CREDIT RISK MANAGEMENT AND PERFORMANCE OF MORTGAGE LENDING COMMERCIAL BANKS IN KENYA

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DECLARATION

Declaration by candidate:

I hereby declare that this thesis is my original work and has not been presented for a degree in any other university.

Signature …… Date ……..

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SUPERVISOR'S DECLARATION

This thesis has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

The study is devoted to both of my parents, the late Mr. John Ngigi and Mrs. Lucy Ngigi for their support and patience in the course of my study.

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OPERATIONAL DEFINITION OF TERMS

Asset quality A parameter that is used to determine asset deterioration among mortgage lending commercial banks in Kenya measured by the loan impairment charge as a percentage of loans to customers.

Arrear rate Refers to mortgage repayments which are overdue over a certain duration of time. The proxy is loan installments past due but not exceeding 30 days as a gross portfolio percentage owing.

Bank Size Denotes the total assets of a mortgage lending bank in Kenya and indicates the financial strength of the bank normally evaluated by the natural logs of bank assets and debt

Capacity A mortgagor from a mortgage lending commercial bank in Kenya financial ability to repay the mortgage as assessed by the net borrower revenue either from employment or business sources.

Capital to risk weighted assets An assessment of a mortgage lending commercial bank in Kenya ability to absorb loss measured by the amount of capital in relation to the risk weighted credit exposures aamount. Weighted risky assets are evaluated by adjusting each class of assets for risk for purpose of determining a bank's real exposure to potential losses.

Credit history score Refers to a mathematical expression based on a level of assessment of the history of a mortgage borrower with regard to the credit worthiness of the individual in meeting their financial obligations.

Credit reputation	Mortgage borrower's history of fulfilling his (or her) financial obligations. It is measured by establishing a credit score for the borrower.
Credit risk	The danger of a mortgage borrower failing to repay a loan or otherwise fulfil a contractual commitment, resulting in the loss of principal or a financial reward.
Credit risk management	The mitigations and mechanisms rolled out by mortgage lending Kenyan commercial banks with the goal of reducing or eradicating credit risk. The proxies are delinquency rates, value at risk and distance to default.
Delinquency rate	The past due loans number compared to gross current loans is used to determine the quality of a mortgage lending bank's loan portfolios in Kenya. The proxy for this parameter is arrears rate
Debt equity ratio	Measure of the quantity of debt a mortgagor has utilized to finance its assets relative to the value of shareholders' equity measured by debt divided by equity
Debt service coverage ratio	The ratio which ensures that the mortgage property on its own is producing more than adequate net rental revenue to cover the projected payments on the new loan, in addition to a required cushion amount measured as net operating income divided by total debt.
Distance to default	This is the anticipated mortgage amount which would be lost in case

	of default in a year. Debt service coverage ratio was used as the proxy
Loans loss rate	A past measure of loss from unrecoverable mortgage loans measured through adjustment of loan loss reserves
Loans loss provision	An assessment of the credit quality of a mortgage lending bank in Kenya that denotes the extent to gross portfolio which provision has been made but not yet charged off.
Loans to deposit ratio	A mortgage lending bank's ratio parameter that assesses liquidity by evaluating the funds that a bank has converted into loans from the collected deposits.
Loans to total asset	A mortgage lending bank ratio which assesses the exposure level of the bank to total loans divided by total assets is an indicator of credit risk.
Loans to value ratio	Term used by mortgage lending banks in Kenya to indicate the ratio of a loan to the value of an asset purchased as measured by the amount of mortgage as a percentage of total assessed value of real property.
Mortgage	Refers to a financial loan from a mortgage lending bank in Kenya with a real property as the security.
Mortgagee	Commercial bank in Kenya advancing mortgage credit
Mortgagor	Person seeking mortgage facility from a mortgage lending commercial bank in Kenya

Mortgage industry	In lieu of this study, it refers to all the 34 mortgage lending commercial banks in Kenya.
Mortgage lending commercial banks	In relation to the research, these constitute the commercial banks in Kenya that specialize in offering financial loans with real property as collateral
Non-performing loan	On the basis of this study, a loan is non-performing the moment interest as well as principal payments have not been made for 90 days or more. The gross non-performing loans to total mortgage advances ratio is used as a proxy.
Performance	Degree of under-performing loans in mortgage lending commercial bank in Kenya as assessed by gross non-performing loans ratio (90>) to total mortgage advances.
Portfolio at risk	Refers to the value of all outstanding mortgage loans in arrears. This is measured by gross outstanding loan balance on delinquent loans as a the overall portfolio's outstanding loans percentage.
Risk adjusted assets	Minimum amount of asset that must be held by a mortgage lending bank in Kenya to reduce insolvency risk. The proxy is the risk weighted assets as provided in the balance sheet.
Value At Risk	For mortgage lending commercial banks in Kenya, it refers to the possible value loss of a hazardous asset or portfolio in a span of time for a particular confidence interval level. The proxy used is loans to total assets

ACRONYMS AND ABBREVIATIONS

BBK	Barclays Bank Kenya
BIS	Bank of International Settlement
CAMEL	Capital Adequacy, Asset Quality, Management Quality, Earnings and Liquidity
CAR	Capital Adequacy Ratio
CBA	Commercial Bank of Africa
CBK	Central Bank of Kenya
CRB	Credit Reference Bureaus
CRM	Credit Risk Management
CEO	Chief Executive Officer
Delit	Delinquency Rate
DSCR	Debt Service Coverage Ratio
DTB	Diamond Trust Bank
DTD	Distance to Default
GDP	Gross Domestic Product
KCB	Kenya Commercial Bank
LTV	Loan-To-Value

NACOSTI	National Commission for Science, Technology and Innovation
NPL	Non-Performing Loans
NPLR	Non-Performing Loans to Total Assets Ratio
PAR	Portfolio at risk
RGNPL	Ratio of gross non-performing loans to total mortgage advances
ROA	Returns on Assets
ROE	Returns on Equity
SACCOs	Savings and Credit Cooperatives
UN	United Nations
USA	United States of America
VaR	Value at Risk

ABSTRACT

In spite of Kenya's mortgage market having grown substantially, it is dominated by large mortgage lending commercial banks pointing to possible restrictions to entry or a likelihood of high risk for tier II as well as III lending commercial banks in Kenya. In 2017, Kenyan mortgage lending commercial banks recorded an average gross non-performing loan ratio of 10.3 percent against the industry recommended Central Bank of Kenya average of 4 percent. In 2018, Kenyan mortgage industry assets was approximated to be 2.5 percent relative to the country's gross domestic product with about 24,458 mortgage accounts in the industry. The mortgage sector has in the recent past experienced increased bad mortgage loans. It is thus, from the foregoing statistics the study sought to evaluate credit risk management influence on Kenya's mortgage lending commercial banks performance with the objective of establishing the influence of delinquency rates, value at risk, distance to default and bank size on credit risk management of Kenya's mortgage lending commercial banks. The study employed credit history score to act as the moderating variable. Merton's Default Theory, Portfolio Theory, Theory of Information Asymmetry and Credit Risk Theory guided this study. A census survey on all of Kenya's 34 mortgage lending commercial banks in Kenya was utilized. Further, both explanatory and descriptive research designs with positivism as the research philosophy were adopted. The researcher used secondary panel data covering the period 2012 to 2018 with a record survey sheet as the data collection tool. Published audited reports of mortgage lending commercial banks submitted to Central Bank, publications such as such as Banking Supervision Report, and Economic Review Reports by CBK provided data required. Analysis of the data gathered was carried out using STATA after being subjected to the following diagnostic tests, for purpose of addressing any violation of ordinary least squares assumptions; multicollinearity, Hausman, normality, stationarity heteroscedasticity and autocorrelation tests. Panel regression of coefficients results displayed that there was a positive as well as substantial correlation between delinquency rate and mortgage lending commercial banks performance, negative as well as substantial correlation between value at risk and mortgage lending commercial banks performance, positive and substantial association between distance to default and performance of mortgage lending commercial banks and a negative and statistically significant correlation between size of bank and performance of mortgage lending commercial banks. Credit history score has a substantial moderating impact on the affiliation between credit risk management and mortgage lending commercial banks performance in Kenya since coefficient of determination rose after moderation. These findings suggest that mortgage lending commercial banks might require to improve their credit risk monitoring strategies by using more precise tools like credit scoring to reduce high non-performing loans levels in the mortgage sector, and that regulatory authorities should regularly assess the mortgage industry's lending behavior. By retrieving and analytically assessing client background information, credit scoring can estimate the likelihood of loan default. Even for consumers with the best credit scores, loan defaults occur despite effective credit risk management. More research into the demographic characteristics that lead to mortgage loan default could be done.

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Real estate investment is vital for creating jobs, providing housing for families, increasing revenue redistribution, and reducing poverty (Nasieku & Wanyonyi, 2016). Mortgage acquisition in nowadays mortgage market is a complex process since it entails numerous procedures aimed at ensuring the probability of loss through default is minimized. Mortgage financing by commercial banks is a global practice where banks invest in earning pleasing returns in the process. However, like any other business, several challenges come along and managing credit risk has been identified as one of the ways to overcome the challenges (Kioleglou, 2018).

In the USA, for instance, there was a mortgage crisis in the years 1997-2006 whereby regular houses increased value by up to 124%. Simultaneously, interest rates were low, resulting in increased borrowing for both subsistence as well as home loans. Improved borrowing accelerated the expansion of the housing price bubble. Huge acquisitions of risky credit facilities by state corporations Fannie Mar and Freddie Mac contributed to the worsening of the crisis. Due to increased confidence in subprime loans, investment banks developed mortgage-backed securities as well as collateralized loan obligations, which received safe scores from the USA as well as Europe based credit rating agencies. Due to 2008 house prices decline, the USA and Europe experienced a major financial crisis. Simply put, banks in the United States overleveraged themselves and built a poor asset quality base through subprime borrowers lending, resulting in a crisis (Shukla, 2014).

Multiple regulatory frameworks in the United States, as per Singh (2016), have led to the problem. The United States recognizes five bank regulatory agencies, each of which performs same roles but deals with different bank kinds. The Banking Crisis in the United States was exacerbated by various organizational structures. The US banking platform's weak spot remains non-performing loans huge levels, especially in the real estate sector.

Commercial banks, like other financial organizations in Nigeria, play a significant role in the private sector, with significant potential in mobilization as well as provision of finance for development of housing. In recognizing this, Nwokediuko (2017) Indicated Nigerian Central Bank, as in the late 1970s, mandated that commercial and merchant banks devote a certain percentage of their lending to housing building. However, studies on commercial bank participation and mandate in mortgage finance have yielded varied results. Aliyu, Usman and Alhaji (2015), Commercial banks' loan portfolios on housing development have declined, according to a review of the Annual Reports and Statements of Accounts of Nigeria's Central Banks. The current situation is that commercial banks will not grant house development loans outright. Few people still grant people housing loans, and those who do have very strict restrictions that potential borrowers find difficult to meet.

Lowery (2016) also stated that, until recently, commercial banks in most emerging nations did not consider mortgage lending to be very profitable. As a result, they set a variety of limits on their mortgage operations, both individually and in terms of group mortgage portfolios. Nevertheless, according to Ford (2017), whereas commercial banks have recently demonstrated an increased interest in mortgage financing, they are risk averse as well as conservative, therefore new mortgage finance products are typically regarded with suspicion, and a thorough risk assessment is the preferred course of action. Due to the high interest rate

in the financial market, most commercial and merchant banks are unable to finance housing projects unless the dwellings are projected to be sold quickly after completion, (Nubi ,2015). They also mentioned particularly commercial banks, function on short-term deposits, but mortgage financing requires long-term resources.

Mortgage financing remain under-utilized in developing countries due to inflation, high interest rates and cost of mortgages (Njiriri & Wanyoike, 2014). Under-utilization of the mortgage finance system calls for government involvement through efficient legal systems, creation of credit information sharing systems, mortgage fund guarantee, and provision of an enabling macroeconomic environment (Kanjumba, 2015). For example, the Government of Morocco partnered with commercial banks to make mortgage financing affordable through the Fogarim program which is a mortgage guarantee fund for households with little and irregular income. In this program the Government guarantees 70% of a mortgage loan to households with informal income leading to lower interest rates in the long run (Kibati, 2015). Real estate firms equally benefit from the program as it boosts their ability to construct many low-cost housing units and sell them at discounted prices to the needy households.

Availability of long-term funds has been ranked by the banks as a key barrier to the growth of the mortgage industry (Juma, 2012). As per Essendi, (2013), the CBK has classified the overlapping restrictions of low household incomes and high credit risk as the second and third significant restrictions, respectively. High loan rates were also seen as a big stumbling block. According to the research, Kenya, like many other African countries, has a massive housing deficit that is growing each year and is becoming more predominant in metropolitan

areas (Essendi, 2013). Kenya's housing deficit as per the Central bank of Kenya, (2017) stood at 156,000 units per annum as at December 2017.

Kenya bureau of standards estimates that Kenya population is expected to reach 50 million with an annual demand of 206,000 units of houses as at 2018 with prevailing levels of housing construction in Kenya put at 50,000 units a year translating into a shortfall of approximately 156,000 units (Kihoro, 2015). Kioleglou (2018) argues that though there were ongoing initiatives to reduce some of the obstacles in the mortgage market as access to long term fund, barriers such as credit risk huge levels due to lack of credit history, financial literacy education and elevated levels of disclosures still persists.

Gestel (2008) describes credit risk as a borrowers' probability of failing to owner their debt obligations. According to Baesems (2012), high credit defaults of the mortgagor signify the borrower is in financial distress and the mortgage could plunge into non per forming loan with potential loss to the mortgagee. This means the current price of bank debt would be lower if sold relative to the original price at which the bank acquired the debt (customer deposits). Baesems, (2012) is however quick to note that loss emanating from failure to pay bank loans should not necessarily be huge since it depends with the recovery efforts of the said bank advancing the loan. If recovery efforts are aggressive, the loss could be minimal and advises banks to have sound debt collection and management mechanisms in place to mitigate the occurrence of loss associated with bad debts. This has also been advocated for by the Basel Accords III with an emphasis on sound internal credit risk measures and mechanisms.

1.1.1 Credit Risk Management in Kenya

Credit risk management refer to the schemes, controls and processes, formulated by firms with the expectation that collection of payments from customers will be efficient hence lowering the chances of default (Kalui & Kiawa, 2015). According to Tanui, Wanyoike and Ngahu (2015) CRM refers to mitigations and mechanisms rolled out by organizations with the aim of reducing or credit risk eradication. Credit risk management measures in commercial banks are mainly the asset quality, portfolio at risk, debt service coverage ratio and probability of default. Basel Accord III advocates for commercial banks to make use of both financial and operating proportions in attempts to better evaluate and evaluate commercial banks financial performance (Sinkey, 1975). Several researches such as Sinkey, (1975) and Altman, (1977) have since interrogated the usage of the financial and operational ratios in measuring performance.

Sinkey, (1975) in one of the studies in which discriminant analysis was used established that the ratios are better utilized in distinguishing commercial banks with sound credit risk management tools from those which are problematic. On the other hand, Altman, (1977) who analyzed assets and liabilities in commercial banks asserted that the ratios could be used to caution banks from a possible financial distress and aid them is formulation of strategies to counter it. Altman advocated for the usage of CAMEL system of rating in commercial banks. The Central Bank of Kenya has ever since exploited the system (Chaplinska, 2012).

Credit risk is managed in a variety of ways by financial institutions. The most common methods include security, guarantees, as well as netting loans against deposits from the same counter-party (CBK, 2018). Banks in Kenya are supposed to ensure efficiently handled all risk sorts that they confront following the introduction of Basel I, II, as well as III, as well as

the supervisory requirements of CBK. According to Central Bank of Kenya, (2018), CAMEL system strengthens the internal soundness of commercial banks in terms of capital, liquidity, risky assets held percentage of customer deposits advanced as mortgage loans. Chaplinska, (2012) asserts that most troubled banks are associated with failure of the CAMEL system. According to, Hanc (2015), most bank failures is as a result of failure of internal processes perpetrated by senior bank management.

Odongo, (2012) asserts credit risk management cures the ills of a bad mortgagor. According to the researcher, credit risk management must factor in the value of asset considered for collateral as part of the credit worthiness appraisal. The house under the mortgage consideration becomes prime for sale upon default. However, Ostman, (2010) cautions that the sale of the collateral will only be successful for mortgage foreclosure if the the loan to value was properly assessed and determined. The value of the house if sold should always be more than the debt advanced.

1.1.2 Delinquency Rates

The amount of past due loans relative to total current loans is used to calculate the delinquency rate of a mortgage lending bank's loan portfolios in Kenya (Stanga, Vlahu & Haan, 2018). Delinquency in the mortgage market is explained by an inability of the households to pay and thus defaulting on their payments (Stanga, Vlahu & Haan, 2018). In some instances, borrowers may default on a mortgage owing to a decline in the cost of housing and on weighing, the client perceives the gains of defaulting being higher than the related costs (Chatterjee et al. 2007). In developing counties such as Kenya, high default rate is related to issues of loss of unemployment and also the shocks that come with related costs

that clients may not have been aware when they took the mortgage (Stanga, Vlahu & Haan, 2018).

In 2017, Kenya's mortgage market recorded highest, the level of growth in under performing loans rising from Kes 220 million in December 2016 compared to Kes 273 million in December 2017. Such high delinquency rates led to two financial institutions leaving the mortgage market owing to high losses (Muchira & Anyanzwa, 2018). Stanga, Vlahu and Haan (2018) indicate that high levels of delinquency were experienced in the United States owing by liquidity crisis resulting in 2008 into a Global Crisis. The National treasury of Kenya in 2018 indicated that out of the Kes. 17.5 billion Mortgage assets held by Chase Bank, Kes. 4.5 billion were non performing which was triggred by the period when the bank went through financial crisis (Guguyu, 2018).

1.1.3 Value at Risk

For commercial banks, value at risk refers to the possible risk asset or portfolio decline in value in a span of time for a particular level of confidence interval (Akbar & La, 2014). In the mortgage industry, value at risk is a parameter that entails quantifying the monetary risk for a given portfolio in a given period of time (Castagna & Fede, 2013). Risk could be in the form of credit risk, liquidity risk or market risk. Focus on housing and mortgage market was drawn because of the high default rates leading to very high loan to value ratios. Further, the market had been subjected to high interest rates that have led to risk of default being high. Value at risk was proposed as a mechanism which provides an analysis of various risk positions. It is a tool which provides the ability to assess risk for traders, managers and employees and thereby discouraging organizations from taking excess risk. It provides an avenue for entities to hedge against possible risk (Jin & Ziobrowski, 2011).

According to Renaud and Jaffe (1996), the development and expansion of the mortgage market has always been limited by reluctance of the players to join and stay in the market. Mortgages are deemed risky owing to the high value of the house, high interest rates and the liquidity of the persons making the purchase. The mortgage market operates in a manner that lenders do not give loans that are more than three times of the total annual income of the borrower with the aim of minimizing default risk.

In Kenya, despite the lucrative profit margins in the mortgage market, there are only approximately 24,458 active mortgages (Kioleglou, 2018). The number is a reflection of the risk related to the mortgage industry. Kioleglou indicated that it is important for the mortgage players to better understand the market dynamics and make informed decisions through research to understand value at risk in the mortgage market if they were to have successful foreclosures.

1.1.4 Distance to Default

Distance to default refers to the likelihood that there will be failure to meet loan requirements detailed in a loan agreement and is normally measured by the debt service coverage ratio (Saunders & Allen, 2002). In the mortgage industry, it refers to the anticipated mortgage amount which would be lost in a year in the event of default (Jin & Ziobrowski, 2011). Understanding the likelihood that a loan may be defaulted is an important tool in credit risk analysis. Prediction of default in an organization can only be done within a certain level of probability. Distance to default explains the frequency which standard deviations of the price of the asset should change in order for default to be triggered future (Akbar & La, 2014). Mertons KMV Model has been used previously to understand distance to default. The debts face value is subtracted in the model while forecasting the loan horizon. The model is pegged

on an estimation of assets of a company, the market as well as the value of debt (Kliestik, Misankova & Kocisova, 2015). Understanding the distance to default has the potential to reduce potential risks in the mortgage market especially because of the high exposure that institutions place themselves.

1.1.5 Bank Size

Bank size is the cumulative assets a bank has and indicates a financial strength and economic capability of the said financial institution. Bank size could be measured based on market capitalization, cumulative bank assets held, revenues generated from commercial activities of the bank, and the equity held in the books of the bank (Schildbach, 2017). In the mortgage industry, bank size denotes the total assets of a mortgage lending bank in Kenya and indicates the financial strength of the bank normally evaluated by the bank asset and debt natural logarithm (Castagna & Fede, 2013).

Statistics by the CBK (2017) indicate that 75.5% of the mortgages in Kenya have previously been advanced by six commercial banks with one being categorized as medium while five others are from the tier one. Mwendwa (2015) indicates that the firm size is statistically significant in explaining how mortgage financing affects the profitability of financial firms. Kenya's banks are seen to have the ability and capacity to issue mortgages in Kenya owing to financial stability available as measured by the asset base.

1.1.6 Credit History Score

Credit history score of an individual refers to the history of a borrower with regard to the credit worthiness of the individual in meeting their financial obligations (Gopal, 2008). In the mortgage industry, credit history score refers to a mathematical expression based on a level of assessment of the history of a mortgage borrower with regard to the credit worthiness of

the individual in meeting their financial obligations (Sanders, 2017). Credit score is computed based on mathematical models that are based on an individual's credit history based on outstanding balances, late payments and the age of credit of an individual. Credit score according to Metropol in Kenya ranges between 200 and 900. A score of less than 400 indicates that customers are in default (Metropol, 2018).

According to Sanders (2017) building a credit score takes time and multiple steps and could be explained by the age of an individual, and debt to income ratio. Financial institutions including mortgage banks use the credit score in making an analysis of whether one will pay back their loans or they will default. The use of credit history score has been criticized in the past owing to its characteristic of being impersonal as well as being discriminatory on sex, gender, and marital status. In Kenya, the credit score has been on review to harmonize the system to ensure that consistent interpretation is made by all players in the lending role including mortgage firms.

1.1.7 Mortgage Lending Commercial Banks Financing in Kenya

Mortgage financing plays an important role in real estate investment which in effect helps in provision of job opportunities, facilitating shelter to households, enhancing revenue circulation, as well as alleviation of poverty. Kenya's financial sector as at 31st December 2018, comprised of the regulator, the Central Bank of Kenya, forty-two commercial banks, twelve microfinances, fifteen money remittance providers, three bureaus of credit reference and eighty bureaus foreign exchange (See Appendix I) (CBK, 2018).

The Kenya mortgage sector was pioneered by Housing Finance Group (Formerly HFCK). The sole objective then was to implement the government policy aimed at encouraging home

ownership in Kenya (www.nse.co.ke).Kenya government had a forty percent stake while the remainder was held by the Commonwealth Development Corporation.

Housing finance currently controls twenty-nine percent of the mortgage portfolio in Kenya with KCB being its closest rival. Following the change of a prohibitive Banking Act in 2002 that lead to the removal of five years' term loan restriction, other commercial banks ventured into the mortgage business (Mwendwa, 2015). Other commercial banks such as Barclays, Stanchart, Commercial bank of Africa, and Cooperative banks started offering mortgage facilities with others joining in subsequent later years, (Nyamute, 2018).

Comparison of the mortgage market of Kenya with the East African peers indicate that the mortgage sector is slightly above at 2.5 percent relative to Kenya's GDP. However, countries such as India, at 6 percent and Colombia at 7 percent have outperformed Kenya. Developed economies such as countries in Europe and the US have the highest ratios at 50 and 70 percent respectively (The World Bank, 2016).

1.1.8 Mortgage Lending Commercial Banks Performance in Kenya

In spite of the mortgage industry having expanded rapidly, large commercial banks continue to dominate (Central Bank of Kenya, 2018). This could be attributed to some inherent barriers to entry such as solid CAMEL requirements by CBK which limit medium and smaller commercial banks (Osero, *et al* 2013). Nonetheless, smaller banks have always registered rapid growth rate at an average of 38 percent, 25 percent by medium banks while large banks trail 24 percent on average. The commercial banks' average size of loan is approximately Kshs.8.3 million (Central Bank of Kenya, 2018). However, medium sized commercial banks do have a somewhat higher average size of loan that could be associated

with some outliers. The average size of mortgage loan has however been on the increase across all the mortgage lending commercial banks in Kenya.

A Baseline Survey done by CBK in 2018 with regard to development of Kenya's mortgage market for residential housing revealed that the value of mortgages outstanding during the period had rose from Kenya shillings 164.0 billion in 2015 to 203.3 billion 2016, which a growth of Ksh. 39.3 billion or 23.0% attributed to heightened appetite for a need to own a home by Kenyans as opposed to renting. Mortgage lending approximated at 71.6 percent was by five CBK (CBK, 2018).

In terms of the total nonperforming mortgage loans outstanding, outstanding the value improved from Kenya shillings 10.8 billion in 2017 to 11.7 billion in December 2018. The ratio of nonperforming loans to total mortgage loans rose from 8.7 % in 2017 to 9.1 % in 2018.This was above the central bank of Kenya recommended ratio of 7 percent, associated with cashflow constraints for the mortgagors attributed mainly to failure by both the county and national governments to owner payments for suppliers (Central Bank of Kenya, 2018).

Kenya had 24,458 mortgage loans accounts as at 2017 an upward shift from 22,013 held 2016, representing an 11.11 percent or 2,445 increases as a result of improved demand from the ballooning middle class. Size of mortgage loan rose from Ksh 7.5 million to Ksh 8.3 million attributed to high property prices. Commercial banks number reduced from 37 to 34 in 2016 due to the collapse of Dubai and Imperial banks. Under the supervision of Kenya's Central Bank, Chase Bank collapsed into receivership (Central Bank of Kenya,2017)

In terms of the gross NPL, the value increased from Kenya shillings 81.4 billion in 2017 to 108 billion, representing an upward rise of 32.7 percent. Asset quality worsened of from 2.3 percent recorded in 2017 to 2.7 percent registered in 2018 a clear signal that credit risk in

Kenya's mortgage sector was on the rise. Gross NPL ratio was 12.3 percent with an overall of 10.3 percent against the Central bank of Kenya recommended ratio of 4 percent.

As per CBK Mortgage Market Survey carried out in 2016, factors such as being able to access long term loans, dwarfed income levels and credit risk were highlighted as the top three obstacles to mortgage market development in Kenya (See appendix IV).

1.2 Statement of the Problem

In spite of the Kenyan mortgage segment having recorded a significant growth, it still remains dominated by large mortgage lending commercial banks which could indicate probable restrictions with regard to entry or high levels of credit risk for both medium and small commercial banks. Kenya's total mortgage loans held as at 2017 was equal to 2.5 percent of Kenya's GDP with about 24,458 mortgage accounts in the whole industry. However, active accounts are about 6,000 representing 24.5%. 32% are already in default (NPL) while the rest 43.5% are under watch (delinquent). The mortgage sector has in the recent past experienced poor performance and increased cases of mortgage delinquencies and defaults. In the financial period ending December 2017, the Kenya mortgage lending commercial banks recorded an average gross NPL ratio of 10.3 percent relative to CBK's recommended average of 4 percent (Central Bank of Kenya, 2017).

Credit risk is a decisive factor for commercial banks performance since a great amount of the revenue of banks is from loans issued which attract an interest. This risk poses a significant threat to bank performance and must be adequately addressed (Bhattarai, 2016). In past studies, credit risk management has been used in predicting bank performance. For example, NPLs which indicate credit risk can destabilize a bank's overall credit scheme and lower the value of a bank (Afriyie & Akotey, 2012). Asset quality, the asset risk and financial stability

of a bank predicts the magnitude of credit risk which impacts financial performance and health of a bank (Dang, 2011).

A few studies that have been done in attempt to address concerns in Kenya's mortgage industry comprise; Oyedokun, *et al* (2013) did a research to evaluate the effect of lending practices with regard to residential mortgage default. Mkukwana (2012) did a study to establish macroeconomic factors impact on risk default through a residential mortgages case study. Specifically, in Kenya, Osero *et al* (2013) did a study to examine how effective management strategies among the mortgage lending banks in Kenya loan default. Further, Nanyuki and Omar (2016) examined factors that influence the performance of the mortgage lending commercial banks in Mombasa and finally, Abdulrehman and Nyamute (2018) completed a research on the impact of mortgage financing on mortgage firms' financial performance.

The studies above, however, did not adequately address how credit risk management impact performance of the mortgage institutions which is an existing gap in the field. The study thus pursues filling the gap by specifically evaluating how credit risk management influence mortgage lending commercial banks performance in Kenya. Size of bank which was not factored in the aforementioned studies was included as a variable to factor in different risk appetites and capabilities for the commercial banks involved in mortgage lending in Kenya. Credit history score which was also not included in the aforementioned studies was incorporated in this study as a moderating variable having been emphasized on by CBK for all commercial banks monthly net debt position returns (Central Bank of Kenya, 2017).

1.3 Objectives of the study

1.3.1 General objective

The general objective of this study was to examine the influence of credit risk management on the performance of mortgage lending commercial banks in Kenya.

1.3.2 Specific Objectives

1. To establish the influence of delinquency rate on the performance of mortgage lending commercial banks in Kenya.
2. To establish the influence of value at risk on the performance of mortgage lending commercial banks in Kenya.
3. To establish the influence of distance to default on the performance of mortgage lending commercial banks in Kenya.
4. To establish the influence of bank size on the performance of mortgage lending commercial banks in Kenya.
5. To establish the moderating effect of credit history score on the relationship between credit risk management and performance of mortgage lending commercial banks in Kenya.

1.3.3 Research Hypotheses

The study sought to resolve the below research hypothesis:

H_{01}: Delinquency rate lacks substantial influence on mortgage lending commercial banks performance in Kenya.

H_{02}: Value at risk lacks substantial influence on the mortgage lending commercial banks performance in Kenya.

H_{03}: Distance to default does not have significant influence on the performance of

mortgage lending commercial banks in Kenya.

H_{04}: Bank size does not have significant influence on the performance of mortgage lending commercial banks in Kenya.

H_{05}: Credit history score does not have significant moderating effect on the relationship between credit risk management and performance of mortgage lending commercial banks in Kenya.

1.4 Significance of the study

The study may benefit to the mortgage lending commercial banks in Kenya in that it may shed light on strategies they ought to adopt to remain profitable in the mortgage business. It may also prompt the management to re-assess their decisions when launching mortgage products in the Kenyan market. It may aid them when formulating strategies, standards, policies, procedures and guidelines that may help in responding to mortgage default incidences in the banking industry.

The regulator, CBK, may find this study useful in understanding how the industry is embracing prudential guidelines meant to mitigate credit risk, appreciate the different controls being applied by banking institutions in managing this risk, level of adoption of related preventive measures and the effect this may have on banks' mortgage performance. This may guide the regulator in the formulation of further policies for enforcement in the banking industry. Scholars may appreciate, refer and enhance growth of the study further.

1.5 Scope of the Study

The research focused on all the thirty-four (34) registered mortgage lending Kenya's commercial banks operational as per the Banking Act of Kenya and regulation of CBK

between year 2012 and 2018 which is a period that was considered adequate to evaluate correlation between credit risk management and the performance since two of the initial credit bureaus were established in 2012 hence availability of the credit history data required for data analysis (Central Bank of Kenya, 2019). The independent variables for the study were delinquency rate, value at risk, distance to default and bank size while performance was the dependent variable. Credit history score was used as a moderating variable.

1.6 Limitations of the Study

A few commercial banks involved in mortgage business did not have the mortgage related data required for some years within the scope since they started offering mortgage facilities some in 2013 while others in early 2014. The initial operating licenses for the affected commercial banks were for retail facilities. To overcome this challenge, data analysis only focused on those years where a complete set of data existed.

1.7 Organization of the Study

The study is organized as: Chapter one constitutes the background, objectives, significance, scope as well as limitations of the study. Second Chapter comprises; theoretical review, empirical review, gaps identified as well as conceptual framework. Chapter three shows methodology. Chapter 4 contain data analysis, presentation as well as interpretation whereas chapter 5 comprise of summary of the study, conclusion and recommendation

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter examines the theories, empirical literature, gaps and the conceptual framework underpinning the study.

2.2 Theoretical Review

Research on the correlation between credit risk management and the mortgage firms performance in Kenya was guided by the following theories related to mortgage financing: Merton's Default Theory, Portfolio Theory, Theory of Information Asymmetry and Credit Risk Theory.

2.2.1 Merton's Default Risk Theory

This is the current study's anchor theory, and it was proposed by Merton (1970). The use of the theory is wide in evaluation of cooperatives as well as mortgage lending companies default. Credit analysts must properly appraise financial organizations, according to Merton's model, while somehow checking on the business' ability to remain liquid during the analysis period and expiry of debt (Jorion, 2014). It has been useful in determining debtors' ability to repay debts, and it can help credit analysts determine credit default risk in a company.

Merton's theory was based on a few fundamental ideas about capital structure of a firm (Merton, 1970). The market worth of the firm's assets in proportion to its liabilities in the case of default falls below a predetermined level, and the firm is said to have defaulted. Risks faced by commercial banks one of them being credit risk, is one of the factors for bank default (Jorion, 2014).

The first stage in tailoring a solution to meet the demands of a customer is credit appraisal. To achieve a suitable fit in terms of the financing solution, the evaluation starts with a thorough grasp of the client's needs and capabilities. Credit appraisal is a crucial protection to assure the fundamental loan being offered quality, and it is regarded an important component of managing credit risk because the credit analyst may determine a mortgagor's credit worthiness as well as the value of security given (Cade, 2009).

The theory serves a function in the research since it aims to assess financial institution's credit risk analysis, that is a significant factor. According to Merton's model, analysts must evaluate the firm's ability to stay liquid during the analysis period, which probes into the firm's financial stability. The theory is critical to this research since it highlights the role of credit analysts being able to determine a mortgagor's debt repayment ability, and so determining the overall firm credit risk.

2.2.2 Portfolio Theory

Portfolio theory was comprehended as well as advanced by Markowitz (1952). According to the theory, portfolio creation involves four essential steps: valuation of security, asset allocation, portfolio maximization, as well as performance management (Seibel, 2012). Many organizations, as per the theory, utilize value at risk models in managing market risk as well as risk of interest rate exposure.

Despite the fact that credit risk remains the most significant risk faced by most commercial banks, Margrabe (2007) claims that the applying current portfolio theory exercise to credit risk management has yet to be fully adopted. As a result, the theory intends to highlight the

importance of credit risk management for mortgage lending commercial banks in order for them to stay viable businesses.

Although the mechanisms used by each commercial bank differ, the common practice tactic includes credit quality assessment of mortgage credits as well as other credit exposures on a regular basis, assigning a suitable credit risk rating, as well as accumulating the outcomes to determine a portfolio's expected losses (Waithaka, 2012). The asset-by-asset strategy is based on a good loan assessment and effective internal credit risk rating systems, according to Gakure et al (2012). This strategy employs a loan appraisal as well as credit risk rating system that enables management to detect large changes in a person's credit or portfolio tendencies in a timely manner.

Essendi, (2013) asserts that the portfolio theory has the basic assumption that investors often want to get the most out of investments for them in a specified risk degree, and it offers a framework for defining and quantifying investment risk as well as developing risk-return correlations. The asset-by-asset methodology has a number of flaws, including difficulty establishing and analyzing concentration, or additional portfolio risk stemming from advanced exposure to a single mortgagor or a group of linked mortgagors.

The study benefits from portfolio theory of management since it explains the necessity to understand other variables that influence mortgage bank performance, such as delinquency rates, value at risk, and distance to default. In order to correctly and effectively manage credit risk, Portfolio quality metrics as well as productivity measures are encouraged by the theory (Kairu, 2009). The study thus incorporated a number of ratios in understanding credit risk including arrears rate, loan to total assets, debt service coverage as well as provision for loan

loss to the relative to gross loans. The theory also advocates for diversification of commercial banks' investments and thus mortgage lending commercial banks reduce the risk originating from underperformance of any single asset by offering several mortgage loans such as plot, construction, buy & build, project, joint ventures among others.

2.2.3 Theory of Information Asymmetry

In their encounters, Stiglitz et al. (1970) developed the theory that both mortgagees and mortgagors face information asymmetry. The situation arises when a borrower obtains a mortgage and has knowledge of the potential dangers allied with the investment initiatives for that loan is meant. The mortgagee, contrary, is completely oblivious of the facts (Edward & Turnbull, 2013). The hidden details cause problems with adverse selection as well as moral hazard (Horne, 2012).

Stiglitz et al (1970) argue that commercial banks tend to devise loan contractual terms to attract mortgagors taking in pursuit of the banks and to provoke less risk credit searchers because mortgage firms are unable to accomplish as well as influence financial embezzlement of all credit pursuers as a due to insufficient as well as expensive information. As a consequence, the demand for mortgages outperforms the supply of credit, resulting in equal interest rates. The amount of credit extended and the level of security given have an impact on the nature of loan applicants, the distribution of funds disbursed, and the return to commercial banks (Moti *et al*., 2012). Non-performing loans deplete commercial banks' capital reserves, making it impossible for them to grow their mortgage business (Taylor, 2013).

The information asymmetry theory is critical to comprehending the requirement for disclosure in the mortgage industry's issuing. Credit risk emerges in the market as a result of unknown events that might have an impact on mortgage lending commercial banks performance. The study looked at how mortgage lenders could better assess such criteria in order to reduce losses and improve profits by keeping good loans from becoming delinquent.

2.2.4 Credit Risk Theory

The theory was advanced by Melton (1974) and is also referred to as structural theory. It postulates that default occurrences stems from the development of the assets of the firm displayed by a dilution trajectory with fixed notable parameters like arrears rate, portfolio at risk and loan loss rate. According to the theory, loss provisional on default is recommended for all securitized loans since failure to pay debts could happen in the course of the entire life of a mortgage and not only at maturity (Crosbie *et al*, 2003).

According to Varotto (2011) and Zhang (2012), the risk of default could be mitigated early in so as to credit risk to lenders. They argue that, credit risk mitigation can be achieved through pricing based on risk, provisioning, altering the cost of funds in relation to the strength of the mortgagor, loan tightening (reducing the amount of loans available to applicants with higher risk) and having a diverse loan portfolio (expanding the mix of portfolio to borrowers) and buying credit covers. Credit risk management is possible by taking appropriate mechanisms to offer protection against for credit risk such as taking security, guarantees and other methods that supplement borrower’s credit standing and enhance quality of credit exposure (Hussain *et al*, 2013).

The theory is instrumental in the study in understanding how the risk of default could be mitigated early for purpose of reducing credit risk to lenders. Default could ultimately lead to poor performance of mortgage institutions and should be understood through the theory by understanding the association of credit risk management and Kenyan mortgage lending commercial banks performance.

2.3 Empirical Literature Review

The empirical review is meant to understand the researches that have been carried out in the past in relation to the study.

2.3.1 Delinquency Rate and Performance of Mortgage Lending Commercial Banks

Brent, *et al* (2011) evaluated the elements of mortgage delinquency in the US. The study covered the period between the years 2004 and 2009 in a bid to understand what lead to residential mortgage delinquency. The study used a time series regression model that estimated delinquency between 30, 60 and 90 days and the delinquencies in the period. The outcome revealed that major causes of delinquency include the income of the borrowers, the type of loans borrowed and the state of the economy. The study target was however on the home owners and not the mortgage institutions. There is thus a need to understand the bank specific factors aimed at mitigating credit risk and how this ultimately influences the overall mortgage performance.

Karanja (2013) studied the association mortgage finance and Kenya's commercial banks profitability. Portion of loan portfolio of Kenya banks of great importance is Mortgage loans, according to the research, and are a substantial contribution to profitability. The research utilized descriptive research design administering questionnaires to 44 commercial banks. Analysis of data was through regression model and the results revealed that banks seek

mortgage financing in order to improve profitability owing to the positive relationship between the two. The study however did not establish how the mortgage appraisal is carried out prior to the financing of mortgage by mortgage lending institutions. Profitability of mortgage lending banks is significantly affected by defaults and thus the researcher did not address this factor. The methodology of data collection is also questionable since data on profitability cannot be collected in form of questionnaires.

Abdulrehman and Nyamute (2018) investigated the effect that mortgage finance had on commercial banks performance in Kenya. They established that mortgage financing play crucial role in offering an opportunity for mortgage institutions to generate an income. The study target population was all Kenya's commercial banks. The research used Pearson correlation as well as regression model. The findings of the study indicated interest charged on mortgage institutions had positive significant correlation with commercial banks performance that was assessed in relation to ROE. The research though failed to find the association of credit risk with the mortgage lending firms performance in Kenya as measured in terms of non-performing loans.

Ng'ang'a (2018) intended to investigate the influence of macroeconomic factors on the mortgage market in Kenya with the variables being exchange rates, inflation and GDP per capita. The study employed an explanatory study and used the financial statements for the mortgage banks between 1998 and 2015. Data analysis was carried out using the panel regression to define the association between the study elements and the mortgage market. Results indicated a positive significant correlation between GDP per capita and exchange rate existed. Though, no correlation between inflation and the mortgage market was established. However, the research did not address how the microeconomic factors such as credit risk,

operational risks, non-performing mortgages among others factors correlate with the mortgage market. The study thus attempts to partially address the gap by focusing on managing credit risk of Kenyan mortgage lending commercial banks.

2.3.2 Distance to Default and Performance of Mortgage Lending Commercial Banks

Oyedokun, *et al,* (2013) investigated mortgage lending in Nigeria. The study noted that there had been a concern in the levels of default of mortgages in the country and thus sought to understand the effect of lending practice on residential mortgage default. Through a survey that sought to collect information from mortgage borrowers in the country, the study covered a period of five years across 65 financial institutions in the country. Analysis of data conducted using regression model showed that the lending structures in the country had the potential to contribute to ability of borrowers to pay and thus leading to default. The study however did not address the impact that such default practices have on the mortgage institutions performance.

Osero *et al,* (2013) did a research on the effectiveness of management strategies with regard to mortgage defaults among the mortgage institutions in Kenya. The study noted that there were few studies addressing the challenges mortgage firms go through handling bad loans. The research studied 43 Kenyan banks. Using descriptive study design and simple regression analysis, the study findings established that although mortgage lending commercial banks have effective system in managing loan default, they rarely find the need to engage credit reference bureaus. The study findings were however qualitative and the researcher used questionnaire addressed to only credit officer to collect the data. Effectiveness of loan default can only be determined quantitatively through specific bank ratios such arrears rate, delinquency rates, write- offs among other factors.

Mkukwana (2012) did a study on how macro-economic factors affect the risk of default through a residential mortgage case study. It was noted that though poor loan repayment was associated with specific factors linked to the borrower, it was likely that default could be caused by macroeconomic factors beyond the control of the borrowers. Using four estimation model, expected to capture macroeconomic factors within 30, 60 and 90-day delinquency rates between the years 2006 and 2010, the study established that interest rates were likely to lead to default within 30 and 60 days. Further, house price index, credit growth was also likely to lead to default within 90 days. The study however mainly addressed factors leading to default leaving a gap on how the identified default factors are mitigated by the mortgage institutions the study seeks to address.

2.3.3 Value at Risk and Performance of Mortgage Lending Commercial Banks

Ergeshidze (2017) analyzed credit risk models for mortgage firms in USA and assessed risk of default by the sub- prime mortgage borrowers. The research noted that for the years that preceded the financial crisis, there was a heightened attention on credit risk management across the world. Through multiple discriminant analysis, the study established that the main characteristic determining the credibility of the borrowers included the ratio of payment relative to income, LTV, the credit history and the type of customer. The study proposed the importance of mortgage firms to be keen to credit risk models which improve profitability, a gap that was not yet covered. The research thus seeks addressing the gap by further interrogating how LTV, a bank parameter used by mortgage lending commercial banks in assessing credit risk ultimately impacts the credit risk management process and how it influences their performance.

Goodman and Zhu (2015) carried out a study on the loss severity on residential mortgages in USA. Default probability and the severity of loss owing to the default were the core variables of the study. The study identified that the severity of loss had been limited across the years owing to a limitation in access of information; the study however was able to make the use of Freddie Macs enhanced data. The study measured the severity of loss using the unpaid principal balance lost in the period of non-repayment. Research conclusions indicated that mortgages with high LTV and insurance cover for the mortgage had a smaller loss severity and thereby could yield lower bank financial losses. The research however did not establish how significant was the influence and also zeroed in on the stock of the listed mortgage companies performance and trading in Freddie Mac (A Securities Brokerage Firm in USA) as opposed to evaluation of credit risk in relation to NPLs, best assessed in form of PAR, arrears rate and asset quality.

Itto *et al,* (2013) evaluated the effect loan to value had on value of mortgage default. The study explored the factors that influence mortgage default in Jammu and Kashmir banks in Pakistan. Among the study variables, the research included the loan to value ratio. Data in the study was gathered from 26 mortgage firms where a sample of 115 default cases were analyzed using Pearson correlation and the panel regression. It was established that the LTV was positively correlated to default risk. The study however did not establish whether a lower LTV or higher LTV is the one with positive correlation and thus the research sought to resolve the ambiguity and how LTV affects the NPL position.

2.3.4 Bank Size and Performance of Mortgage Lending Commercial Banks

Al Karim *et al,* (2013) investigated how credit risk, bank size, efficiency in operations and asset management influenced private commercial banks performance in Bangladeshi. ROA, was utilized to assess the financial performance of the sampled commercial banks. Secondary data for the duration 2008-2012 for identified commercial banks from the audited reports was used in the panel regression analysis to better comprehend the impact of the variables highlighted above. Performance was assessed using Return on Assets with the limitation of only restricted to performance of the assets. The current study measures performance of mortgage lending firms through gross bad loans to total mortgage advances which is a relevant ratio in evaluating how effective credit risk management practices are the mortgages market.

Yoon and Jang (2011) sought to investigate the link between ROE, financial leverage and the size of 62 restaurant firms in US covering years 1998 - 2003. Multiple regression model was adopted for data analysis. Findings revealed 44 firms which were highly leveraged, were less risky in both market and accounting-based performance parameters. The outcome also established favor for a positive link between ROE and financial leverage. Furthermore, the findings revealed that, in comparison to debt, the firm size had a significant impact on ROE, and that, regardless of leverage, smaller enterprises were riskier than bigger ones. The findings also show that bank size has a strong relationship with bank performance. It is an indication that focus should not only be on financial variables but rather, attention should also be given to bank size and others.

Said *et al*, (2008) did a research on performance of banks in Malaysia and China. Liquidity ratio, credit availability, capital adequacy, operating expenses and the size of the banks were all assessed in terms of how they contributed to their performance. ROAA and ROAE were used for measuring performance. The empirical study was based on data from a panel from 2001 to 2007. Size of the bank was evaluated through real assets held. A key finding was that bank size as well as liquidity did not have any correlation with performance of the banks. The findings are contrast to those by Yoon and Jang (2011) whose view was that bank size had influence on performance which necessitates further study.

2.3.5 Credit History Score and Performance of Mortgage Lending Commercial Banks

Cross (2013) carried out a study seeking to understand how credit history score influenced performance of prime and sub-prime mortgages. The researcher sought to review lending in the mortgages as an industry which is steadily and explosively growing. Performance was measured between 1999 and 2012 and compared performance of prime and sub-prime loans and the prepayment behavior. The findings of the study indicated that nonprime mortgages differ from prime mortgages and people respond differently to incentives to prepay or default on loans. The tests in the study indicated that default rate in mortgages is less responsive to the owners of the homes when the credit scores are included in the loan details. The research though failed to reveal the association of credit and the financial performance of mortgage institutions.

Laufer and Paciorek (2015) evaluated the effect of credit score on mortgage loans availability. Findings indicated that tight credit limitations limit the ability of households to access credit while on the other hand lose increases the risk of default for mortgage. The

study however did not address the role of credit score in relation to risk of default and its impact on has on the mortgage institutions performance.

Kigomo, (2016) conducted a research on the Kenyan mortgage interest rates and the implication on home ownership. The study was conducted through a descriptive study with a 168 respondents sample size who responded to questions through the questionnaire. The study analysis was done through a regression model that revealed that high credit risk exists in Kenya which is caused by absence of a borrower's credit history. The study recommended for commercial banks involved in mortgage lending to employ credit scoring systems for appropriate loan appraisal in order to mitigate credit risk cases attributable to insufficient credit history information. The study attempts to address the gap by establishing how mechanisms laid out by the mortgage lending commercial banks ultimately influence performance of the mortgage institutions.

Nyuki and Omar (2016) did a research to assess which factors influenced performance of the mortgage lending banks in Mombasa. Findings established that mortgage loans had improved the profitability of mortgage banks. Further, 90% of the study responses in indicated that lack of a credit history influenced the ability of borrowers accessing mortgage loans. The study however does not explain whether the influence of credit history is positive or negative and to what extent.

2.4 Research Gap and Summary of Literature Review

Table 2.1: Summary of Literature Review and Research Gaps

Author	Research	Methodology	Findings	Research Gap	Addressing Research Gap
Delinquency Rate and Performance of Mortgage Lending Commercial Banks					
Abdulrehman and Nyamute (2018)	Effects of mortgage finance on commercial banks in Kenya performance	Correlation and Regression Analysis	The interest rate charged by mortgage companies has a considerable positive link with performance.	The study focuses on financing of mortgage banks due to inadequate funds that could be led by delinquency	The study sought to understand impact delinquency on performance of mortgage lending banks through mortgage loan parameters such as arrears rate and PAR
Ng'ang'a (2018)	The influence of macroeconomic factors on the mortgage market in Kenya with a focus on exchange rates, inflation and GDP per capita.	Correlation and Multiple Regression Analysis	The GDP per capita and the exchange rate have a considerable positive relationship. Inflation, on the other hand, has no relation on the mortgage market.	There is a gap in understanding the impact of other variables such as delinquency, value at risk and distance to default on the financial performance of mortgage institutions. The study focused on	The study sought to understand mortgage sector specific parameters within the control of the commercial banks via the variables delinquency, value at risk and distance to default on the financial performance of mortgage

				macro-factors affecting the mortgage industry. The mortgage sector has little/no control over them.	institutions
Karanja (2013)	Kenyan commercial banks' profitability and mortgage financing	Multiple regression model	Portfolio diversification had a significant positive association with ROA	Study focused on profitability of mortgage banks owing to their sources of finance	The research capitalized on assessing the influence of credit risk management in terms of the value of NPLs.
Brent, Kelly, Lindsey-Taliefero & Price (2011)	Determinants of Mortgage delinquency rates	Linear Regression model	Major causes of delinquency include the income of the borrowers, the type of loans borrowed and the state of the economy	The study focus was on the home owners but the relationship with mortgage delinquency rates for the mortgage lending commercial banks was not established.	The study addresses the effect of delinquency on performance of mortgage lending institutions
Distance to Default and Performance of Mortgage Lending Commercial Banks					
Osero, Walter and Nyaoga, (2013)	Effectiveness of Mortgage defaults management	Correlation Analysis	3 out of 5 commercial banks have	The study did not identify how	The study established how distance to

	strategies among mortgage banks in Kenya		effective systems for controlling loan default	defaults influence mortgage banks' financial performanc e. Performanc e was also measured in terms of ROA. Default is best assessed in terms of NPL ratios	default influences performance in terms of debt service coverage ratio as mechanism to mitigate rising cases of NPLs as opposed to measuring profitability.
Oyedokun, Adewusi, Oletubo and Thomas (2013)	A study to investigate mortgage lending in Nigeria.	Multiple Regression model	The outcome of the study showed that the current lending structures in the country have the potential to contribute to ability of borrowers to pay and thus leading to default	The study addressed mortgage industry macro-factors in Nigeria whereas the current study seeks to understand bank specific factors in form of credit risk manageme nt; which are micro-factors .Kenyan perspective is required as well	The study addressed the gap through the common credit risk managemen t tools used by mortgage lending commercial banks in Kenya in line with the CBK prudential guidelines.
Mkukwana (2012)	Effect of Macro-economic factors on the	Estimation Models	Interest rates could lead to default	Study was on macroecon omic	Study sought to establish the

	credit risk in residential mortgages		within 30 and 60 days. Further, house price index, credit growth and credit growth were likely to lead to default within 90 days	factors likely to lead to default as opposed to mechanisms put in place to mitigate default cases .	effectiveness of the mechanisms laid out by mortgage lending commercial banks to curb defaults.
Value at Risk and Performance of Mortgage Lending Commercial Banks					
Ergeshidze (2017)	Credit Risks Model: Assessing the Default Probability of mortgage loan borrower	Regression Analysis	The main characteristic determining the credibility of the borrowers includes the payment to income ratio, the loan to value ratio, the credit history and the type of customer	The study only focused on the probability of a borrower defaulting. The current study addresses the credit risk mechanisms put in place by commercial banks to reduce the number of mortgage defaults instead.	The study used the Loan to value as one of the measures used by commercial banks to mitigate credit risk and how it ultimately influences the level of mortgage NPLs
Goodman and Zhu (2015)	The loss severity on residential mortgages	Discriminant Analysis	Loans with high LTV and mortgage insurance have a	The study primarily focused on a single variable which is	The study used several financial ratios such as debt service

			lower loss severity and thereby could lead to lower financial losses to the bank.	the loan to value leaving out a myriad of other financial ratios in credit risk mitigation. One variable gives skewed findings	coverage ratio, arrear rate among others in efforts to better explain credit risk managemen t.
Itto, Mutharusa and Filipe (2013)	The Impact of Loan Value on Collateral on Mortgage Default Value	Chi-square, multiple regression, ANOVA,	Loan to value ratio is positively correlated to the performanc e	The study addressed loan impact to value on financial performanc e of mortgage banks,howe ver,the current research seeks to establish value at risk influence on NPLs with LTV as proxy	The study sought to analyze how LTV (proxy for value at risk) as mechanism for credit risk managemen t influences the value of mortgage NPL.
Credit History Score and Performance of Mortgage Lending Commercial Banks					
Laufer and Paciorek (2017)	Effect of mortgage credit availability with a focus on rules relating to minimum credit scores	Empirical Study	Tight credit limitations limit the ability of households to access credit while on the other hand lose	The study did not address t how credit scores influence mortgage defaults. The findings are vague.	The study sought to bring out exactly how the credit scores influence mortgage loan appraisals and the

			increases the risk of default for mortgage		ultimate influence on mortgage NPL
Kigomo, (2016)	Mortgage rates in Kenya: Implications for homeowner ship	Multiple Linear Regression Analysis	Lack of credit history leads to lower loan uptake	Study focus was on the effect of credit history on loan uptake and not credit history scores as a mechanism for credit risk manageme nt	Study sough to establish how credit scores affect managemen t of credit risk in terms of mortgage loan provisions and ultimate influence on mortgage NPLs
Nanyuki & Omar ,(2016)	Factors that affect performance of mortgage banks in Mombasa	Multiple Linear Regression Analysis	Cost of mortgage and mortgage structure have significant relationshi p with the performanc e of mortgage banks	Study's main focus was Commercia l banks in Mombasa and thus the sample was significantl y small. The focus was also on factors influencing performanc e	The study population is all the 34 mortgage lending commercial banks in Kenya while the focus is on credit risk managemen t
Cross (2013)	Credit History and the performance of Prime and sub-prime loans	Multiple Linear Regression Analysis	Sub-prime mortgages differ from prime mortgages and people respond differently to incentives	The study does not link the impact that credit history actually has on the financial performanc	The study sought to clearly bring out influence of credit scores on mortgage NPLs. Realistic bank

			to prepay or default on loans	e of mortgage institutions	proxies have been used to address the gap

2.5 Conceptual Framework

This is a diagrammatic presentation of variables under research mainly aiming to spell out the issue of concern in the most simplified version. Hence, it is a set of wide ideas utilized to summarize the association between predictor and predicted variables. It provides a connection with the research title, the objectives, the study literature review and methodology (Coulthard, 2010).

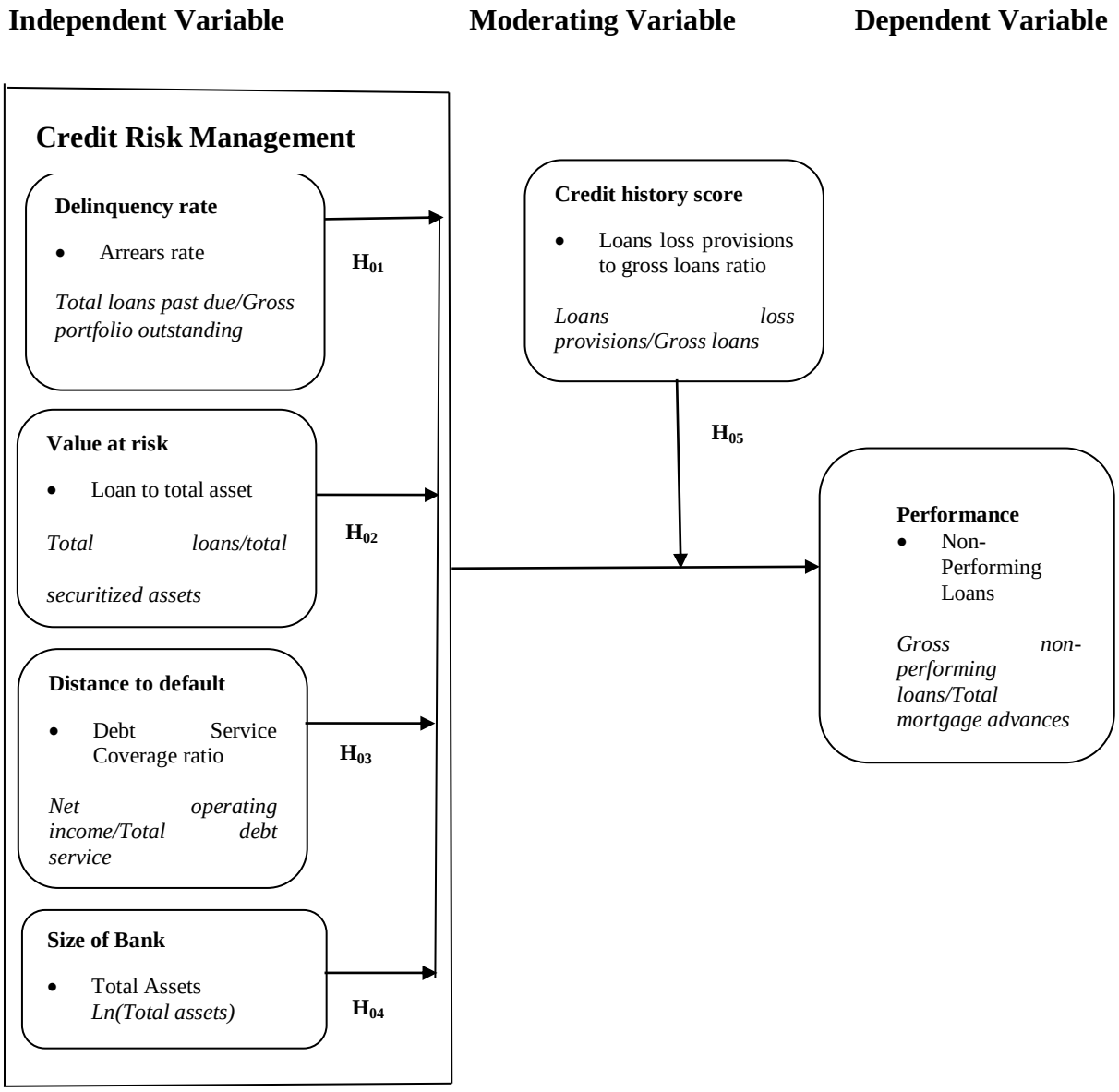


Figure 2.1: Conceptual Framework

Source: (Author, 2020)

Figure 2.1 above is a conceptual of the studies empirical research by bringing an abstract representation of the study variables that serves as a blueprint in the process of collecting data as well as its subsequent analysis.

Figure 2.1 above shows that delinquency was measured by the rate of arrears, value at risk by loan to total assets ratio, distance to default by debt service coverage ratio, size of bank through logarithmic transformation cumulative assets of each mortgage lending commercial banks and credit history score by loans loss provisions to gross loans ratio The variables are deemed to influence how Kenya's mortgage lending commercial banks attempt to manage credit risk. Performance was assessed in form of value of nonperforming loans evaluated through ratio of gross value of bad mortgage loans to total mortgage advances. The credit history score acted as a moderating variable which is instrumental as it shows there are other external elements in action.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The section presents data collection techniques including the sampling frames, sizes, procedures and tools for data analysis to be used for research.

3.2 Research Philosophy

Crossman (2003), asserts that research philosophy evaluates how practical it is to carry out research of any given phenomena and is of great significance to the advancement of knowledge and also orientation of the knowledge (Saunders et al., 2009). Selection of one's research philosophy aids in the definition of an ideal research proposal and imparts key strategies in the whole research course with the main categories of research philosophy being epistemology and ontology.

The epistemological orientation is concerned with how to study a social entity (Bryman & Bell, 2011). Two of the aspects of epistemological philosophy are positivism and interpretism. Crossman (2003), asserts that positivism emphasizes on the essence of simulating the natural science through right approaches utilization. Natural science connotes being capable of working with actual observations, which consequently lead to the one being able to produce data which is measurable. Relevant techniques are assertions that employ mathematics and formal logic in providing profound analyses of the world utilizing deduction as a method of generating generalizations and laws.

Interpretism on the other hand, contradicts positivism since researchers need to comprehend the differences between humans and objects, of which the former are social players

(Bryman& Bell, 2011). According to this philosophical stance, if social science focused solely on tangible facts and actual observations, it would become too solid and finite.

The ontological orientation focuses with the social entity's orientation—does a social entity exist independently of social actors, or are social actors the ones that construct social entities (Saunders *et al.,* 2009). It is further subdividing into objectivism and constructionism. Objectivism alluded that social phenomenon besets the researcher's external facts, which are out of reach of the researcher's influence (Bryman & Bell,2011). Meanwhile, a constructionist locale proposes that social phenomenon and their understanding is formed from the idealization and later deeds of social players (Saunders et al.,2009). Hence, the researcher's role is to attempt to decipher the reasons, deeds and purpose of social players.

The study adopted positivism research philosophy. Inheriting this perception, the researcher targets to bring out the reality in which possible cause of effects among social players. The researcher attempt to explicate human behavior nor attempt to perceive detailed phenomena outside the actual observations for the researcher believes information is assimilated once it turns out to be of logic and can empirically be substantiated (McKenzie, 2011).

3.3 Research Design

The research utilized both explanatory as well as descriptive research designs. Explanatory research design reveals root relationship between variables, according to Saunders et al. (2009). In order to infer or detect relevant underlying linkages, researchers ought to be familiar with the phenomena (Zikmund *et al.,* 2012). The scholar must be able to assess and comprehend how changes in one event affect the outcomes of other events. In descriptive design, the focus is on describing a group of elements or components (Robson, 2012).

Sreejesh et al (2014) further explain descriptive study design, claiming it ought to characterize the specific groups features in attempts to detect specific behavior, create specific projections, and assess the differences across groups. Because a result, the study's design is both explanatory and descriptive, as the researcher stresses the relationship between variables with the goal of determining their root effect.

3.4 Empirical Model

According to Bard *et al*, (2014), several financial aspects that influence mortgagee's determination of the amount of mortgage advanced, for instance, financial market structure, mortgagor behavior, mortgage facility and bank characteristics. The borrower's features and behavior indicate the credit risk and hence affects amount of mortgage advanced. On the other hand, bank characteristic like credit policy, credit limits, reserve cash reserve ratio, and availability of money to lend are all supply-side factors that could affect the availability of credit.

This study used panel regression model. The model was adopted since it has been used extensively in literature and for its simplicity (Maddala, 2013).

Mortgage performance is hypothesized to be influenced by the below factors and can best be simplistically written as:

$$Y = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.1)$$

Where;

Y=Performance of Kenya 's mortgage lending commercial banks as determined through ratio of gross nonperforming loans to total mortgage advances

X_1= Delinquency rate as measured by arrears rate which is measured by total installments past due divided by gross portfolio outstanding

X_2 = Value at risk as evaluated through ratio of loans to assets

X_3 = Distance to default as assessed by debt service coverage ratio

X_4 = Bank size as determined by log transformation of the cumulative assets of commercial banks under study

$\beta_{0=}$ Intercept

$\beta_{1,}\ \beta_{2,}\ \beta_{3,}\ \beta_4$ = parameters of independent variables under study

β_5= parameter of moderating variable under study

$\varepsilon_=$ Error term

i= Banks under study

t=Period in years (2012-2018)

3.4.1 Moderating model

$$RGNPL = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 M + \beta_6 X_{1it} M + \beta_7 X_{2it} M + \beta_8 X_{3it} M + \beta_9 X_{4it} M + \varepsilon_{it} \quad \text{(3.2)}$$

Where;

M=Moderating variable (Credit History Score)

The moderating variable must be used to normalize all of the variables (M). The compute function (X1it M, X2it M, X3it M, and X4it M) must be used to calculate the interaction terms (X1it M, X2it M, X3it M, and X4it M) (3.2). If $\beta_{6,}\ \beta_{7,}\ \beta_8$ andβ_9 are significant, moderation impacts exist in the four correlations. Unless one of the relationships is

significant, the moderating effect only exists in one of them and if both $\beta_{6,}$ $\beta_{7,}$ β_{8} and β_{9} are insignificant, there is no moderation effect, and M becomes an independent variable (MacKinnon, 2011).

3.5 Operationalization and measurement of variables

This section provides particulars of how each of the variables were assessed and operationalized.

Table 3.1: Operationalization and measurement of variables

Variable	Category	Operationalization	Measurement
Performance of mortgage lending commercial banks	Dependent	Non-Performing Loans	$=\frac{Gross\ Non-Performing\ Loans}{Total\ Mortgage\ Advances}$
Delinquency rate	Independent	This is a metric for assessing the quality of a bank's loan portfolio that is calculated by dividing the number of past-due loans by the total current loans number	Arrears rate $=\frac{\text{Total loan instalments past due}}{\text{Gross portfolio outstanding}}$

Value at risk	Independent	For a certain confidence interval, this is a measure of the probable loss in value of a risky asset or portfolio over a certain timeframe.	Loans to total asset $=\frac{\text{Total loans}}{\text{Total assets}}$
Distance to default	Independent	This is the anticipated loan proportion that might be lost in a year in the due to a default.	Debt service cover $=\frac{\text{Net operating Income}}{\text{Total debt service}}$
Bank size	Independent	This is the total assets of a bank and indicates the financial strength of the bank	Ln (Total assets)
Credit history score	Moderating	This a mathematical expression determined by analyzing the level of a individual's credit file, to represent a person's credit worthiness.	Loans Loss provisions to gross loans ratio $=\frac{\text{Loans loss provisions}}{\text{Gross Loans}}$

3.6 Target Population

Population is defined by Kombo and Tromp (2006) as a collection of items, people, events, or objects that are being assessed in order to derive conclusions. The focus population of the study were all the 34 registered mortgage lending commercial banks regulated under the Banking Act of Kenya and under supervision of Kenya's Central Bank (Central Bank of Kenya, 2018).

3.7 Sampling design

This researcher conducted census survey where all the 34 mortgage lending commercial banks licensed by CBK to offer mortgage services were involved. Secondary panel data was gathered from commercial banks audited and published financial reports from their websites, CBK's economic review and banking supervision reports as well as NSE's banking, commercial and allied sector reports.

3.8 Data collection instruments

Secondary panel data for the time span of 2012 to 2018 being utilized. The data was captured on a record survey Sheet (See Appendix VI). The duration choice was guided by data availability and increased number of mortgage portfolio at risk culminating to increased mortgage delinquency rates and also defaults. The period was also long enough to establish a trend analysis

3.9 Data Collection Procedure

Secondary panel data of the 34 mortgage lending banks in operating in Kenya between 2012 and 2018 were collected. The data was based on the published audited accounts of mortgage lending commercial banks submitted to the CBK.

3.10 Data Analysis and Presentation

STATA was employed for data analyses. Data which was quantitative in nature was analyzed in form of descriptive statistics comprising; measures of tendencies including the mean and the standard deviation. Inferential statistics involved measurement and relationship which include: correlation, panel regression and analysis of variance. Presentation of the output of data analysis was in tabular form. Precedent to the analyses, the assessments below were conducted so as address any breach of the assumptions of OLS.

3.11 Diagnostic Tests

Before analyzing data, the subsequent tests were performed out for purpose of evaluating and arresting any violation of OLS assumptions.

3.11.1 Correlation analysis

This was conducted so as to establish the root association between predicted and predictor variables of the study. Correlation co-efficient start from negative one to positive one. A significant positive correlation coefficient indicates that the variables trajectory is the same. The sign of the co-efficient would be positive and vice versa for negative correlation. A zero co-efficient postulates no association between the variables (Guajarati, 2004).

Correlation test was conducted through Pearson's correlation and each correlation coefficient with significance recorded. The significance level was in form of *p*-values. A significance level of less than 0.05 means that it is significant with the two variables being related linearly. On the other hand, a significance level of more than 0.50 is considered relatively large meaning that the two variables are not linearly related (Crossman, 2003).

3.11.2 Multi-collinearity

This is extremely high level of inter-coalition between the independent variables. Similar results are produced by variables with virtually identical absolute correlation coefficients; thus, one must be dropped in favor of the other to avoid the multi-collinearity issue. According to Guajarati (2004), correlation coefficients below 0.8 indicate that the problem is minor and must be overlooked. Above 0.8, on the contrary, indicates a high degree of multi-collinearity that must be rectified. Variance Inflation Factor (VIF) being utilized to test multi-collinearity.

3.11.3 Hausman Test

After conducting the Hausman test, where hypothesis (null) being favorite system for data analysis is random effect, the option to use random or fixed impact model in the research will be determined. compared to alternative fixed-effects models. Random as well as fixed effects models are described as follows, according to Saunders et al, (2009), referenced in Belay (2012);

$Y_{it}= X_{it}\beta+\alpha+\mu_{it}\rightarrow$Fixed effects---------- (3.3)

$Y_{it}= X_{it}\beta+\alpha+\mu_{it}+ \varepsilon_{it}\rightarrow$Random effects---------- (3.4)

Where;

X_{it}=Variable vector

β= Coefficients vector

μ_{it}=Interference terms (between entities)

ε_{it}= Interference terms (within entities)

Random effects asserts that the interference term has no relationship having predictor factors, allowing time-invariant variables to serve as control variables. In other words, it allows overall inferences outside of the model's sample (Maddala, 2013). Furthermore, Maddala (2013) claims that fixed effects models will be used to investigate the source of alterations within an object. The Hausman test was used to see if there was a relationship between the unique disturbances (μit) and the regressors, with the null hypothesis being that there was noneDurbin–Wu–Hausman will be used to conduct the test. Reject the null hypothesis if the p-value is below 0.05. (Chmelarova, 2007).

3.11.4 Normality Test

The normality test is widely used to evaluate when conditional mean has skewed the standard errors (Chmelarova, 2007). Testing being conducted using the Jaque-Bera statistic. Zero is the skewness of normally distributed data, whereas the kurtosis is around 3.

The null assumption must be presented in order to correctly test for normality, i.e., data follows a normal distribution, whereas the alternative basis is that data fails to follow a normal distribution. Whenever the J-B value is significant, the researcher should reject the null hypothesis because of normal distribution in data. Researcher is expected to accept the null hypothesis whenever the value is modest, because of normal distribution in the data (Zikmund et al., 2012). Logarithmic transformations were used to transform data that was not normal.

3.11.5 Stationarity Test

It is a data property in which variables collection chosen at random for a series joint distribution will often be similar, regardless of series source (McKenzie, 2011). A stationary

series' mean will constantly remain unchanged even though the timing of sample is varied, but a non-stationary series' mean would vary, resulting in asymptotically skewed panel data (Crossman, 2003). This could lead to false regression, with non-stationary as well as independent time-series components, high determination coefficients, and stunted Durbin-Watson Scores (Saunders *et al*., 2009).

3.11.6 Heteroscedasticity Test

The researchers used a heteroscedasticity test to see if the variance of the standard error term would remain static. If the results demonstrate otherwise, the assumption has been broken. The white test of statistics was used, in which the researcher expressed the errors total as the model's predictor's function and regressed it using the liner regression approach. It is assumed that if the model has no heteroscedasticity, all of the co-efficients will equal zero (Pesaran, 2004). A box –cox transformation is used when heteroscedasticity is found.

3.11.7 Autocorrelation

The autocorrelation in a regression analysis model is considered to be zero (Roodman, 2006). It's possible for autocorrelation to be negative or positive. If the standard errors are minor, the predictors' approximations are relatively precise than they actually are (Wang (2013). If serial is found, the null hypothesis is rejected, which is erroneous. Inefficient coefficients come from autocorrelation problems, resulting in inaccurate forecasts.

The Pesaran test was used to examine autocorrelation because it (autocorrelation) is analogous in panel data to cross-dependence. After significance of the test is verified, autocorrelation can be used (cross-sectional dependency) exists (Pesaran, 2004)). Lagging

the dependent variable was used to treat data that was revealed to possess dependency cross-sectionally.

3.12 Ethical Consideration

Kenyatta University's terms as well as conditions were imposed on the researcher. The researcher gathered data from secondary sources, as reported previously, after receiving consent from the institution. As a consequence, the researchers assured that data was protected in accordance with Kenyatta University's and NACOSTI's criteria. The confidentiality of all institutions for data collecting and analysis was observed by the researcher, and the data was kept confidential to be used solely for the context of this research.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

The data analysis, presentation, as well as interpretation are all covered in this part. The segment highlights the methods used to address research questions. Inferential, trend graphs, and descriptive results are produced.

4.2 Response Rate

This survey targeted to gather secondary panel data of the 34 mortgage lending banks in operating in Kenya for the period between 2012 and 2018. However, data for 3 mortgage lending banks were missing or incomplete and were excluded in the study. This resulted in a 91.18 percent response rate , which was deemed adequate for this research.

4.3 Descriptive analysis

This section contains the study's descriptive data. Averages, maximums, minimums, and measures of variation. The results can be found in Table 4.1

Table 4.1: Descriptive Results

Variable	Obs	Mean	Std. Dev.	Min	Max
Delinquency rate	217	9.060403	8.41896	0.323625	63.36207
Value at risk	217	6.986403	13.16729	0.127175	76.01388
Distance to default	217	49.92594	115.8374	-603.341	454.3846
Bank size in million KES	217	96,360	116790.8	2,924	621723
Credit risk score	217	36.65463	56.37062	0.01779	356.3333
NPL	217	35.81884	381.097	0.280636	5621.164

Source: Research Data, 2020

The secondary data gathered was explained in relation to mean, standard deviation, minimum, and maximum in Table 4.1. Delinquency rate mean operationalized as the ratio of total loan installments past due to gross portfolio outstanding was 9.060403. The commercial bank minimum and the maximum delinquency rate was 0.323625 and 63.36207 respectively.

8.41896 was the Std. Dev., demonstrating that the rate of delinquency varied across the study's time period.

The average value at risk, as determined by total loans to total assets ratio, was found to be 6.986403 percent. The min as well as the max of value at risk are 0.127175 and 76.01388 respectively. The Std. Dev. was 13.16729 indicating that value at risk varied across the measurement period. Value at risk attempts to quantify level of financial risk exposures facing an enterprise. The approach is often employed by financial institutions to predict and manage probable risks that might be facing the business. Commercial banks' lending mortgages use value at risk to predict and manage risk exposures.

Results in addition also shown that the mean distance to default operationalized as a value of net operating income to total debt service was 49.92594. The minimum and the maximum of distance to default were -603.341 and 454.3846 in that order. 115.8374, was the standard deviation was showing that the value at risk changed over time.

Furthermore, the research revealed that the mean-average bank size, as measured by total assets, amounted KES 96,360 million. KES 2,924 million as well as KES 621723 million were the minimum as well as maximum bank sizes, correspondingly. KES 116790.8 million was the standard deviation, indicating that bank size varied across the study's time period. Profitability, which measures a bank's efficiency and effectiveness, is closely linked to total assets. As a result, the bank represents economies of scale in the financial sector. The findings are consistent with Yoon and Jang (2011), who found that firm size had a significant impact on ROE when compared to debt, and that smaller enterprises were riskier than larger enterprises regardless of leverage.

Credit risk score measured as ratio of loans loss provisions to gross loans ratio had an average of 36.65463 across all the banks. The min and max of credit risk score was -0.01779 and 356.3333 in that order. 36.65463 was the Std. Dev. signifying that credit risk score varied across the measurement period.

Finally, it was found that performance of mortgage lending commercial banks average measured as the average of nonperforming loans was 35.81884. The min and max of nonperforming loans were 0.280636 and 35.81884 in that order. The Std. Dev. was 5621.164 which indicated that NPLs was variable over the research time scope. Lower NPLs implies that the borrowers are performing well and thus repaying their loans in time. High cases of NPLs are an indication of poor performance of loans borrowed among customers thus low repayment rate. Higher instances of delinquent loans may make the bank bankrupt as many loans given were never repaid for.

4.4 Trend Analysis

Trend pattern for delinquency rate, value at risk, distance to default, bank size, credit risk score and performance of mortgage lending were generated. Trend patterns are shown in the next figures.

4.4.1 Delinquency rate

Trend line for delinquency rate measured as ratio of total loan installments past due to gross portfolio outstanding was generated covering the period 2012-2018. The trend line is presented in Figure 4.1.

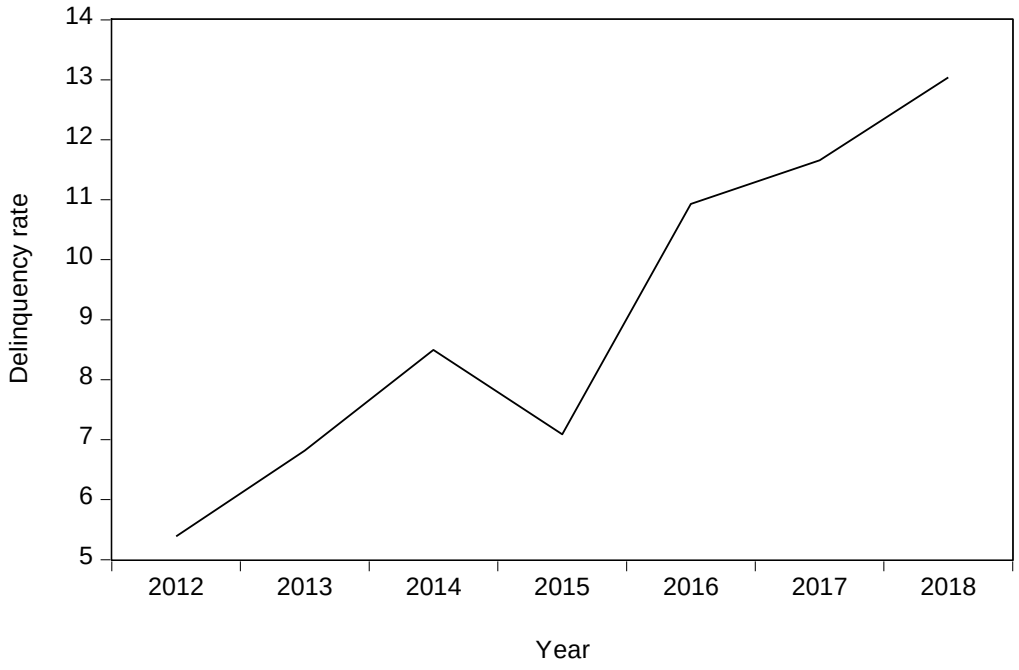
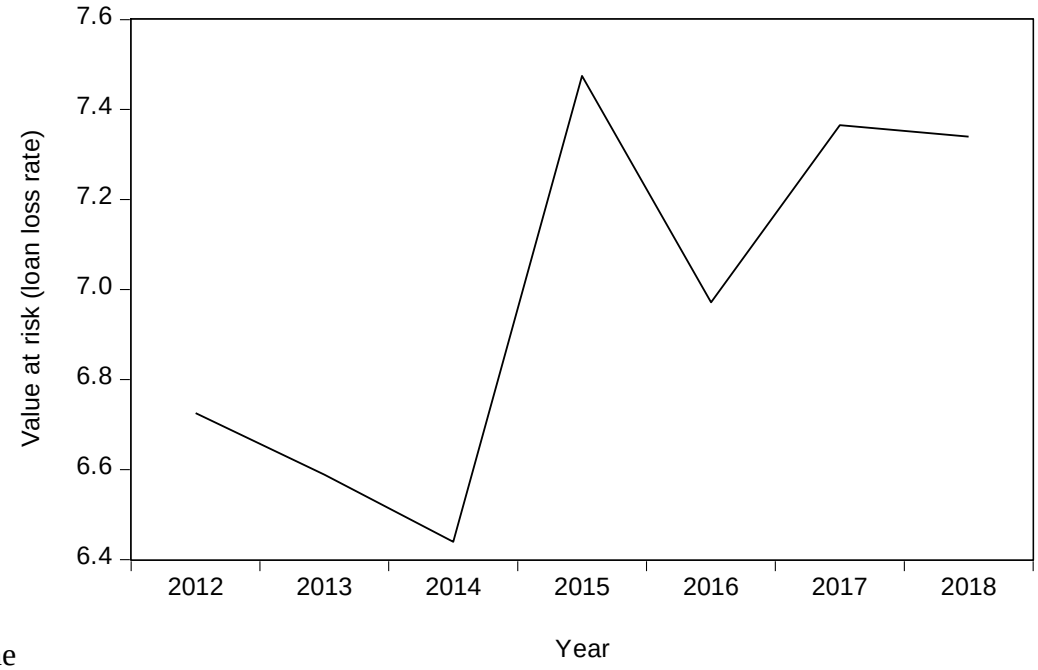


Figure 4.1: Delinquency rate

The results indicate that delinquency rate rose steadily from 2012 to 2014 before dropping in 2015. Delinquency rate further rose steadily in the subsequently years. Delinquency describes a phenomenon where loanee fails to repay loan in time. Paying outstanding loans take 30, 60, 90, or 120 or more days though this scenario relied on longest unpaid loan went unpaid.

4.4.2 Value at risk

From 2012 to 2018, a trend line for value at risk, as assessed by the ratio of total loans to total assets, was established for Kenyan commercial banks. Figure 4.2 illustrates the trend



line

Figure 4.2: Value at risk

Results indicate that value at risk dropped steadily from 2012 to reach lowest in 2014. Further, value at risk rose steadily to reach highest in 2015 before dropping slightly in 2016. There was subsequent rise of value at risk in 2017 and 2018.

4.4.3 Distance to default

The study sought established the trend line for distance to default operationalized as ratio as ratio of net operating income to total debt service for the financial banks covering 2012-2018. Trend line is presented in Figure 4.3.

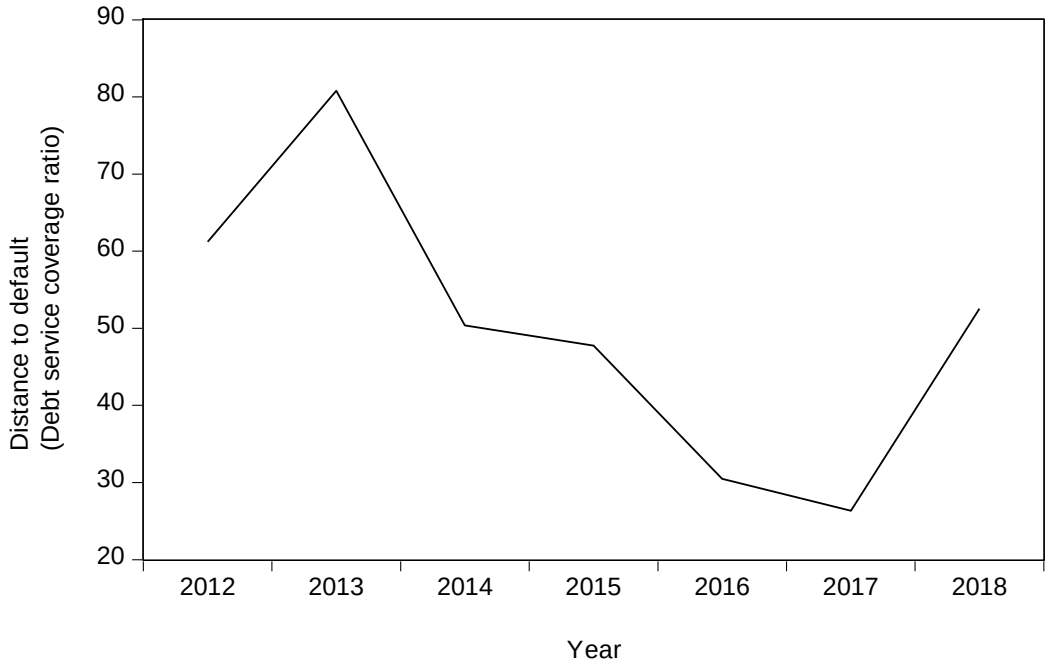


Figure 4.3: Distance to default

Results from the trend analysis showed that distance to default rose in 2012 to reach highest in 2013. Distance to default dropped in 2014, 2015, and 2016 reaching lowest in 2017 before rising again in 2018.

4.4.4 Bank size

The study sought present trend line for bank size measured using total assets for the Kenyan commercial banks between 2012-2018. Figure 4.4 illustrates the trend line.

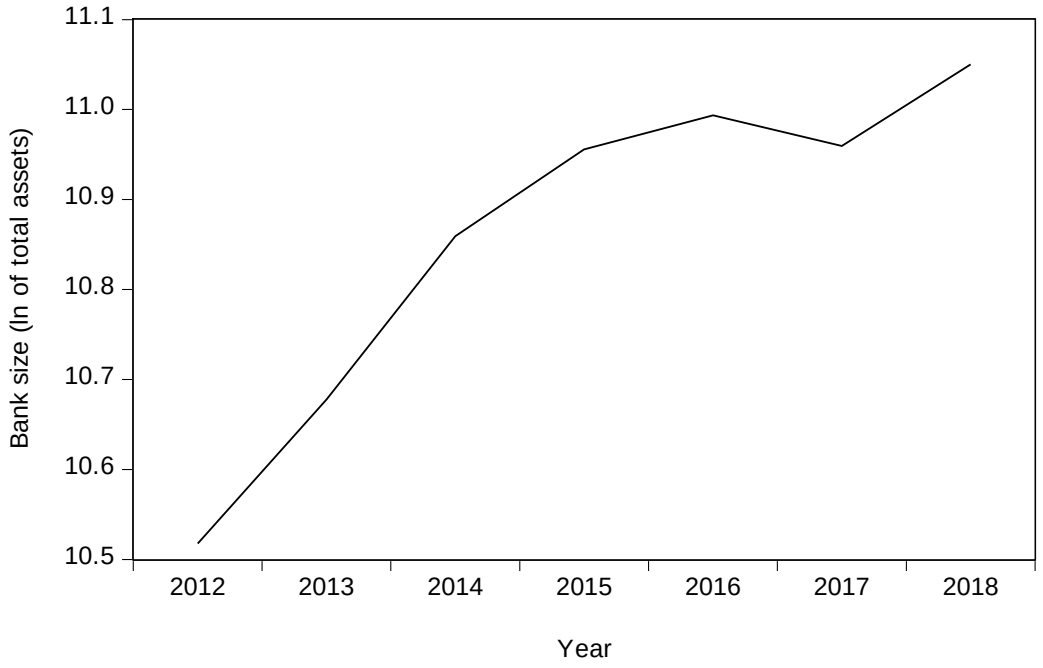


Figure 4.4: Bank size

The outcome showed that bank size operationalized using total assets in KES was rising from the years from 2012 to 2016 before dropping in 2017 and later rising in 2018. The drop in 2017 may be attributed to election periods that scare away investors resulting to business shrink. Bigger banks can have larger source of funding and thus can support larger lending. Larger banks have larger loan portfolio. The findings are consistent with Yoon and Jang (2011), who found that the size of the firm had a significant impact on ROE when compared to debt, and that smaller enterprises were riskier than larger enterprises regardless of leverage.

4.4.5 Credit history score

The study sought establish the trend line for credit history score operationalized as ratio of loans loss provisions to gross loans ratio covering the period 2012-2018. The trend line is presented in Figure 4.5.

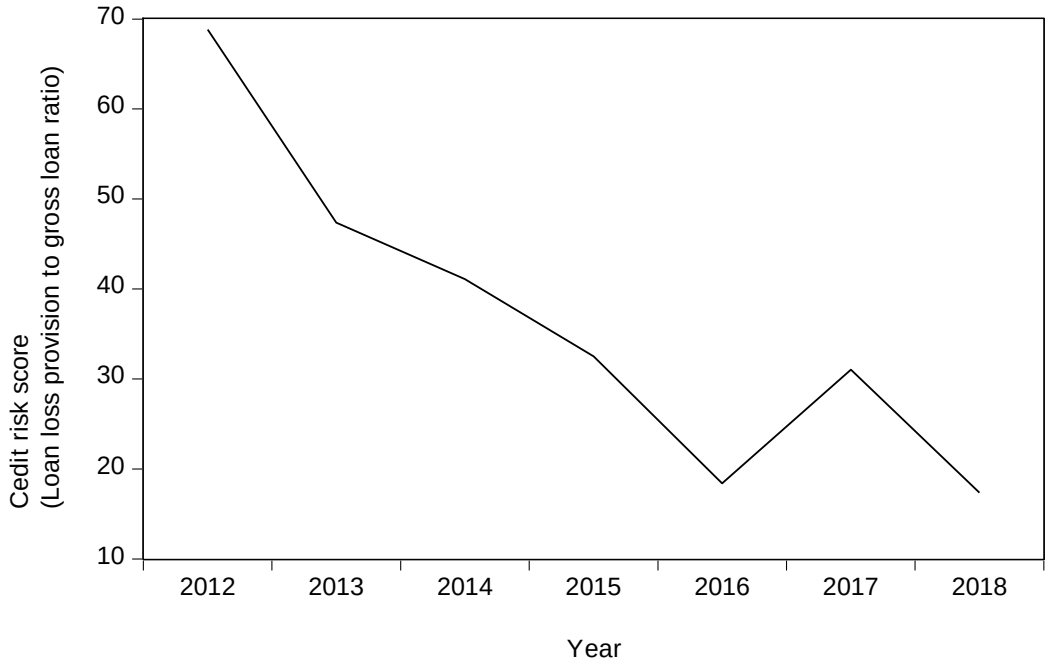


Figure 4.5: Credit history score

Credit history score was highest in 2012, before drooping drastically in the subsequent years to reach lowest in 2016. Further, credit risk score rose again in 2017 a phenomenon that could be attributed to election effects in Kenya.

4.3.6 Performance of mortgage lending commercial banks in Kenya

Trend line for performance of mortgage lending commercial banks measured as the average of NPLs covering the years 2012-2018. The trend line is presented in Figure 4.6.

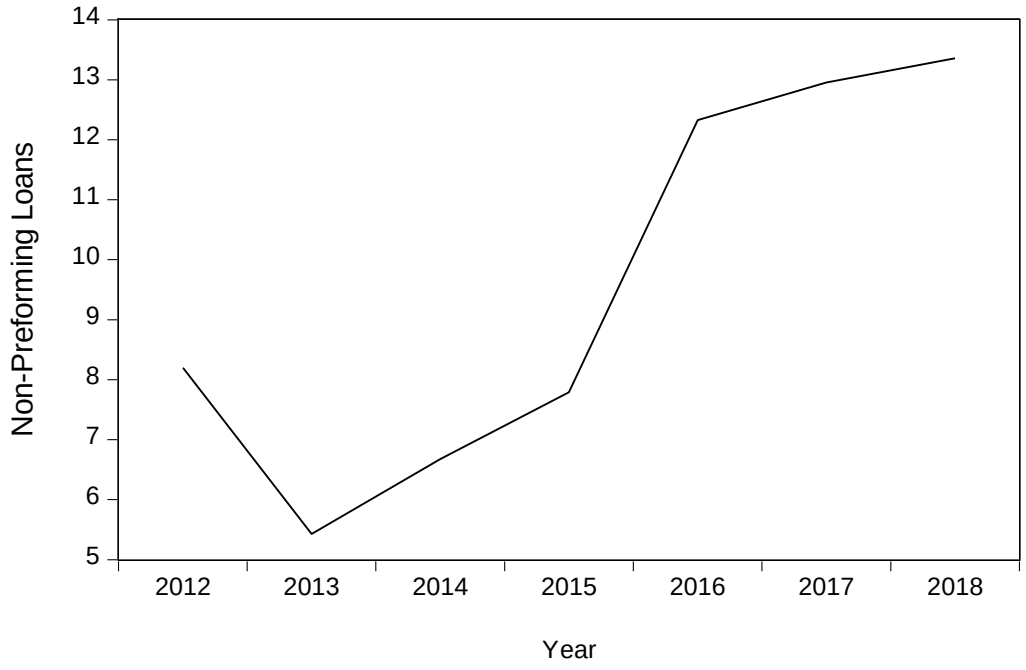


Figure 4.6: Performance of mortgage lending commercial banks in Kenya

The results of the trend line designated those non-performing loans was lowest in 2013. However, in the subsequent years, non-performing loans rose gradually.

4.5 Diagnostic Tests

4.5.1 Fisher-type test of unit root

Before executing any model, unit root tests should be done to ensure that the results are accurate and consistent. The stationarity of the data was tested using the Fisher-type test in this study. The stationarity result is depicted in table 4.3. The following are the hypotheses that will be tested;

Ho: All panels contain unit roots

Ha: At least one panel is stationary

Table 4.2: Fisher-type test of unit root

Variable		Inverse chi-squared(70) P	Inverse normal Z	Inverse logit t(179) L*	Modified inv. chi-squared Pm
Delinquency rate	test statistic	99.4495	-1.8098	-1.8875	2.2875
	p-value	0.0178	0.0352	0.0303	0.0111
Value at risk	test statistic	262.0531	-9.6049	-11.3366	15.8378
	p-value	0.000	0.000	0.000	0.000
Bank size	test statistic	357.6492	-11.9497	-15.5291	23.8041
	p-value	0.000	0.000	0.000	0.000
Distance to default	test statistic	198.3579	-3.9093	-6.8028	10.5298
	p-value	0.000	0.000	0.000	0.000
Credit history score	test statistic	221.4198	-8.991	-9.5401	12.4516
	p-value	0.000	0.000	0.000	0.000
Performance of mortgage lending commercial banks	test statistic	324.5335	-12.1493	-14.545	21.0445
	p-value	0.000	0.000	0.000	0.000

The stationarity outcomes test for unit root showed that, at level only delinquency rate, bank size, distance to default and performance of mortgage lending commercial banks were stationary because p-value<0.05 at P, Z, L* and Pm. Credit history score was non stationarity at level since p-value>0.05. This occurrence necessitated the use of differencing to keep these variables stationary. The credit history score became stationary once the first level differencing was completed. The findings suggest that the findings are suitable for a running model (Gujarati, 2003), implying that panel regression models can be created.

4.5.2 Hausman Test

The Hausman test is used to assess which model is superior, fixed or random. Table 4.3 shows the Hausman outcome results.

H_0: Random effect is appropriate

H_1: Fixed effect is appropriate

Table 4.3: Hausman Results

Performance of mortgage lending commercial banks				
Column1	**(b)** Fixed	**(B)** random	**(b-B)** Difference	**sqrt(diag(V_b-V_B))** S.E.
Delinquency rate	6.154319	2.368167	3.786152	4.642177
Value at risk	-9.42823	-15.33	5.901754	5.092194
Bank size	-4.61644	-2.01704	-2.599398	1.847248
Distance to default	-33.2721	-17.7489	-15.52319	22.66803
chi2(4)	5.60			
Prob>chi2	0.2312			

Source: Stata 14 computations

The random effects model was found to be superior to the fixed effects approach. The chi-square of the Hausman results was 5.60, with a significance value of 0.2312, which is greater than 0.05. The null hypothesis was not rejected, and the result was that random mode is preferable to fixed mode.

4.5.3 Normality Test

The goal of normality is to guarantee that data is dispersed evenly (Brooks, 2008). Table 4.5 shows the financial firms' normalcy outcomes utilizing the skewness as well as Kurtosis tests. Bera and Jarque (1981) conducted a normalcy check. The normality null at the level of 5% is rejected in case the p-value is less than 0.05. A nonparametric test is used if the data is not normally distributed. There were no extremes in the data distribution.

H_0: No normal distribution in the data

H_1: No normal distribution in the data

Table 4.4: Normality Test

Variable	Observation	Skewness	Kurtosis	p-value
Performance of mortgage lending	217	1.0670	0.7324	.166
Delinquency rate	217	2.0211	0.6413	.825
Value at risk	217	4.8153	0.5104	.967
Bank size	217	3.0634	0.5679	.084
Distance to default	217	1.2035	0.8241	.487
Credit history score	217	5.0481	0.7204	.063

The results of the skewness and Kurtosis tests are shown in Table 4.4. We infer that the data is normally distributed because the P-values were greater than the critical 0.05.

4.5.4 Multicollinearity Test

To test for multicollinearity, variance inflation factors (VIF) were used. According to Field (2009), a VIF larger than 10 designates the multicollinearity presence.

Table 4.5: Multicollinearity Test

Variable	1/VIF	VIF
Delinquency rate	2.11	0.474861
Value at risk	1.52	0.658248
Bank size	1.25	0.800058
Distance to default	1.54	0.650159
Mean VIF	1.6	

Because the VIF of all the variables was less than 10, the data in Table 4.5 revealed that there was no multicollinearity. There was no multicollinearity because the VIF values for delinquency rate, value at risk, bank size, and distance to default were all less than 10.

4.5.5 Autocorrelation Test

To keep track of standard correlation errors in the data, autocorrelation was used. To see if there was any serial correlation, the Wooldridge test was used. The following hypotheses were investigated, with the results listed in Table 4.6.

H_0: Residuals of this regression model does not have serial correlation

H_1: Residuals of this regression model have serial correlation

Table 4.6: Serial Correlation Tests

Performance of mortgage lending commercial banks
Wooldridge test
H_0: no first-order autocorrelation
F(1, 35) =.419
Prob > F = 0.5215

Source: Research Data, 2019

The null hypothesis was rejected. The F-test result was 0.416, and the p value was 0.5215>0.05. As a result, there is no serial association.

4.5.6 Heteroscedasticity

The Breusch-Pagan test is utilized to determine for heteroskedasticity. Null hypothesis stated that error term variance is static. The findings of the Heteroskedasticity Test are shown in Table 4.8.

Table 4.7: Heteroskedasticity Test Results

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity		
Ho: Constant variance		
Variable: fitted values		
chi2(1)	=	0.7003
Prob > chi2	=	0.6429

The p value produced was more than 0.05, 0.7003>0.05. Therefore, heteroskedasticity nor present in the data set.

4.6 Panel Regression Results and Hypothesis testing

An overall panel regression model depicting the association between delinquency rate, value at risk, bank size, distance to default and performance of mortgage lending commercial banks was conducted. Table 4.8 shows the results of the panel model.

Table 4.8: Panel Regression Results

NPL	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
Delinquency rate	2.533986	0.228219	11.10	0.002	-3.79321	8.86118
Value at risk	-0.84222	0.315452	-2.67	0.036	-4.79244	3.107992
Distance to default	0.103365	0.0239567	4.31	0.027	-0.44618	0.492907
Bank size	-7.6355	2.86961	-2.66	0.041	-70.4992	15.22812
_cons	5.6739	3.9529	1.43	0.193	-160.465	795.8128
R-squared:	within = 0.4917					
	between = 0.5309					
	overall = 0.4836					
Wald chi2(4)	=48.89					
Prob > chi2	=0.0000					

The R squared test was used to determine the variable's explanatory power. Table 4.9 shows that the investigation was supported by a 0.4836 R square. This means that delinquency rate, value at risk, bank size, distance to default explains 48.36% of performance of mortgage lending commercial banks.

4.6.1 Delinquency rate and performance of mortgage lending commercial banks

The output in Table 4.8 revealed that delinquency rate and performance of mortgage lending commercial banks are positively as well as significantly related (β =2.533986, p=0.002). The z-statistic of 11.10>1.96 also supports the model. This means that when the rate of delinquency rises, so does the performance of mortgage lending commercial banks as measure by non-performing loans. Hypothesis being tested by engaging p-vale strategy. The hypothesis was that delinquency rate has no significant influence on the performance of mortgage lending commercial banks in Kenya and Ho_1 was rejected since p-value is 0.002<0.05. Mortgage financing plays a crucial role in offering an opportunity for mortgage institutions to generate an income. High cases of mortgage delinquencies results to reduced performance of mortgages. The decision to become delinquent on a mortgage depends on

borrower's desire to repay the loan in time. The results are in line with Brent, *et al* (2011) evaluated the elements of mortgage delinquency in the US and revealed that major causes of delinquency include the income of the borrowers, the type of loans borrowed and the state of the economy.

4.6.2 Value at risk and performance of mortgage lending commercial banks

Results in Table 4.8 also showed that value at risk negatively and significantly linked to performance of mortgage lending commercial banks (β =-0.84222, p=0.036). The z-statistic of 2.67 >1.96 also supports the model.This implies that a rise in value at risk results to a subsequent increase in the performance of mortgage lending commercial banks evaluated through non-performing loans. The p-value methodology was used to test the hypothesis. The hypothesis was that value at risk does not have significant influence on the performance of mortgage lending commercial banks in Kenya and Ho_2 was rejected since p-value is 0.002<0.05. Value at risk is employed by banks to measure the risks. The ability of a bank to predict probability of loan default risks will provide a chance to cushion itself against lending mortgage funds to unworthy customer. The results concur with Sujeewa (2015) who investigated mortgage lending in Nigeria and found that lending structures in the country had the potential to contribute to ability of borrowers to pay and thus leading to default.

4.6.3 Distance to default and performance of mortgage lending commercial banks

Additionally, Table 4.8 panel model showed that distance to default is positively and significantly associated to performance of mortgage lending commercial banks (β =0.103365, p=0.027). The z-statistic of 4.31>1.96 also supports the concept. This implies that a rise in distance to default results to a subsequent increase in the performance of

mortgage lending commercial banks assessed via non-performing loans. The p-value methodology was used to test the hypothesis. The hypothesis was that distance to default lacks significant influence on the performance of Kenyan mortgage lending commercial banks and $Ho_3$was rejected since p-value is 0.027<0.05.

Distance to default refers to the likelihood that there will be failure to meet loan requirements detailed in a loan agreement and is normally measured by the debt service coverage ratio. Understanding the likelihood that a loan may be defaulted is an important tool in credit risk analysis. Prediction of default in an organization can only be done within a certain level of probability. Distance to default explains the frequency which standard deviations of the price of the asset should change in order for default to be triggered future. The results agree with Oyedokun, *et al*, (2013) who investigated mortgage lending in Nigeria and showed that the lending structures in the country had the potential to contribute to ability of borrowers to pay and thus leading to default. The results also tally with Osero *et al*, (2013) that although mortgage lending commercial banks have effective system in managing loan default, they rarely find the need to engage credit reference bureaus.

4.6.4 Bank size and performance of mortgage lending commercial banks

It was also found as illustrated in Table 4.8 that bank size is negatively and statistically related to performance of mortgage lending commercial banks (β =-7.6355, p=0.041). A z-statistic of 2.66 >1.96 also supports the model. This means that as the size of a bank grows, so does the performance of mortgage lending commercial banks as measured by non-performing loans. The p-vale methodology was used to test the hypothesis. The hypothesis was that bank size has no significant effect on the performance of Kenyan mortgage lending commercial banks, and Ho4 was rejected because the p-value was 0.041<0.05.

The size of a bank refers to the bank's economies of scale. Due to economies of scale as well as scope, a large bank can save money. The size of a bank possess substantial effect on the amount of money that can be borrowed. The results support Yoon and Jang (2011)'s assertion that bank size has a strong relationship with bank performance. Larger banks have more lending power because they control a larger resources pool.

4.7 Moderating effect of Credit History Score

The study assessed the moderating of credit history score on linkage between credit risk management and performance of mortgage lending commercial banks in Kenya. All the independent variables (delinquency rate, value at risk, bank size, distance to default) were moderated by credit history score yielding composite (interaction term). After moderation, the fitness of a regression model is shown in Table 4.9.

Table 4.9: Moderating effect of Credit history score

NPL	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
Delinquency rate	2.597786	0.537148	4.84	0.021**	-4.3349	9.53047
Value at risk	0.77609	2.85678	0.27	0.786	-6.37528	4.823094
Distance to default	-0.01044	0.00429	-2.433	0.042**	-0.58724	0.566367
Bank size	28.7777	22.28923	1.29	0.197	-72.4638	14.90836
Delinquency rate*M	0.17619	0.018468	9.54	0.003**	-0.53815	0.185771
value at risk*M	-0.12021	0.017879	-6.72	0.017**	-0.37064	0.33022
Distance to default*M	0.021349	0.006104	3.50	0.025**	-0.01061	0.013312
Bank size*M	-0.011609	0.099244	0.12	0.907	-0.18291	0.206124
_cons	352.9227	248.2164	1.42	0.155	-133.572	839.4178
R-sq:	within = 0.5669					
	between = 0.5373					
	overall = 0.5185					
Wald chi2(4) =	43.93					
Prob > chi2 =	0.0034					

M=Moderator/ credit risk score

Output in Table 4.9 indicates credit history score has a moderating role on linkage between credit risk management and performance of mortgage lending. Output results identifies that R^2 increased from 0.4836 prior to moderation (Table 4.8) to 0.5185 later moderation. Delinquency rate, value at risk and distance to default were significantly related to mortgage lending commercial banks performance in Kenya post moderator introduction. The hypothesis that credit history score has no substantial moderating effect on the link between credit risk management and mortgage lending performance was rejected. The alternative hypothesis accepted in the research was that credit history score has a strong moderating effect on the association between credit risk management and mortgage lending performance. Credit history score of an individual refers to the history of a borrower with regard to the credit worthiness of the individual in meeting their financial obligations. Financial institutions including mortgage banks use the credit score in making an analysis of whether one will pay back their loans or they will default. However, the use of credit history score has been criticized in the past owing to its characteristic of being impersonal as well as being discriminatory on sex, gender, and marital status.

Commercial banks will usually look at the credit history of the client before making a lending decision. Albeit a borrower's record as a consumer may assume a significant job in deciding home loan advance execution, scarcely any distributed examinations have had the option to join such data in their investigations. Be that as it may, significant record information is frequently hard to get and difficult to measure. The accessible proof, in any case, demonstrates that advances made to borrowers with defective records as a consumer may experience issues meeting booked installments on past advances. The results agree with Ergeshidze (2017) analyzed credit risk models for mortgage firms in USA and assessed risk

of default by the sub- prime mortgage borrowers and established that the main characteristic determining the credibility of the borrowers included the ratio of payment relative to income, LTV, the credit history and the type of customer. The results also agree with Cross (2013) on Credit history and the performance of prime and sub- prime loans and established that sub-prime mortgages differ from prime mortgages and people respond differently to incentives to prepay or default on loans.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

The research is summarized in this section. Policy approvals that administration in banks may accept mortgage lending commercial banks performance in Kenya are also suggested in this section. This segment also includes suggestions for further research.

5.2 Summary of the Study

In spite of the mortgage sector in Kenya having recorded a significant growth, it still remains dominated by large mortgage lending commercial banks which could indicate probable restrictions with regard to entry or high levels of credit risk for both medium and small commercial banks. The research goal being to look into the impact of credit risk management on Kenyan mortgage lending commercial banks performance. The study employed explanatory and descriptive research designs targeting thirty-four registered mortgage lending commercial banks. Output was described employing descriptive output, correlations and pane models. The p-value mechanism was used to confirm the hypothesis.

Objective one of the research was finding out delinquency rate influence on mortgage lending commercial banks performance. The outcomes of the trend analysis show that the rate of delinquency has fluctuated throughout time. The correlation results found that delinquency rate is positively as well as significantly connected with performance of mortgage lending commercial banks. The results of a panel regression of coefficients revealed that delinquency rate is positively and significantly connected to mortgage lending commercial bank performance. Research output rejected the null hypothesis that delinquency

rate does not have significant influence on the performance of mortgage lending commercial banks.

The second goal was to determine the impact of value at risk on the performance of commercial mortgage lenders. Value at risk of commercial banks has been fluctuating across the stud period. The correlation results found that value at risk is negatively and significantly is associated with performance of mortgage lending commercial banks. Panel regression of coefficients findings further showed that value at risk is negatively and significantly related to performance of mortgage lending commercial banks. The null hypothesis that value at risk has no effect on the performance of mortgage lending commercial banks was refuted by the findings.

Third objective being establishing the influence of distance to default on the performance of mortgage lending commercial banks. Distance to default rose fluctuating across the study period. The correlation results found that distance to default in Commercial banks that lend money to people have a favorable and significant relationship with their performance. Panel regression of coefficients revealed that distance to default is positively and significantly related to performance of mortgage lending commercial banks. Research output rejected the null hypothesis that distance to default fail to significantly influence on mortgage lending commercial banks performance.

The fourth aim was to find out bank size influence on mortgage lending commercial banks performance in Kenya. Results from the trend analysis showed that bank size of commercial banks measured as total assets fluctuated during the study period. The correlation results found that bank size is negatively as well as substantially associated with performance of

mortgage lending commercial banks. Panel regression output also showed that bank size is negatively and significantly related performance of mortgage lending commercial banks.

The null hypothesis, bank size has no effect on the mortgage lending commercial banks performance was rejected by the findings.

The fifth goal was to see if credit history score had a moderating effect on credit risk management and mortgage lending commercial bank performance. The results indicate that coefficient of determination improved after moderation. The hypothesis that credit history score influenced linkage between credit risk management and performance of mortgage lending commercial banks was affirmed.

5.3 Conclusion

Conclusions were generated relating them to study objectives. The study concludes that delinquency rate positively influences performance of mortgage lending commercial banks in Kenya. A high delinquency rates may result to financial institutions leaving the mortgage market owing to high losses.

The study also concludes that value at risk negatively influences Kenyan mortgage lending commercial banks performance. Value at risk is a mechanism which provides a various risk positions analysis. It provides an avenue for commercial banks dealing with mortgage funds to hedge against possible risk.

The study further concludes that distance to default positively influences performance of Kenyan mortgage lending commercial banks. Distance to default refers to the likelihood that there will be failure to meet loan requirements detailed in a loan agreement and is normally

measured by the debt service coverage ratio. Understanding the likelihood that a loan may be defaulted is an important tool in credit risk analysis. Prediction of default in an organization can only be done within a certain level of probability.

The research discovered size of a bank has a negative impact on mortgage lending commercial banks performance. The size of a bank refers to the bank's economies of scale. As a result of economies of scale as well as scope, a large bank can save money. The size of a bank has a considerable impact on the availability of loans.

According to the findings, credit history score moderates the connection between credit risk management and mortgage lending commercial bank performance. Financial institutions including mortgage banks use the credit score in making an analysis of whether one will pay back their loans or they will default.

5.4 Recommendations

To alleviate high incidences of nonperforming loans in the mortgage banking sector, mortgage lending commercial banks might have to improve their credit risk monitoring procedures by adopting more precise methods including credit scoring. By retrieving and computationally assessing client background information, credit scoring can estimate the likelihood of loan defaults. Non-performing loan incidences can be reduced by closely monitoring loans provided and scrutinizing borrowers. Commercial bank credit guidelines for mortgage lending must be harmonized with loan lending procedures.

Mortgage lending commercial banks management may need to carefully draft credit policies with clear implementation procedures to enhance performance of mortgage lending to ensure maximum returns while minimizing default rates. Credit guidelines of the commercial banks

may be integrated with the mortgage lending guidelines to form sound credit management procedures.

There may be need to implement and adopt financial technologies that include predictive modeling to predict credit worthiness of borrowers before awarding mortgage loans. Understanding borrowing pattern of loanees and circumstances may help reduce high cases of default rates.

The study recommends the use of credit-scoring models to screen loan applicants. However, this method may not be very precise and so commercial banks offering mortgages may be willing to absorb high anticipated default rates expenses in return for supplementary benefits related to high-volume credit-scored loans attached to securities.

5.5 Areas for Further Research

Even for consumers with the best credit scores, loan defaults occur despite effective credit risk management. More research into the demographic characteristics that lead to mortgage loan default could be done.

The major method of analysis used in the study was panel regression. However, there are significant limitations to multivariate regression, such as when the rigorous conditions of multivariate regression are not met, causing the precision of the coefficients to be questioned. Subsequent research may use a different data analysis methodology, such as structural equation modeling (SEM). SEM is a multivariate analytical technique which allows models to examine association between variables whereas demonstrating the correlation with structures and diagrams at the same time.

Other macroeconomic factors have an impact on commercial bank mortgage lending growth. Inflation, interest rate, and money supply are examples of macroeconomic factors. These variables could be used in future study to see how macroeconomic conditions influence mortgage lending in commercial banks.

REFERENCES

Abaidoo, A., & Oppong, S. (2017). Determinant of Loan Default and Its Effect on Financial Performance of Commercial Banks in Ghana. A Case Study of Fidelity Bank Limited.

Abdulrehman, A., & Nyamute, W. (2018). Effect of Mortgage Financing On Financial Performance of Commercial Banks in Kenya. *Journal of International Business, Innovation and Strategic Management*, *1*(6), 91 - 122. Retrieved from http://www.jibism.org/core_files/index.php/JIBISM/article/view/54

Achou, T. F., & Tenguh, N. C. (2008). Bank performance and credit risk management. *Finance Universitu of Skodve School of Technology and Society*.

Addai, B., & Pu, C. (2015). The Impact of Delinquent Loans on Financial Performance of Banks in Ghana. *British Journal of Economics, Management & Trade*, *9*(2), 1-8. doi: 10.9734/bjemt/2015/19268

Adolphus,T. J. (2011). Modelling bank management, rural lending and small business finance in Nigeria. *Global Journal of Management and Business Research*, *11*(7).

Adzis A. A., Sheng L. E. &Bakar, J. A. (2018). Bank lending determinants: evidence from Malaysia commercial banks. *Journal of Banking and Finance*, 1(3), 36-48.

Afriyie, H. O. & Akotey, J. O. (2012). *Credit risk management and profitability of selected rural banks in Ghana.* Catholic University College of Ghana

Ahmed, A. S., Takeda, C., & Thomas, S. (1999). Bank loan loss provisions: a reexamination of capital management, earnings management and signaling effects. *Journal of Accounting and Economics*, *28*(1), 1-25.

Akbar, S., & La, D. (2014). *Mortgage Lending Institutions in Scandinavia: A study of risk for the period 2000-2013* (Degree project). Umeå School of Business and Economics.

Al Karim, R., & Alam, T. (2013). An evaluation of financial performance of private commercial banks in Bangladesh: ratio analysis. *Journal of Business Studies Quarterly*, *5*(2), 65.

Alexander, C. (2005). The present and future of financial risk management. *Journal of Financial Econometrics*, *3*(1), 3-25

Altman, E.I., Hartzell, J., Peck, M., (1995). "A Scoring System for Emerging Market Corporate Debt", *Salomon Brothers*, 15

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, *58*(2), 277-297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, *68*(1), 29-51.

Awojobi, O. (2011). Analysing risk management in banks: Evidence of bank efficiency and macroeconomic impact. *Journal of Money, Investment and Banking*, (22).

Baldwin, C. Y., & Mason, S. P. (1983). The resolution of claims in financial distress the case of Massey Ferguson. *The Journal of Finance*, *38*(2), 505-516.

Bali, T., & Cakici, N. (2009). World Market Risk, Country-Specific Risk and Expected Returns in International Stock Markets. *SSRN Electronic Journal*, 57-73. doi: 10.2139/ssrn.1489159

Basel Committee on Bank Supervision, BCBS (2003). *Overview of the new basel capital accord. Technical report, Basel Committee on Bank Supervision, CH-4002 Basel*, Switzerland. Consultative Document.

Berger, A. & Udell, G. (2009). Securitization, Risk, and the Liquidity Problem in Banking,

Berkowitz, J., & O'Brien, J. (2001). How Accurate Are Value-at-Risk Models at Commercial Banks. *SSRN Electronic Journal*, *1*(1). doi: 10.2139/ssrn.278547

Bhattarai, Y. R. (2016). *Effect of credit risk on the performance of Nepalese commercial banks*. NRB Economic Review, Tribhuvan University

Bhutta, N. (2012). Mortgage debt and household deleveraging: accounting for the decline in mortgage debt using consumer credit record data. *Available at SSRN 2027262*.

Borgersen, T. A. & Greibrokk, J. (2012). Reflections on LTV, risk and incentives in mortgage markets. *Journal of European Real Estate Research*, 5 (3), 199-210

Brent, W., Kelly, L., Lindsey-Taliefero, D., & Price, R. (2011). Determinants of Mortgage Delinquency. *Journal of Business & Economics Research (JBER)*, *9*(2). doi: 10.19030/jber. v9i2.1815

Brockman, P., & Turtle, H. J. (2003). A barrier option framework for corporate security valuation. *Journal of Financial Economics*, 67(3), 511-529.

Bryman, A., & Bell, E. (2011). *Business research methods*. Cambridge: Oxford University Press.

Case, K.E. and R.J. Shiller (2003). Is there a bubble in the housing market*? Brookings Papers on Economic Activity*, vol. 2003, 299-342.

Castagna, A., & Fede, F. (2013). *Measuring and managing liquidity risk*. Chichester: John Wiley & Sons.

CBK. (2011). *Quaterly report on Development in the Kenyan banking Sector* for *the period ended 30th March 2017,* Retrieved from www.centrabank.go.ke/downloads

Central Bank of Kenya (2016) FSD Kenya, *FinAccess National Survey*

Central Bank of Kenya (2016) Mortgage Finance in Kenya: *A Baseline Survey*

Central Bank of Kenya (2016). *Prudential guidelines 2016*. Retrieved from https://www.centralbank.go.ke/index.php/news/245-issuance-of-revised-prudential-guidelines-and-risk-management-guidelines-for-banks

Central Bank of Kenya (2016*). Risk management guidelines 2016*. Retrieved from https://www.centralbank.go.ke/index.php/news/245-issuance-of-revised-prudential-guidelines-and-risk-management-guidelines-for-banks on 10th April 2017

Central Bank of Kenya (2017). *Quarter 4 Economic Review Report, 2017*Retrieved from https://www.centralbank.go.ke/index.php/economic- review-reports on 25th February 2018

Central Bank of Kenya, (2016). *Risk management survey for the banking sector*. CBK, Nairobi.

Central Bank of Kenya, (CBK) (2016*). Bank Supervision report; Kenyan banking Sector for the period ended December 2016.* Retrieved on 10th April 2017.www.centrabank.go.ke/downloads.

Central Bank of Kenya, World Bank (2016) Mortgage Finance in Kenya: *Mortgage Survey Analysis*

CFS Working Paper No. 98/06. Centre of Finance Studies- University of Frankfurt. Germany.

Chiquier, L., & Lea, M., (2010) Housing Finance Policy in Emerging Markets, World Bank Policy Research Working Paper 3255, June 2010

Chiquier, L., Hassler, O., & Lea, M., Mortgage Securities in Emerging Markets, World Bank Policy Research Working Paper 3370, August 2012. Copenhagen: Swedish Fiscal Policy Council.

Consultive paper issued by Basel Committee on Banking Supervision, Basel.

Cooper, D. & Schindler P. (2001). Business research methods (7th edn), N, Y, Irwin/McGraw-Hill

Diaz-Serrano, L. (2013). Income volatility and residential mortgage delinquency across the EU. *Journal of Housing Economics*, 14(3), 153-177.

Duan, J. C., & Wang, T. (2012). Measuring distance-to-default for financial and nonfinancial firms. *Global Credit Review*, 2(01), 95-108.79

Ergeshidze, A. (2017). Credit Risk Model: Assessing Default Probability of Mortgage Loan Borrower. *SSRN Electronic Journal*. doi: 10.2139/ssrn.3038004

European Mortgage Federation. (2013). Hypostat: A review of Europe's mortgage and housing markets.

Ewert,R. and Schenk, G. (2011) *Determinants of Bank Lending Performance*.

Fallon, W. (1996). Calculating Value-at-Risk, Wharton Financial Institutions Center, The Wharton School, University of Pennsylvania.

Financial Sector Deepening-Kenya (2009) *Cost of collateral in Kenya*; *Opportunities for Reform*. Nairobi. FSD-Kenya.

Finansinspektionen (Swedish Financial Services Authority). (2013). The Swedish Mortgage Market 2013.

Ford, C. (2017). Sedimentary Innovation: How Regulation Should Respond to Incremental Change. *Innovation and the State: Finance, Regulation, and Justice (Cambridge University Press, 2017, Forthcoming)*.

Frees, E. W. (2004). *Longitudinal and panel data: analysis and applications in the social sciences*. Cambridge University Press.

Geitangi, D. M. (2015). *The Relationship between Credit Risk Management Practices and the Performance of Loan Portfolio of Commercial Banks in Kenya* (Doctoral dissertation, Masters thesis, University of Nairobi).

Gil-Diaz, F. (2008) The Origin of Mexico's 1994 Financial Crisis, The Cato Journal, vol.17, No.3, http://www.cato.org/pubs/journal/cj.

Gizycki, M. C. (2001). *The effect of Macroeconomic conditions on banks' risk and profitability*. Reserve Bank of Australia.

Goodman. L. and Zhu. J. (2015). *Loss Severity on Residential Mortgages.* Evidence from Freddie Mac's Newest Data. 1-17.

Gopal, C. (2008). *Financial management*. New Delhi: New Age International (P) Ltd., Publishers.

Greene, W. H. (2003). *Econometric analysis*. Pearson Education India.

Guguyu, O. (2018). *High loan default hits Chase Bank:* The Standard. Retrieved from https://www.standardmedia.co.ke/article/2001275680/high-loan-default-hits-chase-bank

Gujarati, D. N. (2003). Basic Econometrics. 4th. *New York: McGraw-Hill*.

Hassler, O., & Walley, S., (2007) Mortgage Liquidity Facilities, Housing Finance International, Vol. XXII No. 2

Haurin, D. R. (1991). "Income Variability, Homeownership, and Housing Demand." *Journal of Housing Economics* 1(1):60-74.

Hendricks, D. (1996). Evaluation of value-at-risk models using historical data. *Federal Reserve Bank of New York Economic Policy Review*, 2(1), 39-69.

Herring, R. J., & Wachter, S. (1998). Real estate booms and banking busts: an international perspective. *US-Japan Management Studies Center*, Wharton School of the University of Pennsylvania.

Hlawatsch, S., & Ostrowski, S. (2009). *Economic loan loss provision and expected loss (No. 09013)*. Otto-von-Guericke University Magdeburg, Faculty of Economics and Management.

Holmes, C. (2003). *Commercial Mortgage Delinquency, Foreclosure and Reinstatement*. University of British Columbia, Faculty of Commerce.

Hull, J. (2012). *Risk Management and Financial Institutions,* Vol. 733. John Wiley & Sons.

Iannotta, G., Nocera, G., & Sironi, A. (2007). Ownership structure, risk and performance in the European banking industry. *Journal of Banking & Finance*, *31*(7), 2127-2149.

Itoo, R., Mutharasu, S., & Filipe, J. (2013). The impact of loan-to-value on the default rate of residential mortgage-backed securities. *Int. J Latest Trends Fin. Eco. Sc.*, *3*(4), 635-651.

Jickling, M. (2009). *Causes of the financial crisis (R40173).* Washington, DC: Congressional Research Service.

Jin, C., & Ziobrowski, A. (2011). Using Value-at-Risk to Estimate Downside Residential Market Risk. *JRER*, *33*(3).

Jorion, P. (2014). Value at Risk: The New Benchmark in controlling market risk. *Irwin, Chicago*, *1*, 997.

Juma, A. (2012). *Analysis of the Factors Influencing Mortgage Financing In Kenya a Case of Housing Finance Company Of Kenya.* Masters' Degree in Project Planning and Management. University of Nairobi.

Kalui, F. M. & Kiawa, E. (2015). Effects of credit risk management procedures on financial performance among microfinance institutions (MFIs) In Kenya: A Case of MFIs in Nairobi County. *International Journal of Humanities Social Sciences and Education*, 2(3), 81-103

Karanja, A. (2013). *Mortgage Financing and Profitability of Commercial Banks in Kenya* (Master of Business Administration). Kenyatta University.

Kargi, H. S. (2011). Credit Risk and the Performance of Nigerian Banks. *Ahmadu Bello University, Zaria*.

Karim, Y., Haneef, S., Riaz, T., Ramzan, M., Rana, M. A., Hafiz, M. I., & Karim, Y. (2012). Impact of risk management on non-performing loans and profitability of banking sector of Pakistan. *International Journal of Business and Social Science*, *3*(7).

Kigomo, J. (2016). Mortgage rates in Kenya: Implications for homeownership. International Academic Journal of Economics and Finance, 2 (1), 31-40

Kimani, J. (2011). Fraud Risk Assessment Plan for Barclays Bank of Kenya. Tampere University of Applied Sciences.

Kithinji, A. M. (2010). Credit risk management and profitability of commercial banks in Kenya. *School of Business, University of Nairobi, Nairobi*.

Kliestik, T., Misankova, M., & Kocisova, K. (2015). Calculation of Distance to Default. *Procedia Economics and Finance*, *23*, 238-243. doi: 10.1016/s2212-5671(15)00481-5

Kolapo, T. F., Ayeni, R. K., & Oke, M. O. (2012). Credit risk and commercial banks' performance in Nigeria: a panel model approach. *Australian Journal of Business and Management Research*,*2*(2), 31.

Kombo, D. K., & Tromp, D. L. A. (2006). Project and Thesis Writing: An Introduction. *Pauline" s Publications Africa*.

Kwambai, K. D., & Wandera, M. (2013). Effects of Credit Information Sharing on Nonperforming Loans: The Case of Kenya Commercial Bank Kenya. *European Scientific Journal*, *9*(13).

Lawrence, E.L., Smith, S., Rhoades, M., (1992). "An Analysis of Default Risk in Mobile Home Credit", *Journal of Banking and Finance*, 299-312.

Lowery, C. A. (2016). *Intention versus impact: comparing interest rates charged by non-profit organizations and commercial banks in the Latin American microfinance industry* (Doctoral dissertation, San Diego State University)

Maina, G. M., & Muturi, W. (2013). Determinants of financial performance of commercial banks in kenya.J*omo Kenyatta University of Agriculture and Technology*, 207.

Makori, J., & Memba, F. (2015). Factors Influencing Performance of Mortgage Financing Among Commercial Banks in Kisii Town, Kenya. *International Journal of Economics, Commerce and Management*, *3*(3). Retrieved from http://ijecm.co.uk/

Malede M. (2014). Determinants of commercial banks lending: evidence from Ethiopian commercial banks. *European Journal of Business and Management*, *6*(20), 109-117.

Markowitz & Harry M. (1999). The early history of portfolio theory: 1600–1960, *Financial Analysts Journal, Vol. 55, No. 4*

Mercieca, S., Schaeck, K., & Wolfe, S. (2007). Small European banks: Benefits from diversification? *Journal of Banking & Finance*, *31*(7), 1975-1998.

Merton, R. C. (1974). On the pricing of corporate debt: The risk structure of interest rates*. *The Journal of Finance*, 29(2), 449-470.

Merton, R.C. (1963). An Inter-temporal Capital Asset Pricing Model. Econometrica 41 (5): 867–887

Metropol. (2018). *Metropol Corporation | Scores*. Retrieved from https://www.metropol.co.ke/personal/scores/

Mian, A., & Sufi, A. (2009). The consequences of mortgage credit expansion: Evidence from the US mortgage default crisis. *The Quarterly Journal of Economics*, 124(4), 1449-1496.

Milne. A. (2014). Distance to default and the financial crisis. *Journal of Financial Stability*. 12(C), 26-36

Mkukwana. K. (2012). *The Impact of Macroeconomic Factors on the Risk of Default: The case of Residential Mortgages*. University of Witwatersrand. Masters of Management in Finance and Investment.

Moody's Investor Service (2016). Corporate Bond Defaults and Default Rates, *Moody's Special Report.*

Muchiri, N., & Anyanzwa, J. (2018). *Trouble brewing in Kenya's house loans market.* Retrieved from https://www.theeastafrican.co.ke/business/Trouble-brewing-in-Kenya-house-loans-market/2560-4891996-l9jehaz/index.html

Musyoki D, & Kadubo A. S (2011). The impact of credit risk management on the financial Performance of Banks in Kenya for the Period 2000–2006. *International Journal of Business and Public Management* 2(2), 72-80.

Mutero, B. N. (2007). A survey of credit risk management practices by pharmaceutical manufacturing firms in Kenya. *Unpublished MBA Project.*

Mwendwa, E. (2015). *The Effect of Mortgage Financing On Profitability of Commercial Banks in Kenya* (Degree of Master of Business Administration). University of Nairobi.

Mwirigi, P. K. (2006). An Assessment of Credit Risk Management Techniques Adopted by MFIs in Kenya. *Unpublished MBA Dissertation. University of Nairobi, Nairobi*.

Nanyuki, L., & Omar, N. (2016). Effects of Bank Deposit Costs on Financial Performance of CommercialBanks in Mombasa County. *The Journal of Strategic Business & Management Journal*, *3*(4), 692-707.

Nasieku, T., & Wanyonyi, R. M. (2016). The relationship between mortgage finance and real estate development in Kenya. *Journal of Social Science Research*, *10*(1), 1950-1955.

Nelson, W.M. and Kalani, V. M. (2009). Commercial Banking Crises in Kenya: Causes and Remedies. *Global Journal of Finance and Banking Issues, Vol. 3, No. 3, 2008*. Available at SSRN: http://ssrn.com/abstract=1536159

Ng'ang'a, K. (2018). *The Influence of Macroeconomic Factors On The Mortgage Market In Kenya* (Degree of Bachelor of Business Science). Strathmore University.

Ngare, E. M. (2008). *A survey of credit risk management practices by Commercial Banks in Kenya* (Doctoral dissertation).

Ngugi R. W. (2004). An Empirical Analysis of Interest Rate Spread in Kenya. African Economic Research Consortium (AERC) Research Paper No. 106.

Njiru G.M. (2003) Credit Risk Management by Coffee Cooperatives in Embu District. Unpublished MBA Project. University of Nairobi.

Nubi, T. G. (2015). Beyond Bricks and Mortar: Demystifying the Affordable Housing Debacle in a Transiting Economy. *The University of Lagos*.

Ntiamoah, E., Oteng, E., Opoku, B., & Siaw, A. (2012). Loan Default Rate and its Impact on Profitability in Financial Institutions. *Research Journal of Finance and Accounting*, *5*(4), 67-92.

Nwokediuko, J. N. (2017). *An Examination Of The Soundness Of Banks In Nigeria: A Case Study Of Selected Banks* (Doctoral dissertation).

O'Brien, J., & Szerszen, P. (2014). An Evaluation of Bank VaR Measures for Market Risk During and Before the Financial Crisis. *SSRN Electronic Journal*. doi: 10.2139/ssrn.2418345

Odundo, O. G., & Orwaru, M. J.(2018). Bank Size and Financial Stability of Commercial Banks in Kenya: Empirical Evidence. *Journal of Emerging Issues in Economics, Finance and Banking*, 7(1), 2667-2680.

Osero, L., Walter, B., & Nyaoga, R. (2013). Effectiveness of Loan Default Management Strategies Among Commercial Banks in Kenya: A Survey of Selected Commercial Banks in Nairobi CITY. *International Journal of Management, IT and Engineering*, *3*(11), 326-339.

Owojori et al (2011) *The challenges of risk management in Nigerian Banks in the post consolidation era*

Oyedokun, T., Adewusi, A., Oletubo, A., & Thomas, O. (2013). Investigation of Mortgage Lending: An Overview of Nigerian Practice. *Research Journal of Finance and Accounting*, *4*(12), 150-159.

Padilla, A.J., & Pagano, M., (2012). Sharing default information as a borrower discipline device. *European Economic Review 44 (10), 1951–1980.*

Pennington-Cross, & A. and J. Nichols. 2000. "Credit History and the FHA-Conventional Choice." *Real Estate Economics* 28(2): 307-336.

Pennington-Cross, A. (2003). Credit History and the Performance of Prime and Nonprime Mortgages. *The Journal of Real Estate Finance and Economics*, 27(3), 279-301. doi: 10.1023/a:1025891223226

Pesaran, M. H. (2004). General diagnostic tests for cross section dependence in panels. CESifo working papers, No. 1229

Santomero, A. M. (2012). Commercial bank risk management: an analysis of the process. *Journal of Financial Services Research*, *12*(2), 83-115.

Saunders, M., Lewis, P., & Thornhill, A. (2009), Research methods for business students, 3rd, Pearson Education, England

Scheessele, Randall M. "2011 HMDA Highlights." *Housing Finance Working Paper Series*, HF-009. July 2011. (See U. S. Department of Housing and Urban Development).

Shiller, R.J. (2013). Understanding recent trends in house prices and home ownership. *Paper presented at the symposium on "Housing, Housing Finance and Monetary Policy*" organized by the Federal Reserve Bank of Kansas City in Jackson Hole, Wyoming.

Shin, H. S. (2009). Reflections on Northern Rock: the bank run that heralded the global financial crisis. *The Journal of Economic Perspectives*, 101-120.82

Shukla, S. (2014). Analysis of banking system performance of select global economies with that of India–during and after the global financial. *Procedia Economics and Finance*, *11*, 383-395.

Simiyu, B. N. (2008). *A survey of techniques of credit risk management in micro-finance institutions in Kenya* (Doctoral dissertation, University of Nairobi).

Sing, L., (2009) Pension-Secured Loans: Facilitating Access to Housing in South Africa, Finmark Trust

Singh, D. (2016). *Banking regulation of UK and US financial markets*. Routledge.

Sinkey, J. F. (1975). A multivariate statistical analysis of the characteristics of problem banks. *The Journal of Finance*, 30(1), 21-36.

Smirlock, M. (1985). Evidence on the (non) relationship between concentration and profitability in banking. *Journal of money, credit and Banking*, *17*(1), 69-83.

Smith, K. A. (2004). Voluntarily reporting performance measures to the public a test of accounting reports from US Cities. *International Public Management Journal*, *7*(1), 19

Sørensen, P. B. (2013). The Swedish housing market: Trends and risks.

Sreejesh, S., Mohapatra, S., & Anusree, M. R. (2014). *Business Research Design: Exploratory, Descriptive and Causal Designs.* In Business Research Methods (pp. 25-103). Springer International Publishing.

Stanga, I., Vlahu, R., & Haan, J. (2018). Mortgage delinquency rates: A cross-country perspective. *CEPR Policy Portal*. 1 (1).

Steinbach, G. 2012. "Making Risk-Based Pricing Work." *Mortgage Banking*.

Structural Change in Banking, M. Klausner & L. White, editors, Irwin Publishers, Illinois.

Sujeewa, K. (2015). Impact of credit risk management on the performance of commercial banks in Sri Lanka. *International Journal of Scientific Research and Innovative Technology*, *2*(7), 24-29.

Tafri, F. H., Hamid, Z., Meera, A. K. M., & Omar, M. A. (2009). The impact of financial risks on profitability of Malaysian commercial banks: 1996-2005. *International Journal of Social, Human Science and Engineering*, 3(6), 268-282.

Tanui, J. K., Wanyoike, D. M. & Ngahu, S. (2015). Assessment of credit risk management practices on financial performance among deposit taking SACCOs in Nakuru East Sub County, Kenya. *International Journal in Management and Social Science,* 3(5), 602-610

UN-Habitat, (2010) The State of African Cities: Governance, Inequalities and Urban Land Markets, November 2010

Urban Institute, Development of Mortgage Default Insurance in Kenya Assessment Report, prepared for OPIC, August 2006

Vyas, M., & Singh, S. (2011). *Risk management in banking sector*. BVIMR Management Edge, 4(1).

Wanjira, T. L. (2010). *The relationship between non-performing loans management practices and financial performance of commercial banks in Kenya* (Doctoral dissertation, School of Business, University of Nairobi).

World Bank (2014) Banking Sector Stability, Efficiency, and Outreach in Kenya, Policy Research Working Paper 5442

World Bank (2016) *Housing Finance Survey Policy*, Research Working Paper 7070

Yamai, Y., & Yoshiba, T. (2002). Comparative analyses of expected shortfall and value-at-risk: their validity under market stress. *Monetary and Economic Studies*, 20(3), 181-237.

Yoon, E., & Jang, S. (2005). The effect of financial leverage on profitability and risk of restaurant firms. *The Journal of Hospitality Financial Management*, *13*(1), 35-47.

Zikmund, W. G., Carr, J. C., Griffin, M., & Babin, B. J. (2012). *Business research methods*. Australia.

Zorn, P. M. (2013). "The Impact of Mortgage Qualification Criteria on Households' Housing Decisions: An Empirical Analysis Using Microeconomic Data." *Journal of Housing Economics* 3(1): 51-75.

APPENDIX

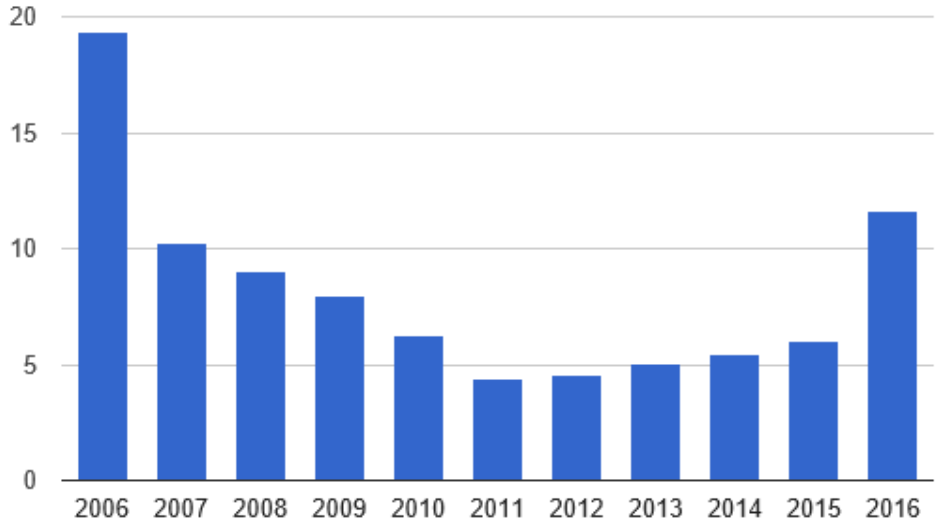
Appendix I: Mortgage Lending Commercial Banks Licensed by the CBK-2018

	Mortgage lending Commercial Banks
1	Kenya Commercial Bank Ltd
2	HFC Ltd
3	Cooperative Bank of Kenya Ltd
4	Standard Chartered Bank ltd
5	CFC Stanbic Ltd
6	Equity Bank Ltd
7	Barclays Bank Ltd
8	Chase Bank
9	Commercial Bank of Africa Ltd
10	Jamii Bora Bank ltd
11	I&M Bank Ltd
12	Family Bank Ltd
13	Consolidated Bank Ltd
14	NIC Bank Ltd
15	Development Bank Ltd
16	Fidelity Bank Ltd
17	National Bank of Kenya Ltd
18	African Banking Corporation Ltd
19	Bank of Africa Ltd

20	Eco-bank Ltd
21	First Community Bank Ltd
22	Gulf African Bank Ltd
23	Bank of Baroda Ltd
24	Diamond Trust Bank of Kenya Ltd
25	Prime Bank Ltd
26	Guardian Bank Ltd
27	Paramount Universal Bank Ltd
28	Giro Commercial Bank Ltd
29	Bank of India
30	Spire Bank Ltd
31	Middle East Bank Ltd
32	M-Oriental Commercial Bank Ltd
33	Victoria Commercial Bank Ltd
34	UBA Bank of Kenya Ltd

Source: Central Bank of Kenya, Banking Supervision Report, December 2018

Appendix I: Kenya residential mortgages non-performing loans



Source: Central Bank of Kenya, Banking Supervision Report, December 2016

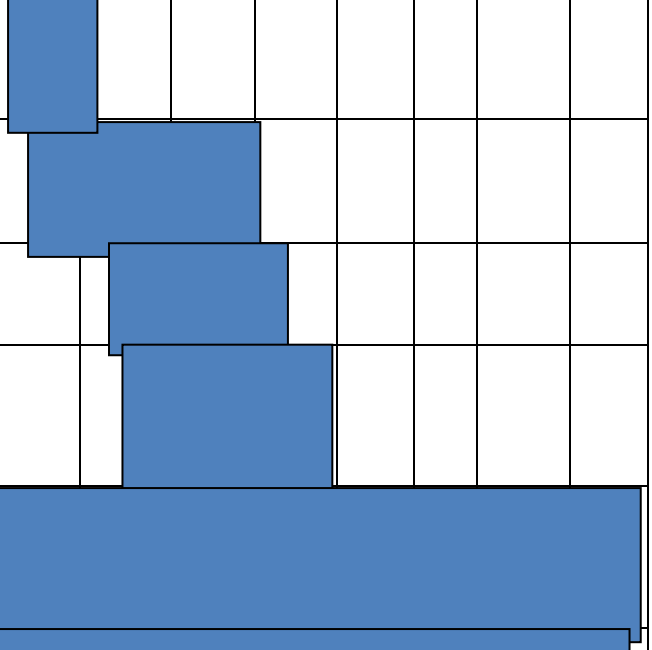
Appendix III: Obstacles to Mortgage Market Development Survey-2016

Mortgage Market Obstacles	*Frequency of Response*
Access to Long Term Funds	21
Low level of incomes/informality	15
Credit Risk (lack of credit histories, documented income, etc.)	11
High interest Rates	10
Difficulties with property registration/titling	7
Cost and time of foreclosing on a property	6
Burden of regulation (provisioning, capital requirements, liquidity rules, etc.)	4
Lack of housing supply—new construction	4
Lack of capacity/skills in banking sector to develop products, carry out loan underwriting	3
Lack of understanding of mortgage product by consumer—lack of financial literacy	2
AIDS/HIV as an inhibitor of long term lending	1

Source: Central Bank of Kenya, Mortgage Survey, 2016

Appendix IV: Gantt chart

		Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct
Task Desription	Hr									
Preliminary	24									
1. Research	816									
2. Data Collection	430									
3. Proposal documentation	600									
4. Consulting with Supervisors	48									
5.Requirement definition	72									
6.Detailed Analysis	144									
7.Documentation	120									
Total:	2254(94days/ 3months and 4 days)									



Source: (Author, 2020)

Appendix V: Budget

The following is the estimated budget encompassing the thesis.

No. of Items	**Items and Description**		**Amount (Kshs) Appendix**
1	Laptop		**50,000**
2.	Unlimited internet		**12,000**
3.	Photocopying		**3,000**
4.	Printing		**10,000**
5.	Miscellaneous		**5,000**
	Total		**80,000**

Source: (Author, 2020)

Appendix VI: Secondary data collection instrument

Secondary data for all the registered banks as at 2018 was collected as follows:

Mortgage lending commercial bank	**Year**	**Non-Preforming Loans** $\frac{Gross\ Non-Performing\ Loa}{Total\ Mortgage\ Advances}$	**Arrear rate** Total loan insta / Gross portfoli	**Loan Loss Rate** Total loa / Total ass	**Debt Service Coverage ration** Net operating / Total debt s	**Bank size** Ln (Total assets)	**Loan Loss provision to Gross Loans ratio** Loan loss provisio / Gross Loans
1	2012						
1	2013						
1	2014 - 2018						
2	2012						
2	2013						
2	2014 - 2018						
3	2012						
3	2013						
3	2014 - 2018						
4---34	2012						
4---34	2013						
4---34	2014 - 2018						

Source: (Author, 2020)

Appendix III: Research Authorization

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke
P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Internal Memo

FROM: Dean, Graduate School DATE: 8th October, 2019

TO: Mr. Ngigi Samuel Mwirikia REF: D58/CTY/PT/32411/2015
C/o Department of Accounting & Finance

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that Graduate School Board, at its meeting on 2nd October, 2019, approved your Research Proposal for the M.Sc. Degree entitled, **"Credit Risk Management and Performance of Mortgage Lending Commercial Banks in Kenya."**

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology & Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you

EDWIN OBUNGU
FOR: DEAN, GRADUATE SCHOOL

CC. Chairman, Department of Accounting & Finance

Supervisors:

1. Dr. Jeremiah Koori
   C/o Department of Accounting & Finance
   Kenyatta University
2. Dr. Lucy Wamugo
   C/o Department of Accounting & Finance
   Kenyatta University

KENYATTA UNIVERSITY
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P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Our Ref: D58/CTY/PT/32411/2015 DATE: 8th October, 2019

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MR. NGIGI SAMUEL MWIRIKIA – REG. NO. D58/CTY/PT/32411/2015

I write to introduce Mr. Ngigi Samuel Mwirikia who is a Postgraduate Student of this University. He is registered for M.Sc. degree programme in the **Department of Accounting & Finance.**

Mr. Mwirikia intends to conduct research for a M.Sc. thesis Proposal entitled, **"Credit Risk Management and Performance of Mortgage Lending Commercial Banks in Kenya."**

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL

Appendix IIIII: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 170826

Date of Issue: 23/October/2019

RESEARCH LICENSE

This is to Certify that Mr. Samuel Neigi of Kenyatta University, has been licensed to conduct research in Nairobi on the topic: CREDIT RISK MANAGEMENT AND PERFORMANCE OF MORTGAGE LENDING COMMERCIAL BANKS IN KENYA for the period ending : 23/October/2020.

License No: NACOSTI/P/19/2304

170826

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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