COLLEGE OF BUSINESS AND ECONOMIC

SCHOOL OF BUSINESS

Master of Business administration

MORTGAGE FINANCE MARKET AND HOUSING AFFORDABILITY IN URBAN AREAS IN RWANDA (A case of Kigali city)

A thesis submitted in partial fulfilment of the requirements for the award of the Degree of Master of Business Administration in Finance

IYANDEMYE SAMUEL

2017

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By

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July 2017

DECLARATION AND COPYRIGHT

I declare that this Dissertation contains my own work except where specifically acknowledged

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Signed……..

Date…….

ACKNOWLEDGEMENT

I wish to thank my committee members who were more than generous with their expertise and precious time. A special thanks to Dr. Jonas BARAYANDEMA, my supervisor for his countless hours of reflecting, reading, encouraging, and most of all patience throughout the entire process. Thank you agreeing to serve on my dissertation. I would like to acknowledge and thank my lecturers and other post graduates staffs for allowing me to conduct my studies and providing any assistance requested. Special thanks go to the MBA coordination team for their continued support. Finally I would like to thank the Banks and other Institutions that assisted me with this project. Their excitement and willingness to provide feedback made the completion of this research an enjoyable experience.

DEDICATION

I dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my beloved daughter IYANDEMYE Ada Samuella and my loving wife, MD UWERA Claudine; whose words of encouragement and push for tenacity ring in my ears. I dedicate this work and give special thanks to my classmates and Postgraduates staffs for being there for me throughout the entire MBA program. Both of you have been my best cheerleaders.

ABSTRACT

The high speed of urbanization in Rwanda has considerably increased housing demand and the mortgage market has emerged to ensure that funds are available to producers and purchasers of real estate. But, the housing needs vis-à-vis the capacity of most people to afford to own homes from their own incomes is still a challenge as mortgages products are available at outrageous conditions making mortgage finance unaffordable. For better market readjustment, the effects or mortgage market factors to housing affordability should be clarified. The objective of this study is therefore to determine how mortgage finance market affects the affordability of housing in Rwanda, particularly in Kigali city.

To attain this objective, relevant research methods are used to collect and analyse data. The research findings revealed that the adopted loan amortization schedule, the risks caused by the absence of secondary mortgage market resulted in high cost of finance, and the dominance of short-term financial institutions reduced mortgage finance affordability and therefore only 15% of Kigali city households could afford housing annually in the last ten years. It is noted that, this said affordability is only purchase affordability without repayment affordability. The study highlights also that, if the secondary mortgage market is properly developed to reduces the risks that caused the high interest rate, the flexibility on loan amortization is adapted and the long term financial institutions participate in the market with favourable legal framework, the mortgage finance market can contribute a lot in alleviating the issue of housing affordability in Kigali city. And Kigali city become a show case to other developing countries too.

Key words: *Mortgage, mortgage finance market, housing affordability*

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LIST OF ABBREVIATIONS OR ACRONYMS

AaR: Affordability at Risk

AL: Affordability Limit

ARM: Adjustable Rate Mortgage

BK: Bank of Kigali

BNR: National Bank of Rwanda

BoG: Bank of Ghana

CAHF: Centre for Affordable Housing Finance in Africa

CNT: center for neighborhood technology

FHA: Federal Housing Authority

FM: Fixed Rate Mortgage

Frw: Rwanda Francs

GDP: Gross Domestic Product

H+T: Housing and Transportation

HAI: Housing Affordability Index

HFC Bank: Home Finance Company

I&M Bank: Investment and Mortgage Bank

KCB: Kenya Commercial Bank

LTV: Loan To Value

MBA: Master of Business Administration

MFIs: Micro Finance Institutions

MININFRA: Ministry of Infrastructure

NISR: National Institute of Statistic of Rwanda

PMT: Periodic payment

RBC: Royal Bank of Canada

REIT: Real Estate Investment Trust

UN-Habitat: United Nations Human settlements Programme

VA: Veteran Affairs

Chapter1: INTRODUCTION

1.1. The Study Background

High urbanization speed has made home one of the basic necessities of man in modern societies. At the same time, the housing market contributes significantly to national economic development through its forward and backwards linkages with other sectors of the economy. This ubiquitous acceptance notwithstanding, access to decent and affordable housing remains one of the greatest challenges within the Sub-Saharan African region due to a plethora of demand and supply constraints exacerbated by its exponential population growth and low income levels (Center for Affordable Finance in Africa 2012). One key constraint to the realization of decent housing units by many households is the issue of finance; high and escalating housing prices coupled with the meagreness of incomes makes home ownership barely a dream to most households in developing countries (Boamah, 2011).

The theories have proved that the use of residential mortgage credit as a means of financing homeownership is indispensable. Mortgage markets have emerged to ensure that funds are made available to producers and purchasers of real estate (World Bank 2011). A well-functioning mortgage market serves the basic role of increase funding for housing at competitive cost, thereby enabling more people to have access to decent housing (Bog, 2007). In addition, International experience has further shown that favorable access to mortgage loans has significant impact on the quality of housing, infrastructure and urbanization (Bright *et al.*, 2016). But the recent studies challenged the workability of mortgage funding in developing countries. The evidence is found in sub-Saharan countries. For example, the Center for affordable housing in Africa (2016) argued that, only 17.45% in Kenya of urban could afford mortgage finance ; in Uganda around 90% of population cannot afford formal mortgage finance the same for Rwanda, where less than 10% of urban dwellers can access formal mortgage lending (CAHF, 2016). In many countries in Africa, access to residential mortgage facilities is woefully inadequate and virtually non-existent for middle and low income groups (Aha, Ayitey and Martey, 2014).

Various researchers strived to find out what should be done to address the challenge. Therefore, the majority have called for measures to reduce mortgage interest rates and extend the mortgage term to set the auspicious nature of mortgage finance market (Kihato and Rust, 2010; Aha, Ayitey and Martey, 2014). These studies covered only few mortgage market indicators. However, the scheme somehow solves the issue of purchasing affordability. On the other hand, it

compromises the repayment affordability issue (Mutero, 2010; Arvanitis, 2013). Evidently, the available theories are not sufficient to address housing affordability concerns in developing countries. There are still gaps in theories highlighting the effects of mortgage market factors to housing affordability. Therefore, this research examines the effect of mortgage finance market on affordability in the city of Kigali.

Mortgage finance market indicators, such as mortgage term, payment to income ratio, loan to value ratio, interest rate, available types of mortgage loan etc, are analysed to find out to what extent they affect housing affordability in selected area for the last ten years.

1.2. Statement of the Problem

Different theories and surveys results have proved that the problem of shelter affordability should be solved through mortgage schemes(Boachie, Kofi and Sciences, 2015). But the challenge is that the theories are successful in developed countries than in others. In developing countries, they are applicable at the slight rate (Mutero, 2010). The case is not different in Rwanda (Mutero, 2010; UN-HABITAT, 2012; MININFRA, 2013). Therefore, the mortgage market should be readjusted to fit African context for sustainable housing affordability. It is argued that the effectiveness and efficiency of market readjustment can only become realistic if the effects on mortgage market factors to housing affordability are clearly understood in particular market (Lin and Yang, 2005; Campbell, 2013).

As seen earlier, various researches have tried to elaborate how the market should be readjusted. Their overall suggestions are the reduction of the interest rate and the increase of mortgage term (Mutero, 2010; UN-HABITAT, 2012; IEG-World Bank, 2016). Referring to Arvanitis (2013), the scheme can only increase purchase affordability, but it compromise repayment affordability. In addition, few theories have elaborated the effects of mortgage markets elements to housing affordability in sub-Saharan countries in general, and in urban areas of Rwanda in particular (Mutero, 2010). The study analyses the effects of mortgage finance market on housing affordability as foundation to sustainable mortgage finance market redesigned to fit developing countries context. Hence, it is worthy to highlights the effects of essential mortgage market variables to housing affordability indicators in Kigali city. The results of the study enhance sustainable decisions making in mortgage market reformation for sustainable housing affordability.

1.3. Research Questions

In this section, we elaborate the questions that would be answered and avail the targeted findings.

1.3.1. Main research question

How does the mortgage finance market affect the housing affordability in Kigali city?

1.3.2. Sub research questions

1. What are the mortgage finance market factors which affect the housing affordability in Kigali city?
2. How is the status of mortgage finance market over the last 10 years?
3. What are the housing affordability indicators in the city of Kigali?
4. What has been the effect of mortgage finance market on housing affordability over the last 10 years?

1.4. Objectives of research

1.4.1. Main research objective

The objective of this study is to determine how the mortgage finance market affects the housing affordability in Kigali city.

1.4.2. Specific objectives

1. To examine to which extent mortgage finance market affects the housing affordability over the last 10 years in Kigali city.
2. To find out the most influential mortgage finance market determinants of housing affordability in Kigali city

1.5. Research hypothesis

H_0: Mortgage finance market facilitates housing affordability in Kigali city

H_1: Mortgage finance market does not facilitate housing affordability in Kigali city

1.6. Significance of the Study

The problem of mortgage finance affordability is alarming in most of all developing countries. This is the same case for Rwanda. Only few Rwandans can access the scheme. However, there is a need of thorough researches to prof the best way of improving mortgage finance market. One of the major problems is to know at which extend the problem is? The majority of researches set out only the low level of income as the cause of unaffordability. On the other hand, the cost of finance and the terms to be followed are not yet clearly illustrated. Hence, this research will illustrate the effect of mortgage finance market on housing affordability. Evidently, the findings of this research will facilitate further inquiries on what to be done on the improvement of mortgage funds and the way forward, simplifying researches on satisfying mortgage market segments and assists further studies on sustainable terms and regulations governing mortgage finance market in Rwanda. Briefly, this study will increase the body of knowledge in mortgage finance industry in developing countries and avails the foundational information required to solve the problem of housing affordability

1.7. Rationale of the Study

Refereeing to other works completed in mortgage finance, there are still some gaps in identifying the status of mortgage market and its implication of housing affordability. Surely, it is difficult to solve the problem if you don't understand it. Hence this study intends to increase the level of understanding of all concerned sides, both academicians and practitioners, in mortgage finance market.

1.8. Conceptual Framework

Mortgage finance markets have been proven as the sustainable solution to middle and low income earners. The same approach was adopted in developing countries especially in Rwanda. But there are still a mismatch between the demand and supply of mortgage products which leads to low level of funds affordability of developers and buyers of real properties. The research studies the effects of this market to shelter affordability. It analyses to what extent the "pillars" of the mortgage finance market facilitate the housing affordability in the city of Kigali over the last ten years. As we are studying the effects of the mortgage market to housing affordability, the analysis will focus specifically on relationship between mortgage finance market factors and housing affordability indicators in the city of Kigali.

1.9. Scope and Limitations

The research study investigates how mortgage pricing affect housing affordability. Through survey and literatures, it determines the mortgage market factors and suitable housing affordability indicators to consider in Kigali and shows the mortgage finance market effects on housing affordability in the city of Kigali. As MBA finance candidate, the study will concentrate much more on finance side. We are sure that there are no active real estate financial institutions in Rwanda. Though, institutions in concern here are commercial banks with mortgage product and one development bank with housing finance product. It is a fourteen week study starting from mid February 2017 and takes an end in May 2017. And the case study will be the city of Kigali alone. The majority of data are extracted from NISR, commercial banks, and concerned government competent institutions annual reports and archives. Secondary data are retrieved in academic publications such as journals, recent books and publications and competent organs in Rwanda. Finally the field survey will provide the rest of the data which cannot be found in the secondary data. Hence the scientific methods and tools are used for presentation and analysis of data.

Chapter 2: LITERATURE REVIEW

2.1. Introduction

This study, examines the effects of mortgage finance market on housing affordability. It is worthy to look at different literatures in relation with mortgage finance market and housing. Therefore, relevant literature is developed on mortgage finance itself, mortgage finance market indicators, housing affordability and finally, the effects of mortgage finance market on housing affordability.

2.2. Mortgage concept

Mortgage can be defined as the use of other people's money to either buy or build or renovate a house and the real property serves as collateral. The term is also used while raising funds for other purposes by pledging a real estate. This real property can be either residential or commercial or other purposes(Boachie, Kofi and Sciences, 2015). In this study, our concern is only residential real estate. Hence, we can consider it as source of funds to finance acquisition of residential houses. However, let us have a sight at mortgage characteristics, mortgage types, mortgage market and finally mortgage suppliers.

2.2.1. Characteristics of residential mortgage

In developed countries, the residential mortgage loan is characterized by the low interest rates between 1.68 % and 5 %, long maximum payment period between 25 year and 30 year depending on the county (Aha, Ayitey and Martey, 2014). And the nature of interest rates varies depending on lender and borrower agreement after discussions. It may be either fixed rate mortgage or adjustable rate mortgage or convertible rate one (Bog, 2007). On other side, residential mortgage in developing countries is opposite. The interest rate is high, and in many countries the mortgage term is 25 years and less. There is no room for negotiation and the interest can be adjusted only upward. Generally the interest rate is a fixed one (Aha, Ayitey and Martey, 2014). Both the developed and developing countries have the down payment characteristic known as Loan to Value Ratio and the periodic payment is 30% of the income (Rowley *et al.*, 2012). Generally, residential mortgage is characterized by long term finance which requires serious underwriting. Based on the information provided by the borrower; the mortgage officers analyses the so called four Cs. The borrower's capacity viewed though his

possible Payment to income ratio, through his ability to meet loan to value ratio and through other financial ability to close the deal. Second, the borrower's Credit history is analysed i.e. the performance analysis of previous loan acquired. The third C is Character, which evaluates the borrower's credibility and reputation. And finally the collateral is evaluated basing on the Valuation report provided (Brueggeman and Fisher, 2011). Note that these characteristics of residential mortgage determine its classification. The following section discusses the types of mortgage loan and the suitable ones for our study.

2.2.2. Types of mortgage loans

Residential mortgage loan can be categorized in different ways. Some theories differentiate mortgages loans basing on interest rates risks, default risks, payment mode, mortgage term, etc. According to Brueggeman and Fisher (2011), they are three types of mortgage loan based on interest rate risks. The Fixed rate mortgage (FM), is the mortgage loan type, where the interest rate remains fixed for the whole period; whereas the interest rate for Adjustable rate mortgage type (ARM) is readjusted periodically in line with current market conditions. The convertible mortgage loan provides a room for changing from either FM to ARM or the opposite. Brueggeman and Fisher (2011) classified mortgage loan basing on default risks too. Conventional mortgage loan, insured conventional mortgage loan, FHA insured mortgages and VA guaranteed mortgage loans. In conventional mortgage loan, the mortgagor and mortgagee seat down and agreed on loan to value ratio, payment to income ratio and the interest rate (FM or ARM terms). The borrower provides collateral and the assured mortgage loan is certain percentage of the Value of that collateral. The borrower may need the mortgage loan exceeding the allowable percentage of collateral value. Therefore, the mortgagor may request the mortgage insurance. In this case, it becomes insured conventional mortgage loan. When the insurer is Federal housing Authority, the mortgage loan is called ''federal housing authority (FHA) insured mortgages''. Finally the mortgage loan guaranteed by the military veterans is called ''Veterans Afairs (VA) guaranteed loans''. There are other theories which classify mortgages basing on payment mode. Principal and interest mortgage is the type of mortgage where the periodic payment is made of both mortgage and the interest. This is the most common in Rwanda. The interest mortgage may come in hybrid form. Here, the periodic payment is made of interest only and paid for perpetuity. As the payment is perpetual, there is no payment of principal. It is called

Interest only lifetime mortgage. There are also others like reverse mortgages, interest and partial principal, variations and foreclosure and nonrecourse lending all classified according to the payment mode (Lehnert, Passmore and Sherlund, 2008). There is also classification basing on length of mortgage term, capacity of borrower, etc... According to Pinnegar *et al.* (2008), the type of mortgage loan has its own impact to either the lender or the borrower. It is very important to decide the type of mortgage loan which brings the win-win scheme (Pinnegar *et al.*, 2008). In this study we chose only three types of mortgage loan combining both interest rate and mode of payment classifications. Those are fixed rate mortgage (FM), adjustable rate mortgage (ARM) and the convertible mortgage loans. All these three types of mortgage are interest and principal mortgages.

2.2.3. Mortgage finance market

According to Elliott (2011), mortgage finance market is a market for loans to people and institutions buying property. For the World Bank, mortgage finance market is the demand and supply of housing funds, market payers and conditions associated to that market aiming at sustainable housing affordability (World Bank 2011). Hence, mortgage finance market is the market of loans for raising housing funds with market conditions and participants enhancing sustainable housing affordability. They are various types of mortgage markets; but according to sustainable housing affordability, there are two major types; Primary mortgage market and the secondary mortgage market. According to Belsky, Goodman, and Drew (2005); the primary mortgage market is when real estate finance intuitions and Banks enter into mortgage lending contract with the borrowers for housing purpose. Due to illiquidity nature of Real Estate and the long term requirement in mortgage finance, there is need of relaxing from the risks associated for both lenders and borrowers. Therefore, the secondary mortgage market is crucial (World Bank 2011). The secondary mortgage market is when the contracted formed in primary market is transformed into portfolios and or securities marketable in capital market (Hulchanski, 2005). The latter mortgage type is not yet developed in Rwanda; a further step is still needed. Let’s look at the Rwanda mortgage finance market players in the next topic.

2.2.4. Types of mortgage finance market

There are two broad categories of mortgage finance market; the Primary mortgage market and secondary mortgage market.

2.2.4.1. Primary mortgage market

The primary mortgage market is the market where financial institutions provide mortgage loan to the borrowers for real estate acquisition. The supply side remains with the right to confiscate the pledge provided by the demand side and the provider of collateral keep enjoying the use of pledged Real Estate (Mogaka, Mboya and Kamau, 2015). The primary mortgage suppliers are principally financial institutions such as banks, savings and loan associations, pension funds, insurance companies and mortgage bankers who have money to lend. For a primary mortgage market to be effective, mortgages must offer attractive risk-adjusted returns, documentation and underwriting; they must be standardized; and there must be a proven record of high-quality servicing and collection (Boamah, 2011). According to Jaffee and Renaud (1996), there are risks and challenges associated with lenders in the primary mortgage market primarily the commercial banks. Those risks are:

1. **The liquidity risks**

The liquidity is ability of asset to be converted easily into cash. The Lenders with primarily short term liabilities (notably deposits) are exposed to liquidity risk Liquidity, when they allocate a large part of their assets to mortgages because mortgages are typically long term assets (Berhad, 2013). Liquidity risk has two key elements: short-term cash-flow risk which is the probability the lender can lack the liquidity to meet the daily liabilities. Reason being that mortgages are not short-term investments, same thing on their maturities and therefore present a low liquidity for such banks that operate to meet their short-term transactions and deposit withdrawals. The second key element is the long term funding risk; which is the risk that the mortgage loans may not be available when the depository or non-depository institutions require them or the funds may also not be available for the required term or at acceptable cost (Jaffee and Renaud, 1996).

2. Defaults risks

The credit risk known as a default risk is the probability that the borrower fails to repay the guaranteed mortgage loan. This type of risks is highly present in developing economies. Although the mortgage loan amount is lower than the property value and the lender can always recover the loan principal by taking over the property and selling it; there are still challenges in developing and transitional economies. Firstly, because the property rights and foreclosure procedures needed for real estate to act as loan collateral, are not well established in the legal and institutional structures. Second reason is that accurate methods for estimating property values are still developing (Jaffee and Renaud, 1996; Berhad, 2013). Credit risk ranks the second challenge to developing a mortgage market, after lack of access to long term funds being the first constraint and high interest rates as the third (World Bank, 2011).

3. Interest rate risk

When the reasonable fixed mortgage interest rate is applied, there is a chance that market interest rates may increase due to inflation and that such interest rates are not immediately raised in return and this leads to interest rate risk. This risk is accentuated by the long term nature of mortgages. However, many of lenders in developing and transitional economies decide to apply the fixed rate mortgage but at higher cost or apply the adjustable rate mortgage to displace such risks to the borrowers (Boamah, 2011; Berhad, 2013).

Jaffee and Renaud (1996) proposed that the interest rates risks should be alleviated by floating rate or adjustable rate mortgages, but these instruments only shift the interest rate risk to the borrower. This increases the default probability because adjustable rate mortgages tend to transform the banks' interest rate risk into credit risk. Concerning the credit risk mitigation, it is argued that the mortgage insurance, thorough analysis of borrowers capacity and considering changes that might occur in interest rate. For the liquidity risks (Jaffee and Renaud, 1996) suggested that transferring such risk to long term investors in the secondary mortgage market would increase the level of liquidity in the mortgage market. Boamah (2009) added on this, noting that liquidity would reduce liquidity risk, as it would facilitate participation in the mortgage market and increase lending activities, by providing lenders access to the capital market and expanded funding opportunities**.**

2.2.4.2. Secondary mortgage market

However, the market for securities derived from mortgage loan is a secondary mortgage market. It is the segment of the mortgage market where existing mortgages are resold (Bright *et al.*, 2016). In secondary mortgage markets the products are increased in number. Their form will depend on the type of participants. And the products may be mortgage bond, swap, option stocks and shares, debentures, treasury bills etc. Mortgages in this market are often grouped together into tranches based on risk, size and structure, and are then sold as a collateralized debt obligation or mortgage backed security (Boamah, 2011). The secondary mortgage market in residential mortgages is a network of mortgage originators who lend money to homebuyers and investors who buy mortgage loans. By its nature, it helps the loan originators to transfer the risk associated with the mortgage loans to third parties. Therefore, it is argued that the secondary mortgage market reduces the burdens associated with the primary mortgage market once the preconditions of its existence are met (Lehnert, Passmore and Sherlund, 2008; Bright *et al.*, 2016). Though, it can contribute in increasing mortgage finance affordability. There are prerequisite of a sound secondary mortgage market to be successful. Boachie, Kofi, and Sciences (2015) argue that a successful and sustainable secondary mortgage market depends on discussed in the ensuing sections.

1. **Stable macroeconomic environment**

The macroeconomic environment has a major effect on the demand of mortgage. The macroeconomic environment with a high inflation rate and/or high nominal interest rates leads to an increase in the mortgage interest rate as the lenders seek to compensate the loss of purchasing power in their money. While in the presence of a low inflation the interest rates happen to be low and stable, this leads to an increase of in demand of loans and attracts long term foreign investors. Therefore, volatile macroeconomic environment have a significant effect on the supply and demand of loans and the characteristics of loans offered by lenders and creates difficulties for investors (Badev, 2014).

2. **A well-developed legal environment**

The sustainable land titling and well developed legal framework and structure facilitate borrowers to provide reliable collaterals and the mortgage lenders act confidently in loan provision. Hence, well-functioning title registry system is an important factor that affects the primary and secondary mortgage system (Boachie, Kofi and Sciences, 2015).

3. The primary mortgage market

Since the secondary mortgage market helps the primary mortgage market to transfer the risks associated with the holding of mortgage loans to third parties, the mortgage cash flows must be predictable to attract investors. The underwriting must be consistent, solid and well documented, and appraisal forms should use accurate methods to determine the value of properties. The servicing of loans also should be consistent as it is an important component of a reliable secondary mortgage market (Ajanlekoko, 2001). The introduction of uniform mortgage documents, loan applications, appraisal forms, servicing and underwriting standards for mortgages make them more standard and liquid. Standardization of the mortgage instrument is a key factor in secondary market development. Mortgages must be attractive investments. The interest rates on the mortgages must be market determined which means they should fall in the balance of what the borrowers can afford to pay and what the investors are willing to accept as a return on investment and provide investors with a positive return. To create a secondary mortgage market there must be enough volume of loans to justify the cost for its development. The expansion of balance sheets to hold more mortgages and the more competitive for mortgage originators, is the mortgage market the greater potential for secondary market development (Badev, 2014; Boachie, Kofi and Sciences, 2015)

4. The capital market

The capital market by definition deals with the investors who are looking to commit capital to long term uses. Mortgage securities are vehicles to tap capital markets for funds for housing and can improve the accessibility and affordability of housing and allow lenders to better manage the complex risks of housing finance (Badev, 2014). For a capital market to work out, the use of particular instruments needs to be in line with the standards and prerequisites of investors and the underlying legal infrastructure. Since a secondary mortgage market is a system of increasing liquidity into housing finance through the capital market. It means that the demand for mortgage-backed securities and Mortgage-backed bonds is determined by investors in the capital markets, while their supply is determined by mortgage lenders in the housing finance market (Ajanlekoko, 2001). However, this should be put under consideration as well. In a well-developed capital market, wholesale funding and secondary mortgage market can be developed by the private sector, whereas in less developed capital market, government support maybe necessary to achieve investor acceptance and increased access to funds. Secondary mortgage institution must

have sufficient scale and capital to absorb the start-up costs of developing the systems, procedures and marketing as well as risk associated with making a market in a mortgage a backup guarantee by the government can provide the necessary comfort to investors (Lehnert, Passmore and Sherlund, 2008).

2.2.5. Mortgage finance market indicators

In many literatures, market is always considered as the interaction between the demand and supply (Monash, 2004; IEG-World Bank, 2016). This is not different with the mortgage finance market. When Mortgage finance market comes, People start thinking about the interest rates, lending institution and borrowers. In this study, we wish to look beyond that. Not ignoring the interest rates and other cost associated, the factors like loan to value ratio (LTV), length of mortgage period (mortgage term), and the proportionate of periodic payment to the income are discussed. These indicators are the key variables for further market analysis (Atati 2014; Green and Shoven 1986; HKMA 2010) and are detailed below.

2.2.5.1. Loan to Value Ratio (LTV)

For the sake of reducing risks, most of all lenders in developing countries prefer the commitment and contribution of the borrower. The contribution is, for most of the time, certain percentage of the total value of the targeted property (Wong *et al.*, 2004). The professional term for this percentage is ‘’ Loan to Value (LTV) Ratio. This factor is among the major determinants of mortgage funds affordability. Its growth results in decline of housing funds affordability to certain group of income which leads to low housing affordability (HKMA 2010). Even though the reduction of LTV seems increasing housing affordability; there are other theories warning that it is only the purchase affordability increased. And there is no warranty that the repayment affordability is satisfied. Hence, the affordability limit concept contradicts it. It says that the affordable limit is an increasing function of LTV. It means that the increase of LTV results in increase of housing affordability (Gan and Hill, 2009). This is justifiable as the affordability limit concepts consider both purchase affordability and repayment affordability at the same time. In addition, the combination of equity and debt in financing can eliminate risks on both sides once quality level of leverage is enhanced (Glickman, 2014). Hence, the rise of LTV increases housing affordability but become problematic if the down payment constraint is binding for a significant proportion of households(Gan and Hill, 2009).

2.2.5.2. Mortgage interest rate

Nowadays, the challenge of affordable housing has pushed many researchers to explore the causes and cons of current mortgage finance status. The cost of mortgage funds is the most reflected factor. Mortgage interest rate; determine the rewards of lender committing funds for future repayment. On the other hand, it determines the cost of accessing mortgage funds to borrowers. Hence it is key factor of mortgage finance market (Boamah, 2011). Its change, affects directly housing affordability in both purchase affordability and repayment affordability. Therefore, the adequate form and size of interest rate should be chosen for sustainable housing affordability (Defusco *et al.*, 2014). It is argued that, the mortgage interest rate roots from either economic environment or the nature of the market itself. The interest rate caused by the economic frustration is the most challenging in mortgage finance market. It limits housing affordability from inner and outer sides of housing affordability (Aha, Ayitey and Martey, 2014). On the other hand, the mortgage interest rate rooted in the nature of the mortgage market may be remedied. This interest is always found in immature mortgage market where the secondary mortgage market is missing, where the mortgage fund suppliers are dominated by middle and short term financial institutions. Therefore, the perfection and maturity of mortgage finance market reduces mortgage interest rate and affect positively the housing affordability (Brueggeman, William B and Fisher, 2011).

2.2.5.3. Mortgage term

Every mortgage contract should determine the period of payment, the due date of payment and the duration. This period of payment is known as Mortgage term in Real Estate finance. However, it is the source of the profit to the lenders committed the funds for future refunds accompanying with profit (Burke, Stone and Ralston, 2011). Most of the time, its length depend on the issuing financial organizations. Commercial banks and micro finance institutions provide short and or middle mortgage term. Their liquidity constraint limits their ability of providing the long term mortgage products. Only building societies, housing banks, pension funds, REITs, insurance companies and other real estate financial institutions can provide long term mortgage finance duration (Samuel, 2013). Mortgage term also plays the vital role in mortgage affordability. It is argued that, the increase of mortgage term increases purchase affordability and increase the profit to the mortgage lenders once the risks are well managed. Obviously the

liabilities of borrowers are aggravated hence; repayment affordability is reduced (Gan and Hill, 2009).

2.2.5.4. Payment to the income ratio

After discussing other factors, the last but not the least is the Payment to income ratio. The payment to income ratio is the maximum accepted proportion of the household's income during the mortgage payment. This ratio condition varies in different countries. For example, 1/3 of the income is the maximum loan payment allowed in Rwandan financial system. It can be extended to 50%, when the mortgage loan is for owner occupation purpose. Note that there is increase as the borrower will no longer pay the housing rent. It is the essential tool for mortgage supplier to measure the borrower's ability to repay back the mortgage loan (Rowley *et al.,* 2012). This policy is beneficial to both sides in mortgage market as it indicates the capacity to fulfill the loan agreement to be signed. Once the borrower decides to use the bigger part his/her income, repayment affordability is disturbed (Bierut et al 2015).

2.2.5.5. Types of mortgage finance market in operation

As seen in in previous 2.2.4 section, one of major determinants of mortgage finance market status is the nature and types of mortgage market in operation. When the primary mortgage is the only market in operation, the risks are high to the mortgage lenders and there is a high probability of expensiveness of mortgage products. These are common in developing and transitional economies (Ajanlekoko, 2001). Well-functioning mortgage finance markets must have both primary and secondary mortgage market in operation. In addition the secondary mortgage markets should be vibrant to attract investors and the primary mortgage should be well organized and active as it is the foundation of the secondary one. However, it is argued that the types of mortgage market in operations determine whether the mortgage finance market is vibrant or not (Badev, 2014).

2.2.5.6. Mortgage loan amortization schedule types

Referring to the recent theories the major types of mortgage loan amortization schedule are '' even total payment and even principal payment''. In even total payments, the mortgagee pays both the principal and interest. The total periodic payment remain constant during the payment period, the interest paid keep decreasing while the principal payment increases. On the other side

for the even principal payments, the periodic payment and interests keep decreasing while the principal paid stay constant for the whole period (Brueggeman, William B and Fisher, 2011). They may be other derivatives depending on the both side agreements. Those are like Even Loan Payment Computation, Balloon Payments and etc… According to Brueggeman, William B;Fisher (2011) the choice made maybe either expensive or cheap. Therefore, the applied amortization schedule affects the mortgage affordability (Hofstrand, 2013).

2.2.6. Mortgage suppliers (Source of mortgage loan)

The characteristics of residential housing do not allow short term financial institutions to be qualified mortgage suppliers. The short term fund suppliers such as commercial banks and FMIs need enough liquidity to meet the needs of depositors. Once they engage in mortgage loan, there is high probability of charging higher interest rate and reducing the mortgage term as they must manage the liquidity issue (Glickman, 2014). According to Lawson et al. (2012), mortgage finance suppliers, should be financial institutions without plentiful need of financial liquidity. Those are insurance companies, life insurance companies, Property companies and the stock market, housing banks, building societies, real estate investment trusts (REITs), pension funds and etc.. The facts that mortgage suppliers are specific are sufficient to predict the negative effects rose from unqualified financial institutions. The dominance of shorter mortgage suppliers causes high cost of mortgage funds and strict conditions in mortgage finance market resulting in limited housing affordability (Aha, Ayitey and Martey, 2014).

2.3. Housing affordability

In literature, housing affordability has been defined in various ways. Some focused on low and middle income or median household income (Burke, Stone and Ralston, 2011). For further understanding the concept of housing affordability, it is worthy to start by defining the affordability. According to (Monash, 2004), the concept of affordability has two elements: people and what they want to buy. It is essential that the affordability of a given item be correlated with the buying power of its users. Though, in this context, the two elements of housing affordability are housing and its users. Hence, housing affordability describe the relationship between those two elements. Housing affordability can also be defined based on the classic assumption of Economic Man. In this concept, anyone who has somewhere to live is

living in affordable unit. This concept ignores the standards of living (Burke, Stone and Ralston, 2011). Actually, the housing affordability is defined as the ability of households to access housing either by rent or by purchase or by personal construction (O'Neill *et al.*, 2008). In this research, we look at housing affordability in at least three concepts; purchase affordability, repayment affordability and income. Purchase affordability refers to the ability of a household of borrowing enough funds of purchasing a home. Repayment affordability constitutes the aptitude of a borrower to persist the burden of mortgage repayment. The income affordability compares the income and the price of house; house price to income ratio (Gan and Hill, 2009). At a certain price of house, one may not afford to borrow for it; but when the length of the mortgage increases borrowers access the mortgage immediately; this is purchase affordability. However, the situation does not guaranty the persistence of the borrower during the repayment as whole; repayment affordability. The situation will be better only when the combination of borrower's income and market conditions allows having both repayment affordability and purchasing affordability. Hence, housing affordability is achieved only, when three forms of affordability are achieved.

2.3.1. Housing market trend

Some researchers and academicians view the housing market trend as the change of housing prices for certain range of period of time. For others, the quantity of houses in their respective categories is used i.e. the change of demand and or supply in specific time (Pedersen and Isaksen, 2015). Both the housing prices and housing demand keep increasing all over the world. In developed countries; only housing prices change considerably compared to the change in quantity demanded. On the other side, both house prices and housing demand are changing dramatically in developing countries (Pedersen and Isaksen, 2015). For example, in Ghana, 100,000 units are needed annually, but only 40,000 units are being delivered every year (Boachie, Kofi and Sciences, 2015). In Kenya, The average price of property was 7.1million Kenya Shilling in December 2000. However, it has risen to 31.4 million in March 2017 (Arvanitis, 2013). By having a look at the increase in demand and the price, one may conclude that the market is booming. But there is a major challenge of housing affordability. Less than 20% of population in developing countries has access to formal housing. Even though there are opportunities clear attention and deep analysis is needed (Lawson *et al.*, 2012). The housing

market in Rwanda is not different even though it is still at its early stage. Few findings available indicate that the estimated housing demand in Kigali city in 2012 reached 458,265 dwelling units. These requirements could be met by building new 344,068 dwellings plus existing acceptable housing stock of 114,197 units. Surprisingly, the supply is still below the demand and the delivered real estate is only achieved by the household earning Frw 900,000 and above (UN-HABITAT, 2012).

2.3.2. Spatial house price trends

Housing distribution has changed from social consideration to market forces and amenities consideration. As results, there came spatial differences of house prices. It is argued that the spatial housing market prices work through two channels: the productivity channel and amenity channel. The places with high economic agglomeration attract people at high competition thus can bear higher house prices. On the other side, the availability of valuable amenities attracts people too, but at the low pace compared to productivity channel (Zhuang and Angeles, 2006). Due to the availability of both channels in urban areas than rural areas, it is evidenced the house prices in urban centers are higher than in rural areas. In the urban centers themselves, the trend indicate that house prices are higher near the leading economic activities and amenities and reduce gradually till the end of the thresholds of such economic agglomerations and or amenities (Zhuang and Angeles, 2006).

2.3.3. Housing affordability indicators

The theories of the current era indicate different ways of measuring housing affordability. However, not every indicator is applicable in every country, region or any other particular location. In this part, different approaches are reviewed and later on, those which are more relevant to this study are highlighted.

2.3.3.1. Median Multiple/ Price to income ratio

The concept Median multiple is the same as the price to income ratio. This is the indicator recommended by the World Bank (Norazmawati, 2015). It is mostly used to evaluate urban markets in a certain country. Median multiple is the ratio of the median house price over the median of gross annual household income (Burke, Stone, and Ralston 2011). The market is said unaffordable when the median multiple is above 3 and the opposite indicate the affordable

market. But, when the median is 2 and below, some theories highlight the market depression (Cox and Pavletich, 2017). Internationally the table below shows how it works

Table 3.1: Scale of multiple median

Rating	Median Multiple
Severely unaffordable	$X \geq 5.1$
Seriously Unaffordable	$4.1 \leq X \leq 5$
Moderately Unaffordable	$3.1 \leq X \leq 4$
Affordable	$X \leq 3.0$

Source: The New Zealand Initiative, 2016

2.3.3.2. Income affordability

The measuring housing affordability using household income is done in different ways for various locations. Some use Housing-expenditure-to-income-ratio tool and 30:40 indicator. The common thing is that all consider the percentage of the income spent on housing. For housing expenditure to income ratio tools, the maximum expenditure should be 30% and 25% depending on the country (Tang, 2009). The 30:40 identifies households as being in housing affordability stress when the household has an income level in the bottom 40 % of country's income distribution and is paying more than 30 % of its income in housing costs. It is an indirect gouge of housing affordability for particular group and not a scientific measurement for determining affordability in general market (Burke, Stone and Ralston, 2011). In another form, income affordability may be used as the family budget approach. The aim of this method is to measure whether the household's revenue is sufficient to cover both housing and non-housing expenses. Housing expenses are measured based on fair market rent; but in most cases the basic income determined referring to this approach is greater than the amount a household actually needs for basic requirements. The last approach of income affordability is the residual income approach which is used to clarify whether the household's income can cover other remaining expenses after the payment of housing expenses (Burke, Stone and Ralston, 2011). Not that, for both residual income approach and the family budget approach, the benchmark is grounded on ''enough or not" with different focuses (Rowley *et al.*, 2012).

2.3.3.3. Housing Affordability Index (HAI)

HAI facilitates to determine whether the affordability is increasing or reducing. It facilitates to indicate the performance. It has a value of 100 when the median-income household has sufficient income to buy a median priced existing house. Here, the qualifying income (the minimum income whose the owner can afford housing) is equal to the median Family income. When the index is higher than 100, the affordability rate is high, when it is below 100, the rate of affordability is low (Burke, Stone and Ralston, 2011; Norazmawati, 2015; CoreLogic Asia Pacific, 2016).

HAI = (Median Family Income / Qualifying Income) * 100

Housing affordability index is mostly calculated periodically and the calculated figures facilitate to plot a graph thereby facilitate the analysis of such selected period (Tang, 2009).

2.3.3.4. Amenity Based Housing Affordability index

Fisher, Pollakowski, and Zabel have developed this housing affordability indicator. They say that the housing affordability should not consider shelter provision alone; location factors should be taken into account. The location facilitating accessibility to jobs, education, social infrastructures and amenities were considered crucial in this indicator. The families is counted affording, when the median income facilitate the households in certain location to acquire housing with access to jobs, education, and other amenities. Therefore, the index is developed based on this affordability and is called amenity based housing affordability index (Fisher, Pollakowski and Zabel, 2009).

2.3.3.5. Housing and Transportation Index

Basing on amenity based housing affordability, when the transportation is the only amenity considered and the index is developed, the indicator is called housing and transportation index known as ‘’H+T Index’’. This housing affordability indicator was developed by the center for neighborhood technology (CNT) in United State of America. Like the Amenity-Based Housing Affordability, housing said affordable when the median income facilitate households to meet the least standards in both housing and transportation (Rowley *et al.*, 2012).

2.3.3.6. Self Sufficiency Standard

This indicator is based on a family budget approach, was developed by Diana Pearce in 2001. It measures the amount of income the family requires to meet the basic needed expenses without public or private subsidies. Those basic needs are housing, food, medical care, education, transportation and so forth (Rowley *et al.*, 2012). Without either combining or averaging the circumstances that families face; it recognizes the sufficient basic needs for a given household in a given place. The Self Sufficiency standard also recognizes the taxes and location factors in costs to be covered. To increase housing affordability, the Self Sufficiency Standard advises families to increase their income once it is lower than needed income for the standard (Brooks, 2000). However, the indicator's weakness is that it focuses on income alone than focusing on housing.

2.3.3.7. Shelter Poverty Measure

Based on the residual income approach, Stone developed the Shelter Poverty Measure for housing affordability. It measures whether the household's income remaining after the payment of housing cost is sufficient to meet the remaining basic non-housing costs. When the residual income of the family is not enough to cover the non-housing costs, that household is directly classified in non-affording ones. This situation is technically called '*'shelter poverty measure''* (Burke, Stone and Ralston, 2011). Compared to self-sufficient standard indicator, shelter poverty measure focuses on housing than income. Rather than measuring all expenses as a whole, it measures the amount available for non-housing expenses and subtracts housing expenses from total income (Brooks, 2000).

2.3.3.8. The affordability limit

Referring to Gan and Hill (2009), the concept of affordability limit illustrate how many times of a household income required to achieve a house at a certain price. If the price of the house is Y and X the household income; the Affordability limit (AL) will be:

$$AL = \frac{Y}{X}$$

Let use the market factors to determine the affordable limit, and then later we will discuss how they are affecting housing affordability.

Let **α** be PMT to Income ratio (the loan the proportion of household income to mortgage repayment), the PMT= **αX**.

The maximum present Value of the maximum achievable repayment stream is equal to:

$$\sum_{n=1}^{N} \frac{\alpha X}{(1+i)^n}$$, where i= mortgage interest rate and N the mortgage term.

According to Bourassa (1996), the borrowing constraint is defined as below:

$$\sum_{n=1}^{N} \frac{\alpha X}{(1+i)^n} \geq Y - D,$$ Where **D** is the household commitment (deposit)

The deposit **D** is proportionate to the total price of the house intended. However, **D= βY** and **β** is the loan to value ratio previously seen.

Therefore, the constraint can be written again as:

$$\alpha X \geq (1-\beta)\, Y \times \left[\frac{i}{1-(1+i)^{\wedge -N}}\right]$$

$$Y = \frac{\alpha X}{(1-\beta)} \times \left[\frac{1-(1+i)^{\wedge -N}}{i}\right]$$

Dividing x to every side then

$$\frac{Y}{X} = \frac{\alpha}{(1-\beta)} \times \left[\frac{1-(1+i)^{\wedge -N}}{i}\right]$$

And $\frac{Y}{X} = AL,$ hence affordability limit AL is found as:

$$AL = \frac{\alpha}{(1-\beta)} \times \left[\frac{1-(1+i)^{\wedge -N}}{i}\right]$$

The affordable limit here is an increasing function of **β**. This is problematic if the down payment Constraint is binding for a significant proportion of households.

2.3.3.9. Affordability at risk (AaR)

The AaR measures the probability that the houses on the market during a certain period are not affordable for the household of certain income level. It is built basing on concept of affordability limit. The determining formula is below

$$\text{AaR}(x) = \int_{x \times Al}^{y1} f(y)dy = 1 - F(X \times AL)$$

And overall measure of AaR for the whole population is obtained as

$$\text{AaR} = \int_{x0}^{x1} \text{AaR}(x)\, g(x)dx .$$

Hence the increase of AaR means the decrease of affordability(Gan and Hill, 2009). Here, f (.): the probability density function of house prices, F (.): cumulative distribution function of house prices, $y_0 \leq 0$ and $y_1 < 1$; F (y_0) = 0 and F (y_1) = 1, g (.): probability density function of household income, G(.): cumulative distribution function of household income, $X_0 \leq 0$ and $X_1 < 1$; $F(X_0) = 0$ and $F(X_1) = 1$.

After looking at various housing affordability indicators, we may now decide which ones fit our market. For example, the concept of affordability at risk is not necessary at current stage in Rwanda. It is dealing with determining the available houses unaffordable on the market. However, it is not worthy as we are sure that even the housing supply is limited. For other indicators discussed above, they can be applied in local market. Therefore, some of them are used in data analysis. As the study examines the impacts of mortgage finance market indicators on housing affordability; the concept of affordability limit is the champion indicator.

Clearly this affordability limit determined here, is totally composed with the mortgage finance market factors discussed earlier. The mortgage interest rate **(i)**, Loan to Value Ratio (**β** known as **LTV**)**,** the proportion of income a household can allocate to mortgage repayments $(\boldsymbol{\alpha})$ and the length of the mortgage period (**N** known as Mortgage term) are the sole constituents of the formula. Here, **β** affect much housing affordability. As it can be illustrated affordability limit formula, the increase of loan to value ratio (β) results in the increase of affordability limit (AL). When **α** and **N** are fixed, there is a repayment affordability. But when these parameters remain changing there is purchase affordability. In both cases of affordability, the interest rate (i) is set by market conditions and varies over time. Referring to Urban Research Centre (2008), it may cause dangers on either lender side or borrower side while set beyond market conditions.

Palpably, the status of these mortgage finance market elements found in Affordability limit concept, affects housing affordability in that particular market. Hence, the affordability limit indicator is the best among others for our study.

2.4. The effects of mortgage finance market to housing affordability

Today, there are literatures which indicate clearly the influence of mortgage finance market factors to housing affordability. According to Alice Pittini (2012), the change of mortgage finance market conditions and housing prices increase have led to a situation of over indebtedness in buying a home for many European households. The situation is aggravated in developing countries and in Rwanda in particular (Mutero, 2010). For better understanding the effects of mortgage finance market to housing affordability, let's identify the effects of each mortgage finance market component.

2.4.1. Effects of types of financial institution in operation

The real estate finance theories have disqualified commercial banks as sustainable source of mortgage finance product. Rather the insurance companies, pension funds, building societies Real Estate Investment Trust, Building societies etc. are the real financial institutions to provide housing finance as the have long term funds (Defusco *et al.*, 2014). When the mortgage market is dominated by commercial banks, the mortgage finance products are provided in short term which results in lack of purchase affordability. Whenever they provide the long-term products, there are exposed to high risks and low liquidity. The results of these, is the decline in mortgage supply and the charge of highest mortgage interest rate. Therefore, the limited number of population access the housing loan, hence the housing affordability decline (Hilbers, Lei and Zacho, 2001).

2.4.2. Effects of loan amortization schedule type

It is argued that the type of loan amortization schedule influence much the amount of the interest paid, even though the mortgage interest rates is the indicator of cost of borrowing. According to (Brueggeman and Fisher, 2011), the even total payment amortization type reduces mortgage finance affordability than even principal payment type. The total interest paid on a mortgage loan using the even total payment is greater than the interest paid using the even principal payment. It is argued that the reduction of mortgage finance affordability is direct proportional to housing affordability reduction to urban dwellers (Brueggeman and Fisher, 2011).

2.4.3. Effect based on available mortgage finance market type

When the mortgage products suppliers are not long-term financial institutions, and there is no secondary mortgage market, the risks in the market are very high. To manage those risks, the supplies charge the higher interest rate and lend in period to limited people. Hence the housing affordability decline (Bright *et al.*, 2016).

2.4.4. Effects of interest rate

As seen earlier, any risk increases results in cost of fund increase. The level of the interest rate charged is the good indicator of the presence of certain mortgage market components and their possible types. When the charged interest rate is very high, the mortgage loan is very expensive. Hence limited housing affordability occurs (Defusco *et al.*, 2014). When the market adapts the adjustable rate mortgage, the interest rate can be changed due to the market condition; and the cost of finance can be reduced. On the other side, the fixed interest rate, the mortgage finance suppliers try to increase the cost of borrowing as they are dealing with future uncertainty. Hence housing affordability is limited in FM compared to the ARM situation (Green and Shoven, 1986).

2.4.5. Effects of mortgage term, Loan to value and Payment to income ratio

Referring to the affordability limit concepts, the increase of mortgage term is inversely proportionate to repayment affordability while the increase of payment to income ratio is directly proportionate to the increase of both repayment and purchase affordability. It is also argued that affordable limit here is an increasing function of loan to value ratio. It means that, the increase of loan to value ratio leads to the increase of housing affordability. But the income of the borrower to cover his/her contribution plays a significant role (Gan and Hill, 2009).

2.5. Conclusion

Referring to the review of literatures above, mortgage finance market and housing affordability have been subject to extensive studies. They consist of the findings on mortgage concepts such as characteristics of residential mortgage, types of mortgage loans, mortgage finance market and mortgage finance market determinants (World Bank 2011; Bright et al. 2016; Burke, Stone, and Ralston 2011; Gan and Hill, 2009; Green and Shoven 1986; Wong et al. 2004). On the other hand, other scholars have focused on housing affordability. They studied and published on housing market trend, spatial house price trends and housing affordability indicators (Stone, 2004; O'Neill *et al.*, 2008; Gan and Hill, 2009; Tang, 2009; Kihato and Rust, 2010; Burke, Stone and Ralston, 2011). Finally, other scholars highlighted the effects of mortgage finance market to housing affordability Gan and Robert, 2009; Boamah, 2011; Bright *et al.*, 2016) where the low performance mortgage finance market reflect the less housing affordability to urban dwellers.

This study adds to the growing body of literature on mortgage finance market and housing affordability by investigating at which extent mortgage finance market affect housing affordability and by finding out the most influential mortgage finance market determinants of housing affordability in urban areas of particularly in Kigali city.

Chapter 3: RESEARCH METHODOLOGY

3.1. Introduction

This section presents the research methods and techniques used in the study, the reasons for the choice of the subjects, the manner of determining the sample size, the instruments to be used and their validation, and data analyses scheme which includes the application of mathematical tools for treatment of data arising from the study.

3.2. Research designs

This research is more quantitative than qualitative. The mortgage finance market such as interest rates, LTV ratios and payment to income ratios, the minimum house prices and the population percentage belonging to certain level of income are quantitative data used. The data are presented in tables, graphs and charts, and the adequate analyses are done by applying financial and statistical tools.

3.3. Population and Sampling Techniques

Considering that the housing market issues are critical in Rwandan towns, more particularly in Kigali city, this area was considered as a case study. According to Yin (2003), a case study method allows investigators to retain the holistic and meaningful characteristics of real-life events such as individual live cycles, small group behaviour, organizational and managerial processes, neighbourhood change, international relation and the maturation of industries. Our research is not far away from understanding the real-life event in Kigali city because it is the biggest urban area we have in Rwanda, a place where mortgage finance market is much more meaning full. In addition, all mortgage lenders are accessible in the selected area.

For the local community required data were provided by National Institute of statistics of Rwanda. On the mortgage lenders side, data was collected from Development bank of Rwanda (BRD). Among 12 commercial banks available in the case study; we have selected the 3 based on convenience approach. Those three Banks are Bank of Kigali, I&M Bank and Kenya Commercial Bank Rwanda Ltd (KCBR). For the data from local community, among 286,664 households of Kigali city, the sample size of 96 households has been used. It has been identified by use formula $SS = \frac{Z^2 \times (\mathrm{p}) \times (1-\mathrm{p})}{C^2}$ (Systems, 2013; Bwana and Nooseli, 2014). Where Z = Z

value (1.96 for 95% confidence level); Z = Z value (1.96 for 95% confidence level); p = percentage picking a choice, expressed as decimal (0.5 used for sample size needed) and C = confidence interval, expressed as decimal (0.1 = ±10). The next step was the selection of sectors using Javeau formula (Javeau formula, 1985). However, 20% of sectors in each district were identied. In Gasabo district 3 Sectors was selected among 15 sectors, 2 sectors among 10 Sectors in Kicukiro district and 3 out of 10 Sectors in Nyarugenge district have been selected. In Nyarugenge districs, the sample size have been increased more than 20% for increasing perfection as nyarugenge district is the most urbanized district in Kigali city. Therefore, the selected sectors using convenience approach are Remera, Jali and Gatsata in Gasabo district, Masaka and Kagarama in Kicukiro district Nyarugenge, Gitega and Nyamirambo in Nyarugenge district and 12 households have been selected in each sector by equal distribution of sample size.

The data related to the least prices of standard building in the city of Kigali, the snowballing technique was used. Starting from competent institutions and finish to qualified construction professionals. Below are research instruments used to gather data from the selected sample and case study.

3.4. Research Instruments

The main research instruments used are questionnaires designed for mortgage suppliers, questionnaire reserved for collecting the least house price of houses in different period and Reading for data extracted from archives of National Institute of statistics, Rwanda housing Authority and Land centres. However, where reading was used as research instrument; it was backed with data collection form as convenient data collection tool. The last instrument is structured interview. This instrument was used according to the will of respondents. The content of structure interview was likely the same as the one in questionnaires and or data collection form.

3.5. Data Gathering Procedures

3.5.1. Secondary data

For the secondary data, we reviewed the publication from reliable academic and research journals, articles, books, research institutions etc. to examine what other and researchers have found on the studied matter. For the data related to the mortgage finance market, we studied the reports and archives from national bank, Rwanda institute of Statistic and other banks.

3.5.2. Primary data

The primary data was collected through the field survey. Mortgage Finance data was collected from BRD, Bank of Kigali, I&M Bank, and KCB. Data from local community was collected through Rwanda Institute of statistics, Housing data from professionals Rwanda housing Authority, Kigali City one stop centre and field survey. Finally the data related to status of income distribution and some mortgage performance aspects was collected in field survey from the local community.

3.6. Statistical Treatment of Data

For being more accurate, data processing was conducted. Starting from both field and office editing of research instrument were reviewed to avoid any mistake or misleading information. The next step was coding where necessary. Coding was very essential as we used SPSS package in data treatment.

3.7. Limitations of the study

Due to the limited time and finance, we could not reach the micro finance institutions, pension fund and insurance companies during the data collection. We believed in findings of other scholars and applied them in our study. That why our study focused on commercial banks and one development bank available in Kigali city. In addition to these, we wished to interview big number mortgage defaulters to realize the real image of repayment affordability itself. However, due to limited means and the deep discovery required, we could not realize it in the short period and scarce resources we had. Hence the information gathered from mortgage suppliers side was used alone.

Chapters 4: PRESENTATION OF FINDINGS, ANALYSIS AND INTERPRETATION

4.1. Introduction

In this section, the data gotten from the field are presented and analysed, with supports of researchers findings where necessary, to highlight the overview of the mortgage finance market in Rwanda, mortgage finance market analysis, housing affordability over the last ten years, effect of mortgage finance market on housing affordability and discussion of results and hypothesis testing.

4.2. Status of the mortgage finance market in Rwanda

The mortgage finance market in Kigali is still at its early stage and it is not easy to get the clear information from the literatures of the exact time of its existence, except through thorough survey. The available mortgage suppliers are commercial banks and one development bank. There are currently Fifteen (15) insurance companies and one (1) pension funds, but none of them provides mortgage lending. Pension funds and insurance companies qualified for real estate financial institutions are developers in lieu of providing mortgage product. Evidently this situation is negative to mortgage finance market and results in less housing affordability (Mutero, 2010). Apart from the nature of mortgage suppliers, mortgage finance market features also have been identified. Through the field survey, the fixed mortgage interest rate, the mortgage short term, the loan to value ratio, the payment to income ratio are all present in the local market. Concerning the amortization schedule and types of mortgage market; only ‘*’Even Total Payments’’* is available as sole mortgage loan payment schedules on local market and the’’ *Primary mortgage market’’* for mortgage market types. During field work, it has been identified that the ‘’*secondary mortgage market* ‘’ is under development in BRD. In the coming period, it can be found on the Rwanda mortgage market. The table 4.1 summarizes the gathered information. The nonappearance of secondary mortgage market as seen in literature review indicates the increase of risks to the mortgagors. Recently, the period of mortgage loan in Rwanda, increased from 10 years to 15 years, 20 years and above depending on a lender. This change increased the purchase affordability (Mutero, 2010).

Table 4.1: Applicable mortgage market factors in Kigali city

		Mortgage finance market factors								
		Fixed rate mortgage (FRM)	Adjustable rate mortgage (ARM)	Loan to Value Ratio	Income to Pmt Ratio	Mortgage term	Primary Market	Secondary market	Even Principal payment	Even Total Payments
Mortgage Finance Suppliers	KCB	yes	No	yes	yes	yes	yes	No	No	yes
	BRD	yes	No	yes	yes	yes	yes	Under development	No	yes
	I&M	yes	No	yes	yes	yes	yes	No	No	yes
	BK	yes	No	yes	yes	yes	yes	No	No	yes

Source: Authors' Field Survey in banks, July 2017

Table 4.1 shows that, except adjustable rate mortgage, secondary mortgage market and even principal payment, other mortgage finance market factors are applicable in surveyed banks. Therefore, the study will focus on existing mortgage finance market factors and examine how they affect the housing affordability.

4.2.1. Contribution of mortgage finance market to money market from 2006-2016

The Rwandan money market has ten distinct sectors. Those are agricultural, fisheries and livestock sector, mining sector, manufacturing sector, Water and energy sector, mortgage industries sector, trade and hotels sector, transport and warehousing sector, other financial institution and insurance sector and service sector. Among ten sectors, trade and hotels sector and mortgage sector dominate the money market. They both count 63.1% of the average contribution in the last ten years. Referring to the table 4.2, even though the mortgage market is in its early stage, its contribution is significant. Apart from the trade and hotels occupying the first position, the mortgage finance market is the second large contributor to money market for the last ten years. For understanding mortgage market contribution evolution in last ten years, we compare the contribution of mortgage sector to the total contribution of other sectors in table 4.3.

Table 4.2: The sectorial contribution in money market in Percentage (%)

		Period (2006 - 2016)											
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Sectors of Loan provided	Personal loan	4.14	5.54	6.29	8.00	10.00	12.00	21.50	20.11	18.00	13.00	8.75	11.58
	Agricultural, fisheries& livestock	2.86	3.70	2.01	2.80	4.00	4.80	3.27	3.31	3.66	2.50	2.20	3.19
	Mining activities	0.18	0.01	0.00	0.01	0.05	0.40	0.00	0.00	0.00	0.00	0.05	0.06
	Manufacturing activities	12.52	11.77	5.96	6.00	6.20	8.20	5.47	5.55	5.60	9.00	9.25	7.77
	Water & energy activities	0.33	0.11	0.12	0.12	0.60	0.60	1.05	1.05	1.50	2.50	2.25	0.93
	Mortgage industries	17.16	19.32	29.74	29.75	29.71	28.50	27.50	28.90	29.02	31.50	35.25	27.85
	Trade & hotels	47.96	44.40	40.12	37.91	36.07	33.60	30.40	30.10	31.30	31.50	31.10	35.86
	Transport & warehousing	7.76	9.77	9.34	9.10	7.31	6.60	6.26	6.33	6.45	5.50	6.40	0.73
	OFI &Insurance	2.11	1.80	1.23	1.20	1.13	1.10	1.21	1.24	1.26	1.50	1.60	0.14
	Service sector	4.98	3.58	5.19	5.11	4.93	4.20	3.34	3.41	3.45	3.00	3.15	0.40
	Total sector	100	100	100	100	100	100	100	100.00	100	100	100	100

Source: Author's estimation based on BNR financial stability reports from 2006 to 2016

Although the ten years performance the trade and hotels sector with average of 35.86% is ahead of Mortgage market sector with 27.85% in deep analysis indicate the opposite. Referring to the table 4.3 and figure 4.1, the mortgage industry is performing better than all other sectors.

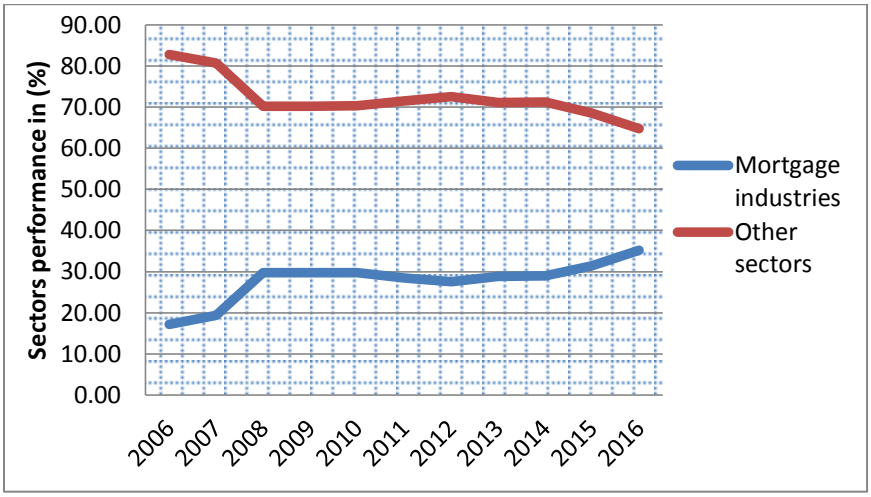
Table 4.3: Mortgage sector and other sectors performance from 2006 to 2016 (%)

	Period (2006 - 2016)											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Mortgage industries	17.16	19.32	29.74	29.75	29.71	28.50	27.50	28.90	29.02	31.50	35.25	27.85
Other sectors	82.84	80.68	70.26	70.25	70.29	71.50	72.50	71.10	71.23	68.50	64.75	72.15
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: Author's estimation based on BNR financial stability reports from 2006 to 2016

The trend in mortgage market is increasing while the other sectors trend is decreasing (look at figure 4.1). The mortgage sector was attractive than other sectors in the last ten years. Therefore, it annual contribution in money market rise from 17.16 % in 2006 to 35.25% in 2016. As results of mortgage market reform started in 2011, there was a slit decrease in 2012 but the reform stabilized and the trend continued to grow. On the other side, the trend other sectors started from 82.84% and decreased to 64.75 % (Table 4.3).

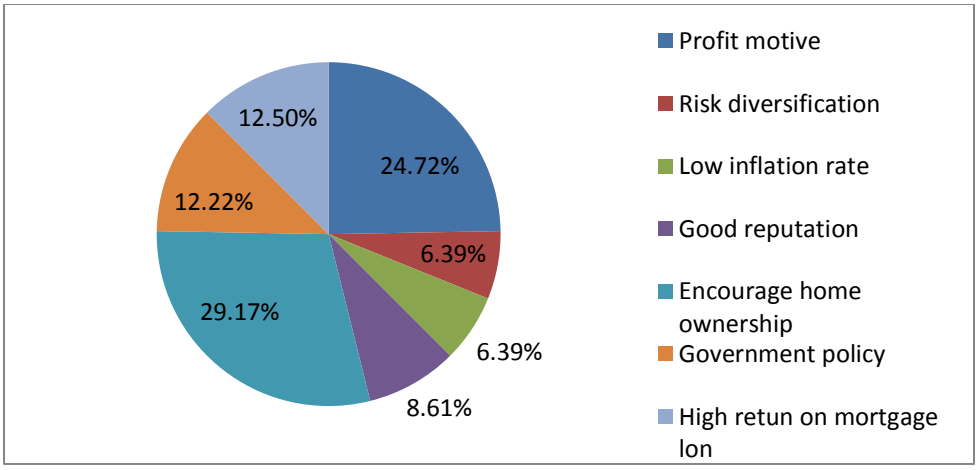
Figure 4.1: Mortgage sector and other sectors performance from 2006 to 2016



Source: Author's estimation based on BNR financial stability reports from 2006 to 2016

However, referring to the figure 4.1, Mortgage industry increases at the expense of others sectors. Obviously, the mortgage market is attracting fund suppliers than other sectors. Though, study highlights the major reasons in figure 4.2 as profit motive, risk diversification, low inflation rate, good reputation, encourage home ownership, government policy and high return on mortgage loan.

Figure 4.2: Motivations of commercial banks to invest in the Rwandan mortgage market



Source: Authors' Field Survey in commercial banks, 2017

Basing on these figure 4.1, figure 4.2 and table 4.3; one may say the mortgage market sector is the most promising sector among others in local money market. And it is a growing market (figure 4.1). After determining that the mortgage market is the most promising among other

sectors in money market, one may analyse each and every mortgage market factor in Kigali city for having the real picture of mortgage finance market in Kigali city.

4.3. Mortgage finance market Analysis

The mortgage finance market is infant and unaffordable to the majority of urban dwellers in the city of Kigali. Referring to table 4.4, the survey results shows that in the total amount of mortgage loan granted to the consumers, only 35% of mortgage loan granted went to Corporates and developers while 65% was given to households. In the total mortgage granted to households 31% was given to the population earning above Frw 600,000 monthly and 69 % to the population earning between Frw 300,000 and Frw 599,999. There was no loan granted to the population earning below Frw 300,000. In addition, in the total loan granted for the last ten years, Development bank of Rwanda (BRD) led the mortgage market with 53.94 % while BK, I &M bank and KCB shares 46.06 % remaining.

Table 4.4: Mortgage loan distribution from 2006 to 2016

Mortgage loan distribution from 2006 to 2016 (%)													
Category		**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Average**
distribution among borrowers	Corporate/ Developers	45.30	40.30	35.00	30.30	31.50	35.10	36.34	25.10	26.60	28.51	50.99	35.00
	Households	54.70	59.70	65.00	69.70	68.50	64.90	63.66	74.90	73.40	71.49	49.01	65.00
Distribution households' income (Frw)	≤ 600,000	31.50	32.51	32.40	32.31	32.31	32.47	31.30	29.34	28.60	28.59	28.39	30.88
	600,000<X≤300,000	68.50	67.49	67.60	67.69	67.69	67.53	68.70	70.66	71.40	71.41	71.61	69.12
	<300,000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Distibution among suppliers	BRD	55.00	56.10	52.12	56.20	55.36	57.80	52.28	51.12	52.28	52.50	52.53	53.94
	Other Commercial banks	45.00	43.90	47.88	43.80	44.64	42.20	47.72	48.88	47.72	47.50	47.47	46.06

Source: Authors' Field Survey in banks, 2017

Obviously, Kigali city mortgage finance markets is led by development bank of Rwanda and the households side is still dominating the corporate and developers side. To encourage corporates and developers, during the interview, the managing director of Rwanda housing bank under BRD highlighted that since 2015, they have stopped providing mortgage loan to individuals rather, they finance corporate and developers projects at lowest cost of finance. This is in line of facilitating home ownership. Although the mortgage market reform of 2011 increased the number of borrowers earning between Frw 300,000 and Frw 599,999; the repayment

affordability is still a challenge. Referring to the table 4.5, in the total of 96 households surveyed, only 92 managed to give us feedbacks while 4 refused completely.

Table 4.5: Mortgage payment affordability

			Mortgage payment performance (%)		
			Pay easily	**Pay hardly**	**Failed**
From field survey	Responded	92	18.4	77.44	4.16
	Not responded	4			
From financial institutions			15.1	79.7	5.2

Source: Authors' Field Survey in local community, 2017

Among the gotten feedback from respondents, only 18.4% of households perform better in the mortgage loan granted while 77.44% are distress to payback the mortgage loan and 4.16% failed or seem failed to pay back the fund granted. This is not far from the reality, as the gathered information from financial institutions highlight that more 5.2 % of mortgage consumers seems defaulting and force sold their pledged collaterals, 79.7 % of with the problem of repayment affordability and few (15.1%) of them pays without any distress. Looking at the above results, it is obvious that the mortgage finance market is not in favorable conditions. In detailed analysis of market determinants are here under.

4.3.1. Status of adopted mortgage loan amortization schedule

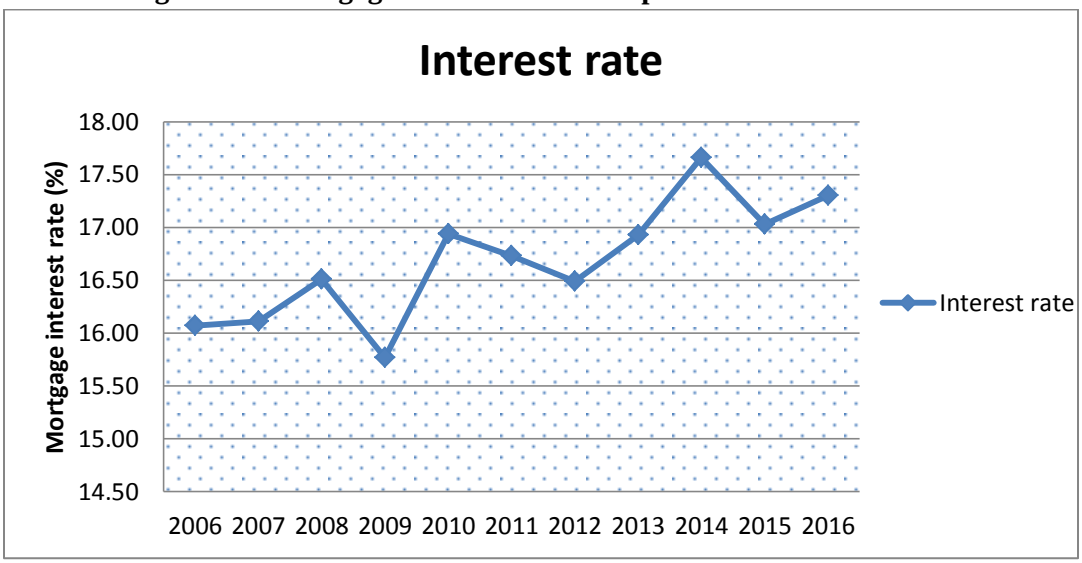
The field work has identified the Even Total Payments amortization schedule is adopted in Kigali city. With market conditions, for the 20 years mortgage loan at 16% interest rate, it is found that the cost of mortgage finance is 1.67 times higher than what should be the cost if even principal payment was adopted. However, the adopted system without flexibility makes the mortgage market expensive in the city of Kigali. Let continue looking at other determinant for more detail.

4.3.2. The cost of borrowing

Apart from the cost related to the implemented mortgage amortization schedule, the interest also charged is very high. Referring to the market conditions (for the 20 years mortgage loan at 16% interest rate compounded monthly), the total payment is 3.34 times the mortgage loan requested and the interest paid alone is 2.34 times loan granted. The mortgage interest rate kept growing from 16.07% to 17.3% on average, for the past 10 years (Figure 4.3). In 2009 the interest rate

reduced from 16.51% to 15.77% the raised again to 16.94% in 2010 the main reason is the good macroeconomic factors and increase of competition among mortgage suppliers. The reforms of 2011, realized its effects in 2012 due to the increase of purchase affordability but, without repayment affordability as illustrated in table 4.5. Therefore, the level of risks increased and caused the mortgage supplies to charge the higher interest rates of 16.93% kept growing from 2013 to 2014 and 2015 the competition and market stabilization reduced the interest rate again, In addition to the interest rate, there are additional charges including: the service commission fee and the valuation report fee. Clearly the mortgage market is very expensive.

Figure 4.3: Mortgage interest rate development from 2006 to 2016



Source: IFS, IMF, Monetary and Financial statistics

4.3.3. Status of mortgage term (n), Loan to Value ratio (LTV) and Payment to Income ratio (α) from 2006 to 2016

The period covered by the study has two remarkable parts (table 4.6). The period before the new mortgage law in 2011 is characterized by the tight conditions. Before 2011, the mortgage term was 15 years on average, the payment to income ratio was 1/3, and the loan to value ratio was 30%. The lowest mortgage term was in BK at 10 years and the highest term was 20 years offered by development bank BRD. The payment to income ratio and loan to value ratio were the same in every bank. Note that the KCB appearing in the sample was not present on mortgage market in this period. After 2011, the change appeared. The mortgage term became 18.75 years on

average. Only Bank of Kigali has the lowest mortgage term of 15 years and the highest term is 20 years. The client contribution became 25% on average. 20% for KCB and I&M bank and 30% for both BRD together with BK. The special in LTV is found in KCB where they accept even 10% when it is the home purchase mortgage. Concerning the payment to income ratio, the payment of 50% of household income is accepted except in BRD where the LTV remained 30%.

Table 4.6: the evolution of mortgage term (n), Loan to Value ratio (LTV) and Payment to Income ratio (α) from 2006 to 2016

	Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
BK	LTV(%)	30	30	30	30	30	30	30	30	30	30	30
	n (years)	10	10	10	10	10	10	15	15	15	15	15
	α (%)	33.33	33.33	33.33	33.33	33.33	33.33	50	50	50	50	50
BRD	LTV(%)	30	30	30	30	30	30	30	30	30	30	30
	n (years)	20	20	20	20	20	20	20	20	20	20	20
	α (%)	33.33	33.33	33.33	33.33	33.33	33.33	33.33	33.33	33.33	33.33	33.33
I&M BANK	LTV(%)	30	30	30	30	30	30	20	20	20	20	20
	n (years)	15	15	15	15	15	15	20	20	20	20	20
	α (%)	33.33	33.33	33.33	33.33	33.33	33.33	50	50	50	50	50
KCB	LTV(%)						20	20	20	20	20	20
	n (years)						20	20	20	20	20	20
	α (%)						50	50	50	50	50	50
Average	LTV(%)	**30**	**30**	**30**	**30**	**30**	**27.5**	**25**	**25**	**25**	**25**	**25**
	n (years)	**15**	**15**	**15**	**15**	**15**	**16.25**	**18.75**	**18.75**	**18.75**	**18.75**	**18.75**
	α (%)	**33.33**	**33.33**	**33.33**	**33.33**	**33.33**	**37.5**	**45.83**	**45.83**	**45.83**	**45.83**	**45.83**

Source: Author's field survey in banks, 2017

Note that in the fiscal year 2016-2017, BRD changed the way of supplying the mortgage product. It is now targeting only big developers and it became developer itself. Hence the mortgage market factors such as mortgage interest rate, mortgage term, payment to income ratio and loan to value ratio took the new system and the individual clients remained in BPR. Referring to Gan and Robert (2009), the change of the mortgage law increased slightly the purchase affordability alone. And the repayment affordability kept decreasing.

The above findings clarify that Kigali city mortgage finance was in its infant stage for the last 10 years. It is promising to the mortgagors but associated with high risks. The market is very expensive to mortgage consumers and supplied to the limited number households. These findings are in line with the works of other scholars; they confirmed the infancy of Kigali city mortgage market, its virginity, its middle and short term finance dominance, high risks associated to it and that the market is limiting a good number of households but promising to the mortgage suppliers (Africa 2012; Brueggeman and Fisher 2011; Defusco et al. 2014; Gan and Robert 2009; Hilbers, Lei, and Zacho 2001; Mutero 2010).

4.4. Housing affordability over the last ten years

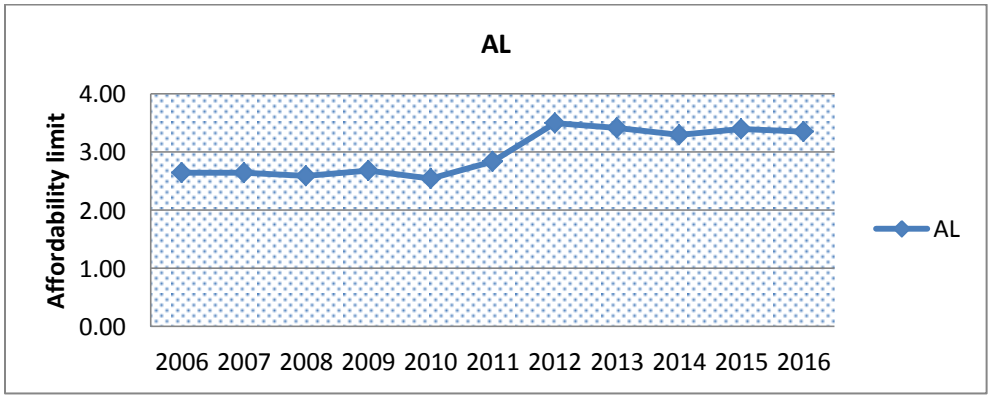
In this section, let's use the affordability limit concept as it facilitates to measure the trend of housing affordability basing on the trends of mortgage market element. Here, the interest rate trend is gotten from IMF, then β, N, and α trend are collected from the field survey according to the table 4.7. In the same table, the affordability limit is calculated basing on the $\mathbf{AL} = \frac{\boldsymbol{\alpha}}{(\mathbf{1}-\boldsymbol{\beta})}\left[\frac{\mathbf{1}-(\mathbf{1}+\boldsymbol{i})^{-\boldsymbol{N}}}{\mathbf{i}}\right]$.

Table 4.7: Housing affordability limit indicator trend from 2006 to 2016

	Period	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Mortgage Finance market Indicator	LTV(%)	30	30	30	30	30	27.5	25	25	25	25	25	27.5
	n (years)	15	15	15	15	15	16.25	18.75	18.75	18.75	18.75	18.75	16.82
	α (%)	33.33	33.33	33.33	33.33	33.33	37.5	45.83	45.83	45.83	45.83	45.83	39.39
	Source: Author's Field survey, 2017												
	Period	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Average**
	i (%)	16.07	16.11	16.51	15.77	16.94	16.73	16.49	16.93	17.66	17.03	17.30	16.69
	Source: IFS, IMF, Monetary and Financial statistics, 2017												
Housing affordability indicator	**Period**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	
	AL	2.64	2.64	2.59	2.68	2.54	2.84	3.49	3.42	3.30	3.40	3.35	
	Source: Author's Calculation based on AL formula, 2017												

After calculating the affordability in table 4.7, let use a graph (figure 4.4) to demonstrate the performance of housing affordability due to the change of mortgage market factors in the last ten years.

Figure 4.4: Housing affordability limit indicator trend from 2006 to 2016



Source: Author's Calculation based on AL formula

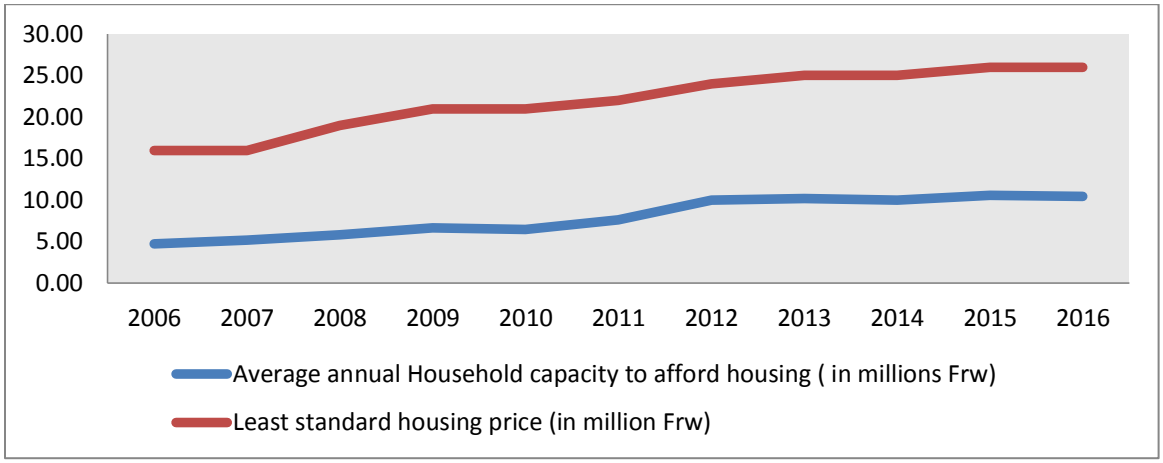
The indicator shows that the affordability was slightly constant from 2006 to 2010. Looking at this period, it is clear that the mortgage interest rate plays a significant role in housing affordability. In table 4.7, from 2006 to 2010, α and β remained constant. But, it is clear that the housing affordability were decreasing slightly due to the slight increased interest rate from 2006 to 2008. The decrease of interest rate in 2009 resulted in the increase of housing affordability. Dues to the change of the mortgage law in 2011, there were increase of payment to income ratio (α) and increase of mortgage term (N) which resulted in the increase of housing affordability (purchase affordability) after 2011. The reduction of LTV from 30% in 2010 to 25% in 2012 and the slight continuous increase of the mortgage rate caused the slight gradual reduction of housing affordability. All these situations indicate that the high interest rate reduces housing affordability, constant α and N testify repayment affordability while the changing measures the purchase affordability and finally the increasing factor of affordability is β. These are also confirmed on other mortgage finance market (Gan and Robert, 2009). For those with qualified income one can be mistaken that there are repayment affordability from 2006 to 2010 and from 2012 to 2016 as **α** and **N** remained constant. However, there is different situation on the field. Referring to gathered information on the field, more than 65 % of respondent confirmed the low performance of mortgagees. We cannot conclude that this is the weakness of affordability limit; rather, it is the effects of adopted *''even total payment and higher cost of borrowing''* present on the market. As seen before, with the available mortgage conditions, the mortgagees were paying back more than 3 times the loan they received from mortgagor. The facts of charging the higher interest rates are associated with the risks caused by the lack of secondary mortgage market (Lehnert, Passmore and Sherlund, 2008; Hofstrand, 2013). To determine clearly whether there were housing affordability let's use Affordability limit, the least standard housing price and the average annual household income in the table 4.8 and figure 4.5.

Table 4.8: Housing affordability in Kigali city from 2006 to 2016

Period	2006	2007	2008	2009	2010	2011	2012	2013	2014	20015	2016
Average annual Income per House hold	1,791,510.36	1,954,192.44	2,256,016.12	2,490,510.62	2,548,020.15	2,692,510.29	2,861,355.00	2,982,527.09	3,035,738.37	3,112,180.93	3,114,728.95
AL	2.64	2.64	2.59	2.68	2.54	2.84	3.49	3.41	3.3	3.4	3.35
AL× Income	4,740,390.16	5,161,198.11	5,848,791.72	6,683,496.95	6,477,049.39	7,650,466.43	9,997,190.95	10,191,718.60	10,006,364.39	10,581,776.16	10,434,341.97
Least standard house price	16,000,000	16,000,000	19,000,000	21,000,000	21,000,000	22,000,000	24,000,000	25,000,000	25,000,000	26,000,000	26,000,000

Source: Author's Field survey (from local community and construction expert), July 2017

Figure 4.5: Comparison of average household capacity to afford housing and housing prices



Source: Author's Field survey (from local community and construction expert), July 2017

In table 4.8, the AL × Average annual households income indicates the average capacity of Kigali city households to afford housing. Therefore, we compare the average household's capacity to afford housing and the least standards price of housing for the last ten years. In the figure 4.5 the least standard housing prices is higher than the average household capacity. Therefore one may conclude that, housing was hardly affordable through mortgage finance market for the last ten years.

4.5. Effect of Mortgage finance Market on housing affordability in Kigali city

In this section, the study highlights the effects of mortgage finance factors to housing affordability and the extent at which mortgage finance market affect housing affordability in the city of Kigali. Below are details.

4.5.1. Effects of types of financial institution in operation

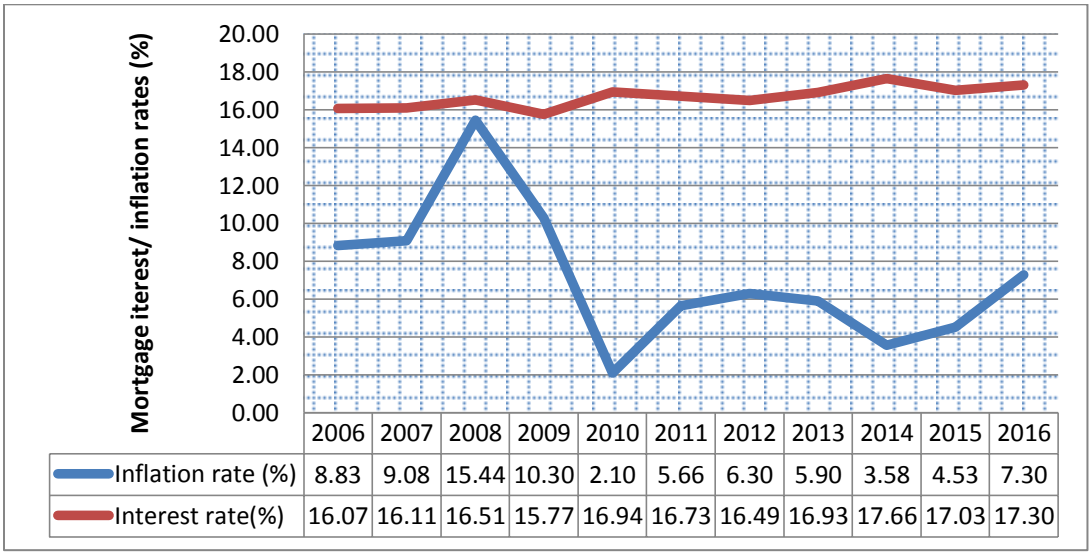
The results of the study showed that the qualified real estate financial institutions did not participate in mortgage finance market at all. Unfortunately, the market is dominated by commercial banks without long term finance. As results, the mortgage suppliers limit the mortgage term to middle and short term and charges high to meet the need of financial liquidity. The middle and short term mortgage finance limits directly the purchase affordability and the high cost of funding disturb the repayment affordability.

4.5.2. Effect based on available mortgage finance market type

The primary mortgage market was the only housing fund market in the Kigali city for the last ten years. And it is expected that it exposed the mortgage suppliers to high risks; referring to the literature review highlighted that the lack of secondary mortgage market increases risks to mortgage lenders resulting in high charged interested rate. Therefore, the field survey was undertaken to confirm whether these effects are present in local mortgage market. Hence, the high interest rate was found and other strict conditions. These are best indicators of confirming risks presence. Therefore, it is worthy to illustrate whether, the risks are associated with the economic environment or they are associated with the mortgage finance market itself.

Referring to the figure 4.6, it is clear that the risks are not highly associated with the inflation as the mortgage interest remains flat while

Figure 4.6: The Relationship between mortgage interest rate and inflation rate from 2006 to 2016



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Inflation rate (%)	8.83	9.08	15.44	10.30	2.10	5.66	6.30	5.90	3.58	4.53	7.30
Interest rate(%)	16.07	16.11	16.51	15.77	16.94	16.73	16.49	16.93	17.66	17.03	17.30

Source: Author's computation basing on IFS, IMF, Monetary and Financial statistics

the inflation rate line is up and down, rather the risks are extremely rooted inside the market itself. Therefore, to minimize these risks the mortgage supplier's charges higher interest rate and strict mortgage lending conditions. Confidently, the dominance of primary mortgage market is the basis of risks causing the high mortgage cost and strict mortgage market conditions. Finally, mortgage finance market cuts down the mortgage consumers; hence housing affordability goes down.

4.5.3. Effect of loan amortization schedule type

The effect of adopted loan amortization schedule is already clear in later sections. Though, we can only highlight that the use of even total payment alone has increased the cost of mortgage finance which generated the lack of repayment affordability.

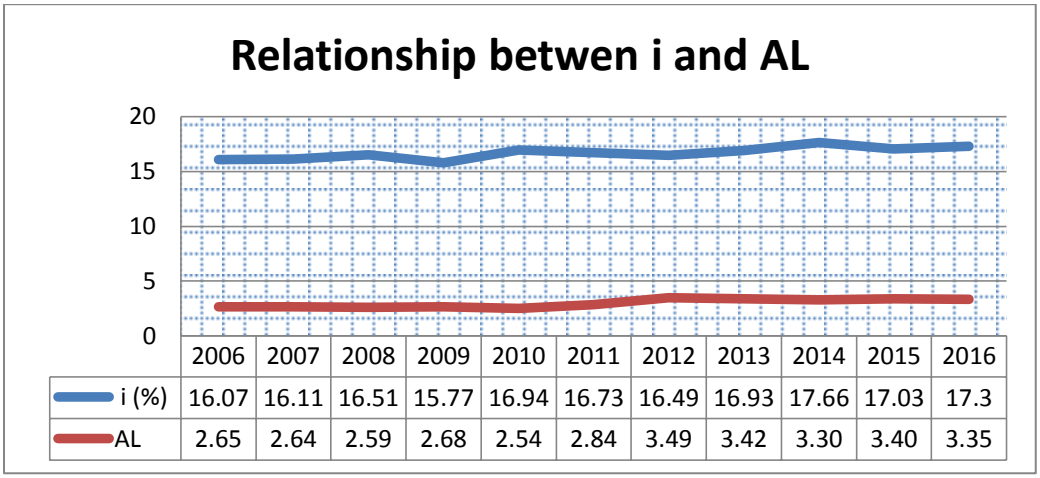
4.5.4. Effects of mortgage term, Loan to value and Payment to income ratio

The effects of mortgage payment period, LTV and payment to income ratio can be seen in the table 4.7 and the affordability limit curve in figure 4.4. The increase of mortgage term, the increase of payment to income ratio and the reduction of Loan to value ratio (LTV) have increased affordability limit from 2.54 to 3.49 which indicate the increase of housing affordability. Note that the increase of mortgage term, increase of payment to income ratio and reduction of loan to value ratio are not sufficient enough to certify the increase of housing affordability. These become true if the situation allows both repayment and purchase affordability. Therefore, these become realistic once the cost is minimized; the income of household is sufficient and other factors to enhance repayment affordability. However, the increase of mortgage term, increase of payment to income ratio and reduction of loan to value ratio increases only purchase affordability.

4.5.5. Effects of interest rate

It has been found that the high and fixed mortgage interest rate on Rwanda market is not highly subject to the inflation. Rather, it depends on market itself. The charged interest rate has the direct effect to housing affordability. In the figure n^{o} 6 showing the relationship between interest rate and affordability limit, it is obvious the increase of the interest rate results directly to the decrease of affordability limit and vice versa. The concrete examples can be found. One in 2009, where the decrease of interest rate from 16.51% in previous year to 15.77 %; the affordability limit increased from 2.59 to 2.68.

Figure 4.6: The Relationship between mortgage rate and affordability limit



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
i (%)	16.07	16.11	16.51	15.77	16.94	16.73	16.49	16.93	17.66	17.03	17.3
AL	2.65	2.64	2.59	2.68	2.54	2.84	3.49	3.42	3.30	3.40	3.35

Source: Author's computation based on field survey and IFS/IMF Data

The second can be found to the gradual decrease of interest rate which resulted in gradual increase of affordability limit from 2010 to 2012. Here, the interest rate was reduced from 16.94% to 16.49% and affordability limit increased from 2.54 to 3.49. Evidently, one can highlight the increase of mortgage interest rate decreases the housing affordability. Hence, the rise of interest rate affects housing affordability negatively while the reduction affects it positively.

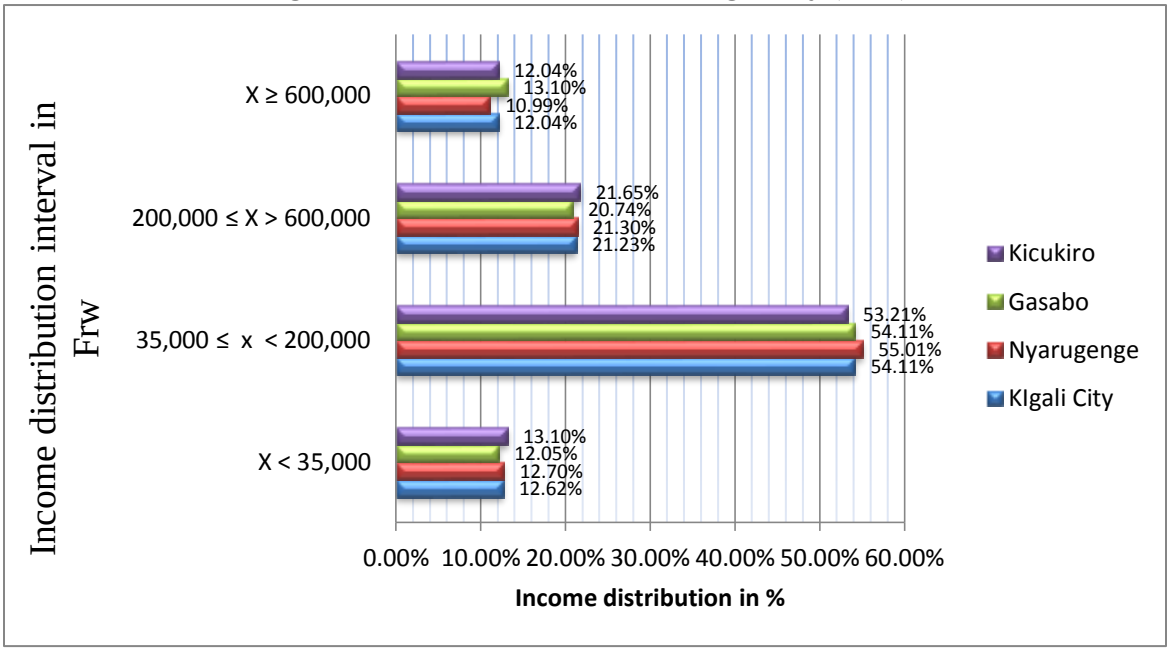
4.5.6. The extent at which mortgage finance market affected housing affordability

The effects of mortgage finance market to housing affordability in Kigali city can be illustrated better through the indication of the percentage of households who can afford the housing. The affordability limit indicates the maximum allowable times of the annual income a household can afford. Therefore, the percentage of the Kigali city dwellers who can afford housing in the last ten years can be estimated. To arrive on this, in addition to the affordability limit figure we have, we only need the least standard price of houses for the last ten years, and their corresponding income distribution.

Table 4.9: The least income to access mortgage loan from 2006 to 2016

Period	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Least standard housing price	16,000,000	16,000,000	19,000,000	21,000,000	21,000,000	22,000,000	24,000,000	25,000,000	25,000,000	26,000,000	26,000,000
	Source: Authors estimation based on field survey										
Period	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**20015**	**2016**
AL	2.65	2.64	2.59	2.68	2.54	2.84	3.49	3.42	3.30	3.40	3.35
Least allowed Annual income	6,046,795	6,058,105	7,328,746	7,825,353	8,261,234	7,742,695	6,869,182	7,316,055	7,584,519	7,646,798	7,761,194
Least allowed monthly income	503,90	504,842	610,729	652,113	688,436	645,225	572,432	609,671	632,043	637,233	646,766
	Source: Author's calculations based on affordability limit concepts										

Figure 4.7: Income distribution in Kigali city (2016)



Source: Author's field survey (From local community and NISR), July 2017

Looking at the Table 4.9, the housing affordability indicators, shows that only the households earning above Frw 500, 000 per month in 2006, 2007; households earning Frw 570,000 monthly and above in 2012 and households gaining above Frw 600,000 and above every month in remaining years could afford housing through mortgage finance market. According to (Bog, 2007; Aha, Ayitey and Martey, 2014); mortgage finance market confirmed as the major solution to affordable housing. Referring to the figure 4.7, and Table 4.9 the least allowed income in 2016, only 12.04 % of households could afford housing. Hence the mortgage finance market limited housing affordability of 12.04 % of households in Kigali city. Note that the households of Kigali city earning above Frw 500,000 for the last ten years is 15% on average (NISR, 2016). There, only 15% of Kigali city households could have purchase affordability but with limited

repayment affordability due to the total even amortization adoption and higher interest rate on the market. Hence the mortgages finance market limit housing affordability in the City of Kigali.

4.6. Discussion of results and hypothesis testing

4.6.1. Results discussion

The mortgage finance in Rwanda is still at infant stage. Till today market is dominated by unqualified mortgage suppliers and the mortgage consumers are not satisfied with the available products. This is not far from the findings by other scholars. They confirmed the infancy of mortgage market in Rwanda (Mutero, 2010; UN-HABITAT, 2012; IEG-World Bank, 2016).

It is the market with limited flexibility in choice of types of mortgage loan amortization schedule. Only middle and short term finance is provided due to zero participation of long term financial institutions. In addition, there is only primary mortgage market. According to Bright et al., (2016), the lack of secondary mortgage market is the evidence of high risks associated with the market itself. Hence, high cost of borrowing on mortgage market can be partially defined.

Referring to Mutisya (2015), the said characteristics of mortgage market are sufficient to suspect the limited housing affordability. For certainty the affordability limit indicator and the average household housing capacity are used. Therefore, housing is not affordable to households of the Kigali city. This is not different from the findings of IEG-World Bank (2016); Mutero (2010); and CAHF (2016) who highlighted that housing affordability is highly limited in the city of Kigali.

The facts that housing is unaffordable in the city of Kigali and characteristics of mortgage market facilitate to suspect the effects of mortgage finance market to housing affordability. The research findings indicate that;

1. The commercial banks dominating mortgage market provide expensive middle and short term funds, conditioned LTV and conditioned payment to income ratio which facilitates limited households to afford housing.
2. The lack of secondary mortgage market exposed lenders to high risks managed with charge of higher interest rates which lead to expensiveness of mortgage; hence housing becomes unaffordable.

3. The even total payment used without flexibility also, increases mortgage fund cost resulting in limited repayment affordability.
4. The high mortgage interest rate limits both purchase and repayment affordability.

These effects are coherent with the findings of other researchers such as Defusco et al. (2014); Gan and Robert (2009); and Hilbers, Lei, and Zacho (2001) who highlighted that, the decrease of mortgage term and reduction income to payment ratio increase of consumer contribution reduce housing affordability while the opposite rise purchase affordability without repayment affordability. Bright *et al.* (2016)confirm that the lack of secondary mortgage reduces housing affordability while Brueggeman, William B;Fisher (2011); etc. confirm the expensiveness of mortgage products roots from even total payment resulting in reduction of housing affordability too. In addition many researchers highlight the negative effects of higher and inflexible mortgage interest rates (Boamah, 2011; Burke, Stone and Ralston, 2011; Aha, Ayitey and Martey, 2014). These effects of Kigali mortgage markets determinants facilitate to highlight the most influential ones. Therefore, the most influential mortgage finance market determinants of housing affordability in Kigali city are:

1. The nature of financial intuitions in mortgage finance market operation as mortgage term, LTV and payment to income ratio are determined by their nature conditions.
2. The available types of mortgage market (only primary mortgage market)
3. Type of mortgage loan amortization schedule adopted (even total payment alone) and
4. The charged nature and level of interest rate (fixed and high interest rate)

The study finally reveals (by the use of affordability limit built on most influential determinants such as the nature of financial intuitions in mortgage finance market operation as mortgage term, LTV and payment to income ratio are determined by their nature conditions, The charged nature and level of interest rate and income distribution in Kigali city) that mortgage finance market is not affordable and it affects housing affordability to the extent that only 15 % of Kigali city households could afford purchase affordability but with limited repayment affordability. In addition to this, the even total payment loan amortization schedule adopted aggravates the expensiveness of mortgage products and finally affects high the housing affordability. Therefore, Mortgage finance market does not facilitate housing affordability in Kigali city.

4.6.2. Hypothesis testing

In this section, the study prof whether the mortgage finance market facilitates housing affordability in Kigali city; or whether mortgage finance market does not facilitate housing affordability in Kigali city. Remember that the null hypothesis says *'' Mortgage finance market facilitates housing affordability in Kigali city''* and the alternative one is ''*Mortgage finance market does not facilitate housing affordability in Kigali city''*. However, we chose to test hypothesis using Income affordability and affordability limit housing affordability indicators; as they are considering the most influential mortgage finance market determinants.

1. Using income affordability indicator

In this indicator, the mortgage finance market indicators like type of mortgage loan amortization type and the nature of mortgage interest rate are used to determine whether mortgage finance market facilitate housing affordability or not. Though, Mortgage finance market facilitate housing affordability, when the maximum allowable payment to income is greater or equal to the required periodic payment for the mortgage loan to acquire the least standard housing price.

Hypothesis to test: $H_0: \mu_{(\alpha \times income)} \geq \mu_{(pmt)}$

$H_{1:} \mu_{(\alpha \times income)} < \mu_{(pmt)}$

Note that these hypotheses constitute a one-tailed test. The null hypothesis will be rejected if the sample mean is too small.

In the analysis plan; the level of significance is 0.05 and one sample t-test is use. The one sample t-test is used because of the following assumptions:

1. The dependent variable is normally distributed
2. They are no significant outliers
3. The dependent variable is measured in Frw and
4. There is no relationship between the observations

Let's correct data and start the analysis

Referring to the table 4.8 for household's income and table 4.7 for the corresponding payment to income ratios, we can calculate the maximum allowable payment to income below.

Table 4.10: Maximum allowable monthly payment

Period	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	1016
Households' annual income	1,791,510.36	1,954,192.44	2,256,016.12	2,490,510.62	2,548,020.15	2,692,510.29	2,861,355.00	2,982,527.09	3,035,738.37	3,112,180.93	3,114,728.95
Households' monthly income	149,292.53	162,849.37	188,001.34	207,542.55	212,335.01	224,375.86	238,446.25	248,543.92	252,978.20	259,348.41	259,560.75
α (%)	33.33	33.33	33.33	33.33	33.33	37.50	45.83	45.83	45.83	45.83	45.83
Maximum allowable monthly payment	49,759.20	54,277.70	62,660.85	69,173.93	70,771.26	84,140.95	109,279.92	113,907.68	115,939.91	118,859.38	118,956.69

Source: Author's field survey (From local community and NISR), July 2017

And the periodic payment of the mortgage loan for acquiring the least standard housing price can be found basing on least standards housing prices presented in table 4.6 in results presentation and analysis chapter.

$$\mu\ (Av.Least\ standard\ housing\ price) = \frac{1}{n}\sum_{k=1}^{n} \mu1, \mu2, \mu3, \ldots\ldots\ldots \mu n$$

Referring to the Table 4.9 the first column indicating the least standard housing price let's calculate the average least standard housing price below.

$$\frac{16{,}000{,}000 + 16{,}000{,}000 + 19{,}000{,}000 + 21{,}000{,}000 + 21{,}000{,}000 + 22{,}000{,}000 + 24{,}000{,}000 + 25{,}000{,}000 + 25{,}000{,}000 + 26{,}000{,}000 + 26{,}000{,}000}{11}$$

$$\mu\ (Av.Least\ standard\ housing\ price) = \text{Frw } 21{,}909{,}090.90909$$

Let's round and Say Frw 21,909,000

Referring to the table 4.7 the average LTV is 27.5%, average interest rate is 16.69%, the average mortgage term is 16.82 years and average payment to income ratio is 39.39%.

If the least standard housing price is Frw 21,909,000; the required mortgage loan is equal to

Frw (21,909,000× (1-LTV))

Therefore, the required mortgage is equal to Frw (21,909,000× (1-0.275)) = Frw 15,884,025

Using the fixed mortgage interest rate, compounding monthly and the adapted total even loan amortization schedule, the periodic payment is calculate below

$$Pmt = (Pv*i) / [1 - (1 + i)^{(-n)}]$$

$$Pmt = (21{,}909{,}000\times 0.1669/12) / [1 - (1 + 0.0139)^{-(16.82*12)}]$$

$$Pmt = 304{,}717.675 / 0.938$$

$$Pmt = 324{,}702.95$$

The monthly payment is Frw 324,702.95

Now: $H_0: \mu_{(\alpha \times income)} \geq 324{,}702.95$

$H_{1:}\ \mu_{(\alpha \times income)} < 324{,}702.95$

T-test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Maximum allowable payment to income	11	8.7975E4	27790.39433	8379.11916

The maximum allowable monthly payment to income Frw (87,975 ± 27,790.39) and it is far below the monthly payment of mortgage loan to acquire the least housing price Frw 324,702.95. Here the conclusion is visible; but let use the scientific way in the next table.

One-Sample Test

	Test Value = 324702.95					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Maximum allowable payment to income	-28.252	10	.000	-2.36727E5	-255396.6164	-218056.9345

Here, P value is < 0.0005; and it is below the significance level of 0.05. Hence, we are 95% confident that the maximum allowable monthly payment to income is statistically significantly

lower than the required monthly payment of mortgage loan to acquire the least housing price (i.e $t(10) = -28.252$, $p < 0.0005$). Where:

1. *t* Indicates that we are comparing to a t-distribution (t-test).
2. (10) Indicates the degrees of freedom, which is N – 1
3. -28.252 Indicates the obtained value of the t-statistic (obtained t-value)
4. *p* <0.0005 Indicates the probability of obtaining the observed t-value if the null hypothesis is correct.

Therefore, it statistically significant that maximum allowable monthly payment to income is below the monthly payment of mortgage loan to acquire the least housing price ($p < 0.05$) and, therefore, we can reject the null hypothesis and accept the alternative hypothesis.

2. Using Affordability limit

The affordability limit is the most fitting indicator to test the influence of mortgage market to housing affordability. Except the type of mortgage loan amortization schedule, affordability limit contains the most influential mortgage market determinants as it is made of LTV, payment to income ratio, mortgage term and the mortgage interest rate ($\mathbf{AL} = \frac{\boldsymbol{\alpha}}{(\mathbf{1}-\boldsymbol{\beta})}\left[\frac{\mathbf{1}-(\mathbf{1}+\boldsymbol{i})^{-\boldsymbol{N}}}{\mathbf{i}}\right]$). Remember that the state of mortgage interest rate reflect directly the type of mortgage market, types of sources of funds, macro-economic environment etc. as seen earlier. Therefore, we combine LTV, payment to income ratio, mortgage term and the mortgage interest rate as mortgage finance factors to highlight weather housing is affordable or not through affordability limit indicator.

Here, the mortgage finance market facilitates housing affordability, when the product of affordability limit (AL) and Average annual income is greater or equal to the least housing cost in that certain period. Hence, below of the test proceed.

Hypothesis to test: $H_0: \mu_{(Al \times Annual\ income)} \geq \mu_{(Least\ standard\ housing\ price)}$

$H_{1:} \mu_{(Al \times Annual\ income)} < \mu_{(Least\ standard\ housing\ price)}$

Referring to the calculation in previous indicator, the least standard housing price is Frw 21,909,000. Therefore,

$H_0: \mu_{(Al \times Annual\ income)} \geq$ Frw 21,909,000

$H_{1:} \mu_{(Al \times Annual\ income)} <$ Frw 21,909,000

Note that these hypotheses constitute a one-tailed test. The null hypothesis will be rejected if the sample mean is too small.

In the analysis plan; the level of significance is 0.05 and one sample t-test is use. The one sample t-test is used because of the following assumptions:

5. The dependent variable is normally distributed
6. They are no significant outliers
7. The dependent variable is measured in Frw and
8. There is no relationship between the observations

Let's correct data and start the analysis

Referring to table 4.8, household capacity (AL × Income) is written in Table 4.10 below.

Table 4.11: households' housing capacity

Period	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	1016
AL× Income	4,740,390.16	5,161,198.11	5,848,791.72	6,683,496.95	6,477,049.39	7,650,466.43	9,997,190.95	10,191,718.60	10,006,364.39	10,581,776.16	34,955,045.60

Source: Author's field survey in local community, July 2017

T-test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Housing Capacity	11	1.0208E7	8.48465E6	2.55822E6

The mean housing capacity is Frw (10,208,000 ± 8,484,650) and it is below the average least housing price Frw 21,909,000. Here the conclusion is visible; but let use the scientific way in the next table.

One-Sample Test

	Test Value = 21,909,000					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Housing Capacity	-4.574	10	.001	-1.17005E7	-1.7401E7	-6.0004E6

Here, P value is < 0.001; and it is below the significance level of 0.05. Hence, we are 95% confident that the housing capacity is statistically significantly lower than the least standard housing cost (i.e $t(10) = -4.574$, $p = 0.001$).

Where:

5. *t* Indicates that we are comparing to a t-distribution (t-test).
6. (10) Indicates the degrees of freedom, which is N – 1
7. -4.574 Indicates the obtained value of the t-statistic (obtained t-value)
8. $p = 0.001$ Indicates the probability of obtaining the observed t-value if the null hypothesis is correct.

Therefore, it statistically significant that the mean housing capacity is far below the least standard housing price mean ($p < 0.05$) and, therefore, we can reject the null hypothesis and accept the alternative hypothesis.

Note that the hypothesis tests through both income affordability and affordability limit indicators have rejected the null hypothesis; and most influential mortgage finance market indicators, (through LTV, payment to income ratio, mortgage term, interest rate and even total payment amortization schedule) have been used. Hence, we confidently reject the null hypothesis and accept the alternative hypothesis. Therefore, one may conclude that ‘’*mortgage finance market does not facilitate housing affordability in Kigali city’’*.

Chapter 5: CONCLUSION AND RECOMMENDATIONS

5.1. Conclusions

The overall decision of redesigning the mortgage finance market in Kigali city is being challenged by the gap in theories showing the effects of mortgage finance market on housing affordability. Therefore, the research examined at which extent mortgage finance market affects housing affordability in Kigali city over the last 10 years and demonstrated the most influential mortgage market determinants to housing affordability. To determine how the mortgage finance market affects the housing affordability in Kigali city; the question like '' what are the mortgage finance market factors which affect the housing affordability in Kigali city? How is the status of mortgage finance market over the last 10 years? What are the housing affordability indicators in the city of Kigali? And what has been the effect of mortgage finance market on housing affordability over the last 10 years?'' were answered.

Therefore, the findings highlight that the interest rate, mortgage term, loan to value ratio, income to payment ratio, adopted mortgage amortization schedule and types of mortgage market in operation are the mortgage finance market factors affecting the housing affordability in Kigali city. The status of the market over the last 10 years indicates that the market is at infant stage. It is characterized by fixed and high interest rate, inflexibility to mortgage amortization schedule choice and lack of secondary mortgage market. The results indicate also the effects of mortgage markets determinants to housing affordability for 10 years ago. The lack of secondary mortgage market increased the risks associated to mortgage suppliers; the remedy was the rise mortgage interest rate. Hence, housing remained unaffordable. Finally, the change of the mortgage law in 2011 influenced the financial institutions to shift from short term mortgage lending to middle term mortgage financing, increase of payment to income ratio 33.33% to 45.83% and decrease of LTV from 30% to 25%. The effects were the increase of purchase affordability but without warranting repayment affordability. Therefore, these effects facilitated to highlight the most influential mortgage finance market determinants to housing affordability in Kigali city. Those are the nature of financial intuitions (commercial banks and one development bank) in mortgage finance market operation, the available types of mortgage market, the type of mortgage loan amortization schedule adopted and the charged nature and level of interest rate.

The housing affordability limit indicator was selected to ease and sustain the realisation of the study. Among other indicators determined, it is the sole housing indicator considering many influential mortgage market determinants such as mortgage term LTV and payment to income ratio gathered in nature of financial institutions in operation and the interest rate. Note that the type of mortgage market influences much the level of interest rate. Hence the type of mortgage market is also covered. By use of this indicator, the average annual household's income and the distribution of income in the city of Kigali, the study results indicated that housing is not affordable and the mortgage market affect the housing affordability to the extent that only 15% of Kigali city households could afford housing but without repayment affordability over the last 10 years. Therefore, as it is, mortgage finance market does not promote housing affordability in the city of Kigali.

5.2. Recommendations and suggestions for policy change

Considering the research findings, it is evident that the mortgage market readjustment is possible; if there is the presence of the secondary mortgage market to reduce risks associated to the primary mortgage market, a room for negotiating loan amortization schedules, a flexibility of mortgage interest rate and long-term financial institutions participating actively in mortgage supply. Such mortgage finance market could be conducive to housing affordability and recommendations can be formulated as follows:

5.2.1. Recommendation to policy makers

1. To encourage the pension funds and insurance companies to engage actively in mortgage finance market.
2. To set up quality regulations in consultation with concerned stakeholders and professionals.

5.2.2. Limitation

During this study, even though we used quality scientific research system, we couldn't determine how the mortgage market can be readjusted, second, we couldn't manage to deepen in how BRD is developing the secondary mortgage market and finally, we did not deepened much in each and every detail due to the limited time and minus finance. Therefore, one can recommend the following.

5.2.3. Recommendations for further research

Since the study findings indicate that only short-term mortgage suppliers are active, further research can be conducted to find out the reason why pension fund insurance companies are less attracted by mortgage lending on Rwanda mortgage finance market. Further, the comparative studies analysis can be undertaken to engage more than one mortgage finance market.

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Appendices

1. **Field survey questionnaire**

UNIVERSITY OF RWANDA

COLLEGE OF BUSINESS AND ECONOMICS

LOCAL COMMUNITY QUESTIONNAIRE

Part I: Introduction

Dear Sir/Madam,

I am postgraduate student from the Business school at the University of Rwanda – College of Business and Economics in Kigali. We are currently conducting a research on mortgage finance market and housing affordability in Rwanda, specifically looking at how mortgage finance market determinants affect housing affordability. The study is strictly for academic purposes only (partial fulfillment of the award of MBA Degree in Finance option) and any information provided herein will be treated with the utmost confidentiality. Moreover, it is expected that the findings generated by the study will help policy makers to put in place the right measures for the development of a vibrant mortgage lending in Rwanda. We therefore beseech your full cooperation and adequate and candid response to the followings questions. Thank you!!!

Part II: Identification of Respondent

1. Name of Respondent …….
2. Location: ……..Village,……...Cell, …….. Sector, ...District

Part III: Questionnaire for Mortgage finance performance

1. Respond by **yes** or **no**

a. Have you taken mortgage loan? ☐ **If no, Jump to (3)**

b. Is it easy to apply and get the mortgage loan? ☐

c. Did you finish paying already? ☐ **If no, Jump to (1. e)**

d. Was it easy to pay? ☐

e. Are still paying the mortgage loan? ☐ **If no, Jump to (2)**

f. If you are still paying the mortgage loan, are you paying easily? ☐

2. Why are you not paying the mortgage loan?

……

……

3. On your own experience, how do you see

a. Local mortgage market finance purchase affordability?

……

……

……

b. Local mortgage market finance Repayment affordability?

……

……

……

Part IV: Questionnaire for Income distribution

Tick (V) in the table below the range from which your household income falls from 2006 to 2016

		INCOME DISTRIBUTION				
Period in years		Income groups in 000 Frw				
		Below 300	[300 -400[	[400 - 500[	[500 - 600[	[600 and above
	2006					
	2007					
	2008					
	2009					
	2010					
	2011					
	2012					
	2013					
	2014					
	2015					
	2016					

Thank you very much for your time

4. Least cost for standard housing Data Questionnaire.

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COLLEGE OF BUSINESS AND ECONOMICS

CONSTRUCTION PROFESSIONALS QUESTIONNAIRE

Part I: Introduction

Dear Sir/Madam,

I am postgraduate student from the Business school at the University of Rwanda – College of Business and Economics in Kigali. We are currently conducting a research on mortgage finance market and housing affordability in Rwanda, specifically looking at how mortgage finance market determinants affect housing affordability. The study is strictly for academic purposes only (partial fulfillment of the award of MBA Degree in Finance option) and any information provided herein will be treated with the utmost confidentiality. Moreover, it is expected that the findings generated by the study will help policy makers to put in place the right measures for the development of a vibrant mortgage lending in Rwanda. We therefore beseech your full cooperation and adequate and candid response to the followings questions. Thank you!!!

Part II: Identification of Respondent

1. Name of Respondent …….
2. Tick your construction profession
   a. Quantity surveyor ☐
   b. Registered construction engineer ☐
   c. Registered Real Property Valuer ☐
   d. Registered Architect ☐
3. Contact
   a. Telephone contact: ……..
   b. Email address: ……

Part III: Question for least standard house prices

Fill in the table below with the least standard housing price from 2006 to 2016.

If you work in Rwanda Housing Authority, fill the RHA column.

If you work in Kigali city one stop center, fill the KGL One stop Center column.

If you are self-employed, fill the Professionals column

Period	least standard house prices in ,000 Frw		
	RHA	KGL One stop Center	Professionals
2006			
2007			
2008			
2009			
2010			
2011			
2012			
2013			
2014			
2015			
2016			

4. Bank's Data collection form

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I. IDENTIFICATION	
Financial Institution name	
Available mortgage products	
Basis of adjasting interest rate if any	
Adobted amortization scheme	

		II. Mortgage Finance market factors						
		Mortgage period (n)		**Interest rate**		**Payment to Income Ratio (α)**	**Borrower contribution (β)**	
		Minimum	**Maximum**	**Type (Fixed or Adjastable)**	**Rate (%)**		**LTV Ration**	**Other**
Period in years	**2006**							
	2007							
	2008							
	2009							
	2010							
	2011							
	2012							
	2013							
	2014							
	2015							
	2016							

III. Mortgage Loans Status									
		Optional	**Mortgage loan in Frw**		**Borrowers**		**Perfoming/ Peformed**	**Repayment affordability**	
		Total loan	**Planned**	**Granted**	**Receved**	**Perfoming**		**Areas**	**Forced Recovered**
Period in years	**2006**								
	2007								
	2008								
	2009								
	2010								
	2011								
	2012								
	2013								
	2014								
	2015								
	2016								

		IV. Distribution of granted mortgage loan				
		Mortgage loan distribution to borrowers		Mortgage distribution accorting to income distribution		
		Corporated and or Developers	Households	600,000 ≥ x	300,000 ≤ x < 600,000	x < 300,000
Period in years	2006					
	2007					
	2008					
	2009					
	2010					
	2011					
	2012					
	2013					
	2014					
	2015					
	2016					
Total						

5. Income data collection form

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INCOME DISTRIBUTION

Period in years		Income groups in 000 Frw															
		Total Population in Kigali City	Below 300		[300 -400[		[400 - 500[		[500 - 600[		[600 - 700[		[700 - 800[		[800 -900[		[900 and above	
			No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
	2006																	
	2007																	
	2008																	
	2009																	
	2010																	
	2011																	
	2012																	
	2013																	
	2014																	
	2015																	
	2016																	

AVERAGE ANNUAL INCOME

Period in years	Period	Kigali city annual average household income in in Frw
	2006	
	2007	
	2008	
	2009	
	2010	
	2011	
	2012	
	2013	
	2014	
	2015	
	2016	