INFLUENCE OF LENDING INTEREST RATES ON THE RELATIONSHIP BETWEEN MORTGAGE FINANCING AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

BY

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DECLARATION AND APPROVAL

DECLARATION BY STUDENT

This is my original work and it has not been presented in any University for examination.

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DEDICATION

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ABSTRACT

Financial performance of commercial banks has not been stable as evidenced in annual supervision report of 2011 to 2020, the period within which Return on Assets (ROA) rose to 6.2% in 2012 from 3% in 2011, and to lower than 3% in the years 2016 to 2020. Literature reveals commercial banks' lending criteria as pro-cyclical, implying being very strict during real estate boom and flexible during the bust; with likelihood of commercial Banks underestimating the default risk of the loans during periods of high demand, subsequently resulting in credit risk exposure to mortgage product. Literature provides evidence of increased mortgage lending while the performance of the Commercial Banks was declining on a fluctuating trend with non-performing Loans increasing. On the other hand interest rates demonstrate fluctuation in a less volatile order despite that studies revealing limited information on the influence of lending cost on the relationship between mortgage financing and financial performance of commercial banks. The purpose of this study was to analyse the influence of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya. Specifically, the study sought to: establish the effect of mortgage financing on financial performance of commercial banks in Kenya, to analyse the effect of lending interest rates on financial performance of commercial banks in Kenya and to evaluate the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya. The study was guided by Title Theory and Lien Theory of Mortgages, Loanable Funds Theory and Efficiency Theory. Banks in rerun; gain right to title, interest income and better management in respective theories. Secondary balanced panel data obtained from the audited published financial reports of 27 commercial banks offering mortgage financing in Kenya was used and found to be valid and reliable. The study covered 7-year period as from 2015 to 2021, giving 189 data points. Data was analysed using E-views 10 statistical package. The regression analysis revealed that the independent variables explained 86.69% (R^2=0.8669). In the regression analysis, the coefficient of mortgage financing is 0.004434, with a p-value=0.0004 meaning that mortgage financing has a significant positive effect on financial performance of commercial banks in Kenya. The coefficient of lending interest rate was found to be -0.158824 with a p-value= 0.0020 meaning that banks' lending interest rates have a significant negative effect on financial performance of commercial banks in Kenya. The coefficient of the product term for mortgage financing and lending interest rate was found to be -0.057650 with a p-value=0.0066. This means that lending interest rates moderates the relationship between mortgage financing and financial performance of commercial banks in Kenya. This study will be of significance to banking industry, government and academicians. The conclusions of the study are that mortgage financing has a significant positive effect on financial performance; lending interest rates have a negative and significant effect on financial performance; lending interest rates have a moderating effect on the relationship between mortgage financing and financial performance; the effect of capital adequacy on financial performance is non-monotonic. The study recommends that commercial banks in Kenya should increase the amount of mortgage offered and adjust their mortgage lending rates positively whenever they increase the amount of mortgage offered which will in turn enhance their profitability leading to an improvement in financial performance.

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LIST OF ABBREVIATIONS AND ACRONIMMS

ARM   Adjustable-Rate Mortgage

FRM   Fixed Rate Mortgage

CAHF   Centre for Affordable Housing Finance

CBK   Central Bank of Kenya

CBR   Central Bank Rate

FRM   Fixed Rate Mortgage

GDP   Gross Domestic Product

GHLC   Government Housing Loan Corporation

KBA   Kenya Bankers Association

MBS   Mortgage-Backed Securities

MDO   Mortgage Debt outstanding

MPC   Monetary Policy Committee

NIM   Net Interest Margin

NSE   Nairobi Securities Exchange

PWSP   Pension Welfare service Public

RBV   Resource Based View

ROA   Return on Assets

ROE   Return on Equity

SCP   Structure Conduct Performance

MMR   Moderated Multiple Regression

CLRM   Classical Linear Regression Model

CAR   Capital Adequacy Ratio

NPLR   Non-performing Loan Ratio

OPERATIONAL DEFINITION OF TERMS

Average Interest rates - Average Interest Rates are a calculated percentage based on the aggregate interest payments divided by the total loans.

Base Lending Rates - is a minimum interest rate calculated by financial institutions based on a formula which takes into account the institutions cost of funds and other administrative costs.

Capital Adequacy Ratio-Capital Adequacy Ratio (CAR) is the ratio of a bank's capital in relation to its risk weighted assets and current liabilities. It is decided by central banks and bank regulators to prevent commercial banks from taking excess leverage and becoming insolvent in the process.

Commercial Banks- They are financial institutions that accept deposits, offer checking account services, makes various loans, and offer basic financial products like certificates of deposit (CDs) and savings accounts to individuals and small businesses. A commercial bank is where most people do their banking.

Financial Performance - measure the results of a firm's policies and operations in monetary terms. These results are reflected in the firm's return on Equity (ROE), return on assets (RAO), Net Interest Margin (NIM). It also helps us to evaluate how well a bank is using its resources to make a profit.

Lending Rates

Lending rates represent the price of loans extended to borrowers by commercial banks.

Mortgage - It is the transfer of an interest in property to a lender as a security for debt usually a loan of money

Mortgage Financing - refers to a loan secured by collateral of some specified real estate property that the borrower is obliged to pay back with predetermined set of instalments.

Mortgage Rates - A mortgage rate is the rate of interest charged on a mortgage.

Net Interest Margin- is usually expressed as a percentage of what the financial institution earns on loans in a specific time period and other assets minus the interest paid on borrowed funds divided by the average amount of the assets on which it earned income in that time period (the average earning assets)

Non- performing loans - A loan is nonperforming when payments of interest and principal have not been paid for 90 days or more

Panel data- This refers to data containing observations with both a group (cross-section) and time (within-group) identifiers.

Return on Assets- (ROA) refers to a financial ratio that indicates how profitable a company is in relation to its total assets. It is expressed as a percentage by using a company's net income and its average assets. It is given by Profit Before Tax over Net Assets

Return on Equity- is the ratio of Net Income after Taxes divided by Total Equity Capital. It represents the rate of return earned on the funds invested in the bank by its stockholders. ROE reflects how effectively a bank management is using shareholders' funds.

Volume of Mortgage Lending –Means total actual loan given out as mortgage by commercial banks. This was measured by the natural log of the total income.

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INTRODUCTION

This chapter presents the background of the study, statement of the problem, objectives of the study, research questions and hypotheses, significance of the study, scope of the study and the conceptual framework.

1.1 Background of the Study

Financial Performance in broader sense refers to the measure of the results of a firm's outcome of resources' employment and operations in monetary terms (Didin, Jusni and Mochamad, 2018). It is used to measure firm's overall financial health over a given period of time and can also be used to compare similar firms across the same industry or to compare industries or sectors in aggregation. It serves as a medium of engagement between a firm and its trade creditors, Bond holders, Investors and management (Veena and Patti, 2016). CFI (2023), on the other hand, defines Financial Performance as a complete evaluation of a company's overall standing in categories such as assets, liabilities, equity, expenses, revenue, and overall profitability; measured through various business-related models that allow users to determine exact details regarding a company's potential effectiveness

Globally, commercial banks have continued to face big risks emanating from non-performing loans (NPLs) World bank and Central Bank of Kenya (2010). Therefore, it is recommended that commercial banks should devise methods of tracking and evaluating the conduct of different borrowers and thus be in a position to come up with favourable loan portfolio to help commercial banks to realise not only sound financial performance but deliver their mandate to all stakeholders (Khole, 2014). The bottom line is that the main source of revenue in commercial banks is derived from loans advanced out and just like any other enterprise, profit maximisation explains why lending influences how banks perform financially (Khole, 2014).

Financial performance of commercial banks has not been stable. According to CBK Annual Supervision Report (2021), the profitability of banking industry demonstrated unpredictable trends beginning the year 2011. The Return on assets (ROA) was 6% in 2011, Return on equity (ROE) 36% in 2011, in 2012, Return on assets (ROA) was 3%, Return on equity (ROE) 30%, in 2013, Return on assets (ROA) was 5%, Return on equity (ROE) 32%, in 2014, Return on

assets (ROA) was 3%, Return on equity (ROE) 26% in 2015, Return on assets (ROA) was 4%, Return on equity (ROE) 24%, this was followed by a less than 3% on ROA in 2016 up to 2020.

In the recent past, a large number of people have opted to buy or build homes and houses rather than stay on rented ones. This has resulted in an upsurge of mortgage companies that offer financial solutions (Athanasoglous, 2008). Many commercial banks now provide mortgage financing as one of their products to enhance their financial performance, remain competitive and improve their market share. A homebuyer or builder can obtain financing (a loan) either to purchase or secure against the property from a financial institution such as a bank either directly or indirectly through intermediaries (CBK and World Bank 2016).

Mortgage is nothing more than the name given to a particular type of loan; in this case, a real estate loan. Like any other loan, it is really an IOU—that is, a promise to repay a sum of money received today at some future time (McDonald and Thornton, 2008). According to Brueggeman and Fisher (2014) Mortgage refers to the charging of real (or personal) property by a debtor to a creditor as a security for a debt on the condition that it shall be returned on payment of the debt within a certain period. Mortgage is the primary mechanism used in many countries to finance private ownership of residential and commercial property. Lenders provide funds and the property functions as collateral. The bank or mortgage firm loans a large amount of money (typically 80%) of the price of the property, which is paid back with interest over a set period. The most basic arrangements would require a fixed monthly payment over a period of ten to thirty years depending on local conditions (Gerardi *et al.,* 2017).

Mortgage finance plays a significant role in the development of the economy and in enabling people to be homeowners through provision of mortgages. The changing home mortgage market and unique financing requirements brought about by widespread home ownership have caused a continuing evolution in the mortgage lending practice. According to Bienert and Brunauer (2007) mortgage financing refers to a loan secured by collateral of some specified real estate property that the borrower is obliged to pay back with predetermined set of instalments. The loan is usually for the purchase or construction of housing estates by individuals or companies. Mortgage financing normally centres around two specific goals. First the financing seeks to create revenue for the lender and secondly the extension of mortgage allows qualified individuals and business entities to secure properties that can be repaid in

terms that are within the ability of the recipient of the loan to repay off a timely manner (Bienert and Brunauer, 2007).

In most mortgage financing arrangements, the property that is purchased with the financing is used as collateral for the debt. For the duration of the mortgage, the lender functions as the mortgage holder on the property (Asare and Whitehead, 2016). Should the owner of the mortgaged property default on the loan, the lender has the right to secure full ownership of the property and offer it for resale to another party. According to Okwir (2002), Mortgage financing is the process of underwriting and extending a home-loan or mortgages on commercial property to a qualified applicant.

In mortgage financing, there is the transfer of a legal or equitable interest in a specific immovable property for the payment of a debt. The possession of the property may remain with the borrower and with the lender getting the full legal title. The transferor of the interest (borrower) is called the mortgagor while the transferee (bank) is called the mortgagee. The instrument of transfer is called the mortgage deed (Brueggeman and Fisher, 2014)). Features of mortgage loans such as the size of the loan, maturity of the loans, interest rates, method of paying off the loan, and other characteristics can vary considerably.

Mortgage financing is an important line of business for the banking industry, and mortgage-financing activities contribute significantly to the Kenyan economy. Most of the commercial banks rely on revenue from this line of business to grow and prosper (Aguko, 2013). History has shown, however, that imprudent risk taking and inadequate risk management, particularly during periods of rapid economic growth, can lead to significant losses and be a major impediment to the performance of commercial banks with risks of failure very high (Campbell, 2015). One of the major ways in which this line of business influences the performance of commercial banks is through the cyclical nature of mortgage markets where, as markets peak and decline, banks with large concentrations of mortgage loans may suffer considerable losses leading to poor performance (Kibirige, 2016). Wolfgang and Opfer (2003) observed that prevailing interest rates affect the financial performance of firms. They compared the financial performance of financial institutions and five other industries and found that financial institutions have greater sensitivity to changes in long term interest rates.

In Kenya, some of the mortgage lenders have designed mortgage products that would encourage Kenyans to save from the early years of employment with a view of accumulating enough savings that would enable them mobilize the mortgage finance, Housing Finance (2011). The Retirement Benefits Regulations (2019) provides for policies that would entice Kenyans to access mortgage finance. Such policies include the use of accumulated pension funds to act as security for mortgage borrowing. According to Nabutola (2004), by its nature, housing in Kenya represents major investment requiring substantial capital outlay. In the majority of housing projects, the developer, whether as a corporate or an individual has to borrow. The main constraints to affordable housing in the urban areas are: Land, finance, building materials and regulatory framework, (Housing Finance 2019). For someone to qualify for a mortgage finance the following criteria is considered; High eligibility criteria, proof of adequate and dependable income, requirement for provision of marketable satisfactory collateral with proof of ownership, predetermined payment periods and amounts. Moreover, existing mortgage finance institutions require lengthy and complicated loan procedures, which impose demands on the poor who can neither spare their time nor comprehend some of the issues. Literacy levels of the majority, means that they are unable to comprehend and go through these procedures (Nabutola, 2014).

There are many Kenyans who have been occupying properties as tenants for many years, yet there exist financial institutions offering mortgage finance. Such rent paying Kenyans have not been motivated enough to consider mortgage finance and have continuously opted to enrich property owners leaving mortgage lenders with dwindling performance (Nabutola, 2004). Generally, the boom-and-bust nature of the mortgage market plays a critical role in business cycles, fuelling the upswing and magnifying the downswing. Falling mortgage prices tend to put downward pressure on the banking sector, not only because of increases in bad debt expenses for non-performing mortgage loans, but also because of a deterioration in the balance sheets of borrowers who rely on real estate as collateral (Chambers *et* al., 2017).

Price fluctuations of real estate can have a significant effect on the financial performance of commercial banks. A sharp drop in real estate prices may lead to commercial banks facing a financial crisis through several channels. Directly through rising bad debt cost in mortgage loans, worsening of the financial conditions of debtors and the banks, or indirectly through the fall in financial transactions and the economic activities (Ndururi, 2013). In most situations mortgage financing makes up a major part of the loans extended by commercial banks. In some

countries, it can be one third while in others it can be more than half of total bank credit (Mc Donald & Thornton, 2008). Falling real estate prices means a lower return for mortgage loan and therefore loans to real estate sector are expected to default. This reduces the banks' profitability and raises the bad debt expenses of the banks (Aguko, 2003).

In Kenya, it is estimated that 234,000 new housing units are required every year yet only 20,000- 30,000 units per year are currently being produced and a mere 20% of these are affordable to low- and moderate-income families (Ministry of Housing 2011). Government has estimated a housing need of 190,000 dwellings per year in Kenya's urban areas though it was not clear what assumptions underlined this estimate (Ministry of Housing, 2011). Government further estimated that formal production by the public and private sectors is not more than 30,000 units per year and concludes that the annual deficit of more than 120,000 housing units is met by slum housing. In Nairobi, with a population of around 4.4 million people, nearly 60% of households live in slum areas. A recent survey of these settlements showed that 73% of households live below the poverty line (Census Report 2019). Therefore, to enable commercial banks afford to make profits, mortgage financing is critical so that the gap between mortgage lending and financial performance is reduced significantly.

Interest rate is the percentage charge or pay for the use of money (D' Alberto, 2015). It is charged when the money is being borrowed, and paid when it is being loaned. The interest rate that the lender charges are a percentage of total amounts loaned. Similarly, the interest that a bank pays to hold depositor's money is a percentage of the amount deposited (Brueggeman and Fisher, 2014). Banks charge a little higher interest rate than they pay depositors for that same money so that they can make profits for providing such services. Interest rates affect most of the industries with, the real estate and banking being the only directly impacted. When interest rates increase, cost of borrowing increases reducing consumer demand for mortgage loans and other loan products, and hence affecting the financial performance of mortgage firms.

For the banks to balance their main objectives of liquidity, profitability and solvency, lending interest rates must be handled effectively and the banks must behave in a way that there potential customers are attracted and retained (Kadri and Hemingford 2012). Lending interest rates, which may be on short, medium or long-term basis, is one of the services that deposit money banks do render to their customers. In other words, banks do grant loans and advances to individuals, business organizations as well as government in order to enable them embark

on investment and development activities as a means of aiding their growth in particular or contributing toward the economic development of a country in general (Kadri Hemingford 2012).

The level of interest rates spread (IRS) affect's bank's investment portfolio, which is a key indicator of its performance, thus directly influencing the allocation of money and real capital to specific industries and firms (Garriga, 2017). The level of interest rates in the equilibrium determines the supply and demand for loanable funds in the market. High interest rates on savings, households, who are savers, make available a large quantity of funds than at low interest rates. That is, the larger the amount of this payments the larger the deferral of household consumption and thus the greater the amount of funds available to borrowers. This prompts banks to reduce the interest rates charged on borrowers of funds in order to increase their demand thus leading to reduction in the interest rates spread (IRS).

Interest rate is a critical factor that drives the mortgage market and access to more middle-income housing. Commercial banks base the mortgage rates on the volatility of the CBR as their lending rate. CBR affect the mortgage financing since the mortgage rates are pegged towards CBR. The increase in CBR leads to a consistent increase in the mortgage rate which tends to slow down mortgage uptake. High mortgage rate leads to an increase in cost of borrowing, leading to defaults by borrowers and foreclosures. Conversely, high mortgage rates result to increase in profits by mortgage firms. The CBK sets its rate for overnight loans to commercial banks at 8.5%. The commercial banks ought to use the CBK interest rate to set their prime lending rates. This is not the case; the banks are still offering mortgages with interest rates as high as 28% (CBK, 2016).

It is widely believed that fluctuations of market interest rates exert significant influence on the activities of commercial banks. Mortgage-backed securities investors determine mortgage rates offered to consumers; the mortgage production line ends in the form of a mortgage-backed security purchased by an investor. The free market determines the market clearing prices investors will pay for mortgage-backed securities. These prices feedback through the mortgage industry to determine the interest rates offered to consumers (Brueggeman and Fisher, 2014). If banks set interest rates too high, they may induce adverse selection -problems because high risk borrowers are willing to accept these high rates. Excessive high interest rates by commercial banks in Kenya sector have strongly discouraged long-term investment and

constrained Kenya's ability to grow (Ngumo, 2012). Interest rates chargeable on mortgages influence the mortgage quality in that the higher the interest the more expensive the mortgage product becomes, and the more susceptible to defaults due to high repayment costs. Low interest rates on the other hand encourage compliance and prompt repayment thus guaranteeing quality products (Banking Survey 2018).

Financial performance helps us to measure the results of a firm's policies and operations in monetary terms. These results are reflected in the firm's return on investment, return on assets, value added. It also helps us to evaluate how well a bank is using its resources to make a profit. Common examples of financial performance include operating income, earnings before interest and taxes, and net asset value. It is important to note that no one measure of financial performance should be taken on its own (Koivu, 2002). Rather, a thorough assessment of a company's performance should take into account many different measures. Financial performance is a subjective measure of how well a bank can use assets from its primary mode of business and generate revenues. This term is also used as a general measure of a firm's overall financial health over a given period of time, and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation (Almazari, 2011). Profitability of banks is described as income by interest or non-interest and after-tax profits which are computed as an amount of income after the subtraction of provisions and operating costs (Ganbacorta et al,. 2019).

Commercial banks play a crucial role in the economic resource allocation of countries by channelling funds from depositors to investors continuously (Ongore and Kusa, 2013). They offer all important services of providing deposit and loan facilities for personal and corporate customers, making credit and liquidity available in adverse market conditions, and providing access to the nation's payments systems (Handley-Schachler *et al.*, 2007). Commercial banks make most of their money from lending to their customers in various forms. The soundness of the banks to a larger extent depends on their financial performance which indicates the strength and weakness of a particular bank (Makkar and Singh, 2013). Banks represent a significant and influential sector of business worldwide that plays a crucial role in the global economy.

In a study done in the USA by Moench, Vickery and Aragon (2010) they analysed recent trends in households' mortgage decisions, focusing in particular on the choice between fixed rate mortgages (FRM) and adjustable-rate mortgages (ARM). They documented that the market

share of ARMs has declined significantly across all segments of the mortgage market in recent years. Using a simple model, they present evidence that this decline in the ARM share can largely be accounted for by factors that explain mortgage choice in earlier periods in particular, measures of the relative borrowing costs for fixed-rate and adjustable-rate mortgages. Supply-side factors, especially the increasing share of the conforming mortgage market, are also important in accounting for the fall in the ARM share over this period (Moench, Vickery and Aragon, 2010).

Rubio (2008) studied how the proportion of fixed and variable-rate mortgages in an economy can affect the way shocks are propagated. Secondly, she analysed optimal implementable simple monetary policy rules and the welfare implications of this proportion. In another study, World Bank Report (2010) on FRM and ARM, it says that fixed-rate mortgages are most suitable for low to moderate and stable inflation and interest-rate environments. Mortgage financing does not necessarily mean improved financial performance and profitability, as mortgage defaults can result in financial crises and bank failures. (Carranza and Estrada, 2012) conducted a research to identify the determinants of mortgage default in Colombia between 1997 and 2004. They found out that home prices and debt balances are the main determinants of mortgage default. During the late 1990's the Colombian economy, similarly to several other emerging economies, experienced a severe financial crisis and economic slowdown. The effects of such crisis were fuelled by a very high increase in the default rate among mortgage holders, leading to the collapse of several major financial institutions and a major economic crisis that persisted for years.

According to Hellwig (2009), since August 2007, financial markets and financial institutions all over the world have been hit by catastrophic developments that had started earlier in 2007 with problems in the performance of subprime mortgages in the United States. Financial institutions have written off losses worth many billions of dollars, Euros or Swiss francs, and are continuing to do so. Liquidity has virtually disappeared from important markets. Stock markets have plunged. Central banks have provided support on the order of hundreds of billions, intervening not only to support the markets but also to prevent the breakdown of individual institutions. According to Dirnhorfer (2012), Mortgage loans significantly affect banks performance. The author examines whether mortgage-backed securities affected the performance of banks in the USA during the 2007 financial crisis.

Musah, Anokye, and Gakpetor (2018) evaluated the effect of interest rate spread on the profitability of commercial banks in Ghana. Return on Assets (ROA) and Return on Equity (ROE). The study is based on a sample of 24 banks over a ten - year period using a panel data. The results of the study show that there is a positive and statistically significant association between interest rate spread and bank profitability in Ghana. Malik, Shehzad, Khan and Khan (2014) conducted a study to check and examine the market interest rate effect on the bank's profitability in public and private sectors of Pakistan. The results show that the interest rate has more effects on both ROA and ROE in private banks as compared to the public sector banks.

Locally, studies had investigated the effect of types of Mortgages on financial performance of Mortgage Institutions in Kenya indicating that falling asset prices have adversely affected mortgage financing (Ndirangu 2004). A study by Ndururi (2012) evaluated the effects of mortgage on the financial performance of commercial banks in Kenya. This study adopted descriptive research design. The target population of this study was 44 commercial banks in Kenya. The study used primary data and secondary data. The study concluded that mortgage financing is influenced by market and financial factors. The study therefore established that there is positive relationship between commercial bank performance with effects of mortgage financing which are core saving, diversification of portfolio, increased income and economic growth. It was observed that literature on how mortgage financing affects the profitability of commercial banks is mixed.

In a study by Fredrick Odi (2015), the study sought to investigate the effect of real estate finance on the financial performance of listed commercial banks in Kenya. Data for nine listed commercial banks was collected for the period 2009 − 2013 from the annual reports of the respective banks. Panel regression analysis was employed on the collected data. The results showed that real estate finance did not have a significant effect on the financial performance of listed commercial banks. A study by Adongo *et al*., (2012) on the influence of mortgage financing and financial performance of commercial banks in Kenya. The study found that there is strong and positive relationship between mortgage financing and financial performance of the commercial banks. Dondi and Obura (2016) studied the relationship between volume of mortgage lending and financial performance of quoted commercial banks in Nairobi securities exchange in Kenya. The results were that there is a positive relationship between volume of Mortgage lending and financial performance of commercial banks in Kenya,

Macharia (2013) evaluated the effects of global financial crisis on the financial performance of commercial banks offering mortgage finance in Kenya. This study concluded that there is a negative relationship between inflation as a result of global financial crisis and financial performance of commercial banks offering mortgage finance in Kenya. (Wahome, 2010) conducted a study on the effects of mortgage financing on performance of the firms and concluded that mortgage financing is influenced by market and financial factors which includes increase in investment and improve profitability of the firm, improvement of risk management, attraction' of more customers, promotion of innovations, market penetration, diversification of investment and encountering competitions in the market lowering of interest on Treasury bond, Kenya financial laws require bank to have less cash in reserve and high interest from mortgage, creating of wealth and improving savings.

Empirical evidence (Macharia, 2013; Wahome, 2010, among others) on the mortgage financing and financial performance report mixed results. These studies have investigated effects of global financial crisis on the financial performance of commercial banks offering mortgage finance in Kenya. Ndururi, 2012 and Ndirangu, 2004 used descriptive research design and primary data to study loan portfolio management, mortgage financing and financial performance and reported positive significant results, other studies include (Aragon, 2012; Odi, 2015) and Kamara and Basuku, 2017) analysed non-performing loan, home mortgage loans, mortgage backed securities and financial performance and posted positive outcomes. On the contrary, Amahalu et al, 2014, Ankoye and Gakpeter, 2018 evaluated the effect of interest rate spread on the profitability of commercial banks in Ghana. None the less most of these studies have mainly used descriptive research design to evaluate the effect of interest rate spread, bank profitability determinants, loan mortgage management and financial performance. Although other studies have looked at real estate finance on the financial performance of listed commercial banks in Kenya, no studies explored the volume of mortgage financing on financial performance of all the commercial banks offering mortgage loans in Kenya.

Georgievska, Kabashi, Trajkovska, Mitreska and Vaskov (2011) examined determinants of lending rates and interest rate spread in Greece. The results from their study indicated that lending rates were mostly influenced by bank size and share and to a lesser extent by deposit rates and non-performing loans. (Brock and Franken 2003) studied interest rate spread in Chile, the study showed that that the influence of industry concentration, business cycle variables,

and monetary policy variables on interest rate spreads differed markedly depending on whether the spreads were computed from balance sheet data or from disaggregated loan and deposit data.

Ngumo, (2012) examined the effect of interest rates on the financial performance of firms offering mortgages in Kenya. The study adopted a survey research design on a target population of all organizations registered for mortgage lending as of 31st December 2011, which were 33. The study used secondary data sources to collect data from CMA library and Central Bank of Kenya. The data collected were analysed using multiple linear regression analysis. The study established positive relationships in the five-regression analysis between financial performance and the amount of mortgage loans advanced.

Previous studies (Georgievska al., 2011; Kadri and Hemingford 2012among others) on lending interest rates and financial performance have yielded inconclusive findings. Some scholars like Gull & Zamman 2013; and Khan and Satar; 2014 employed panel methodology to evaluate interest rate changes and financial performance and the findings were positive significant results, while others (Ngumo2012) on effect of interest rates on the financial performance of firms offering mortgages in Kenya, this study adopted a survey research design. However, none of these studies evaluated the effect of lending rates on financial performance of commercial banks.

Bienert and Brunaar (2006) conducted a study to determine the mortgage lending value, prospect for development within Europe. The authors examined the methods and concepts use in German and developed a model based on the idea of the mortgage lending value. However, looking at the methods deriving the mortgage lending value (MLV) less progress was achieved by the new regulation, leading to the conclusion that the country seems to have potential for improvement.

A study by Ngugi (2004), on the effects of lending rates on share prices of commercial banks quoted in the Nairobi securities exchange lending interest rate has been widely varying for last 5 years, changes that have been mimicked by the commercial banks' share prices. This observation was further enhanced by the proof of existence of a strong relationship between the lending interest rate and the commercial banks' share prices. The study also found that the

lending interest rate inversely affects commercial banks' share prices where an increase in lending rates causes a decline in the share prices.

Ngure (2014) investigated the effect of interest rates on financial performance of Commercial banks in Kenya, the study found that interest rates have significant positive effect on financial performance of commercial banks in Kenya at 95% confidence level. The relationship between interest rates and financial performance was also found to be linear with increase in interest rates leading to higher profitability. The study also concluded that bank size and interest rate volatility had effect on profitability of commercial banks. The study also found that the model containing interest rates and size of commercial bank can explain 64% of the changes in commercial banks profitability.

Shikumo, Mwangi & Mirie (2016) investigated Determinants of Lending to Small and Medium Enterprises by Commercial Banks in Kenya, a descriptive research design was employed. The study undertook a census of the 43 commercial banks in Kenya, with full data being obtained for 36 institutions. The study used secondary data from the annual published reports of commercial banks in Kenya for a period of 5 years from 2010-2014. The data collected was analysed through the multiple linear regression using the Statistical Package for Social Studies version 20.The study established that bank size and liquidity significantly influences (positively and negatively, respectively) lending to SMEs by commercial banks in Kenya while credit risk and interest rates have no significant influence on lending to SMEs by commercial banks in Kenya.

From the literature reviewed (Bienert and Brunaar 2006; Gerlach and Peng, 2013; and Ngugi, 2014) on mortgage lending value, prospect for development, mortgage financing and financial performance gave both mixed and inconclusive results depending on the context. (Green 2006; Gerlach and Peng (2013); and Ngugi (2014) on effects of interest on mortgage prepayments, interest rates and mortgage credit, were bi-variate studies and they did not employ panel methodology and correlation design. Moreover, none of these studies incorporated lending rates as a moderator, hence, the need to assess the influence of interest rates on the relationship between mortgage financing and financial performance of commercial banks offering mortgage products in Kenya.

1.2 Statement of the Problem

The performance of Commercial banks has demonstrated inconsistent trend for the period 2011 to 2020; varying between high profits while at times reporting losses. Banks rely on lending interest income to support their performance, while controlling for default rate, and managing default risk. The Kenya financial stability report (2021) reveals uneven profitability of Commercial Banks from 2011 to 2020; the period during which return on asset (ROA) rose to 6.2% in 2012 from 3.0% in 2011 and to lower than 3% in the years 2016 to 2020. The return on equity (ROE) however, was high in 2011 at 36% and declined to 31% in 2012 but had a serious decline of 19% in 2017. Commercial Banks' lending for the same period consistently registered increasing credit volumes to the various credit portfolios. Evidence reveals that total credit issued movement was Ksh 1,504.1 billion for 2011, Ksh 1,702.5billion through to Ksh 2,705.5 billion for 2020. Consequently, the movement of lending interest rates as a price of selling the loans' for the period under review reveals fluctuations, based on credit demand and other actors in the money market. Since the lending criteria are not very strict in a "real estate boom" while very strict during the bust, commercial banks are more likely to underestimate the default risk of mortgage loans during a real estate boom arising from high interest rate incomes. Such a situation leads to increase of banks' credit risk exposure to mortgage loan investments. Evidence reveals critical role of lending cost on financial performance of the lending institutions. Interest rates movement therefore have potential of influencing Commercial Banks' performance; which makes commercial banks with high proportion of mortgage loans in their portfolios suffer considerable losses if the interest rates increase beyond credit productivity ratio. Drop of the interest rates on the other hand attract reduction in real estate prices; making the commercial banks that have high proportion of mortgage loans in their portfolios, or loans to other financial institutions to default risk. This in turn affects their financial performance in significant proportions resulting in the country's financial system becoming at risk; with a potential of adverse effect on financial performance of commercial banks. While previous studies provided valuable insight of positive influence of mortgage financing on financial performance of the commercial banks, on a direct relationship, the fact that the relationship plays on a platform of cost interaction, requires the examination of lending interest rates contribution on the relationship.

1.3 Objective of the Study

The main objective of the study was to investigate the influence of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya. The specific objectives of the study were to:

i. Establish the effect of mortgage financing on financial performance of commercial banks in Kenya,

ii. Analyse the effect of lending interest rates on financial performance of commercial banks in Kenya.

iii. Evaluate the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya.

1.4 Research Hypotheses

The objectives were addressed by the following hypotheses:

Ho_1:   Mortgage financing has no significant effect on financial performance of commercial banks in Kenya.

Ho_2:   Lending interest rates do not significantly influence the financial performance of commercial banks in Kenya

Ho_3:   Interest rates do not have moderating effect on the relationship between mortgage financing and financial performance of commercial banks in Kenya.

1.5 Significance of the Study

This study will be of great benefit to banking institutions in Kenya since it will outline risk factors influencing the growth of mortgage loan and the effect of interest rates in the banking sector. The development of the bank depends on several factors of which mortgage financing and interest rate plays a major role in the current banking sector. This study will ascertain the benefits of mortgage financing and the influence of interest rates on the relationship between mortgage financing and banking institutions in Kenya. This will help in developing more innovative strategies of financing mortgages to enhance bank's profitability. The findings of this study will be significant to academicians in terms of contribution to theory on mortgage financing, interest rates and financial performance of commercial banks. It will also be significant to the researchers and scholars as it will form a background reference for future studies and contribute to the existing knowledge of literature. The study will be significant to

the government in developing policy pertaining to mortgage and asset financing and that of interest rates. Due to knowledge gained by most applicants through the study most applicants will comfortably embrace mortgage financing and how interest rates influence financial performance, and this will lead to high returns to most banks and high tax return to the government.

1.6 Scope of the Study

This section covers the scope of the study in terms of subject scope, geographical scope and time scope. In terms of subject scope, the study was limited to the field of finance as a study area. The independent variables, moderating variables and dependent variables were all drawn from the field of finance. In terms of geographical scope, the study was conducted in Kenya. Kenya is a country in Eastern Africa. It is 580,367 square kilometres with a population of 47.6 million people national population census report (2019). In terms of time scope, the research study spanned over a period of 7 years as from 2015 to 2021. This period was characterised as a time of significant developments in the country's banking sector including the capping of the interest rates.

This study looked at the effect of mortgage financing on financial performance of commercial banks in Kenya, effect of interest on financial performance of commercial banks in Kenya and the influence of interest rates on the relationship between mortgage financing and financial performance of commercial bank*s*. Mortgage financing comprised annual data on volume of mortgage lending. Interest rates comprised banks' average lending rates while financial performance was measured by Return on Assets (ROAs) on a yearly basis, the choice of Return on Asset is because ROA is not distorted by high equity multipliers unlike the ROE. The target population of this study comprised of all the 32 commercial banks in Kenya offering mortgage financing as of 2021. The study was a census where all the 32 commercial banks in Kenya surveyed over a period of seven years from 2015 to 2021. The choice of commercial banks is because it is the largest mortgage financier and offer mortgage to a large market share (CBK 2011).

1.7 Conceptual Framework

The study is based on the conceptual framework shown on figure 1.1 below.
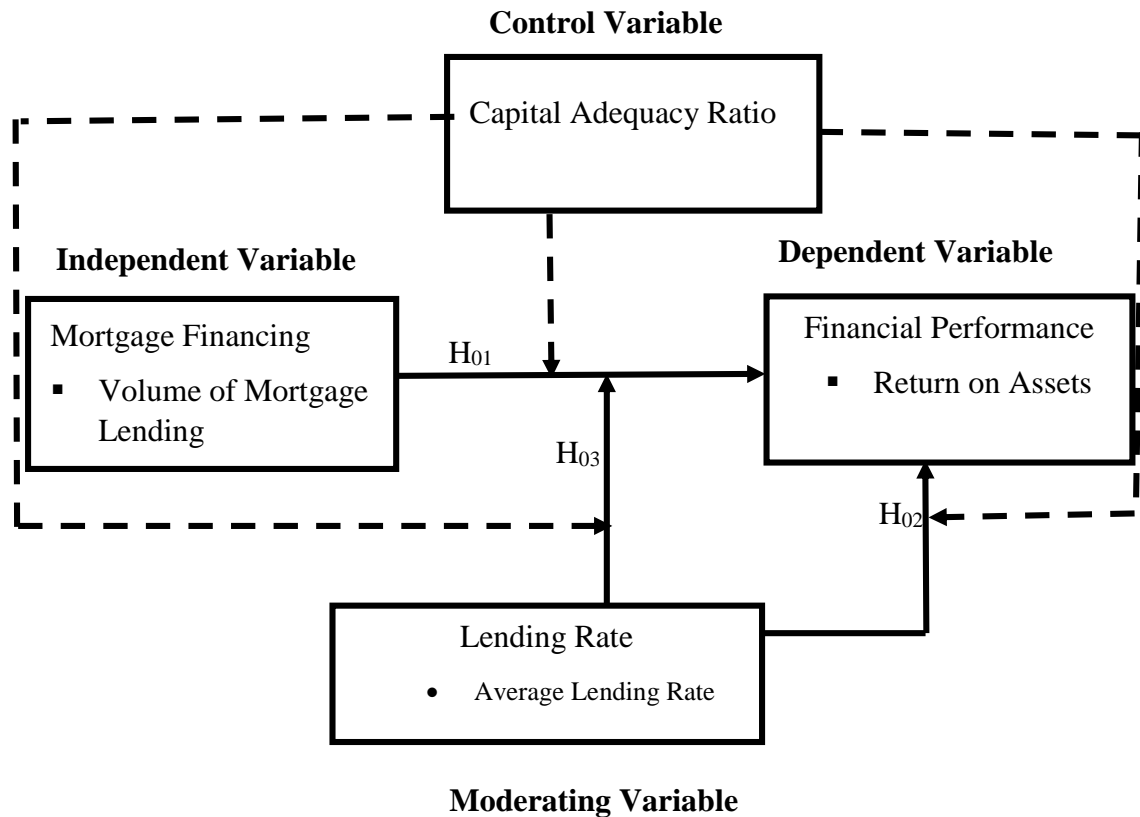
Figure 1.1 Mortgage Financing, Interest Rates and Financial Performance of Commercial Banks Relationship.
Source: Adapted from Dondi and Obura(2016)

Where H_{01}, H_{02} and H_{03} represent test for hypotheses $1 - 3$

The conceptual framework of this study was adapted from Dondi and Obura (2016*)* by modifying it to suit the research purpose. Dondi and Obura (2016*)* looked at volume of mortgage financing as a measure of mortgage lending among quoted commercial banks in Kenya. The modification of Dondi and Obura (2016) in the current model lies in the operationalisation of independent, dependent and moderating variables. In this study lending rate was chosen as a moderator between mortgae financing and financial performance of commercial banks in Kenya. In addition, the current study incorporated capital adequacy ratio as control variable to make it robust.

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This study adopted concepts generated by Title theory and Lien theory of mortgage financing, the influence of interest rates on financial performance and models and conceptualize them in framework explaining the relationship between the independent variables-factors such as Mortgage Financing and the relationship between the moderating variable like Lending Rates. For the purpose of this study, the dependent variable, financial performance of the commercial banks was measured using Return on Assets. Commercial banks play an essential role in mortgage sector as a viable component. In Kenya, they finance mortgages to improve on financial performance. All these were drawn from the independent variables with volume of mortgage lending used in the study to measure mortgage financing. Moderating variable also have a role to play and was measured using lending rates. The choice of commercial banks is because they play a vital role in the economy through economic resource allocation. They act as intermediaries between savers and borrowers, provide investment opportunities for savers and provide savers with experts in financial management (CBK, 2016).

CHAPTER TWO

LITERATURE REVIEW

This chapter presents a critical review of the research work that was done by various scholars in the field of mortgage financing, interest rates and financial performance of commercial banks. The theoretical and empirical review is critically reviewed.

2.1 Theoretical Review

The last three decades have witnessed a revolution in mortgage finance. As recently as 2010, lenders offered relatively few mortgage products. The products that were offered had relatively uniform interest rates and served borrowers meeting stringent credit standards, loan-to-value and debt-to-income ratios. Not so today, as risk-based pricing has changed underwriting standards and origination volumes have soared, diverse mortgage products have flourished in both the traditional prime and growing non-prime markets and a broker-dominated mortgage delivery system has emerged. Mortgage financing in this study will be based on the following theories.

2.1.1 Title Theory and Lien Theory of Mortgages

This theory was stated by Gilbert (1968); the basic concept is that upon making the mortgage, the mortgagor passes title of the property, the subject of the mortgage to the mortgagee, subject to a condition subsequent. This condition subsequent is the payment of the debt. The lien theory means that the mortgage lender will have the mortgage agreement as legal security registered against the property and will not keep the title to the real estate property. Some banks retain and treat the mortgage as a title theory. Since the mortgage is said to hold a title interest, she has the right to possession under this theory. Some banks apply a lien theory. This theory only gives the mortgagee a lien interest in the property. In a title theory bank, the mortgage is treated as having transferred title to the mortgage, subject to the mortgagee's duty to recovery if payment is made. The title is said to remain in the mortgage until the mortgage has been satisfied and foreclosed. Although the mortgagee has the right of possession to the property, there is generally an express agreement giving the right of possession to the mortgagor. The mortgagee is said to hold the title for security purposes only. The mortgagor is given the right of possession (Buckley and Kalarickal, 2014).

In a lien theory bank, the mortgagor retains legal and equitable title to the property, but conveys an interest that the mortgagee can only foreclose upon to satisfy the obligation of the mortgagor. This is equivalent to a future interest in the property which allows the mortgagee to use the process of foreclosure. The interest is a security interest or mortgage, which forms a lien on the property. In this theory the right to possession arises upon a default. The mortgagor has a right to sue the mortgagee for any interference with his right of possession (Buckley and Kalarickal, 2014).

For practical applications there is usually very little difference between a lien theory and a title theory. The principle difference arising in the title theory bank is that the mortgagee is given the right to possession before the foreclosure is complete. The language of the mortgage provides for possession rights being in the mortgagor up to the time of the foreclosure. In these theories, there is evidence that the property that is mortgaged result into additional loan by the bank to the mortgagor. This also results into increase in loan volume and with this increase the interest arising from the loan increases the profitability hence the effect on the performance for the banks.

2.1.2 Loanable Funds Theory

This theory was developed by Swedish economist Knut Wicksell (1996). According to the loanable funds theory of interest, the rate of interest is calculated on the basis of demand and supply of loanable funds present in the capital market.

In economics, the loanable funds market is a hypothetical market that brings savers and borrowers together, also bringing together the money available in commercial banks and lending institutions available for firms and households to finance expenditures, either investments or consumption (Woodford, 2003). Savers supply the loanable funds; for instance, buying bonds will transfer their money to the institution issuing the bond, which can be a firm or government. In return, borrowers demand loanable funds; when an institution sells a bond, it is demanding loanable funds. Another term for financial assets is "loanable funds", funds that are available for borrowing, which consist of household savings and sometimes bank loans. Loanable funds are often used to invest in new capital goods; therefore, the demand and supply

of capital is usually discussed in terms of the demand and supply of loanable funds (Mc Connell & Blue, 2005).

This theory asserts that interest rate is the cost of borrowing or demanding loanable funds and is the amount of money paid for the use of a dollar for a year. The interest rate can also describe the rate of return from supplying or lending loanable funds. The loanable funds form part of the bank deposits, the main source of banks funding and are lowest cost of funds. The more deposits are transformed into loans, the higher the interest margin and profits and the effects on the financial performance on commercial banks.

2.1.3 Efficiency Theory

The efficiency theory originated from Demsetz (1973). The theory postulates that the performance of any bank is defined by the efficiency of the bank. Banks that are efficient tend to incur low costs, which would result in high return on assets (ROA), return on equity (ROE) hence better performance. The efficiency of a bank can also be attributed to better management and investment technologies that have lower costs. With this theory banks can attain favourable levels of production through economies of scale. The size factor is also considered as large banks are in a better position of hiring highly qualified management and investing production techniques that result in lower operational costs hence leading to high returns as compared to smaller banks. This theory therefore provides an understanding on how bank performance is affected by other factors such as interest rates and size of lending.

2.1.4 Mortgage Financing and Lending Interest Rates

For growth of commercial banks, there is need for mortgage financing. Through mortgage financing, homeowners are able to acquire real estate properties at affordable rates. (Garmaise and Moskowitz, 2003) observed that there exists significant correlation between mortgage financing and financial performance. Homeowners acquire nearby properties, avoid brokers since they are informed parties in the sale transactions and also consider their past income trends. Selection on the mode of finance is greatly affected by the information content that homeowners possess.

Technology-based lenders increased their market share of U.S. mortgage lending from 2% to 8% from 2010 to 2016. Using market-wide, loan-level data on U.S. mortgage applications and originations, the data shows that technology-based lenders process mortgage applications about

20% faster than other lenders, even when controlling for detailed loan, borrower, and geographic observables. Faster processing does not come at the cost of higher defaults. In areas with more technology-based lending, borrowers refinance more, especially when it is in their interest to do so (Federal Reserve Bank of New York Staff Reports, 2018).

Interest rate is a critical factor that drives the mortgage market and access to more middle-income housing. Commercial banks base the mortgage rates on the volatility of the CBR as their lending rate. CBR affect the mortgage financing since the mortgage rates are pegged towards CBR. The increase in CBR leads to a consistent increase in the mortgage rate which tends to slow down mortgage uptake. High mortgage rate leads to an increase in cost of borrowing, leading to defaults by borrowers and foreclosures. Conversely, high mortgage rates result to increase in profits by mortgage firms. The CBK sets its rate for overnight loans to commercial banks at 8.5%. The commercial banks ought to use the CBK interest rate to set their prime lending rates. This is not the case; the banks are still offering mortgages with interest rates as high as 13.21% (CBK, 2020).

2.1.5 Financial Performance

Profit is the ultimate goal of commercial banks. All the strategies designed and activities performed thereof are meant to realize this grand objective. However, this does not mean that commercial banks have no other goals. Commercial banks could also have additional social and economic goals. To measure the profitability of commercial banks there are a number of ratios used of which Return on Asset and Return on Equity are the major ones (Murthy and Sree, 2003; Alexandru *et al*., 2008).

2.1.5.1 Return on Assets (ROA)

ROA shows the profits generated by asset values and decides how banks use investment resources throughout the year to generate profits (Sheeba, 2011). ROA shows the level of efficiency of asset management by the bank concerned. It indicates the ability of banks to earn a profit on the assets owned by banks (Frianto, 2012). Thus, it measures the ability of bank management to generate revenue by utilizing the assets of the companies. That is, it shows how efficiently the company's resources are used to generate revenue which further indicates the efficiency of managing a company in generating net income from all institutional resources (Khrawish, 2011). Wen (2010) stated that a higher ROA shows that the company is more efficient in using its resources. According to Horne and Wachowicz (2005) ROA measures

the overall effectiveness in generating profits through the invested capital. According to Ang and Robert (2007) ROA measures the ability of the company to generate profits by utilizing the assets they have.

Naceur and Goaied (2008); Kosmidou and Abbasoglu (2008); Aysan and Gunes (2007) among others, in their study used ROA as the dependent variable. ROA reflects the management's ability to utilise the bank's financial and real investment resources to generate profits (Hassan and Bashir, 2003). For any bank, ROA depends on the bank's management policy decisions as well as on uncontrollable factors relating to the economic environment and government regulations. (Rivard and Thomas 1997) suggest that a bank's ROA is not distorted by high equity multipliers unlike the ROE. Hence, it represents a better measure of the ability of a firm to generate returns on its portfolio of assets. ROE on the other hand, reflects how effectively a bank management is in utilising its shareholders funds. Since ROA tends to be lower for financial intermediaries, most banks heavily utilise financial leverage heavily to increase their ROE to competitive levels (Hassan & Bashir, 2003). Thus, ROE is not a good measure of financial performance.

2.1.5.2 Capital Adequacy Ratio

Capital is one of the bank specific factors that influence the level of bank profitability. Capital is the amount of own fund available to support the bank's business and act as a buffer in case of adverse situation, (Athanasoglou et al., 2005). Banks capital creates liquidity for the bank due to the fact that deposits are most fragile and prone to bank runs. Moreover, greater bank capital reduces the chance of distress (Diamond, 2000). However, it is not without drawbacks that it induces weak demand for liability, the cheapest sources of fund.

Capital adequacy is the level of capital required by the banks to enable them withstand the risks such as credit, market and operational risks they are exposed to in order to absorb the potential loses and protect the bank's debtors. According to Dang (2011), the adequacy of capital is judged on the basis of capital adequacy ratio (CAR). Capital adequacy ratio shows the internal strength of the bank to withstand losses during crisis. Capital adequacy ratio is directly proportional to the resilience of the bank to crisis situations. It has also a direct effect on the profitability of banks by determining its expansion to risky but profitable ventures or areas (Sangmi and Nazir 2010). Researchers argue that commercial banks that have higher levels of

capital post better financial results than their counterparts who have less capital at their disposal (Staikouras and Wood 2003).

2.2 Empirical Literature Review

Empirical literature on the hypothesized relationships is reviewed in this section. According to Coughlan et al., (2013) the purpose of empirical literature review is to summarize and synthesize all previous studies that relate or argue positively with the study's hypotheses. Therefore, empirical literature review presents results of past researches in an objective and discursive manner. It offers a critical evaluation of extensive research relating to each specific objective of the study. (Cronin et al., 2008) say that empirical literature review should offer a concise summary of findings describing current knowledge and offering a rationale for conducting future research. They further show that any gaps in knowledge that have been identified should lead logically to the purpose of the study.

2.2.1 Mortgage Financing and Financial Performance

A study in Nepal which sought to explore the impact of nonperforming loan on profitability of Nepalese commercial banks was conducted by (Kumar and Basuku 2017). The main objective of this study was to investigate the impact of non-performing loan on profitability of Nepalese commercial banks, Pooled data of fourteen commercial banks with 77 observations for the period of 2010 to 2015 had been analysed using regression model. The estimated regression models revealed that NPLR had negative and statistically significant impact on bank profitability (ROA). This study concluded that profitability of commercial banks in Nepal is influenced by the non-performing loan ratio and other covariates like: bank size, cost per loan assets and gross domestic product growth rate.

A similar study by Viswanadham and Nahid (2015) using cross-sectional survey design confirmed that macro-factors such as: economic condition and GDP impact negatively on the level of non-performing loans in Dodoma in Tanzania. There was however some methodological limitation in these studies because they used descriptive design and focused mainly on Non-performing loans. Secondly the studies focused only on one city in the study that is Dodoma in Tanzania.   By focusing only in one city in their respective countries, there is a potential limitation of locking out other banks in the other cities found in those countries from the study.

Musah, Fred and Erasmus (2020) carried out a study in Bangladesh to investigate Bank-specific and Macroeconomic Determinants of Profitability of commercial banks listed on Dhaka Stock Exchange. The study was conducted using panel data set from 18 conventional private commercial banks listed in Dhaka Stock Exchange over a period of 2010 to 2019. Return on Asset (ROA) was used as dependent variable as a proxy for profitability; nine bank-specific variables and three macroeconomic variables were used as independent variables. The study was conducted using panel data regression model and Hausman test was conducted to choose between fixed effect and random effects model. Empirical results show that Non-performing loan ratio, Equity multiplier, cost to income ratio, Net interest margin, Non-interest income to total asset ratio among the bank-specific variables and Real rate of interest, Economic growth among the macroeconomic variables have significant impact on profitability. An interesting finding was that banks profitability over this period had significant negative relationship with economic growth.

Fang (2014) conducted a study on the relationship between home mortgage loan and real estate market in China and their effect on banks financial performance, the study sought to analyse the correlation between the development of real-estate market and home finance and their effect on banks financial performance. The study further revealed that both real estate financing and mortgage had positive effects on the bank's profitability. Although residents' sustainable income, macroeconomic factors are all the reasons for the development of the China's real estate market. However, the mortgage cannot be ignored which is also an important factor for rising home prices, and at different times, different regions show different characteristics. In the short term, the function of mortgage is more apparent in promoting house prices, while the real estate market in a region or city getting gradually mature, the effect of mortgage on the house prices tends to be less evident, but it remains an important factor that cannot be ignored. Furthermore, subsequent studies have not replicated this study in other developing countries with a view of establishing the extent to which mortgage lending influence the performance of commercial banks in emerging market.

Duraj (2015) investigated the profitability behaviour of bank-specific, industry related and macroeconomic determinants from Albania. The primary objective was to investigate the determinants of the profitability and to present all the debates through the literature review on the profitability of these important financial institutions and the banks. An important element of the macro-prudential analysis was the evidence of the internal and external factors and their

relationship to the profitability of the banking sector and how this relationship is affected by institutional and structural characteristics. On the other hand, internal factors of the banks influencing in the profitability were analysed. The estimated results suggested that the profitability of Albanian banks is influenced not only by factors related to their management decisions which are classified as internal factors, but also to changes in the external macroeconomic environment example; GDP, inflation which resulted as significantly related to profitability of the banks.

Dirnhofer (2012) examined the impact of Mortgage-Backed Securities on the performance of the Top 375 US banks during the financial crisis. The study used a correlation study design and only secondary data was used. Regression analysis was carried out to examine the relationship between the variables and bank performance. Banks which were highly involved in the securitization process of mortgage loans tended to perform very poorly during the financial turmoil. Furthermore, Mortgage-Backed Securities did not only affect bank performance but also had a positive correlation on the number of impaired loans. Mortgage Backed Securities have proven ones more how financial instruments can have a large impact on the entire financial market and their effects when being used inappropriately.

During the turmoil hundreds of banks have made use of this financial tool to increase their leverage and diversify the risk in order to enhance their growth. However, in the end this plan failed as banks began to misuse this tool and third parties were unable to screen and observe relevant information with regard to MBSs. The study concluded that Mortgage Backed Securities had a negative effect on bank performance during the banking turmoil as well as on the number of impaired loans. These findings were strongly related to mortgage and real estate banks and illustrate how Mortgage-Backed Securities and mortgage loans had a strong impact on the performance of banks during the financial turmoil of 2007. Moreover, major emphasis was given to mortgage backed securities. By only looking at mortgage backed securities in the study, therefore, there is a clear limitation that other types of mortgages were ignored in the study and hence its conclusion may not be relied upon to give a fair view on the financial performance.

Amahalu, Obi, Abiahu and Ezechukwu (2017) analysed the relationship between loan management and financial performance of quoted deposit money banks in Nigeria. The objective of this study was to determine the relation between loan management and financial

performance with a focus of deposit money banks, evaluate on the floor of Nigerian stock exchange from 2010 – 2015. This study used secondary data obtained from fact books, annual report and accounts of the listed deposit money banks in Nigeria. The relevant data obtained were subjected to statistical analysis using STATA 13, Pearson co-efficient of correlation and multiple regression analysis were the statistical tools used for this study, the result of this study revealed that there was a positive and statistically significant relationship between loan management and financial performance (ROA, EPS, DPS of quoted deposit money bank in Nigeria).

Ayele (2012) investigated the determinants of private commercial banks profitability in Ethiopia by using panel data of seven private commercial banks from year 2002 to 2011. The study used quantitative research approach and secondary financial data were analysed by using multiple linear regressions models for the three bank profitability measures; Return on Asset (ROA), Return on Equity (ROE), and Net Interest Margin (NIM). Fixed effect regression model was applied to investigate the impact of capital adequacy, asset quality, managerial efficiency, liquidity, bank size, and real GDP growth rate on major bank profitability measures i.e., (ROA), (ROE), and (NIM) separately. Beside this, the study used primary data analysis to solicit managers' perception towards the determinants of private commercial banks profitability.

The empirical results shows that bank specific factors; capital adequacy, managerial efficiency, bank size and macro-economic factors; level of GDP, and regulation have a strong influence on the profitability of private commercial banks in Ethiopia. Thus, management bodies of private commercial bank should strive to strengthen the identified significant factors and government bodies should also see the adverse effect of tight polices imposed on the existing private banks as well as for the new entrant. However, even though the study reveal that there is a strong influence on the profitability, the findings were limited only to private banks in Ethiopia.

Ogboi and Unafe (2013) conducted a study in Nigeria on credit risk management and capital adequacy. The study objective was to analyse the impact of credit risk management and capital adequacy on the financial performance of commercial banks in Nigeria. The study used a time -series and cross sectional data from 2004-2009 obtained from selected banks annual reports and accounts in Nigeria, This is with a view to providing further empirical evidence on how

credit risk management strategies and capital requirement variables affect banks' profitability in Nigeria.

Panel data model was used to estimate the relationship that exists among loan loss provisions (LLP), loans and advances (LA), non-performing loans (NPL), capital adequacy (CA) and return on asset (ROA). Results showed that sound credit risk management and capital adequacy impacted positively on bank's financial performance with the exception of loans and advances which was found to have a negative impact on banks' profitability in the period under study. A similar study by Kolapo *et al,.* (2012) using panel data regression for the period 2000 to 2010 found that the effect of credit risk on bank's performance measured by the Return on Asset (ROA) of banks is cross-sectionally invariant.

They concluded that the nature and managerial pattern of individual firms do not determine the impact. Also, (Hosna, Manzura and Juanjuan 2009) reemphasized the effect of credit risk management on profitability level of banks. They concluded that higher capital requirement contributes positively to bank's profitability. (Muhammed, Shahid, Munir and Ahad 2012) used descriptive, correlation and regression techniques to study whether credit risk affect banks performance in Nigeria from 2004 to 2008. They also found that credit risk management has a significant impact on profitability of Nigerian banks. However, none of these studies focused on volume of mortgage lending both in the developing countries and developed ones.

Ajang (2018) carried out a study on the effect of loan portfolio management on the profitability of Deposit Taking Microfinance Institutions in Nairobi, Kenya. The study used a descriptive survey design. The population of the study was made up of all the Deposit Taking Microfinance Institutions operating in Nairobi County. A census was used to carry out the study. The study used primary data which was collected using questionnaires. The data collected was then tabulated and analysed using the Statistical Package for the Social Sciences. Multiple regression was used to determine the effect of the independent variables on dependent variable. The results were presented in tables and graphs.

The study found out that loan portfolio planning, client screening and loan portfolio control had significant influence on the profitability of Deposit Taking Microfinance Institutions. The study concluded that loan portfolio management has a significant effect on the profitability of the Deposit Taking Microfinance Institutions in Nairobi County at 55.2%. This study focused

mainly on deposit taking microfinance institutions in Nairobi, while the finding is that loan portfolio control had significant influence on the profitability, the scope is so limited to enable sound results and therefore little is known as to whether, the same findings can be elicited to influence financial performance of commercial banks.

Karanja (2013) carried out a study on the relationship between mortgage financing and profitability of commercial banks in Kenya. The study sought to answer the following specific objectives; to determine how mortgage core savings influences profitability of commercial banks, to establish the relationship between income and profitability of commercial banks, to establish the relationship between economic factors and profitability of commercial banks and to establish how diversification of portfolio influences profitability of commercial banks. The study adopted a descriptive research design for it portrays an accurate profile of situations.

The population of this study comprised of financial managers and credit managers from the mortgage financing institutions in Kenya. The target population of this study was 44 commercial banks in Kenya. The study adopted a census survey of all the banks. The study used primary data and secondary data. The study used a survey questionnaire administered to each member of the sample population. The study administered the questionnaire individually to all respondents of the study. Secondary data was obtained from the individual bank reports and from central bank of Kenya. Quantitative data collected was analysed by the use of descriptive statistics using SPSS and presented through percentages, means, standard deviations and frequencies. The information was displayed by use of bar charts, graphs and pie charts and in prose-form. The inferential analysis which includes regression and correlation was done to establish the relationship between mortgage financing and profitability of commercial banks in Kenya. The study established that there is positive relationship between mortgage financing and profitability of commercial banks in Kenya.

A similar study by Adongo (2012) using cross-sectional data confirmed the results with the finding that only a few banks, 9 out of the 43 do not offer mortgage financing. However, the studies give general view on financial performance with finding on how mortgage lending influence the profitability of commercial banks. According to Ndungu (2010) Kenya's mortgage market is growing and the mortgage industry is dominated by the larger commercial banks indicating barriers to entry or high risk for medium and smaller banks. He further stated that the growth rates of small sized banks have been the fastest, with a growth rate of 38% on

average, followed by medium banks which are growing at 25% on average with large banks closely following at 24% on average (Ndungu, 2010). Ndirangu (2014), focused on the effect of adopting different types of mortgages on financial performance of mortgage institutions in Kenya his study revealed that adopting different types of mortgage positively affect the financial performance of mortgage institutions in Kenya (Ndirangu 2014) further found that the growth rates of banks ranged between 40-50% in 1990 to 70% in 2004. This was linked to mortgage firm's ability to match services to the need of the customers which generated adequate risk-adjusted returns, besides being influenced by the overall growth in the mortgage finance market (Ndirangu, 2004).

Odongo and Memba (2015) analysed factors influencing performance of mortgage financing among Commercial Banks in Kisii Town, Kenya. The objective of the study was to assess the factors influencing mortgage financing by commercial banks in Kenya. This study used descriptive research design which helped in obtaining information concerning the current status of the factors influencing commercial banks mortgage lending. Data was obtained through self-administered questionnaires with closed and open ended questions. Data analysis which includes regression and correlations was done to establish factors influencing mortgage financing by commercial banks in Kenya and found out that commercial banks can be able to identify various risks they face in lending to the borrowers.

Ndururu (2012) evaluated the effects of mortgage on the financial performance of commercial banks in Kenya. The study sought to answer the following specific objectives; to determine effects of mortgage saving on financial performance in commercial banks, to establish effects of mortgage diversification on financial performance of commercial banks. This study adopted descriptive research design for it portrays an accurate profile of situations. The target population of this study was 44 commercial banks in Kenya.

The study used primary data and secondary data. The inferential analysis which included regression and correlations was done to establish effects of mortgage financing on financial performance in commercial banks in Kenya. The study concluded that commercial banks in Kenya emphasises on mortgage financing to improve bank performance. The study concluded that mortgage financing is influenced by market and financial factors which includes increased investment and Improve Profitability of the firm, improvement of risk management, attraction of more customers, promotion of innovations, Market Penetration, diversification of

investment and encountering competitions in the market lowering of interest on Treasury bond, Kenya financial laws require bank to have less cash in reserve and High interest from Mortgage, creating of wealth and Improving savings.

The study therefore established that there is positive relationship between commercial bank performance with effects of mortgage financing which are core saving, diversification of portfolio, increase income and economic growth. Murugu (2013) carried out a study on perceived quality of service in the mortgage sector. In his study it was found that Commercial Banks in Kenya offered quality mortgage products as perceived by the customer. (Mutero 2007) did a study on access to housing finance in Africa, exploring the issues, he found that that Kenya has a well-developed and regulated financial system and, in recent years, the mortgage finance sector has become competitive and innovative, this sector serves only those households at the top of the income pyramid. (Mutero 2007) recommended that there was need to assess the effects of mortgage financing on financial performance of commercial banks in Kenya. (Nkirote, 2014) did a study on environmental challenges and the strategic responses in the mortgage industry in Kenya, his study found that that there was stiff competition in the industry, the study also found that mortgage firms were responsive to environmental challenges by having produced tailored products to suit their clients.

Prior studies (Kumar and Basuku, 2017; Viswanadham and Nahid, 2015; Aslam, 2020 among others) have mainly focused on non-performing loans, bank specific factors, macro-economic factors and loan mortgage management on profitability. (Bekalu and Abel, 2017) on determinants of Profitability in Ethiopian Private Commercial Banks: Evidence from Selected Banks of Ethiopia. Whereas most studies notably Ajang, 2018; Karanja, 2013 and Ndururu, 2012 used descriptive research design and primary data to explore loan portfolio management, mortgage financing, mortgage savings, mortgage diversification and either profitability or financial performance and reported positive significant results, others (Fang, 2014; Duraj, 2015, Dirnhofer, 2012 and Kamara and Basuku, 2017) analysed non-performing loan, home mortgage loans, bank specific factors, mortgage backed securities and financial performance and posted positive significant findings. On the contrary, Viswanadham and Nahid (2015) investigated macro-economic factors and non-performing loans of commercial banks and found significant negative results whereas other studies (Amahalu et al, 2014, Dondi and Obura, 2016 and Ayele, 2012) analysed listed commercial banks' profitability determinants and loan mortgage management using panel methodology.

From the foregoing studies, majority of the studies have mainly used descriptive research design to explore non-performing loans, bank profitability determinants, loan mortgage management and financial performance. Whereas other studies have analysed listed commercial banks' profitability determinants, loan mortgage management and volume of mortgage lending using panel data, no studies exploring the volume of mortgage financing on financial performance of all the commercial banks offering mortgage loans in developing market.

2.2.2 Lending Interest Rates and Financial Performance

Hammed (2018) evaluated the impact of interest rate fluctuations on the profitability of banks. Thus, annual data of seven years from 2007 to 2014 was taken for 20 banks operating in Pakistan. The sample banks were taken on the basis of highest market share and return. To make substantially noteworthy results study used Correlation and Regression analysis in order to evaluate the impact of interest rate changes, deposits with other banks, advances and loans and investment over the profitability indicators; return on assets (ROA), return on equity (ROE) and earnings per share (EPS). The result showed that deposits with other banks and interest rate are negatively affecting the profitability of banks, while advances and loans and investment were having positive influence over profitability of banks.

Khan and Sattar (2014) analysed the impact of interest rates changes on the profitability of commercial banks being operated in Pakistan by examining the financial statements of four major banks during 2008 to 2012. As a result, variations in the interest rate depress the savings and investment and on the other hand it increases the efficiency of banks' lending. In the study interest rate was an independent variable and bank profitability was a dependent variable. To examine the impact of interest rate changes on the profitability of commercial banks in Pakistan, Pearson correlation method was used in the study. As a result, it was found that there was strong and positive correlation between interest rate and commercial banks profitability. It means if the value of interest rate increases/decreases then as result value of banks profitability will also increases/decreases.

Gull and Zaman (2013) evaluated the impact of interest rate fluctuations and financial outcomes of banking sector of Pakistan. A sample of 20 banks listed at Karachi Stock Exchange KSE - 100 was taken into consideration on the basis of high return and market share for the

period of 2007-2012. The determinants for measuring the financial performance were return on assets, return on equity, earnings per share as dependent variables and independent variables include Interest rate, loans or advances, investment and deposits with other banks. Descriptive, correlation and regression analysis were used as statistical techniques. The results showed the value for R-square model for ROA is 0.43 that shows that 43% variations in ROA is explained by independent variables. The value of R-square for ROE is 0.30 that shows that 30% variations in ROE is explained by independent variables. The value of R-square for EPS is 0.717 that shows that 71% variations in EPS is explained by independent variables. From the Outcomes of analysis, it is concluded that interest rate and other variables show significant influence on financial performance of commercial banks operating in Pakistan.

Chirwa and Malachila *(2004)* used panel data techniques to investigate the causes of interest rate spreads in the commercial banking system of Malawi over the liberalized period of the 1990s. Their results showed that high interest rate spreads were attributable to monopoly power, high reserve requirements, high central bank discount rate and high inflation. (Demirguc-Kunt *et a.l,* 2010) using bank level data for 80 industrial and developing countries over the period 1988-1995 showed that differences in interest margins reflect a variety of determinants such as bank characteristics, macroeconomic conditions, explicit and implicit bank taxes and the overall financial structure. (Aburime 2008) used a sample of 154 banks with 1255 individual observation on unbalanced panel data over the period 1980-2006 to investigate the macroeconomic determinants of bank profitability in Nigeria. The result revealed that real interest rate, inflation, monetary policy and foreign exchange regime are positively associated with banks' return on assets. Despite conflicting results given from these studies, the studies give a general views on the effects of interest rates in general as opposed to lending interest rates, further more these are emerging countries after the developed countries and therefore the financial performance in these banks may not be of good comparison with developing countries such as Kenya.

Ogunbiyi & Ihejirika (2014) investigated the effect of interest rates on profitability of deposits money banks in Nigeria. The study covered all the data of thirteen years at the country level and used multivariate regression analysis. The dependent variables for measuring the Banks performance were return on assets (ROA), return on equity (ROE) and net interest margin (NIM). The independent variables were Real interest rate, T-bill rate, Minimum discount rate, interbank rate, Savings deposit rate and Inflation. According to the estimated results,

profitability of Nigerian deposits money banks were influenced significantly and negatively by Real interest rate and Savings deposit rate as measured by return on assets and return on equity. In contrast, it was found that there seems to be no prominent relationship between interest rate variables and Net interest margin.

According to the results of this study, the profitability of the banking depends on the changing interest rates. In another study by Musah *et al.,* (2018) on the effect of interest rate spread on the profitability of commercial banks in Ghana, the study measured interest rate spread using net interest income (IntSp) and net interest margin (NIM) and bank profitability using Return on Assets (ROA) and Return on Equity (ROE). The study was based on a sample of 24 banks over a ten - year period using a panel data. The results of the study showed that there is a positive and statistically significant association between interest rate spread and bank profitability in Ghana. This result confirms the reason for the high interest rate in African countries despite all liberalization reforms in the sector to increase competition and efficiency to reduce interest rates on borrowing in the continent.

In Kenya, commercial banks as per the study, inflation rate had a negative and significant effect on bank profitability. (Lardic & Mignon 2013) studied the relationship between interest rate and inflation rate in G-7 countries using Engel-Granger co-integration method. According to their study, there is a long run relationship between interest rate and inflation rate. (Kipngetich, 2011) examined the effect on interest rates on the performance of commercial banks in Kenya. The study used published incomes statement of commercial banks between 2006 and 2010 to model the relationship between interest rates and financial performance. The study concluded that in the short term, interest rates did not have a significant effect on profitability of commercial banks.

The study recommended the application of diversification strategies to enhance performance of commercial banks. (Okech, 2013) undertook a study on the effect of lending rates on the performance of commercial banks in Kenya. The study considered management efficiency and operating cost efficiency, in regard to lending interest rate. The study found that a weak positive relationship between lending rates and performance of commercial banks. Since interest rates accounted for only 14.4% of the revenue in commercial banks, the study recommended income source diversification for better performance.

Kavwele, Arieba & Evusa, J., (2018) conducted a study on the effect of interest rate capping on the financial performance of commercial banks in Kenya. Interest capping law became operational on September 14, 2016 (CBK, 2018). It was implemented following concerns raised by the public regarding the high cost of credit in Kenya, which was viewed as a hindrance to credit access by a large segment of the population. Implementation of the law, was therefore, expected to lower the cost of credit and increase access to credit. To unravel the evidence, the bank first reviewed the literature on the outcomes of interest rate controls. International experience showed that in most cases, caps had produced undesirable outcomes, such as reduced intermediation and transparency, reduced bank competition and increased risk to financial stability.

Using bank level data covering the period before and after the interest rate capping law, coupled with selected macroeconomic indicators, CBK's analysis showed that interest rate caps had started to yield negative effects which included the following: First and foremost, the capping of interest rates had infringed on the independence of the central bank and complicated the conduct of monetary policy. It was found that under the interest rate capping environment, monetary policy produces perverse outcomes.

Secondly, there was evidence of reduced financial intermediation by commercial banks, as exemplified by the significant increase in the average loan size arising from declining loans accounts, mainly driven by the large banks, thus shunning the smaller borrowers. Thirdly, banks had shifted lending to Government and the large corporate. Whereas demand for credit immediately increased following the capping of lending rates, credit to the private sector has continued to decline.

Fourthly, while the structure of revenue of the banks had started to shift away from interest income, some banks had exploited the existing approval limits to increase fees on loans in a bid to offset loss in interest income. Fifth, although the banking sector remained resilient, small banks had experienced significant decline in profitability in recent months, which might complicate their viability. Sixth, rationing out Micro, Small and Medium Enterprises (MSMEs) from the credit market by the commercial banks was estimated to have lowered growth in 2017 by 0.4 percentage points. However on the other side, banks had started adjusting their business models towards enhancing efficiency. The Bank noted that these outcomes which had emerged

in the last one year might present a partial picture, as a much clearer picture is envisaged to emerge in the medium to long term.

Kihara (2017) investigated the effect of interest rates on the financial performance of commercial banks in Kenya. They used an explanatory research design. This study used a census research design; of all the 43 commercial banks in Kenya. The study also used secondary data. Multiple linear regression model was used to analyse the data using statistical package for the social sciences (SPSS) version 20. The study concluded that lending rate ratio influence the financial performance of commercial banks in a positive way. Deposit interest ratio on the other hand negatively affects performance of commercial banks. Liquidity management and liquidity management influence performance positively and negatively respectively. The study concluded that there is a positive significant relationship between lending rate ratio and financial performance of commercial banks.

Previous studies Hammed *et al*., 2018; Ogunbiyi & Ihejirika 2014; Kavele et al., 2018; Khhara 2017 among others majorly concentrated on interest rate fluctuations, interest rate profitability and interest rate capping on banks profitability. Some scholars like Gull & Zamman 2013; and Khan and Satar; 2014 employed panel methodology to evaluate interest rate changes and either profitability or financial performance and the findings were positive significant results, while others (Hammed et al., 2018; Ogunbiyi & Ihejirika 2014; Thini 2018) used panel approach to analyse interest capping, interest rate fluctuations and profitability posted negative significant findings.

From the aforementioned scholars, it is evident that the findings were mixed. That is some studies posted negative results while others yielded positive outcomes. Moreover, these studies majorly investigated interest rate fluctuations, interest rate profitability and interest rate capping on banks profitability using correlation research design and panel methodology. However, none of these studies evaluated the effect of lending rates on financial performance of commercial banks.

2.2.3 Mortgage Financing, Lending Interest Rates and Financial Performance

Green (2006) in their study of effects of interest on mortgage prepayments found out that market interest rate is a significant determinant of prepayment probabilities. They found out that where the due-on –sale clause was applicable (meaning that the lender could claim the face

value of the mortgage if the borrower sells the residence). If interest rates are lower than the contracted rate of the mortgage at the time of the sale, the option of the lender will not be enforced. However, if the prevailing rate is higher than the contracted rate, the homeowner is forced to give up a below-market loan should he sell the house. This sacrifice or "lock-in" presumably affects the likelihood of selling and therefore the effective expected maturity of the mortgage asset and its value. Their information indicated that a ten percent lock-in reduces prepayment probabilities 35 percent. If the clause cannot be enforced, the reduction in probability becomes 63 percent. Both of these effects would be eliminated if mortgages had floating interest rates. Their analysis indicates that the rules regarding due-on-sale clauses significantly affect the value of mortgage portfolios, possibly enough in some circumstances to wipe out the net worth of savings and loan institutions. They also found that the average age to prepayment is highly dependent on interest rates.

Gerlach & Peng (2013) carried out an assessment to determine the long- and short-term relationship between interest rates and mortgage credit of the Hong Kong housing market. The property prices in Hong Kong underwent extraordinarily large swings, with at least three episodes of price increases of over 20% (measured over four quarters) and two episodes of sharp declines by as much as 50% in the 1990's. They observed that the increase in interest rates was positive and significantly related to growth in long term mortgage loans.

Ahmed & Raja (2018) studied the impact of interest rates on financial performance banks in Pakistan. The annual data of seven years from 2007 to 2014 had been taken for 20 banks operating in Pakistan. The sample banks were taken on the basis of highest market share and return. To make substantially noteworthy results study used Correlation and Regression analysis in order to evaluate the impact of interest rate changes, deposits with other banks, advances and loans and investment over the profitability indicators; return on assets (ROA), return on equity (ROE) and earnings per share (EPS). The result showed that deposits with other banks and interest rate were negatively affecting the profitability of banks, while advances and loans and investment were having positive influence over profitability of banks. The results of the study are consistent with the findings of (Raharjo et al. 2014) who found a strong positive association between net interest margin and profitability of Indonesian banks, furthermore, the analyses of the above studies looked at other factors like deposits with other banks and interest rates on deposits whereas (Gerlach and Peng 2013) results compared effect

of interest on growth of long term mortgage loans and not how lending rates influence profitability of commercial banks.

In Kenya (Ngugi, 2014) brought out that interest rates effect on the amount of credit to the economy is largely minimal. Instead, the overall net credit available in Kenya financial industry is influenced more by other factors such as information asymmetry between the borrowers and the lenders, value of the reserve requirements, debit credit controls on the banking system and perception of risk regarding the solvency of other banks within the banking system.

Abdulrehman & Nyamute (2018) analysed the effect of mortgage financing on financial performance of commercial banks in Kenya. All commercial banks in Kenya were used as target population. Secondary data collected using a data collection sheet from the financial reports of the commercial banks as well as CBK annual reports was used in the study. Both correlation and regression analysis were conducted. The findings revealed a positive significant effect of Amount of Mortgage Offered on financial performance. The study findings also indicated that Interest Charged on Mortgage has a positive and significant effect on financial performance of commercial banks.

Bett (2012) while looking at financial performance of the banking sector in Kenya established a multivariate analysis model for predicting financial failure in the Kenyan banking system by discriminating against various performance ratios. He found out that loan portfolio deteriorates as banks keep on lending to their major big borrowers because they fear that if they fail, the bank will equally follow suit. He found that failed banks were lending at high interest rates to mainly high-risk operators who were unable to pay.

In a study by Aguko (2012) which investigated the factors inf1uencing mortgage uptake in Kenya, the objective was to examine the extent to which interest rate inf1uence mortgage financing in Kenya. A descriptive survey was employed in this study. This study targeted 238 staffs in selected department in Housing finance Corporation, Kenya. Stratified random sampling method was conducted to capture the various levels of staffs and management. The study concluded that interest rate setting on mortgage debt; government instruments and fiscal measures are the major policies that govern mortgage financing.

Macharia (2013) evaluated the effects of global financial crisis on the financial performance of commercial banks offering mortgage finance in Kenya. The study also sought to determine the influence of inflation, interest rates, capital flow and foreign exchange rates on the financial performance of commercial banks offering mortgage finance in Kenya. This study was carried out through a descriptive research design. The target population of this study therefore was 330. The sample size of this study was therefore 99 respondents. The study collected primary data which was largely quantitative, using semi-structured questionnaire. In addition, the researcher used both descriptive and inferential statistics to analyse the data. In descriptive statistics, the researcher used frequencies, percentages, mean and standard deviation. In inferential statistics, the researcher used multivariate regression analysis to determine the relationship between variables (dependent and independent). This study established that capital flow as a result of global financial crisis was influencing financial performance of commercial banks offering mortgage finance in Kenya followed by foreign exchange rates, inflation and interest rates. This study recommends that financial institutions should avoid high level of debts. This study also recommends that financial institutions should ensure that their interest rates are well regulated so as to avoid poor financial performance.

Ongore & Kusa (2013) conducted a study on determinants of financial performance of commercial banks in Kenya. The objective was to analyse the moderating effect of ownership structure on bank performance. The study used linear multiple regression model and Generalized Least Square on panel data to estimate the parameters. The findings showed that bank specific factors significantly affect the performance of commercial banks in Kenya, except for liquidity variable. But the overall effect of macroeconomic variables was inconclusive at 5% significance level. The moderating role of ownership identity on the financial performance of commercial banks was insignificant.

From the literature reviewed Gerlach & Peng, 2013; and Ngugi, 2014) none of the studies assessed the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya, for instance, a study by Green (2006) on effects of interest on mortgage prepayments,Gerlach & Peng (2013) on interest rates and mortgage credit, were bi-variate studies and they did not embrace panel methodology and correlation design. Local studies in Kenya by Bett (2012); Ngugi 2014); and Abdulrehman and Nyamute (2018), brought out that interest rates effect on the amount of credit to the economy which did not incorporate lending rates as a moderator, hence, the need to

assess the influence of interest rates on the relationship between mortgage financing and financial performance of commercial banks offering mortgage products in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter describes the design and methodology that was used in the study. It expounds on the study design, data sources, study area, study population, sample size and sampling techniques, research instruments used, the validity of the instruments, methods of data analysis and presentation of results and the limitation of administration of research tools.

3.1 Research Design

A research design is simply the structural framework of various research methods as well as techniques that are utilised by the researcher. It helps the researcher to pursue his journey into the unknown but with a systematic approach on his side. Research designs began with selection of the topic and a paradigm (Robson 2011). The topic of the research was to analyse the influence of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya. (Robson, 2011) say that a paradigm provides the research with an idea of assumptions about the social world and how a study should be conducted.

It suggests legitimate problems, solutions, and criteria of proof. Paradigms therefore encompass both theories and methods. According to Creswell (2014) a study can follow a qualitative and or a quantitative paradigm. The quantitative paradigm is termed the traditional, positivist, experimental or empiricist paradigm. It is based on the empiricist tradition. In contrast, the qualitative paradigm is termed as the constructivist, naturalistic, interpretative, post positivist, experiential or post-modem perspective (Schiffman and Kanuk, 2009). This study followed the quantitative paradigm as it is in tandem with the main purpose of the study (Creswell, 2014). Utilizing a quantitative paradigm, this study explored the influence of lending interest rates on the relationships between mortgage financing and financial performance of commercial banks in Kenya. (Creswell, 2014) summarizes assumptions relating to ontology, epistemology, axiology, rhetoric and methodology that guide a quantitative paradigm.

Each assumption is described in turn. Ontologically, reality is objective and singular apart from the researcher. Epistemologically, the researcher is independent from that which is being researched. The axiological assumption is that research is value-free and unbiased.

Rhetorically, the language of the research is formal, based on set definitions, employs impersonal voice, and uses acceptable quantitative words. Methodologically, the research followed the deductive process (Creswell, 2014). A descriptive research design was used in this research. This involved collection of quantitative information that could be tabulated along a continuum in numerical form.

This study adopted a correlation research design for they portray an accurate profile of situations (Polit and Beck 2003). A correlation research design is a design that is used when a researcher wants to describe the relationship of two or more variables. To address the first, second and third objectives, correlation design was used since it involves the determination of the causal effect between mortgage financing and bank's performance.

3.2 Study Area

The study was conducted in Kenya. Kenya, with Nairobi as the capital city.

3.3 Target Population

For the purposes of this study, secondary data was used. It targeted all the commercial banks in Kenya offering mortgage financing. According to the Central Bank of Kenya (2021) report, there are 39 established Banks in Kenya, 32 offering mortgage financing out of which 27 had mortgage financing data for all the study period. The study used a census technique where all the 27 commercial banks were surveyed. However, included in the 27 banks were four banks which were acquired during the study period but retained their identity; they include; Spire Bank acquired in 215, Kingdom Bank acquired in 2019, SBM acquired in 2016 and National Bank in 2019. It was also noted that NCBA was left out because it was created out of a merger between NIC Bank and CBA Bank in 2019 and therefore it's inclusion could not fit in well in a balanced panel data and at the same time, its inclusion could raise outlier problem. The secondary data were sourced from the annual reports obtained from the Central bank of Kenya. Annual data was collected for seven years as from 2015 to 2021. The data was collected using data collection sheet attached in appendix VI

3.4 Data Collection

The study used secondary balanced panel data. The data was quantitative in nature and sourced from the Central Bank of Kenya annual supervision reports. This was done through the data collection sheets from commercial banks as attached in Appendix V. The panel data set covered

a period of 7 years as from 2015 to 2021 giving 189 data points. This period is characterised as a time of significant developments in the country's banking sector (CBK, 2016a). Also, and over the same period of time, the capping of the interest rates had been affected, and the country's GDP had stagnated in growth.

3.4 Validity and Reliability of Data

The annual financial statements and supervision reports relied upon are always prepared in line with the generally accepted accounting standards and principles, the International Financial Reporting Standards (IFRSs) and International Accounting Standards (IASs). This is in addition to their compliance with the relevant provisions of the country's Banking laws and other prudential guidelines issued by the regulatory authority, the Central Bank of Kenya (CBK). Thus, the data that was obtained from these reports in line with the specific objectives of the study were valid and reliable. In addition, diagnostic tests such as unit root test, test of normality, autocorrelation, multicollinearity, correlation, and heteroscedasticity tests were carried out to ensure that the data conformed to the basic assumptions of classical linear regression model.

3.5 Diagnostic Test Results

The researcher conducted various diagnostic tests. This was to ensure that the assumptions of classical linear regression model (CLRM) were not violated. It was also to assert that the tests were an appropriate model chosen for analysis in the event that classical linear regression model assumption were not compromised. Estimating the regression models when the classical linear regression model (CLRM) assumptions are violated result in inefficient, inconsistent parameters estimates. The results of the diagnostic tests are as presented below. They include results on a unit root tests, model specification test, test of normality of the residual and multicollinearity test. These are then followed by a discussion of the heteroskedasticity test and the correlation test.

3.5.1 Results on the Unit Root Tests

Empirical woks based on time series data assume that the underlying time series is stationery. To establish the stationery conditions of the data series in the study, unit root test using the Levin, Lin, Chu (LLC) test was used to establish whether the variables were stationery or non-

stationery. The purpose of this is to avoid spurious regression results being obtained by using non-stationery series.

Table 3.5.1. shows the results of the unit root tests conducted on the variables using Levin, Lin, Chu (LLC) common root test. From the results, all the variables of the study were found to be stationary at levels, that is probabilities are less than 0.05

Table 3.5.1: Summary of the Levin, Lin, Chu (LLC) Common Root Test Results on the Study Variables

Study Variable	Statistic	Prob.
Financial Performance (ROAS)	9.38165	0.0000*
Mortgage Financing (MLN)	4.86372	0.0000*
Lending Interest Rate (LNRT)	27.0000	0.0000*
Capital Adequacy Ratio (CAR)	6.10058	0.0000*

represent significance at the 0.05 level.

Source: Field Data, 20230

The detailed E-views results are shown below:

3.5.1.1 Unit Root Test on Financial Performance-ROAs

Null Hypothesis: Unit root (common unit root process)
Series: ROAS
Date: 04/29/23   Time: 16:59
Sample: 2015 2021
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 162
Cross-sections included: 27

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-9.38165	0.0000

** Probabilities are computed assuming asympotic normality

Intermediate results on ROAS

Cross	2nd Stage	Variance HAC of		Max	Band-

43

Section	Coefficient	of Reg	Dep.	Lag	Lag	width	Obs
ABSA	-0.66598	2.E-05	6.E-05	0	0	0.0	6
ABC	-0.47065	5.E-07	4.E-06	0	0	1.0	6
BOA	-1.14692	0.0006	0.0003	0	0	5.0	6
BOB	-0.62523	3.E-05	3.E-05	0	0	3.0	6
BOI	-1.23877	1.E-05	2.E-05	0	0	3.0	6
CON	-0.90012	7.E-05	0.0002	0	0	0.0	6
COOP	-1.00151	3.E-05	1.E-05	0	0	5.0	6
DBK	-1.18818	0.0006	0.0003	0	0	5.0	6
DTB	-0.23975	5.E-05	1.E-05	0	0	5.0	6
ECO	-0.86790	0.0006	0.0003	0	0	5.0	6
EQT	-0.72191	0.0002	5.E-05	0	0	5.0	6
FBK	-0.87229	0.0002	0.0003	0	0	3.0	6
FCB	-1.19727	0.0002	9.E-05	0	0	1.0	6
GBL	-0.47000	3.E-05	5.E-06	0	0	5.0	6
GAB	-0.63764	3.E-05	0.0001	0	0	1.0	6
HFC	-0.33468	7.E-05	3.E-05	0	0	3.0	6
I&M	-0.55970	3.E-05	9.E-06	0	0	5.0	6
KCB	-1.00382	6.E-05	2.E-05	0	0	5.0	6
KBL	-1.11209	0.0022	0.0025	0	0	2.0	6
MIB	-0.67529	0.0001	0.0001	0	0	2.0	6
NBK	-0.97474	3.E-05	2.E-05	0	0	5.0	6
PBK	-1.19911	5.E-06	5.E-06	0	0	5.0	6
PBL	-0.46057	2.E-05	3.E-05	0	0	0.0	6
SMB	-0.94573	0.0076	0.0026	0	0	5.0	6
SPIRE	-0.24835	0.0068	0.0024	0	0	5.0	6
SBL	-1.07399	2.E-05	1.E-05	0	0	5.0	6
SCB	-1.19727	8.E-05	2.E-05	0	0	5.0	6

	Coefficient	t-Stat	SE Reg	mu*	sig*		Obs
Pooled	-0.63640	-12.400	1.093	-0.554	0.919		162

3.5.1.2 Unit Root Test on Mortgage Financing-MLN

Null Hypothesis: Unit root (common unit root process)
Series: MLN
Date: 04/29/23   Time: 17:02
Sample: 2015 2021
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 162
Cross-sections included: 27

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-4.86372	0.0000

** Probabilities are computed assuming asympotic normality

Intermediate results on MLN

Cross Section	2nd Stage Coefficient	Variance of Reg	HAC of Dep.	Lag	Max Lag	Band-width	Obs
ABSA	-0.06919	0.0060	0.0011	0	0	5.0	6
ABC	-0.70808	0.0198	0.1191	0	0	0.0	6
BOA	-1.36148	0.1159	0.1429	0	0	1.0	6
BOB	0.05681	0.0111	0.0039	0	0	5.0	6
BOI	-1.15958	0.0706	0.1172	0	0	2.0	6
CON	-1.18525	0.1620	0.5462	0	0	1.0	6
COOP	-0.60847	0.0154	0.0351	0	0	0.0	6
DBK	-0.94761	0.0146	0.0073	0	0	5.0	6
DTB	-0.30354	0.0064	0.0031	0	0	5.0	6
ECO	-0.33700	0.0080	0.0189	0	0	0.0	6
EQT	-0.19290	0.0028	0.0005	0	0	5.0	6
FBK	-0.34802	0.0378	0.0468	0	0	2.0	6
FCB	-0.12076	0.1175	0.0284	0	0	5.0	6
GBL	-0.80048	0.1104	0.1893	0	0	0.0	6
GAB	-1.95573	0.1883	0.5566	0	0	0.0	6
HFC	-0.06261	0.0394	0.0089	0	0	5.0	6
I&M	-0.83911	0.0324	0.0147	0	0	5.0	6
KCB	-0.64860	0.0053	0.0026	0	0	5.0	6
KBL	-0.07243	0.0628	0.0096	0	0	5.0	6
MIB	-0.45790	0.1836	0.1834	0	0	2.0	6
NBK	-0.79774	0.0104	0.0210	0	0	0.0	6
PBK	-0.19248	0.0108	0.0024	0	0	5.0	6
PBL	-0.44991	0.0226	0.0514	0	0	1.0	6
SMB	-0.97277	0.0716	0.1068	0	0	2.0	6
SPIRE	-0.41780	0.3300	0.0992	0	0	5.0	6
SBL	-0.18708	0.0106	0.0090	0	0	2.0	6

	Coefficient	t-Stat	SE Reg	mu*	sig*		Obs
Pooled	-0.39697	-7.837	1.185	-0.554	0.919		162

3.5.1.3 Unit Root Test on Lending Interest Rate-LNRT

Null Hypothesis: Unit root (common unit root process)
Series: LNRT
Date: 04/29/23   Time: 17:04
Sample: 2015 2021
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 162
Cross-sections included: 27

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-27.0000	0.0000

** Probabilities are computed assuming asympotic normality

Intermediate results on LNRT

Cross Section	2nd Stage Coefficient	Variance of Reg	HAC of Dep.	Lag	Max Lag	Band-width	Obs
ABSA	-1.24762	5.E-06	2.E-06	0	0	5.0	6
ABC	-1.14264	3.E-05	4.E-05	0	0	2.0	6
BOA	-1.13247	8.E-06	0.0001	0	0	0.0	6
BOB	-0.82572	2.E-05	3.E-05	0	0	0.0	6
BOI	-0.89839	6.E-06	3.E-05	0	0	0.0	6
CON	-1.10216	4.E-05	8.E-05	0	0	5.0	6
COOP	-0.51663	1.E-06	7.E-06	0	0	2.0	6
DBK	-0.95573	1.E-05	2.E-05	0	0	3.0	6
DTB	-0.90343	0.0001	5.E-05	0	0	5.0	6
ECO	-0.72375	0.0002	0.0003	0	0	1.0	6
EQT	-0.92265	8.E-06	1.E-05	0	0	2.0	6
FBK	-0.63884	9.E-06	7.E-05	0	0	2.0	6
FCB	-0.50941	0.0002	0.0002	0	0	0.0	6
GBL	-0.93833	1.E-05	9.E-05	0	0	1.0	6
GAB	-0.89329	9.E-07	6.E-05	0	0	1.0	6
HFC	-0.99531	4.E-06	3.E-05	0	0	1.0	6
I&M	-1.17845	3.E-06	9.E-05	0	0	1.0	6
KCB	-0.48999	6.E-06	2.E-06	0	0	5.0	6

KBL	-0.69978	0.0002	6.E-05	0	0	5.0	6
MIB	-0.59093	8.E-05	0.0003	0	0	0.0	6
NBK	-0.50813	2.E-05	1.E-05	0	0	5.0	6
PBK	-0.37255	1.E-05	4.E-06	0	0	5.0	6
PBL	-1.19855	1.E-06	1.E-05	0	0	2.0	6
SMB	-1.21575	2.E-06	3.E-05	0	0	2.0	6
SPIRE	-0.88661	0.0001	0.0002	0	0	2.0	6
SBL	-0.88017	9.E-06	2.E-05	0	0	0.0	6
SCB	-1.06293	9.E-06	6.E-06	0	0	5.0	6

	Coefficient	t-Stat	SE Reg	mu*	sig*		Obs
Pooled	-0.91053	-28.853	1.191	-0.554	0.919		162

3.5.1.4 Unit Root Test on Capital Adequacy Ratio-CAR

Null Hypothesis: Unit root (common unit root process)
Series: CAR
Date: 04/29/23   Time: 17:08
Sample: 2015 2021
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 162
Cross-sections included: 27

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-6.10058	0.0000

** Probabilities are computed assuming asympotic normality

Intermediate results on CAR

Cross Section	2nd Stage Coefficient	Variance of Reg	HAC of Dep.	Lag	Max Lag	Band-width	Obs
ABSA	-0.36845	0.0001	5.E-05	0	0	5.0	6
ABC	-0.04936	1.E-05	2.E-06	0	0	5.0	6
BOA	-0.32503	0.0004	0.0001	0	0	5.0	6
BOB	-0.43265	3.E-05	6.E-06	0	0	5.0	6
BOI	-0.33572	0.0002	5.E-05	0	0	5.0	6
CON	-1.19944	9.4529	3.9393	0	0	5.0	6
COOP	-0.95263	0.0022	0.0007	0	0	5.0	6
DBK	-0.62083	0.0005	0.0002	0	0	5.0	6
DTB	-0.52167	0.0001	4.E-05	0	0	5.0	6
ECO	-0.30382	0.0001	0.0003	0	0	1.0	6

EQT	-1.76552	5.E-05	0.0001	0	0	2.0	6
FBK	-0.47560	0.0004	0.0004	0	0	0.0	6
FCB	-0.38157	0.0003	0.0003	0	0	4.0	6
GBL	-0.37275	1.E-05	1.E-05	0	0	5.0	6
GAB	-0.99807	0.0001	5.E-05	0	0	5.0	6
HFC	-0.14110	0.0003	0.0001	0	0	3.0	6
I&M	-1.55286	3.E-05	6.E-05	0	0	1.0	6
KCB	-1.35486	9.E-05	0.0002	0	0	1.0	6
KBL	-0.04110	0.0012	0.0015	0	0	1.0	6
MIB	-1.02794	0.0182	0.0062	0	0	5.0	6
NBK	-0.83184	0.0004	0.0003	0	0	5.0	6
PBK	-0.97301	7.E-05	0.0001	0	0	3.0	6
PBL	-0.59687	0.0002	0.0005	0	0	0.0	6
SMB	-1.20195	0.0043	0.0020	0	0	5.0	6
SPIRE	-0.61493	0.0378	0.0588	0	0	0.0	6
SBL	-0.93406	4.E-05	4.E-05	0	0	3.0	6
SCB	-0.32972	3.E-05	3.E-05	0	0	1.0	6

	Coefficient	t-Stat	SE Reg	mu*	sig*		Obs
Pooled	-0.47576	-8.524	1.249	-0.554	0.919		162

3.5.2 Model Selection using Hausman Test

When panel regression is used in data analysis, it is important to determine whether to run a fixed effects (F.E) model or random effects (R.E) model. Whereas the fixed effects model assumes firm specific intercepts and captures effects of those variables which are specific to each firms and constant over time, the random effects model assumes that there is a single common intercept and it varies from firms to firms in a random manner (Brooks 2008). The difference between the fixed effects and the random effects approaches is the assumption made about the likely correlation between the individual or cross-section specific error component and the regressors.

The fixed effects model allows for heterogeneity among the firms by allowing each firm to have its own intercept value. To make the choice, the Hausman test was conducted with the null hypothesis being that errors are not correlated with the regressors (Hsiao 2002). Where the null hypothesis is supported, the random effect model is adapted, otherwise, the fixed effect model is used. Results for the Hausman tests are presented in table 3.5.2

Table 3.5.2: Summary Results on Hausman Test

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	49.539951	6	0.0000*

* represent significance at the 0.05 level.

Source: Field Data, 2023

Based on the test results as presented in Table 3.5.2 the p- value is less than 0.05, therefore, the null hypothesis was rejected and hence, the fixed effect (F.E) model was used.

3.5.3 Results on the Test for Normality of the Residual

Another important diagnostic test conducted in this study was the normality assumption Brooks (2008) stated that the normality assumption is required in order to conduct single or joint hypothesis tests about the model parameters.

3.5.3: Results on the Test of Normality of the Residual

Figure showing histogram of Standardized Residuals with the following statistics:

Series: Standardized Residuals	
Sample 2015 2021	
Observations 189	
Mean	5.51e-20
Median	0.001952
Maximum	0.069016
Minimum	-0.069491
Std. Dev.	0.025615
Skewness	-0.298866
Kurtosis	3.066233
Jarque-Bera	2.848149
Probability	0.240731
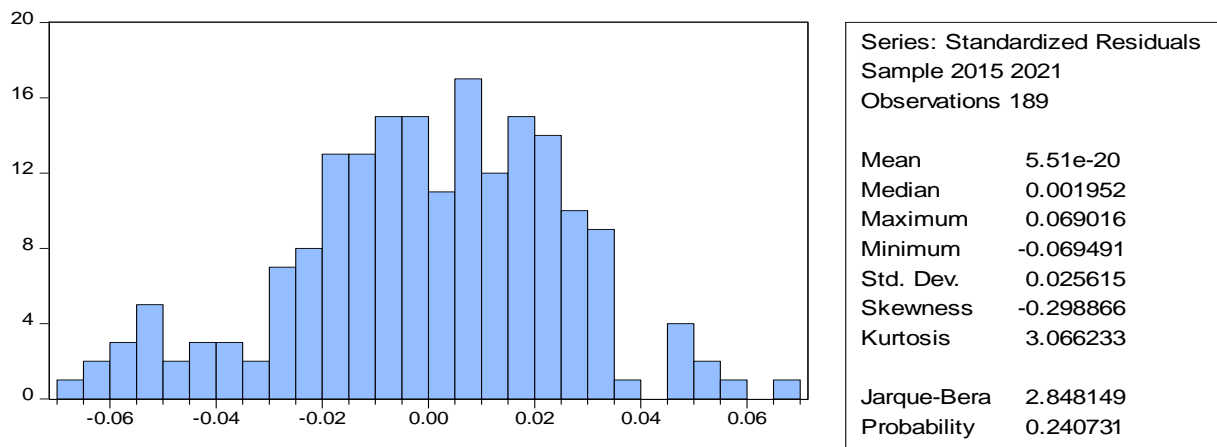
Figure 3.5.3 Result for the Test of Normality

Source: Field Data, 2023

One of the most commonly applied tests for normality is the Jarque-Bera (JB) test. Jarque-Bera formalizes this by testing the residuals for normality and testing whether the coefficient of skewedness and kurtosis are zero and three respectively. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how far the tails of the distribution are. Figure 3.5.3 above revealed that the data is normally distributed and residuals are normally distributed since the histogram is bell-shaped and the Jarque-Bera statistic of 2.848149 has a probability of 0.240831 indicating a mesokurtic distribution. This implies that, the inference made about the coefficient estimates was significant. This means that the p-value given at the bottom of the normality test screen should be higher than 0.05 to not reject the null hypothesis at 5% level of confidence. If the residuals are normally distributed, the histogram was bell-shaped and then the Jarque-Bera statistic is significant. Therefore, the residuals from the regression were normally distributed at 5% level of confidence

3.5.4 Results on Multicollinearity Test

This study assessed the multicollinearity of the independent variables by means of variance inflation factor (VIF). Multicollinearity refers to the presence of correlations between the predictor variables (Hair *et al*., 2006). Multicollinearity is present in the dataset if the VIF of

the variable is larger than 10 or tolerance is below 0.25; otherwise, multicollinearity is not a concern in the model (Gujarati, 2004).

Table 3.5.4: Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.56E-06	2.214812	NA
CAR	5.58E-07	1.945594	1.935464
MLN	6.65E-06	12.16054	9.691289
LNRT	0.006436	8.176531	7.938898

Key: CAR=Capital Adequacy Ratio, MNL=Mortgage Financing, LNRT=Lending Interest Rate

Source: Field Data, 2023

As indicated in Table 3.5.4, the Centred VIF values are lower than 10 with the highest being 9.691289. It can, therefore, be safely concluded that there was no multicollinearity within the data. (Field, 2005, Hair et al. 2006).

3.5.5 Discussion on Heteroscedasticity Test

The other assumption of the model was about heteroscedasticity. Since the data was obtained from cross-section of banks over a period of time, this raises concerns about the existence of heteroscedasticity. Heteroscedasticity occurs when the standard errors of a variable, monitored over a specific amount of time, are non-constant (Gujarati, 2003). The classical linear regression model assumes that the error term is homoscedastic, that is, it has constant variance.

If the error term variance is not constant, then there is heteroscedasticity in the data. To avoid the problem of heteroscedasticity of the disturbance term in the analysis, Generalised Least Square (GLS) method was preferred to Ordinary Least Square (OLS) because its suitable for fitting linear models on data sets that exhibit heteroscedasticity (Alexander Aitken in 1935). The GLS assigns weight to each observation and is capable of producing estimators that are Best, Linear, Unbiased and Efficient (BLUE) (Gujarati, 2003). Therefore, there is no problem of heteroscedasticity in the regression results

3.6 Test for Autocorrelation

The data used involves both cross-section and time-series, this raises the suspicion of the existence of serial correlation. The presence of autocorrelation indicates that the variables in the model violates the assumptions of the classical linear regression model (CLRM) Brooks (2008). Serial correlation occurs when the effect of one independent variable on another independent variable is seen across time intervals affecting the future levels of the other independent variables. According to Gujarat (2008), failure to identify and account for serial correlation in the error terms in a panel model would result into biased standard errors and inefficient parameter estimates

To cater for serial correlation, Durbin-Watsons test was used to verify the residual from a linear regression or multiple regression analysis. According to Chris brooks (2008) if the Durbin Watson result is near to two, it shows that there is no autocorrelation problem. In this case, the analysis of Fixed Effect Regression- Basic Model table shows that DW test result was 1.594 or 1.6, therefore there is no evidence for the existence of serious autocorrelation problem in this study.

3.7 Data Analysis and Presentation

To analyse the data, the researcher used EViews-10 Statistical Package. The choice of EViews-10 Software was because it is simple to use and diagnostic tests are automatically computed, making it possible to test whether the model is economically valid or not (Field, 2018). Descriptive statistics were calculated to determine the characteristics of the data, such as means, standard deviations and frequencies (Field, 2018). A bivariate correlation analysis was performed using Pearson product moment correlation coefficients (Cohen, 1988).

Lastly, a moderated multiple regression was used to test the research hypotheses including the moderated hypothesis. The results were then presented in form of tables and graphs.

3.7.1 Moderated Multiple Regression (MMR)

Moderation analysis is always carried out when a researcher wants to examine whether the nature of a variable's effect on an outcome variable is dependent on a third variable (Hayes, 2012). Moreover, moderation effect is commonly referred to as interaction (Hayes & Rockwood, 2017), for example if X's effect on Y is moderated by Z, then X and Z interact. Importantly, when a moderating effect is continuous, researchers rely on MMR (Aiken et al.,

1991). Moderated multiple regression (MMR) is commonly applied for estimating moderating effects within organisational sciences (Aguinis and Gottfredson, 2010). Thus, MMR involves developing a regression model that predicts the outcome 'Y' based on a predictor 'X; and a second predictor 'Z', hypothesised to be a moderator, and the product term between X and Z, that carries information on the moderating effect of Z on the X-Y relationship (Aguinis et al., 2017). Moreover, the regression coefficient for the product term XZ represents information concerning the moderator effect (Aguinis et al., 2017).

The moderator variable can further be distinguished by whether it exert direct influence on the endogenous variable. There is a pure moderation if the moderator variable only interacts with the exogenous variable x, but itself does not exert any direct influence on the endogenous variable y. Besides, there is a quasi-moderation if the moderator variable additionally exerts a direct influence on the endogenous variable y (Darrow and Kahl 1982; Sharma et al. 1981). This study followed best practising guidelines outlined by (Aguinis and Gottfredson, 2010) for estimating the moderating effects using MMR. It is recommended that researchers develop a rationale for why they assume a moderating effect should exist. Also, they should also consider design features such as appropriate sample size and reliability of variables (Aguinis & Gottfredson, 2010). The sample size of this study was deemed appropriate. The same was the case with data reliability as the study was based on audited financial statements of the commercial banks.

Moreover, the reliability of the data was enhanced as the data was collected based on the (CBK) Regulator's authority. Post-data collection best practices including mean-centring of predictor variables when dealing with interaction terms was required, which was done. This was relevant as mean-centring addresses the issue of multicollinearity (Field, 2018) and thus help achieve the objective of making the interpretation of the first-order coefficients meaningful by the technique of re-scaling (Aguinis & Gottfredson, 2010). Also, Independent of the type of the actual moderation relationship within the interaction model, the interaction term as well as the predictor and the moderator variable have to be integrated. Moreover, the interpretation of the first-order effects was made within the interaction model.

3.7.1.1 Testing the Moderation Effects

The moderating effect can be judged by the significance of the regression coefficient of the interaction term (Aguinis 2004; Baltes Go¨tz 2006). Alternatively, it can be examined with the

F test which involves checking whether the change of the coefficient of determination R^2 from the base model to the interaction model is significantly different from zero. Thus, a hierarchical regression is recommended in such a case. The change of the coefficient of determination R^2 is also a measure for the effect size of the moderator effect (Aguinis 2004; Jaccard et al. 1990).

The R^2-increase indicates how much criterion variance is additionally explained by the product term and, therefore, can be ascribed to the moderator effect (Aguinis 2004). This is identical to the use of the t-test. Moreover, in case of a significant moderator effect it is necessary to do a more detail analysis to examine which kind of moderation is involved. This takes place by using a simple t-test for the regression coefficient of the moderator variable z in the base model. Hence, in case of a quasi-moderation, the regression parameter of the moderator variable in base model is statistically significant; otherwise, it is a pure moderation.

3.7.1.2 Use of covariates and fixed effects

Endogeneity concerns arising from omitted factors make it difficult to draw a causal interpretation. Omitted factors can induce bias. (Larcker and Rusticus ,2010) suggest that fixed effects regressions, along with inclusion of control variables, are alternative empirical approaches to mitigating endogeneity problems. Accordingly, this study used capital adequacy ratio (CAR) as control variable. In line with the best practices in a MMR the CAR was entered in the first step of the regression equation, followed by the predictor variable-mortgage financing, moderator variable-lending interest rate, and product terms in subsequent steps. Further, the results are based on fixed effects, as supported by the Hausman Test, hence, mitigate bias from time invariant omitted factors.

3.7.2 Model Specification

The researcher used the multiple regression analysis both in the basic and the interactive regression models as follows:

3.7.2.1 Basic Model

$$ROA_{it} = \alpha_0 + \beta_1 CAR_{it} + \beta_2 CAR_{it}*CAR_{it} + \beta_3 MLN_{it} + \beta_4 MLN_{it}*MLN_{it} + \beta_5 LNRT_{it} + \mu_{it}$$

Where:

ROA_{it} = Return of asset of bank *i* at time *t*

CAR_{it} = Capital Adequacy Ratio of bank *i* at time *t*

MLN_{it} = Mortgage financing of bank *i* at time *t*

α_0 =   Intercept,

$LRNT_{it}$ =   Lending Interest rate of bank i at time t

μ_{it} =   Error term where i is cross sectional and t time identifier.

3.7.2.3 Interactive Model

$$ROA_{it} = \alpha_0 + \beta_1 CAR_{it} + \beta_2 CAR_{it}*CAR_{it} + \beta_3 MLN_{it} + \beta_4 MLN_{it}*MLN_{it} + \beta_5 LNRT_{it} + \beta_6 MLN_{it}*LNRT_{it} + \mu_{it}$$

Where:

ROAi t=   Return of asset of bank i at time t

CAR_{it} =   Capital Adequacy Ratio of bank i at time t

MLN_{it} =   Mortgage financing of bank i at time t

α_0 =   Intercept

$LRNT_{it}$ =   Lending Interest rate of bank i at time t

$MLN*LNRT_{it}$ = interaction term representing the moderator effect of bank i at time t

μ_{it} =   Error term where i is cross sectional and t time identifier.

Note: The square of mortgage financing variable (MLN*MLN) was included in the model to take care of the second order effects.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

This chapter presents the results on descriptive analysis; trend analysis; correlation analysis and regression analysis. The chapter also presents the discussion of results in line with the study objectives. The first objective of the study was to establish the effect of mortgage financing on financial performance of commercial banks in Kenya. The second objective of the study sought to analyse the effect of lending interest rates on financial performance of commercial banks in Kenya and the third objective was to evaluate the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya.

4.1 Descriptive Statistics

Table 4.1 presents the descriptive statistics relating to the study variables.

Table 4.1: Summary of Statistics of the Study Variables

	ROAS	MLN	LNRT	CAR
Mean	0.009987	4.11E-14	4.27E-16	0.177816
Median	0.014846	0.005886	0.000407	0.147509
Maximum	0.074021	3.559180	0.062593	8.491264
Minimum	-0.302464	-4.639080	-0.031407	-0.504693
Std. Dev.	0.046222	1.768463	0.011805	0.612979
Skewness	-3.649655	-0.032412	1.141766	13.29389
Kurtosis	21.48392	2.685284	9.311741	180.9311
Jarque-Bera	3110.114	0.813078	354.7891	254885.2
Probability	0.000000	0.665951	0.000000	0.000000
Sum	1.887451	7.76E-12	8.05E-14	33.60722
Sum Sq. Dev.	0.401656	587.9630	0.026201	70.63976
Observations	189	189	189	189

Source: Field Data, 2023

Key: ROAs =Financial Performance of Commercial Banks, MLN=Mortgage Financing, LNRT=Lending Interest Rate, CAR=Capital Adequacy Ratio

Table 4.1 presents the descriptive statistics of the study for the 189 observations collected from twenty seven commercial banks in Kenya over the period 2015 to 2021. The statistics are in respect of mean, median, skewness, Kurtosis, Jarque-Bera and their probabilities. The financial performance measures used in this study proxied by ROA indicates that commercial banks attained on average, a positive financial performance over the seven years from 2015 to 2021. The Return on asset (ROA), in this case shows the profits earned per unit of asset, which reflects bank's ability in utilizing the financial and real assets, to generate profits which is measured by Net income divided by total asset. For the total sample, the mean ROA was 0.09% with a minimum of -30% and a maximum of 7%. This means that the financial performance of commercial banks ranges between negative 30% to positive 7%, and averages at 0.09%. On the other hand the standard deviation of ROA was 0.046222 which indicates a minimum variation of profitability among the sampled banks. This compares favourably with what is reported by Tibebe and Gujral (2021), whom in their study examining the determinants of profitability of commercial banks in Ethiopia; where profitability of banks ranged between negative 30% to 5% averaging at 3% and with a standard deviation of 0.01348. These descriptive results compares unfavourably with Bekalu and Abel (2017) who analysed the determinants of Profitability in Ethiopian Private Commercial Banks: Evidence from Selected Banks of Ethiopia, and established that profitability was ranging between 0.5% to 5% averaging to 3% and with the standard deviation of 0.46, which shows the existence of higher variations. However, both the studies did not capture mortgage financing and lending interest rates and how lending rates influence the relationship between mortgage financing and financial performance of commercial banks

On the other hand, mortgage financing measured by the volume of mortgage lending (MLN) had a mean of 4.11E-14 indicating that on average, commercial banks were increasing their mortgage lending with a standard deviation of 1.768463 while the mean for lending rate (LNRT) was 4.27E-16 with a standard deviation of 0.011805. This contradicts the result of Kihara (2017) who reported a mean of 0.15 or 15% with a standard deviation of 1.97989. Further, the mean for capital adequacy ratio (CAR), used as a control variable was found to be 0.177816 with a standard deviation of 0.612979 during the study period. The standard deviation of return on assets, mortgage financing and the lending rate are low implying that the data are more reliable or that the data is closely clustered around the mean.

4.2 Trend Analysis on the Study Variables

These include trend analysis on financial performance, mortgage financing and lending interest rate as follows:

4.2.1 Trend Analysis on Financial Performance commercial Banks
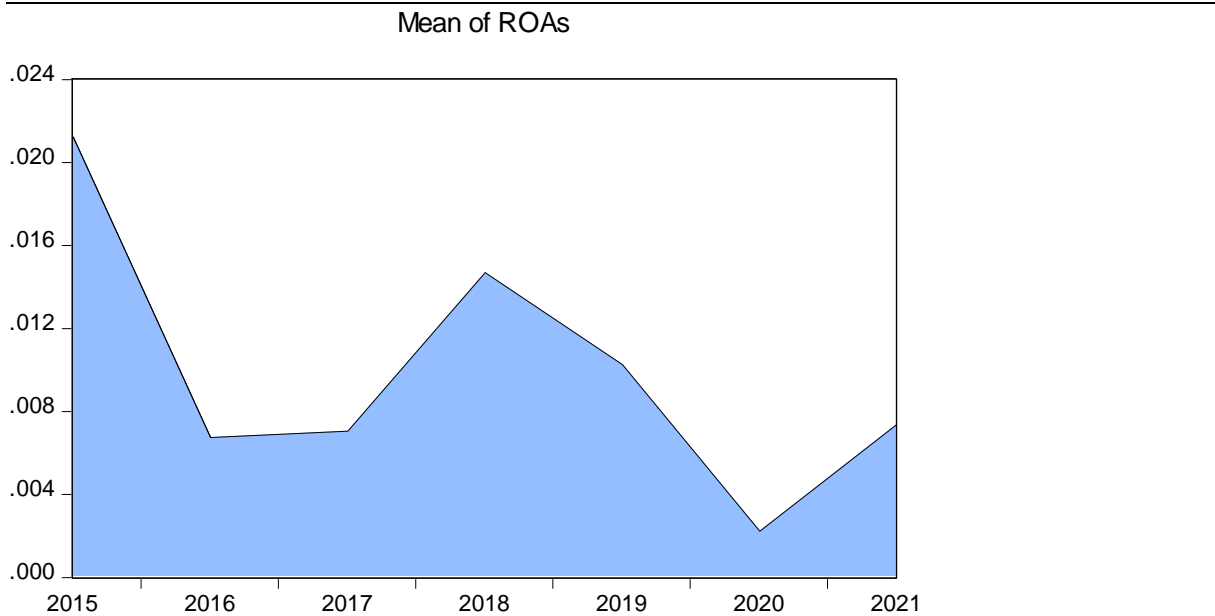
Figure 4.2.1: Trend of Financial Performance- ROAs

Source: Field Data, 2023

Figure 4.2.1 indicates that the mean ROAs for the sampled commercial banks in Kenya had a decreasing trend from 2015 to 2016, stagnated in 2016 and increased gradually from 2017 to 2018 before taking a downward trend again and was minimum in 2020. The minimum returns experienced in 2020 might be attributed much to the negative effects of the covid-19 pandemic that led to the slow growth in lending.

4.2.2 Trend Analysis on Mortgage financing on Financial Performance of Commercial Banks in Kenya
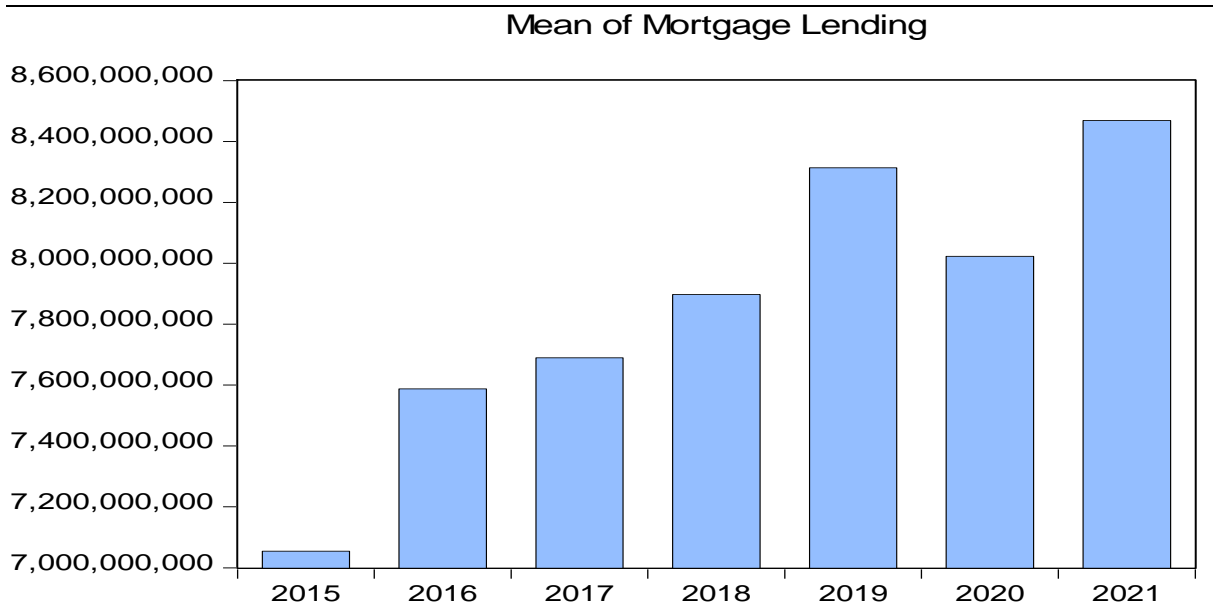
Figure 4.2.2: Trend of Mortgage Financing

Source: Field Data, 2023

Figure 4.2.2 shows an upward trend with an annual average mortgage lending increasing from over seven billion in 2015 to approximately 8.4 billion in 2019, then declined a bit to eight billion in 2020 due to the covid-19 pandemic that constrained households and finally increasing to over 8.4 billion in 2021. All in all, there was high uptake of mortgage loans over the study period. This finding is consistent with the finding of Karanja (2009) who conducted a study and found out that annual average mortgage volume consistently increased over time.

4.2.3 Trend Analysis on Lending Interest Rate of Commercial Banks in Kenya

Mean of Lending Interest Rate
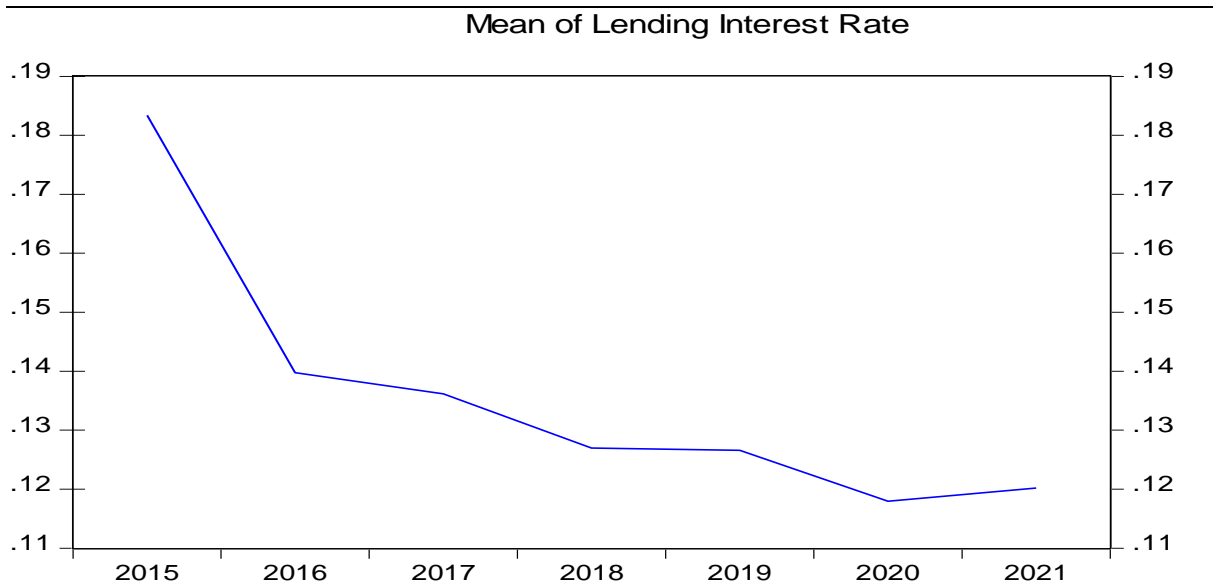
Figure 4.2.3 Trend Analysis and lending interest of Commercial Banks

Source: Field Data, 2023

Figure 4.2.3 shows a downward trend of the average lending interest rate as from 2015 to 2020 and stagnating towards 2021. This trend might be attributed largely to the enactment of the interest rate capping law in September 2016 which led to the setting of the maximum limit in interest rates that can be charged by commercial banks on their lending activities including mortgage lending. The rise seen in 2021 is due to the Central Bank of Kenya (CBK) allowing commercial banks to adopt a risk-based approach in pricing their loans.

4.3 Inferential Statistics

The second level of analysis involved examining the study variables through inferential processes, where the hypotheses are tested for proof of significance and impact. This process was done through performing several diagnostic tests, a number of whose results have been presented and discussed in chapter three, in keeping with methodology requirements. This was to ensure non-violation of the classical linear regression model (CLRM) and also to establish how well the data fitted in the regression model used in testing the hypotheses.

4.3.1. Results on Correlation Analysis Mortgage Financing, Lending Interest Rates and Financial Performance of Commercial Banks in Kenya

This section presents the correlation matrix which indicates all independent and dependent variables included in the analysis, as listed in Table 4.3.1. The correlation coefficient is a measure of linear association between two independent variables. The values of the correlation coefficient always lies between -1 and +1; with coefficient of +1 indicating that two variables are perfectly related in a positive linear sense. This implies that both variables are moving to a positive direction with the same rate of change. On the other hand a correlation coefficient of -1 indicates that two variables are perfectly related in a negative linear sense which implies that both variables are moving to a negative direction with the same rate of change. A correlation coefficient of zero (0) indicates that there is no linear relationship between the two variables. The correlation between the explanatory and explained variables of the study are presented and analysed as follows;

Table 4.3.1: Correlation Matrix of Mortgage Financing, Lending Interest Rates and Financial Performance of Commercial Banks in Kenya

Correlation Probability	ROAS	MLN	LNRT	CAR
ROAS	1.000000			

MLN	0.298489	1.000000		
	(0.0000) *	-----		
LNRT	-0.080742	-0.239512	1.000000	
	(0.2694)	(0.0009) *	-----	
CAR	0.019395	-0.044934	0.000505	1.000000
	(0.7911)	(0.5392)	(0.9945)	-----

Key: ROAs =Financial Performance of Commercial Banks, MLN=Mortgage Financing, LNRT=Lending Interest Rate, CAR=Capital Adequacy Ratio
*Note: p-values in parentheses; * represent significance at the 0.05 level*

Source: Field Data, 2023

Table 4.3.1. therefore indicates the correlation coefficients and their probabilities. From the table, financial performance measured in terms of ROAs is positively correlated (0.298489) with the volume of mortgage financing and financial performance of commercial banks in

Kenya at 5% significant level. This implies that higher amounts of Mortgage loans lead to a significant improvement in financial performance. On the other hand, it is insignificant and negatively correlated (-0.080742) with lending interest rate (LNRT) at a p-value of 0.2694 ≥0.005 significance level implying that higher Interest Charged on Mortgage will translate to an insignificant reduction in financial performance. Moreover, there is a negative correlation (-0.239512) between the lending interest rate and volume of mortgage lending at a 5% significant level. This contradicts the results obtained in the past study by Abdulrehman and Nyamute (2018), whose findings shows a positive and insignificant correlation between Interest Charged on Mortgage and financial performance (r = 0.095, p(0.121) ≥ 0.05) significance level.

Murphy and Russell (2017), noted that as the likelihood of detecting a moderator becomes lower the stronger is the linear relationship between the dependent variable and the independent variable(s) and the moderator(s). Further, the likelihood decreases as the correlation between the independent variable(s) and the moderator(s) goes up. Therefore, to detect a moderator effect, the correlation between independent variable and the moderator should also be reasonably small.

Based on the correlation matrix in Table 4.3.1, the correlation between lending interest rate and financial performance (-0.080742) is less than that of mortgage financing and financial performance (0.298489). Also, the correlation between mortgage financing and financial performance (0.298489) is greater than that of lending interest rate and mortgage financing (-0.239512). This means that the correlations between the moderator variable and the independent variable are not so large as to create excessive collinearity with cross-product terms, and the combined validities of the independent variable and the moderator are not so large as to create statistical barriers to demonstrating a moderator effect. Further, lending interest rate as a variable is evidently a moderator, as it does not contribute quite so much as an independent predictor unlike the case with mortgage financing.

4.3.2 Regression Results

The second level of data analysis of this study consists of establishing coefficient of determination as an output of regression analysis. The study employed Generalised Least Square (GLS) method because it is suitable for fitting linear models on data sets that exhibit heteroscedasticity (Alexander Aitken in 1935). The Generalised Least Square assigns weight

to each observation and is capable of producing estimators that are Best, Linear, Unbiased and Efficient (BLUE) (Gujarati, 2003). These results include summary statistics of the multivariate regression model and the regression results on the effect of mortgage financing on financial performance of commercial banks in Kenya, the effect of lending interest rates on financial performance of commercial banks in Kenya and the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in   Kenya. The detailed E-views results follow the summary:

4.3.2.1 Summary Statistics of the Regression Model Financial Performance of Commercial Banks in Kenya

	Basic Model	**Interactive Model**
R-Squared	0.861338	0.866892
Adjusted R-Squared	0.833959	0.839587
F-statistic	31.45970	31.74929
Prob (F-statistic)	0.000000	0.000000
Durbin-Watson stat	1.594746	1.592612

Table 4.3.2.1: Summary Statistics of the Moderated Regression Model
Source: Field Data, 2023

Table 4.3.2.1 presents the summary statistics of basic and interaction regression model. From the statistics, R-Squared of interaction is 0.866892. This means the independent variables jointly explain about 86.69% of the variations in the financial performance of commercial banks in Kenya while 13.31% of the variation in financial performance of commercial banks is accounted for by other factors other than mortgage financing and lending interest rates. The adjusted R^2 is 0.839587. In addition, the results show that the Adjusted R-Squared is 0.839587, a clear indication that the independent variables collectively, are good explanatory variables of the financial performance of commercial banks in Kenya.

Moreover, the difference between R-Squared and Adjusted R-Squared is 0.027 implying that the predictive power of the independent variable would generally be the same if the entire population was used and therefore it can safely be concluded that mortgage financing and lending interest rates explain 86.69% of the variations in in the financial performance of commercial banks in Kenya.

4.3.2.2 Regression Results on the effect of mortgage financing on financial performance of commercial banks in Kenya

Objective One: This objective sought to determine effect of mortgage financing on financial performance of commercial banks in Kenya.

Table 4.3.2.2: Regression Results on the effect of mortgage financing on financial performance of commercial banks in Kenya

	Basic Model				Interactive Model			
	Coefficient	Std. Error	t-Statistic	Prob.	Coefficient	Std. Error	t-Statistic	Prob.
MLN	0.004889	0.001518	3.220914	0.0016*	0.004434	0.001222	3.629713	0.0004*
MLN*MLN	0.000718	0.000805	0.891259	0.3742	0.000703	0.000780	0.901059	0.3689

* represent significance at the 0.05 level.

Source: Field Data, 2023

Table 4.3.2.2 shows that the coefficient of mortgage financing (MLN) in the interactive model is 0.004434, with a p-value=0.0004. This indicates that a unit increase in mortgage financing leads to an increase of 0.004434 in the financial performance of commercial banks in Kenya holding other factors constant. Moreover, the effect is significant since the p-value is less than the 0.05 level of significance leading to the rejection of the null hypothesis that mortgage financing has no significant effect on the financial performance of commercial banks in Kenya. Hence, the alternative hypothesis was instead accepted. However, the square of mortgage financing variable (MLN*MLN) is included in the model to take care of the second order effects with a coefficient of 0.000703 with a p-value=0.3689 was insignificant. The results holds even in the basic model as indicated above.

These findings are inconsistent with the argument by (Bekalu and Abel 2017), in their study, saving deposit, noninterest income and market concentration has a positive relationship, but statically insignificant. Their findings shows that the coefficient of saving deposit (SD), fixed deposit (FD), and liquidity risk (LR), non-performing loan (NPL) and inflation (INF) against return on asset (ROA) were negative; which is -0.041, -0.050, -0.024, -0.023 and -0.003 respectively.

This indicates that there was an inverse or negative relationship between the independent variables and ROA. This implies that the increase of those variables would cause a decrease in ROA. While this study is in agreement with (Ayele 2012) that capital adequacy, managerial

efficiency, bank size and macro-economic factors; level of GDP, and regulation have a strong influence on the profitability of private commercial banks in Ethiopia; explanatory variables, managerial efficiency, bank size, and GDP, have a positive relationship with ROA, with a coefficient of 0.19, 0.41, and 0.5 respectively. The study found that a unit increase in mortgage financing leads to an increase of 0.004434 in the financial performance of commercial banks. The result is also similar with the findings of Dirnhofer (2012) on Impact of Mortgage Backed Securities on Bank Performance during the Financial Crisis. (Viswanadham & Nahid 2015) that there was a positive relationship and significant effect between non-performing loans and commercial banks in Tanzania. Amahalu et al, 2014, and, Dondi and Obura (2016), analysed listed commercial banks' profitability determinants and loan mortgage management using panel methodology.

However, these findings considered factors such as saving deposit, Mortgage Backed Securities on managerial efficiency during crisis in developed countries and not volume of mortgage lending and financial performance, moreover, majority of these studies have mainly used descriptive research design to explore non-performing loans, bank profitability determinants, loan mortgage management and financial performance and hence, it is clear that none of these studies evaluated the effect of mortgage financing on financial performance of commercial banks in Kenya. Furthermore, these studies did not consider the second order effect in their analysis and since the p-value is 0.0004 which is sufficiently low, the null hypothesis is rejected and we can say that the model is well fitted at 5 percent level of significance and conclude that the regression output has economical meaning for financial performance of commercial banks in Kenya.

4.3.2.3 Regression Results on the effect of lending interest rates on financial performance of commercial banks in Kenya

Objective Two: This study analysed the effect of lending interest rates on financial performance of commercial banks in Kenya.

Table 4.3.2.3: Regression Results on the effect of lending interest rates on financial performance of commercial banks in Kenya

Lending Interest Rate Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRT	-0.158824	0.050408	-3.150767	0.0020*

* represent significance at the 0.05 level.

Source: Field Data, 2023

Table 4.3.2.3 shows that the coefficient of lending interest rate (LNRT) is -0.158824 with a p-value= 0.0020. This means that a unit increase in the banks' lending interest rates leads to a decrease of -0.158824 in financial performance of commercial banks in Kenya, other factors being constant. When interest rates increase, cost of borrowing increases reducing consumer demand for mortgage loans and other loan products, and hence affecting the financial performance of commercial banks. Further, the effect is significant as the p-value is lower than the 0.05 level of significance. Thus, the null hypothesis that banks' lending interest rates have no significant effect on financial performance of commercial banks in Kenya was rejected leading to the acceptance of the alternative hypothesis. This study was consistent with (Ogunbiyi and Ihejirika 2014), whose finding was that the interest rates have negative and significant effects on the profitability of Nigerian deposit money banks as measured by return on assets at the 5% level of significance. This finding concurs with the findings of Ahmed and Raja 2018. However, the studies failed to analyse the effect of lending rates on financial performance of commercial banks.

4.3.2.4 Regression Results on the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya.

Objective Three: This study evaluated moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya.

Table 4.3.2.4: Regression Results on the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya

Moderator Variable	Coefficient	Std. Error	t-Statistic	Prob.
MLN*LNRT	-0.057650	0.020935	-2.753725	0.0066*

* represent significance at the 0.05 level.

Source: Field Data, 2023

The results in Table 4.3.2.4 show that the coefficient of the product term (MLN*LNRT) is -0.057650 with a p-value=0.0066. This means that a unit increase in mortgage financing together with an increase in the lending interest rates leads to a decrease of 0.057650 in financial performance of commercial banks in Kenya. In addition, the effect is significant as the p-value is less than the 0.05 level of significance leading to the rejection of the null

hypothesis that Interest rates do not have moderating effect on the relationship between mortgage financing and financial performance of commercial banks in Kenya. However, the moderating effect is partial or quasi since lending interest rate has a significant negative direct effect on financial performance of commercial banks in Kenya as per the results of the basic model.

The moderating effect can be judged by the significance of the regression coefficient of the interaction term (Aguinis 2004; Baltes Go¨tz 2006). Alternatively, it can be examined with the F test which involves checking whether the change of the coefficient of determination R^2 from the base model to the interaction model is significantly different from zero. Thus, a hierarchical regression is recommended in such a case. The change of the coefficient of determination R^2 is also a measure for the effect size of the moderator effect (Aguinis 2004; Jaccard et al. 1990). The R^2-increase indicates how much criterion variance is additionally explained by the product term and, therefore, can be ascribed to the moderator effect (Aguinis 2004). This is identical to the use of the t-test. (Baron and Kenny 1986) defines moderation as a qualitative or quantitative variable that affects the direction *and /or* strength of the relationship between the independent and the dependent variable. In case of a significant moderator effect it is necessary to do a more detailed analysis to examine which kind of moderation is involved. This takes place by using a simple t-test for the regression coefficient of the moderator variable z in the base model. Hence, in case of a quasi-moderation, the regression parameter of the moderator variable in base model is statistically significant; otherwise, it is a pure moderation.

This study contrasts the finding of (Abdulrehman and Nyamute 2018), in their study, interest charged on mortgage has a positive and significant effect on financial performance of commercial banks. The study findings also indicated that interest charged on mortgage positively affect returns on assets significantly (Beta = 0.107, Sig = 0.02). This implies that one unit increase in the Interest Charged on Mortgage leads to a 0.107 unit's growth in returns on assets. However, the study applied unbalanced panel data. Whereas in this study, a balanced data was preferred over unbalanced panels, because it allows an observation of the same unit in every time period which reduces the noise introduced by unit heterogeneity. Other studies such as (Ongore and Kusa 2013; Gerlach and Peng, 2013; Bett , 2012 and Ngugi, 2014) none of the studies assessed the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya, for instance, a study by Green (2006) on effects of interest on mortgage prepayments, Gerlach and Peng (2013) on interest rates and mortgage credit, were bi-variate studies and they did not

embrace panel methodology and correlation design. Local studies in Kenya by Bett (2012; Ngugi 2014), brought out that interest rates effect on the amount of credit to the economy which did not incorporate lending rates as a moderator, hence, the need to assess the influence of interest rates on the relationship between mortgage financing and financial performance of commercial banks offering mortgage products in Kenya.

4.3.2.5 Regression Results on the effect of capital adequacy on financial performance of commercial banks in Kenya

The study included the ratio of total capital to bank assets as a control variable of the banks' level of financing to engage in mortgage lending.

Table 4.3.2.5: Regression Results on the effect of capital adequacy on financial performance of commercial banks in Kenya

Capital Adequacy Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	0.073991	0.028182	2.625464	0.0095*
CAR*CAR	-0.008675	0.003295	-2.632408	0.0093*

represent significance at the 0.05 level.

Source: Field Data, 2023

Table 4.3.2.5 results show that the capital adequacy ratio (CAR) has a positive coefficient of 0.073991 with a p-value=0.0095. This shows that capital adequacy has a positive and significant effect on the financial performance of commercial banks in Kenya since its p-value is less than the 0.05 level of significance. However, the square of the capital adequacy ratio (CAR*CAR) included has a negative coefficient of 0.008675 with a p-value=0.0093.

Detailed E-views Regression Resuls

Random Effect Regression-Interaction Model

Dependent Variable: ROAS
Method: Panel EGLS (Cross-section random effects)
Date: 05/01/23   Time: 15:21
Sample: 2015 2021
Periods included: 7
Cross-sections included: 27
Total panel (balanced) observations: 189
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.031564	0.004844	-6.515960	0.0000
CAR	0.331653	0.030454	10.89041	0.0000
CAR*CAR	-0.038838	0.003565	-10.89436	0.0000
MLN	0.007027	0.001487	4.725474	0.0000
MLN*MLN	-0.000620	0.000715	-0.867911	0.3866
LNRT	-0.167272	0.212878	-0.785761	0.4330
MLN*LNRT	-0.050587	0.101386	-0.498956	0.6184

Effects Specification

			S.D.	Rho
Cross-section random			0.007272	0.0569
Idiosyncratic random			0.029596	0.9431

Weighted Statistics

R-squared	0.397839	Mean dependent var	0.008373
Adjusted R-squared	0.377988	S.D. dependent var	0.041774
S.E. of regression	0.032946	Sum squared resid	0.197552
F-statistic	20.04079	Durbin-Watson stat	1.318780
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.461875	Mean dependent var	0.009987
Sum squared resid	0.216141	Durbin-Watson stat	1.205358

Random Effect Regression-Basic Model

Dependent Variable: ROAS
Method: Panel EGLS (Cross-section random effects)
Date: 05/01/23   Time: 15:20
Sample: 2015 2021
Periods included: 7
Cross-sections included: 27
Total panel (balanced) observations: 189
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.030552	0.004984	-6.130125	0.0000
CAR	0.320626	0.030973	10.35193	0.0000
CAR*CAR	-0.037544	0.003626	-10.35378	0.0000
MLN	0.007106	0.001548	4.591024	0.0000
MLN*MLN	-0.000403	0.000665	-0.606561	0.5449
LNRT	-0.117998	0.200721	-0.587872	0.5573

Effects Specification

			S.D.	Rho

Cross-section random		0.008517	0.0769
Idiosyncratic random		0.029510	0.9231

Weighted Statistics			
R-squared	0.377592	Mean dependent var	0.007937
Adjusted R-squared	0.360587	S.D. dependent var	0.040634
S.E. of regression	0.032492	Sum squared resid	0.193203
F-statistic	22.20390	Durbin-Watson stat	1.336784
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.458940	Mean dependent var	0.009987
Sum squared resid	0.217320	Durbin-Watson stat	1.188438

Fixed Effect Regression-Basic Model

Dependent Variable: ROAS
Method: Panel EGLS (Cross-section weights)
Date: 05/01/23   Time: 15:26
Sample: 2015 2021
Periods included: 7
Cross-sections included: 27
Total panel (balanced) observations: 189
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001181	0.004644	-0.254218	0.7997
CAR	0.068570	0.029190	2.349091	0.0201
CAR*CAR	-0.008036	0.003416	-2.352902	0.0199
MLN	0.004889	0.001518	3.220914	0.0016
MLN*MLN	0.000718	0.000805	0.891259	0.3742
LNRT	-0.118125	0.049680	-2.377704	0.0186

Effects Specification			

Cross-section fixed (dummy variables)

Weighted Statistics			
R-squared	0.861338	Mean dependent var	0.059314
Adjusted R-squared	0.833959	S.D. dependent var	0.075571
S.E. of regression	0.028023	Sum squared resid	0.123294
F-statistic	31.45970	Durbin-Watson stat	1.594746
Prob(F-statistic)	0.000000		

Unweighted Statistics			

R-squared	0.643818	Mean dependent var	0.009987
Sum squared resid	0.143062	Durbin-Watson stat	1.614344

Fixed Effect Regression-Interaction Model

Dependent Variable: ROAS
Method: Panel EGLS (Cross-section weights)
Date: 05/01/23   Time: 15:26
Sample: 2015 2021
Periods included: 7
Cross-sections included: 27
Total panel (balanced) observations: 189
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002127	0.004800	-0.443142	0.6583
CAR	0.073991	0.028182	2.625464	0.0095
CAR*CAR	-0.008675	0.003295	-2.632408	0.0093
MLN	0.004434	0.001222	3.629713	0.0004
MLN*MLN	0.000703	0.000780	0.901059	0.3689
LNRT	-0.158824	0.050408	-3.150767	0.0020
MLN*LNRT	-0.057650	0.020935	-2.753725	0.0066

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.866892	Mean dependent var	0.059682
Adjusted R-squared	0.839587	S.D. dependent var	0.076165
S.E. of regression	0.028120	Sum squared resid	0.123355
F-statistic	31.74929	Durbin-Watson stat	1.592612
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.645216	Mean dependent var	0.009987
Sum squared resid	0.142501	Durbin-Watson stat	1.613486

Model Specification

Basic Model

$$\mathbf{ROA_{it} = \alpha_0 + \beta_1 CAR_{it} + \beta_2 CAR_{it}*CAR_{it} + \beta_3 MLN_{it} + \beta_4 MLN_{it}*MLN_{it} + \beta_5 LNRT_{it} + \mu_{it}}$$

$$ROA_{it} = \alpha_0 + \beta_1 CAR_{it} + \beta_2 CAR_{it}*CAR_{it} + \beta_3 MLN_{it} + \beta_4 MLN_{it}*MLN_{it} + \beta_5 LNRT_{it}$$

ROAS = -0.001181+ 0.068570*CAR - 0.008036*CAR*CAR + 0.004889*MLN + 0.000718*MLN*MLN -0.118125*LNRT + [CX=F]

Where

CX=F   Cross-sectional fixed Effect

Interactive Model

$$ROA_{it}=\alpha_0+\beta_1CAR_{it}+\beta_2CAR_{it}*CAR_{it}+\beta_3MLN_{it}+\beta_4MLN_{it}*MLN_{it}+\beta_5LNRT_{it}+\beta_6MLN_{it}*LNRT_{it}+\mu_{it}$$

ROAS = - 0.002127 + 0.073991*CAR -. 008675*CAR*CAR + 0.004434*MLN + 0.000703*MLN*MLN - 0.158824*LNRT - 0.057650*MLN*LNRT + [CX=F]

Where

CX=F   Cross-sectional fixed Effect

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of the study's findings, conclusions and recommendations thereof. It also points out the limitations of the study and make suggestions on areas for further research. The general objective of the study was to evaluate influence of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya. Specifically the study aimed at; establishing the effect of mortgage financing on financial performance of commercial banks in Kenya; analysing the effect of lending interest rates on financial performance of commercial banks in Kenya and evaluating the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya.

5.1 Summary of Findings

Objective one sought to establish the effect of mortgage financing on financial performance of commercial banks in Kenya. It was established that mortgage financing has a positive and significant relationship with the financial performance of commercial banks in Kenya.

Objective two of the study sought to analyse the effect of lending interest rates on financial performance of commercial banks in Kenya. The findings show that banks' lending interest rate has a negative and significant effect on financial performance of commercial banks in Kenya based on the sampled commercial banks.

Objective three of the study sought to evaluate the moderating effect of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya. The results indicate that lending interest rates have a moderating effect on the relationship between mortgage financing and financial performance of commercial banks in Kenya.

The study also looked at the effect of capital adequacy on financial performance of commercial banks in Kenya. The results show that the effect of capital adequacy on financial performance is non-monotonic and hence the effect is positive while negative based on the product term of the variable.

5.2 Conclusions on the Study Findings

In view of the study findings, the first objective of the study established that mortgage financing has a significant positive effect on financial performance of commercial banks in Kenya. This implies that a unit increase in mortgage uptake due to demand for mortgage financing causes an increase in financial performance of commercial banks in Kenya.

The second objective established that lending interest rates had a negative and significant effect on financial performance of commercial banks in Kenya. This implies that an increase in the banks' lending interest rates leads to a decrease in financial performance of commercial banks in Kenya. Lending interest rate is a percentage charge or pay for the use of money charged when the money is being borrowed, a high rate inhibits borrowers from seeking mortgage financing leading to low demand for mortgage uptake and hence reduced financial performance of commercial banks. However, lending interest rates leads to a decrease in financial performance of commercial banks in Kenya.

Finally, lending interest had a negative and a statistically significant moderating effect on the relationship between mortgage financing and financial performance of commercial banks in Kenya. This implies that an increase in mortgage financing together with an increase in lending interest rates leads to a reduction of financial performance of commercial banks in Kenya. On the other hand, the effect of capital adequacy on financial performance is non-monotonic.

5.3 Recommendations

The study established in the first objective that mortgage financing has a significant positive effect on financial performance of commercial banks in Kenya and therefore, therefore, Central Bank of Kenya (CBK) should champion for the enactment of favourable regulations that motivates more banks to adopt mortgage financing among their key lending activities as it will boost their revenue streams and hence impacting positively on their financial performance thus guaranteeing their sustainability in the changing competitive landscape.

In the second objective, the finding is that lending interest rates had a negative and significant effect on financial performance of commercial banks in Kenya, the study recommends that CBK should encourage adoption of risk-based pricing by the mortgage financing institutions to prevent exorbitant pricing of mortgage products since high lending rates have a negative impact both to financial performance and mortgage financing.

The study also recommends that banks should be encouraged to pursue an optimal capital strategy as holding excess capital at particular levels leads to a decline in the financial performance of the commercial banks.

5.4 Limitation of the Research

The outcome of the study may not be applicable to other financial institutions such as micro finance institutions given the variations in the way both banks and these other financial intermediaries operate. Hence, while it can offer important insights to other financial institutions, such conclusions should be approached with care given the variations in the way banks operate and the way other financial institutions operate. The study also relied on secondary data from the financial statements of the commercial banks and central bank. While these are a reliable source of data, it is quantitative in nature and therefore it was not possible to fully interrogate the mortgage financing issues of the banks as may have been the case if interviews were conducted. To improve this, it will be important to use mixed methods in data collection. The time period for the study was also limited as the data collected was only for seven years. This might not provide robust results as to the long-term relationship between the study variables. A longer period, of say 10 years, would have been preferred to be able to conduct a long time series or panel analysis.

5.5 Suggestions for Further Research

Following the limitations of the current study, the following areas have been suggested for further research. Firstly, the study only focused on secondary data on commercial banks offering mortgage in Kenya. Future researchers should expand the geographical scope to include other institutions offering mortgage financing within the East African block for comparative analysis. Further studies should also incorporate other financial institutions such as micro finance institutions. Studies should also be conducted on the topic using a fairly longer time period of 10 years and above so as to help in showing the trends as well as the long-term relationship between the study variables.

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APPENDICES

Appendix I: Letter of Approval

MASENO UNIVERSITY SCIENTIFIC AND ETHICS REVIEW COMMITTEE

REF: MSU/DRPI/MUSERC/01161/22 Date 30 November 2022

To Daniel Odhiambo Dondi

PhD/BE/00081/2017
Department of Accounting and Finance
School of Business and Economics
P. 0. Box, Private Bag, Maseno, Kenya

Dear Sir,

RE: Influence of Lending Interest Rates on the Relationship between Mortgage Financing and Financial Performance of Commercial Banks in Kenya

This is to inform you that **Maseno University Scientific and Ethics Review Committee (MUSERC)** has reviewed and approved your above research proposal. Your application approval number is MUSERC/01161/22. The approval period is 30th November, 2022 - 29th November, 2023.

This approval is subject to compliance with the following requirements;
i.   Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by Maseno University Scientific and Ethics Review Committee (MUSERC).
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to Maseno University Scientific and Ethics Review Committee (MUSERC) within 24 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to Maseno University Scientific and Ethics Review Committee (MUSERC) within 24 hours.
v.   Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to
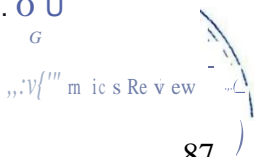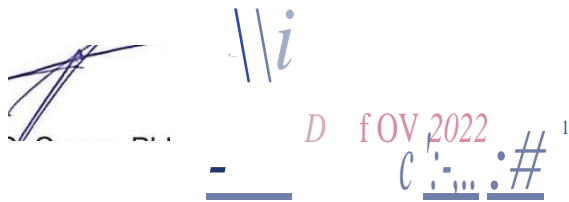
Maseno University Scientific and Ethics Review Committee (MUSERC).

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology a dJnn.ovation (NACOSTI) https://oris.nacosti.go.ke and also
obtain other clearances needed. O U

Yours sincerely /

Prof. Philip <Y. Owuor, PhD, P   \ cF -Nr$\.S TE

Chairman, MUSERC

MASENO UNIVERSITY 9001 CERTIFIED

Appendix II: **Muserc Approva**

MASENO UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Office of the Dean

Our Ref: PHD/BE/00081/017

Private Bag, MASENO, KENYA
Tel:(057)351 22/351008/351011
FAX: 254-057-351153/351221
Email: sgs@maseno.ac.ke

Date: 22 September 2022,

TO WHOM IT MAY CONCERN

**RE: PROPOSAL APPROVAL FOR DANIEL ODHIAMBO DONDI –
PHD/BE/00081/017**

The above named is registered in the programme of Doctor of Philosophy in Finance in the School of Business and Economics, Maseno University. This is to confirm that his research proposal titled **"Influence of lending interest rates on the relationship between mortgage financing and financial performance of commercial banks in Kenya"** has been approved for conduct of research subject to obtaining all other permissions/clearances that may be required beforehand.

Prof. J.O. Agure
DEAN, SCHOOL OF GRADUATE STUDIES

.,-

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Appendix III: **NACOSTI Research Letter**

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: **278081**

Date of Issue: **13/December/2022**

RESEARCH LICENSE

This is to Certify that Mr.. **DANIEL ODHIAMBO DONDI** of **Maseno University**, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: **Influence of Lending Interest Rates on the Relationship between Mortgage Financing and Financial Performance of Commercial Banks in Kenya for the period ending : 13/December/2023.**

License No: **NACOSTI/P/22/22681**

278081

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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Scan the QR Code using QR scanner application.

See overleaf for conditions

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Appendix IV: Letter of Introduction

Daniel Odhiambo Dondi
Department of Accounting and Finance
School of Business and Economics
Maseno University
Private Bag Maseno
Kenya
Email: odhiamodondi@yahoo.com or odhiamodondi@gmail.com
Tel: 0720499131

December 13, 2022.

The Research Department Central Bank of Kenya
P.O. Box 6000 - 0200
Nairobi
Kenya

Dear Sir/Madam,

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a postgraduate student at Maseno University pursuing a Doctor of Philosophy (PhD) in Finance. In partial fulfilment of the requirements of the degree, I am pursuing mortgage financing research among all commercial banks in Kenya. The topic of the research is: "**Influence of Lending Interest Rates on the Relationship between Mortgage Financing and Financial Performance of Commercial Banks in Kenya**".

The research will investigate the influence of lending interest rates on the relationship between

mortgage financing and the financial performance of commercial banks in Kenya.

In order to achieve this aim, the study will seek to:

  i.   Assess the effect of mortgage financing on financial performance of commercial
       banks in Kenya,
  ii. Analyse the effect of lending interest rates on financial performance of commercial
       banks in Kenya.
  iii. Evaluate the moderating effect of lending interest rates on the relationship between
       mortgage financing and financial performance of commercial banks in Kenya

The purpose of this letter is to kindly request Annual secondary data for ten years between 2011 to 2020 and annual financial reports from all commercial banks. The research will use secondary data. The data will be collected from the annual reports obtained from the records of the banks.

The information provided will be treated with the utmost confidentiality and the names of the respondents will not be mentioned in this research. All the information provided will not be used for any other purpose other than for this research.

This study report should be relevant in the Kenyan context given its important role in the housing sector. It is expected that the findings of this study should have important policy implications for Kenyan state, and privately-owned corporations.

I shall be grateful if you will kindly permit me to conduct research at this institution. Your written permission will be highly appreciated. For more information, contact my supervisors at the contacts below.

Thanks in advance.

Yours Faithfully

…………………………..   ………………….   ……………………….

Daniel Odhiambo Dondi   **Dr. R K Mule**   **Dr. B O Ombok**
Tel: 0720499131   0720664885   0722416974

Candidate   **Supervisor**   **Supervisor**

Appendix V: Data Collection Sheet

	A SAMPLE LIST OF COMMERCIAL BANKS OFFERING MORTGAGES IN KENYA							
	BANK/YEAR							
		R.O.A	NET ASSETS	TOTAL CAPITAL	VOL OF M.L	L.RATES	PBT
1	KCB Bank Kenya Limited						
	Year 2015						
	Year 2016						
	Year 2017						
	Year 2018						
	Year 2019						
	Year 2020						
	Year 2021						
2	Barclays Bank of Kenya Limited						
	Year 2015						
	Year 2016						
	Year 2017						
	Year 2018						
	Year 2019						
	Year 2020						
	Year 2021						
3	African Banking Corporation Limited						
	Year 2015						
	Year 2016						
	Year 2017						
	Year 2018						
	Year 2019						
	Year 2020						
	Year 2021						

RAO   Return on Assets

VOL OF ML   Volume of Mortgage Lending

PBT   Profit Before Tax

Appendix VI: A List of the Sampled Commercial Banks

Name of the Bank	Abbreviation
1. Absa Bank of Kenya Plc	ABSA
2. Africa Banking Corporation Ltd	ABC
3. Bank of Africa Kenya Ltd	BOA
4. Bank of Baroda (K) Ltd	BOB
5. Bank of India	BOI
6. Consolidated Bank of Kenya Ltd	CON
7. Co-operative Bank of Kenya	COOP
8. Development Bank of Kenya Ltd	DBK
9. Diamond Trust Bank Kenya Ltd	DTB
10. Eco Bank Kenya Ltd	ECO
11. Equity Bank Kenya Ltd	EQT
12. Family Bank Ltd	FBK
13. First Community Bank Ltd	FCB
14. Guardian Bank Ltd	GBL
15. Gulf African Bank Ltd	GAB
16. HFC Limited	HFC
17. I & M Bank Ltd	I&M
18. KCB Bank Kenya Ltd	KCB
19. Kingdom Bank Ltd	KBL
20. Middle East Bank (K) Ltd	MIB
21. National Bank of Kenya Ltd	NBK
22. Paramount Bank Ltd	PBK
23. Prime Bank Ltd	PBL
24. SBM Bank (K) Ltd	SMB
25. Spire Bank Ltd	SPIRE
26. Stanbic Bank Kenaya Ltd	SBL
27. Standard Chartered Bank (K) Ltd	SCB

Appendix VII: Data Collection Schedule

Bank	Year	Lending Interest Rates	Mortgage Lending - Ksh Millions	PBT- Ksh Millions	Net Assets- Ksh Millions	Total Capital- Ksh Millions
ABSA	2015	0.185	6578	12074	241153	41222
ABSA	2016	0.138	7539	10440	259498	42746
ABSA	2017	0.138	8420	10006	271682	43934
ABSA	2018	0.128	9692	10250.07	325362.74	42880.319
ABSA	2019	0.128	12594	11857.47	374109.2	46433.739
ABSA	2020	0.113	14298	8300	377936	51909
ABSA	2021	0.12	15768	14725	428746	56357
ABC	2015	0.163	2026	355	22058	3012
ABC	2016	0.141	920.59	222	22422	2969
ABC	2017	0.124	729.78	203	24804	2906
ABC	2018	0.124	547.95	157.6	27212.71	3073.246
ABC	2019	0.125	707.4	164.26	28680.49	3076.075
ABC	2020	0.123	765	147	32643	3208
ABC	2021	0.12	659	126	36341	3313
BOA	2015	0.205	1622	-1434	69280	8651
BOA	2016	0.139	3110.95	-16	55996	7637
BOA	2017	0.137	1916.33	35	54191	6986
BOA	2018	0.125	3615.91	209.56	49080.86	4959.437
BOA	2019	0.129	2996	-2929.68	43996.12	2657.425
BOA	2020	0.113	2285	-680	44917	3484
BOA	2021	0.125	1313	290	43350	3755
BOB	2015	0.176	667.75	2486	68178	11547
BOB	2016	0.139	854.4	3876	82907	13992
BOB	2017	0.139	1020.73	5053	96132	16909
BOB	2018	0.129	1212.5	5159.08	123014.4	20200.548
BOB	2019	0.13	1268.8	5466.2	143311.34	22858.745
BOB	2020	0.11	1563	5791	166313	26670

BOB	2021	0.115	2305	6683	180381	28679
BOI	2015	0.173	191.29	1470	42163	7144
BOI	2016	0.14	375.96	2185	47815	8971
BOI	2017	0.14	304.47	2675	56631	11069
BOI	2018	0.13	289.8	2447.91	62689.13	12643.481
BOI	2019	0.13	252.7	2798.62	62543.24	14992.969
BOI	2020	0.121	289	2733	75129	17322
BOI	2021	0.117	584	3452	86867	20184
CON	2015	0.205	2838.98	49	14136	1312
CON	2016	0.13	631.11	-277	13918	1001
CON	2017	0.132	607.86	-439	13456	595
CON	2018	0.126	665.32	-351.57	12887.33	109429.717
CON	2019	0.106	2272.3	-516.91	11865.61	1369.437
CON	2020	0.11	869	-262	12886	1076
CON	2021	0.111	944	-286	14283	699
COOP	2015	0.175	18183	14073	339550	63372
COOP	2016	0.139	16161.23	18024	349998	72770
COOP	2017	0.139	10192	16502	382830	81048
COOP	2018	0.13	11725	17586.76	408303.62	28732.458
COOP	2019	0.13	11646	20326.06	449616.47	64711.979
COOP	2020	0.125	11884	16961	496823	77446
COOP	2021	0.127	13825	21325	540387	85952
DBK	2015	0.188	2757.76	178	16943	2018
DBK	2016	0.136	3043.43	95	16418	2019
DBK	2017	0.136	3810	58	16320	1898
DBK	2018	0.125	3350	168.81	15323.11	2075.758
DBK	2019	0.126	2950	1136.82	15358.07	2952.103
DBK	2020	0.125	3092	19	17222	2695
DBK	2021	0.124	3102	65	17289	2584
DTB	2015	0.183	554	7055	190948	30299
DTB	2016	0.137	678.2	8876	244124	33904
DTB	2017	0.139	753.67	8228	270082	38790

DTB	2018	0.106	842	9264.77	281515.7	45102.257
DTB	2019	0.106	980	9279.31	287250.6	48907.303
DTB	2020	0.12	1118	3942	312189	51543
DTB	2021	0.12	1125	4415	326377	53031
ECO	2015	0.173	1099	93	52427	9904
ECO	2016	0.139	922.71	-2889	47124	7606
ECO	2017	0.144	609	-1434	53456	5995
ECO	2018	0.142	594.18	136.26	54463.88	5737.693
ECO	2019	0.152	550.6	243.35	75377.85	6918.214
ECO	2020	0.109	533	6	94428	7070
ECO	2021	0.107	535	612	103388	7669
EQT	2015	0.19	7798	22388	341329	52887
EQT	2016	0.141	8882	22778	379749	55095
EQT	2017	0.138	8847	23086	406402	61902
EQT	2018	0.128	9740	24382.34	438508.78	55864.207
EQT	2019	0.127	10872	25973.66	507525.24	82739.024
EQT	2020	0.126	11529	14207	667650	92118
EQT	2021	0.126	12544	41042	877415	132496
FBK	2015	0.155	3390.57	2883	81190	13884
FBK	2016	0.134	3344.07	633	69432	14450
FBK	2017	0.14	3657.66	-1371	69051	13147
FBK	2018	0.13	5450.86	419.88	66909.84	12725.325
FBK	2019	0.13	7161.8	1352.24	78857.13	13263.038
FBK	2020	0.13	7656	1326	90591	13363
FBK	2021	0.129	5796	3145	111683	17354
FCB	2015	0.164	833.66	11	14613	2024
FCB	2016	0.14	990.18	-41	14962	1969
FCB	2017	0.14	2067	216	17360	2021
FCB	2018	0.13	1936	-278.41	17880.46	1078.077
FCB	2019	0.13	2108	185.48	18762.84	1130.466
FCB	2020	0.09	2416	238	21947	1619
FCB	2021	0.09	5690	602	24701	1912

GBL	2015	0.156	365.07	329	14609	1984
GBL	2016	0.137	541.68	302	14705	2215
GBL	2017	0.136	1062.2	228	15803	2375
GBL	2018	0.127	982.4	348.05	16185.96	2557.152
GBL	2019	0.127	880	250.55	16386.45	2740.81
GBL	2020	0.113	793	77	16858	2834
GBL	2021	0.126	436	135	17736	2989
GAB	2015	0.165	761.31	1093	24714	3877
GAB	2016	0.143	957.12	754	27156	4266
GAB	2017	0.141	847.45	254	31316	4836
GAB	2018	0.132	604.52	292.2	33325.58	6127.447
GAB	2019	0.131	751	218.05	35122.98	5876.86
GAB	2020	0.125	386	559	37653	6055
GAB	2021	0.127	2315	687	37678	5910
HFC	2015	0.152	47581.16	1737	68809	9548
HFC	2016	0.125	51754	1445	68085	9580
HFC	2017	0.119	46652	393	62127	9109
HFC	2018	0.114	33706	-395.28	57083.28	7610.639
HFC	2019	0.112	40066	-23.49	57083.28	6371.264
HFC	2020	0.107	26092	-963	54478	4200
HFC	2021	0.105	24103	-654	52098	4652
I&M	2015	0.208	3446.27	8367	147846	26544
I&M	2016	0.139	3491.69	8651	164116	26934
I&M	2017	0.139	3728	7516	183953	32227
I&M	2018	0.129	3936	8725.33	229161.13	35785.032
I&M	2019	0.129	2546	12012.34	254252.17	45275.624
I&M	2020	0.125	2866	10289	283569	49335
I&M	2021	0.124	4020	10587	307802	52850
KCB	2015	0.173	47749	23445	467741	61072
KCB	2016	0.135	54333	28482	504778	85691
KCB	2017	0.131	65554	27472	555630	78020
KCB	2018	0.12	64303	31384.94	621722.88	95595.972

KCB	2019	0.12	66134	33183.95	674301.72	101066.966
KCB	2020	0.116	69063	23586	758345	126674
KCB	2021	0.121	76327	40503	826395	138433
KBL	2015	0.218	4494	36	16782	2300
KBL	2016	0.193	3439	-490	15724	2789
KBL	2017	0.148	3188	-762	12851	2349
KBL	2018	0.136	2734	-383.4	10004.86	1259.015
KBL	2019	0.136	1294.6	-1143.38	8584.54	678.505
KBL	2020	0.136	1194	-124	30612	1026
KBL	2021	0.132	949	512	31691	1051
MIB	2015	0.246	28	43	5678	1257
MIB	2016	0.177	69	-101	5234	1186
MIB	2017	0.142	59	-41	5121	1157
MIB	2018	0.131	41	0.51	5360.86	2683.456
MIB	2019	0.131	42	59.63	8466.28	1093.714
MIB	2020	0.115	22	105	11022	1221
MIB	2021	0.135	21	151	11186	1334
NBK	2015	0.169	2313	-1684	125295	10531
NBK	2016	0.13	2321	162	115114	10501
NBK	2017	0.14	1709	740	109942	4771
NBK	2018	0.129	1979	587.5	115143.44	3419.154
NBK	2019	0.126	1953	-821.25	112028.75	7734.329
NBK	2020	0.128	2163	313	126842	7835
NBK	2021	0.128	2217	1387	146543	11605
PBK	2015	0.174	312.77	169	10526	1532
PBK	2016	0.132	357.76	105	9427	1638
PBK	2017	0.136	291.63	96	9541	1638
PBK	2018	0.128	278.59	150.79	9887.41	1574.544
PBK	2019	0.128	254	85.64	10443.3	1660.39
PBK	2020	0.128	246	97	11378	1747
PBK	2021	0.126	251	153	12448	1878
PBL	2015	0.195	413	2593	65001	8351

PBL	2016	0.139	319	2336	65338	10765
PBL	2017	0.139	259	1977	76438	11796
PBL	2018	0.129	187	2088.48	98534.46	20074.411
PBL	2019	0.129	195	2456.5	108785.53	22033.737
PBL	2020	0.118	164	1849	116204	22912
PBL	2021	0.12	237	2903	126482	24639
SMB	2015	0.199	2357	-277	15025	1700
SMB	2016	0.139	1885	-2267	9902	-787
SMB	2017	0.14	1619	-361	11745	1041
SMB	2018	0.13	2836.79	955.73	70647.74	6952.209
SMB	2019	0.13	3239.6	1179.98	72519.36	7856.083
SMB	2020	0.117	3049	617	79190	7932
SMB	2021	0.122	1741	227	81958	8053
SPIRE	2015	0.199	111.63	-655	14470	2033
SPIRE	2016	0.127	63.87	-968	13802	1895
SPIRE	2017	0.115	86.2	-1576	11148	1206
SPIRE	2018	0.124	414	-307.4	9223.08	-1562
SPIRE	2019	0.125	390.8	-453.43	6860.3	-1331.313
SPIRE	2020	0.126	323	-1257	5114	-2581
SPIRE	2021	0.125	313	-1166	3855	-286
SBL	2015	0.178	14716	7077	198578	30351
SBL	2016	0.133	14972	6910	204895	32876
SBL	2017	0.134	18936	5599	239408	36208
SBL	2018	0.121	25645	8797.96	280953.01	39656.966
SBL	2019	0.121	28380	8239.66	292705.14	43686.655
SBL	2020	0.106	30541	6237	318986	46444
SBL	2021	0.112	31357	9568	319199	49835
SCB	2015	0.185	17290.01	8974	234131	40147
SCB	2016	0.131	22900	12764	250274	42104
SCB	2017	0.13	20681	9510	285125	42242
SCB	2018	0.125	25912.33	11433.57	284691	41776.778
SCB	2019	0.124	21983	12691.23	302295.9	43037.925

| SCB | 2020 | 0.109 | 21422 | 7018 | 325873 | 45676 |
| SCB | 2021 | 0.111 | 20170 | 12142 | 335111 | 46670 |