mortgage industry when they handled nearly half of all loan originations each year. This resulted to the merging of the mortgage financing industry and the increasingly fundamental role of commercial banks as housing mortgage originators currently (Rajan et al., 2010). Real estate prices fell drastically as a result of mortgage providers lacking incentives to carefully screen borrowers so as to increase their mortgage loans and consequently the borrowers defaulted (Loutskina & Strahan, 2011). A crash emerged as investors in real estate industry were left holding properties with no one purchasing them because the interest rates on mortgages were too much high such that it was impossible for people to afford the mortgages as they did before (Rajan et al., 2010).

A report by CBK (2018) indicates that the high level of activities in the real estate property sector is at variance with the low level of borrowing to finance the sector. Since independence, Kenya has slightly under 20,000 mortgage accounts notwithstanding the fact that several banks offer mortgage lending. This suggest that the thriving real estate sector could be the main beneficiary of money laundering and other related activities in the country particularly considering the discrepancy between the rate of mortgage uptake and the rate at which properties are on the increase all over the city. However, the Regent Management Reports (2018) contends that the high interest rates that keep on changing can be attributed to the low mortgage uptake as most of Kenyans perceive borrowing from Savings and Credit Cooperatives (SACCOS) as cheaper and slowly build their homes or alternatively negotiate with a developer to pay an upfront 50 % deposit and pay the remainder in the future at a more friendlier way.

Though the theories utilized in the study namely the Simulation Theory and the Public Interest Economic Regulation Theory (PIERT) offer a good foundation to understand the different mortgage financing principle, the studies undertaken in the sectors have not been wholly conclusive and this presents a knowledge gap. In the global arena, studies by Sewin Chan et al. (2015) and Sebastião (2015) focussed on investigating the real estate market efficiency, examining the real estate market determinants and demographics as the variable for

establishing the use of mortgage loans. McGibany and Nourzad (2004) noted that mortgage rate was among the main aspects of property affordability and performance index, and the increase in the mortgage rate reduces the index and vice versa. Debelle (2004) likewise noted that majority of property investment are quite sensitive to interest rate changes, in counties having variable mortgage rates for example Sweden, due to the increased indebtedness in the last two decades. Equally, Vries and Boelhouwer (2005) arrived to a conclusion that mortgage risks, interest rates and expected prices are determinant of property prices. The studies did not segregate mortgage financing in its various sub-components and assess their performance on the real estate sector, thus presenting a knowledge gap.

In the regional front, Okonkwo (1997) affirms that one of the key vital input toward housing production is finance. Consequently, the degree of financing is directly associated with the degree of development of real estate. In the local scene, Amande & Makori (2015) established a notable positive association in their study. This finding concurs with those of Arvanitis (2013), Muli (2011), Julius (2012), and Muthee (2012) who also obtained a positive relationship. There is a knowledge gap nonetheless, the specific impact of mortgage financing was not established in the studies since they credited the performance of the real estate market to other factors apart from mortgage financing, for example the pricing rates. The studies did not segregate mortgage financing in its various sub-components and assess their performance on the real estate sector.

The disconnect between demand for real estate property and its supply capacity by investor-developers, with the actual growth levels of the real estate industry despite the existence of mortgage presents a research problem which this research seeks to address. Even though there is increase in the real estate's importance, only constricted empirical evidence exists regarding its present movements and how it is influenced by mortgage financing. There is a knowledge gap in the mentioned empirical literature and they are not adequate to the extent that they fail to describe the actual effect that mortgage financing has on the real estate market. Thus, this study endeavoured to address the research question, does mortgage financing impact on the performance of the residential real estate industry in Kenya?

## 1.3 Research Objective

To determine the effect of mortgage financing on the performance of the residential real estate industry in Kenya.

## 1.4 Value of the Study

The analyses and findings from this research are of interest to researchers, academicians, policy makers, and industry practitioners. The study will provide literature and background information to research organizations and scholars who will need to undertake further studies on real estate financing as a key area of development, specifically mortgage financing. It will enable them to gain insight on the current trends in real estate market in Kenya and the significance of mortgage financing and form a ground for future research.

The study will aid the Kenyan government, through the Ministry of Housing and Urban Development, to understand the contribution of the real estate sector in its overall economic growth and how to foster the sector through implementation of policies that increase number of mortgage accounts and outstanding mortgage loan values, reduce mortgage interest rates, and mitigate mortgage risk in order to promote funding of the real estate sector as a fundamental investment project.

The practitioners in the Real Estate market in Kenya will find the finding of this study to be beneficial. The findings will show how mortgage financing helps when it comes to real estate's development and its influence of the real estate performance. In this way, they will appreciate numerous means of boosting their social capital and have the option to gain more from their investment. Additionally, the results of this study will help future investors in establishing how and when to source for funding for real estate investment. The Venture capitalist will also benefit from the findings as they will be made aware of existing financing gaps in the real estate sector and this will assist in maximizing return of their investment. The study will also influence households' decisions concerning financing for housing. It will provide more information on the availability and accessibility of mortgage finance and the importance of the same in securing a home. The lenders will also gain insight on how the mortgage they offer is utilized in developing of the real estate market and this will ultimately help them to come up with innovative products and services for the mortgage holders. Particularly, the findings will be an enabler for them in evaluation of the mortgage loan performance in order to reduce the default rates and to find the appropriate mortgage rates.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

In this chapter, the literature on the research variables is reviewed. Additionally, the theories together with prior empirical evidence in the area of study are undertaken and finally the drivers of performance of real estate market are discussed.

**2.2 Theoretical Review**

In this section the theories applicable to the present study which include: The Simulation Theory and the Public Interest Economic Regulation Theory (PIERT).

**2.2.1 Simulation Theory**

Laibson (1998) proposed the Simulation Theory, which investigates the degree that markets are able to help provide housing finance throughout a number of countries. The theory contends that housing is a major investment, which needs long-term financing, and in most cases properly working housing systems are those that are able to offer long-term financing. The theories goes further to suggest that in countries where the legal rights for both the borrower and lenders are stronger, and have having proper bankruptcy as well as collateral laws, and with stability in macroeconomic environment and also with credit information systems that are deeper tend to have housing finance systems that are stronger.

Adler and Lehmann (2012) advocated that loan-to-value and loan-to-income ratios statistical comparison to some extent can be a good indicator of the risks which homeowners encounter when they are financing their homes. However, this way of comparison overlooks the origins of risk which are interest rates variations, changes in house price and changes in income. Additionally, the comparison ignores either the core characteristic, for instance; mortgage cost, incentives direct or indirect comprising of interest discount, which are some of the factors that in a major way, affect the actual costs and risks encountered by homeowners.

The theory links to the study because it helps in explaining the change in housing finance throughout developing economies like Kenya. In developed countries, housing finance is stronger as these economies tends to have macroeconomic conditions that have low volatility, comparatively deep credit information systems, and stronger legal rights for borrowers and lenders. Therefore, this theory assisted in explaining the level of housing finance.

**2.2.2 Public Interest Economic Regulation Theory**

Arrow (1985) proposed this theory, which is also referred as the normative theory of market failure. It is built around the classical economic welfare that is mainly concerned with protection and promotion of the welfare and utility. This theory offers a solution to the issues

of affordability suggesting that the government should intervene in the housing market by ensuring that the housing resources are optimally and efficiently allocated. The theory is founded on the notion of there being a mutual interest or public interest whereby government is the most appropriate in provision and protection through regulation. In this context, regulation denotes making of laws and administering controls and actions that the government employ so as to influence production, prices, entry into the market through intervening in terms of taxation, incentives, tariffs, and quotas (Okechukwu, 2009).

The theory holds that intervention by the government in markets through regulation is a reaction to demands by the public for the government to correct inefficient or inequitable market practices (Guerin, 2003). The government institute regulation on the premises that markets are essentially inefficient and that the government is the only one with the ability of correcting the failure of the market so that the optimal and efficient outcome is realized. Regulation further assumes that the benefits of government interventions in markets outweigh the costs created by the interventions. According to Guerin (2003), there are several forms in which the benefits of regulation may take and this can be narrowed down to the improvement in the welfare of a group or an individual and may occur through going down of cost of goods and services or income increment of the producer of goods and services. As indicated by Rittenberg et al (2004) it is important for regulation, as this will lower the goods and services prices, increase productivity and avoid unhealthy competition. Furthermore, regulation is necessary, as it will guarantee the availability and accessibility of essential services and goods.

This theory links to the study because of the role of government policies and legislations to provide housing. It is required of the government to eliminate the failures in housing market and regulate such kind of market by using suitable interventions that deliver good housing that is appropriate for its citizens. The government can utilize mortgages to stimulate provision of housing. However, the mortgages sector mainly operates in a free market economy. The challenge for governments is, however, on the best way of intervening efficiently so as to guarantee that a more equitable housing delivery system is developed. The mortgage industry is regulated by CBK. Inappropriate government controls and regulation are themselves bad and could lead to more distortions in the housing market.

World Bank, The Breton Wood Institutions and the International Monetary Fund (IMF) disapprove and condemn direct intervention of government in housing as this intervention may

lead to market inefficiency contending that pro-market policy reforms encourages market efficient and also acts a stimulant of economic growth (Pugh, 1994). PIERT however, advocates for careful intervention by government in a way that does not distort the housing market. Therefore, in development of national housing and in guaranteeing that the housing interest of the lower and middle-income groups of the urban population, the government must adopt better and more appropriate ways of intervening the market. The main areas that are in need of intervention include mortgage financing, land market, infrastructure, and accessibility of inexpensive building materials. The overall goal of this government intervention ought to be improvement of accessibility of sufficient housing and reduction of the price of housing per individual and consequently leading to accessible and affordable housing amongst social economic groups in the society.

## 2.3 Drivers of Mortgage Financing

The indicators of mortgage financing which include; number of mortgage loan accounts, outstanding mortgage loans amounts, mortgage interest rates, and mortgage risks, are enumerated here.

### 2.3.1 Number of Mortgage Loan Accounts

Mortgage financing is one of the main ways to finance an investment in the real estate market (Brueggeman & Fisher, 2008). Massive investment in terms of capital is needed when one is investing in real estate, this capital may be quite large for investors to raise on their own (CBK, 2012). The lack of enough capital would lead to the investor looking for funding through borrowing from lender and securing the real estate with a mortgage.

A mortgage is defined as a secured loan where the collateral is some stated real estate property, which the borrower has the obligation to repay through a number of instalments, which are predetermined (Biernert & Brauner, 2007). As indicated by Giddings (2007), mortgage financing is a way of long term financing so as to develop more housing that are new, improvement urban infrastructure and also mortgage financing is a key propeller of capital markets developments. From an international perspective, it is recommended that extensive accessibility of residential mortgages have a positive effect on eradication of poverty, urbanization, infrastructure, and quality housing (Erbas, 2005).

13

Two types of mortgages that are most common are adjustable-rate mortgages and Fixed-rate mortgages (Njongoro, 2013). He further stated that fixed rate mortgages are the most common type of mortgages due to the act that monthly payments are the same for the period of the mortgages and in spite of the changes in the market interest rates the borrower continues to pay the same interest rate for the period of the loan. Adjustable-Rate Mortgages (ARM) on the other hand have varying interest rates over the loan period.

### 2.3.2 Outstanding Mortgage Loans Amounts

One of the main activities of commercial banks in Kenya is lending and this can be enhanced by the loans, which forms their assets base. The argument implies that lending is the largest source of revenue for commercial banks and this affects its financial performance through generation of interest income earnings (Karanja, 2013). The real estate financing sector growth has been attributed to the increased housing need. The availability of mortgages has a favourable effect on the housing quality, infrastructure as well as urbanization and as a result leading to improved standards of living (Muri, Frank &Nothaft, 2002).

Normally large financial institutions in aspect of proportion and figures, yields benefits due to economies of scale. Mostly, large financial instructions are better capable of assessing credit, giving loans and collecting deposits from individuals and this helps them to reduce the transaction costs related to loans subsequently increasing availability of housing loans. Mortgage loans are quite significant as far as the success of banks is concerned because they have better returns in comparison to other types of loans (Muri, Frank & Nothaft, 2002).

Lipping (2014), indicates that mainly financial institutions offer mortgages financing as a way of diversifying their risk for example losses by eliminating Non performing loans more so those loans that are not secured. For financial institutions, having lesser financial risk, the higher the cost effectiveness. Financial institutions which offer mortgage financing gain advantages whereby they adopt various types of mortgage loans therefore diversifying the risk and this thus makes it difficult for a case of persons getting mortgage loans openly.

### 2.3.3 Mortgage Interest Rates

The cost of financing investments is usually indicated by the real interest rates. Therefore, interest rates have been discovered to have major effect on the prices of residential houses not only locally but also globally (Barksenius & Rundell, 2012). Considering all this, money supply is a major determinant of interest rate level as interest rates is lowered when money supply increases consequently improving the real estate market performance, since a large number of customers are able and willing to invest. The vice versa can ensue if there is reduced money supply.

Since the mortgage credit is directly influence by the interest rates levels, the demand of mortgage financing is also directly affected by interest rates (Stephens, 2003). Gyntelberg et al. (2007) have contends that if lower interest rates are seen to be permanent, it implies that household would be able to borrow more and this incline to pushing the prices of houses up. In contrast, high interest rates will shrink the demand for houses resulting to lower prices of houses. In an economy, there are some factors that influence interest rates, they include money supply, and inflation rate and this are normally compensated through increasing interest rates. Therefore, when inflation rates are high, most probably the interest rates will be pushed higher and thereby increasing the cost of credit (Samuelson & Nodhaus, 2001). The level of housing built will be largely be determined by the cost of credit that financial institution offer and likewise the price of houses in the market (Gyntelberg et al., 2007).

### 2.3.4 Mortgage Risks

There are different kind of customer from all ways of life in mortgage financing which exposes both the lenders and borrowers to wide range of risks (Scanlon & Whitehead, 2004). The main risk comprises of default risk or credit risk to the lender, which means that there is possibility of the borrower defaulting on the loan obligation, and also investment risk where the home owner feel that the value of the home might fall which also mean the homeowner equity will also fall (Lewis & Neave, 2008). Lea (1990), refer default risk to the risk that emerge as a result of market value of the property falling below the market value of the mortgage. Additionally, another risk which is interest rate risk exist which may be for both parties whereby the interest rate changes against them and lastly prepayment risk to the lender whereby the borrower repays the loan specifically a fixed-rate loan earlier than the term end. In Kenya, there is a risk of un-occupancy, which faces the real estate market (Agaba et al., 2009).

15

As indicated by IMF (2009), a Non-Performing Loan (NPL) is any credit advancement that interest and principal payments are in arrears for a period greater than three months, or more than three months' worth of interest has been refinanced, capitalized, or deferred by agreement, or payments are not yet three months overdue but are no longer expected. IMF further defines an NPL as one in which the maturity date has lapsed, though some of the amount lent is yet to be paid. Ahmad and Ariff (2007) states that NPLs are the proportion of loan values that remains unpaid for ninety days and more.

## 2.4 Empirical Literature

Globally, Agnello, Castro, and Sousa (2019) assessed the effect of securitization, liberalization of the mortgage sector and involvement by the government housing finance during the times of normal, booms, and bust. The study utilized duration analysis in a panel of 20 OECD countries over the period of the first quarter of 1970 to the last quarter of 2015. The study findings discovered that liberalization of mortgage sector is normally related with longer housing booms whereas increment in securitization is associate with shorter period of bust. Additionally, the finding exhibit that span of busts and booms in housing is specifically sensitive to characteristics of housing finance though that is usually not the case during normal times. Further findings indicated that intervention by the government do not always protect against housing busts and that close evaluation of their distributional effect, together with the impact on the trade-off amongst liquidity and guarantee, is also need in preventing longer housing booms. The study also revealed that regulation of housing finance might be important especially in protecting against the harmful impact of housing buts and the financial stability risks related to housing booms and that monetary policy intervention could be necessary in complementing macro-prudential policies. Lastly, the study established that participation by the government in housing finance ought to be planned in such a way that does not cause undesirable amplification of variation in price of houses. This study did not analyze the impact of mortgage financing on performance of the residential real estate sector but only assessed effect of securitization, liberalization of the mortgage sector and involvement by the government housing finance during the times of normal, booms, and bust. Thus, this presents a conceptual gap. The study also used duration analysis while the current study utilized inferential statistics entailing correlation and multiple linear regression analysis and utilized time series data. Thus, this presents a methodological gap.

Rodríguez-Planas (2018) intended to ascertain the influence of culture on mortgage financing. A sample of 12,344 immigrants from 41 different countries of ancestry living in Spain was used, it was established that the higher the mortgage infiltration in the country of ancestry, the higher the probability of having a mortgage loan in Spain. Likewise, the higher the mortgage depth in the ancestry country, the higher the current value of the monthly mortgage repayments. Thus, social practices with respect to mortgage financing in the nation of heritage matter in deciding immigrants' mortgage financing in the host nation. Along these lines, the impact of social practices on the choice to have a home loan and the measure of the home loan instalments is about 33.3% and 10% respectively of the impact of having a higher education degree on mortgage loans. Proof of solid ingenuity of culture amongst those with longer residency in the host nation, the individuals who moved as youngsters or youthful adults, and second-generation workers implies that vertical transmission of convictions, from parents to kids, is a conceivable channel of transmission. The study also established that when deciding to obtain a mortgage, the most applicable factor that help an individual make the decision is the cultural attitude as far as property rights is concerned but those pertaining to credit information are only considered when explain the amount of the home loan. This study did not analyze the impact of mortgage financing on performance of the residential real estate sector but only investigated influence of culture on mortgage financing. This presents a conceptual gap.

Canepa and Khaled (2018) investigated the determinants of credit risk with focus on the role of affordability of housing and household indebtedness. The study also scrutinized the effect of credit market development and regulations. A big panel of countries was utilized. The study established that affordability of housing and fragility of households to a large extent had an influence on the loan portfolio of banks. More so, an examination of the restrictive quartiles of NPLs proportions uncovered that financial institutions in nations with more noteworthy levels of financial liberalization and less regulated markets also were faced by a higher credit risk. This study did not analyze the impact of mortgage financing on performance of the residential real estate sector but only investigated the determinants of credit risk with focus on the role of housing affordability and household indebtedness. This presents a conceptual gap. The study also analyzed a large panel of countries, while the current study focused on one country, Kenya. This presents a methodological gap.

In the regional front, Anidiobu, Okolie, and Ugwuanyi (2018) examined impact that mortgage financing had on the delivery of housing in Nigeria. The study examined how main institutions offering mortgages had influenced investment in Nigerian housing sector. The study utilized annualized data from the year 1992 to 2016. It utilized the ordinary least square (OLS) as the main technique of analysis. The Johansen co-integration test was also utilized. The finding proved that a long-term relationship between mortgage finance and housing delivery existed over the period of study. Additionally, it was uncovered that mortgage deposit positively and significantly affected the housing delivery in Nigeria whereas mortgage loan produced an insignificant and negative impact on housing delivery in Nigeria. The conclusion of the study was that in spite of housing being a significant sector which can develop the economy of Nigeria, lack of enough mortgage finance in the sector reduces the growth and by and large economic impact. Although the study utilized the mortgage financing aspect of outstanding mortgage amounts to analyze its effect on the residential real estate performance, it did not utilize the rest of the mortgage financing drivers utilized in the current study, namely; outstanding mortgage accounts, mortgage rates, and defaults. This presents a conceptual gap.

Udoka and Owor (2017) investigated mortgage financing and housing development in Nigeria and focused on ascertaining the effect that mortgage loan had on development of housing in Nigeria. The study period constituted 15 years, from 1990 to 2014. The analysis methods utilized were Augmented Dickey-Fuller unit root test, the co-integration tests, and the Error Correction Models. The findings uncovered a long-term and significant connection amongst mortgage financing and housing development. Interest rate and mortgage loan was found to be significantly and positively related to housing development whereas the building cost negatively affected development of housing in Nigeria. More findings indicated that mortgage deposit positively affected mortgage investment whereas on the contrast inflation negatively affected mortgage investment. Although the study utilized the mortgage financing aspect of outstanding mortgage amounts to analyze its effect on the residential real estate performance, it did not utilize the rest of the mortgage financing drivers utilized in the current study, namely; outstanding mortgage amounts, mortgage rates, and defaults. This presents a conceptual gap. The study also utilized the Augmented Dickey-Fuller unit root test, the co-integration tests, and the Error Correction Models as the analysis techniques while the current study utilized correlation and multiple linear regression analysis.

In the local scene, Mbulo and Oluoch (2019) endeavoured to ascertain the main determinants of demand for mortgage finance in solving the problem of less than desired uptake of mortgage finance. Secondary data was utilized and inferential statistics entailing both correlation and regression analysis were undertaken. The study uncovered that there is a strong relationship between demand for mortgage finance and price of housing, interest rates, and disposable income. This study did not analyze the impact of mortgage financing on performance of the residential real estate sector but only investigated the determinants of demand for mortgage financing. This presents a conceptual gap.

Kipyegon and Wephukulu (2019) undertook an examination on the effect of interest rate changes on mortgage uptake amongst the selected commercial banks in Kenya. The study established that GDP growth and mortgage uptake in Kenya had a positive significant relationship. The study also found out that inflation and mortgage uptake had a negative significant relationship. The study further established that credit risks had insignificant influence on the mortgage uptake. The study revealed that loan demand had positive and significant influence on the mortgage uptake. The study conclusions were that inflation rate has a significant negative influence on the mortgage uptake of commercial banks in Kenya. This is because inflation reduces the value of money, which consequently does not favour the mortgage uptake. Quantitatively, the findings showed that 68.8% of the mortgage uptake is explained by the GDP, credit risk, loan demand, and inflation and the remaining 31.2 percent can be accounted by the standard error and other factors. This study did not analyze the impact of mortgage financing on performance of the residential real estate sector but only investigated the effect of interest rate volatility on mortgage uptake. This presents a conceptual gap.

Abdulrehman and Nyamute (2018) endeavored to establish the impact of mortgage financing on financial performance of commercial banks in Kenya. All licensed commercial banks were the study populace. Secondary data was utilized and inferential statistics entailing regression and correlation were undertaken. It was indicated from the findings that mortgage loans amount positively and significantly affected the financial performance. Further, interest rate charged was found to positively and significantly influence the financial performance. This study analyzed the effect of mortgage financing on financial performance of banks offering the mortgages and not the performance of the residential real estate sector, which the current study intended to analyze. This presents a conceptual gap.

Onchomba, Njeru, and Memba's (2018) study set out to ascertain the impact of real estate loans on financial performance of commercial banks in Kenya. The study utilized a census of the 42 licensed Kenyan commercial banks and was done for a period of ten years from 2006-2015 because of increased loan portfolio, while utilizing a cross-sectional survey design. Primary data was utilized and a questionnaire was used to collect it. The respondents consisted of one key person in the finance or credit department of each bank. The study utilized secondary data extracted from annual accounts and other applicable sources. Inferential statistics as well as descriptive statistics was used in analysis. It was uncovered that real estate loans had an influence of the commercial banks financial performance. The finding was supported by the modern portfolio theory. This study analyzed the effect of mortgage financing on financial performance of banks offering the mortgages and not the performance of the residential real estate sector, which the current study intended to analyze. This presents a conceptual gap. The study also used primary data while the current study solely utilized secondary data which presents the methodological gap.

Gakuo (2018) endeavored to ascertain the effect of interest rate capping on mortgage financing among commercial banks in Kenya. A descriptive research design was utilized and the population of the study included all the 43 licensed commercial banks that were operational in the study period. Monthly sources of data were utilized for 30 months from June 2015 to December 2017. Data analysis was done using descriptive statistics and paired t-test. The study found that interest rate capping resulted into an increased mortgage financing and bank deposits. Similarly, it led to a significant reduction in bank overdraft and lending rates while decreasing operational efficiency. Paired t-tests results established that bank overdraft and lending rates were statistically significant while mortgage financing, operational efficiency and customer deposits were insignificant. This study analyzed the effect of interest rate capping on mortgage financing and not the effect of mortgage financing on the performance of the residential real estate sector, which the current study intended to analyze. This presents a conceptual gap. The study utilized descriptive statistics and paired t-test as the data analysis techniques while the current study involved inferential statistics that entailed correlation and multiple linear regression analysis.

## 2.5 Conceptual Framework

As indicated by Young (2009), the conceptual framework is a diagrammatic outlay that shows the association between independent and dependent variables. The conceptual framework can

also be defined as a detailed description of the variables under study by use of a visual or graphical representation of the key study variables (Mugenda, 2008). For this research, the independent variables are the indicators of mortgage financing which are; number of mortgage loan accounts, outstanding mortgage loans amounts, mortgage interest rates, and mortgage risks, while the dependent variable is performance of the residential real estate sector.

Figure 2.1 clearly illustrates the structure, which enables the researcher to make deductions from the findings.

**Independent Variables**

**Drivers of Mortgage Financing**

**Dependent Variable**

Number of Mortgage Loan Accounts
- $((MLA_{t+1} - MLA_t)/MLA_t)$

Outstanding Mortgage Loans Amounts
- $((OMLA_{t+1} - OMLA_t)/OMLA_t)$

Mortgage interest rates
- $((I_{t+1} - I_t)/I_t)$

Mortgage risks
- $((NPL_{t+1} - NPL_t)/NPL_t)$

Performance of the residential real estate sector
- HASS sales price index
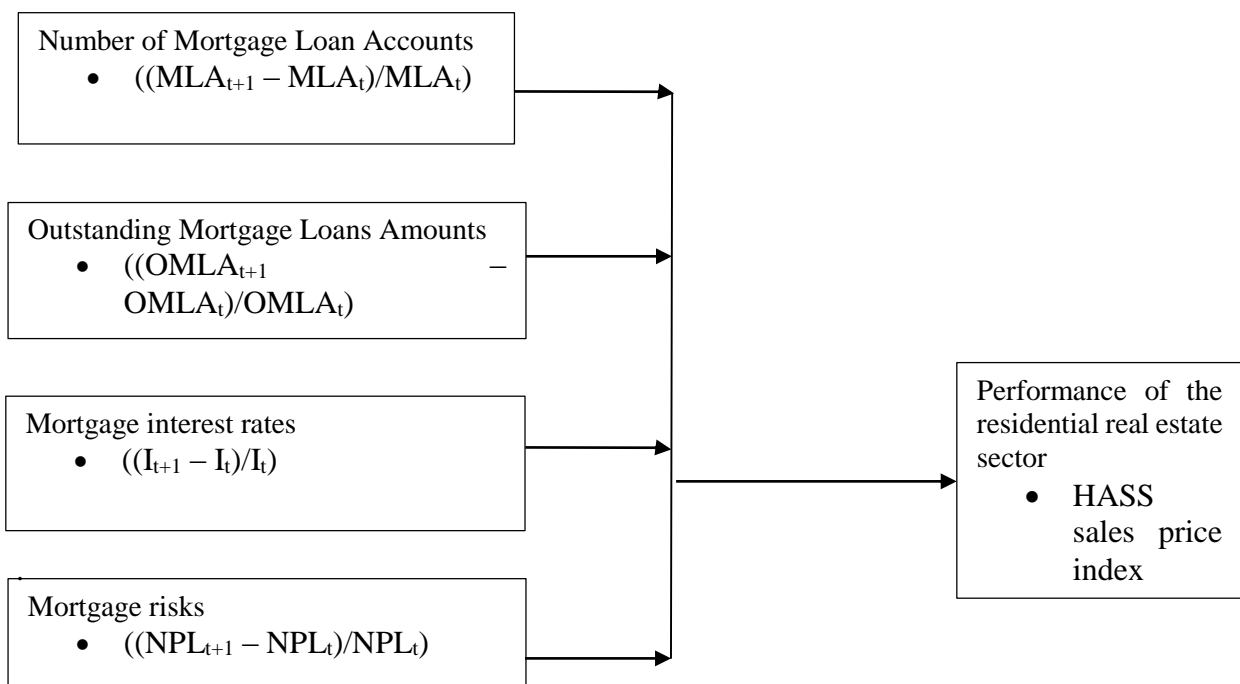
**Figure 2.1: Conceptual Model**

**2.6 Summary of the Literature Review**

Mortgage financing was exhibited to having a relationship with residential real estate performance. Evidence of long-run relationship was found to exist between mortgage finance and housing development and delivery over the period studied (Anidiobu, Okolie & Ugwuanyi, 2018; Udoka & Owor, 2017).

The indicators of mortgage financing; number of mortgage loan accounts, outstanding mortgage loans amounts, mortgage interest rates, and mortgage risks, are hypothesized to have a significant positive relationship with stock market capitalization, both jointly and in isolation. This is according to a study by Muri, Frank, and Nothaft (2002) which stated that the real estate

financing sector growth has been attributed to the increased housing need and that availability of mortgages has a favourable effect on the housing quality, infrastructure as well as urbanization and as a result leading to improved standards of living. Stephens (2003) stated that since the mortgage credit is directly affected by the interest rates levels, the demand of mortgage financing is also directly influenced by interest rates. Gyntelberg et al (2007) contends that if lower interest rates are seen to be permanent, it implies that household would be able to borrow more and this incline to pushing the prices of houses up. In contrast, high interest rates will reduce the demand for houses leading to lower prices of houses. Gyntelberg et al (2007) further enumerated the level of housing constructed will largely be determined by the cost of credit that financial institutions offer and likewise the price of houses in the market (Gyntelberg et al., 2007).

Many of the global, regional, and local studies reviewed did not address the relationship amongst mortgage financing and performance of the real estate sector thus presenting a conceptual gap. Only the studies conducted by Anidiobu, Okolie, and Ugwuanyi (2018) and Udoka and Owor (2017) addressed the relationship but there is an inherent conceptual gap because they did not address the effect of all the aspects of mortgage financing included in the study. Number of mortgage loan accounts, outstanding mortgage loans amounts, mortgage interest rates, and mortgage risks, on performance of the real estate sector.

The global and regional studies reviewed were conducted in other jurisdictions and thus were not conducted in the Kenyan context and this presents a contextual gap. There is a methodological gap in the studies conducted by Gakuo (2018), Udoka and Owor (2017), Canepa and Khaled (2018), Agnello, Castro and Sousa (2019), and Onchomba, Njeru, and Memba's (2018). The current study utilized linear regression to establish the causal relationship between the two phenomena.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

In this chapter, the research methodology that was applied is laid out. This chapter contains several sections, which includes research design explaining the design applied, data collection to explain procedure for gathering data, the population, and the data analysis methods applied.

## 3.2 Research Design

The study applied a causal research design because it sought to determine the cause and effect relationship between variables. Thus, this design was utilized because it addressed the aim of research in examining the association amongst variables of the research. The study was a formal study because it employed relevant theories and literature to guide it. It was also be an ex post facto study because the variables were not manipulated but simply measured. It was a field setting with the unit of analysis being the country. This design took into account aspects like method of analysis, the variables used in the research, and data gathering methods.

## 3.3 Target Population

Zikmund et al. (2010) describe population as all the people or individuals in a study. The population tends to have similar characteristics. Grabich (2012) posits that a set of people, events or elements that are studied with an aim of providing answers to the research questions is referred to as a study population. The study scope was a census. All the 42 licensed commercial banks and the sole licensed mortgage housing company formed the population in this study. This brings the total population to 43 banks as at 30th December 2019.

## 3.4 Data Collection

The process of gathering data is critical as it ultimately impacts on the authenticity of the results. In this regard, the researcher utilized secondary data. Data collected was longitudinal data, data on the unit analysis was collected over a given time period. In particular, the investigator relied on data provided by CBK and various publications, which entailed; the real estate performance index, mortgage loan accounts, outstanding mortgage loans amounts, average interest rates, and the default rates. Quarterly publication of The Hass Sales Price Index by the Hass Consult Real Estate Company contained the measure of asking price changes of

residential housing nationwide throughout Kenya. The indicator served as an indicator of trends. The mortgage loan accounts, outstanding mortgage loans amounts, average mortgage rates, and the mortgage default rates were obtained from the CBK publications. The study unit period of analysis was quarterly and data was gathered for a period of eight years, from 2012 to 2019. Data on the HASS sales price index, number of mortgage loan accounts, outstanding mortgage loans amounts, average interest rates, and the default rates was collected for the period.

## 3.5 Diagnostic Tests

For the validity of regression analysis, a number of assumptions are done in conducting linear regression models. These are; no multi collinearity, observations are sampled randomly, conditional mean ought to be zero, linear regression model is "linear in parameters", spherical errors: there is homoscedasticity and no auto-correlation, and the optional assumption: error terms ought to be distributed normally. According to the Gauss-Markov Theorem, the first 5 assumptions of the linear regression model, the regression OLS estimators, are the Best Linear Unbiased Estimators (Grewal *et al*., 2004).

The aforementioned assumptions are of great importance since when any of them is violated would mean the regression estimates will be incorrect and unreliable. Particularly, a violation would bring about incorrect signs of the regression estimates or the difference of the estimates would not be reliable, resulting to confidence intervals that are either too narrow or very wide (Gall et al., 2006).

The diagnostic tests are undertaken so as to ensure that the assumptions are met to attain the Best Linear Unbiased Estimators. Regression diagnostics assess the model assumptions and probe if there are interpretations with a great, unwarranted effect on the examination or not. Diagnostic examinations on normality, linearity, multicollinearity, and autocorrelation were conducted on the collected data to establish its suitability in the formulation of linear regression model. Normality was tested by the Shapiro Wilk test of normality, which though uncommon, fails to work well where large amount of data is involved, necessitated the test to be supplemented by the Kolmogorov-Smirnov test which is suitable for testing distributions of Gaussian nature which have specific mean and variance. Linearity indicates a direct proportionate association amongst dependent and independent variable such that variation in independent variable is followed by a correspondent variation in dependent variable (Gall et

al., 2006). Linearity was tested by determining homoscedasticy which was determined by the Breuch-Pagan test.

Tests for multicollinearity of data was carried out using variance inflation factors (VIF) and Tolerance statistics to determine whether the predictor variables considered in the research are significantly correlated with each other. According to Grewal *et al*. (2004) the main sources of multicollinearity are small sample sizes, low explained variable and low measure reliability in the independent variables. Auto-correlation test was carried out through the Durbin-Watson Statistic.

## 3.6 Data Analysis

Data collected was organized, tabulated and simplified so as to make it easier to analyze, interpret and understand. Data analysis was done using SPSS Version 25. Correlation analysis was used to show whether and how strongly changes in mortgage financing is associated to residential real estate industry performance while regression analysis was employed to determine the relationship between mortgage financing and residential real estate industry performance. The quantitative reports obtained from the investigation were displayed using tabulations.

The study adopted a confidence interval of 95%. The results were set to be statistically significant at the 0.05 level, which indicates that the significance value should be less than 0.05. A statistical inference technique was applied to conclude the accuracy of the model in predicting the market capitalization. The model significance was tested using the significance values at 95% confidence. The meaning of the association amongst every predictor variable plus response variable were also determined by the significance values, which illustrates how much standard errors indicated that the sample deviates from the tested value.

## 3.6.1 The Model of Analysis

The objectives of the research were attained through use of a multiple linear regression analysis, which tested whether economic growth has any effect on capital market capitalization. The statistical tests were conducted at 95% significance level meaning that the study allowed for an error of up to 5%. The model is illustrated as shown;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where:

Y = Performance of the residential real estate industry denoted by HASS sales price index

α = Constant

$\beta_{1-}\beta_4$ = Beta coefficients

$X_1$ = Number of mortgage loan accounts denoted by the percentage change

$X_2$ = Outstanding mortgage loans amounts denoted by the percentage change

$X_3$ = Mortgage Interest Rates denoted by the percentage change of average interest rates

$X_4$ = Mortgage risks denoted by the percentage change in the default rate

$\epsilon$ = error term

**Table 3.1: Operationalization of the study variables**

| Variable | Measurement |
|---|---|
| Performance of the residential real estate industry | Denoted by HASS sales price index |
| Number of mortgage loan accounts (MLA) | Denoted by $((MLA_{t+1} - MLA_t)/MLA_t)$ |
| Outstanding mortgage loans amounts (OMLA) | Denoted by $((OMLA_{t+1} - OMLA_t)/OMLA_t)$ |
| Mortgage Interest Rates | Denoted by the percentage change of average interest rates (I); $((I_{t+1} - I_t)/I_t)$ |
| Mortgage risks | Denoted by the percentage change in the default rate (NPL); $((NPL_{t+1} - NPL_t)/NPL_t)$ |

**3.6.2 Tests of Significance**

The study adopted a confidence interval of 95%. The results were set to be statistically significant at the 0.05 level, which indicates that the significance value should be less than 0.05. A statistical inference technique was used to make conclusion on the accuracy of the model in predicting the market capitalization. The model significance was tested using the significance values at 95% confidence. The meaning of the association amongst every predictor variable plus response variable was also determined by the significance values, which illustrates how much standard error indicated that the sample deviates from the tested value.

# CHAPTER FOUR

# DATA ANALYSIS, RESULTS, AND FINDINGS

## 4.1 Introduction

This chapter entails the data analysis, interpretation and the discussions of the findings. The section hence is fragmented to three sub sections, which entail diagnostic tests, inferential statistics, and interpretation and the discussions regarding the outcomes. Precisely this chapter summarizes the platform for data presentations, analysis, interpretations, and discussions.

## 4.2 Diagnostic Tests

Diagnostic tests were conducted as a precursor to conducting linear regression so as to ensure Best Linear Unbiased Estimates. Diagnostic tests done in this study included; normality tests, homoscedacity tests, multicollinearity tests, and autocorrelation tests. Normality test was carried out using Shapiro Wilk test, which was supplemented by the Kolmogorov-Smirnov test. The homoscedacity test was conducted through the Breusch-Pagan test. A test on Multicolinearity of data was carried out using VIF and Tolerance tests. The autocorrelation test was done through the Durbin-Watson statistic.

## 4.2.1 Normality Test

The normality tests for all the variables employed in the study are highlighted in Table 4.1.

**Table 4.1: Normality Test**

|  | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | Statistic | df | Sig. | Statistic | df | Sig. |
| Hass Sales Price Index | .113 | 32 | .200[*] | .969 | 32 | .470 |
| Δ Mortgage Loan Accounts | .103 | 32 | .200[*] | .960 | 32 | .273 |
| Δ Outstanding Mortgage Values | .132 | 32 | .169 | .923 | 32 | .025 |
| Mortgage Rates | .533 | 32 | .000 | .177 | 32 | .000 |
| Non_Performing Mortgages | .277 | 32 | .000 | .830 | 32 | .000 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

In testing for normality of the data, the null hypothesis holds that the data has a normal distribution. The level of significance adopted in the study is 5%. The significance values of both tests of the Hass Sales Index and mortgage loan accounts are greater than the α (0.05), thus the null hypothesis is not rejected. Hence, the data series of the variables are normally distributed. The significance values of the outstanding mortgage values, mortgage interest rates, and non-performing mortgages ratio are less than the α (0.05), thus the null hypothesis is rejected. Hence, the data series of the variables are not normally distributed.

### 4.2.2 Test for Homoscedacity

The homoscedasticity tests for all the predictor variables employed in the study are enlisted in Table 4.2. The Breusch-Pagan test was applied. There is no direct Breusch-Pagan test of heteroscedasticity in SPSS. However, there is an indirect method of conducting it. The unstandardized and standardized residuals were saved and transformed by squaring them and regressing the resultant variable with all the independent variables included in the study. The resulting output in the Analysis of Variance is the Breusch-Pagan test

**Table 4.2: Test for Homoscedacity**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .000 | 4 | .000 | 1.259 | .310[b] |
| | Residual | .000 | 27 | .000 | | |
| | Total | .000 | 31 | | | |

a. Dependent Variable: RES_SQ

b. Predictors: (Constant), Nonperforming Mortgages, Δ Mortgage Loan Accounts, Mortgage Rates, Δ Outstanding Mortgage Values

The null hypothesis is that there is homoscedasticity. The level of significance adopted in the study is 5%. Since the significance value obtained in the findings (0.310) is greater than the α (0.05), the null hypothesis is not rejected. Hence, the data series of all the predictor variables are homoscedastic.

### 4.2.3 Test for Multicollinearity

Results on Test for Multicollinearity of data carried out using Tolerance and Variance Inflation Factors (VIF) are displayed in Table 4.3.

**Table 4.3: Multicollinearity Statistics**

| Model | | Collinearity Statistics | |
|---|---|---|---|
| | | Tolerance | VIF |
| 1 | Δ Mortgage Loan Accounts | .533 | 1.878 |
| | Δ Outstanding Mortgage Values | .444 | 2.250 |
| | Mortgage Rates | .942 | 1.061 |
| | Non_Performing Mortgages | .716 | 1.396 |

a. Dependent Variable: Hass Sales Price Index

The common rule in statistics is that tolerance values should be greater than 0.1 and VIF values should be less than 10 and greater than 1. The findings indicate that the tolerance values of all the predictor variables employed in the study exceed 0.1 while the VIF values fall below 10 and greater than 1. Thus, there is no multicollinearity for the predictor variables.

### 4.2.4 Tests for Autocorrelation

The result on the autocorrelation test carried out using the Durbin-Watson Statistic is presented on Table 4.4.

**Table 4.4: Autocorrelation Test**

| Model | Durbin-Watson |
|---|---|
| 1 | 1.330[a] |

a. Predictors: (Constant), Nonperforming Mortgages, Δ Mortgage Loan Accounts, Mortgage Rates, Δ Outstanding Mortgage Values

b. Dependent Variable: Hass Sales Price Index

The Durbin-Watson statistic ranges from point 0 and point 4. If there exist no correlation between variables, a value of 2 is shown. If the values fall under point 0 up to a point less than 2, this is an indication of a positive autocorrelation and on the contrast a negative autocorrelation exist if the value falls under point more than 2 up to 4. As a common rule in statistics, values falling under the range 1.5 to 2.5 are considered relatively normal whereas values that fall out of the range raise a concern. Field (2009) however, opines that values above 3 and less than 1 are a sure reason for concern. Therefore, the data used in this panel is not serially auto correlated since it meets this threshold having a Durbin-Watson Statistic of 1.330.

### 4.3 Inferential Statistics

Inferential statistics are used in determining the direction, relationship, and strength of the association between the predictor variables and the response variable. The section entails the

inferential statistics employed in the study, which entailed correlation and multiple linear regression analysis.

### 4.3.1 Correlation Analysis

Correlation analysis establishes whether there exists an association among two variables. The association falls between a perfect positive and a strong negative correlation. The study used Pearson Correlation. This study employed a Confidence Interval of 95% and a two tailed test.

**Table 4.5: Correlation Analysis**

|  |  | Hass Sales Price Index | Δ Mortgage Loan Accounts | Δ Outstanding Mortgage Values | Mortgage Rates | Non_Performing Mortgages |
|---|---|---|---|---|---|---|
| Hass Sales Price Index | Pearson Correlation | 1 | .131 | .296 | .019 | -.397* |
|  | Sig. (2-tailed) |  | .474 | .100 | .919 | .025 |
| Δ Mortgage Loan Accounts | Pearson Correlation | .131 | 1 | .642** | .036 | -.051 |
|  | Sig. (2-tailed) | .474 |  | .000 | .847 | .782 |
| Δ Outstanding Mortgage Values | Pearson Correlation | .296 | .642** | 1 | .066 | -.409* |
|  | Sig. (2-tailed) | .100 | .000 |  | .719 | .020 |
| Mortgage Rates | Pearson Correlation | .019 | .036 | .066 | 1 | -.230 |
|  | Sig. (2-tailed) | .919 | .847 | .719 |  | .205 |
| Nonperforming Mortgages | Pearson Correlation | -.397* | -.051 | -.409* | -.230 | 1 |
|  | Sig. (2-tailed) | .025 | .782 | .020 | .205 |  |
|  | N | 32 | 32 | 32 | 32 | 32 |

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

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

Table 4.5 displays that only the non-performing mortgages ratio is significantly correlated at the 5% significance level to performance of residential real estate. The non-performing loans

ratio has a negative association with the performance of residential real estate. Number of mortgage accounts, outstanding mortgage values, and mortgage interest rates are not significantly correlated at the 5% significance level to performance of residential real estate.

## 4.3.2 Multiple Linear Regression Analysis

The cause and effect relationship between the predictor variables and response variable was evaluated using a multiple linear regression model. The data met almost all the First-Order conditions to conducting linear regression. However, the data series; outstanding mortgage values, mortgage interest rates, and non-performing mortgages ratio, did not meet the conditions of normality. The variables were standardized as a remedy for rectifying normality.

The regression analysis adopted a 5% significance level. The significance critical value exhibited from the Analysis of Variance (ANOVA) was compared with the critical value obtained in the analysis ($\alpha$=0.05). The significance values exhibited from the model coefficients was compared with the critical value obtained in the analysis ($\alpha$=0.05). When the various aspects of mortgage financing were regressed against performance of the residential real estate sector, the findings that are displayed form Table 4.6 through to Table 4.8 were exhibited.

**Table 4.6: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .429[a] | .184 | .063 | .019957 |

a. Predictors: (Constant), Zscore: Non_Performing Mortgages, Δ Mortgage Loan Accounts, Zscore: Mortgage Rates, Zscore: Δ Outstanding Mortgage Values
b. Dependent Variable: Hass Sales Price Index

The Co-efficient of Determination ($R^2$) indicates deviations in response variable as a consequence of variations in the predictor variables. From Table 4.6, the $R^2$ value is 0.184, a discovery that mortgage financing causes an 18.4% of the deviations in performance of the residential real estate sector. Other factors not incorporated in the model justify for 21.65% of the variations in performance of the residential real estate sector.

**Table 4.7: Analysis of Variance**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .002 | 4 | .001 | 1.524 | .223[b] |
| | Residual | .011 | 27 | .000 | | |
| | Total | .013 | 31 | | | |

a. Dependent Variable: Hass Sales Price Index

b. Predictors: (Constant), Zscore: Non_Performing Mortgages, Δ Mortgage Loan Accounts, Zscore: Mortgage Rates, Zscore: Δ Outstanding Mortgage Values

The null hypothesis is that mortgage financing does not significantly influence performance of the residential real estate sector. The significance value obtained in the study (0.223) is greater than the critical value of 0.05. Consequently, the null hypothesis is not rejected. Thus, mortgage financing does not significantly impact on performance of the residential real estate sector. Therefore, mortgage financing cannot be utilized to significantly predict performance of the residential real estate sector.

The null hypothesis was that there was no significant relationship between each of the mortgage financing components and performance of the residential real estate sector. The study findings exhibited that no components of mortgage financing had a significant effect on performance of the residential real estate sector. This is because their significance values are greater than the critical significance value ($\alpha$) of 0.05. Thus, the null hypothesis is not rejected, there was no significant relationship between each of the mortgage financing components and performance of the residential real estate sector.

**Table 4.8: Model Coefficients**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | T | Sig. |
| 1 | (Constant) | .011 | .006 | | 1.921 | .065 |
| | Δ Mortgage Loan Accounts | .023 | .204 | .027 | .115 | .909 |
| | Zscore: Δ Outstanding Mortgage Values | .003 | .005 | .138 | .529 | .601 |
| | Zscore: Mortgage Rates | -.002 | .004 | -.073 | -.410 | .685 |
| | Zscore: Non_Performing Mortgages | -.007 | .004 | -.356 | -1.732 | .095 |

a. Dependent Variable: Hass Sales Price Index

## 4.4 Interpretation and Discussion of Findings

The study endeavoured to assess the effect of mortgage financing on the performance of the residential real estate industry in Kenya. In addition, the study specifically aimed at to determine the effect of number of mortgage loan accounts, outstanding mortgage loans amounts, mortgage interest rates, and mortgage risks, on the performance of the residential real estate industry in Kenya. The data met almost all the First-Order conditions to conducting linear regression. However, the data series; outstanding mortgage values, mortgage interest rates, and non-performing mortgages ratio, did not meet the conditions of normality. The variables were standardized as a remedy for rectifying normality.

The study findings established that only the non-performing mortgages ratio is significantly correlated at the 5% significance level to performance of residential real estate. The non-performing loans ratio has a negative association with the performance of residential real estate. Number of mortgage accounts, outstanding mortgage values, and mortgage interest rates are not significantly correlated at the 5% significance level to performance of residential real estate.

Additionally, the study findings revealed that mortgage financing does not significantly impact on performance of the residential real estate sector and thus it cannot be utilized to significantly predict performance of the residential real estate sector. Finally, the study findings also exhibited no components of mortgage financing had a significant effect on performance of the residential real estate sector.

The study finding that mortgage financing does not significantly impact on performance of the residential real estate sector affirms Wambui's (2013) assertion that too much reliance on the normal mortgage financing, it is proving quite hard in developing and financing large real estate simultaneously. The finding is also in agreement with a report by CBK (2018) which indicated that the high level of activities in the real estate property sector is at variance with the low level of borrowing to finance the sector.

The study finding that mortgage financing does not significantly impact on performance of the residential real estate sector contradicts Okonkwo's (1997) affirmation that one of the vital input required for housing production is finance and the degree of financing is directly associated with the degree of development of real estate market. The finding is also not

congruent to Abdelgalil's (2005) finding that mortgage financing is a significant enabler of the real estate marker growth whereby homeowners is offered the opportunity to buy real estate properties at affordable prices.

Okonkwo (1997) affirms that one of the key vital input toward housing production is finance. Consequently, the degree of financing is directly associated with the degree of development of real estate. Amande & Makori (2015) established a notable positive association between mortgage financing and performance of the real estate industry in their study. This finding also concurs with those of Arvanitis (2013), Muli (2011), Julius (2012), and Muthee (2012) who also obtained a positive relationship. These contradict the current study finding that mortgage financing does not significantly impact on performance of the residential real estate sector.

Giddings (2007) indicated that mortgage financing is a way of long term financing so as to develop more housing that are new, improvement urban infrastructure and also mortgage financing is a key propeller of capital markets developments. Erbas (2005) opined that extensive accessibility of residential mortgages have a positive effect on eradication of poverty, urbanization, infrastructure, and quality housing. These contradict the current study finding that mortgage financing does not significantly impact on performance of the residential real estate sector.

According to Marcum and Goddard (2012), the Kenyan real estate sector encountered a greater expansion during the period 2002 to 2007 as the cost of mortgage financing was low during that time worldwide and this encouraged home ownership. This contradicts the study finding that mortgage interest rates have neither a significant association nor relationship with the performance of the residential real estate sector.

Debelle (2004) likewise noted that majority of property investment are quite sensitive to interest rate changes, in counties having variable mortgage rates for example Sweden, due to the increased indebtedness in the last two decades. McGibany and Nourzad (2004) noted that mortgage rate was among the main aspects of property affordability and performance index, and the increase in the mortgage rate reduces the index and vice versa. These contradict the study finding that mortgage interest rates have neither a significant association nor relationship with the performance of the residential real estate sector.

Gyntelberg et al. (2007) contends that if lower interest rates are seen to be permanent, it implies that household would be able to borrow more and this incline to pushing the prices of houses up. In contrast, high interest rates will shrink the demand for houses resulting to lower prices of houses. This is not in tandem with the current study finding that mortgage interest rates have neither a significant association nor relationship with the performance of the residential real estate sector.

Equally, Vries and Boelhouwer (2005) arrived to a conclusion that mortgage risks, and interest rates are determinant of property prices. This contradicts the study finding that mortgage interest rates have neither a significant association nor relationship with the performance of the residential real estate sector. However, this affirms the study finding that mortgage risks has a significant negative association with the performance of the residential real industry. Conversely, the study also established that mortgage risks do not have a significant relationship with the performance of the residential real industry.

Lea (1990) expounded that default risk is the risk that emerge as a result of market value of the property falling below the market value of the mortgage. Canepa and Khaled (2018) investigated the determinants of credit risk with focus on the role of affordability of housing and household indebtedness. The study also scrutinized the effect of credit market development and regulations. A big panel of countries was utilized. The study established that affordability of housing and fragility of households to a large extent had an influence on the loan portfolio of banks. These confirm the study finding that mortgage risks has a significant negative association with the performance of the residential real industry. Conversely, the study also established that mortgage risks do not have a significant relationship with the performance of the residential real industry.

Anidiobu, Okolie, and Ugwuanyi (2018) examined the impact that mortgage financing had on the delivery of housing in Nigeria. The study examined how main institutions offering mortgages had influenced investment in Nigerian housing sector. The study utilized annualized data from the year 1992 to 2016. The findings proved that a long-term relationship between mortgage finance and housing delivery existed over the period of study. This contradicts the current study finding that mortgage financing does not significantly impact on performance of the residential real estate sector. Additionally, it was uncovered that outstanding mortgage loans produced an insignificant and negative impact on housing delivery in Nigeria. This

confirms the current study finding that outstanding mortgage loans have neither a significant association nor relationship with the performance of the residential real industry.

Udoka and Owor (2017) investigated mortgage financing and housing development in Nigeria and focused on ascertaining the effect that mortgage loan had on development of housing in Nigeria. The study period constituted 15 years, from 1990 to 2014. The findings uncovered a long-term and significant connection amongst mortgage financing and housing development. This is not in sync with the current study finding that mortgage financing does not significantly impact on performance of the residential real estate sector. Interest rate and mortgage loan was found to be significantly and positively related to housing development.. This confirms the current study finding that mortgage interest rates and outstanding mortgage loans have neither a significant association nor relationship with the performance of the residential real industry.

# CHAPTER FIVE

# SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## 5.1 Introduction

This section shows the study findings summary, offered conclusions, and recommendations on the relationship between mortgage financing and the performance of the residential real industry in Kenya. Additionally, the research limitations and further research suggestions are also outlined.

## 5.2 Summary of Findings

The study endeavoured to assess the effect of mortgage financing on the performance of the residential real estate industry in Kenya. The study also sought to determine the effect of number of mortgage loan accounts, outstanding mortgage loans amounts, mortgage interest rates, and mortgage risks, on the performance of the residential real estate industry in Kenya. The study employed the use of correlation and multiple linear regression analyses.

The correlation analysis employed in the study established that only the non-performing mortgages ratio is significantly correlated at the 5% significance level to performance of residential real estate industry. The non-performing loans ratio has a negative association with the performance of residential real estate. Number of mortgage accounts, outstanding mortgage values, and mortgage interest rates are not significantly correlated at the 5% significance level to performance of residential real estate.

The multiple linear regression analysis revealed that that mortgage financing does not significantly impact on performance of the residential real estate sector and thus it cannot be utilized to significantly predict performance of the residential real estate sector. Further findings were that no components of mortgage financing had a significant effect on performance of the residential real estate sector.

## 5.3 Conclusion

In this section, the conclusion of the study is given; the conclusion is affiliated to the study objective, which was to assess the effect of mortgage financing on the performance of the

residential real estate industry in Kenya. The study concluded that mortgage financing does not significantly impact on performance of the residential real estate sector and thus it cannot be utilized to significantly predict performance of the residential real estate sector.

The study conclusion reveals that there is a disconnect between the growth levels of the Kenyan residential real estate industry and financing. The conclusion affirms Wambui's (2013) assertion that too much reliance on the normal mortgage financing, it is proving quite hard in developing and financing large real estate simultaneously. The conclusion is also in agreement with a report by CBK (2018) which indicated that the high level of activities in the real estate property sector is at variance with the low level of borrowing to finance the sector.

The conclusion contradicts Okonkwo's (1997) affirmation that one of the vital input required for housing production is finance and the degree of financing is directly associated with the degree of development of real estate market. The conclusion is also not congruent to Abdelgalil's (2005) finding that mortgage financing is a significant enabler of the real estate marker growth whereby homeowners is offered the opportunity to buy real estate properties at affordable prices.

## 5.4 Recommendations

The study findings will aid in further researches to be conducted on the field of the relations between mortgage financing and performance of the residential real estate industry. Later scholars keen in research on relations between mortgage financing and performance of the residential real estate industry will use the study findings as referral. Policy recommendations are made to the National Treasury and the Ministry of Housing and Urban Development, that since it has been established that mortgage financing does not significantly impact on the performance of the Kenyan residential real estate industry and thus it can be utilized to significantly influence performance of the residential real estate industry, the policy makers should formulate other strategies and policies to enhance the governments affordable housing component of the Big 4 agenda with minimal consideration of mortgage financing. The recommendation will guide government regulators in developing adequate, standardized and well-spaced houses to which will aid in attainment of Kenya's Vision 2030. The finding that mortgage rates have a significant negative association with the performance of the residential

real estate industry generates recommendations to the treasury to regulate the mortgage interest rates so as to enhance the residential real estate performance.

The finding that that mortgage financing does not significantly impact on the performance of the Kenyan residential real estate industry will guide the real estate practitioners not to concentrate on mortgage financing as the sole financing solution to customers. The finding also generates recommendations to commercial bank and mortgage providers not to rely on solely on mortgage financing as the main product offering because other sources of finance are being sought to develop the industry and optimal earnings are not likely to be4 earned from the product offering. The finding that mortgage rates have a significant negative association with the performance of the residential real estate industry generates recommendations to residential real estate developers to scale up their operations when the mortgage interest rates are low because they are more likely to make more sales.

## 5.5 Recommendations for Further Study

Exploring the relations between mortgage financing and performance of the residential real estate industry is of great importance the policy makers in the National Treasury and Ministry of Housing and Urban Development, the practitioners in the real estate industry, and consultants. However, the current study was carried out in the residential real estate context, the same study could be carried out across other real estate sectors, like the commercial sector, to establish if the study findings would hold on the effect of financing and performance of the segments. The study was only carried out in the Kenyan context, further studies can be conducted out of Kenyan context, they can be conducted in the African or global jurisdictions to establish whether the study findings would hold.

The study only considered the mortgage financing components that entailed; mortgage loan accounts, outstanding mortgage loans amounts, mortgage interest rates, and mortgage risks as influencing performance of the residential real estate industry. A study can be conducted to ascertain if there are other factors that influence performance of the residential real estate industry. Additionally, further studies can be conducted to ascertain if there are factors that moderate on the relationship mortgage financing and performance of the residential real estate industry. This study used secondary data, a subsequent research should be undertaken applying primary data to ascertain if the study findings would hold and either complement or criticize the finding of this study. Multiple linear regression and correlation analysis were applied in the

study; other analysis technique for example cluster analysis, discriminant analysis, granger causality and factors should be incorporated in the subsequent researches.

**5.6 Limitations of the Study**

The study was conducted only in the Kenyan residential real estate context, due to time and cost constraints, which does not give clear indication of findings if other real estate segments were also incorporated in the study. More uncertainties would occur if similar studies were replicated in different real estate sectors, like the commercial sector, and countries. The study periods was limited to eight years due to time and cost limitations, other studies can be done extending the study period to establish if the study findings would hold. Although the research engaged secondary sources of data, there were some major challenges like some of the data being not readily available; especially data on financial technology and it took great lengths and costs to obtain it. The data was not utilized in their raw form and further calculations and manipulations of the data were required. Impending delays were experienced due to data processing and further editing before the compilation by the researcher.

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# APPENDICES

**Appendix 1: List of Commercial Banks in Kenya as at 30th December, 2019**

1. Absa Bank Limited

2. African Banking Corp. Ltd

3. Bank of Africa Kenya Ltd

4. Bank of India

5. Bank of Baroda (K) Ltd

6. Stanbic Bank Ltd

7. Chase Bank (K) Ltd (In Receivership)

8. Citibank N.A.

9. Consolidated Bank of Kenya Ltd

10. Co-operative Bank of Kenya Ltd

11. Credit Bank Ltd

12. Development Bank (K) Ltd

13. Diamond Trust Bank (K) Ltd

14. Dubai Bank Ltd (In Receivership)

15. Dubai Islamic Bank (Kenya) Ltd

16. Ecobank Limited

17. Spire Bank

18. Equity Bank Ltd

19. Family Bank Ltd

20. Guaranty Trust Bank

21. First Community Bank Ltd

22. Guardian Bank Ltd

22. Gulf African Bank Ltd

24. Habib Bank A.G. Zurich

25. HFC Ltd

26. Imperial Bank Ltd (In Receivership)

27. I & M Bank Ltd

28. Jamii Bora Bank Ltd

29. KCB Bank Kenya Ltd

30. Mayfair Bank Ltd

31. Middle East Bank (K) Ltd

32. M Oriental Bank Ltd

33. National Bank of Kenya Ltd

34. NCBA Bank Kenya

35. Paramount Universal Bank Ltd

36. Prime Bank Ltd

37. Sidian Bank

38. Standard Chartered Bank (K) Ltd

39. SBM Bank (Kenya) Ltd

40. Transnational Bank Ltd

41. UBA Kenya Bank Ltd

42. Victoria Commercial bank Ltd

Source: Kenya Bankers Association Website (2020)

**Appendix II: Data Collection Form**

| Data | Year | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2014** | **2015** | | | | **2016** | | | | **2017** | | | | **2018** | | | | **2019** | | | |
| **Quarter** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** |
| HASS sales price index | | | | | | | | | | | | | | | | | | | | | |
| Number of mortgage loan accounts (MLA) | | | | | | | | | | | | | | | | | | | | | |
| Outstanding mortgage loans amounts (OMLA) | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mortgage Interest Rates | | | | | | | | | | | | | | | | | | | | |
| Non-Performing Mortgage Loans | | | | | | | | | | | | | | | | | | | | |

**Appendix III: Research Data**

| Year | Quarter | Hass Sales Price Index | Mortgage Loan Accounts | Δ Mortgage Loan Accounts | Outstanding Mortgage Values (kshs. Bn) | Δ Outstanding Mortgage Values | Mortgage Rates | Non-Performing Mortgages (kshs. Bn) | Non_Performing Mortgages |
|------|---------|------------------------|------------------------|--------------------------|----------------------------------------|-------------------------------|----------------|-------------------------------------|--------------------------|
| 2019 | 4 | 0.012 | 31,416 | 0 | 274 | 0 | 0.1235 | 43.12 | 0.157372 |
|      | 3 | 0.009 | 30612 | 0 | 263.47 | 0 | 0.1244 | 42 | 0.158007 |
|      | 2 | -0.03 | 29254 | 0 | 243.5 | 0 | 0.1248 | 40 | 0.163409 |
|      | 1 | -0.026 | 27365 | 0 | 226.94 | 0 | 0.124933 | 39 | 0.173438 |
| 2018 | 4 | 0.013 | 26,504 | 0 | 224.9 | 0 | 0.125567 | 38.1 | 0.169409 |
|      | 3 | 0.011 | 26432 | 0 | 224.3 | 0 | 0.128467 | 36 | 0.158868 |
|      | 2 | 0.036 | 26349 | 0 | 223.9 | 0 | 0.132367 | 34 | 0.152568 |
|      | 1 | 0.024 | 26247 | 0 | 223.7 | 0 | 0.136067 | 27 | 0.122262 |
| 2017 | 4 | 0.01 | 26178 | 0 | 223.2 | 0 | 0.136767 | 27.3 | 0.122312 |
|      | 3 | -0.018 | 25894 | 0 | 222.87 | 0 | 0.1368 | 25 | 0.113743 |
|      | 2 | -0.031 | 25122 | 0 | 221.47 | 0 | 0.1366 | 24 | 0.106561 |
|      | 1 | -0.001 | 24754 | 0 | 220.45 | 0 | 0.136533 | 21 | 0.096847 |
| 2016 | 4 | 0.001 | 24,085 | 0 | 219.9 | 0 | 0.136867 | 22 | 0.100045 |
|      | 3 | 0.012 | 24217 | 0 | 212.65 | 0 | 0.1654 | 19 | 0.091324 |
|      | 2 | 0.036 | 24423 | 0 | 207.4671 | 0 | 0.181467 | 16 | 0.078663 |
|      | 1 | 0.042 | 24517 | 0 | 205.8735 | 0 | 0.179267 | 13 | 0.06266 |
| 2015 | 4 | 0.036 | 24,458 | 0 | 203.3 | 0 | 0.173467 | 11.7 | 0.05755 |
|      | 3 | 0.029 | 23747 | 0 | 196.22 | 0 | 0.160833 | 12 | 0.059015 |
|      | 2 | 0.022 | 22367 | 0 | 178.5 | 0 | 0.155733 | 11 | 0.064034 |
|      | 1 | -0.004 | 21034 | 0 | 169.3 | 0 | 0.1562 | 11 | 0.066745 |
| 2014 | 4 | 0.024 | 22,013 | 0 | 164 | 0 | 0.159767 | 10.8 | 0.065854 |
|      | 3 | 0.031 | 21436 | 0 | 155.74 | 0 | 0.164033 | 10 | 0.066136 |
|      | 2 | 0.006 | 20934 | 0 | 149.36 | 0 | 0.166767 | 10 | 0.064944 |
|      | 1 | 0.019 | 20159 | 0 | 144.36 | 0 | 0.17 | 9 | 0.063037 |

| 2013 | 4 | -0.01 | 19,879 | 0 | 138.1 | 0 | 0.1696 | 8.5 | 0.06155 |
|------|---|--------|--------|---|--------|---|----------|-----|----------|
|      | 3 | -0.015 | 19576  | 0 | 134.73 | 0 | 0.169467 | 8   | 0.061902 |
|      | 2 | 0.023  | 19122  | 0 | 126.89 | 0 | 0.1743   | 8   | 0.062416 |
|      | 1 | 0.005  | 18735  | 0 | 122.56 | 0 | 0.179    | 8   | 0.061195 |
| 2012 | 4 | 0.017  | 18,587 | 0 | 119.6  | 0 | 0.183233 | 6.8 | 0.056856 |
|      | 3 | 0.051  | 18237  | 0 | 113.26 | 0 | 0.200033 | 6   | 0.056507 |
|      | 2 | 0.013  | 17936  | 0 | 107.46 | 0 | 0.202133 | 6   | 0.053043 |
|      | 1 | 0.013  | 17143  | 0 | 99.73  | 0 | 0.200533 | 5   | 0.050035 |
| 2011 | 4 |        | 16,135 | 0 | 91.2   | 0 | 17.9133  | 4   | 0.039474 |
|      | 3 |        | 15727  |   | 87.23  |   |          |     |          |