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Mortgage Finance Market and Housing Affordability in Urban Areas in Rwanda: A Case of Kigali City

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ABSTRACT
Rapid urbanization in Rwanda has considerably increased housing demand and the need for a dependable mortgage market. Unfortunately, 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 on housing affordability in any locality should be properly evaluated. The objective of this study is to determine how mortgage finance market affects the affordability of housing in Kigali, the capital city of Rwanda. To attain this objective, data was obtained from primary and secondary sources and analyzed using applicable statistical techniques. The research findings revealed that the adopted loan amortization schedule (even total payment), the risks caused by the absence of secondary mortgage market, and the dominance of short-term financial institutions reduced mortgage finance affordability and therefore only 15% of Kigali City households could afford housing from 2006 to 2016. It is noted that, this said affordability is only purchase affordability without repayment affordability. The study also highlights that, if (i) the secondary mortgage market is properly developed to reduce the risks that caused the high interest rate, (ii) flexibility on loan amortization is adapted, and (iii) long-term financial institutions participate in the market with favorable legal framework, the mortgage finance market can contribute a lot in alleviating the issue of housing affordability in Kigali City.

Keywords: Mortgage, mortgage finance market, housing affordability, East Africa.
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1 INTRODUCTION
Rapid urbanization has made housing 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 (Bramley & Watkins, 2016; Floetotto, Kirker & Stroebel, 2016). Despite this, access to decent and affordable housing remains one of the greatest challenges in 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, 2010). One key constraint to the realization of decent housing units by many is the issue of finance; high and escalating housing prices coupled with the meagerness of incomes makes home ownership barely a dream to most in developing countries (Boamah, 2011, p. 8). Different theories and surveys results have proved that the problem of shelter affordability should be solved through mortgage schemes (Floetotto, Kirker & Stroebel, 2016; World Bank, 2011). But the challenge is that the theories are successful in developed countries than in others. In developing countries, including Rwanda, they are applicable at the slight rate (Mutero,
2010). 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 & Yang, 2005; Campbell, 2013). Various researchers 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 compromises repayment affordability. In addition, few theories have elaborated the effects of mortgage markets on housing affordability in sub-Saharan countries in general, and in urban areas of Rwanda in particular. Hence, this study aims at examining to which extent mortgage finance market affects the housing affordability over the last 10 years in Kigali City and to find out the most influential mortgage finance market determinants of housing affordability in Kigali City. The results of this study could enhance sustainable decision making in mortgage market reformation for sustainable housing affordability.

2 LITERATURE REVIEW

2.1 Mortgage Finance Market 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 (Arvanitis, 2013). 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 (Floros & White, 2016). In this study, our concern is only residential real estate. Hence, we can consider mortgage as source of funds to finance acquisition of residential houses. 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 (Campbell, 2013; Elliott, 2011). 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 institutions and banks enter into mortgage lending contract with the borrowers for housing purposes. Due to illiquidity nature of real estate and the long-term requirement in mortgage finance, there is need for relaxing from the risks, such as liquidity risks, interest rate risks and default risks, associated for both lenders and borrowers. In this regard, the secondary mortgage market is crucial. The secondary mortgage market occurs when the mortgage contract formed in primary market is transformed into portfolios and or securities marketable in capital market (Hulchanski, 2005). 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. With mortgage finance market, people think 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, factors such as loan-to-value (LVT) ratio, length of mortgage period (mortgage term), and the proportion of periodic payment to the income are crucial. These mortgage finance market indicators are the
key variables for further market analysis (Atat, 2014; Green & Shoven, 1986; HKMA, 2010) and are detailed in a subsequent section on effects of mortgage finance market on housing affordability.

2.2 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 & Ralston, 2011). For further understanding of 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 describes 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 & 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, 2008). In this research, we look at housing affordability in at least three concepts; purchase affordability, repayment affordability and income affordability. Purchase affordability refers to the ability of a household to borrow enough funds to purchase a home (Yates & Milligan, 2007). 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; that is the house price to income ratio (Gan & Hill, 2009). At a certain price for a house, one may not afford to borrow and pay for it; but when the length of the mortgage increases, borrowers access the mortgage immediately; this is the purchase affordability. However, the situation does not guarantee the 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 the three forms of affordability (purchase affordability, repayment affordability, and income affordability) are achieved.

2.4 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 or region. Measuring housing affordability using household income is done in different ways for various locations. Those indicators include housing expenditure-to-income-ratio, budget approach and median multiple also known as price-to-income ratio. The general aim of all income based indicators, are to ascertain whether the households have sufficient funds to cover housing at the agreed rate (Burke, Stone & Ralston, 2011; Rowley & Ong, 2012; Norazmawati, 2015; Cox & Pavletich, 2017). On the other side, some scholars say that the housing affordability should not consider shelter provision alone; location factors, transport accessibility and amount of income the family requires to meet the basic needed expenses without public or private subsidies should be considered (Yates & Milligan, 2007). Therefore amenity based housing affordability index, self-sufficiency standard and shelter poverty measure indicators were developed (Peace & Brooks, 2000; Fisher, Pollakowski & Zabel, 2009; Rowley & Ong, 2012). The last but not the least indicator, is the housing affordability.
indicator which considers the mortgage finance market. This is the affordability limit which is determined based on the following formula.

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

Where \(AL\): affordability limit; \(\alpha\): payment-to-income ratio; \(\beta\): Loan-to-value ratio; \(N\): Mortgage term; and \(i\): mortgage interest rate. The concept of affordable limit “sets the ratio of the maximum allowable loan to income” (Gan & Hill, 2009, p. 4).

2.4 The Effects of Mortgage Finance Market on Housing Affordability

Today, there are literatures which indicate clearly the influence of mortgage finance market factors on housing affordability. According to 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 of the effects of mortgage finance market on housing affordability, we will identify the effects of each mortgage finance market component.

1. **Financial institution in operation:** Short term financial institutions are not considered as good choice for source of mortgage finance products. Rather, insurance companies, pension funds, building societies Real Estate Investment Trust, building societies etc., are considered as good sources of mortgage finance as they have long term funds (Defusco & Paciorek, 2014). When the mortgage market is dominated by short term financial institutions, there is a lack of purchase affordability as lenders increase the cost of funding which limits the access to housing loan, hence the housing affordability declines (Hilbers, Lei & Zacho, 2001).

2. **Adopted loan amortization schedule type:** The even total payment amortization type reduces mortgage finance affordability than even principal payment type. It is argued that the reduction of mortgage finance affordability is directly proportional to housing affordability reduction to urban dwellers (Brueggeman & Fisher, 2011).

3. **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 higher interest rate and lend in period to limited people, hence, housing affordability declines (Bright & DeMarco, 2016).

4. **Mortgage term, Loan-to-value (LTV) ratio, interest rate, and payment-to-income ratio:** Referring to the affordability limit concepts, the increase of mortgage term and interest rate are both 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 & Hill, 2009).
2.5 Conclusion on Literature

Referring to the review of literatures above, mortgage finance market and housing affordability have been subject to extensive studies. On one hand, the findings are on mortgage finance market and mortgage finance market determinants. On the other hand, other scholars have focused on housing affordability and its indicators. 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 area, specifically in Kigali City, Rwanda, East Africa.

3 RESEARCH METHODOLOGY

This research is more quantitative than qualitative. As it is a real-life event, Kigali City was selected as a case study as it is the biggest urban area in Rwanda, a place where mortgage finance market is much more meaningful and mortgage lenders are accessible in the selected area. The study used both primary and secondary data. The secondary data was collected from academic documentations and institutional publications. On the other hand, a survey was conducted to gather primary data using designed and tested questionnaires, and structured interview. Therefore, using convenience approach, three commercial banks were chosen among the total of 12 commercial banks available in the study area. Those three banks are Bank of Kigali, I&M Bank, and Kenya Commercial Bank, Rwanda Ltd (KCBR). For the local community, 96 households constituted the sample size (SS) for a study population of 286,664 households of Kigali City. The following equation was applied (Kathari, 2004):

\[ SS = \frac{Z^2 \times (p) \times (1-p)}{C^2} \]  

Where \( Z = Z \text{ value} \) (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, 1985). However, 20% of sectors in each district were identified. In Gasabo district, 3 sectors were selected among 15 sectors, 2 sectors among 10 sectors in Kicukiro district and 3 out of 10 sectors in Nyarugenge district were selected. In Nyarugenge district, the sample size has been increased by more than 20% as Nyarugenge district is the most urbanized district in Kigali City. Therefore, the selected sectors using convenience approach were Remera, Jali and Gatsata in Gasabo district, Masaka and Kagarama in Kicukiro district, Nyarugenge, Gitega and Nyamirambo in Nyarugenge district, and 12 households were selected in each sector by equal distribution of sample size. For data related to the least prices of standard building in the city of Kigali, the snowballing technique was used. Collected data was coded and analyzed using SPSS.

4 RESULTS AND DISCUSSION

4.1 Results
4.1.1 Mortgage Finance Market Analysis

The mortgage finance market is at the infant stage and unaffordable to the majority of urban dwellers in the city of Kigali. The survey results show that of 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. Of the total mortgage granted to households, 31% was given to the population earning above Rwandan Francs (FWF) 600,000 monthly and 69% to the population earning between RWF 300,000 and RWF 599,999. There was no loan granted to the population earning below RWF 300,000. In addition, of the total loan granted for the last ten years, the Development Bank of Rwanda also known as Banque Rwandaise de Développement (BRD) led the mortgage market with 53.94 % while the Bank of Kigali (BK), Investments & Mortgages Bank (I &M Bank) Ltd and Kenya Commercial Bank (KCB) share the remaining 46.06%. Obviously, Kigali City mortgage finance market is led by Development Bank of Rwanda and the household’s 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 loans to individuals, rather they finance corporate and real estate developers at lowest cost of finance, who will in return provide individuals with houses in line with signed contracts. This is in line with facilitating home ownership. Although the mortgage market reform of 2011 increased the number of borrowers earning between RWF 300,000 and RWF 599,999; the repayment affordability is still a challenge. Of the total 96 households surveyed, only 92 managed to give us feedbacks while 4 refused completely. Among the feedback received from respondents, only 18.4% of households meet their commitment for the mortgage loan granted while 77.44% are distress to payback the mortgage loan and 4.16% failed or seem to fail to pay back the fund granted. This is not far from the reality, as the gathered information from financial institutions highlight that more than 5.2% of mortgage consumers completely defaulted and were forced to sell their pledged collaterals, 79.7% incurred a problem of repayment affordability and 15.1% paid without any distress. Looking at the above results, it is obvious that the mortgage finance market is not in favorable conditions.

4.1.1.1 Status of Adopted Mortgage Loan Amortization Schedule

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

4.1.1.2 The Cost of Borrowing

Apart from the cost related to the implemented mortgage amortization schedule, the interest charged is also 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 increased from approximately 16.07% to 17.3% over a 10-year period (Figure 1). From 2008 to
2009, it decreased from 16.51% to 15.77% and rose again to 16.94% in 2010. One of the main reasons to explain the interest rate increase is the increasing number of borrowers and default risk.

![Mortgage interest rate development from 2006 to 2016](image)

*Source: IFS, IMF, Monetary and Financial statistics, 2017*

*Figure 1: Mortgage interest rate development from 2006 to 2016*

As mentioned above, the default risk increased and caused mortgage supplies to charge higher interest rates. But, although there was upward movement in interest rate over the period of study, the competition and market stabilization reduced the interest rate in 2009. In addition to the interest rate, there are additional charges including the service commission fee and valuation report fee. Clearly the mortgage market is very expensive.

### 4.1.1.3 Status of Mortgage Term (N), Loan-to-Value (LVT) Ratio and Payment-to-Income Ratio (A) from 2006 to 2016

The period covered by the study has two remarkable parts (Table 1). The period before the new mortgage law in 2011 was characterized by the tight conditions (banks had to seek permission from mortgagees to recover their money in case of default and 70 per cent down payment requirement by clients which was deemed too expensive). Before 2011, the mortgage term was 15 years on average, $\alpha$ was 1/3 and LVT ratio was 30%. The lowest mortgage term was in BK at 10 years and the highest term was 20 years offered by BRD. LVT ratio and $\alpha$ were the same in every bank. Note that KCB was not present in the mortgage market prior to 2011. After 2011, the change appeared. The mortgage term became 18.75 years on average. Only BK has the lowest mortgage term of 15 years and the highest term is 20 years. The LTV ratio amounts to 25% on average; 20% for KCB and I&M Bank and 30% for both BRD and BK. Concerning the payment to income ratio, the payment of 50% of household income is accepted except in BRD where the LTV remained 30%.

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 a developer itself. Hence, the mortgage market factors such as mortgage interest rate, mortgage term, payment-to-income ratio and loan-to-value ratio are considered in the new system and the individual clients remained in BPR. Referring to Gan and Robert (2008), due to the amendment of the mortgage law in Rwanda
(Gazette, 2010), the change in $\alpha$, $\beta$ and $N$ increased slightly the purchase affordability alone, while the repayment affordability kept decreasing.

Table 1: The evolution of mortgage term ($n$), Loan to Value ratio (LTV) and Payment to Income ratio ($\alpha$) from 2006 to 2016

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</table>

Source: Author’s field survey in banks, 2017

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 limited number of 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 the fact that the market is limiting a good number of households but promising to the mortgage suppliers (Africa, 2012; Brueggeman & Fisher, 2011; Defusco & Paciorek, 2014; Gan & Robert., 2008; Hilbers, Lei & Zacho, 2001; Mutero, 2010).

4.1.2 Housing Affordability Over the Last Ten Years

In this section, the affordability limit concept is used to measure the trend of housing affordability basing on the trends of mortgage market elements. Here, the interest rate ($i$) trend is gotten from the National Bank of Rwanda (NBR, 2017), then LTV ratio, mortgage term ($N$), and $\alpha$ trend were determined on basis of data collected from the field survey as shown in Table 2. In the same table, the affordability limit is calculated using equation (1).

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 2, from 2006 to 2010, $\alpha$ and $\beta$ (LTV ratio) remained constant. But it is clear that the housing
affordability were decreasing slightly due to the slight increase in interest rate from 2006 to 2008.

<table>
<thead>
<tr>
<th>Period</th>
<th>LTV (%)</th>
<th>n (years)</th>
<th>α (%)</th>
<th>i (%)</th>
<th>AL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>30</td>
<td>15</td>
<td>33.33</td>
<td>16.07</td>
<td>2.64</td>
</tr>
<tr>
<td>2007</td>
<td>30</td>
<td>15</td>
<td>33.33</td>
<td>16.11</td>
<td>2.64</td>
</tr>
<tr>
<td>2008</td>
<td>30</td>
<td>15</td>
<td>33.33</td>
<td>16.51</td>
<td>2.59</td>
</tr>
<tr>
<td>2009</td>
<td>30</td>
<td>15</td>
<td>33.33</td>
<td>16.77</td>
<td>2.68</td>
</tr>
<tr>
<td>2010</td>
<td>30</td>
<td>15</td>
<td>33.33</td>
<td>16.94</td>
<td>2.54</td>
</tr>
<tr>
<td>2011</td>
<td>27.5</td>
<td>16.25</td>
<td>37.50</td>
<td>16.73</td>
<td>2.84</td>
</tr>
<tr>
<td>2012</td>
<td>25</td>
<td>18.75</td>
<td>45.83</td>
<td>16.49</td>
<td>3.49</td>
</tr>
<tr>
<td>2013</td>
<td>25</td>
<td>18.75</td>
<td>45.83</td>
<td>16.93</td>
<td>3.42</td>
</tr>
<tr>
<td>2014</td>
<td>25</td>
<td>18.75</td>
<td>45.83</td>
<td>17.66</td>
<td>3.30</td>
</tr>
<tr>
<td>2015</td>
<td>25</td>
<td>18.75</td>
<td>45.83</td>
<td>17.03</td>
<td>3.40</td>
</tr>
<tr>
<td>2016</td>
<td>25</td>
<td>18.75</td>
<td>45.83</td>
<td>17.30</td>
<td>3.35</td>
</tr>
<tr>
<td>Average</td>
<td>27.5</td>
<td>16.82</td>
<td>39.39</td>
<td>16.69</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Author’s Field survey, 2017 and NBR, Interest Rate Structure, 2017; AL values were from author’s calculation using AL formula

Figure 2 shows a graphical presentation of the affordability limit illustrating the performance of housing affordability due to the change in mortgage market factors in the last 10 years.

The decrease in interest rate in 2009 resulted in the increase of housing affordability. Due to the change of the mortgage laws in 2011, there was an increase in $\alpha$ and $N$ 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, increase in $\alpha$ and $N$ leads to the increase in purchase affordability alone and the increasing factor of affordability is $\beta$. The research findings concur with those of Gan and Robert (2008) who observed that on mortgage finance markets, housing
affordability decreases as the mortgage interest rate increases. For households with qualified income one can be mistaking that there is repayment affordability from 2006 to 2010 and from 2012 to 2016 as α and N remained constant. However, the situation in the field is different. Referring to gathered information on the field, more than 65% of respondent confirmed that they suffered a problem of declining affordability. 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, mortgagors were paying back more than three times the house loan they received from mortgagees. The charging of higher mortgage interest rates are associated with the risks caused by the lack of secondary mortgage market (Lehnert, Passmore, & Sherlund, 2008; Hofstrand, 2013). With reference made to Gan and Hill (2009), to determine clearly whether there was housing affordability, affordability limit, the least standard housing price and the average annual household income were used in Table 3.

<table>
<thead>
<tr>
<th>Period</th>
<th>Average annual income per household (in RWF)</th>
<th>AL</th>
<th>AL × Income</th>
<th>Least standard house price (in RWF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1,791,510</td>
<td>2.64</td>
<td>4,729,587</td>
<td>16,000,000</td>
</tr>
<tr>
<td>2007</td>
<td>1,954,192</td>
<td>2.64</td>
<td>5,159,068</td>
<td>16,000,000</td>
</tr>
<tr>
<td>2008</td>
<td>2,256,016</td>
<td>2.59</td>
<td>5,843,082</td>
<td>19,000,000</td>
</tr>
<tr>
<td>2009</td>
<td>2,490,511</td>
<td>2.68</td>
<td>6,674,568</td>
<td>21,000,000</td>
</tr>
<tr>
<td>2010</td>
<td>2,548,020</td>
<td>2.54</td>
<td>6,471,971</td>
<td>21,000,000</td>
</tr>
<tr>
<td>2011</td>
<td>2,692,510</td>
<td>2.84</td>
<td>7,646,729</td>
<td>22,000,000</td>
</tr>
<tr>
<td>2012</td>
<td>2,861,355</td>
<td>3.49</td>
<td>9,986,129</td>
<td>24,000,000</td>
</tr>
<tr>
<td>2013</td>
<td>2,982,527</td>
<td>3.42</td>
<td>10,200,243</td>
<td>25,000,000</td>
</tr>
<tr>
<td>2014</td>
<td>3,035,738</td>
<td>3.3</td>
<td>10,017,937</td>
<td>25,000,000</td>
</tr>
<tr>
<td>2015</td>
<td>3,112,181</td>
<td>3.4</td>
<td>10,581,415</td>
<td>26,000,000</td>
</tr>
<tr>
<td>2016</td>
<td>3,114,729</td>
<td>3.35</td>
<td>10,434,342</td>
<td>26,000,000</td>
</tr>
</tbody>
</table>

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

In Table 3, 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 10 years. In Figure 3, the least standard housing prices is higher than the average household capacity in each year. Therefore, one may conclude that housing was hardly affordable through mortgage finance market within the last 10 years (2006 – 2016).

4.1.3 Effect of Mortgage Finance Market on Housing Affordability in Kigali City

4.1.3.1 Effects of Types of Financial Institution in Operation

The results of the study showed that the qualified real estate financial institutions such as the Rwanda Social Security Board (RSSB) did not participate in mortgage finance market at all. Unfortunately, the market is dominated by commercial banks such as BK, KCB, BPR, etc. without long term mortgage financing. As a result, the mortgage suppliers limit the mortgage term to
middle and short terms and charges high to meet the need of financial liquidity. The middle and short terms mortgage finance limit directly the purchase affordability and the high cost of funding disturb the repayment affordability.

4.1.3.2 Effect of Available Mortgage Finance Market Type on Housing Affordability

The primary mortgage market was the only housing fund market in Kigali city for the last ten years. It is expected that it exposed the mortgage suppliers to high risks; as highlighted in the literature review that the lack of secondary mortgage market increases risks to mortgage lenders resulting in high interest rates. 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 such as high LTV, insurance policy and high valued collaterals. 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.

Figure 3: The Relationship between mortgage interest rate and inflation rate from 2006 to 2016

Referring to Figure 3, it is clear that the risks are not highly associated with the inflation as the mortgage interest remains flat while 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 rates 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. Consequently, mortgage finance market cuts down the mortgage consumers; hence housing affordability goes down.

4.1.3.3 Effect of Loan Amortization Schedule Type on Housing Affordability

The effect of adopted loan amortization schedule is made 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.

4.1.3.4 Effects of Mortgage Term, Loan-to-value and Payment-to-Income ratio on Housing Affordability
The effects of $N$, $\beta$ (LTV) and $\alpha$ can be seen in the Table 2. From 2010 to 2012 period, the increase in $N$ (from 15 years to 18.75 years), the increase in $\alpha$ (from 33.33 % to 45.83 %) and the reduction of $\beta$ (from 30 % to 25 %) have increased affordability limit from 2.54 to 3.49 (Table 2) which indicate the increase of housing affordability. Note that the increase in $N$, increase in $\alpha$ and reduction of LTV 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 if the household’s income is sufficient and stable to enhance repayment affordability. However, the increase of $N$, increase of $\alpha$ and reduction of LTV ratio increases only purchase affordability.

4.1.3.5 Effects of Interest Rate on Housing Affordability

It has been found that high and fixed mortgage interest rate on Rwanda market is not highly subject to inflation. Rather, it depends on market itself. The charged interest rate has a direct effect on housing affordability. Figure 4 shows the relationship between interest rate and affordability limit, it can be deduced that the increase in interest rate results directly in the decrease of affordability limit and vice versa. The concrete examples can be found in 2009, where the decrease in interest rate from 16.51% in previous year to 15.77% led to an increase in affordability limit from 2.59 to 2.68.

![Figure 4: The Relationship between mortgage interest rate and affordability limit from 2006 to 2016](image)

Source: Author's computation based on field survey and IFS/IMF Data, 2017

Also, the gradual decrease in interest rate 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 conclude that the increase in mortgage interest rate decreases housing affordability.

4.1.4 Effect of Mortgage Finance Market on Housing Affordability

The effects of mortgage finance market on housing affordability in Kigali City can be illustrated better through the indication of the percentage of households who can afford the housing. The
affordable limit sets the ratio of the maximum allowable loan to income (Gan & Hill, 2009, p. 4). Therefore, the percentage of the Kigali City dwellers who can afford housing in the last 10 years can be estimated. To arrive at this, in addition to the affordable limit figure we have, we only need the least allowed income for the last ten years, and their corresponding income distribution. The least allowed annual income is found by taking the least standard house price divided by AL. Later the quotient is also divided by 12 to find the least allowed monthly income. Hence the households earning this monthly income and above are eligible for the mortgage loan.

The Table 4 shows that only the households earning at least RWF 505,051 per month in 2006 and 2007; households earning RWF 573,066 monthly and above in 2012 and households earning RWF 609,162 and above per month from 2013 to 2016 could afford housing through mortgage finance market. In 2016, only 12.04% of households could earn above RWF 600,000 (Figure 5). So, 12.04% of Kigali City households could afford mortgage loan. Hence the mortgage finance market limited housing affordability through mortgage lending at 12.04% of households in Kigali City. Note that the households of Kigali City earning above RWF 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.

4.2 Results Discussion
The mortgage finance in Rwanda is still at an 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 who confirmed the infancy of mortgage market in Rwanda (Mutero, 2010; UN-HABITAT, 2012; IEG-World Bank, 2016).

Source: Author’s field survey (From local community and National Institute of Statistics of Rwanda, 2017

**Figure 5: Income distribution in Kigali city (2016)**

It is a 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 and the lack of secondary mortgage market, as specified by Bright & DeMarco (2016), an evidence of high risks associated with the market itself.

The research findings concur also with Mutisya (2015), who shows that the characteristics of mortgage market indicated above prevent housing affordability. The affordability limit indicator and the average household housing capacity findings show that housing is not affordable to households in Kigali city. This is also in line with the findings by IEG-World Bank (2016) and Mutero (2010) who demonstrated that housing affordability is highly limited in the city of Kigali. The research findings also show that:

a) The commercial banks dominating mortgage market provide expensive middle and short-term home loans, conditioned LTV ratio and conditioned payment-to-income ratio from which stem limited housing affordability.

b) The lack of secondary mortgage market exposes lenders to high risks and high interest rates lead to expensive mortgages; hence housing becomes unaffordable.
c) The even total payment used without flexibility also increases mortgage fund cost resulting in limited repayment affordability.

d) The high mortgage interest rate limits both purchase and repayment affordability.

These findings are in line with those of other researchers such as Defusco & Paciorek (2014); Gan & Robert (2008); and Hilbers, Lei & Zacho, (2001) who highlighted that, the decrease of mortgage term and reduction in payment-to-income ratio reduce housing affordability, while the opposite increases purchase affordability without repayment affordability. The research findings concur also with Bright and DeMarco (2016) who confirm that the lack of secondary mortgage reduces housing affordability while Brueggeman and Fisher (2011), Aha and Ayitey (2016), Boamah (2011), Burke, Stone and Ralston (2011) and French (2012) argue that the adoption of even total payment loan amortization schedule and high mortgage interest rate make mortgage products expensive and lead to reduction of housing affordability too.

The study identified also the most influential mortgage finance market determinants of housing affordability in Kigali City which include:

a) The mortgage term, LTV and payment-to-income ratio
b) The available types of mortgage market (only primary mortgage market).
c) Type of mortgage loan amortization schedule adopted (even total payment alone).
d) The charged nature and level of interest rate (fixed and high interest rate).

5 CONCLUSIONS

The research examined at which extent mortgage finance market affects housing affordability in Kigali city over the last ten years. To attain this objective, effort was made to address the following 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?

The research findings indicate also that the lack of secondary mortgage market increases the risk for mortgage suppliers. Moreover, it was shown that the change of the mortgage law in 2011 influenced the financial institutions to shift from short-term mortgage lending to middle-term mortgage financing which resulted in increase of payment-to-income ratio from 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. The study results show that housing was hardly 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. As it is, mortgage finance market does not promote housing affordability in the city of Kigali.

In this context it is recommended that financial institutions revise the house loan products to meet the rising demand for home ownership in Kigali City. Mortgage market stakeholders should consider the identified mortgage finance market determinants (the mortgage term, LTV, payment-to-income ratio, types of mortgage market and type of mortgage loan amortization schedule
adopted and interest rate) in policy and decision-making processes to enhance access to home loans.

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