THE EFFECT OF INTEREST RATE VOLATILITY AND INFLATION RATE ON THE LEVEL OF NON-PERFORMING MORTGAGE LOANS IN COMMERCIAL BANKS IN KENYA

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D61/60403/2013

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION (MBA),

SCHOOL OF BUSINESS, UNIVERSITY OF

NAIROBI

DECEMBER, 2018

DECLARATION

This research proposal is my original work and has not been presented for a degree in any other university.

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This research proposal has been submitted for examinations with my approval as the university supervisor.

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LIST OF ABBREVIATIONS AND ACRONYMS

CBK   Central Bank of Kenya

CBR   Central Bank Rate

CBZ   Central Bank of Zimbabwe

GDP   Gross Domestic Product

IMF   International Monetary Fund

NPLs   Non-Performing Loan

SPSS   Statistical Package for Social Sciences

ABSTRACT

The study sought to establish the impact of the volatility of interest rates and inflation rate on the amount of nonperformance of mortgage loans among Kenyans commercial banks. The target population for the study was mortgage financing commercial banks in Kenya as at 31st December 2016. Regression analysis was carried out using SPSS in order to establish how interest rate volatility and inflation rate affected the level of non-performing mortgage loans. Normality test carried out using Kolmogorov-Smirnov and Shapiro-Wilk Test revealed that the data is appropriate for carrying out parametric tests such as regression analysis and analysis of variance. The study found out that the amount of non-performing mortgage loans among Kenya's commercial banks had been increasing steadily over the study period (2012-2016). The study further found out that interest rates in Kenya were very volatile over the study period (2012-20016) and that there were significant variations in inflation rates over the same period of time. The upticks and downticks of interest rates were attributed to Central Bank of Kenya monetary policies, uncertain economic conditions and aggressive borrowings by businesses and other consumers. High or low inflationary pressure was attributed to weather conditions, international crude oil prices internationally and Central Bank's monetary policies. The study concluded that there is strong relationship between non-performing mortgage loans, interest rate volatility and inflation rate. Interest rate volatility and inflation rate both accounted for 27.1% of the total variance in non-performing mortgage loans and they both have a positive and significant effect on the level of non-performing mortgage loans among commercial banks in Kenya. This implies that any increase in interest rate volatility and inflation rate (cost of living) would result to increase in non-performing mortgage loans. The recommendation of the study was that the

Central Bank of Kenya should enforce relevant monetary policies with the aim of curbing the rise in the cost of living which in turn forces customers to default their mortgage loans.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The primary objective of setting up a commercial entity is to create shareholders' value through increased dividends and growing prices of shares (Brock & Rojas-Suárez, 2008). To achieve this goal, business firms invest their resources in projects that promise high returns. In most cases such projects are expensive and may require the organizations to look for additional funds to actualize their investment (Kamuyu, 2013). Chirwa and Mlachila (2004) said that, financial institutions are meant to provide the link between the savers through accepting savers' deposits that they lend to borrowers in a process known as financial intermediation. For this to be effective and efficient in discharging this noble role, financial institutions must ensure that their books are balanced (Kamuyu, 2013).

This area of interest rate volatility and inflation has had contributions from different scholars who conclude differently about the factors causing and consequences of interest rate volatility and inflation. The Classical theory of interest rates by Keynes holds that interest rates are dictated by the demand for credit thus volatility in the rates is as a result of variability in the demand of loans (Caplan, 2000). The Knut Wicksel Loanable Funds theory states that rates of interest are dictated by the demand and supply of credit that provides the distributing mechanism in the processes of investments and saving thereby resulting in variations in rates (Wicksell, 1898; Robertson, 1934; Ohlin, 1937).The demand pull theory of inflation further suggests that the increase in aggregate demand due to investment, consumption and government expenditure causes demand-pull inflation which then causes an increase in borrowing (Totonchi, 2011). This increases the amount of non-performing credit among lending institutions.

The president of Kenya on August 2016 signed into law an amendment to the 2015 banking bill which saw the capping of interests rates at 4 % above the Central bank rate. This was majorly caused by the general high interest spread than the peers in the past years (World Bank, 2016). This action by the president was a move to make the loans affordable to both small businesses and low income people thus reduce the amount of defaulting borrowers for bank loans , increase fees on commercial bank products and also reduce their productivity. The reason for controlling the interest that is charged on credit and other financial instruments in Kenya is centered on the need to control economic patterns by the CBR through the interest rates which has a great effect on the wider society (Corb, 2012).

1.1.1 Interest Rate Volatility

Interest rate is the fee paid by borrowers for borrowing funds and also the return by lenders for parting in liquidity (Ibimodo, 2005). In a country's economy, interest rates are key especially in determining the trend with which the funds are channeled in an economy. With the recognition of the importance of interest rates in an economy, various governments have been reluctant in allowing market forces of supply and demand to determine the rate of interest in their economies and as such they have used various mechanisms to control and manipulate the prevailing interest rate either directly or indirectly (Emeka et al, 2015).

Volatility is a measure of spread of interest rates from the mean. To overcome the issue of volatility, governments globally opt to use approaches such as setting the interest rate ceiling, using guided regulation and sometime deregulations and financial liberalization. The government chooses the approaches depending on the government monetary policy, variants of inflation economy and the stage of the economy in relation to the global economy. An analysis of the

volatility and spread of rates of interest in Kenya between 1970 and 1999 established that a growth in volatility was due to two reasons which are high intermediation costs and yet-to-be gained efficiency (Ngugi, 2001).

Ngacha (2013) determined the impact of rates of interest volatility on mortgage default rate in Kenya through the data adopted from the Central Bank of Kenya. Banks published financial statements starting 2008 – 2012 and Central Bureau of Statistics. The researcher established a positive correlation between the two study variables .It was found out that an increase in interest rate caused an increase of non-performing loans. Wehnam and Jagero (2013) evaluated the causes of interest rate volatility and its economic implications on Nigeria and established that to a large extent, interest rate volatility is caused by fluctuations in money demand and supply and that the volatility has a negative economic implication on Nigeria. Ajibola, Uche and Ayodele (2013) assessed the relationship between bank credit risk and interest rate volatility through comparing Granger Causality and Var-Garch Approaches. The researchers established an absence of causality between credit risk and volatility in interest rates.

1.1.2 Non-Performing Mortgage Loans

Loans that are non-performing are those that have been defaulted on or are about to be defaulted on. According to IMF (2009), loans are non-performing when interest and principal obligations have not been met by ninety days or more and it is reasonable to doubt that the payments was fully made. Non-performing loans affect the performance of loaning institutions since they are treated as undesirable outputs or costs to the loaning bank. According to Gaitho (2010) banks face the risks of non-performing loans as a result of bad conditions in the external economic

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environment for instance during an economic depression. Controlling the risks is thus crucial to the performance of any single financial institution as well as the wider economy.

Non-Performing Loans are undesirable to the operations of the firm since they cause a reduction of the liquidity of the firm, reduces credit expansion, causes sluggishness in the sectoral growth with direct concerns about the performance of the entity that has defaulted and sometime the whole economy. According to Gaitho (2010), the common causes of non- performing loans among banks include; insider lending, high interest rates, macroeconomic instability, liquidity support and prudential regulation, inadequate management of credit risk and economic mismanagement and political interference. The Global Economy (2015) established that the global average of performing loans globally was 7.1 percent. The country with the highest value was San Marino with 46.76 percent and Macao with the lowest value of 0.12 percent. According to the World Bank (2015) for the period 1998 to 2015, Kenya maintained an average of 16.3 percent of non-performing loans during the period, with a low percentage of 4.43 in 2011 and a maximum level of 34.9 percent in 2003.

In mortgage business, banks ensure that they keep the mortgage interest rates high but not above the base interest rates which makes the mortgage interest repayments easily vary from month to month (Mutero, 2007). In this sector, it is the lender who mostly determines the rates which can either be fixed or variable. The frequent rising and falling of mortgage rates with the country's interest rates can affect the real estate market to a great extent. The mortgage rates charged and the size of the loan the borrower is able to obtain can also be determined by the borrower's credit score. The mortgage rates charged determines the amount the borrower pay monthly and also the cost of the mortgage.

According to Aiyar et al. (2015), in Europe, banks are struggling with huge levels of non-performing loans especially in mortgages that are not written-off for a variety of deep-seated reasons some of which involves legal and tax code issues. The European NPLs at the end of 2014 were over 9% of their GDP which was greater than twice the 2009 level. The level of NPLs increased especially in the Southern countries, for instance Greece, Cyprus, Portugal and Italy (Aiyar et al., 2015). In Kenya The Central Bank of Kenya Annual Report (2011) suggests that that shift towards variable mortgages rates in 2011 is attributed to the interest rate volatility at the period and is said to cause low growth rate in the residential mortgage market in Kenya.

1.1.3 Interest Rate Volatility and Non-Performing Mortgage Loans

Scholars both local and internationally have carried out various studies to evaluate the interest rate volatility and non-performing mortgage loans correlation in different institutions. For instance, Ongweso (2005) did a study about interest rates and non-performing loans relationships and found out there existed a positive correlation between the study variables and any increase in interest rates caused an increase in non-performing loans. A significance test however revealed a weak relationship between the two. Ndung'u & Ngugi (2005) conducted research on the impact of interest rate spread on non-performing loans and established positive relationship between the two.

The study by Kiragu (2012) suggested that interest rate spread and volatility is brought about by financial liberation which results from financial sectors having weak institutions and policies. This causes borrowers to pay more for their loans even though they have no guarantee that the investments was able to pay back. This may also increase the rate of loan default. Kamuyu (2013) assessed the determinants of interest rate volatility among Kenyan commercial banks

using data from the 42 commercial banks in Kenya less the Islamic banks since they do not charge interests. The researcher established that determinants of interest rate volatility in Kenya include, the Central Bank Rate (CBR), the negotiation power held by commercial banks, the regulatory frameworks such as fiscal, monetary and legal, enforcements of credit contracts, broad money growth and the infrastructures of financial services. Ngacha (2013) established through her study that the volatility of the rates of interest has correlated positively with mortgage loans default rate although her study was general. However, this study focused on Kenya's commercial banks.

1.1.4 Commercial Banks in Kenya

The banking industry where commercial banks are part of was liberalized in 1995 with the Central Bank of Kenya playing the regulatory role by ensuring the formulation and overseeing implementation of rules governing the sector. This formed under the companies Act, the banking Act, the Central bank of Kenya Act and supplementary guidelines defined by the Central Bank of Kenya (CBK). The sector also comprises of 47 institutions; forty four commercial banks and 3 mortgage finance companies (CBK Annual Reports, 2015). Out of the 47 institutions 35 are locally owned and of the 44 commercial banks 30 are locally owned and 14 have foreign owners (CBK Annual Reports, 2015).

Commercial banks in Kenya have faced turbulence since 2015 which some scholars attribute to questionable governance practices such as capping of the rates, weak supervision and widespread fraudulent activities in the sector. There has even been a concern by the Kenya Revenue Authority on fraud-related investigations on banks such as the Commercial Bank of Africa, the National Bank of Kenya and the Cooperative Bank of Kenya for alleged unethical conduct and

tax evasion and even intends to rope in several other banks in the investigation (MacPherson, 2014).Despite this, the Central Bank of Kenya has given assurances just to inspire confidence in the public. The CBK has described the events such as placing Dubai Bank, Imperial Bank and Chase Bank Kenya into receivership as isolated case and reassured the public that the country's banking sector is not suffering from efficiency problems (MacPherson, 2014).

In Kenya, banks currently occupy an important position in the allocation of economic resources. This is through channeling funds from depositors to others who need it urgently to invest or spend which enhances economic development. Also when these banks are financially healthy, they ensure the shareholders get a return to their investment which in turn triggers more investment thus economic growth. According to Oloo (2011), when the banks are not financially healthy, it may lead to failure of financial market which may cause a financial crisis that hinders economic growth. Thus it's important that the government through the various regulatory bodies to monitor and set policies and regulations that ensure a healthy business environment for the commercial banks in the country for economic development.

1.2 Research Problem

Variation in the economic events such as the country's economic growth and inflation, economic crises in both the local and foreign financial markets and the changes in government policies causes changes in the country's interest rates (Kamuyu, 2013). Some of the economic events such as crises and change in government policies are irregular and unprecedented thus their effect on the country's interest rates is reactive and not predictive. According to Bikbov and Chernov (2004), the regular events in the economy over time determine the level of volatility in the interest rates of a country. The volatility in interest rates affects various sectors and

organizations differently. Changes in the direction of the interest rate is often seen in the lending rates and interests on deposits by commercial banks since they are the most exposed institutions in the financial market with respect to interest rate changes (Ghazali& Ali, 2002). However literature has not exhaustively determined the effect that changes in interest rate has on non-performing mortgage loans among commercial banks.

There has been turbulence among the commercial banks in Kenya since 2015. The turbulence saw three medium -sized banks placed under receivership as well as Chase Bank recently. This turbulence and additional trends in the sector suggests a possible existence of many challenges among the commercial banks which others attribute to weak supervision, questionable governance practices such as capping the rates and widespread fraudulent activities in the sector (MacPherson, 2014). Recent developments in the sector have seen the capping of banks' cost of loans at four percentage points above the CBK lending rates rate. This faced a strong opposing force from the Kenya Bankers Association but the bill was still signed into law by the president.

Various studies have been conducted in this area. Wehnam and Jagero (2013) assessed the causes of interest rate movement and the economic implications on Nigeria and found that interest is mainly caused by fluctuations in money demand and supply. Rizviand Khan (2015) reviewed the impact of inflation on loan default in Pakistan and found that inflation affects loan defaults both positively and negatively. Locally, Okoth (2011) established the impact of interest rate volatility on borrowing of credit in Kenya and found that interest rate volatility does adversely affect the rate of borrowing. Ngacha (2013) examined the correlation of interest rate volatility and mortgage loans default rate in Kenya and found a positive relationship. Mwangi (2014) determined the effect of interest rates on bad loans in commercial banks in Kenya and revealed a significant, negative correlation that is linear between banks' NPLs and interest rates.

Most of the studies reviewed focused on establishing the relationship between interest rate volatility and economic growth for instance Wehnam and Jagero (2013). Other studies such as Okoth (2011) and Mwangi (2014) were based on other types of loans other than the mortgage loans which cannot be used to conclusively represent the trend in the mortgage loans. The studies reviewed also find mixed results on interest rate volatility and non-performing loans. Ngacha (2013) came close to tackling the topic although generalized her study instead of focusing on commercial banks. Thus no study has been done in Kenya, to exhaustively determine the relationship between volatility of interest rates and the non-performing mortgages among banks. This is the gap that the study will endevour to fill by addressing the question: what is the impact of interest movement on defaults on mortgage loans in commercial banks in Kenya?

1.3 Research Objective

To determine the effect of interest rate volatility on the level of non-performing mortgage loans in commercial banks in Kenya.

1.4 Value of the Study

The researcher's findings were significant to different parties like the government and other regulators, the management of commercial banks and other firms that offer mortgage loans, investors and to researchers and academicians.

To the state and other regulatory organs like the Central Bank of Kenya and the Capital Markets Authority, the findings of the study was useful in regard to advising on the formulation of interest rate policies and guidelines that would enhance the growth of the mortgage business which in turn contribute to the country's economic growth.

To the management of commercial banks and other firms that offer mortgage loan, this study enlighten them on how the volatility of interest rates affects the non-performing loans thus help them make informed decisions when it comes to mortgage thus enhance their performance.

The study also seeks to enlighten investors on the effects of interest rate volatility on mortgage loans thus help them make informed decisions when investing in mortgage in light of interest rate volatility to safeguard their interests.

The study will be a good source of literature review to other researchers and academicians, for future research studies in the same area.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction.

This chapter covered a review of the theoretical, and the empirical literature that related to the study as well as literature summary, research gaps and the conceptual framework

2.2 Theoretical Review

Interest rate and inflation theories developed by scholars to explain the volatile nature of interest rate and how the rates impact on various banks in the economies. This was anchored on three theories which include; classical theory of interest rates, the Loanable Funds theory and the Demand Pull Theory of Inflation.

2.2.1 The Classical Theory of Interest Rates

The Classical theory of interest rates OR Demand and Supply theory was developed by John Maynand Keynes (1936). However other scholars such as Vaish (2000) suggest that Classical theory of interest rate cannot be credited to one single scholar that belongs to the classical school. The theory holds rates of rates are determined by the supply and demand for credit thus volatility in the rates is as a result of variability in the supply and demand of credit (Caplan, 2000). The classical theory uses the classical economics theory in determining the level of interest rates through comparing the supply of savings with the demand for borrowing and applying the supply and demand curves to calculate the equilibrium rate by determining the curves intersection point. The theory assumes that the demand for credit comes from businesses or people who borrow for consumption or litigation while supply of credit emanates from those who save from their current income.

The Classical theory of interest rates is however criticized on the ground that it assumes that there is full employment of resources thus an increase in one thing implies the withdrawal of the other for instance an increase in the investment mean more postponement of consumption which is not true (Tushar, 2013). This theory is also criticized on the basis that it neglects the changes in the income levels of individuals (Ho and Saunders, 1981) as cited by Mungai (2013). This theory is also criticized because it assumes that the investment demand schedule can shift without causing a change in the saving curve schedule which is wrong. It is also criticized on the account that it does not provide other factors besides supply and demand for credit income wealth dynamisms in borrowers and building funds (Ho and Saunders, 1981). This theory is however relevant in the study because it suggests that interests are dictated by the supply and demand for credit thus volatility in the rates results from variability in the supply and demand of credit which in turn has adverse effects on various aspects of the economy such as the performance of the commercial banks.

2.2.2 Loanable Fund Theory

The theory was coined by Knut Wicksell (1898).the theory states that, the level of interest rates is dictated by the supply and demand for credit which also plays an important role in the investment and saving processes (Robertson, 1934 and Ohlin, 1937). The Loanabe Funding was developed from the limitations of the classical theory of interest rates. The theory is of the opinion that the supply of credit funds come from dishoarding, bank credits and savings while the demand of loanable funds come from three major sources that include; common household consumers ,firms and the government who need credit for consumption, hoarding and investment (Robertson, 1934). This theory is preferred to classical theory because it factors in both real and

monetary factors which help acknowledge the role of bank credits as a component of money supply.

The theory further states that effective interest rates was at the level where the supply of loanable funds is equated to the demand (Ngugi, 2001) and at this price the people and institutions that invests and saves are the happiest. According to this theory, the volatility in the levels of interest rates results from the market forces for funds at the disposal to lend. It further states that at that point both parties should be well compensated and spread in the rates do not have to be wide because some parties feel over exploited. Here, the government's role is to structure the interest rates to ensure contention of each player (Emmanuelle, 2003).

The Loanable Funds theory was criticized by Keynes on the grounds that the theory is based on an unrealistic assumption of full employment. Hansen (1941) also criticizes the Loanable funds theory on the same basis since it is not determinate i.e. it assumes that saving and income are independent however saving is dependent of income. Its assumption that savings, and investment relate to interest rates but in investments are hence investing decisions could be affected by other factors apart from interest rate. This makes it unrealistic. This theory is however relevant to this study for its suggestion that change in the supply and demand for money causes volatility in the level of interest rates which in turn affects various aspects of the economy such as the performance of commercial banks.

2.2.3 Demand Pull Theory of Inflation

This theory was developed from work of John Maynard Keynes (1883). This theory, states that the surge in aggregate demand causes the demand-pull inflation in any country. The components of total demand include; investment, consumption and government expenditure. According to the

theory, the inflationary gap arises where the level of total demand surpasses the level of total supply at the full employment . The larger the inflationary gap the more rapid is the inflation. Thus according to the demand-pull inflation theory of Keynes, effectively reducing the pressure of demand and inflation only occur through putting in place policies that result in decrease in each component of total demand. These may include; reductions in the expenditure by the government through tax increase and also controlling the amount of money individually or together can effectively reduce effective demand and inflation control.

Demand pull inflation is said to be caused by five factors which include: an increase in the level of expenditure and investment by consumers on firms that then employ more labor to meet the demand; an immediate increase in exports that causes currency undervaluation ; an increase in government expenditure and projections and expectations of inflation, where firms raise their prices to be in tandem with the movement of the expected rise and also on monetary growth which has to compete with too few goods resulting to increase in prices. When the country's economy is experiencing difficult conditions such as hyperinflation in periods of war regulating the amount of money in circulation and reduction in general expenditure may be impractical the government can use increase in tax to control demand (Keynes, 1936). The theory is criticized by scholars on the grounds that it lacks practicability. This theory is relevant to this study for its suggestion that the increase in aggregate demand due to an increase in investment, consumption and government expenditure causes demand-pull inflation which then causes an increase in borrowing that increases the chances and levels of non-performing loans among lending institutions.

2.4 Determinants of Non-Performing Loans

Various scholars have come up with various determinants of the level of non-performing loans among banks. These include; GDP, inflation, the level of income, banks policy and borrower attributes. This study however focus on four determinants which include; the level of income, inflation, banks policy and borrower attributes. These four determinants are common across various scholars.

2.4.1 Level of Income

The customer's income level is the amount of money that the consumer earns from their investments or work. The level of income of the customers has a direct relationship with non-performing loans. The level of income by borrowers is a crucial factor to determine by the lenders. The relationship between the borrower's level of income and the level of non-performing loans among banks has been reviewed by many scholars. Lawrence (1995) used a theoretically model to determine the relationship between level of income and the borrower's probability to default on their loans. The study established that borrowers with poor incomes default more due to high rate of exposure to unemployment risk and inability to finance their obligations.

A study by Gambera (2000) conducted to establish the macro-economic variables on loan losses in America for the period 1987-1999 established that income and unemployment levels are macro-economic factors leading to loan losses in America. Other scholars such as Fofa (2005) and Jimenez and Saurina (2005) suggest that a positive growth in the country's real GDP increases the level of income by the households that enhances their debt servicing ability which

contributes to low non-performing loans. Otherwise, when there is a slowdown in the economy (low or negative GDP growth) the level of NPLs increases.

Rinaldi and Sanchis-Arellano (2006) examined the factors that affect household loan defaults in a set of European countries and established that non-performing loans by banks in the European countries are unemployment, household disposable income and monetary conditions. The scholars further suggested that the chance of default by borrowers depends on their current income and the country's unemployment rate, which is associated with the risks regarding future income and the lending rates.

The study by Berge and Boye (2007) established that non-performing loans are highly correlated with the income level, lending rates and unemployment for the Nordic banking system for the period 1993 to 2005. A study by Khemraj and Pasha (2009) established that gross domestic product (GDP) growth increases the income by households which in turn enhances their capacity to repay their loans which contributes to lowering the amounts of bad loan and vice versa. Dash and Kabra (2010) studied the effect of real income on non-performing loans in Indian banks for the period 1998-2009 and established that the real income variation negatively affects the bank's NPLs. The study further established that other factors such as high rates of interest and real effective exchange rate increased the level of NPLs in banks.

Prasanna, Thenmozhi and Rana (2014) determined the relationship between macro-economic factors and non-performing loans in banks operating in India for the period 2000 to 2012. The study employed a panel dataset of 31 Indian banks. The study found that an increased growth rate in GDP is related to per capita income which is in turn related to reduction in NPLs among Indian banks. The increase in inflation and interest were also found to contribute positively to an

increase in NPLs. The general view by majority scholars on this area of knowledge is that increased income level enhances capacity to repay their loan which reduces the level of non-performing loans and vice versa. However, no study reviewed the relationship between level of income of the borrower and the bad mortgage loans among Kenya's commercial banks, it is thus through this study that this relationship is reviewed.

2.4.2 Inflation

Inflation is the general raise in the price level of goods or the cost of living in an economy. High and volatile inflation levels have been widely agreed to be detrimental to individual consumers, businesses and even the economy as a whole (Okoth, 2013). The inflation rate is generally used to measure the stability of prices in an economy. Recently, the topic of inflation has got the attention of governments, researchers and academicians. According to Fisher hypothesis, nominal interest rate change in tandem with the expected inflation but this does not affect the real interest rate (Fisher, 1930) as cited by (Mitchell-Innes, 2006).

The relationship between inflation and the non-performing loans level is not reviewed broadly by researchers but a few that have reviewed it suggest that the inflation determines the cost of borrowing in banks which in turn affects level of non-performing loans. According to Akoth (2013) there are three major explanations of inflation levels in an economy which include; through fiscal, balance of payments or monetary aspects. Through fiscal aspect, inflation is said to be caused mainly by budget deficits, through the balance of payments aspect, inflation is said to be caused by changing levels in the interest rates, while through monetary aspect, inflation is viewed as caused by increase in money supply.

In Kenya, the economy experienced a high inflationary pressure which involved an increase in inflation from 4.51% to 19.7% in January for about 9 months in 2011 which caused a rise in interest rates by banks as in April 2011 (Kamuyu, 2013). This in return increased the level of non-performing loans among banks. In 2012 however, the levels of inflation started to reduce. This was as a result of the then Finance Minister Uhuru Kenyatta, putting in place some measures to reduce its budget deficit to 5.1 percent (Murage, 2013). The level of inflation recorded then in April 2013 in Kenya reduced to 4.14 percent in April 2013. In the period 2014/15, the level of inflation slightly increased to 5 percent.

The study by Khemraj and Pasha (2009) on the relationship between inflation and non-performing loans among banks in Guyana established that there is mixed results on the relationship. These findings were concluded from an analysis that established that inflation had a negative relationship with NPLs at time t but a positive impact on NPLs at time t-1. This suggested that high inflation at time t saw a reduction in the level of NPLs in the banking sector in Guyana. High inflation from the previous period however, caused commercial banks to incur higher non-performing loans.

Fofack (2005) in his study established a correlation between inflation rate and non-performing loan. The scholar suggests that inflation has led to an increase in the level of loans defaults in a number of Sub-Saharan African whose exchange rate regime are flexible. According to this author, inflation is responsible for rapid diminishing of commercial banks' equity and therefore higher credit risks in the banking sectors of these countries .The inflation rate and the level of non-performing loans correlation is thus subject to further study since. No study however reviewed the relationship between the variables. It is thus through this study that this relationship is reviewed.

2.4.3 Banks Policy

The banking sector acts as the primary vehicle used in executing monetary policy decisions that affect the economy as a whole including prices, interests rate and liquidity, thus establishing an effective and sound banking sector is important since it ensure the country's financial system is healthy (Sawe, 2013). Commercial banks just like other institutions have put in place different policies to achieve different goals. For instance according to CBK(2012), commercial banks in Kenya put in place liquidity preference and bankruptcy policies to assist them restore confidence in the banking sector among investor's. Some banks even put in place policies on the level of non-performing loans, collaterals and clearance by credit rating bureaus to be capable of distinguishing good from bad borrowers, minimize transaction costs, spread risks, thus lend to best investors and gain highest return rates of. Many banks and other financial institutions prefer liquidity to investing thus have to set policies that help them maintain a balanced quick acid ratio thus be able to meet their current liabilities when they fall due (Kamuyu).

In Kenya, in light of the new policies on interest rates, many banks have opted to change their policies to avoid accumulation of non-performing loans, for example some banks stopped unsecured lending and new unsecured loans applications (Ciuri, 2016). According to Anyanzwa (2016), the Kenyan banks especially the large market banks like KCB, Co-operative bank and Diamond Trust bank have also reviewed their policies on lending. This is attributed to uncertainty before the elections in August 2017. Commercial banks in Kenya have opted to put in place policies such as; ensuring sound macroeconomic policies are set, liquidity policies and bank capitalization regulations all in the effort to reverse the declining trend in the growth of the Kenyan commercial banks' profitability.

Brock & Franken (2005) through their study suggested that individual bank policies and characters only affect interest rate volatility on a little extent although it determines individual bank profitability and financial stability. The study however did not focus on the level. Otieno (2013) examined the impact of the policies of credit giving on the amounts of non-performing loans (NPLs) of commercial banks in Kenya and established that bank policies on lending is related to the bank's defaults on loans. The study found that lending policies helps the banks in prudential lending which involves lending to lower risk borrowers and strict adherence to the lending policies to reduce the level of poor loans in the bank. No study however reviewed the relationship between bank policies and the loan defaults among Kenya's commercial banks , it is thus through this study that this relationship is reviewed.

2.4.4 Borrower Attributes

According to Ito (2007), the borrowers are very sensitive to changes in factors such as interests such that a unit change in the interest rate by commercial banks may result to more than a proportional change in their borrowing characteristics. A 1% decrease in the lending rate results to a 12% increase in the number of investors who get attracted to consider investing through acquiring loans from banks or other financial institutions. This implies that investors are very sensitive to changes in interest rates by commercial banks (Thygersa, 1995) as cited by Kamuyu (2013). The borrower's ability to repay their loans is determined by among other factors high interest rate, this is because defaults in the loans occur when the borrowers are unwilling and or not able to repay their loans (Hoque & Hossain, 2008).

The level of uncertainty in the banking industry due to changes in the interest rate is reflected on the reactions of borrowers. Borrowers are either risk-averse, neutral or risk lovers (Ataullah &

Lee, 2006). The investment decisions that fund borrowers are affected by the interest rate volatility among the commercial banks. The investors must assess the effective market rate before making a decision to spend on investments which in turn depend on the level spread among banks. The volatility in interest rates affects the level of risk involved in investments. Unstable rates of interest make the banks lock out risk averse investors from accessing credits which limits their ability to undertake investments (Barnea& Kim, 2007).

The study by Mabvure, Gwangwava, Faitira, Mutibvu and Kamoyo (2012) on defaults in CBZ Bank Limited in Zimbabwe found that lower integrity had a relationship with the level of non-performing loans in the CBZ Bank Limited. The researchers established that integrity of the borrower affected the non-performing loans in CBZ Bank Limited to a great extent. A study by Kamuyu (2013) established that when it comes to credit extensions, most commercial banks in Kenya prefer attributes such as corporate clients, high income individuals and then the middle class earners as least preferred. The study however focused on interest rates volatility and defaults on loans. No study however reviewed the relationship between borrower attributes and the defaults on mortgage loans among Kenya's commercial banks, it is thus through this study that this relationship is reviewed.

2.5 Empirical Review

The empirical review is based on the international and local studies abut volatility of interest rates on the non-performing mortgage loans in commercial banks.

2.5.1 International Studies

Kawaja and Din (2007) examined the determine interest rate spreads in Pakistan for the period 1998 to 2005. The researchers used panel data of 29 banks. The study employed both the firm variables and the industry variables. The study's industry variables consisted of deposit inelasticity and concentration while the firm variables used included firm administration costs, liquidity, asset quality, market share, and macroeconomic variables of inflation, real output and real interest rates. The study established that deposit supply inelasticity is the major determinant of interest rate spread.

Wehnam and Jagero (2013) examined the causes of interest rate volatility and its implications on the Nigerian economy. The researchers focused on causes of interest rate volatility and how this affects the Nigerian socio-economic development for the period 2000 – 2005. Data that was collected mainly from secondary sources was used. The study established that interest rate volatility is caused by the demand and supply of money. The researcher further established that a change in money supplied by 1% causes a 14.064% change in the level of interest rate which in turn affects the economy to a great extent.

Ajibola, Uche and Ayodele (2013) determined the effect of bank credit risk on the interest rate volatility in Nigeria through comparison of the Granger Causality and Var-Garch Approaches for the period 1981 to 2011. The study employed time series data from the Central Bank of Nigeria statistical bulletin and the annual accounting reports of deposit money banks. The study established that there is no causality between credit risk and interest rate volatility. The researchers also found that the two models are similar as Granger Causality show that no information flows or transmission between credit risk and interest rate, also, the Var-Garch

approach reveals that there is zero causality between the two variables. The researchers established that credit risk negatively affected interest rate volatility but the relationship is insignificant.

2.5.2 Local Studies

Ng'etich and Wanjau (2011) examined the influence of interest rates spreads on the commercial banks' level of Non-performing Assets in Kenya. The researchers employed a descriptive research design. The population constituted all the 43 banks that were in operation in 2008. The study used both used questionnaires and the Bank Supervision Reports to collect data. The researchers found that interest rate spread affected the commercial banks performing assets through increasing the cost of loans charged on the borrowers. The researchers also established that regulations on interest rates have on a great extent affected the assets non-performance through determining the interest rate spread among banks and also moral hazards incidental to Non-performing Assets.

Ngacha (2013) determined the impact of the volatility of interest rate in Kenya's mortgage default rate for the period 2008 – 2012. The study adopted a descriptive design. The population comprised all the 44 commercial banks and the mortgage finance company. The researcher found a positive correlation between the level of interest and default rate. The researcher established that a raise on interest rate causes an increase in non-performing loans. The researcher then recommended that banks in Kenya ought to carefully evaluate their customers and ensure they levy interest rates fairly to avoid high and ineffective interest rate policies that increase the default rate.

Mwangi (2014) determined the impact of rate of interest on nonperforming loaned in commercial banks in Kenya. This researcher used a descriptive design. The population comprised all the 43 Kenya's licensed commercial banks. The researcher focused on the data about banks total revenue, total risk weighted assets, bank's total non-performing loans, the interest rate charged by the banks, bank's noninterest expense, total assets and total loan and advances by banks for the period 2009 – 2013. The researcher found a negative and linear relationship the study variables. The bank's cost income ratio on the other hand was found to be positively associated with bank NPLs. The researcher then concluded that there is a strong relationship between the variables of the study.

2.6 Conceptual framework

This study's conceptual framework includes; the independent, the dependent and the control variables. The independent variable is the interest rates volatility among Kenya's commercial banks. The dependent variable is the level of non-performing loan among commercial banks in Kenya. The control variables include; inflation, bank policy, borrower attributes and level of income.

Figure 2.1: Conceptual Framework

Independent Variables   **Dependent Variables**

```
┌──────────────────────────┐                    ┌────────────────────────────────┐
│ Interest Rate Volatility │ ─────────────────▶ │ Level of Non-Performing Loans  │
└──────────────────────────┘                    └────────────────────────────────┘
                      ▲
                      │       ┌──────────────────────┐
                      ├───────│ Inflation            │
                      │       └──────────────────────┘
                      │       ┌──────────────────────┐
                      ├───────│ Bank Policy          │
                      │       └──────────────────────┘
                      │       ┌──────────────────────┐
                      ├───────│ Borrower Attributes  │
                      │       └──────────────────────┘
                      │       ┌──────────────────────┐
                      └───────│ Level of Income      │
                              └──────────────────────┘
```

Control Variables
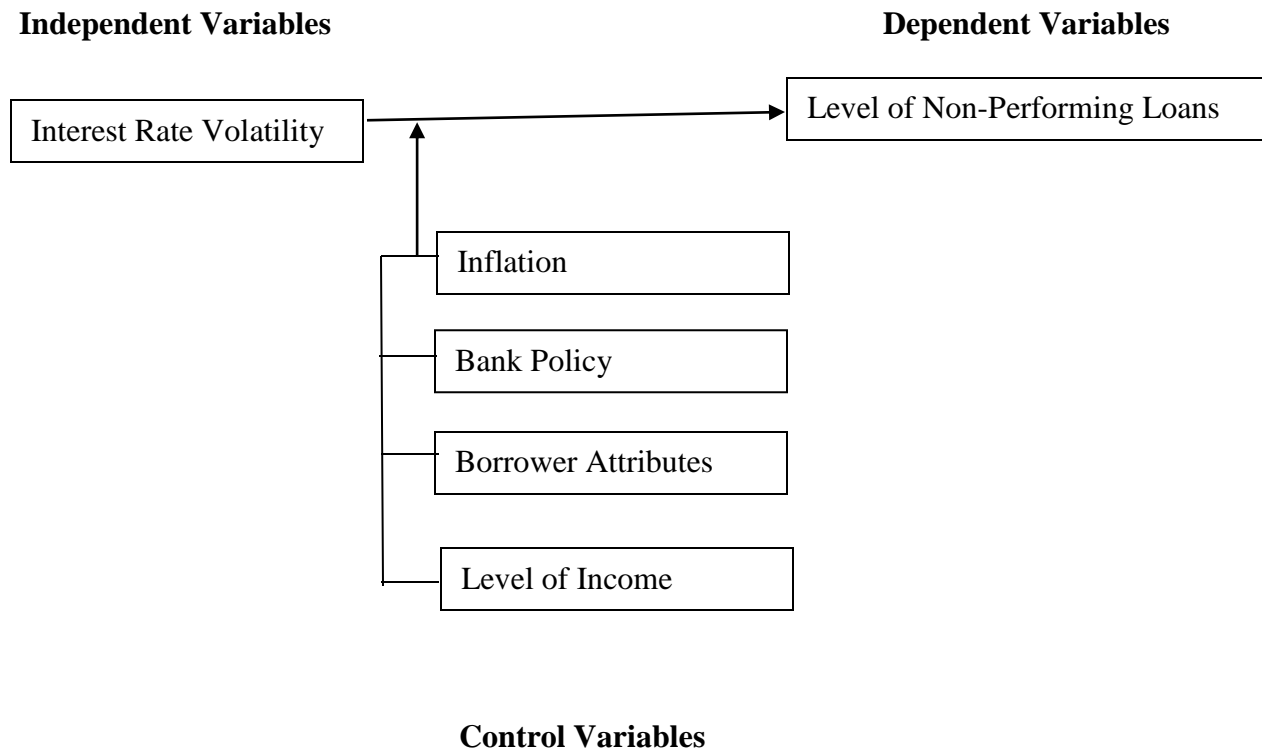
2.7 Literature Review Summary and Research Gap

Chapter two covered literature reviewed on impact of interest rates volatility on defaulted mortgage loans in commercial banks. The study is based on three theories that try to explain causes of inflation, volatilities in the interest rates and how the volatilities affect various institutions in the economies. These include the Classic theory of interest rates, the theory of Loanable and the Demand Pull Theory of Inflation. The theories reviewed suggest different determinants of inflation and interest rate volatility for instance; the Classical theory of interests rates suggests that volatility rate of interests is caused by the supply and demand for credit (Keynes, 1936) while the Loanable Funding theory on the other hand suggests that the volatility

in interests rates is caused by the variability in the supply of loanable funds (Wicksell, 1898). From the literature, it can also be summarized that the common factors that determine the level of default on loans include; the level of income, inflation, bank policies and borrower attributes.

The literature however does not establish a set of factors that cause interest rate volatility that are agreed by all scholars. However the common factors that that causes volatility in interests rates include; government regulations, borrower attributes, bank policies and inflation. This study seeks to find out whether the factors influencing the non-performing mortgage loans in Kenya's commercial banks. Some of the literature reviewed is based on countries other than Kenya which cannot be basis for concluding the same on commercial banks in Kenya due to the a variation in factors such as market forces and the country's economic performance. For instance Khawaja and Din (2007) based their study on Pakistan while Wehnam and Jagero (2013) based their study on Nigeria. Some studies in this area of knowledge were also based on interest rate spread instead of interest rate volatility. Most of the local studies are also based on Kenya in general and not contextualized in this study which is Kenya's commercial banks. This brings out a gap in knowledge that this study sought to address by seeking to understand how interest rate volatility affect the level of non-performing mortgage loans in the Kenya's commercial banks.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explained the study design used, population of the study, data collection methods, instruments and analysis of data.

3.2 Research Design

Dul and Hak (2008) state that research design is "an arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance with the research purpose". This study employs a descriptive survey research design. According to Mugenda and Mugenda (2003), research design provides the structure, plan and strategy to be used in order to provide answers to different research questions. Descriptive research design was used because it allows the researcher to describe the population of interest. The design also allowed the researcher to determine how the volatility of rates of interest affects the non-performing mortgage loans in Kenya's commercial banks.

3.3 Population of the Study

The target population for this study was the commercial banks offering mortgages in Kenya as at the end of 31st December 2016. According to the Central Bank of Kenya (2016), there were 42 banks offering residential mortgage in Kenya as at 31st December 2016 as per Appendix I. This excluded Dubai Bank, Imperial Bank Ltd and Chase Bank under receivership. The banks are classified into Tier 1, Tier 2 and Tier 3. This study was based on a census survey since the population of study is small (42 commercial banks offering mortgage services), hence no sampling is required.

3.4 Data Collection Instruments

Secondary data was used in the study. It was collected from central bank in relation to interest rates volatility and inflation while the level of non-performing mortgage loans was collected from individual banks financial statements.

3.5 Data Collection Procedure

Secondary data that was used in this study was collected from both individual banks financial statements and the Central Bank's database. The secondary data was collected over a five year period (2012-2016). Data concerning non-performing mortgage loan was extracted from individual commercial banks audited financial statements while data on interest rates and inflation rate was retrieved from the Central Bank website.

3.6 Analysis of Data

The data obtained was checked for consistency and analyzed using the statistical software, specifically, SPSS. Graphs were adopted to present the trend of the variables over the study period (2012-2016). Descriptive statistics namely means and standard deviations were adopted in this study. The results of the study were presented with the aid of graphs, tables and percentages.

3.6.1 Analytical Model

Regression analysis was used to explain the correlation linking interest rate volatility and non-performing mortgage loans in Kenyas' commercial banks. The analytical model that was used is as described below:

$$\mathbf{Y}_i = \boldsymbol{\beta_o} + \boldsymbol{\beta_1}\mathbf{X_1} + \boldsymbol{\beta_2}\mathbf{X_2} + \boldsymbol{\varepsilon}$$

Y_i = Level of Non-Performing Loans

X_1 = Interest Rates Volatility

X_2 = Inflation Rate

β_o = constant of the model (y-intercept)

β_1 - β_2 = co-efficients of the model

ε = model error estimate

Table 3.6: Operationalization of Variables.

Non-Performing Mortgage Loan	Measured using the total amount of banks non-performing loans.
Interest rate volatility	Measured using risk free interest rate on government 5 year bonds
Inflation rate	It is measured using the annual consumer price index

Source: Researcher (2017)

3.6.3 Test of Significance

The significance of the correlation between interest rate volatility and Non-performing Mortgage Loans was tested using a p-value equal to or less than 0.05. All the calculations were carried out at 95% confidence level. The analytical model's goodness of fit was tested using Analysis of Variance (ANOVA) with an F statistics of 5% or less being used as the level of significance.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND INTERPRETATION

4.1 Introduction

The chapter presents the analysis, findings and interpretation of the secondary data from the Central Bank of Kenya and the Kenya National Bureau of Statistics. The study sought to determine the relationship between the study variables .Regression analysis was carried out using SPSS in order to establish the direction of relationship of the variables. Study findings were presented in tables and figures.

4.2 Test for Normality

The researcher carried out a normality test on the secondary data collected. The researcher hypothesized that the data was not normal. If the study recorded a significant value (p-value) of less than 5%, the hypothesis would be rejected. The test results are as shown in Table 4.2.

Table 4.2: Test for Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Non-Performing	.278	60	.200	.676	60	.753
Interest Rate Volatility	.240	60	.200	.727	60	.727
Inflation Rate	.246	60	.200	.748	60	.733
a. Lilliefors Significance Correction						

Source: Research Findings (2017)

The results of both Kolmogorov-Smirnovand Shapiro-Wilk Test recorded p-values greater the 5% for all the variables which implies that the research data was normally distributed. The researcher therefore considered the data appropriate for carrying out parametric tests such as regression analysis, variance analysis and Pearson's correlation.

4.3 Descriptive Analysis

A description of the trend of the study variables was done for period 2012 to 2016.

4.3.1 Non-Performing Mortgage Loan

The researcher endeavored to analyze the trend of the variables as shown in Table 4.3.1.

Table 4.3.1: Non-Performing Mortgage Loan

Year	2012	2013	2014	2015	2016
Non-Performing Mortgage Loans	6863	8451	10795	11737.18	22028.21
STDEV	650.19	788.69	917.71	776.06	1467.04

Source: Research Findings (2017)

The study found out that the amount of defaulted mortgage loans among Kenya's commercial banks had been increasing steadily over the study period. For instance, the value of Non-performing mortgage loans increased from Kshs. 6,363 million to Kshs. 22,028.21 million in 2016. The standard deviations recorded indicated that the level was fluctuating over the study period. The trend of non-performing mortgage loans during the study period is as presented in Figure 4.3.1.

Figure 4.3.1: Non-Performing Mortgage Loan
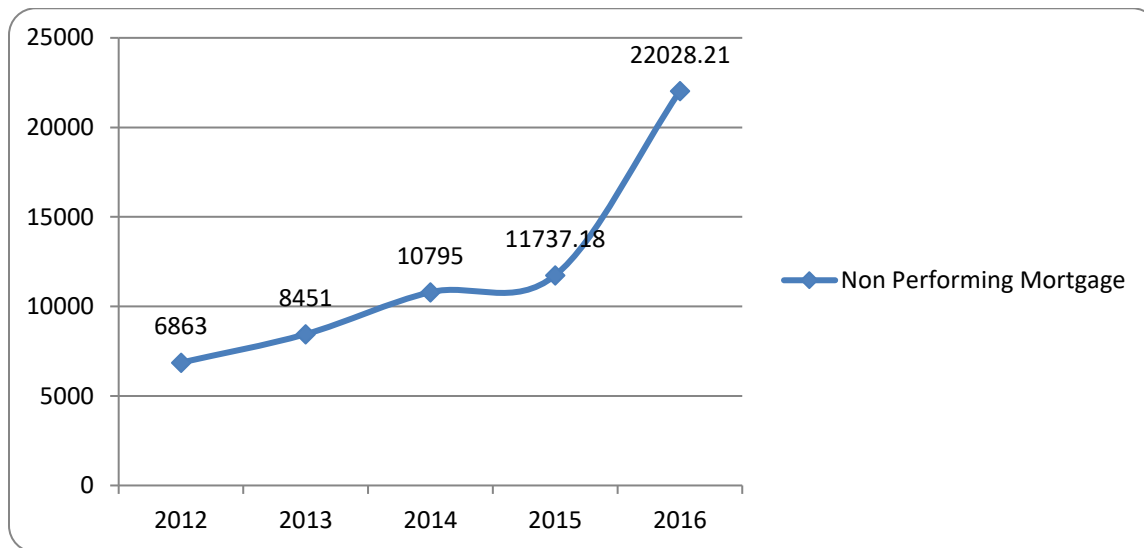
Source: Research Findings (2017).

4.3.2Interest Rate Volatility

The study further sought to analyze the trend of Kenya's interest rates volatility. The results of the study are as shown in Table 4.3.2.

Table 4.3.2: Interest Rates Volatility

Year	2012	2013	2014	2015	2016
Interest Rates	12.76	8.93	8.93	10.93	8.51
Stdev	4.537	1.489	0.493	3.927	1.379

Source: Research Findings (2017)

During the study period (2012-2016), Kenya's interest rates were highly volatile. The rates oscillated from a high of 12.76% in 2012 to a low of 8.93% in 2013 and 2014 before increasing again to a high of 10.93% in 2015. The rates sunk again to a low of 8.51 in 2016. This indicates that there were variability of interest rates on both loans and savings over the study period. This

volatility has a great impact on the borrowing costs and investment account earnings. The upticks and downticks of interest rates can be attributed to Central Bank of Kenya monetary policies, uncertain economic conditions and aggressive borrowings by businesses and other consumers. The trend during the study period is as shown in Figure 4.3.2.

Figure 4.3.2: Interest Rate Volatility
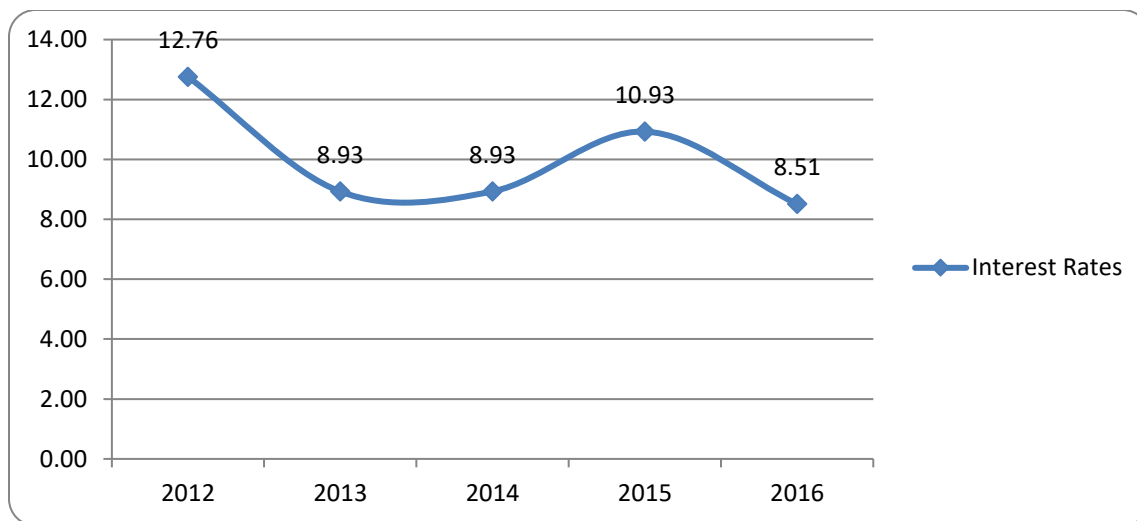
 Source: Research Findings (2017).

4.3.3 Inflation Rate

The study lastly sought to analyze the trends of Kenya's inflation rates. The study findings are as tabulated in Table 4.3.3.

Table 4.3.3: Inflation Rate

Year	2012	2013	2014	2015	2016
Inflation Rates	9.64	5.72	6.88	6.58	6.30
STDEV	5.449	1.674	0.493	0.713	0.719

 Source: Research Findings (2017)

There were significant variations in Kenya's inflation rates in the study period (2012 – 2016). The study found out that the highest inflation rate of 9.64% was recorded in 2012 while the lowest inflation rate of 5.72% was recorded in 2013. The rates decreased from 6.88% in 2014 to 6.30% in 2016. High inflation rate is an indicator of high cost of living while low cost of living is an indicator low cost of living. This implies that the cost of living was vet high in the year 2012 while it was lowest in the year 2013. The cost of living was on decline between 2014 and 2016. Low inflationary pressure can be attributed to improved weather conditions, lower crude-oil prices internationally and stringent monetary policies by the Central Bank. The trend of Kenya's inflation rate over the period is as shown in Figure 4.3.3.

Figure 4.3.3: Inflation Rate
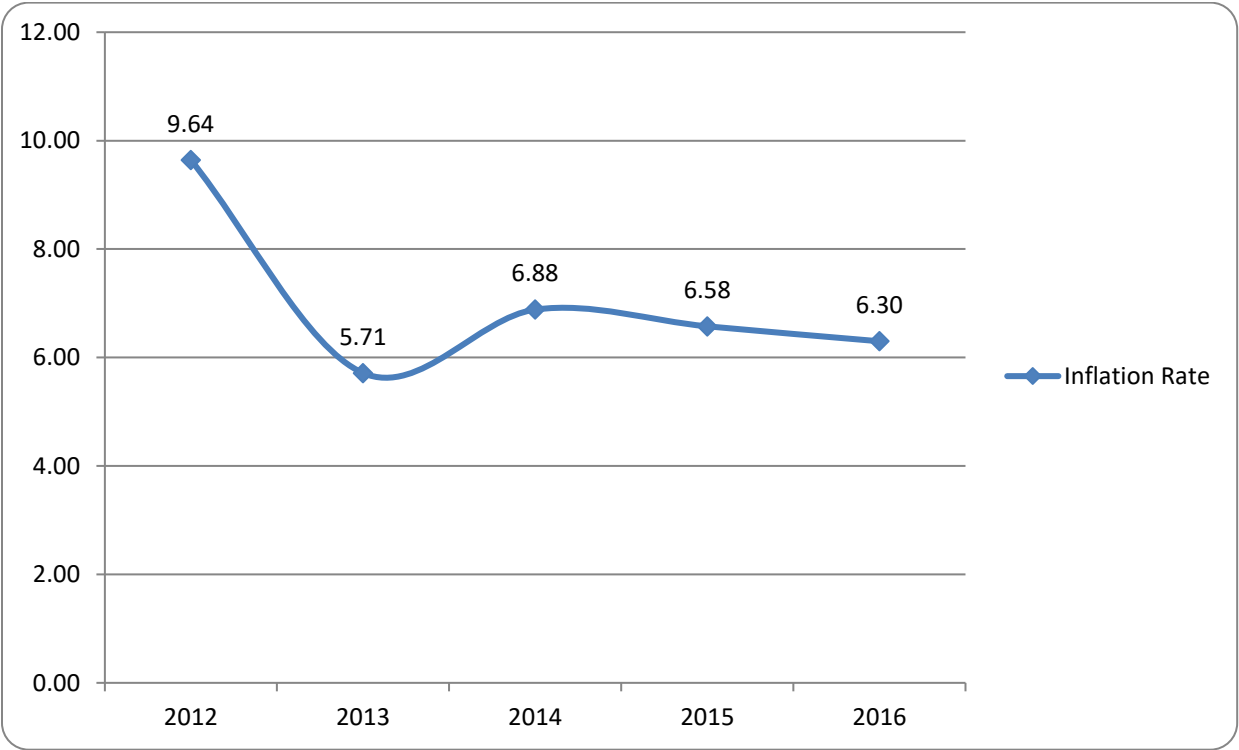
Source: Research Findings (2017).

4.4 Regression Analysis

Regression analysis was carried out using SPSS in order to establish how interest rate volatility and inflation rate affect level of non-performing mortgage loans. Model summary is used to indicate the strength of the correlation between dependent and independent variables.

4.4.1 Model Summary

Table 4.4.1: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.544[a]	.296	.271	1109.43518
a. Predictors: (Constant), Inflation Rate , Interest Rate Volatility				

Source: Research Findings (2017).

The study sought to determine. The study established that there was strong relationship (R= 0.544) between non-performing mortgage loans, interest rate volatility and inflation rate. The study further established that volatility of interest rate and inflation rate both accounted for 27.1% of the total variance in non-performing mortgage loans. This was evidenced by the adjusted R-squared value of 0.271.

4.4.2 Coefficients of Determination

The study further sought to know how interest rate volatility and inflation rate individually affects the amount of non-performing mortgages. Regression coefficients of determination was computed and the results are presented in Table 4.4.3.

Table 4.4.2: Coefficients of Determination

Coefficients[a]					
Model	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	691.400	278.389		2.484	.016
Interest Rate Volatility	33.865	13.206	.083	2.567	.013
Inflation Rate	270.938	70.172	.599	3.861	.000
a. Dependent Variable: Non-Performing Mortgage Loan					

Source: Research Findings (2017).

The coefficients of determination revealed that at 95% confidence level, both interest rate volatility and rate of inflation a positive and significant effect on the level of non-performing mortgage loans. All the services recorded high t-values and p-values less than 0.05 as follows: Interest Rate Volatility (t= 2.567, p= 0.013) and Inflation Rate (t= 3.861, p= 0.000).

The following regression equation was estimated:

$Y = -691.4 + 33.865X_1 + 270.938X_2 + \varepsilon$

Where,

Y = Non-Performing Mortgage Loan

X_1 = Interest Rate Volatility

X_2 = Inflation Rate

The constant value of 691.4 in the regression model above shows that if interest rate volatility and inflation rate were rated zero, the level of non-performing mortgage loans would be -691.4.A unit increase in interest rate volatility and inflation rate can result to an increase of non-performing mortgage loans by 33.865 and 270.938 respectively.

4.4.3 Analysis of Variance

The study further sought to verify goodness of fit of the regression model through the Analysis of Variance (ANOVA) statistics. The results of the study are as shown in Table 4.4.3.

Table 4.4.3 Analysis of Variance (ANOVA)

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	29491421.668	2	14745710.834	11.980	.000[b]
	Residual	70158245.566	57	1230846.413		
	Total	99649667.233	59			
a. Dependent Variable: Non-Performing Mortgage Loan						
b. Predictors: (Constant), Inflation Rate , Interest Rate Volatility						

Source: Research Findings (2017)

The analysis of variance statistics show that the regression model recorded a significance level (p-value) of 0.0% which is an indication that the model was ideal and reliable in predicting the effect of the independent variables on the dependent variable of the study.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the entire study in general, giving limitations encountered and provides recommendations.

5.2 Summary of Findings

The study sought to establish how interest rate volatility and inflation affects the level of non-performing mortgage loans among Kenya's commercial. Regression analysis was carried out using SPSS in the analysis. Normality test carried out using Kolmogorov-Smirnov and Shapiro-Wilk Test revealed that the data was appropriate for carrying out parametric tests such as regression analysis and analysis of variance.

The study found out that the level of defaults on mortgage loans among Kenya's commercial banks had been increasing steadily over the study period (2012-2016). The study further found out that interest rates in Kenya were very volatile over the study period (2012-20016) and that there were significant variations in inflation rates over the same period of time. The upticks and downticks of interest rates were attributed to Central Bank of Kenya monetary policies, uncertain economic conditions and aggressive borrowings by businesses and other consumers. High or low inflationary pressure was attributed to weather conditions, international crude oil prices internationally and Central Bank's monetary policies.

The study established that there was strong relationship (R= 0.544) between non-performing mortgage loans, rates of interest and inflation rate. The study also established that rate volatility of interest rates and inflation rate both accounted for 27.1% of the total variance in non-

performing mortgage loans. Both interest rate volatility and inflation rate had a positive and significant effect on the amount of mortgage defaults among Kenya's commercial banks .The analysis of variance statistics revealed that the regression model was ideal and reliable in predicting the impact of volatility of interest rates and inflation rate on the amount of non-performing mortgage loans among Kenya's commercial banks.

5.3 Conclusions

The study concludes that a strong correlation between non-performing mortgage loans, interest rate volatility and inflation rate existed. Interest rate volatility and inflation rate both accounted for 27.1% of the total variance in non-performing mortgage loans and they both have a positive and significant effect on the amount of non-performing mortgage loans among Kenya's commercial banks. This implies that any increase in interest rate volatility and inflation rate (cost of living) would result to increase in non-performing mortgage loans.

5.4 Policy Recommendations

The study found out that increase in inflation rate (cost of living) leads to increase in the number of defaults on mortgage loans among Kenya's commercial banks. Further, inflationary pressure was attributed to weather conditions, international crude oil prices internationally and Central Bank's monetary policies. The study recommends that the Central Bank of Kenya should enforce relevant monetary policies with the aim of curbing the rise in the cost of living which in turn forces customers to default their mortgage loans.

The study further established that interest rate of volatility also has an adverse effect on the level of mortgage loans defaults among Kenya's commercial banks. Again, the study recommends that

the Central Bank of Kenya should come up with monetary policies aimed at stabilizing the interest rates to help the customers of commercial banks meet their obligations of repaying their mortgage loans.

5.5 Study Limitations

The study mainly depended on the data provided by the National Bureau of Statistics and Central Bank of Kenya. This implies that the researcher had no control on the accuracy of the data provided. Since this is a common problem of dealing with secondary data, the researcher counter-checked the data from the two sources to make sure they tallied.

Further, the researcher found it difficult to obtain the actual level of defaulted loans from individual commercial banks. The researcher handled the problem by using the figures provided by the CBK in their annual banking supervision reports.

5.6 Suggestions for Future Studies

This study only used interest rate volatility and inflation rate an exclusive drivers of non-performing mortgage loans. However, the two only account for 21.7% of the total variance in commercial banks non-performing mortgage loans. Therefore, there is a need for further research to determine the other key determinants the level of non-performing mortgage loans.

Further, this study only considered a ten year period. This study therefore recommends that a future study should consider a longer period of time, preferably 15-20 years, as this may yield different results and help the researcher to make more adequate conclusions.

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APPENDICES

Appendix I: Commercial Banks in Kenya

Tier 1

1. Co-operative Bank of Kenya

2. Kenya Commercial Bank(KCB)

3. Equity Bank

4. Barclays Bank

5. Commercial Bank of Africa(CBA)

6. Standard Chartered Bank

Tier 2

7. Family Bank

8. I&M Bank

9. NIC Bank

10. Diamond Trust Bank

11. Bank of Africa

12. Housing Finance

13. Ecobank

14. Prime Bank

15. Bank of Baroda

16. CFC Stanbic Bank

17. Citibank

18. Guaranty Trust Bank

19. National Bank

20. Bank of India

Tier 3

21. Jamii Bora Bank

22. ABC Bank

23. Credit Bank

24. Paramount Universal

25. Consolidated and Development Bank

26. Fidelity Bank

27. Equatorial Commercial Bank

28. Giro Bank

29. Guardian Bank

30. Middle East Bank

31. Oriental Commercial Bank

32. Paramount Universal Bank

33. Trans-National Bank

34. Victoria Bank

35. First Community Bank

36. Habib A.G Zurich Bank

37. Habib Bank

38. Gulf Africa

39. Sidian Bank

40. UBA Bank

41. Consolidated Bank

42.   Development Bank

Source: Central Bank of Kenya (2017).

Appendix II: Inflation Rate and Interest Rates

Year	Month	Inflation Rate	Interest Rates
2012	Jan	18.31	20.56
	Feb	16.70	19.70
	Mar	15.61	17.80
	Apr	13.06	16.01
	May	12.22	11.18
	Jun	10.05	10.09
	Jul	7.74	11.95
	Aug	6.09	10.93
	Sep	5.32	7.77
	Oct	4.14	8.98
	Nov	3.25	9.80
	Dec	3.20	8.30
2013	Jan	3.67	8.08
	Feb	4.45	8.38
	Mar	4.11	9.88
	Apr	4.14	10.38
	May	4.05	9.46
	Jun	4.91	6.21
	Jul	6.02	5.92
	Aug	6.67	10.03

	Sep	8.29	9.58
	Oct	7.76	9.72
	Nov	7.36	9.94
	Dec	7.15	9.52
2014	Jan	7.21	9.26
	Feb	6.86	9.16
	Mar	6.27	8.98
	Apr	6.41	8.80
	May	7.30	8.82
	Jun	7.39	9.81
	Jul	7.67	9.78
	Aug	8.36	8.29
	Sep	6.60	8.38
	Oct	6.43	8.67
	Nov	6.09	8.64
	Dec	6.02	8.58
2015	Jan	5.53	8.59
	Feb	5.61	8.59
	Mar	6.31	8.49
	Apr	7.08	8.42
	May	6.87	8.26
	Jun	7.03	8.26

	Jul	6.62	10.57
	Aug	5.84	11.54
	Sep	5.97	14.61
	Oct	6.72	21.65
	Nov	7.32	12.34
	Dec	8.01	9.81
2016	Jan	7.78	11.36
	Feb	6.84	10.63
	Mar	6.45	8.72
	Apr	5.27	8.92
	May	5	8.15
	Jun	5.8	7.25
	Jul	6.4	6.16
	Aug	6.26	8.48
	Sep	6.34	8.06
	Oct	6.47	7.76
	Nov	6.68	8.22
	Dec	6.35	8.44

Source: CBK and KNBS (2017)

Appendix III: value of non performing mortgage loans(Ksh M)

		2012	2013	2014	2015	2016
1	Housing Finance Company Ltd	2,331	3,209.00	4,149.00	3,031.96	5,862.00
2	Kenya Commercial Bank Ltd	2,218	2,468.00	2,521.00	2,776.00	3,584.00
3	Standard Chartered Bank Ltd	162	67.06	142.68	117.88	393.00
4	CfC Stanbic Ltd	190	147.28	362.48	788.00	671.00
5	Equity Bank Ltd	35	205.00	162.00	195.50	794.40
6	Cooperative Bank of Kenya Ltd	312	479.00	837.00	1,074.00	1,167.07
7	Barclays Bank of Kenya Ltd	19	56.70	66.00	90.00	72.00
8	Commercial Bank of Africa Ltd	153	64.43	126.00	120.09	384.00
9	Development Bank Ltd	147	188.01	499.70	719.12	1,142.52
10	I&M Bank Ltd	26	12.00	32.00	46.34	117.47
11	Chase Bank Ltd	28	104.34	373.30	455.68	4,586.27
12	Consolidated Bank Ltd	286	340.00	776.05	761.60	112.70
13	Family Bank Ltd	7	-	38.28	112.00	249.39
14	National Bank of Kenya Ltd	572	567.50	179.30	288.00	502.00
15	Bank of Africa Ltd	5	44.00	26.90	155.90	293.95
16	NIC Bank Ltd	-	22.00	32.00	21.00	46.00
17	Jamii Bora Bank Ltd	7	15.00	57.00	156.00	965.00
18	Fidelity Bank Ltd	115	25.87	46.00	317.00	439.00
19	African Banking Corporation Ltd	37	42.00	68.80	72.40	65.60
20	Gulf African Bank Ltd	3	36.04	30.86	49.35	178.93
21	Ecobank Ltd	183	311.00	65.00	194.00	143.66
22	Trans-National Bank Ltd	25	2.97	-		-
23	Imperial Bank Ltd	-	39.00	157.45		-
24	Diamond Trust Bank of Kenya	-	-	4.17	37.37	28.20
25	Prime Bank Ltd	-	-	-	-	21.0
26	Bank of Baroda Ltd	2	1.97	1.87	30.89	29.03
27	Guardian Bank Ltd	-		-	-	-
28	Giro Comercial Bank Ltd	-	2.47	-	-	-
29	Paramount Universal Bank Ltd	-	-	25.75	27.90	23.28
30	Bank of India	-	-	-	-	-

31	First Community Bank Ltd	-	-	14.90	78.35	136.74
32	Equatorial Commercial Bank Ltd	-	-	-	-	-
33	Middle East Bank Ltd	-	-	-	-	20.00
34	Victoria Commercial Bank Ltd	-	-	-	-	-
35	Oriental Commercial Bank Ltd	-	-	-	-	-
36	Dubai Bank Ltd	-	-	-	-	-
37	Charterhouse Bank Ltd	-	-	-	-	-
38	Citibank N.A.	-	-	-	-	-
39	Credit Bank Ltd	-	-	-	-	-
40	Guaranty Trust Bank Ltd	-	-	-	-	-
41	Habib Bank A.G. Zurich	-	-	-	-	-
42	Habib Bank Ltd	-	-	-	-	-
43	K-Rep Bank Ltd	-	-	-	20.85	-
44	UBA Bank of Kenya Ltd	-	-	-	-	-
	Total	**6,863**	**8,451**	**10,795**	**11,737.18**	**22,028.21**