INTEREST RATE SPREAD, CREDIT RISK, BANK SIZE, OWNERSHIP AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

BY
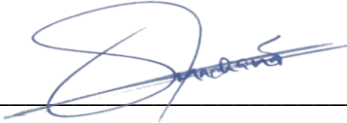
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A DOCTORAL THESIS PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF DOCTOR IN PHILOSOPHY IN BUSINESS ADMINISTRATION, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

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DECLARATION

This thesis is entirely my own work and has not been submitted anywhere for publication or a scholastic honor. The cited materials, documents or publications are duly acknowledged and referenced.

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DEDICATION

To the Almighty for the love and providence that has helped me achieve this great academic achievement.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BIS	-	Bank for International Settlements
BSD	-	Bank Supervision Department
CAMELs	-	Asset Quality, Management, Earnings, Liquidity and Sensitivity to the
CAR	-	Capital Adequacy Ratio
CBK	-	Central Bank of Kenya
CBR	-	Central Bank Rate
CR	-	Credit Risk
CRM	-	Credit Risk Management
EAD	-	Exposure at Default
EBA	-	European Banking Authority
FDIC	-	Federal Deposit Insurance Corporation
FP	-	Financial Performance
GDP	-	Gross Domestic Product
ICT	-	Information & Communications Technology
IMF	-	International monetary fund
IRSs	-	Interest Rate Spreads Market
LGD	-	Loss Given Default
MDBs	-	Money Deposit Banks
MFBs	-	Micro Finance Banks
MRPs	-	Money Remittance Providers
NIM	-	Net Interest Margin
NPLR	-	Non-performing Loan Ratio
NPLs	-	Non-Performing Loans
PD	-	Probability of Default
RCII	-	Risk Culture Intensity Index
ROA	-	Return on Assets
ROAA	-	Return on Average Assets
ROE	-	Return on Equity
ROAE	-	Return on Average Equities
ROI	-	Return on Investment
VIF	-	Variance Inflation Factor

ABSTRACT

The country's commercial banks have been confronted with a plethora of difficulties that are connected to several essential FP data. Some of the problems that continue to plague the banking industry include expanding interest rate spreads (IRSs), declining asset quality, worries over capital sufficiency, and liquidity issues. This research investigates the links between credit risk and FP, and it considers the expected influence of the IRS as an ex-ante variable. Bank size and ownership were moderating factors in this investigation. The major objective of this study was to examine the links between IRS, credit risk, company size, ownership structure, and FP. The study used a positivist research ethic and used a longitudinal research approach to analyze data from 41 authorized financial institutions to determine correlations between variables. The investigation is based on secondary data, which was subjected to multiple regression analysis in STATA. Normality, multicollinearity, Heteroscedasticity, Stationarity, autocorrelation and Hausman tests were some of the diagnostic examinations carried out to assess the compliance of the model to the key regression assumptions. The study is built on six hypotheses. The first hypothesis postulated that interest rate spread does not affect credit risk and was rejected. The second theory proposed that credit risk had no bearing on financial results; this too was debunked. The third and fourth hypothesis state that bank ownership and size do not regulate the relationship between credit risk and financial performance. The assumption made in the sixth hypothesis, which was that IRS does not influence FP, was similarly disproved. In conclusion, the research came to the conclusion that size and ownership both have a considerable impact on FP. Further, it also confirmed that interest rate spread, credit risk, bank ownership, and size have a joint effect on FP. It recommends that policy makers and the regulators need to have a keen interest in the IRSs and develop credible and robust policy frameworks that will guide the determination of interest rates. The interest rate caps introduced in 2016 were blamed of being reactionary and therefore well-thought-out frameworks that are not necessarily restrictive would be helpful. In many Sub-Saharan Africa countries, the challenges of widening interest rates spreads persist, and the financial systems end up with discontented borrowers that are likely to default in credit repayments and this negatively impacts the bank returns. To reduce credit risk, commercial banks in conjunction with the regulator should be able to adopt or invest in very robust credit risk management systems that will help stem out the increasing levels of non-performing loans. Recovery and collections efforts that will help in the management and reduction of NPLs need to be in place and regulators should insist on more aggressive and stringent NPLs management policies and procedures if the banks' financial performance is to be improved. Central bank of Kenya should also encourage mergers and consolidations to ensure that there are fewer but financially strong commercial banks which serves to strengthen the financial system. Ownership structure is also an important factor, and this study establishes that an ultra-expanded structure is beneficial in increasing a bank's FP. The study contributed to the four theories including the loanable funds theory, modern portfolio theory, arbitrage portfolio theory and agency theory. The results of this research corroborate the connections proposed by the theoretical frameworks' central concepts, particularly with regard to the importance of interest rates in establishing the pricing of loans and, by extension, the amount of money that may be borrowed. The study provides a unique conceptual approach or model in examining the liaison between credit risk and FP. Ex-ante evaluation of IRS and credit risk and FP backed up with two moderating variables provides an enriched study which in not very common based on review of past studies. Areas that future research could consider include interrogating the impact of the additional stringent standards such as IFRS 9 or Basel II & III Accords. The impact of massive adoption of technology in banking operations presents an aspect that should be studied on how it has impacted on the main relationship. These additional dimensions to research would be very practical and beneficial not only to researchers but also to banks and policy makers.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Interest rate spread (IRS) is a key determinant that defines the level of the interest income which is a vital constituent of financial performance (FP). Sujeewa (2015) and Aladwan (2015) postulate that IRS plays a big role in matching supply and demand of loanable funds and ultimately determines the levels of profitability. CR is at the nucleus of any bank's intermediation role, which remains a critical objective of any FI involved in commercial banking business. Alshatti (2015) claims that credit risk is a major issue for the banking sector generally and the lending sector. Investors, management, and authorities are continually scrutinizing the controls put in place to manage CR because of the impact asset quality has on FP. Many banks, and the economy, have been portrayed as facing a major challenge due to the deteriorating quality of their loans and the resulting increase in nonperforming loans (NPLs) (Sujeewa, 2015; Aladwan, 2015). Both internal and environmental factors might affect the CR-FP relationship. Politics, scale, leverage, governance and management systems, and the presence or absence of regulations are only a few examples.

Snowballing level of NPLs could be linked with deprived CR management systems and this could lead to poor banks' performance and eventually precipitate a financial crisis. NPLs need to be well managed and above all banks must have in place vibrant mechanisms to identify early warnings to avert this problem. Bank size and ownership are noteworthy factors that influence the main link between credit risk and FP and for that reason, the two were included in the study as moderating variables. Scientists disagree strongly on how much of an effect body size has on functional

performance. Others argue that big banks are more lucrative because they have access to more capital and are better positioned to reap the benefits of economies of scale. This allows the large banks to put money into more secure systems, giving them an advantage over their smaller rivals in terms of financial performance. One opposing view is that larger banks always suffer from more bureaucracy and worse financial results. The ability and motivation to establish robust corporate governance systems that may enhance FP performance is directly related to ownership. There have been conflicting positions from past studies on the impact of ownership on FP. It has been argued that in emerging nations, foreign-owned financial institutions are more effective than their domestic counterparts (Zouri et al., 2014).

Conceptually, the study investigated the five variables together because there are strong interlinkages between them and as supported by the past studies which are equally reinforced by the outcomes of this subject study. The results showed that IRS significantly affects CR and that size and ownership significantly affect the connection between CR and FP. This is the reason the study considers the interrelationships between IRS, credit risk, bank size and ownership and ascertain their impact on FP.

This research is anchored on loanable funds theory by Dennis Robertson in 1930s which stipulates that interest rate of a facility is ascertained from forces of demand and supply for funds available to save and lend to borrowers. The basic tenet of this theory is the role that credit demand plays in establishing the equilibrium interest rate. The hypothesis describes the relationship between the degrees of credit risk on lending facilities and the interest rates on such facilities. Subsequently, the levels of interest rates determine the interest income that a bank will report, and this is also

influenced by the levels of credit risk that is largely demonstrated by the levels of nonperforming loans. The theory also helps to expound the fact that size of a bank is because of organic growth derived from continuous accumulation of profits generated from the interest income. As a result, in this study, this anchoring theory has assisted in explaining the interrelationships among credit risk, size and the FP. Loanable Funds Theory serves as the study's foundational theory since it explains and accounts for the relationship between interest rate determination and the study's explanatory factors. High IRS is a precursor of high borrowing rates, and this often leads to inability to satisfactorily repay loans. This increases NPLs and augmentation of the bad loans poses an adverse force on the asset quality, earnings, capital adequacy which leads to poor bank's FP.

Other theories supporting the study include the portfolio theory that was advanced in the year 1952 by Harry Markowitz. Portfolio theory postulates that investors often build portfolios of investments to optimize or maximize the expected return at an assumed risk threshold. The theory helps in clarifying the correlation between credit risk and FP. Agency theory from Ross (1973) and later got supporting contributions from Jensen and Meckling (1976) and is useful in explaining the conflicts that emanate from an agent-shareholder relationship and as Zhong (2013) noted that when the concerns of the executives and the vision of the owners are not lined up, an agency problem is the endgame. The theory therefore helps in explanation of the impact that both the bank size and ownership have on the relationship between credit risk and FP. Arbitrage pricing theory advanced by Ross (1976) helps in elucidating the relationships between CR, IRS, bank size and financial performance. It stipulates that asset returns are explained by systemic factors and investors reduce the specific risks through a good diversification which removes any arbitrage

opportunity. The results of the study reinforced the postulates of these key theories relied on in this research.

Globally, the relationship between CR and FP has been attracting a lot of discussions and studies especially in cases where other factors are introduced. As NPLs increases, more financial institutions are expected to be more alert and keener due to the anticipated adverse outcomes (Alshatti, 2015). The impact of the infamous global financial crisis of 2008/2009 has been felt for many years after the calamity and has made regulators and other policy shapers be extra cautious while dealing with interest rates. In many jurisdictions, burgeoning cases of NPLs continue to be a challenge especially due to the difficulties encountered by lenders while trying to realize the properties held as security (Negro et al., 2010)

In Kenya, a law that introduced interest rate caps was passed in September 2016 but was repealed in November 2019. Maimbo (2014) observes that globally, in the past, at least 76 countries had adopted varying forms of interest rate caps on loans. These interest control measures had diverse outcomes that included reduced private credit and refusal by banks to lend to the poor or some segments of the market that seemed risky. Ferrari et al. (2018) also observed that over the past few years, several countries in the world have introduced interest rate caps or adopted some forms of restrictions even though others have opted to remove or ease them. Though protective to the borrowers, interest rate caps could also lead to some unexpected side-effects that include shift by banks to non-interest fees and commissions, blurred transparency in terms of process, reduction on credit supply and loan approvals to borrowers perceived to be under the risk class bracket.

COVID-19 epidemic also brought a major upset in the banking industry and many businesses were affected. This also affected the lending business because the businesses that had borrowed could not service their debts. This led to a sharp increase in cases of restructurings, defaults, and declarations of bankruptcies. CBK estimated that about Kshs. 1.63 trillion loans which account for about 54.2% of total industry's the loan book was restructured in 2020 (CBK, 2020). The financial markets have also been affected by the continuing conflict between Russia and Ukraine which has damagingly impacted on the industry's resurgence (CBK, 2022).

1.1.1 Interest Rate Spread

Ho and Saunders (1981) defines IRS as the variance between the interest rates levied of credit or loan facilities and those charged to the liabilities such as customers deposits. They assert that IRS is contingent on several key factors that include the strength of risk aversion in management, transaction sizes, the market structure of a bank and differences in interest rates. Interest received on deposits less interest earned on loans and securities is what Maina (2015) called IRS. Ngugi (2001) defines an institution's IRS as the difference between the interest earned on income-generating assets and the interest paid on borrowings. In some cases, the spread of these interest rates is perceived as a profit margin and therefore every important parameter in the determination of financial performance as was also corroborated by Alper et al. (2019).

The challenge of high spreads is not unique to Kenya, it is a problem that affects many countries and negatively impacts financial deepening and economic growth. High interest spreads might be construed to represent inadequacies in the intermediation function of banks. This assertion was supported by Ghasemi and Rostami (2016) who also noted that high IRS can be an indication of

weaknesses in the regulator's role in the market. The levels of interest rates are at times a factor in the demand and supply forces of credit. Shubiri and Jamil (2016) observes that the interest rate margins play a critical role in determining commercial banks' profitability or financial performance. Lending activities are a key driver of economic growth and development, and as such, they serve as a balancer in the broader macroeconomic system. The major causes of the IRS can be classified under bank-specific attributes, industry/sector dynamics and macro-economic variables. Size has a positive impact on IRS because bigger spreads translate into increased interest income and consequently higher profitability and financial performance (Maina, 2015; Mwangi, 2018).

Determinants of IRSs are multi-faceted and can be categorized into three groups. First, respective bank-specific variables for instance, administrative expenses, level of NPLs, ROA, the architecture of the statement of financial position, non-interest income, size of bank, liquidity etc. Second, these include factors that impact on the banking industry or sector and includes, level of competition, statutory/regulatory compliance requirements for example, the statutory reserve limits, set deposit or loan interest rates etc. Lastly, the macroeconomic variables such as the foreign exchange rates, GDP growth rate, inflationary rates among others (Were & Wambua, 2014). Alper et al. (2019) assessed the brunt of interest caps that were legislated and implemented in 2016. The anticipated intention of these restraints was to minimize the cost of borrowings, push for expansion and access of private credit and encourage higher return on savings. Nonetheless, the conclusion was that this did not achieve the goal and had to be reversed. Past studies have shown interrelations between IRSs and credit risk and that is why it has been introduced in the study as ex ante variable. To reduce IRS, some key policy measures are vital which include reduction on government domestic

borrowing and reduction of NPLs in banks using robust credit risk assessment tools (Keith et. al, 2020).

Mesah and Abor (2012) indicate that asset size, market share, capital adequacy and inflation levels have a positive relation with high interest spreads. Interest rate margins are often too high, which could be an indication of bank inefficiencies. Some research has also taken into account the influence of managerial incentives on setting interest rate spreads. This also introduces the importance of agency-shareholder relationship as some managers could set goals for personal aggrandizement as opposed to maximization of the shareholder's value. The introduction of this variable was important as it helps examine the correlation between the IRS and credit risk before relationship with FP is ascertained. Various studies used different measures to quantify the interest rate spreads but studies such as Maina (2015), Abel and Le Roux (2016) and Mesah and Abor (2012) adopted net interest margin. The metric was used because the net interest margin evaluates a bank's growth and returns. In this scenario, growth is evaluated by the total asset's denominator. The measure also introduces the aspect of efficiency in investing and because a positive margin postulates that a bank is more efficient but negative margin indicates the opposite.

According to CBK, the average lending rate for commercial banks was relatively stable in the financial year 2021/2022 at 12.1% in comparison to 12% in 2020/2021 and this is reflective of a more accommodating monetary policy. Likewise, the average deposit rate for the banks was steady at 6.47% compared to 6.41% in the previous financial year. For the interbank rate, in FY2021/2022, the rate marginally increased to 4.62% from 4.01% in the previous year. The 91-day treasury bill rate increased to 7.18% from 6.74% in 2022/2021 while 182-day rate increased

to 7.18% from 6.74% in the previous financial year (CBK, 2022). Since the abolition of interest rate regulations in 2019, interest rates have been rising. It was crucial to study how rising IRSs affect CR and FP.

1.1.2 Credit Risk

Campbell (2007) defines it as likelihood that a borrowing client could become incapable of meeting prior agreed repayments obligations as per the agreement. According to Alshatti (2015), credit risk signifies the potential risk or probability of financial loss that is precipitated by a borrower's failure to make pledged repayments making the debt become nonperforming. Therefore, credit risk can impair the loan portfolio due to defaults leading to loss of capital, interest, and other related charges. The Basel Committee defines credit risk as the risk of financial loss resulting from a borrower's or counterparty's inability to make timely payments as required by the terms of the loan agreement or other contract (BIS, 1999).

Managing credit risk is a critical part of ensuring the strong FP of any bank or any other lending institution. The PD, LGD and EAD are major factors that define credit risk which if not well managed leads to high levels of non-performing credit facilities (Caouette, Altman, and Narayanan 2008). Credit generation is a financial institution's bread and butter and is often one of their primary sources of revenue. To a commercial bank, failure to repay loan obligations by a borrower leads to higher NPLs and consequently higher impairments that lead to lower profits. Equally, if the borrower is unable to service a loan facility, a huge risk of bankruptcy or receivership becomes real, and this comes with huge ramifications (Ekinci & Poyraz, 2019). Judicious assessment, measurement and mitigation of credit risks is key, and the regulators encourage banks to maintain

adequate loss provisions to reduce the expected losses. Most lending institutions rank credit risk high in the key risk register that can severely affect financial performance and stability. It is therefore vital that this risk is given keen attention and banks must ensure proper tools and systems are in place to ensure its effective management (Aladwan, 2015).

It is crucial for commercial banks to be able to monitor credit risk since doing so allows for the creation of effective instruments for doing so. Assessment of likely losses from the lending business is also a key component of this system. Evaluation of credit risk is critical for any lending institution because it has a two-fold impact on profitability. First, weak credit risk management structures lead to high NPLs which leads to high impairments that reduces the projected profits. Second, interest income from the credit facilities or loan assets arguably constitutes the biggest part of the pie as far as the entire bank's profitability or total income is concerned (Singh, 2013; Abel & Le Roux, 2016). To be able to manage credit risk satisfactorily, sound, and tested practices are important and include, first, necessity to create a suitable and tolerable CR atmosphere. Second, lending or granting of credit facilities must be done under stringent and sound lending process, third, banks must maintain watertight credit administration, measurement and monitoring processes and practices and lastly proper and adequate controls over credit risk must be in place. Different banks will design their credit risk management differently but ideally these four areas need to be properly addressed.

Various credit parameters are used to quantify credit risk and the main ones revolve around the levels of NPL or loan loss provisions recorded by a specific bank. NPL as a proportion of total loans and provisions as a percentage of nonperforming loans may be used as indicators of the

sophistication of credit risk management (Timothy, 2018). The ratio of NPL to total gross loans (NPL/TL) is a common metric for quantifying CR, and Ekinci and Poyraz (2019) followed Chege et al. On the other hand, Liu et al. (2016) included bad debts and nonperforming loans as assets. The ratio of bad loans to total loans was used in this study of credit risk. Ratios are used because a bank's nonperforming loan (NPL) ratio is a measurable result that demonstrates how credit risk is handled inside an organization. The measure provides a clear yardstick in measuring how well a lending institution is underwriting and managing its credit portfolio. A bank with high NPL ratio indicates that such a lender harbors high risk of losses precipitated by the delay or failure to efficiently recover the loaned amounts whereas a lender with a lower ratio is perceived to be very efficient and less risky in managing its loan portfolio.

According to the CBK, asset quality worsened in FY2021/2022 with the NPLs to gross loans ratio growing from 14.0% in June 2021 to 14.7% in June 2022. This is attributable to the very challenging operating environment that was complicated by the post-effect of Covid-19 pandemic as well as the Russia/Ukraine war. Loan delinquencies have been on the increase and banks have been stepping up recovery efforts but at times with little success in the legal foreclosure processes. This underscores the need for an in-depth study on CR and how that affects the FP of these banks, and this is also confirmed by the outcomes of this study.

1.1.3 Bank Size

Perkins (2017) indicates that bank size is a product of several factors that eventually lead to a classification under a big, medium, or small bank. Some of these factors include or involve several aspects in models of the business including income statement, balance sheet size, extent of

products and services on offer, sources of funding and the defined risk appetite among other aspects. He also indicates that there are both formal and informal classifications and in some markets such dichotomy exists for example in the USA, banks can be classified as community and Wall Street banks. According to Schildbach (2017), the size of a bank is about defining how large or small the bank is and can be determined by the market capitalization, the levels of total assets, revenues, equity among other factors. There are also other key measures such as risk-weighted assets, customer base, net earnings that could be adopted as measures of size. Laeven et al. (2014) indicate that the optimal size is crucial, and it defines the size of assets, liquidity, capital asset quality that a bank should carry and then a classification of bank size is derived from these key aspects. Bank size has also been used to define commercial banks into either small or easy-to-collapse against the too-large-to-flop banks. Size of bank determines the ability to mobilize resources to improve the operational efficiency levels.

Aladwan (2015) explains that research shows that smaller banks are more lucrative than bigger ones. Large banks need a huge set up costs and need to invest in more advanced technological platforms to effectively be able to compete with their peers satisfactorily. However, other studies have contradicted this viewpoint and argue that small banks struggle in raising resources that would be vital to carry out critical bank operations including investing in Research and Development. There are several viewpoints as explained by Laeven, Ratnovski and Tong (2014) regarding the optimal size of a bank. One of them is that large or big banks contribute to systemic risk, and this is because large banks at times engage in riskier activities. This makes them bare to liquidity surprises. Conversely, there is a different viewpoint that stipulates that there are banks that can be classified under too-big-to-fail category and that the supervisors are often hesitant to

punish. Therefore, this leads to moral hazard conduct that led some banks being reckless in expectations that governments will always come to their rescue through bailouts and rescue packages.

Multinational clients rely on big international banks which are satisfactorily able to support them in their international business and have financial muscle and stability to underwrite big transactions or handle bigger risks. It is therefore of great importance and relevance to define bank size and therefore this is always of keen interest to the regulators, policy makers and customers too. The bigger a bank is, the more it can enjoy economies of scale which allow for the fixed costs to be spread over a bigger asset base (Mwangi, 2018; Schildbach, 2017). Moreover, as the operations increase, banks take advantage of their internal resources such as analysts or credit officers resulting in greater efficiency. However, another argument is that smaller banks are more cautious and are able to handle clients better than big banks (Regehr & Sengupta, 2016). While some studies like Mwangi (2018) observed that size has a positive correlation with profitability, others such as Aladwan (2015) and Dahmash (2015) were of the contrary view.

The challenging environment within which banks continue to operate coupled with several financial crises in recent past always have led to a robust debate on the optimal size and structure of a bank. Various measures such as total assets, equity, customer base among others is used in measuring the size of a bank and all this depends on the appropriateness of each of the studies. Bank size was quantified by assets in Regehr and Sengupta (2016) and Aladwan (2015), but the natural logarithm of total assets in Dahmash (2015) and Mwangi (2018). Schildbach (2017) observed that as a measure of bank size, total assets are often used by regulators and academics.

This is because it measures and provides the gross nominal volume of all the activities of a bank. As a measure, it may suffer from valuation challenges, but it is perceived to be one of the best measures in determining the size of a bank.

According to CBK, bank assets in 2021 was slightly above 6 trillion Kenyan shillings, which is about USD 50 billion. Equity Bank Group was the biggest bank in 2021 with an asset base of USD 10 billion followed by KCB Group with USD 9 billion. There has been a trend toward industry-wide mergers and acquisitions, with the most recent significant transaction being in 2019 when KCB Group Plc successfully acquired National Bank. In the same year, CBA and NIC banks also merged and formed NCBA Group PLC which effectively created East Africa's third largest commercial bank.

1.1.4 Bank Ownership

Cull, Peria and Verrier (2017) define bank ownership as the composition of the shareholders who claim proprietorship to the financial institution and that could be in different shape or form. Rahman and Reja (2015) define bank ownership as the structure of how bank shares are possessed and that could be based on family, government, institutional and foreign ownership. Zouri et al. (2014) observed that bank ownership is defined as a way that shareholding structures are developed and maintained to have an impact on how corporate governance structures are set. Most shareholders wield both incentive and power to dictate the vision of the company. There is an assumption that believes that privately-owned banks are more cost-effective, and this could inspire those owned by governments to work harder to survive the competition. Rahman and Reja (2015) indicated that concentrated ownership structure is perceived as a tool that could help in minimizing

the agency challenge or problem between shareholders and managers. This emanates from the expected performance due to the difference in ownership and control and it is assumed that big shareholders in a firm can enable shareholders to sufficiently put in place measures that will help monitor the managers' decisions. Therefore, they can stop them from engaging in activities perceived to be of moral hazard behavior as well as ensure that the key goal of the managers is to increase shareholders' value and interest.

Foreign-owned banks encourage competition in the local banking sectors which help in improving efficiency and performance. This was the opinion shared by Sarker and Nahar (2017), however, another school of thought that postulates that the trade-off is that these foreign banks can spread external economic shocks which impair access to credit (Cull, Peria & Verrier, 2017). It is believed that power politics or the dominance by the majority is a key driver in defining the winners in the competitive corporate world. Agency theory places a premium on the need to seriously plan on the ownership structure because it has an impact of the risk profile of a bank. A strictly privately owned bank could have a different risk-bearing capacity compared to a fully owned commercial bank. It has also been observed that state-owned banks with political connections could exacerbate aggressive risk-taking behavior because such banks are able to enjoy government bailouts as opposed to privately owned banks. Ownership is greatly connected with accomplishment in republics at development phase but not correlated where industrialized countries are involved. This is in line with the conclusions of Micco et al. (2004).

Ownership also dictates the capacity to mobilize resources, which has an impact on bank size, IRSs and on the ability to set up robust systems to manage credit risks. Cylen (2018) adopted major

shareholders and free float rate as the bank ownership variables in the study. Rahman and Reja (2017) clustered all banks under the family-owned, institutional-owned, government-owned categories and a percentage of each was calculated against the total ownership. This study used the percentage of private and public ownership for a bank to operationalize the variable. Altunbas et al. (2001) noted that cost and profit inefficiencies are traceable to ownership structures of commercial banks. Ownership structure and principal-agency frameworks and issues must be considered. The classification of financial organizations as privately or publicly owned helps explain how bank ownership affects credit risk and FP.

The central bank of Kenya also classifies banks in terms of shareholding. Institutions that are owned by foreigners but are based in another country make up the first group, while those that are owned by foreigners but are based in another country make up the second. The other group consists of banks with Government participation, institutions locally owned and lastly those that are listed on the NSE. The updated list is always published on the regulator's official website.

1.1.5   Financial Performance

Bikker (2010) defines FP as reflection of how bank's resources are utilized in efforts to achieve certain set objectives. It is a comprehensive assessment of a business's complete footing in viewpoint that includes assets, liabilities, equity, expenses, returns among other key financial and non-financial parameters. This means the input that banks bring on the table as wealth on behalf of their customers, stockholders, and other key players. Rengasamy (2012) defined financial performance as the attainment of a certain key financial parameter for a certain period measured by capital adequacy, asset quality, liquidity, solvency, leverage, and profitability etc. Lai et al.

(2015) indicated that financial performance as the real results that can be measured against solid pre-set performance goals. FP is therefore the endgame in any financial institution that is carrying out the banking business.

In any market, commercial banks usually not only dominate the financial sector but also act as a barometer that evaluates the fitness of the sector. Therefore, the FP of these financial institutions is key, and failure of the banking system can send shockwaves and lead to huge implications for economic growth. In various markets, collapse of the banking systems that could be precipitated by bankruptcies or other challenges often leads to a contagion effect that by and large occasion bank runs. If not well managed, this can become a full-blown crisis ending up with immeasurable economic disasters. There have been several cases of bank failures leading to cases of statutory management, receiverships, and eventual buyouts (Ongore & Kusa, 2013).

According to Mwangi (2018), banks play a crucial role in every economy, hence their performance affects economic development. Financial disaster of 2008 precipitated challenges that have made banks engage in continued implementation of the post-crisis reforms for instance the stringent loan loss provisioning in line with the IFSR 9 and additional capitalization based on Basel II and III accords. Disruptive technologies leading to proliferation of financial technologies and virtual currencies dictate a different way of managing performance. Financial performance is thus important and has a huge impact on the general economy of a nation (CBK, 2018; Aladwan, 2015; Dahmash, 2015).

The measure adopted depends on the appropriateness of each of the studies and these measurement parameters may be the Tobin's Q for listed firms or banks, CAMELs, ROA, or ROE. Babar and Lions (2012) and Ahsan (2018) used the CAMELs model as a measure of financial performance while Li and Zou (2014) and Sujeewa (2015) used the ROE and ROA. CAMEL's model is more encompassing and assess many financial parameters that are critical in determination of the overall performance. They include capital adequacy, asset quality, management, earnings, liquidity etc. This is the reason CAMELs rating was used as a yardstick of FP. However, to avoid multicollinearity among the variables, the measures used to compute each of the key parameters of the CAMELs score have been carefully selected. The research chose the metric because it evaluates a bank's strength in six important areas, unlike other measures that focus on one or two categories.

Profit before tax for the industry fell by 29.5% in 2020, from Kes.159.1billion in December 2019 to Kes.112.2billion in December 2020, as reported by CBK. This precipitous drop may be traced back to the regulatory and banking restrictions put in place in the wake of the Covid-19 outbreak, which had an adverse effect on financial results. The total asset base of the entire sector stood at Kes.5.4 trillion as at the end of 2020, which was a 12.4% growth from Kes. 4.8 trillion as at December 2019. Approximately 66.8% of total net assets were held by 20 local private commercial banks, while the remaining 0.6% was held by 2 local public commercial banks. 17 of the banks were foreign-owned and this represented 32.6% of the total bank assets over the period.

1.1.6   Commercial Banks in Kenya

As per CBK, the sector was comprised of one regulatory authority and 41 commercial banks as of December 31, 2020. However, the number reduced to 38 as at the end of 2021 due to several mergers and acquisitions. All commercial banks are supervised by the CBK under the Bank Supervision Department (BSD) which draws its powers from section 4(2) of the Central Bank of Kenya Act. Supervision is important and helps in ensuring stability of the banking industry as well as the economy (CBK, 2018). Banks are expected to be compliant with all the standards such as the Basel Accord and other IFRS requirements.

In 2020, the banking sector was hit hard as non-performing loans continued to soar coupled by dwindling incomes in comparison to the budgeted figures. To help financial institutions face the novel difficulties brought on by COVID 19, the Basel Committee on Bank Supervision has produced guidance on credit facility management. Unlike at the onset of the pandemic, most countries have now been reopened for business and therefore collections have resumed albeit at a slower pace. Land registries, Courts of Law and other important government offices are still operating at minimal capacity which continues to delay some key processes in the banking business. In March 2020, which was the advent of the COVID-19 epidemic, the Central Bank introduced a raft of emergency measures in the banking system which were aimed at providing much needed relief to borrowers affected by the impact of the disease. According to the CBK, commercial banks restructured about 54.2% of the then outstanding loan book in 2020. The percentage of NPLs to gross loans went up from 14.1% in December 2020 compared to 12% in December 2019 (CBK, 2021). This is the reason why the study incorporated credit risk as independent variables in the investigation of the interrelationships with the other selected variables.

Kenya's new interest rate limit legislation is the legislative embodiment of the country's transition to a system of regulated interest rates. Limits on both lending and deposit rates were enacted by legislation in 2016. It was set at no more than 400 bps above the base rate set by the Central Bank. It also set a floor of deposits to at least 70% of that same benchmark rate (CBK, 2018). While some players, especially the customers celebrated the action, other players including policy makers and the regulator were not entirely supportive of the idea. The interest rate capping law was also seen as being inconsistent with the spirit and letter of the dictates of a free market economy. According to CBK, rate caps reduced access to loan accounts. This therefore led to a rising average loan size by about 36.7% over that period. The interpretation is that there was a reduced number of loan accounts and indication that there was a lower access to loans by the targeted borrowers. In November 2019, the law that removed the interest rate caps was assented to by the president marking the end of the regime that had been accused of a being a hurdle to access to credit. The IRSs have been fairy stabilized due to the interest rate controls but with major downsides of the decision (Alper et al., 2019). Several mergers and consolidations were reported as well.

Requirements of IFRS 9 that seek to improve credit risk provisioning has made banks invest more in maintenance of better systems to manage the risk. Internationally, the implementation of IFSR 9 is on course and in April 2018, the CBK issued guidelines to the banks on how to implement the Expected Credit Loss (ECL) model that replaces the older model under IAS 39 which was an Incurred Credit Loss based approach. Some of the key implications of the implementation of the provisions or IFRS 9 included first more volatility in the statement of income. IFRS 9 requires that assets be valued at fair values and those revaluation amounts had a direct impact on the statements of income for most of these commercial banks. Second, it involves earlier recognition and

provisions of impairments for both receivables and loan assets. It therefore means businesses are currently required to commence provisions for possible future credit losses once these credit facilities are booked in the books, which is a complete departure from the postulates of IAS 39. Lastly, IFRS 9 brought about more requirements in terms of disclosure of important data and information to various stakeholders including the regulators. This obviously means the banks must set up robust systems that will help in the collection and collation of the required data and information (CBK, 2018).

In December 2017, the Basel Committee certified the conclusion of Basel III reforms although their implementation was postponed and would be effective until January 2022. This was in phases and rollout was in five years (CBK, 2018). The Basel III model is a key element of the Basel Committee's swift reaction or response to the global financial calamity of 2009. The framework addresses several weaknesses and shortcomings that were noted and came bare after the crisis. Some of these shortcomings involved the regulatory framework and precipitated need to provide a regulatory environment that guarantees a solid and very resilient banking system that can withstand systemic risks that are at times complete unseen or forecasted.

1.2   Research Problem

Credit risk poses numerous difficulties to any lender and if not well managed can lead to financial ruin at individual bank and sectorial levels. There is an elevated connection between massive NPLs and ineffective CR management solutions. IRS is an antecedent to credit risk and the higher the spread translates to increased credit risk (Sujeewa, 2015; Muriithi et al., 2016). The introduction and subsequent repeal of the caps in 2016 and 2019 respectively triggered a big change in the IRSs

and CBK confirmed that the repeal led to a better performance (CBK,2022). FP is also impacted by the size of a bank because size determines the capacity and resources that a financial institution can amass to address some of the key FP indicators (Mwangi, 2018). This argument has also been corroborated by the findings of this study. Another factor that also influences the association between CR and FP is ownership. Differences and variety in ownership influence the way management of the business is conducted. This touches on many aspects of the business including how the profits are distributed among other decisions. Researchers have explored the relations between these variables but every so often resulted in contradictory findings. Conceptually, the interlinkages between the factors explained have persuaded and buttressed the need to carry out a study that included IRS, Credit risk, bank size, ownership, and financial performance.

Whereas Mwangi (2018) established that size has a direct positive impact on FP, other studies such as Aladwan (2015) and Dahmash (2015) contradicted that assertion. Micco et al. (2004) and Mamatzakis et al. (2017) looked at the impact of ownership on FP and came to the same conclusion: the two are positively correlated. Cull, Peria, and Verrier (2017) found, however, that the opposite was true. Judging from this and other examples, it is safe to posit that there is no sole agreed position on the topic. These conflicting results from previous studies motivated this study to introduce the two variables which are bank size and ownership that were very helpful in testing the impact on the main relationship. To enrich it further, the study also introduced is interest rate spread as an ex-ante variable which allows the study to first interrogate its antecedental impact on credit risk before testing the main relationship. There have been conflicting results on the impact of IRS on both CR and FP, and it is the reason it was deemed appropriate to include it in the study.

Therefore, the findings have helped in decoding the interrelationships between IRS, CR, bank size, ownership, and FP.

As elucidated, banks continue to experience unprecedented challenges that are not only intrinsic to the business but also caused by external factors. Expanding IRSs is one of the main questions that regulators continue to grapple with to date. Sharp increase in rates make lending expensive and this could make borrowers struggle due to what is referred to as debt fatigue. As a result, NPLs might rise, causing returns to suffer from extra impairments. The pathogenic COVID-19 virus and the pillaging Russia–Ukraine war are two extraterritorial causes that have worsened the situation. FinTechs are also posing stiff competition to the traditional banking business. This is also complicated by the advancing enterprise models, progressively tough regulations, and compliance constraints as well as upsetting bank technology. Basel II and III Accords, the Dodd-Frank Act and IFRS 9 as examples of the international benchmarks that banks are expected to adopt or align with. High spreads increase CR, and this is a fact that was corroborated by Khawaja and Din (2007) and Maina (2015).

According to the CBK, the sector is still grappling with the negative impacts of the ever-changing operating ecosystem that concerns asset quality and other growth factors. A study on the key financial parameters in Kenya is timely at this moment. As of 2021, the total assets stood at 6 trillion which is a marginal increase from 5.4 trillion in 2021. Profitability has started to recover but the post Covid-19 impact, and the ongoing Ukraine war are still a challenge. The ROA & ROE of the sector was 3.3% & 22.1% respectively in 2021 compared to 2% & 13.3% respectively in 2020. The asset quality is still a big challenge with the NPLs to Gross Loans at 14.1% by end of

2021 which is a very marginal change from 14.5% in 2020 (CBK, 2022). High levels of NPLs, delayed payments by government and a slow growth in the real economy has played a big role. Continued increase in loan provisions due to the impact of the IFRS 9 has adversely impacted on bank profitability, asset quality and capital adequacy (Alushula, 2019). In terms of bank size and ownership, Kenya has experienced a wave of bank consolidations that has changed both the size and ownership structures. This will help in devising solutions that could positively contribute to localized policy solutions and this is one of the reasons why contextually, the study is conducted in Kenya.

Internationally, studies on the interrelationships between IRS, CR, size, ownership, and FP have been done but at times end up with conflicting findings. This could be attributed to several reasons which could be methodological, contextual, or conceptual. On conceptual gaps, very few studies have provided a detailed study on the variables that have been studied. Most of the studies such as Mwangi (2018), Aladwan (2015) and Shehzad et al. (2013) relied on two or three variables, and it was important to carry out a more encompassing study whose conceptual framework will be diverse. Shehzad et al. (2013) studied the connection amongst size, growth, and returns of banks in 148 nations. The population was made up of banks drawn from diverse geographical jurisdictions with different economic capabilities and sophistication as it concentrated on the well-endowed countries in OECD. This presents a contextual gap because the macroeconomic environment and the financial systems in the OECD countries are way stronger compared with the Kenyan financial system. The introduction of other factors such as bank ownership, interest rate spread, and bank size would help in deciphering the interrelation between credit risk and FP. In terms of methodological gaps, Almekhlafi et al. (2016) evaluated the impact of CR on performance

and identified data limitation as the reason a very small sample of 6 banks was used out of a big population. It used Jarque-Bera (JB) as the test of normality of the distribution but due to the size of the sample, Shapiro-Wilk Test could have been more appropriate.

Regionally, several studies were carried out to test the relationships among interest rate spread, credit risk, size, ownership, and FP of commercial banks. The impact of IRS on the FP of banks in Nigeria during a 26-year period was evaluated by Obidike, Ejeh, and Ugwuegbe in 2015. This study did not test the impact of the time-lag effect on some variables which could have introduced a significant bias on the results. Likewise, Musah (2018) assumed a direct causal effect of the key variables and did not consider other factors that could have affected the studied relationship. The study also noted non-availability of data as a limitation that led to use of NIM as a measure of interest rate spread and the results were also affected by multicollinearity. VIF test could have been used and elimination of the correlated variables be carried out. Aladwan (2015) used a very short period for the study, and this could have affected the results. A period of 5 years for the study could be perceived as too short to give a complete view of the trends of the variables.

Locally, in terms of conceptual gaps, there are few studies that have examined the interrelations among all the variables under the proposed study. Mwangi (2018) looked at how bank size affects the FP of Kenyan institutions and found a favorable link. The results corroborated those of Sufian and Kamarudin (2012) and Abel and Le Roux (2016), but those of Aladwan and Dahmash (2015) did not. The influence of other variables on the correlation between CR and FP (IRS, size, and ownership) was investigated. The impact of NPLs on the FP was analyzed by Chege et al. (2018). The study's basic data, however, was heavily dependent on a subjective selection of credit

managers. This is likely to introduce a bias which could have been addressed by a mix of both secondary and primary data. On methodological gaps, there were differences in the operationalization of key variables, for example some studies such as Mwangi (2018) used ROA as a measure of FP while others such as Maina (2015) adopted CAMELs. This study also used CAMELs because they are more encompassing as a measure of FP as opposed to ROA which largely evaluated the returns.

The reviewed studies above had varied results largely attributable to methodological, contextual, or conceptual gaps. The impact of credit risk on FP remains an open case and the introduction of interest rate spread, bank size and ownership has given a chance to test all those interrelations. The study has attempted to respond to a key concern which is the relationship between interest rate spread, credit risk, size, ownership, and FP of commercial banks in Kenya?

1.3 Research Objectives

1.3.1 General Objective

The general goal was to consider the relationships among IRS, CR, bank size, ownership, and FP of commercial banks in Kenya.

1.3.2 Specific Objectives

This study was structured to:

i. Investigate the effect of IRS on FP of commercial banks in Kenya.

ii. Assess the effect of the IRS on CR in commercial banks in Kenya.

iii. Examine the effect of credit risk on FP of commercial banks in Kenya.

iv.   Ascertain the effect of ownership on the relationship between credit risk and FP of commercial banks in Kenya.

v.   Assess the effect of bank size on the relationship between CR and FP of commercial banks in Kenya.

vi.   Establish the effect of interest rate spread, Credit risk, bank size and ownership on FP of commercial banks in Kenya.

1.4   Value of the Study

The research illuminates the interrelationships between IRS, credit risk, size, ownership, and FP. It has significantly addressed interest rates and their spreads which is an integral part of the anchoring theory, loanable funds theory, modern portfolio theory, agency theory and arbitrage portfolio theory. It has contributed immensely to testing the postulates of the theory and by linking the theoretical and empirical underpinnings to the observations and results of the research. First, on loanable funds theory, the key constructs of the theory are interest rates and credit/loanable funds which are part of all the study variables. Some scholars have argued that higher interest rate spreads can lead to borrowers being unable to satisfactorily service their debts which eventually leads to higher expenses in terms of impairments. This leads to suppression of returns which squeezes FP of a financial institution. This research supports the Loanable funds idea that interest rates determine commercial banks' market-accessible private loans. Second, Modern portfolio theory emphasizes credit risk management, return maximization, and asset diversification.

The study has ascertained that credit risk has an impact on returns of FP. It has been established that improved administration of CR leads to a decrease in related costs such as loss provisions that

positively contribute to growth in returns. Third, agency theory's key concepts include the principal-agency relations, corporate governance structures and impact on performance. These constructs were at the centre of the study especially while studying the moderation effect of ownership and size. The findings have also buttressed the position that a well-diversified and well structure of ownership guarantees better corporate governance platform that leads to better financial performance. Lastly, arbitrage theory's main constructs include asset returns, macroeconomic factors, and management of systemic risk. These are some of the main aspects that the study sought to decode and the findings affirm Ross's the theoretical argument that asset's expected return is affected by several external factors and risk. The higher the risks the higher the returns and the general risk has a significant impact on returns.

The research has also enriched the body of knowledge by testing the interrelations between credit risk and FP and the additional factors which include IRS, bank size and ownership. This has helped in identifying the key gaps in the theory which may precipitate the need for review, improvements, or adjustments in future. Study extends the limited research on the understanding of the specified variables. Some of the contributions include, first, the key contribution is on the subject research area as it is among the first to consider the impact of antecedental impact of interest spread and moderation magnitude of ownership and size. It is thus addressing the identified research gaps with reference to the Kenyan banking sector. Second, the research contributed to solving or addressing the trending and critical issues in the banking sector. Some of the key issues include huge IRSs, high NPLs, tight international banking standards, and tough macroeconomic environment among others.

Third, the study provides a unique conceptual approach or model in testing the link between CR and FP. Ex-ante evaluation of IRS and credit risk and FP backed up with two moderating variables provides an enriched study which in not very common based on review of past studies. Fourth, the study has adopted practical methods and attempted to improve on what other studies have used to ascertain the impact on the relations. Use of CAMELs score instead of ROA or ROE as a measure of FP is one of them. The study has helped in the identification of existing knowledge gaps and makes key recommendations to be considered in future research.

Contextually, this investigation is conducted at a time that the local banking sector is undergoing radical changes and facing a myriad of challenges including the ravaging COVID-19 pandemic. This study's findings and conclusions have provided solid solutions that shall generate great value to the stakeholders involved in the financial system and practice including the policy makers, regulators, borrowers, and the commercial banks. Policy makers will need to devise measures that will address the way commercial banks are operated and managed. For instance, the study has made a case for a well-capitalized and sized banks with a well-diversified ownership structure. This is because banks with such a structural enhancement stand a better chance of surviving financial crises. The regulator could also use the outcomes of the study to come up with more solid pronouncements on how some the commercial banks should be regulated and supervised. This may not necessarily mean the introduction of prudential guidelines or limitations on the rates as this was found to be inappropriate to legislate against such sensitive issues.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This offers in-depth analysis and evaluation of scholarly sources such as books, journal articles or academic theses that relate to a specific research topic or research question. This section covers the theoretical literature review and simply delves into the theoretical foundations that explain some of the key variables under study. The emphasis of theoretical literature review is on theory underpinnings as opposed to the application of it.

2.2 Theoretical Literature Review

This review seeks to establish theoretical clasps that exist and ascertain the relationships or interconnections among them. The review also determines the degree to which such theories have been investigated or tested, which gives room to the development of new hypotheses and allow them to be tested as well. The degree of analysis for a particular theory can be based or focused on a certain aspect of a theoretical concept or on the whole theory. This segment reviews the key theories that were relied upon in the study. Specifically, it reviews loanable funds theory, modern portfolio theory, agency theory and arbitrage pricing theory. The section also explains the origin, key arguments, critique of each and their contributions to this study.

2.2.1 Loanable Funds Theory

Dennis Robertson developed LFT in the 1930s. Bertil Ohlin and Knut Wicksell were also instrumental in its development. According to this theory, the cost of credit, expressed as interest, is set by the relative scarcity and availability of loanable money, as reported by Hansen (1951).

LFT is hedged on some key fundamental assumptions that include: first, the market for loanable funds is a totally well-structured market and has perfect mobility of funds within that market. Second, perfect competition exists and therefore only one rate of interest can prevail or exist in the market at a given moment. Third, interest rates are perceived to be flexible to ensure interest rates freely move based on the demand/supply forces of the loanable funds. Fourth, it also assumes full employment of resources to ensure there are constant levels of output and income. Lastly, it is assumed that cash plays a fundamental part in the determination of interest-rates thus banks choses a stabilizing policy with a view of ensuring there is monetary equilibrium (Hansen, 1951). Loanable funds constitute key types of credit, for instance loans and bonds, and their performance is critical in assessing the level of CR.

The theory is very key in explaining the antecedental effect of interest rate spreads and its impact of CR which is key in deciphering the association between CR and FP. All banks largely depend on interest income that is largely determined by the fees, commission and interest charged on credit facilities. When banks are unable to properly manage credit risk through a serious vetting of borrowers, the risk of default increases and this is reflected in the pricing of future loans as a buffer to cater for possible loss through a default. High credit risk leads to high NPLs and ultimately high loss provisions. This not only affects the profitability but all the other CAMELs parameters as well. By extension, the growth or size of a bank is determined by the organic growth largely generated through the annual profits. Equally, low profits lead to low growth in size. Maina (2015) argues that ownership structure determines the levels of interest rates in some banks. Privately held banks, whose primary goal is to maximize profits and provide a healthy dividend to their shareholders, are less flexible than their government-owned counterparts. Conceptually, the

loanable funds theory is therefore able to explain the interrelations amongst almost all the study variables and this justifies the reasons it was adopted as the anchoring theory. This theory helped in explaining relationships between credit risk, bank size, ownership, IRS, and FP.

Demirguc and Huizinga (1998) supported the theory and indicated that equilibrium is only achieved when the interest rates intersect and that is where demand meets the supply for loanable funds. Claeys and Vander (2008) suggested that LFT explained why interest rates would rise if consumers didn't put money into commercial banks. This would cause a shortage of loanable funds and, in turn, interest rates. This leads to increased interest rate spreads. However, Lindner (2013) argued that the theory's views are wrong and illogical assumptions because credit cannot be limited by the level of savings and noted that provision of credit is purely a portfolio decision. The study argued that many economists take saving and supply of credit to be interpretable through macroeconomic saving-investment and identify that as a budget constraint. This view is incorrect, according to Lindner (2013), since reduced consumption increases saving, loan availability, and business investment. According to the research, loanable funds theory proponents committed accounting mistakes that could only be sustained by unusual assumptions.

Snippe (1985), an opponent of the theory, said that there is nothing to distinguish it from the liquidity preference theory of interest. The study designates that there are no succinct distinctions between the LFT and the LPT and hedged most of the arguments of the publications authored by Robertson (1938) and Keynes (1936). The authors agreed regarding the factors that determine rate of interest, but they disagreed on key issues such the key assumptions that make the two theories hold. Bertocco (2013) argued that the consideration of banks in financing investments by issuing

31

credit does not infer acceptance of the LFT. Keynes (1936) attacked the idea and proposed the general theory, which contested that demand and supply factors determine interest rates (Bertocco, 2013).

The LFT contributes to the study by helping in the amplification of the relationship between credit risk and FP. It anchors the research as it addresses interest rates, a key component in most of the variables that include IRS, credit risk, size, and FP. At the center of the theory are two important concepts that are at the heart of this study i.e., interest rates and loanable funds. The theory postulates that the major source of demand for loanable funds is the need for or growth in investments. Investment spurs growth that precipitates the need for additional credit facilities of loanable funds. Under this context, investment means the expenditure required to enable the investors to be able to purchase and stock-up new or additional capital goods. LFT is helpful in explaining how interest rates are determined and this construct is important in deciphering the impact of IRS on credit risk and FP considering the other dynamics such as size and ownership. Other studies that used LFT to anchor their studies include Musah (2018) and Maina (2015).

2.2.2 Modern Portfolio Theory

In 1952, Harry Markowitz formulated the theory which suggests that some investors can create investments-portfolio to boost the anticipated returns at a certain risk threshold. (Markowitz, 1952). Markowitz won a Nobel Prize in Economics in 1990 as recognition for his efforts developing this theory. Markowitz demonstrated that instead of focusing on an individual asset's risk and returns, building a more diversified portfolio is less risky or volatile compared to the summation of the volatility attached to the individual assets considered separately.

The proponents argue that it allows investors to be able to aptly manage or monitor the performance of the portfolios. Indeed, although MPT did not hit the market with a bang, the late 20th and early 21st centuries had its contributions to finance become increasingly appreciated and accepted. Moreover, it is succinct that it is unlikely that the acceptance or popularity of the theory is likely to diminish any time soon and therefore it can be concluded that MPT has earned a key space in the theory and practice of finance (Fabozzi, Gupta & Markowitz, 2002). However, critics of the theory question its appropriateness as a faultless investment instrument. Indeed, Petros (2011) noted that it is only the government that can borrow at the Treasury bill rate and that the assumption that investors are rational is also farfetched. Hubbard (2009) noted that there are many critics of the portfolio theory especially Nicholas Taleb who indicated that MPT is nothing better than astrology. It was also noted that modelling process involved in the portfolio theory ignored the impact of human behavior in financial markets (Otuteye & Siddique, 2017).

The modern portfolio theory enhances the study by explaining the affiliation between credit risk and FP. The key construct of the theory includes management of risk and maximization of returns through asset diversification. It postulates that investors can be able to generate a portfolio that would give the best returns at a reasonable risk level. The theory is therefore critical in rationalizing the inter-relations between CR and FP. It is also vital in explaining how the IRS relates with credit risk and ultimately the FP. This is the rationale of the using the theory to explain the variables in this study The theory explains the risk-return matrix which helps in decoding the correlation between credit risk and FP (Aladwan, 2015).

2.2.3 Agency Theory

Ross and Mitnick formulated the theory in 1973. Agency theory explains the relationships between principals and agents as well as the concept of delegation of control (Mitnick, 1975). The interactions between the shareholders and the agents lead to conflicts due to no alignment of interests. These relationships are also affected by the structure of the ownership or the size of the business among other factors. According to agency theory, management acts as agents for shareholders, whose goals may include, but are not limited to, increasing the company's value. These agents work hard to increase the shareholder's value at the expectation of earning commensurate remuneration or rewards. However, in real life, shareholders' and management's interests are not always aligned and this leads to a conflict usually referred to as the agent-shareholder problem.

At times, owners may feel that they could be overpaying the managers who correspondingly feel undervalued (Mamatzakis et al., 2017; Gedajlovic and Shapiro, 2002). Jassim, Dexter, and Sidhu (1988) supported the theory and noted that only 15% of the major U.S. institutions were owned by the people managing them by 1969 which led to agency problem. Kumalasari and Sudarma (2013) argued that the only cause of the principal-agent conflict is lack of good communication leading to information asymmetry. The agency theory is still contentious to business ethicists who argue that it is the origin of the scandals due to its emphasis in business schools (Heath, 2009). Sometimes it is hard to define or determine if an agent or the management is working in the interests of principals and to measure that a concept of Agency Loss is used. Agency loss quantifies the difference between what would be perceived to be the best possible outcome for the shareholders and the outcomes or consequences of the acts of the managers. For example, if an

agent or management acts in the full interest of their principals, then the agency's loss is zero while the loss increases if the agents act in contravention or against the interests of the shareholders.

Bruce et al., 2005 argued that one of the key objections or limitation of the theory is that it over relies on the basic assumption that agents are filled with greed and are more geared towards self-interests to maximize own economic wealth. This therefore means that it is hard to strike a balance between the agents' self-interest and the need to still maximize wealth for the shareholders. Wiseman et al. (2012) argued that by officially accepting the broader social fabric, it is easier to improve our comprehension of the agency problems. This helps in recognizing that agency challenges might vary from one firm to another as opposed to what had been theorized by other agency scholars. These scholars therefore challenged the critics of the theory who seem to imply that agency theory's value is trapped in a narrow context under the hands of egocentric agents whose only interest is self-aggrandizement.

The importance of ownership and size on FP was further bolstered by this notion. The logarithm of a bank's total assets served as a proxy for its size, while the proportion of privately held stock represented ownership. Failure of managers in their roles could lead to more expenses and impacts performance (Heath, 2009).

2.2.4 Arbitrage Pricing Theory

The theory was articulated in 1976 by Stephen Ross and was based on the idea that asset returns can be forecasted through a balance between the asset and other several risk factors. Key postulate of this theory is the inherent belief that securities that are mispriced can represent short-term, risk-

free profit position which is of great interest and importance to an investor. APT is different from the Capital Assets Pricing Model (CAPM) with the key difference being that APT uses a single factor unlike CAPM that relies on several factors. However, the striking similarity is the fact that both assume that a factor model can satisfactorily explain the correlation between risk and return. (Ross, 1976). This theory contributes to the study by helping in managing risks to optimize the expected returns. Financial establishments that post good financial results can organically grow and therefore effectively impact on the size as well.

APT does not assume that investors hold efficient portfolio as stipulated by the CAPM model. The theory is therefore anchored on some key assumptions which includes the fact that asset returns are as result of systematic factors. Second, investors build portfolio of assets/securities where the specific risk is eliminated by well-planned diversification. Third, no arbitrage opportunities can exist if the portfolios are well diversified. Fourth, in cases where such arbitrage opportunities exist, investors will rush in to exploit them. This explains how the theory earned the name, Arbitrage Pricing Theory. Munshi (2014) criticized APT by indicating that it was in breach of fundamental principles of statistics. He indicated that empirical APT frameworks are validated using the same data sets used to build them which is wrong. APT is also perceived to be complicated in application and requires lots of data and intricate statistical analysis which might distort the results in case of any error.

Proponents of the theory argued that it returned better results compared to the CAPM method. Their results lead to the advice that regulators are better off adopting the multiple-factor risk approach (Bower et al., 1984). The management of NPLs and loan provisions has an impact on

the interest income and therefore on the earnings, which is a significant component of FP under the CAMELs model. The ability of a bank to organically grow from the accumulated profits determines the capacity to manage risks and how it impacts on the levels of NPLs and ultimately the earnings (Lai et al., 2015).

2.3 Empirical Review

The section has delved into preceding works by other academics and experts in search of existing knowledge and existing research gaps that proposed study sought to bridge. The empirical review has managed to identify multiple sources of information that has been appraised to ascertain the points of convergence and divergence on the key observations and results of previous studies that involved some of the variables under this study. The evaluation of the preceding studies has bettered in evaluating the observations and methodologies, objectivity as well as replicability of that information in other similar or related research projects.

2.3.1 Credit Risk and Financial Performance

Munangi (2020) tested the effect of CR on FP of banks in South Africa. 18 banks were selected, and data amassed over 10 years. Panel data was used, and pooled OLS was assumed in judging the impact of credit risk on FP. Credit risk was represented by NPLs while the ROA or ROE represented FP. A chief result was that CR has a negative sway on FP and thus the higher the NPLs, the lower the returns or profitability for a bank. However, it could be important to use other measures of these variables. For instance, some studies suggest that CAMELs rating could be a better and more encompassing tool to measure bank returns or performance because it takes a holistic view of performance. Studies such as Babar and Lions (2012) and Ahsan (2018) used the

CAMELs model as a yardstick for FP although others still used the measures agreed to by Munangi (2020) they include Li and Zou (2014) and Sujeewa (2015). CAMEL's rating scale dissects the performance in different major attributes such as Capital adequacy, asset quality, liquidity and therefore is a more robust measure.

Zhongming et, al. (2019) carried out research in China that examined the relation between credit risk and performance using a multivariate model. The survey used bank size, NPLs, real GDP, net income, inflation, and ROA to loans as surrogates for CR while ROA was measured FP. The data was collected over a 10 years' span starting from 2006 to 2017. Key findings include a negative correlation between nonperforming loans and FP, a positive correlation between net income and FP, a negative correlation between real GDP and FP, and a lack of correlation between the ratio of total bank assets to loans and FP. However, although the study adopted a multivariate framework, the variables under study were not exhaustive. The research was strengthened by the inclusion of potential moderators of the association, such as ownership structure. It also concentrated on 6 commercial banks, and it would be important to also carry out research on the relationships when a bigger sample of banks is adopted.

The impact of CR on the profitability of banks in the Chinese market was analyzed by Isanzu (2017). Information was gathered from five of China's largest banks. NPLs, CAR, and loan provisions were adopted as measures of CR while ROA measured FP. OLS regression method was used based on balanced panel data and the conclusion was that NPLs has a negative impact on FP. However, CAR, being a product of capital divided by risk weighted assets, does not cover only the loan assets that contribute to the CR. However, the analysis would have been better if more

data had been collected and over a longer period. The time-lag effect on some variables such as NPLs, impairments, CAR and profits could have taken time to establish and develop anticipated interrelationships over a short timeframe. A bigger pool of banks and possibly of diverse sizes is recommended as would also have been better in testing these relationships. All Kenyan banks were included in the intended research, and information was gathered for a decade. The verdicts were in line with outcome of Sujeewa (2015) and Muriithi et al. (2016). Nevertheless, the study did not factor the impact of other variables that could affect that relationship for instance, Mwangi (2018) and Adusei (2015) found out that size has an impact on the FP.

Bhattarai (2016) studied the sway of CR on the performance of banks in Nepal. It utilized data from fourteen banks and covered 5 years that started in 2010 to 2015. A regression model was used, and descriptive and causal comparative research designs were assumed. The cost per loan asset improved performance, whereas the NPL % hurt it. Thus, the outcome was consistent with Chege et al. (2018), who demonstrated that increased NPL levels diminish FP. The research also showed that larger individuals tend to do better. Inference was the same as the outcomes of Mwangi (2018), but they were in contradiction to the outcome of the study by Aladwan (2015). A short period could have denied the research the benefit of testing the trends over a longer period.

Sujeewa (2015) explored the effect of CR on performance in Sri Lankan banks. A sample drawn from 8 banks out of the 24 banks was assembled. The panel data was collated for 5 years, and regression analysis adopted for analysis. Bank performance was measured by the OA) while credit risk was proxied by provisions to Total Loans (P/TL), impairments to NPLs, impairments to NPLs/ Total Loans. The result was that credit risk had a negative effect on bank earnings. It recommended

the need to implement robust CR management solutions to eventually improve FP. However, precision of the study could have been improved by obtaining a larger sample size which can provide more precise mean values and weed out outliers. Due to the sample size, additional tests such as Shapiro-Wilk Test for normality which is designed to test for normality in cases of smaller sample size ($n < 50$).

2.3.2 Interest Rate Spread and Credit Risk

Njoroge and Chogii (2017) investigated causes of IRS in selected banks in Kenya. Secondary data was collected, and OLS was applied to investigate relationship and conclusion was there exists a positive correlation between CR and IRS. It relied on loanable funds theory to explain the interrelationships between the key parameters that are determinants of IRS in these commercial banks. To lower CR, the study recommended that the government should license more credit reference bureaus (CRBs) and the CBK to encourage the use of credit information sharing platforms. However, aptly captured the determinants of IRS, the study's adoption of a descriptive research design could have affected the expected results. This design involves viewing and illustrating the outcomes of a subject's behavior and therefore is not the most appropriate for the data used. The study places premium on the need to fully adopt the use of CRBs but there is already a raging debate on the usefulness of the CRBs as far as managing credit risks is concerned. The study recommended future research to include other factors that affect the IRS and therefore change the relationship between credit risk and IRS. This study introduced moderating factors such as size and ownership and tested all the hypothesized interrelationships.

Researchers Shayanewako and Tsegaye (2018) looked at how IRS affects financial institutions in South Africa. Using a nonlinear autoregressive distributed lags model, the authors found evidence of IRS disproportion. It was determined that a positive shock to IRS has a negative effect on efficiency, whereas a negative shock to IRS has the opposite effect in the long run, boosting efficiency. The research also indicated that an increase in IRS leads to a rise in NPLs, which in turn reduces the bank's productivity. The Wald F-test was employed to check for cointegration, while the ADF test was utilized to check for stationarity. As a potential barrier to replication and generalizability, the study's reliance on total assets as the efficiency indicator is acknowledged. Ideally, robust parameters of efficiency including the DEA model could suffice. It is suggested that future studies could use more sophisticated and all-encompassing economic models that loop in more parameters as a measure of efficiency.

Shubiri and Jamil (2017) investigated determinants of IRS of banks in Oman. It concentrated on banks listed in Muscat security market and data was compiled for a period. These key features were segmented into four key sub-groups that include financial, economic, market and legal factors or variables. OLS regression was used, and the Spearman correlation results demonstrated that all economic and legal factors have significant relationship with IRS apart from GDP. However, there was no substantial link between financial factors and IRS, although market indicator showed a relationship to IRS. The study adopted a different set of variables unlike Were and Wambua (2013) who carried out the same study but used a different set of variables that includes bank size, credit risk and liquidity risk. However, this study restricted the data analysis to 6 years and only concentrated on the banks that are listed in the securities exchange. A more detailed study that would cover a longer timeline of at least 10 years could give a different outcome. Enlarging the

population to cover all the commercial banks as opposed to a concentration of the study on the banks that are only listed in the securities market could corroborate the findings.

Mahmood and Bilal (2010) investigated the factors that shape IRS in commercial banks in Pakistan. Twenty-eight banks were adopted for the study and a period between 1997 to 2009 was adopted for data collection and analysis. Linear regression analysis was used and some of the key outcome was that IRS for commercial banks are largely spurred by low cost of funding, operational and administrative expenses; as well as ability to generate extra income from the non-core business operations. The study also found that market concentration and macroeconomic factors, for instance the GDP growth or FX rates or interest rates have a positive impression on spreads. It also investigated the outcome of the imposition of a regulatory floor on the returns from saving deposits on interest rates spread for the commercial banks. This is very practical for a subject study where at one point in 2016, the government of Kenya imposed interest caps on both loans and customer deposit accounts (Alushula, 2019; CBK, 2018). Some studies do not approve of the strategy of introducing interest rate caps and as Alper et al. (2019) noted, they rarely achieve the intended purpose.

2.3.3 Credit Risk, Bank Ownership and Financial Performance

The impact of CR management and individual bank-specific characteristics on the FP of South Asian banks were studied by Saddique et al. (2022). Statistics collected from 10 Pakistani banks and 9 Indian banks between 2009 and 2018. Nonperforming loans and credit average rates were used to gauge credit risk. CER, ALR, and LR, however, were unique to each institution. FP was operationalized through ROE and ROA. The results suggested that nonperforming loans, cost of

equity capital, and loss provisions all negatively affect the FP of Asian banks, but CAR and average loan loss rates improved their FP. In terms of methodology, Generalized Method of Moments (GMM) was adopted and is usually assumed to help in sidestepping unwanted or unnecessary assumptions. Inversely, the use of CAR to measure credit risk might not be the most appropriate for such a study because CAR is measured by the risk weighted assets (RWAs) to capital. RWAs include all the bank's assets including all the other classes of assets and not necessarily only the loan assets. This research includes bank size and ownership as moderating variables since these aspects affect the connections evaluated.

Dakhlallh et al. (2019) explored the impact of ownership on performance of public companies in Jordanian industry. Board independence was incorporated as a moderating variable. It used quoted firms in the Amman Stock Exchange (ASE). Institutional ownership and block holder ownership were utilized as examples of different forms of ownership in this study, with Tobin's Q (TQ) serving as a performance metric for both. Between 2009 and 2017, panel data from 180 ASE-listed firms were analyzed. TQ performance was shown to be significantly impacted by ownership. Consequently, this is consistent with the findings of Yahaya and Lawal (2018) and Mamatzakis et al. (2017), both of which used Nigerian Stock Exchange-listed enterprises in their analyses. Ownership has a big role in the management of any bank and therefore it will impact on the credit risk, interest rates, cost management amongst other factors that have an influence on this study. It is on that basis that the analysis of this study is part of the literature review.

Yahaya and Lawal (2018) assessed the intuition of ownership on business value for deposit-taking banks in Nigeria. It examined the impact of different types of ownership structures on firm value.

These ownership variables included concentrated, managerial, and foreign ownerships. Secondary data from 15 listed banks in the Nigerian Stock Exchange was collected over 8 years running between 2008 to 2016. Only institutional ownership positively affected FP, whereas the others had no effect. Mamatzakis et al. (2017) similarly found that ownership improves FP. The study also zeroed on the banks that are listed which means that corporate governance conditions are enhanced. It will be important to carry out research involving a bigger pool of banks that are possibly not under stringent regulations of a stock market to ascertain if the same findings will still hold.

Sarker and Nahar (2017) examined effect of ownership of banks on credit risk in Bangladesh. Prais Winten regression model analyzed data from 32 banks collected over 4 years between 2000 to 2014. 390 observations were recorded, and longitudinal research design was used. The conclusion was that depositors' influence, shareholders' influence, liquidity, and profitability have a negative relationship with CR. However, to address the time lag effect a distributed lag model could have been used to ensure the lagged values do not introduce bias in the results. The results mirror those from Micco et al. (2004), Ceylan (2018) and Mamatzakis et al. (2017). According to the results of the research, regulators' attention must be paid to these banks only because of the effect or influence of the ownership structure on CR. This is because, as observed, some national commercial banks at times have the temptations of taking in more risks that could be catastrophic to the business absorbing heavy risk. Sarker and Nahar (2017) end up with a more radical proposal that regulators should relook at government ownerships in commercial banks and consider denationalization or reduction of government ownership in these banks. The introduction of

financial performance would extrapolate the study to ensure it addresses other aspects other than credit risk and ownership.

Mamatzakis et al. (2017) considered ownership and performance with attention on the emerging markets. The study is reviewed because the performance measured includes many parameters that include credit risk, earnings, liquidity, and other key factors that we also considered in the current study. A hundred and thirty-two Chinese banks were sampled between 2005 to 2015. It also grouped key shareholders in commercial banks in China under three main categories i.e. government-owned, state-owned enterprises (SOEs), domestic private investors and foreign investors owned. The main reason behind the categorization was because these specific types of shareholders have different and diverse interests, motivations, and incentives. These factors then dictate their need for dominance and control rights over these commercial banks where they have invested in. It was discovered that publicly owned banks lost money compared to their private sector counterparts. The study indicated that the agent-principal dilemma is more prevalent in banks with larger degrees of government ownership. Contextually, China is a unique economy, which of many years was centrally planned economy with most firms under government ownership (Mamatzakis et al., 2017). It would be important to replicate such a study in a more liberalized economy where such arrangement is not as prevalent.

2.3.4 Credit Risk, Bank Size and Financial Performance

Saleh and Afifa (2020) explored the effect of CR, liquidity crunch and capital on returns of Jordanian banks. Data from 13 banks listed in the securities exchange was compiled. It investigated the link between these variables after the infamous financial crisis of 2008/2009. This was a

momentous moment for the banking industry that culminated into huge and very stringent controls and standards being introduced to avert another global financial crisis. A lot of changes on the management of CR, liquidity and CAR were introduced through new Basel regulations, especially Basel 3 regulations introduced in 2010. Key variables included the loan loss provisions to loans ratio that represented credit risk while ROA, ROA, and interest income to earning assets (NIM) were used as determines of performance. The data analysis was based on a fixed effects regression model.

The outcomes gave links of causality among the identified individual-bank-precise variables such as CR, liquidity risk and bank capital and FP. Some of the key outcomes included the fact that size has a negative bias on ROA, ROE and NIM. Institutions with higher liquidity and capital adequacy can face financial crises in a better way and consequently guarantee improved profitability. This study concurred with other related past studies such as Chege et al. (2018) or Mwangi (2018) which also concluded that CR has a large negative impact on FP. Nevertheless, the study was carried out in a very uncertain and unique time when the effects of a financial catastrophe were reflected in the financial statements. If a study is done in normal times, the outcome of the study could change significantly and that is the reason such a study should be replicated in times of normal financial times.

Mwangi (2018) analyzed how Kenyan banks' size impacts their FP. Using OLS to analyze data collected over a decade, researchers found that larger companies tend to have higher FP per employee. Operationalization of the key variables was like Aladwan (2015) and Dahmash (2015) where bank size and FP were measured by total assets and ROA respectively. The findings were

in line with Abel and Le Roux (2016); Sufian and Kamarudin (2012) although Aladwan (2015), Shehzad (2013) and Dahmash (2015) were of the contrary view. Inclusion of other variables could enrich the study for instance, Mamatzakis et al. (2017) concluded that state-owned banks were to a lesser extent profitable compared to privately owned banks. Even if the study produced significant results showing that size has a positive sway on profitability, it can be argued that the relationship was quite simplistic and could have been affected by other key factors. Introduction of other factors such as size, nature of management and ownership could have added value to the research. This made it important for this research to introduce other factors such as ownership and size to ascertain their impact on the principal relationship under study.

Shehzad et al. (2013) examined how size and growth impact levels of profitability for banks in various jurisdictions. They used a dynamic panel of more than 15000 banks drawn from 148 countries. One of the conclusions was that size has impact on variability of bank profitability growth. This concurred with Aladwan (2015) and Dahmash (2015) but was contrary to Mwangi (2018) and Abe and Le Roux (2016). It also concluded that in high-income OECD countries, although more profitable, expansion of big banks is slower compared to smaller ones. OECD countries are more economically endowed compared to developing nations. A study in low-income country like Kenya would help to test the outcomes under different environment.

Kaaya and Pastory (2013) investigated the bearing of CR and performance of banks in Tanzania. It is worthwhile to note that this study also included two control variables, namely, customer deposits and bank size. This has enhanced the study and therefore was deemed necessary to be part of literature review as well. Panel data from eleven banks was adopted and descriptive research

design was applied. Regression analysis was applied, and ROA was used to measure performance while CR was proxied by loan loss to gross loan, NPLs, loan loss to net loan, impaired loans to gross loan. Two control variables, namely, customer deposits and bank size were introduced. The conclusion was that CR has a solid negative correlation with FP. The finding was consistent with most of the past studies as per the reviewed literature for instance Saleh and Afifa (2020); Zhongming et.al (2019) and Bhattarai (2016).

2.3.5 Interest Rate Spread and Financial Performance

Karki (2020) studied the influence of IRS on profitability in Nepalese banks. Secondary data assembled over a period of 10 financial years. Regression analysis was utilized and one of the key outcomes is that it exists a positive bearing of IRS on profitability. However, the investigation faced some numerous limitations for instance, the research relayed on two variables namely IRS and profitability but in a real world many other factors could impact on such a relationship. Additional research based on the interrelationship between these variables and including other moderating or intervening variables could enrich the study. The study also concentrated on only one bank and drew conclusions that reflected the entire banking sector in Nepal. A bigger and diverse sample would have accorded the researcher an opportunity to get more representative results and conclusions.

Musah (2018) investigated the causal relationship between IRS and bank profitability in Ghana. Profitability was evaluated by ROA and (ROE, whereas interest income and NIM comprised IRS. This research relied on the loanable funds theory and used panel data from 22 of the total 34 banks in the country to reach its conclusions. The data was evaluated using the OLS regression technique, and the findings showed that IRS positively affects profits. However, due to a lack of data, the

research could only use a brief synopsis provided by the Bank of Ghana. Multicollinearity was observed and it could have been important to introduce more tests such as Variance Inflation Factor (VIF) and ultimately consider eliminating some of the correlated variables.

Siddiqui (2012) carried out an investigative study to identify the key contributing factors of interest spreads for banks in Pakistan. Data from 14 out of the 22 banks in Pakistan was used. The data was collected for 8 years spanning from 2000 to 2008. The conclusion was that increasing administrative expenses/costs, high NPLs and high return on assets (ROA) can cause a significate increase of interest rate spreads. One of the listed constraints of the study was that it was difficult to establish a prolonged causal link between bank-specific factors and the interest margin due to constraints posed by the availed data. However, the results of the study were in congruence with those of Karki (2020) and Musah (2018) whom in their studies enumerated some of these bank specific variables that are key determinants of IRS.

Obidike, Ejeh, and Ugwuegbe (2015) examined IRS's impact on Nigerian banks from 1986 to 2012. OLS regression was performed to evaluate secondary data, and stationarity and ADF tests confirmed that all variables are integrated of order I. Co-integration showed a long-term relationship between the variables. However, findings showed that IRS has a negative bearing on performance in long-run. Additional studies are important to ascertain if the time factor could have had an impact on the results. The study was over a span of 26 years, and it would be important to ascertain how the result would change in the short run. The time-lag factor also needs to be tested to ascertain if the time-lag effect on some variables introduced a significant bias that impacted on

the results. The study did not consider other variables that could impact the relationship such as bank size, ownership structure, IRS among others.

2.3.6 Interest Rate Spread, Credit Risk, Bank Size, Bank Ownership and Financial Performance

The impact of IRS and bank-specific variables on the long-term viability of Nigeria's tier-one and tier-two deposit money banks was investigated by Segun et al. (2022). Data from Tiers 1 and 2 FIs were collected over a period between 2011 to 2020. The conclusions were that IRS, asset quality, effectiveness, size, and board-size affect bank survival in Nigeria. However, the study would have looked at all the banks instead of concentrating on only tier 1 and 2. That would have availed an opportunity to make more definitive broad view generalizations over the entire commercial banking sector. The dependent variable was bank survival which is measured by with Capital Adequacy Ratio (CAR) which does not fully cover all the aspects that would constitute survival or collapse of a financial institution. The use of the difference between the lending and deposit rates as a measure of IRS may also seem quite basic as it does not factor in the interest earning assets in the assessment. This study adopted net interest margin as a measure of interest rate spread as it is more encompassing and factors the interest spread but compared to the level of interest sensitive assets. One of the key recommendations of the study was that banks must maintain keen attention to interest rate spreads and other bank's internal factors such as asset quality, effectiveness, size and board structure and size.

Chege et al. (2018) reviewed the effect of NPLs on the FP of banks in Kenya. Descriptive research design with a sample drawn from 43 banks. The research found that CR analysis had a beneficial

effect on productivity. This research could have considered tampering with the opinions of the credit risk managers with the available secondary data. It is also noted that the list of the highlighted NPLs management practices is not exhaustive and therefore leaves out other critical NPLs management practices. Even while using primary data, it is possible to develop an index that helps in providing a quantitative measure of qualitative factors (Richter, 2014).

Iannotta et al. (2015) looked at the connection between bank ownership, risk, and profitability in Europe. Between 1999 and 2004, data were gathered from a representative sample of 181 big banks. The study evaluated the impact of different ownership structures on profitability, cost efficacy and risk. Key outcomes of the study included that holding some factors constant mutual and government-owned banks demonstrated decrease in returns compared to those in private hands. This was even though in some cases their costs were lower. The outcome was aligned with that of the research carried out by Mamatzakis et al. (2017) on a similar study. Another conclusion was that public sector banks had lower quality of loan assets and elevated bankruptcy risk whereas the mutual banks had superior asset quality and lesser asset risk than the other two classes of banks. Lastly, although ownership intensity may not substantially impact bank's profitability, a deeper ownership concentration translates into improved asset quality, reduced asset risk and smaller insolvency risk. However, the time frame chosen for the study seemed a bit short and replication of the study could have changed the dynamics and therefore the outcomes of the results. A similar study carried out in the emerging markets could also show different or slight changes in the conclusions and outcomes.

Using a combined cross-sectional time-series and dynamic panel models, Goddard, Molyneux, and Wilson (2004) investigated the factors that most affected profitability in the banking industries of Denmark, France, Germany, Italy, Spain, and the United Kingdom. Six consecutive years, from 1992 to 1998, were used to compile the data. These models of determining factors of profitability included bank size, diversification, risk and ownership and dynamic effects. One of the key observations was that despite the increasing competition the banks would report abnormal profits over the years. Bank size was found to have a weak correlation with profitability, while the requirement of off-balance sheet dealings was only positively correlated with profitability in the United Kingdom, but negatively correlated in the other markets. The results on the size-profitability relationship are partly consistent with some past studies such as Aladwan (2015) and Dahmash (2015) but was inconsistent with the outcomes of Mwangi (2018) and Abe and Le Roux (2016). Some of those in contrary argue that efficiency has a bigger impact on profitability than size. The study could have benefited with a longer time frame of more than six years especially while relying on time series data analysis. The replication of such a study in more diverse markets including the developed, emerging, and undeveloped markets could also add value to future similar research projects.

The impact of risk and scale on Indonesian banks' profitability was analyzed by Irawati and Maksum (2017). There are 30 chosen banks all of which are traded on the Indonesian Stock Exchange. Based on a panel data regression study, it was shown that CAR positively affects ROA while NPLs negatively affect ROA. Finally, there was a favorable correlation between ROA and bank size. Results were like Mwangi (2018) but contrary to studies such as Aladwan (2015) and

Dahmash (2015). The period of the study is quite short and for the use of panel data analysis, more data points would have added value in determination of the relationship between the variables.

2.4 Summary of Empirical Literature Review and Research Gaps

This part presents a summarized review of the analyzed past studies on the key variables which include interest rate spread, credit risk, size, ownership, and FP. To date, there is no succinct accord on the relationship among these variables and these differences are attributable to contextual, conceptual, or methodological gaps. The table below recapitulates some of the key studies reviewed, findings and research gaps that could need further research.

Table 2.1: Summary of Research Gaps

Author(s)	The Study Focus	Research Methodology	Results	Research Gaps	Focus of Current Study
Karki (2020)	The influence of IRS on the profitable operations of Nepalese banks.	Regression analysis	A positive impact of IRS on the profitability.	• Overreliance on data from only one commercial bank • Study relied only two variables i.e., independent, and dependent variables	• Replicate the study with a bigger and more diverse sample from the licensed banks. • Inclusion of additional variables such as moderating or intervening variables could enrich future studies.
Saleh and Afifa (2020)	The effect that CR, liquidity risk, and capital have on the returns that Jordanian banks get.	Regression analysis	Size has a negative effect on ROA, ROE and NIM. Banks with higher liquidity and capital adequacy can face financial crisis in a better way and therefore guarantee better profitability or financial performance.	• The study was carried out in very uncertain and unique times when the pressure of the financial calamity was high	• Replication of the study at what would be normal times to help confirm or dispute the conclusions or outcome of the subject research.
Yahaya and Lawal (2018)	The investigation of the influence that ownership has on the financial	Regression Analysis	Only institutional ownership had a positive impact of on FP, but the others had only a minor impact.	• The study relied on banks listed on the stock exchange and that implies that their corporate governance structures and operations are under greater scrutiny.	• It will be important to diversify the sample to include not only the banks that are listed on the securities exchange. • A mixture of primary and secondary data collected over a

Author(s)	The Study Focus	Research Methodology	Results	Research Gaps	Focus of Current Study
	performance of deposit-taking banks in Nigeria.			• The study also concentrated on secondary data only and it was collected over a short period of time.	longer period could enrich the study.
Aladwan (2015)	The empirical investigation of the link between size and profitability using data from banks that are listed on the Jordanian stock market.	Regression analysis	Size has a positive correlation with profitability	• 5 years of study could be too short. • The study did not factor in the time-lag bias which could have an impact on the causal effect of bank size on profitability. • Other key factors were not considered in the relationship such as the asset quality.	• The proposed study incorporated more tests such as the F-test to establish the long term and short-term causality. • A longer period was adopted of 10 years that allowed more data points and therefore improve the analysis
Sujeewa (2015)	The impact that CR has had on the overall performance of the banks in Sri Lanka.	Regression Analysis	CR has a negative impact on earnings	• A small sample was used and to the size, additional tests should have been done such as Shapiro-Wilk Test for normality. • This study could benefit more if extra variables such as size or ownership was also factored in the research	• IRS, size, and ownership were added as ex ante and moderating variables respectively. • Instead of using a sample, the entire population was adopted to enrich the study and give a more representative outcome

Author(s)	The Study Focus	Research Methodology	Results	Research Gaps	Focus of Current Study
Obidike, Ejeh and Ugwuegbe (2015)	The influence of IRS on the overall performance of Nigeria's banking sector.	Regression analysis	Findings showed that IRS has a negative impact on bank performance in the long run.	• The study was over a span of 26 years, and it would be important to ascertain how the result would change in the short run. • Time lag on some variables should have been tested	• A distributed lag model to be used to address the issue of the lagged (past period) values of this affected variables
Shehzad et al. (2013)	The relationship between the size of commercial banks in 148 nations, their rate of expansion, and their profitability.	Regression analysis	The variability of bank earnings and that of bank growth are independent of bank size.	• Sample of the banks drawn from diverse geographical jurisdictions. • OECD countries are largely industrialized compared to Kenyan economy gave a contradicting result: that bigger banks grow sluggishly compared to smaller banks.	• Replicate Shehzad et al. (2013) study in a different part of the world or clearly delineate the study by different geographic or nations of similar economic status. • Additional variables like NPLs would enrich this study.
Iannotta et al. (2015)	The connection between ownership, risk, and performance for European financial institutions such as banks.	Regression analysis	Banks under public ownership to a lesser extent profitable and riskier than the privately owned.	• The time frame chosen for the study seemed a bit short. • The study concentrated or relied on data collected in the developed European markets	• Replication of the study could change the outcomes or the results. • A similar study carried out in the emerging markets or undeveloped markets to test if the same outcome would hold.

Source: Author, 2022

2.5 Conceptual Framework

Figure 2.1 illustrates the relations between IRS, credit risk, size, ownership, and the FP. The framework is comprised of an ex-ante variable, of an independent, two moderating variables anticipated to have an impact on FP. Credit risk is the independent variable and FP as a dependent variable based on need for further study on them as expounded in the literature review. Interest rate spread has been included as an ex-ante variable to rest its relationship with credit risk. There have been a lot of studies investigating the link between CR and FP. However, few studies have considered other factors that would also alter that relationship. This is the reason this study introduced two moderating variables, bank ownership and size. The reviewed literature demonstrates that the two variables were appropriate if used as moderating variables in testing the relationship between credit risk and FP (Sujeewa, 2015; Shehzad et al., 2013; Musah, 2018).

From the literature review, it is noted that to properly manage credit risks, a robust system is important in mitigation of potential losses such as management costs and loss reserves that ultimately affect asset quality and profitability (Timothy, 2018; Sujeewa, 2016). In summary, there are justifications that led to the adoption of bank size and ownership being adopted as moderating factors in the study. First, there has been diverse studies that have contradicted the argument that size, or ownership structure has a significant influence on FP. Mwangi (2018) found out that a banks with a bigger asset size largely due to the enjoyment of economies of scale and higher level of efficiency. Others like Aladwan (2015) disputed the hypothesis. On bank ownership, studies have also indicated there is a relationship between ownership and FP while others indicate that the relationship is not significant. The study therefore did not factor in any intervening variable but relied on the two moderating and one ex-ante variable to test their influences on the main

relationship between credit risk and FP. There are also interrelations between these variables as well and that is why the study sought to investigate all their associations.

Figure 2.1: Conceptual Model
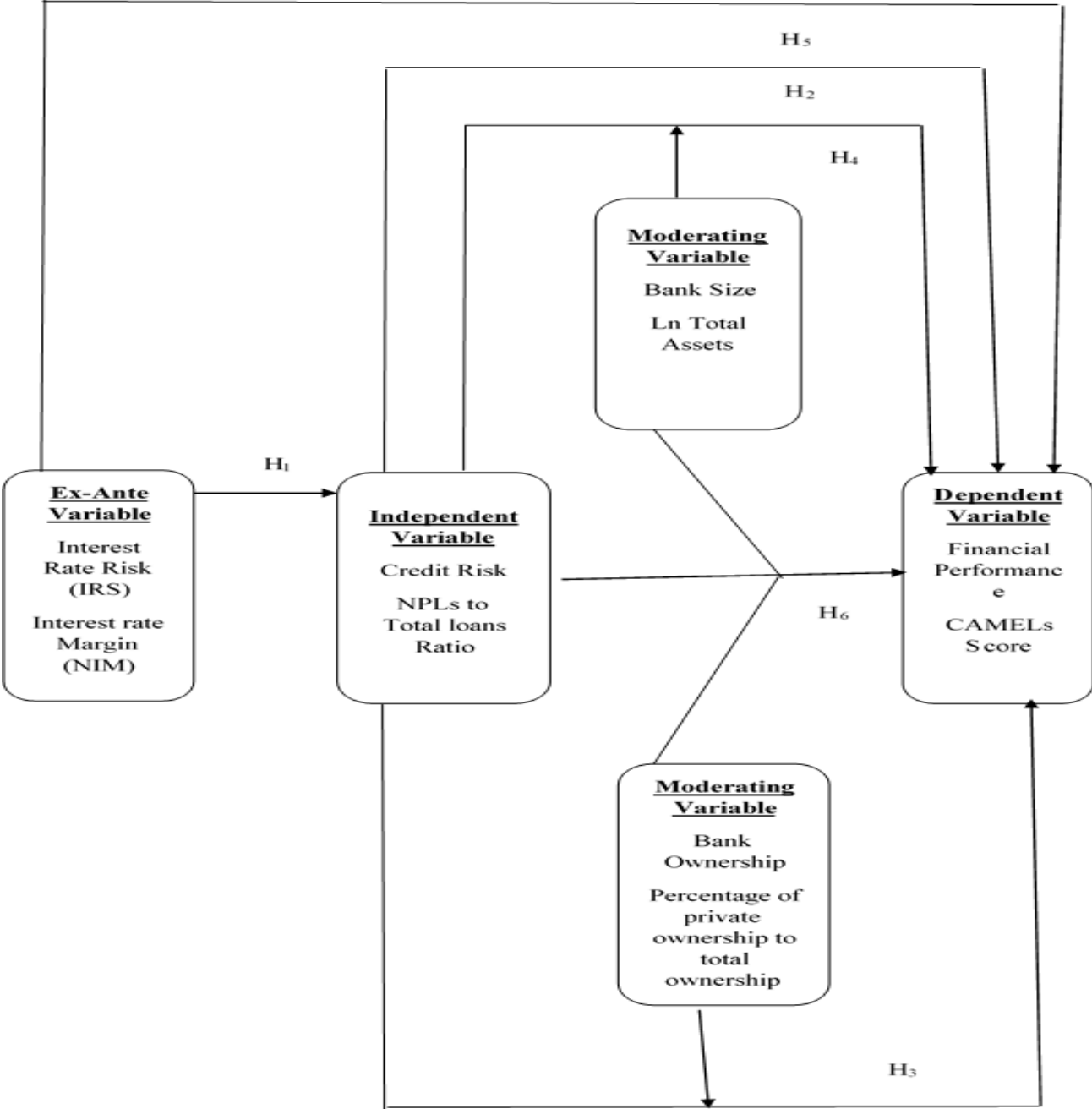
Source, Author, 2022

2.5.1 Research Hypotheses

As per the conceptual framework, the following hypotheses are tested.

H$_{01}$: Interest rate spread does not affect credit risk of commercial banks in Kenya.

H$_{02}$: Credit risk does not affect FP of commercial banks of Kenya.

H$_{03}$: Bank ownership does not moderate the relationship between credit risk and FP of commercial in Kenya.

H$_{04}$: Bank size does not moderate the relationship between credit risk and FP of commercial in Kenya.

H$_{05}$: Interest rate spread does not impact FP of commercial banks in Kenya.

H$_{06}$: Interest rate spread, credit risk, bank ownership, and size do not have joint effect on the FP of commercial banks.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This segment explains in detail the process that was carried out in the research project. It covers the proposed study's location, sources of data, basis for data selection, forms of data to be collected, sampling methods and data collection and analysis methods.

3.2 Research Philosophy

The study adopted a viewpoint that explains the belief about the methods that explain how data has been collected, analyzed, and interpreted. There are various types of research philosophies such as positivism, interpretivism and realism. Positivism as explained by Park (2020) depends on the supposed deductive method to authenticate a priori hypotheses habitually expressed quantitatively. A basic target of positivist examination is to produce explanatory associations that eventually take the lead in forecasting and control of the issue at hand. The positive paradigm is centered on the notion that a single actual reality lives, and it is easily recognized, found, and quantified. This permits clarification and prognostication in a causal framework to work organically.

This study embraced a positivist research philosophy that generally uses quantitative methods of interpreting and undertaking research. Generally, positivism relies on observations that are quantifiable, and which leads to interpretation of data based on statistical analyses. This study also used a positivism approach because it has been observed that in positivism, research is based on observable data which is collected and helps in testing and confirmation of the formulated

hypotheses (Kuhn, 1962). The key reason why the study used the positivist philosophy is because of its rich tradition that buttresses the need of using quantitative approaches to research. This study uses panel data and has used many quantitative methods and approaches in the data analysis. Mkansi and Acheampong (2012) support the approach and indicate that philosophy follows an organized methodology in research and is based on quantifiable or measurable observations. In summary, the study adopted the research philosophy because studies associated with positivism commonly emphasize finding explanatory or causal relationships using quantitative methods which form the basis. This study relies on panel data which has been analyzed using several quantitative methodologies and therefore the positivist research philosophy is deemed the most effective for the exercise.

3.3 Research Design

This is useful for developing an overarching strategy for coordinating various aspects of a study so that all the important aspects of the research challenge are addressed (De Vaus, 2006). There are various research designs which include case study design, cross-sectional design, descriptive research design, mixed methods research design and longitudinal design (Mkansi & Acheampong, 2012). This study adopted longitudinal design as the design allows for correlational research where a researcher can observe and collect data involving several variables over a time. This plan was chosen because it is adaptable to the nature of the work at hand and because it uses continuous or repeated measurements over extended time periods.

Most researchers or policy makers usually wish to know the sway of a program over time and longitudinal qualitative studies provide a unique process of understanding such influence over a period. This study used trend studies which are part of longitudinal design as they are appropriate in measuring the alterations in a sample over time. In a trend study, diverse data from studied variables from a population are examined at altered points in time. Specifically, it employs panel data evaluation, which is useful for judging cross-sectional and longitudinal data in two dimensions, making it a good fit.

The relationship between data and theory is a subject that has generated heated arguments and propositions from different scholars and philosophers for years. The argument has largely been should the theory or the data come first. The scholars have further argued that there is a major dichotomy between the thinking of positivists and social constructionists and those competing paradigms precipitate the need to aptly choose the most appropriate research design (De Vaus, 2006). The researchers in this study employed a longitudinal research strategy since it enabled them to collect panel data over the course of many years and to make repeated observations.

3.4 Population

Population is the number of the licensed commercial banks regulated by CBK. According to the CBK, as of the end of 2020 there were 41 licensed banks operating within the scope of the CBK's regulations. Generally, commercial banks offer loans, deposits, savings accounts among other services to their customers. In terms of ownership, these banks are categorized as public, private, and foreign. In terms of size, the CBK has broad categorization based on a weighted index

constructed from total assets, shareholders' funds, deposits from the customers, number of loans and deposit accounts (CBK, 2020).

3.5 Data Collection

To track changes in the easily quantifiable characteristics that define the variables throughout the time, panel data was compiled. These variables are captured in Appendix II which is a collection form that captures that data that was compiled from CBK and annual reports. The study collected data for 10 years over a period between 2010 to 2019. The data collected over the period will be able to capture the figures immediately after the impact of the financial disaster of 2009 and then compare it with the financial data after the crisis. This will be able to demonstrate if the drastic measures that led to a host of international interventions bore any fruits as far as stabilizing the global banking and financial system is concerned.

The 11 years adopted for the data collection was also important in building the panel data. As explained, panel data comprise of observations of numerous individuals acquired at several time periods. This was important as it offered enough data points. Data was amassed for each of the variables that comprise IRS (net interest margin); CR (NPLs to total loans ratio); Ownership (ownership classification); bank size (total assets) and FP based on the CAMELs rating scores. The operationalization of these data is explained in detail in the next section.

3.6 Operationalization of the Study Variables

The operationalization of a variable refers to the researcher's approach of defining and quantifying the variable. NIM was used to analyze the interest rate spread. Interest revenue received less

interest paid on deposits is the dividing line, while the interest-earning assets are the denominator.

Bank ownership is measured using the nature of ownership for each of the commercial banks under

this study for example, family-owned, privately-owned, and government-owned ownerships, bank

size using natural logarithm of the total assets. Credit risk was measured using NPLs to total gross

loans while the financial performance was measured by the CAMELs model. Under CAMELs

framework, Capital was measured by CAR= (Tier I+Tier II)/Risk-Weighted Assets; Asset quality

by Loan impairments to Total Loans; Management by cost to income ratio; Earnings by ROA

ratio; Liquidity by bank LCR= High quality liquid asset/ Net Cash flows. Table 3.1 summarizes

the variable, indicator, operation definition, measurement, scale used as well as the comparable

studies.

Table 3.1: Operationalization of Study Variables

Variable	Operation Definition	Indicator	Measurement	Scale	Comparable studies
EX Ante Variable - Interest Rate Spread	Difference between interest earned on credit granted and that paid on deposits s	Net interest margin	Interest income - interest expenses/ interest- earning assets	Ratio	Musah (2018); Maina (2015)
Independent Variable -Credit Risk	CR is calculated centered on the borrower's full capability to pay off	Asset quality	NPLs to Gross Loans Ratio	Ratio	Sujeewa (2015); Shehzad et al., 2013
Moderating Variable -Bank Size	The size of a bank i.e., definition of how large or small a bank is.	Total assets	Natural logarithm of total assets	Ratio	Mwangi (2018; Aladwan (2015)
Moderating Variable -Bank Ownership	The structure of the shareholders' ownership	Shareholding	Classification under public bank, private bank or foreign owned.	Ratio	Sarker and Nahar (2017)
Dependent Variable -Financial performance	The documented performance positioned on crucial financial parameters	Performance	CAMELs score ranging from 1-5 with 5 being the weakest	Ratio	Babar and Lions (2012) and Ahsan (2018)

Source: Author, 2022

3.7 Data Analysis

Data has been scrutinized and the findings interpreted to provide the basis of the final conclusions and recommendations. Multiple approaches to data inspection were used throughout the examination process, all of which were conducted utilizing the STATA data analysis framework. Data was analyzed to provide conclusions on the best way to improve asset quality and performance moving forward.

Multiple regression analysis was carried out as it is a statistical method that allowed an examination of the relationship of all the variables. This data was also analyzed with a view to generating the key findings and effectively define the conclusions and recommendations. Table 3.2 below offers a synopsis of the diagnostic tests.

3.7.1 Model Specification and Variable Operationalization

The data was analyzed using multiple regression to look for correlations between the different factors. The table 3.2 delineates a three-stage procedure for determining the significance of the coefficients at each stage. By using this strategy, we may deduce the conditions in which the model's moderation functions overlap with the predicted duties. Moderation analysis is important because it enables a researcher to determine whether a third variable is impacting a certain connection or not. Two main factors may have a stronger, weaker, or otherwise altered relationship depending on the presence of one or more moderating variables.

3.7.2 Diagnostic Tests

The suggested tests for verifying the reliability of the used data and assumptions are listed in Table 3.2 below. The tests performed include the normality, multicollinearity, Heteroscedasticity, panel unit root, autocorrelation and Hausman tests. These diagnostic tests are very critical in validating the outcomes of the data analysis and help in identifying solutions to some of the issues that arise after the diagnosis.

3.7.2.1 Normality Test

It is used to ascertain if sampled data demonstrate the traits of normally distributed data. Normality tests whether research data is close enough to normal that you can use your statistical tool without concern. Several statistical tests and analysis require a normally distributed sample population. This study used Bera-Jarque normality test for panel data used. The data therefore was tested for its skewness as well as its kurtosis. Square roots and natural logs of the data are used in attaining normality. According to the findings, P-value is greater than 0.05 which confirms that the studied data was normally distributed.

3.7.2.2 Multicollinearity Test

Multicollinearity happens when there exists an extreme level of correlation between purportedly autonomous variables used to approximate a dependent variable. Multicollinearity complicates interpretation of a model and poses an over fitting conundrum. This study adopted Variance Inflation Factor (VIF) as a degree of multicollinearity and general rule is that if the value of VIF is 10 and above, then multicollinearity will be a challenge that need to be addressed by eliminating

vastly correlated independent variables. According to the results of the study, VIF for all the variables was less than 10, an indication that there is no multicollinearity.

3.7.2.3 Heteroscedasticity Test

Heteroscedasticity signifies a position where the variation of residuals is disproportionate over a scale of identified data. This is important because while conducting regression analysis, Heteroscedasticity leads to an unbalanced spread of the residuals commonly referred to as an error term. Heteroscedasticity is primarily due to the existence of outliers in the data. This study used Breusch Pagan Test which adopts a rule that in case p-value is less than 0.05, then heteroscedasticity is detected. To address Heteroscedasticity, the crucial variables left out are refitted back in the model. The results demonstrate that homoscedasticity exists and thus heteroscedasticity does not exist.

3.7.2.4 Stationarity/ Panel Unit Root Test

Stationarity implies that key features of a method producing a time series do not alter. This test is important because the statistical analytical tools and tests require that the data possess stationarity. This study adopted panel unit root test to ascertain the stationarity. To address stationarity problems, alternative approaches to auto covariance will be applied. From the results of the study, P-value>0.01 and thus Ho was rejected meaning the data is stationary.

3.7.2.5 Autocorrelation Test

Autocorrelation is an illustration of the extent of resemblance between an original time series and a lagged version and this is observed over sequential time breaks. Ideally, it is equivalent to

correlation between two distinct time series whereas for autocorrelation, identical time series is used twice, one time in its original form and then in a lagged form. The result proved that there are no independent variables that are extremely correlated.

3.7.2.6 Hausman Test

The test helped identify regression model predictors. The fixed effects model is preferred under the null hypothesis. If the p-value is more than 0.05, the random effects model will be employed. The test's results backed up the random effects model's status as the best option. The model recognizes that some of the factors changing the outcome might alter at random within individuals or groups.

Table 3.2: Summary of Diagnostic Tests

Assumption to be Tested	Description	Prescribed Test	Interpretation	Verdict/Conclusion
Normality	Test is used to verify if sample has been obtained from as normally-distributed population.	**Bera-Jarque normality test** for panel data was used. The skewness and Kurtosis test which is more appropriate for the sample size	H0: Joint hypothesis of the skewness being zero and the excess kurtosis being zero. P-Value of skewness/Kurtosis > 0.05; implies data is asymptotically normally distributed. Chi2 > 0.05; implies significant relationship at 5% conf. level	P-values > 0.05 and therefore data is normally distributed. Chi2 > 0.05 which implies significant relationship at 5% confidence level.
Multicollinearity	Multicollinearity is a condition where there exist high-level inter-correlations amongst independent variables	**Variance Inflation Factor (VIF)**	If VIF is 10 and beyond, then multicollinearity problem is a challenge while trying to fit the model and interpret the results	VIF for all the variables < 10; thus, no multicollinearity
Heteroscedasticity	Heteroskedasticity refers to situations where the variance of the residuals is unequal over a range of measured values.	**Breusch–Pagan test**	If prob >chi2 H0: Variance for error terms is constant. i.e., Homoscedasticity exists & thus heteroscedasticity does not exist	P-value>0.05; Ho is not rejected i.e., homoscedasticity is assumed.
Stationarity	Studies involving statistics assume that panel data is stationary.	**Augmented Dickey and**		P-value>0.01 and thus Ho was

Assumption to be Tested	Description	Prescribed Test	Interpretation	Verdict/Conclusion
Panel Unit Root Test		Fuller (ADF) test	Ho: unit root is present in an autogressive model. i.e., Data are non-stationary. Unit Root is characteristic of a time series that makes it non-stationary. P-value ≤ significance level, fail to reject H0	rejected. i.e., data is stationary
Autocorrelation	Conducted to expose the presence of autocorrelation, that is, whether the residual is consecutively correlated over time	Wooldridge test	H0 is there is no 1st order autocorrelation.	No autocorrelation problem observed.
Hausman test	Establishes whether to go for a fixed effects or random effects model	Hausman's test	H0 is random effects model is favored to fixed effects model	Random effects model used as p-value is above 0.05.
Correlation tests	Correlation tests or analysis helps in the provision of information on the intensity and path of a linear relationship	Pearson Correlation test	Pearson correlation coefficient usually has values in the range of +1 and −1. A value of +1 denotes a full positive direct correlation while 0 suggests there is no linear correlation and −1 is total negative linear correlation	The outcome demonstrated that there are no independent variables that are highly correlated. 22

Source: Author, 2022

3.7.3 Research Objective, Hypotheses, Diagnostic tests, and Interpretation

Data analysis on the respective research objectives and hypotheses has been prepared. There are

six research objectives and hypotheses and different diagnostic approaches have been adopted to

ensure the outcome of the study is representative and authentic. The hypotheses are developed in

their null form and the interpretation is based on the analysis of both the null and the alternate

hypotheses. The conclusions will also be drawn from the interrelationships that will be observed

between the identified variables which include the IRS, CR, bank size, bank ownership and FP.

Table 3.3: Research Objective, Hypotheses, Diagnostic Tests, and Interpretation

Objective	Hypothesis	Diagnostic Approaches	Interpretation
Determine the impact that interest rate spreads and credit risks have on Kenya's commercial banks.	H_1: Interest rate spread does not affect credit risk of commercial banks in Kenya.	Regression analysis (Alexopoulos, 2010) $CR = \beta_0 + \beta_1 IRS_{it} + \varepsilon$ FP is the financial performance, β_0 is the intercept, IRS, interest rate spread, β_1, $-\beta_3$ =Coefficients, ε= Error term.	H0 is rejected. P-Value: 0.000<0.05; Relationship between IRS and CR is statistically significant.
Investigate the effect that credit risk has on the FP of commercial enterprises in Kenya.	H_2: Credit risk does not affect FP of commercial banks of Kenya	Regression analysis (Alexopoulos, 2010) $FP_{it} = \beta_0 + \beta_1 CR_{it} + \varepsilon$ FP is the financial performance, β_0 is the intercept, CR is the credit risk, β_1, $-\beta_3$ =Coefficients, ε= Error term.	H0 is rejected. P-Value: 0.000<0.05; Relationship between CR and FP is statistically significant.
Examine the impact that bank ownership has on the correlation between credit risk and the financial position of commercial banks in Kenya and report your findings.	H_3: Bank ownership does not moderate the relationship between credit risk and FP of commercial in Kenya	A regression analysis with independent predicting dependent Step 1: $FP = \beta_0 + \beta_1 CR_{it} + \varepsilon$ Step 2: $FP = \beta_0 + \beta_1 CR_{it} + \beta_2 BO_{it} + \varepsilon$ Step 3: $FP = \beta_0 + \beta_1 CR_{it} + \beta_2 BO_{it} + \beta_3 CR*BO_{it} + \varepsilon$	H0 is rejected. The relationship between CR, ownership and the interaction term CR*BO on FP was statistically significant. Interaction term CR*BO explains 78.09 % of the variation in FP
Find out how much of an impact the size of the bank has on the link between credit risk and the financial position of commercial banks in Kenya.	H_4: Bank size does not moderate the relationship between credit risk and FP of commercial in Kenya.	A regression analysis with independent predicting dependent Step 1: $FP = \beta_0 + \beta_1 CR_{it} + \varepsilon$ Step 2: $FP = \beta_0 + \beta_1 CR_{it} + \beta_2 BS_{it} + \varepsilon$ Step 3: $FP = \beta_0 + \beta_1 CR_{it} + \beta_2 BS_{it} + \beta_3 CR*BS_{it} + \varepsilon$	H0 is rejected. Link among CR, bank size and the interaction term CR*BS on FP was significant. Interaction term CR*BS explains 70.94% of the variation in FP

Establish the interaction between the Internal Revenue Service and the Financial Planning department of commercial banks in Kenya.	**H₅:** Interest rate spread does not impact FP of commercial banks in Kenya	Regression analysis (Alexopoulos, 2010) $FP = \beta_0 + \beta_1 IRS_{it} + \varepsilon$	H0 is rejected. p=0.000<0.05 which imply that the effect of interest rate spread on FP are statistically significant.
Find out the combined impact that bank size, ownership, interest rate risk, and IRS have on the profitability of commercial banks in Kenya.	**H₆:** Interest rate spread, credit risk, bank ownership, and size do not have joint effect on the FP of commercial banks.	Multiple Regression analysis (MacKinnon, 2011) $FP = \beta_0 + \beta_1 CR_{it} + \beta_2 IRS_{it} + \beta_3 BS_{it} + \beta_4 BO_{it} + e$	H0 is rejected. There is a joint effect of the CR, IRS, bank size and ownership and that effect explains 80.55% of the variation in FP.

Source: Author, 2022

CHAPTER FOUR

DATA ANALYSIS, RESULTS, AND INTERPRETATIONS

4.1 Introduction

This involves a process of evaluating and reviewing data using a predefined structured process which ultimately allows a researcher to designate or assign specific meaning. From the recorded observations and results from the data analysis, a researcher is now able to generate valuable contributions to the body of knowledge or to the policy makers or other stakeholders who are consumers of such information. This segment, therefore, introduces the outcomes of the data analysis and shows patterns of the results and their interpretation. Results are shown in tables and graphs.

4.2 Descriptive Statistics

Descriptive statistics offer a synopsis of coefficients that summarize a certain data set drawn from a sample or the entire population. They are presented in measures of central tendency and measures of variability. The mean, median, and mode are the measures of central tendency whereas standard deviation (SD), variance, kurtosis, and skewness represent the measures of variability. Table 4.1 below:

Table 4.1: Descriptive Statistics

Variables	N	Mean	Minimum	Maximum	Std. Deviation	Skewness	Kurtosis
Credit Risk	451	0.183	0.050	0.200	0.033	2.174	6.356
Interest Rate Spread	451	0.082	0.050	0.200	0.028	7.774	8.117
Bank Size	451	13.33	10.003	19.971	2.111	-1.191	-0.245
Bank Ownership	451	2	1	3	1	0.333	0.821
Financial Performance	451	2.17	1.57	3.018	0.181	3.565	23.501

Source: Author, 2022

The results indicate that CR had a mean of 0.183 with a minimum of 0.050 and maximum of 0.200. The SD from the mean was 0.035 with a Skewness value was 2.174, Kurtosis at 6.356. The results also specified that interest rate spread had a mean of 0.082 with a minimum of 0.050 and maximum of 0.028. The SD from the mean was 0.035 with a Skewness value of 7.774 and a Kurtosis of 8.117. The results indicate that the bank size had a log mean of 13.33 with a minimum of 10.003 and maximum of 19.971. SD from the mean was 2.111 with a Skewness value was -1.191 and Kurtosis of -0.245.

For data analysis, bank ownership is presented as follows: local public bank (1), local private bank (2) and foreign owned bank (3) respectively. As indicated in Table 4.1, bank ownership had a mean of 2 with a minimum of 1 and maximum of 3. The SD from the mean was 1 with a Skewness value of 0.333, Kurtosis at 0.821. Lastly, the results indicated that financial performance computed using CAMELs score had a mean of 2.17 with a minimum of 1.57 and maximum of 3.018. The SD from the mean is 2.17 while the skewness is 3.565, Kurtosis at 23.501. As per CBK, the 5-scale rating represents the following: 1-Strong, 2-Satisfactory, 3 Fair, 4-Marginal and 5-Unsatisfactory. Mean of 2.17 therefore represents an overall rating that is satisfactory.

4.3 Trend Analysis

This part describes the trends for each of the variables. Trend analysis is often widely used as a tool of collecting and collating past information and trying to spot a pattern. The trend analysis of all the key study variables has been prepared and presented under this section.

4.3.1   Financial Performance

Below is a graphic presentation of the trend of financial performance over the 11 years period.
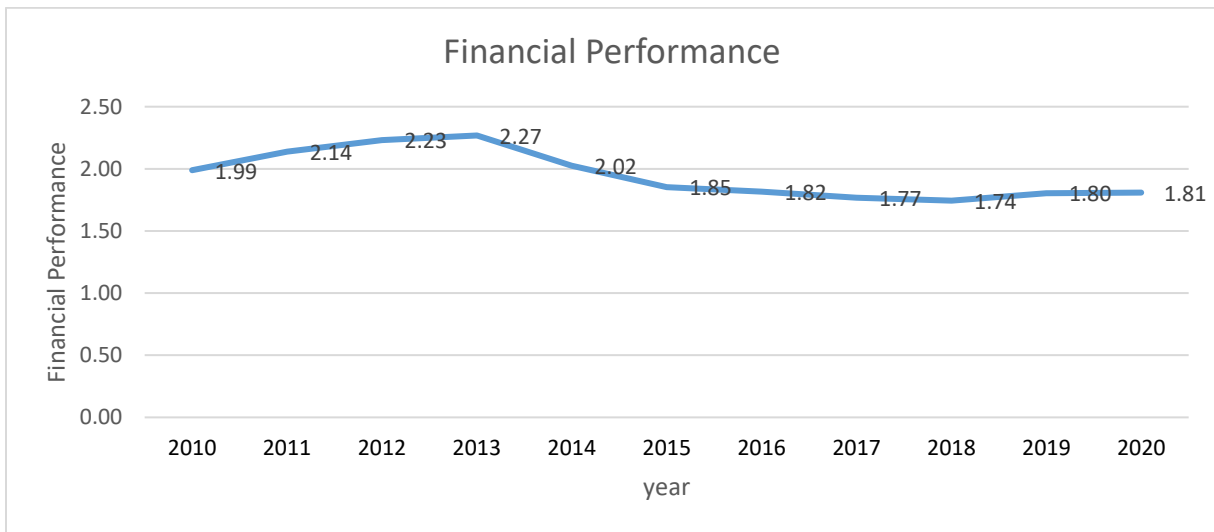
Source: Author, 2022

Figure 4.1: Trend Analysis for Financial Performance

Figure 4.1 indicates that financial performance assessed using the CAMEL rating has been quite stable with the highest Camels score recorded in 2013 while 2018 and 2020 was on the lowest ebb reflecting a better financial performance over the two years. By and large, the banks' financial performance had a rating below a score of 3 which implies that the overall rating was satisfactory over that period.

4.3.2   Credit Risk

Below is the graphic presentation of the trend of Non-performing Loans that represent credit risk over the 11-year period.

Credit Risk

Source: Author, 2022

Figure 4.2: Trend Analysis for Credit Risk

Figure 4.2 above illustrates that the trend analysis for credit risk, which was assessed using the NPLs to gross loans ratio, has been on increase with a notable spike between year 2017 to 2020. The growth of the NPLs over the period was substantially higher than the loan growth and therefore precipitating the rise in the NPLs to gross loans ratio.

4.3.3   Interest Rate Spread

Below is a graphic presentation of the trend of IRS over the 11 years period.

Interest Risk Spread
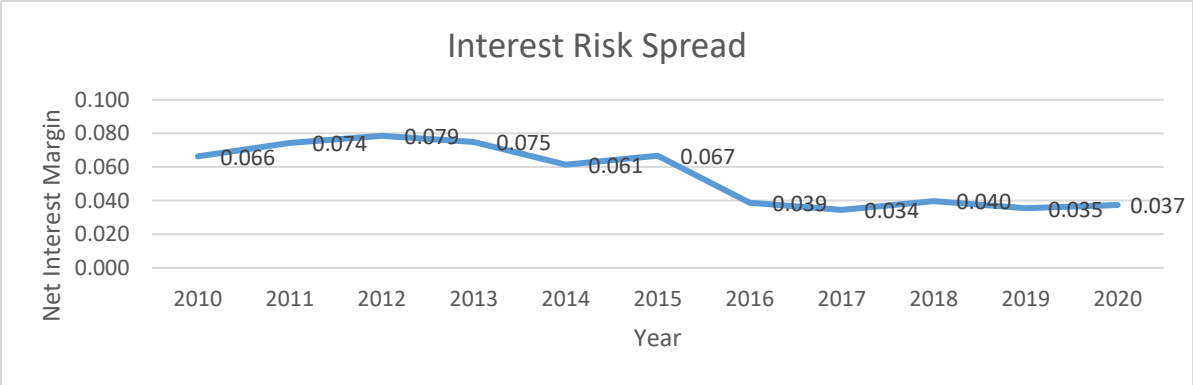
Source: Author, 2022

Figure 4.3: Trend Analysis for Interest Risk Spread

The IRS was gauged by the net interest margin (NIM) and the trend analysis shows an unsteady decreasing trend of IRS with the highest spread recorded in 2012 and the lowest in 2017. This is largely attributable to the introduction of an interest rate cap regime that was put in place in 2016 and later abolished in 2019. According to the Banking (Amendment) Act, 2016, the highest lending rate was put at less than 4% above CBR. The law also provided for the minimum interest rate that customer deposits in a commercial bank should earn which as pegged at least 70% of CBR (CBK, 2018).

4.3.4   Bank Size

Below is the graphic presentation of the trend of bank size represented by total assets over the 11 years period.
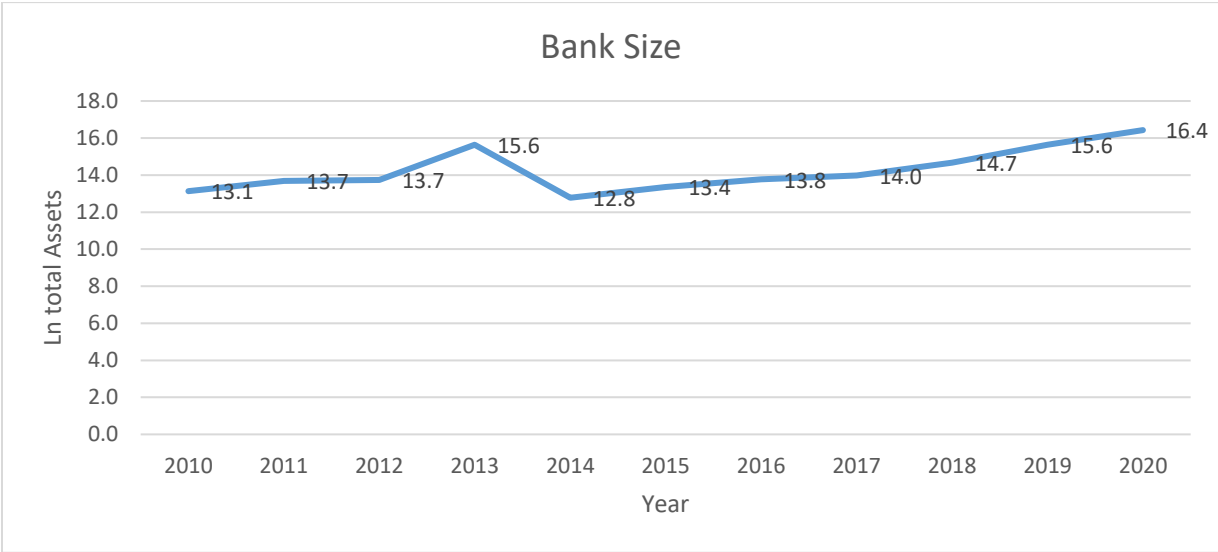
Source: Author, 2022

Figure 4.4: Trend Analysis for Total Assets

Figure 4.4 shows trend analysis for the banks' total assets, and this was assessed using the natural logarithm of total assets. The trend shows assets peaked in 2013 and then dropped in 2014 but recorded an organic growth from 2014 to 2020. The slower growth up to 2020 could be attributed

to the challenging environment especially due to the interest rate caps and tough macroeconomic environment that led to low-risk appetite for aggressive lending by banks.

4.4 Diagnostics Tests

Tests performed included: Normality, multicollinearity, heteroscedasticity, Stationarity, auto-correlation and Hausman tests.

4.4.1 Normality

The normalcy hypothesis ($u_t \sim N(0, \sigma^2)$) was essential to ensure single or joint hypothesis tests about the model parameters (Brooks, 2008). Bera-Jarque normality test for panel data was used. Table 4.2 below presents the results. Skewness and Kurtosis assess symmetry and heavy- or light-tailedness, respectively.

Table 4.2: Normality Test

Variable	Obs	Pr (Skewness)	Pr (Kurtosis)	Prob>chi2
Credit Risk	451	0.663	0.155	0.270
Interest Rate spread	451	0.400	0.120	0.220
Bank Size	451	0.300	0.460	0.470
Bank Ownership	451	0.393	0.580	0.633
Financial Performance	451	0.438	0.755	0.818

Source: Author, 2022

Table 4.2 displays the outcomes of the normality test, as well as the findings of the skewness and Kurtosis analyses. Since the P-values were larger than the significant 0.05 cutoff, we may conclude that the data are normally distributed. Figure 4.5 below displays the outcomes.
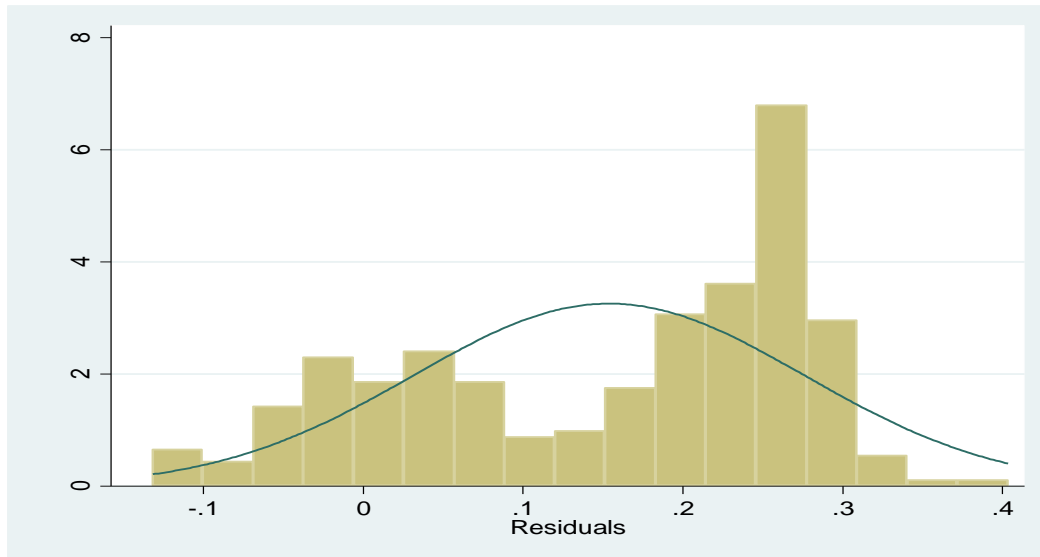
Source: Author, 2022

Figure 4.5: Histograms of Residuals

The outcomes indicate that the residuals are normally distributed and in line with Brooks (2008) who indicated that a normal distribution is symmetric around the mean which is dissimilar from a lopsided distribution which has one tail extended than the other. A normally distributed date gives a histogram which is bell-shaped.

4.4.2 Multicollinearity

A very linear relationship between two or more model variables denotes this situation. Therefore, complete multicollinearity is represented by 1 or 1. Tolerance and the VIF factor are used here to check for multicollinearity. If the tolerance value is less than 0.2 or 0.1 and the VIF value is 5 or above, it is generally accepted that there is a problem.

Table 4.3: Multicollinearity Outputs

Variable	VIF
Credit Risk	2.80
Bank Size	2.71
Interest Rate spread	2.67
Bank Ownership	2.18

Source: Author, 2022

According to the findings, each of the variables had VIF values that were less than ten, as shown in Table 4.3; this indicates that there is no multicollinearity.

4.4.3 Heteroscedasticity

Heteroscedasticity means that the variability is disproportionate round the stretch of values of another variable that appears to forecast it. Breusch-Pagan test was utilized to check for heteroskedasticity. Null hypothesis is error terms have a steady variance. End-results are revealed in Table 4.4 below.

Table 4.4: Heteroscedasticity Results

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity		
Ho: Constant variance		
Variable: fitted values		Financial Performance
chi2(1)	=	1261.07
Prob > chi2	=	0.100

Source: Author, 2022

Since the p-value is lower than 5% then, the alternative hypothesis was ruled out since the result that was reported was 0.100, which was more than 0.05, which was the number that was the key p-value. It is therefore concluded that the data is not affected by heteroscedasticity.

4.4.4 Panel Unit Root Test

Using the Dickey Fuller test for panel data, we examined the possibility of stationary or non-stationary relationships between credit risk, bank size, interest risk rate, and bank ownership. This is essential to ensure that the study does not provide erroneous results as a result of using a non-stationary series. The existence of a unit root was treated as the default assumption in autoregressive models. Table 4.5 below:

Table 4.5: Dickey Fuller Test Results

Variable	Statistics	Inverse chi-squared (P)	Inverse normal (Z)	Inverse logit t (54) (L*)	Modified inv. chi-squared (Pm)
Credit Risk	tau-statistic	55.6458	-6.2346	-4.3358	3.3456
	p-value	0.0094	0.0005	0.0028	0.0020
Interest Rate spread	tau-statistic	72.8840	-5.0898	-6.0287	8.3617
	p-value	0.0000	0.0000	0.0000	0.0000
Bank Size	tau-statistic	101.7276	-5.9891	-8.6733	12.9223
	p-value	0.0000	0.0000	0.0000	0.0000
Bank Ownership	tau-statistic	50.7351	-2.4949	-2.8119	4.8597
	p-value	0.0002	0.0063	0.0034	0.0000
Financial Performance	tau-statistic	78.1389	-2.8583	-5.7291	9.1926
	p-value	0.0000	0.0021	0.0000	0.0000

Source: Author, 2022

The Dickey Fuller test indicated that credit risk, bank size, IRS and ownership had a p-value of >0.000 and thus the null hypothesis was rejected. The test thus determined that these variables do not have unit root which denotes that they were stationary at levels. Therefore, the data was stationary at level and thus did not require differentiating.

4.4.5 Autocorrelation

To look for evidence of autocorrelation, the Wooldridge test was applied. It is essential because it offers a numeric illustration of the connection between a variable's current value and its historical range. When it comes to interpretation, a perfect positive autocorrelation is denoted by an autocorrelation value of +1, whilst a perfect negative autocorrelation is denoted by an autocorrelation value of -1. The null hypothesis is that there exists no autocorrelation in the data. Table 4.6 below:

Table 4.6: Autocorrelation

Wooldridge test for autocorrelation in panel data		
H_0: no first-order autocorrelation		
F (1,40)	=	2.973
Prob > F	=	0.0924

Source: Author, 2022

The F-test statistic was reported to have a value of 2.973, with a range of 1–40. The F-test's P-value of 0.0924 indicates that the result is not significant at the 5% level of certainty. This lends credence to the null hypothesis, and we may draw the inference that residuals are not auto linked. Therefore, the data is not affected by first-order autocorrelation.

4.4.6 Hausman Test

The test determines how well one estimator performs in comparison to another, often one that is less effective but is known to be trustworthy. Therefore, endogenous repressors (predictor variables) were identified using the Hausman Test. The Hausman Test was used to decide whether a fixed or random effects panel model was more suited. The null hypothesis of the Hausman test is that the fixed effects model is preferable to the random effects model. Table 4.7 below:

Table 4.7: Hausman Test

	(b)	(B)	(b-B)	Sqrt (diag(V_b-V_B))
	fixed	Random	Difference	S.E.
Credit Risk	-2.7936	-2.5826	-0.2110	-0.0015
Bank Size	0.8269	0.6296	0.1973	0.0006
Interest rate spread	0.0026	0.0027	-0.0001	0.0003
Bank Ownership	0.0307	0.0273	0.0034	0.0012
chi2(4)	14.67			
Prob>chi2	0.213			

Source: Author, 2022

Since the p-value of 0.213% from the Hausman test is more than 0.05, the chi-square statistic produced from the test failed to reach statistical significance at the 5% level. This meant that the conclusion that the random effects model is preferable over the fixed effect model could not be denied, and the random effects model was therefore used. This implied that random effects models estimated the effects of time-invariant variables.

4.5 Correlation Analysis

It assessed the strength in correlation among credit risk, IRS, size, ownership, and FP. Pearson's correlation was used to examine the distribution of means across the independent variables. Pearson's coefficient of correlation often takes on values between +1 and -1. There is no linear connection when the value is 0, and there is a strong negative correlation when the value is 1. There is a statistically significant relationship if and only if the p-value is less than or equal to 0.05. However, if the p-value is more than 0.05, then there is no significant link (Mkansi & Acheampong, 2012).

The results in Table 4.8 below indicated that CR is negatively related to FP (r= -0.730, p=0.000). IRS is positively and significantly related to FP (r= -0.568, p=0.000). The results further indicated that bank size is positively related to FP (r= 0.504, p=0.000). Finally, ownership is positively and significantly related to FP (r= 0.370, p=0.000). It implies that a rise in CR leads to a drop in FP while an increase in IRS, size, ownership leads to better FP.

Table 4.8: Correlation Analysis

	Financial Performance	Credit Risk	Interest rate spread	Bank Size	Bank Ownership
Financial Performance	1.000				
Credit Risk	-0.730	1.000			
	0.000				
Interest rate spread	0.568	-0.601	1.000		
	0.000	0.000			
Bank Size	0.504	-0.632	0.469	1.000	
	0.000	0.000	0.000		
Bank Ownership	0.370	-0.293	0.378	0.269	1.000
	0.000	0.000	0.000	0.000	

Source: Author, 2022

*The level of significance for the output is at 5% confidence level.

The results in Table 4.8 above postulates a negative correlation between credit risk and IRS (r= -0.601, p=0.000), a significant strong negative correlation between CR and size (r= -0.632, p=0.000) and a negative correlation between CR and bank ownership (r= -0.293, p=0.000). The relationship between bank ownership and size is positive (r= 0.269, p=0.000) and statistically significant.

4.6 Chapter Summary

This part embarks on a review of descriptive statistics that provides a summary of coefficients which summarizes a certain data set drawn from a sample or the entire population. The mean, median, and mode are the measures of central tendency whereas SD, variance, kurtosis, and skewness represent the measures of variability presented for each variable. Generally, the banks' FP had a rating of below a score of 3 which implies that the overall rating was satisfactory over that period, the growth of the NPLs over the period was substantially higher than the loan growth and therefore precipitating the rise in the NPLs to gross loans ratio, there was an unsteady decreasing trend of IRS, size quantified in terms of total assets exhibited an increasing trend.

Normality test outcomes show that residuals are normally distributed, the variance inflation factor shows that there is no multicollinearity among the independent variables, Breusch-Pagan test resolved that the data is free of heteroscedasticity, Dickey Fuller tests indicated that the data was stationary at level and thus did not require differentiating, Wooldridge test for autocorrelation ascertain that the data did not suffer from first-order autocorrelation and the Hausman test supported the adoption of the random effects model.

Correlation analysis verified that CR is negatively linked to FP, IRS is positively correlated to FP, bank size is positively connected to FP. Ownership is positively interrelated to FP, credit risk has a statistically negative correlation with IRS, CR has a statistically significant strong negative correlation with size, CR has a statistically significant weak negative correlation with ownership while ownership has a statistically positive rapport with size.

CHAPTER FIVE

HYPOTHESIS TESTING AND DISCUSSION OF FINDINGS

5.1 Introduction

In statistics, a hypothesis is a specified supposition that is usually tested based on certain data observed, collected, and collated from random variables. Hypothesis testing helps in the assessment of the plausibility of a premised assumption using data sampled from a population. Testing of hypothesis involves a process that is adopted to assess the strength of evidence from the sample and provides a context for arriving at conclusions of determinations that represent the entire population. The first stage in testing a hypothesis involves conversion of the research question into a null hypothesis, H_0, and an alternative hypothesis, H_1. They present two likely versions of the perceived outcome of a relationship between variables involved in a population.

Testing of hypothesis involves testing of two key hypotheses: the null hypothesis and the alternative hypothesis. The null hypothesis, H_0, is the generally accepted fact while alternative hypothesis, H_1, is reverse of the null hypothesis (Mkansi & Acheampong, 2012). They are therefore mutually exclusive and only one of them can be true at a certain time. The key work in research is to try and reject, invalidate, or refute the null hypothesis. The strength of the anticipated and illustrative link between predictor and dependent variables is shown via hypothesis testing. There were six primary goals and corresponding hypotheses for this research.

5.2 Effect of the Interest Rate Spread and Credit Risk in Commercial Banks in Kenya

The first hypothesis tested the effect of interest rate spread on credit risk. Below is the tested hypothesis:

H$_{01}$: Interest rate spread does not affect credit risk of commercial banks in Kenya.

Simple linear regression analysis was applied to test each hypothesis with the model.

$CR_{it} = \beta_0 + \beta_1 IRS_{it} + \varepsilon$

Table 5.1: Regression Results for interest rate spread and credit risk.

	Coef.	Std. Err.	Z	P>|z|
Interest rate spread	0.6924	0.0500	13.85	0.000
_cons	0.2443	0.0047	52.36	0.000
Wald chi2(1)	191			
Prob > chi2	0.000			
R-squared	58.01			

Source: Author, 2022

The fitted regression model was:

$CR_{it} = 0.2443_{it} + 0.6924 IRS_{it}$

Where:

CR= Credit risk

IRS= Interest Rate Spread

The results indicated that the R-squared coefficient of determination (CoD) was 58.01 percent. According to the model, 58.01% of the credit risk fluctuation may be attributed to IRS. With a Wald chi2(1) of 191 and a p-value of 0.000<0.05 indicating a statistically significant association between IRS and CR, the model describing the impact of IRS on credit risk is well-fitting. A beta value of 0.6924 indicates that for every one-unit shift in IRS, there is a corresponding shift of 0.6924 units in CR. As a result, we cannot accept H01, which states that there is no substantial association between IRS and credit risk at Kenyan banks. Were (2014) findings, indicating size and CR have a favorable connection with IRS, are therefore validated.

5.3 Effect of Credit Risk on Financial Performance of Commercial Banks in Kenya

The second hypothesis tested the effect of credit risk on FP. The hypothesis below was formulated for testing:

H$_{02}$: Credit risk does not affect FP of commercial banks of Kenya.

Simple linear regression analysis was applied to test each hypothesis with the model.

$FP_{it} = \beta_0 + \beta_1 CR_{it} + \varepsilon$

Table 5.2: Regression Results for Credit risk and Financial Performance.

Financial Performance	Coef.	Std. Err.	z	P>|z|
Credit Risk	-3.382	0.176	-19.240	0.000
Constant	1.032	0.034	30.250	0.000
Wald chi2(1)	370.05			
Prob > chi2	0.000			
R-squared	53.25			

Source: Author, 2022

The fitted model was:

$FP_{it} = 1.032 - 3.382 CR_{it}$

In table 5.2, CoD, R Square shows a value of 53.25 percent. Credit risk accounts for 53.25 percent of the observed FP variance, according to the model. The Wald chi2(1) of 370.05 indicates the model's fitness with respect to the influence of CR on FP, and the significance levels of p=0.000<0.05 suggest that the effect of CR on financial performance is meaningful. The negative beta coefficient of -3.382 indicates that for every one unit increase in credit risk, there is a 3.382 percentage point drop in FP. Therefore, the assumption (H$_{02}$) that there is no significant relationship between CR and FP was rejected.

5.4 Moderating Effect of Bank Ownership on the relationship between Credit Risk and Financial Performance of Commercial Banks in Kenya.

The third hypothesis tested the moderating effect of bank ownership on the relationship between credit risk and FP is:

H_{03}: Bank ownership does not moderate the relationship between credit risk and FP of commercial in Kenya.

CoD, R-Square, and regression coefficients were used to shed light on the findings, which were mediated by the ownership variable. A hierarchical regression analysis was carried out, with the introduction of an interface term (a combination of credit risk and bank ownership) as an additional predictor. Following the 3 stages of analysis outlined by the following models, the moderation effect was determined:

Step 1: $FP_{it} = \beta_0 + \beta_1 CR_{it} + \varepsilon$

Step 2: $FP_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 BO_{it} + \varepsilon$

Step 3: $FP_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 BO_{it} + \beta_3 CR*BO_{it} + \varepsilon$

Table 5.3 shows the regression coefficients for the first model.

Table 5.3: Regression Results for bank ownership, credit risk and FP.

Financial Performance	Coef.	Std. Err.	z	P>|z|
Credit Risk	-3.382	0.176	-19.240	0.000
_cons	1.032	0.034	30.250	0.000
Wald chi2(1)	370.05			
Prob > chi2	0.000			
R-squared	53.25			

Source: Author, 2022

The fitted model was:

$$FP_{it} = 1.032 - 3.382CR_{it}$$

Cost of Goods Sold, R Squared was 53.25. Based on the results of the model, credit risk is responsible for explaining 53.25 percent of the variance in financial results. The Wald chi2(1) of 370.05 indicates that the model is fit with respect to the impact of credit risk on FP, and the significance levels of $p=0.000<0.05$ suggest that the impact of CR on FP is substantial. The negative beta value of -3.382 indicates that a one-unit shift in CR is related to a 3.382% reduction in output.

The second model was:

Step 2: $FP_{it} = \beta_0 + \beta_1CR_{it} + \beta_2BO_{it} + \varepsilon$

Table 5.4 shows the regression coefficients for the second model.

Table 5.4: Regression Results for the second model.

Financial Performance	Coef.	Std. Err.	z	P>|z|
Credit Risk	-3.2452	0.1792	-18.1	0.000
Bank Ownership	0.0384	0.0087	4.44	0.000
_cons	0.9404	0.0410	22.92	0.000
Wald chi2(2)	426.00			
Prob > chi2	0.000			
R-squared	55.890			

 Source: Author, 2022

The fitted model was:

$$FP_{it} = 0.9404 - 3.2452CR_{it} + 0.0384BO_{it}$$

A value of 55.89% was found for the Coefficient of Determination (R-Squared). According to the model, CR, and ownership account for 55.89% of the variance in FP. The Wald chi2 (2) of 426 indicates that the model fits the data when considering the impact of CR and ownership on FP, and the significance levels of p=0.000<0.05 show that the impact of CR on bank ownership is substantial. The negative beta value of -3.2452 indicates that for every one-unit shift in CR, there will be a 3.2452 percent decrease in FP. Additionally, the beta value of 0.0384 indicates that a shift in ownership of units correlates with a 0.0384 increase in FP.

The third model:

Step 3: $FP_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 BO_{it} + \beta_3 CR*BO_{it} + \varepsilon$

Table 5.5 shows the regression coefficients for the third model:

Table 5.5: Regression Results for the Third Model

Financial Performance	Coef.	Std. Err.	z	P>|z|
Credit Risk	-2.3346	0.1703	-13.7100	0.000
Bank Ownership	0.0297	0.0074	4.0100	0.000
CR*BO	0.4655	0.0389	11.9700	0.000
_cons	0.7322	0.0391	18.7100	0.000
Wald chi2(3)	426.00			
Prob > chi2	0.000			
R-squared	78.09			

Source: Author, 2022

The fitted model was:

$FP_{it} = 0.7322 - 2.3346 CR_{it} + 0.0297 BO_{it} + 0.4655 CR*BO_{it}$

In step three, the outcome justifies that the regression model of CR, ownership and the interface term CR*BO on FP was significant with (β_1=-2.3346, p=0.000<0.05: β_2=0.0297, p=0.000<0.05: β_3=0.4655, p=0.000<0.05). The model specifies that CR, ownership, and the interaction factor CR*BO explains 78.09 % of the variation in FP. The Wald chi2 (2) of 426 demonstrates the fitness of the model shed light on the effect of CR, ownership, and the interface term CR*BO on FP. Because the P value of the interaction term (CR*BO) is 0.000< 0.05 and the R^2 escalated from 53.25% to 55.89% and 78.09% after the interaction factor and accordingly, it is settled that ownership moderates the upshot of CR on FP. The null hypothesis was dropped that the effect of CR on FP is not moderated by ownership.

The conclusions of these studies are equivalent to those of Yahaya and Lawal (2018) and Iannotta et al. (2015). The two studies proved that ownership has a substantial sway on the way FIs are managed and eventually on the FP. One of the primary explanations is that ownership structure has a bearing on the way corporate governance structures are set up. Ineffective corporate structures often lead to negligence and lack of clarity which might lead to penalties from the regulator if not a banking crisis. This supports the basis on which this hypothesis has been rejected.

5.5 Moderating Effect of Bank Size on the relationship between Credit Risk and Financial Performance of Commercial Banks in Kenya.

The fourth objective was to establish the moderation effect of bank size on the connection between CR and FP. The fourth hypothesis:

H04: Bank size does not moderate the relationship between credit risk and FP of commercial in Kenya.

The moderating impact was investigated in three models using hierarchical regression analysis with a cooperation term included as an extra predictor. Coefficient of determination (CoD), R-squared, and regression coefficients were used to draw conclusions:

Step 1: $FP_{it} = \beta_0 + \beta_1 CR_{it} + \varepsilon$

Step 2: $FP_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 BS_{it} + \varepsilon$

Step 3: $FP_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 BS_{it} + \beta_3 CR*BS_{it} + \varepsilon$

Table 5.6 below shows the regression coefficients for the first model:

Table 5.6: Regression Results for bank size, credit risk and Financial Performance.

Financial Performance	Coef.	Std. Err.	z	P>|z|
Credit Risk	-3.382	0.176	-19.240	0.000
_cons	1.032	0.034	30.250	0.000
Wald chi2(1)	370.05			
Prob > chi2	0.000			
R-squared	53.25			

Source: Author, 2022

The fitted model was:

$FP_{it} = 1.032 - 3.382 CR_{it}$

The CoD, R Square was 53.25%. The model implies that CR explains 53.25% of the variation in FP. The Wald chi2 of 370.05 points out that the fitness of the model in terms of the effect of CR on FP and p=0.000<0.05 means that the link between CR and FP are statistically significant. The beta coefficient of -3.382 implies that units shift in CR is coupled with 3.382 decrease in FP.

The second model was:

Step 2: $FP_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 BS_{it} + \varepsilon$

Table 5.7 below shows the regression coefficients for the second model:

Table 5.7: Regression Results for the Second Model:

Financial Performance	Coef.	Std. Err.	z	P>|z|
Credit Risk	-3.1754	0.2184	-14.540	0.000
Bank Size	0.0054	0.0035	1.550	0.120
_cons	0.9235	0.0773	11.950	0.000
Wald chi2(2)	372.68			
Prob > chi2	0.000			
R-squared	53.55			

Source: Author, 2022

The fitted model was:

$FP_{it} = 0.9235 - 3.1754CR_{it} + 0.0054BS_{it}$

The outcome specified that the CoD, R-Squared was 53.55%. The model reveals that CR and size clarify 53.55% of the variation in FP. The Wald chi2 of 376.68 exhibits the fitness of the model concerning the impact of CR and size on FP and p=0.000<0.05 suggests that the effect of CR and size on FP is statistically significant. The beta coefficient of -3.1754 indicated that units change in CR is linked with 3.1754 drop in FP. Additionally, beta coefficient of 0.0384 indicates that unit's variation in size is related with 0.0054 expansion in FP.

The third model was:

Step 3: $FP_{it} = \beta_0 + \beta_1 CR_{it} + \beta_1 BS_{it} + \beta_3 CR*BS_{it} + \varepsilon$

Table 5.8 below shows the regression coefficients for the third model:

Table 5.8: Regression Results for the Third Model

Financial Performance	Coef.	Std. Err.	z	P>|z|
Credit Risk	-2.8926	0.2153	-13.43	0.000
Bank Size	0.0050	0.0033	1.49	0.136
CR*BS	0.0705	0.0126	5.60	0.000
_cons	0.8225	0.0763	10.78	0.000
Wald chi2(3)	426.36			
Prob > chi2	0.000			
R-squared	70.94			

Source: Author, 2022

The fitted model was:

$FP_{it} = 0.8225_{it} - 2.8926CR_{it} + 0.0050BS_{it} + 0.0705CR*BS_{it}$

In step three, the outcome confirms that the regression model of CR, size and the collaboration term CR*BS on FP was significant with (β_1=-2.8926, p=0.000<0.05: β_2=0.0050, p=0.0136<0.05: β_3=0.0705, p=0.000<0.05). The model implies that CR, size, and the interface term CR*BS elucidates 70.94% of the variation in FP. The Wald chi2 (2) of 426.36 reveals the fitness of the model concerning the effect of CR, size, and the interface term CR*BS on FP.

The P value of the interaction term (CR*BS) is 0.000< 0.05 and the R^2 add to from 53.25% to 53.55% and 70.94% after the interface term and therefore, it is concluded that size moderates' affiliation between CR and FP. The null hypothesis was rejected that the link between CR and FP is not moderated by size.

5.6 The effect of Interest rate spread on Financial Performance of Commercial Banks in Kenya

The fifth hypothesis experimented with the effect of IRS on FP. The hypothesis is:

H$_{05}$: Interest rate spread does not impact FP of commercial banks in Kenya.

Simple linear regression analysis was applied to test each hypothesis with the model:

$FP_{it} = \beta_0 + \beta_1 IRS_{it} + \varepsilon$

Table 5.9: Regression Results for interest rate spread and Financial Performance.

Financial Performance	Coef.	Std. Err.	z	P>|z|
Interest rate Spread	2.9874	0.2566	11.64	0.000
_cons	0.1514	0.0247	6.12	0.000
Wald chi2(3)	135.51			
Prob > chi2	0.000			
R squared	60.79			

Source: Author, 2022

The fitted model was:

$FP_{it} = 0.1514 + 2.9874 IRS_{it}$

As presented in Table 5.9, the CoD, R Square was 60.79%. The model suggests that IRS describes 60.79% of the variations in FP. Wald chi2(1) of 135.51 shows the fitness of the model regarding the effect of IRS on FP and p=0.000<0.05 infer that the influence of IRS on FP is statistically significant. The beta coefficient of 2.9874 reminds that unit's alteration in is correlated with 2.9874 growth of FP. Consequently, the null hypothesis was hence rejected that the impact of IRS on FP is not significant.

5.7 Joint Effect of IRSs, Credit Risk, Bank Size and Ownership on Financial Performance of Commercial Banks in Kenya.

The sixth hypothesis was to verify the joint effect of IRSs, CR, bank size and ownership on FP. The sixth hypothesis stated in the null form is as follows:

H$_{06}$: Interest rate spread, credit risk, bank ownership, and size do not have joint effect on the FP of commercial banks.

The specific and combined regression coefficients for the variables IRS, credit risk, ownership and size on FP were done. The joint effect was analyzed using a multiple regression model as:

$$FP_{it}=\beta_0+\beta_1 CR_{it}+\beta_2 IRS_{it}+\beta_3 BS_{it}+\beta_4 BO_{it}+e$$

Table 5.10: Regression Results for IRS, Credit Risk, Bank Size, Ownership and Financial Performance.

Financial Performance	Coef.	Std. Err.	z	P>|z|
Credit Risk	-2.7936	0.2354	-11.87	0.000
Interest rate Spread	0.8269	0.2625	3.15	0.002
Bank Size	0.0026	0.0034	0.76	0.445
Bank Ownership	0.0307	0.0088	3.48	0.000
_cons	0.7657	0.0833	9.2	0.000
Wald chi2(4)	443.51			
Prob > chi2	0.000			
R-squared	80.55			

Source: Author, 2022

The fitted model was:

$$FP_{it}= 0.7657 - 2.7936 CR_{it} + 0.8269 IRS_{it} + 0.0026 BS_{it} + 0.0307 BO_{it}$$

The results account for the fact that the regression model of CR, IRS, size, and ownership on FP was significant with (β_1= -2.7936, p=0.000<0.05: β_2=0.8269, p=0.002<0.05: β_3=0.0026, p=0.0445<0.05). The model confirms that CR, IRS, bank size and ownership validate 80.55% of the variation in FP. Wald chi2(2) of 443.51 exhibits the fitness of the model concerning the effect of CR, IRS, bank size and bank ownership on FP. The P values of the credit risk, IRS, and ownerships were beneath 0.05 and the specific R-squared for the first, second, third, fourth and fifth models was 53.25%, 60.79%, 53.35, 39.08% respectively. The joint model R-squared added to 80.55% and so it is concluded that there is a joint effect of CR, IRS, ownership, and size on FP.

The results of the assessments on this hypothesis are coherent with the outcome of former studies considered with these variables, either independently or in clusters. Mwangi (2018) determined that size has a positive association with FP whilst according to Musah (2018) IRS has a positive effect on profitability of banks. More studies such as Yahaya and Lawal (2018) and Iannotta et al. (2015) approved the postulation that ownership has a pointed effect on the way banks are managed and at last on the FP. The introduction of IRS as an ex-ante variable and bank size and ownership as moderating variables have helped in testing all the liaisons between all variables and the rejection of this hypothesis established that these variables have a joint effect on FP.

5.8 Results and Discussion of the Research Findings

This section discusses results obtained from the data analysis. Results have also been explained in reference to the empirical literature covered and analyzed under chapter 3 of this document. The discussions of the outcomes or findings of the study will be compared with those of the contemporaries who reviewed similar topics in the past and in different geographical regions. This

helps in identifying the consistencies and contradictions of the findings from previous studies in relation to the key variables under examination.

5.8.1 Effect of the Interest Rate Spread and Credit Risk in Commercial Banks in Kenya.

The primary goal was to analyze the impact of the IRS on default probability. With an R-squared value of 58.01, our model shows that the gap between interest rates accounts for that much of the variance in credit risk. For every one-unit shift in credit risk, there is a 0.6924 shift in credit risk, as represented by the beta coefficient of 0.6924. The significance level between IRS and credit risk was found to be 0.000<0.05, therefore negating the null hypothesis (H01).

One of the primary bank-specific characteristics shown to correlate significantly with interest rate spread was CR, as investigated by Were (2014). The study's findings, which verified the same reasoning by rejecting the null hypothesis, were based on the premise that IRS had a substantial influence on credit risk. High spreads could lead to high NPLs due to the increased cost of the loans levied on the credit facilities. However, it is also true that high spreads could lead to an increase in earnings which would improve FP. These results are also supported by Maina (2015) whose results are also consistent with these two studies.

Further, the conclusions of the test of the hypothesis were in accord with Njoroge and Chogii (2017) who observed that there is a positive and significant relationship between credit risk and IRS. The study identified the key impact of high credit risk which includes high NPLs as well as increased expenses such as loan impairments and management costs. Ultimately such additional expenses negatively impact FP of a bank. However, they were inconsistent with Shayanewako

and Tsegaye (2018) who studied the effect of IRS on efficiency and concluded that there is a negative relation between efficiency in managing key bank parameters and a positive shock to IRS. The inconsistency may arise due to the analytical approach where Shayanewako and Tsegaye (2018) factored in shocks to interest rate spread. Bank efficiency is important in determining how well a bank can manage most of the key performance indicators including credit risk and effectively the levels of NPLs.

5.8.2 Relationship between Credit Risk and Financial Performance of Commercial Banks in Kenya

The second goal was to look at how credit risk relates to FP. With an R-squared value of 53.25, our model successfully predicted FP with a high degree of accuracy. According to the -3.382-beta coefficient, for every one-unit shift in CR, there is a 3.382% shift in FP. The assumption that there is no correlation between credit risk and FP was rejected (H_{01}) since the p-value was less than 0.05.

The outcome was consistent with the results of Sujeewa (2015) and Chege et al. (2018) who also established that credit risk has a significant negative impact on FP. Like the current study, the two studies also noted that drawbacks in controlling CR led to an upsurge in NPLs which in effect leads to the need to increase bad loan impairments. This is an expense for a bank and leads to lower profitability and compromise other key financial measurements parameters such as capital adequacy, liquidity levels amongst others. The results also supported the outcome of Muriithi et al. (2016) which ascertained that high levels of NPLs negatively impact banks' performance. To back up the assertion, it was explained that by reducing the interest income due to growth in impairments costs piles more pressure on capital due to high-risk weighted assets. This also leads to increased operating costs and culminates in low credit ratings.

There are many factors that could have precipitated the growth of the NPLs in Kenya for the last three years. It is also worth noting that the lowest level of NPLs to loan ratio was recorded in 2010 which was immediately after the infamous credit crisis of 2008/2009. Immediately after the crisis, most commercial banks embarked on an ambitious clean-up of the loan books that led to better NPL ratios over time. Other studies such as Bhattarai (2016) in Nepal, Isanzu (2017) in China, Zhongming et al. (2019) in China and Munangu (2020) in South Africa were also consistent with the outcome of the tests of this hypothesis. They all concluded that the increase in levels of credit risks, largely represented by high NPLs, affects the performance of the banks.

5.8.3 The effect of bank ownership on the relationship between credit risk and financial performance of commercial banks in Kenya

The final goal was to determine whether and how ownership influences the connection between CR and FP. A partnership term was included as an additional predictor in a hierarchical regression analysis. Three models were used to examine the moderating impact. The R Squared for the initial model was 53.25. According to the model, CR is responsible for 53.25 percent of the variance in FP. The correlation between CR and FP is statistically significant (p=0.000<0.05). The negative beta value of -3.382 indicates that for every one-unit shift in credit risk, there will be a 3.382-unit shift in FP.

R-Squared for the alternative model was 55.89%, as shown by the numbers. It is suggested by the model that CR and ownership account for 54.89% of the FP variance. The significance level between FP and ownership was 0.0000.05, indicating a strong correlation. The negative beta value of -3.2452 suggests that for every one-unit shift in CR, there will be a 3.382 percent reduction in

FP. Also, the beta value of 3.2452 indicates that a shift in bank ownership per unit relates to a 3.2452-point rise in FP. In the third model, the results point that the regression model of CR, ownership and the interface term CR*BO on FP was significant with (β_1=-2.3346, p=0.000<0.05: β_2=0.0297, p=0.000<0.05: β_3=0.4655, p=0.000<0.05). The model indicates that CR, ownership, and the interaction term CR*BO account for 78.09 % of the variation in FP.

The conclusion that ownership moderates the connection between CR and FP is supported by the fact that the P value of the interaction term (CR*BO) is 0.000 0.05 and the R2 increased from 53.25% to 55.89% and 78.09% after the cooperation term. The alternative hypothesis must be accepted.

Micco et al. (2004), who compiled a database of 119 nations' worth of information on bank ownership and performance, reached similar findings. It also used a sample of 50,000 observations collected between 1995 and 2002. The conclusion drawn was that there is a stronger correlation between ownership and performance in emerging nations than in industrialized nations.

Therefore, the findings suggest that factors such as geography and economy are often relevant to studies. Similarly, Mamatzakis et al. (2017) found that banks with high levels of state ownership had low returns on investment. The research also found that different classes of shareholders often have distinct investing goals and hence follow various incentives. Yahaya and Lawal (2018) in Nigeria, Dakhlallh et al. (2019) in Jordan, and Sarker and Nahar (2017) in Bangladesh are just a few examples of research that find ownership to have an impact on FP.

5.8.4 The effect of bank size on the relationship between credit risk and financial performance of commercial banks in Kenya

Coefficient of determination (R-Square) and regression coefficients were used to characterize the results and quantify the moderating influence of bank size. An interface word was included as a predictor in a hierarchical regression analysis. Three models were used to examine the moderating impact. The initial model has a CoD of 53.25 percent. The model estimates that CR accounts for 53.25 percent of the variance in FP. Credit risk and FP have a statistically significant relationship, as shown by the p value of 0.0000.05. Changes in CR per unit are predicted to result in a loss of 3.382 percentage points per unit on FP, according to the beta coefficient of -3.382%.

The second model's findings indicated an R-Squared value of 53.55 percent. According to the model, CR and size account for 53.55 percent of the FP's variance. The correlation between CR and size is statistically significant, as shown by the p value of 0.0000.05. The negative beta value of -3.1754 indicates that for every unit change in CR, there is a 3.1754 percent decrease in FP. Additionally, the beta value of 0.0384 indicates that for every 0.0054 increase in FP, there is a 0.0054 increase in unit size. In step three, the results show that the regression model of CR, size and the interface term CR*BS on FP was significant with (β_1=-2.8926, p=0.000<0.05: β_2=0.0050, p=0.0136<0.05: β_3=0.0705, p=0.000<0.05). The model indicates that credit risk, bank size and the collaboration term CR*BS elucidates 70.94% of the variation in FP.

With the addition of the interaction term, the R2 increased from 53.25 to 53.55% and then 70.94%, suggesting that the association between CR and FP is moderated by bank size. The P value of the interface term (CR*BS) is 0.000 <0.05. Rejecting the null hypothesis that size does not affect the association between credit risk and FP. These results are in line with those reported by Shehzad et

al. (2013), who studied commercial banks' profit and growth and showed that bank size affects the variability of profitability growth.

The conclusions fall together with those of Aladwan (2015) and Dahmash (2015) Sujeewa (2015) and Muriithi et al. (2016). The impact of bank size on the profitability of Jordan's publicly traded commercial banks was studied by Aladwan (2015). The financial institutions were grouped according to their sizes. The study concluded that increasing company size significantly boosts profits. Although Dahmash (2015) focused on a non-financial institution in Jordan, the same conclusion was drawn: larger organizations tend to have higher FP. The results contradicted those of Adusei (2015), who found no correlation between bank size and FP.

Other studies that upheld these outcomes include Mwangi (2018) which settled on the fact that size has a positive relationship with profitability. This was similarly bolstered by the results of Le Roux (2016), Sufian and Kamarudin (2012). The conclusion of this study is thus allied to those in support and the main explanations were that bigger banks can enjoy economies of scale and have a large pool of resources that is able to aid in dealing and refining the vital financial parameters of a FIs. Other studies that have confirmed the effect of size on bank performance include Mwangi (2018), Saleh and Afifa (2020), Shehzad et al. (2013) and Kaaya and Pastory (2013).

5.8.5 The effect of Interest rate spread on Financial Performance of commercial banks in Kenya.

The sixth goal called for an analysis of IRS's impact on FP. Based on the results, we can say that R Squared was 60.79 percent. According to the model, this explains 60.79 percent of the FP variance. A p value of 0.000<0.05 indicates a statistically significant correlation between IRS and

FP. According to the beta coefficient of 2.9874, a shift of one in IRS is associated with a shift of 2.9874 in FP growth. As a result, the assumption (H_{05}) that there is no correlation between IRS and FP was shown to be false.

Musah (2018), who studied the connection between IRS and profitability of banks in Ghana, found that IRS had a favorable influence on profitability, which is consistent with the data presented here. According to the results, both internal and external variables have a significant role in the IRSs. While higher spreads mean more money in your pocket, they might also hurt your bottom line if they cause more loan defaults. The outcomes of the examination of the hypothesis were in line with those of Karki (2020) and Obidike, Ejeh and Ugwuegbe (2015). The two studies assumed that IRS has a reversed relationship with financial performance. High spreads are since of the high interest rates charges on credit facilities or interest earning assets compared to the rates levied on liabilities. Once interest rates surge, banks make enhanced interest income and this increase profitability.

5.8.6 The effect of Interest rate spread, Credit risk, bank size and ownership on financial performance of commercial banks in Kenya.

The research's sixth aim was to determine whether or not IRSs, Credit risk, bank size, and ownership all had an impact on FP together. Independent IRS, credit risk, ownership, and bank size were analyzed for their effects on FP, both alone and in combination. Five models were used to examine the interaction impact. The initial model has a CoD of 53.25 percent. According to the model, CR accounts for 53.25 percent of the FP variance. The correlation between credit risk and FP was statistically significant, with a P value of 0.0000.05. According to the -3.382-beta coefficient, a one-unit change in CR is associated with a 3.382% decrease in FP. The second

103

model's CoD of 60.79% indicates that the variance in FP may be explained by factors within IRS. A p value of 0.0000.05 indicates a statistically significant correlation between IRS and FP. A beta of 2.9874 indicates that for every 1-unit shift in IRS, there will be a 2-point shift in FP.

Size accounts for 53.35 percent of the variance in FP in the third model with a coefficient of determination of 53.35%. A p-value of 0.0000.05 indicates a statistically significant correlation between bank size and FP. With a beta of 0.035, we may infer that a one-unit shift in bank size is associated with a 0.035% increase in FP. A CoD of 39.08% was achieved in the fourth model. The results of the model show that ownership accounts for 39.08% of the variance in FP. The p value of $0.000 < 0.05$ indicated a statistically significant correlation between home ownership and family prosperity. With a beta of 0.0755, we may deduce that for every 0.0755% shift in unit ownership, there will be a 0.0755% shift in FP.

In the fifth model, the results point out that the regression model of CR, IRS, size, and ownership on FP was significant with ($\beta_1 = -2.7936$, $p = 0.000 < 0.05$: $\beta_2 = 0.8269$, $p = 0.002 < 0.05$: $\beta_3 = 0.0026$, $p = 0.0445 < 0.05$). The model reveals that CR, IRS, size, and ownership explain 80.55% of the variation in FP. The P values of the CR, IRS, and ownership were below 0.05 and the individual R-squared for the first, second, third, fourth and fifth models was 53.25%, 60.79%, 53.35%, 39.08% respectively. The joint model R-squared improved to 80.55% and accordingly it is established that there is a joint effect of CR, IRS, ownership, and size on financial performance.

This conclusion is consistent with the conclusions of Goddard, Molyneux and Wilson (2004) that size, diversification, risk, and ownership structure determine bank profitability. This buttresses the

claim expressed by the modern portfolio theory that specifies that at a given level of risk, a cautious investor can improve returns via proper diversification of a portfolio. These results are in line with those of Irawati and Maksum (2017), who discovered that CAR significantly improves ROA, whereas NPLs have a negative but insignificant impact on ROA. Findings on bank size were in line with those of Mwangi (2018), who found a significant positive correlation between bank size and return on equity. However, the results were not in full accord with all the other review past studies for instance, the results negate the outcome of the studies by Aladwan (2015) and Dahmash (2015) which did not corroborate the assertion that size has a significant positive impact on FP.

5.9 Chapter Summary

This part has analyzed the outcome of the data analysis and provided an additional explanation of how the study variables influence each other as well as on the relationships between some variables. This examination was therefore based on the review of the results based on the six hypotheses that help in the investigation of the relationships among the variables that included the IRS, CR, size, ownership, and their impact on FP. Some of the major outcomes of the study include the fact that CR has a significant negative impact on FP.

The research also backed up the idea that IRS has a beneficial effect on banks' credit risk. It was also determined that bank ownership and size have a major role in mitigating the association between credit risk and FP. On the joint effect of the variables on the dependent viable, the regression analysis results confirmed that the impact of CR, IRS, bank size and ownership on FP was statistically significant with (β_1= -2.7936, p=0.000<0.05: β_2=0.8269, p=0.002<0.05:

β_3=0.0026, p=0.0445<0.05). This position is also supported by the result of the CoD which was 80.55%.

In summary, all the six hypotheses that had been framed for the study were rejected which implies that the initial hypothesis that the variables do not have an impact on the relationships that were under investigation were disapproved. Detailed analysis of the results has been done including an in-depth discussion of the findings. Comparison with the outcomes of previous studies that had been reviewed in the literature review has been incorporated in the analysis as well.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This segment gives a synopsis of findings, conclusions, and recommendations. It also captures the limiting factors in the study and details the suggested areas eligible for potential future studies.

6.2 Summary of Findings

Six hypotheses are tested to aid in the examination of the relationships among the variables that include the IRS, CR, size, bank ownership and their impact on FP. The first hypothesis imagined that there is no correlation between credit risk and FP. The P-value was less than 0.05, suggesting a statistically significant association between credit risk and FP, and the regression model suggested that 53.25 percent of the variance in FP could be attributed to credit risk. This led to the rejection of the null hypothesis.

The second hypothesis suggested that IRS has a negligible effect on credit risk. Since the results indicated that around 58.01% of the fluctuations in CR could be attributable to IRS, the null hypothesis was rejected. The p-value was < 0.05 as well, providing more evidence for the significance of the link between IRS and credit risk. The third hypothesis suggested that there is no moderation effect by bank ownership on the relationship between CR and FP. According to the regression model, 78.09 percent of the variance in FP can be accounted for by credit risk, bank ownership, and the interaction term (CR*BO). The CoD increased from 53.25% in step 1 to 55.89% in step 2 and finally to 78.09% after the interaction term, leading to the conclusion that

bank ownership moderates the relationship between credit risk and FP. The p-value of the interaction term (CR*BO) was 0.000, which is less than 0.05.

The fourth hypothesis introduced the second moderating variable and postulated that the relationship between credit risk and FP is not moderated by bank size. The null hypothesis was also rejected as the model showed that CR, bank size and the interface term (CR*BS) supports the assertion that 70.94% of the variation in FP. The same claim was supported as the P value of the interaction term (CR*BS) was 0.000 which is less than 0.05. This aptly led to the conclusion that size moderates the relationship between credit risk and FP.

The fifth hypothesis inferred that the influence of IRS on FP is not significant. The results of the model demonstrated that interest rate spread explains 60.79% of the variation in FP. The p-value of 0.000 was less than 0.05 and all these outcomes led to the inference that the relationship between IRS and FP are statistically significant.

The sixth hypothesis tested the interrelationships among all the study variables and hypothesized that the joint effect of credit risk, ownership, and size on the FP is not significant. The regression model results showed that relationship among credit risk, interest risk spread, bank size and bank ownership on FP was significant with (β_1=-2.7936, p=0.000<0.05: β_2=0.8269, p=0.002<0.05: β_3=0.0026, p=0.0445<0.05). The R squared of 80.55% also supported the conclusion that credit risk, interest risk spread, bank size and bank ownership have a statistically significant impact on financial performance. Table 6.1 summarizes the study objectives, hypotheses, and the outcome of each of the tests.

Table 6.1: Summarizes the study objectives, hypotheses, and the outcome of the tests.

Objective	Hypothesis	Hypotheses test results	Implication
Objective 1: Establish the relationship between Interest Rate Spread and credit risk of commercial banks in Kenya	**H1**: Interest rate spread does not affect credit risk of commercial banks in Kenya.	The fitness of the model concerning the effect of IRS on CR and $p=0.000<0.05$ implied that the relationship between IRS and Credit Risk are statistically significant.	**REJECTED**
Objective 2: Examine the relationship between credit risk and FP of commercial in Kenya.	**H2:** Credit risk does not affect FP of commercial banks of Kenya.	$p=0.000<0.05$ and a beta coefficient of -3.382 imply that the effect of CR on FP is statistically significant.	**REJECTED**
Objective 3: Ascertain the moderating effect of bank ownership on the relationship between credit risk and FP of commercial banks in Kenya.	**H3:** Bank ownership does not moderate the relationship between credit risk and FP of commercial in Kenya.	$p=0.000<0.05$ and a beta coefficient of -3.382 indicate that the effect of CR on FP is statistically significant	**REJECTED**
Objective 4: Determine the effect of bank size on the relationship between credit risk and FP of commercial banks in Kenya.	**H4:** Bank size does not moderate the relationship between credit risk and FP of commercial in Kenya.	$p=0.000<0.05$ and a beta coefficient of -3.382 concludes that the relationship between CR and FP are statistically significant.	**REJECTED**
Objective 5: Establish the relationship between interest rate spread and FP of commercial banks in Kenya.	**H5:** Interest rate spread does not impact FP of commercial banks in Kenya.	$p=0.000<0.05$ and a beta coefficient of 2.9874 indicate that the effect of IRS on FP is statistically significant.	**REJECTED**
Objective 6: Determine the joint effect of interest rate spread, Credit risk, bank size and ownership on FP of commercial banks in Kenya.	**H6:** Interest rate spread, credit risk, bank ownership, and size do not have joint effect on the FP of commercial banks.	The joint model R-squared is 80.55% which imply that there is a joint effect of CR, IRS and bank ownership and size on FP	**REJECTED**

6.3 Conclusions

I have argued throughout this study that there is a myriad of challenges in the contemporary banking sector which opens a lot of risks and opportunities to the industry. The current challenges and dynamism in the sector coupled with many advanced developments in technology-based banking solutions have precipitated a fertile ground for research. It is on that basis that the study has in detail dissected the interrelations between five very critical variables which are also fundamental financial parameters in any banking sector. The study has examined six hypotheses and made very clear findings and conclusions that will adequately contribute to the body of knowledge, theories, and practice. Some of the key conclusions have been expounded in the ensuing section.

The most important thing to remember is that the statistics show commercial banks in Kenya are more susceptible to the negative consequences of credit risk on their bottom lines. Executives and regulators in the banking industry must, therefore, never take their eyes off the subject of credit risk management. When credit risks are high, financial institutions can have crises that lead to subpar FP results. In summary, to reign on high NPLs which is usually a byproduct of weak credit risk management, there are focal elements that must be integrated into a robust system of credit appraisal, assessment, risk diversification, good credit monitoring and control. Banks must also systematically ensure that there is proper training of the teams managing loan or credit facilities. The regulator also should beef up the supervision role to ensure that banks do not risk customers' deposits which could eventually lead to bank runs or a contagion effect that could lead to a collapse of the entire financial system.

Second, commercial banks in Kenya are more vulnerable to default because of the interest rate differential. Bank market structure and government policy are the primary determinants of IRS. Many policy makers have always argued that the panacea to the interest rate issue lies in the liberation of the markets or economy. However, despite the liberalization of the sector, high spreads remain a key point of discourse within many countries in sub-Saharan countries that include Kenya. One of the key findings of the study is that government's kneejerk interventions in the banking sector such as the interest rate caps of 2016 did not yield the expected results. The government is encouraged to deal with the financial sector and more importantly the issue of interest rates at arm's length. Control of the spreads should be restricted to the normal mechanics that are allowed under the monetary policy guidelines and tools. It's important to note that the spread is based on data pertaining to the success of financial intermediation, profitability, regulatory efficiency, and the influence of monetary policy instruments.

Third, the findings of the study have also led to a conclusion that the relationship between CR and FP is affected by other factors. In this study, variables that were introduced included bank size and ownership as moderating factors. Credit risk and FP were also shown to be significantly affected by firm size and ownership structure. The findings indicate that the subject relationship benefits equally from an increase in bank size and a more diverse ownership structure. Growth in bank size could occur through organic growth which involves ploughing back the profits made or through mergers and consolidations.

Another finding is that the connection between CR and FP in Kenyan banks varies depending on who owns the banks. In 2019, CBA and NIC banks merged to become NCBA Group PLC, making it the most recent major consolidation in the banking industry. As a result, the bank grew tremendously, becoming one of Kenya's largest tier 1 financial institutions. The merger also resulted in increased managerial and ownership diversity at the resulting bank. Banks must develop effective corporate governance structures for instance CBK should not only vet initial appointment of senior management and members of the Board in commercial banks, but regular monitoring is also key. Regulators to regularly review the principal guidelines on management and ownership, especially for deposit taking financial institutions.

6.4   Recommendations

The outcomes of the study have revealed that there are critical relations and interconnectedness between the key study variables which included IRS, credit risk, bank size, ownership, and financial performance. The recommendations proposed have been developed or derived from the findings and conclusions. Most of these recommendations include areas of possible improvements as well as practice and policy suggestions.

A major finding of the research is the existence of a negative correlation between credit risk and FP. Better FP in the banking industry may be achieved by the creation of a regulatory framework by the regulator and other policymakers that guarantees credit risk is adequately managed. Having a stable banking sector is essential for a country's economic growth and development, hence this is of utmost importance. A few financial institutions have been rashly endangering their depositors by taking unwarranted risks in the market. To be very specific, to cure the problem the several

recommendations have been suggested and include the fact that banks must set clear strategy that reflect the bank's credit risk tolerance levels and set realistic profitability targets to achieve under such conditions. Second, CBK must also deliberately and consistently ensure that all licensed deposit taking commercial banks strictly adhere to the stringent requirement of setting up a robust credit risk management and control system. Third, to buttress the supervisory role, the banking supervision division should also increase the frequency of both onsite and offsite inspections that should always include the entire loan portfolio.

This research also confirms that interest rate spread has a positive influence on financial performance and a considerable negative effect on credit risk. IRS helps in measuring efficiency in financial intermediation as it assists in ascertaining the cost of mobilizing liabilities compared to earnings on assets. A small spread suggests low transaction costs which could minimize the cost of funds for private credit and investments, and this is key to spurring economic growth. Based on that argument, the following recommendations have been made such as policy makers and regulators need to actively promote/encourage competition and deepening of the financial sector for example by publishing of interest rates of all banks in major local dailies. Financial liberalization, or the elimination of governmental interference in financial markets via measures such as interest rate restrictions, is something that regulators should actively promote. Adoption of risk-based pricing models which allows the different banks to charge different rates based on the risk profile of a borrower. Equally, commercial banks should be encouraged to align to the best international standards such as Basel III and IFRS 9.

The findings also highlighted the importance of bank size in the correlation between credit risk and FP. The study established that there are clear benefits of a well-sized bank compared to a small bank in terms of mobilizing resources that ensure better management of the vital aspects of these institutions. The study has made specific recommendations on how to encourage addressing the issue of size of banks in the sector. First, the government is encouraged to continue supporting mergers and acquisitions (M&As) within the banking sector with the primary objective of developing a sound and resilient financial system. Government and relevant policy makers should also continue revising and improving relevant legal and regulatory frameworks which support the M&A processes, for instance the Competition Act 2011. This could also be done by giving incentives to commercial banks that would be interested in such arrangements. For instance, in 2019, the Treasury exempted CBA and NIC banks from paying share transfer tax in the merger arrangement. This could be introduced in the form of a policy decision or framework that will encourage smaller banks to consider future mergers or consolidations.

The link between credit risk and FP in Kenyan banks is also affected by ownership, according to the study's findings. The research concluded that a company's bottom line would benefit from a more diversified ownership structure. The corporate governance systems that ensure the health of the banking industry and the economy are partly determined by their ownership formation. The banking regulator should be able to conduct a thorough analysis of each bank's performance based on its ownership structure on a consistent basis and should actively promote both ownership diversity and strict adherence to the best practices in corporate governance. CBK should expand the vetting of the senior management of commercial banks at entry level to regular reviews of the

senior management and board members. This is critical to ensure the corporate governance structures continue to be maintained and respected.

6.5 Contributions of the Study Findings

6.5.1 Contributions to Knowledge/Theory

This study has sufficiently addressed the identified multiple research gaps and in so doing makes important contributions to body of knowledge (BoK). Incorporating additional interrelationships with IRS, bank size, and ownership, it expands on the limited research on the knowledge of the link between credit risk and FP. The first major improvement concerns the subject matter of the study. This is one of the first studies to examine the influence of independent and dependent factors such as interest spread, bank ownership, and bank size. Thus, it fills in the gaps in our knowledge of the Kenyan banking industry. These gaps are methodological, conceptual, and contextual and are satisfactorily explained in the problem statement.

Another key contribution to the BoK is that this research contributed to solving or addressing the trending and critical issues in the banking sector. Some of the key challenges that continue to overwhelm the banking industry include huge IRSs, bludgeoning level of NPLs, compliance to several stringent international standards, tough macroeconomic environment among others. This study addressed in detail most of these issues and has helped in highlighting some of the opportunities that banks can enjoy through addressing some of these issues.

The study also provides a unique conceptual approach or model in testing the relationship between credit risk and FP. The ex-ante evaluation of IRS and credit risk and FP backed up with two moderating variables provides an enriched study which is not very common based on review of past studies. There does not seem to be any prior study that examined the effect of such variables on the connection between credit risk and FP. This conceptual model has been added to the BoK by including the ex-ante and two moderating factors since it is customary to provide a direct causal explanation between independent and dependent variables.

This study also used methods that have sought to improve/build on what other studies have used to ascertain the impact on the relations. Most of the studies evaluated such as Mwangi (2018) used the ROA and ROE as the measure of performance, but this study has used CAMELs score which is more encompassing and includes a broader spectrum of financial measures that are under evaluation. The CAMELS model is a contraction for capital adequacy, assets, management capability, earnings, liquidity, sensitivity to market. On a rating system of between one to five, it helps a financial institution ascertain the level of FP with one representing the best rating and five denoting the worst rating. Data analysis was also done using the Stata software that provides a unique platform for data management, visualization, statistics, and provides inimitable reporting output.

6.5.2   Contributions to Theory

The study also helps in expounding the Loanable Funds Theory, Modern portfolio theory, Agency theory and Arbitrage portfolio theory. The first pillar of this study is the LFT proposed by Hansen (1951), which asserts that interest rates are set by the equilibrium between the supply and demand

for loanable funds. According to LFT, the interest rate is set according to the market's requirements for borrowing money. Money that may be lent out is defined broadly and includes deposits, bonds, and other types of credit. Interest rates and credit/loanable funds are central to the theory and are intertwined with and influence a wide range of independent factors. The research shows that a negative relationship between interest rate spreads and credit risk exists. The interest rate on a lending facility is important since it impacts the lender's interest revenue and, inversely, whether or not the borrower will have adequate funds to repay the loan. Banks' capacity to mobilize deposits and increase bank liquidity is affected by the amount of interest given to depositors, called interest expenditure. The introduction of interest rate spread as an ex-ante variable has contributed to knowledge and has also assisted in confirmation of the loanable funds theory.

The study demonstrates there is a significant influence of IRS on credit risk. The introduction of the variable also helped in testing the theory as it examined the dynamics around the levels of interest charges on assets and liabilities and how they impact on the loanable funds. The study has helped in illuminating the relationships between interest rate spread, credit risk, size, ownership, and FP. It addressed the topic of interest rates and their spreads and drawn a link to how their changes impact on the level of credit risks. It has also helped in testing the anchoring theory, loanable funds theory whose cornerstone is based on the mechanics of changes in interest rates. The study concentrated on variables that hold interest rates at the core of their functioning.

The research also provided important insights into MPT theory. It paves the way for investors to put up a diversified portfolio of assets with the goal of maximizing anticipated return within a specified risk profile. It presumes that investors fear loss and, thus, would always choose the safer

portfolio when given the same amount of predicted return. The key constructs of the theory include risk management, maximization of returns, asset diversification and therefore add value in the investigation of the relationship between CR (independent variable) on FP. It is also very helpful in decerning the impact of bank size on the relationship between CR and FP. In a nutshell, the theory was key in the identification of moderators that not only explain the dynamics and mechanics of impact but also the peripheral factors that affect the principal relationship. The theory is also useful in explaining some of the key interrelations between the variables especially where the study did not encounter a lot of empirical research.

The research also added to the multi-factor model for asset pricing known as arbitrage portfolio theory (APT), which links different measures of macroeconomic risk to the value of different types of financial assets. The theory's key constructs include the asset returns, macroeconomic factors, and management of systemic risk. In this study, the theory was very instrumental in establishing the relationship between interest rate spread credit risk and financial performance. The findings affirm the postulates of the theory that partly indicate that to maximize returns, risk must be at an acceptable level. As the results have confirmed, the returns of an asset or a portfolio are also determined by other factors that could be peripheral. The findings have demonstrated that bank size and ownership have a significant impact on the relationship between credit risk and FP.

The study also relied on agency theory which expounds on the principal-agent relationships and the problems that could emanate between the two parties. This study contributed to more knowledge in testing the agency theory which helps in understanding the relationships between agents and principals. It also helps the shareholders, or the owner of the business, ascertain the

extent of control to exert on the business because at times managers may not act to the utmost benefit of the stockholders without regard for self-interest. The findings indicated that the ownership structure of a commercial bank significantly affects the connection between credit risk and FP, as well as the quality of its corporate governance mechanisms. Because of their interconnected nature, controlling these critical components of the banking industry has far-reaching consequences for the whole financial system. There should be no silos between policymakers and regulators. These essential determinants affect the FP of the banking industry and the economy as a whole; thus, they need to be managed with all the resources at their disposal.

6.5.3   Contributions to Policy Making

The study has been carried out while the Kenyan banking sector is undergoing several major changes some which are anchored by evolution in technology and others by the major changes in the regulatory environment necessitated by emerging international best practices and standards. These changes that have an impact on access to financial services have received keen attention from policymakers in the country and around the globe over the last 10 years. The outcomes and results of this study will be very useful in policy formulation in the banking sector in Kenya. Policy formulation process usually conceptualized as sequential components or stages. The first is the problem emergence then agenda setting, review of available policy options, making the choice or decision-making, implementation, and later an evaluation.

One of the areas that needs clear policy formulation is the management of interest rates both on the customers' deposits and loans. The government's action of introduction of interest rate caps in 2016 did not seem well coordinated or emanating from a specific policy formulation. It is important

119

that a very clear policy is developed that addresses the circumstances and the thresholds that could warrant introduction of interest rates restrictions. The operationalization of the risk-based lending models needs to be done under a very clear policy framework. Right now, commercial banks are developing their own models and then passing them to CBK for review and approval. The opposite could be better where the regulator develops the models and banks adopt them as this will allow uniformity and ease in monitoring.

Due to the impact of these changes in the banking sector, most banks have been forced to strategize on how to address some of these challenges. Banks are investing in more robust credit risk management systems that will help stem the increasing levels of non-performing loans. Banks are also improving recovery and collections efforts by introducing more stringent NPLs management policies and procedures. The central bank is also keeping a close eye on consolidation and merger trends, as many commercial banks are looking to increase their size to take advantage of economies of scale. This research has also looked at how commercial banks' size and ownership affect their primary relationship. This will help bank managers be able to make vital choices that will aid in improving performance.

To the regulators and policy makers, CBK should devise stringent mechanisms to inspect loan books of these commercial banks to ensure proper loan administration is done and appropriate levels of loan impairments or provisions are maintained. Levels of NPLs are central to the financial performance of any bank or lender. In 2020, the impact of the COVID-19 was so severe that many Kenyan banks had to post profit warning and suspend dividends to the shareholders. Although the position seems to be improving as the population devise ways to continue working despite the

vagaries of the pandemic, the situation is still dire, and many banks have recorded huge NPLs especially in certain sectors such as hospitality business.

Interest rate spreads are heavily influenced by governmental or regulatory action; for example, in 2016, the adoption of interest rate limits had a direct and dramatic effect on spreads. As a result, it is crucial that policymakers and regulators be included in the deliberations that ultimately lead to choices on interest rate levels. This is due to evidence suggesting that interest rate spreads have an effect not just on credit risk or nonperforming loans but also on the overall FP of these institutions. One school of thought, however, suggests that the influence of the regulations is so tiny that it is not worth any attention, and this has sparked a heated discussion. This is obviously contradicted by another school of thought that strongly believes that this is such an important part of the banking business and therefore ought to be left in the hands of the forces of the market.

The size of the bank is a key aspect of any financial institution because it also determines the capacity in managing key aspects of such institutions. The regulator can set the tone of the sizes that are ideal in the market without being perceived to be intruding or micromanaging the commercial banks. For instance, the levels of minimum capital set by the regulator can guide the market in what the ideal size should be and at times such decisions or requirements from the regulator have precipitated mergers and acquisitions.

6.5.4   Contributions to Practice

As IRS increases the chances that levels of nonperforming loans will increase has been confirmed by the study. There are various reasons why an increase in interest rate spread may lead to an

increase in the levels of credit risk or the levels of the NPLs. Growth in the interest rate spread is largely because of increases in the interest charged on loans or credit facilities compared to the interest charged on the deposits. Increase in loan interest adds pressure on the borrowers and are likely to get debt-fatigued because of the increased repayments occasioned by the increase in interest rates. This largely applies to loans that are on variable or floating rates of interest. Growing interest rate spreads could negatively impact on the levels of NPLs in banks as it augments the loan cost. When the cost of loan increases, at times the borrower may experience debt fatigue that leads to more defaults and therefore exacerbating levels of NPLs.

This study was conducted at a time that the local banking sector is facing innumerable challenges. The growing levels of NPLs have led to the regulator introducing tougher measures to stem the trend which has been negatively affecting the general health of the banking sector and the economy in general. The interest rate caps that had been introduced in 2016 as a panacea to the then skyrocketing lending rates brought major upsets in the market. Access to private credit was drastically reduced which in effect impacted on the ability to register the projected economic growth rates. The caps had to be removed in 2019 and that largely removed bottlenecks that were slowing down the growth of private credit.

Little research has been carried out on the other key factors that can concurrently affect the relationship between credit risk and FP. Most studies concentrated on two or three variables and therefore did not benefit from a wider scope of research on the topic. The study has been able to ascertain the main rapport between credit risk and how interest rate spread, bank size and bank ownership affects such a relationship. The study has demonstrated that interest rate spread has an

impact on credit risk and therefore commercial banks and the regulator must devise ways to maintain spreads at acceptable levels. The impact of credit risk on performance measured by the CAMELs rating framework shows that banks must take keen interest in the management of NPLs.

Increases in nonperforming loans (NPLs) lead to increases in risk weighted assets, which in turn reduces capital adequacy, decreases liquidity, and affects profitability across the board for a financial institution. The banks must therefore come up with well researched and tested measures to manage these key aspects if financial performance is to be at satisfactory levels.

6.6 Limitations of the Study

Several problems and restrictions plagued this investigation. The research used secondary data, which is fairly accurate and impartial, but primary data would have allowed for interviews with bank management to get more insight. Although the research included data from 2010–2020, its timeframe was too soon to account for the COVID-19 pandemic, a key event that occurred in 2020 and had a significant influence on the banking industry in Kenya and indeed in the nations studied. Future studies will be able to capture how the relationships among the variables would have changed factoring in such a major development that happened in 2020.

Another limitation is that there were few studies that had been done that had incorporated all the variables used in this study. Some were studies that sought to test the relationships between two variables that are part of this study. This meant that one had to search for most of these fragmented studies but be able to understand their findings and then use them in ascertaining the joint effect of all the variables in this research. However, despite the limitations highlighted, the study was

still conducted with relevant safeguards in place to ensure the outcome was not significantly impacted by these limitations. The study was able to address the interrelationships among the study variables in the Kenyan banking industry.

6.7 Suggestions for Further Research

In as much as the study helped in the deciphering the interrelationships between interest rate spread, credit risk, bank size, bank ownership and FP, there are still several gaps that would benefit from further research based on these findings and conclusions.

There have been many developments that have occurred in the local banking sector including consolidations and mergers, and the use of Fintech solutions among others. Additional research that will zero in on such topics will be very useful for instance, study on the impact of the emerging technology in banking operations and performance would provide a unique and beneficial dimension to the research. Digitalization has fundamentally changed how people interrelate and carry out business. There are huge advancements and adoption of technology in the provision of banking services, and this poses a big influence on the futuristic approaches will change in the coming years. It is therefore key that future studies spend more resources and time on the impact of technology and how it can affect the main relationship under evaluation.

Additional research around the impact of credit risk on FP could also benefit in taking cognizance of some major changes occasioned by adoption of some international accounting standards. Implementation of IFSR 9 has revolutionized the area of loan loss provisioning and management of defaulted credit facilities. The implementation of IFRS 9 started in 2018 and introduced the

Expected Credit Loss (ECL) model that replaced the Incurred Credit Loss (ICL) model under IAS 39, and this had a major impact on how impairment of loans. Further research that seeks to interrogate the impact of the additional stringent standards such as IFRS 9 or Basel II & III Accords would be very practical and beneficial to the banks and other policy makers.

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APPENDICES

APPENDIX I: DATA COLLECTION FORM

BANK NAME ………………………………………………………………………….

DATE……………………………………………………………………………………

DATA	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Capital										
Total Assets										
Total Debt										
Total Equity										
Profit After Tax										
Total Loans										
Non-Performing Loans (NPLs)										
NPLs/Loans Ratio										
Net interest Margin										

APPENDIX 2: LIST OF LICENCED COMMERCIAL BANKS IN KENYA - 20

 BANK

1. ABC Bank (Kenya)

2. Absa Bank Kenya

3. Access Bank Kenya

4. Bank of Africa

5. Bank of Baroda

6. Bank of India

7. Chase Bank Kenya (In Receivership)

8. Citibank

9. Consolidated Bank of Kenya

10. Cooperative Bank of Kenya

11. Credit Bank

12. Development Bank of Kenya

13. Diamond Trust Bank

14. Dubai Islamic Bank

15. Eco bank Kenya

16. Equity Bank Kenya

17. Family Bank

18. First Community Bank

19. Guaranty Trust Bank Kenya

20. Guardian Bank

21. Gulf African Bank

22. Habib Bank AG Zurich

23. Housing Finance Company of Kenya

24. I&M Bank

25. Imperial Bank Kenya (In receivership)

26. Kingdom Bank Limited

27. Kenya Commercial Bank

28. Mayfair Bank

29. Middle East Bank Kenya

30. M Oriental Bank

31. National Bank of Kenya

32. NCBA Bank Kenya

33. Paramount Universal Bank

34. Prime Bank (Kenya)

35. SBM Bank Kenya

36. Sidian Bank

37. Spire Bank

38. Stanbic Holdings Plc

39. Standard Chartered Kenya

40. United Bank for Africa

41. Victoria Commercial Bank

APPENDIX 3: RESEARCH DATA COLLECTED FOR THE COMMERCIAL BANKS IN KENYA

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
ABC Bank (Kenya)	2010	0.195	0.050	12.569	2	0.082	0.170	0.451
ABC Bank (Kenya)	2011	0.191	0.074	11.414	2	0.087	0.673	0.393
ABC Bank (Kenya)	2012	0.198	0.051	13.869	1	0.080	0.832	0.308
ABC Bank (Kenya)	2013	0.197	0.086	10.355	2	0.053	0.444	0.343
ABC Bank (Kenya)	2014	0.200	0.064	12.359	1	0.085	0.897	0.113
ABC Bank (Kenya)	2015	0.192	0.090	13.890	2	0.096	0.900	0.230
ABC Bank (Kenya)	2016	0.198	0.071	13.327	2	0.070	0.677	0.246
ABC Bank (Kenya)	2017	0.197	0.092	14.588	2	0.075	0.832	0.266
ABC Bank (Kenya)	2018	0.192	0.067	14.562	1	0.084	0.696	0.275
ABC Bank (Kenya)	2019	0.199	0.069	13.185	1	0.062	0.282	0.293
ABC Bank (Kenya)	2020	0.206	0.071	11.808	1	0.040	-0.132	0.311
Absa Bank Kenya	2010	0.199	0.106	11.016	3	0.165	0.723	0.525
Absa Bank Kenya	2011	0.196	0.079	10.825	2	0.099	0.699	0.498
Absa Bank Kenya	2012	0.194	0.064	14.758	2	0.099	0.120	0.452
Absa Bank Kenya	2013	0.199	0.080	11.358	3	0.085	0.727	0.484
Absa Bank Kenya	2014	0.190	0.097	11.304	1	0.098	1.079	0.355
Absa Bank Kenya	2015	0.198	0.087	14.615	1	0.083	0.603	0.355
Absa Bank Kenya	2016	0.199	0.065	14.285	2	0.059	0.483	0.354
Absa Bank Kenya	2017	0.195	0.095	10.197	2	0.064	0.220	0.368
Absa Bank Kenya	2018	0.195	0.090	10.248	2	0.068	0.620	0.370
Absa Bank Kenya	2019	0.197	0.088	12.088	1	0.090	0.408	0.402
Absa Bank Kenya	2020	0.199	0.086	13.928	0	0.112	0.196	0.434
Access Bank Kenya	2010	0.199	0.192	19.971	3	0.208	0.702	0.551
Access Bank Kenya	2011	0.195	0.117	14.635	3	0.291	0.526	0.531
Access Bank Kenya	2012	0.196	0.063	11.301	2	0.058	0.147	0.441
Access Bank Kenya	2013	0.191	0.052	10.279	3	0.092	0.833	0.450
Access Bank Kenya	2014	0.194	0.053	11.485	2	0.075	0.219	0.456
Access Bank Kenya	2015	0.193	0.075	12.797	1	0.086	0.589	0.411

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Access Bank Kenya	2016	0.192	0.054	13.570	1	0.087	0.158	0.377
Access Bank Kenya	2017	0.198	0.094	14.528	1	0.088	1.109	0.373
Access Bank Kenya	2018	0.200	0.067	11.473	1	0.058	0.736	0.378
Access Bank Kenya	2019	0.196	0.078	14.971	2	0.064	0.934	0.354
Access Bank Kenya	2020	0.192	0.089	18.469	3	0.070	1.132	0.330
Bank of Africa	2010	0.197	0.098	11.382	1	0.068	0.924	0.277
Bank of Africa	2011	0.199	0.091	14.531	2	0.058	1.111	0.236
Bank of Africa	2012	0.194	0.079	10.424	2	0.076	0.576	0.224
Bank of Africa	2013	0.197	0.072	10.253	1	0.057	0.837	0.287
Bank of Africa	2014	0.192	0.064	10.180	2	0.060	1.036	0.277
Bank of Africa	2015	0.192	0.070	10.331	1	0.051	0.758	0.293
Bank of Africa	2016	0.198	0.083	13.088	2	0.086	0.329	0.343
Bank of Africa	2017	0.195	0.085	13.697	2	0.079	0.740	0.337
Bank of Africa	2018	0.199	0.059	13.026	1	0.098	0.778	0.345
Bank of Africa	2019	0.190	0.070	13.598	1	0.057	0.227	0.373
Bank of Africa	2020	0.181	0.081	14.170	1	0.016	-0.324	0.401
Bank of Baroda	2010	0.190	0.089	10.288	3	0.053	0.509	0.453
Bank of Baroda	2011	0.200	0.075	13.968	2	0.088	1.111	0.455
Bank of Baroda	2012	0.194	0.068	13.999	2	0.080	1.052	0.398
Bank of Baroda	2013	0.200	0.063	12.074	3	0.080	0.621	0.450
Bank of Baroda	2014	0.192	0.077	13.902	2	0.054	0.276	0.381
Bank of Baroda	2015	0.198	0.055	11.692	2	0.093	0.649	0.373
Bank of Baroda	2016	0.196	0.055	13.888	1	0.094	0.912	0.379
Bank of Baroda	2017	0.199	0.059	10.316	1	0.079	0.400	0.427
Bank of Baroda	2018	0.197	0.088	12.454	2	0.080	0.988	0.411
Bank of Baroda	2019	0.198	0.080	12.484	2	0.088	0.298	0.433
Bank of Baroda	2020	0.199	0.072	12.514	2	0.096	-0.392	0.455
Bank of India	2010	0.195	0.189	13.598	2	0.239	0.159	0.508
Bank of India	2011	0.195	0.089	13.020	3	0.064	1.160	0.496

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Bank of India	2012	0.196	0.063	11.529	2	0.095	1.118	0.474
Bank of India	2013	0.196	0.197	12.821	2	0.218	0.699	0.501
Bank of India	2014	0.190	0.159	11.900	3	0.277	0.540	0.530
Bank of India	2015	0.191	0.060	14.326	2	0.088	1.061	0.329
Bank of India	2016	0.196	0.088	13.578	2	0.087	0.981	0.387
Bank of India	2017	0.193	0.092	13.358	1	0.092	0.739	0.396
Bank of India	2018	0.192	0.079	10.574	3	0.092	1.015	0.462
Bank of India	2019	0.195	0.190	14.700	3	0.196	0.920	0.525
Bank of India	2020	0.198	0.301	18.826	3	0.300	0.825	0.588
Chase Bank Kenya (In Receivership)	2010	0.198	0.099	12.916	1	0.067	0.370	0.438
Chase Bank Kenya (In Receivership)	2011	0.195	0.100	12.898	1	0.056	1.167	0.435
Chase Bank Kenya (In Receivership)	2012	0.197	0.089	12.201	1	0.085	0.281	0.431
Chase Bank Kenya (In Receivership)	2013	0.190	0.088	12.142	2	0.070	0.954	0.428
Chase Bank Kenya (In Receivership)	2014	0.054	0.151	17.425	2	0.246	0.724	0.679
Chase Bank Kenya (In Receivership)	2015	0.197	0.078	11.088	2	0.056	0.127	0.284
Chase Bank Kenya (In Receivership)	2016	0.195	0.085	10.289	1	0.084	0.958	0.396
Chase Bank Kenya (In Receivership)	2017	0.194	0.071	10.109	1	0.061	1.046	0.365
Chase Bank Kenya (In Receivership)	2018	0.194	0.097	10.035	1	0.076	0.819	0.206
Chase Bank Kenya (In Receivership)	2019	0.190	0.100	14.678	1	0.094	0.174	0.327
Chase Bank Kenya (In Receivership)	2020	0.186	0.103	19.321	1	0.112	-0.471	0.448
Citibank	2010	0.196	0.143	18.360	2	0.265	0.456	0.557
Citibank	2011	0.196	0.136	13.936	2	0.230	1.170	0.507
Citibank	2012	0.192	0.164	17.104	3	0.231	0.668	0.564
Citibank	2013	0.052	0.122	18.384	3	0.126	0.403	0.584
Citibank	2014	0.191	0.100	11.255	1	0.100	0.965	0.408
Citibank	2015	0.194	0.072	12.492	1	0.083	0.536	0.432
Citibank	2016	0.055	0.146	19.529	3	0.128	0.503	0.583
Citibank	2017	0.197	0.097	10.261	2	0.078	1.153	0.369
Citibank	2018	0.196	0.130	12.280	2	0.201	0.826	0.549

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Citibank	2019	0.194	0.134	14.404	3	0.298	0.674	0.530
Citibank	2020	0.192	0.138	16.528	4	0.395	0.522	0.511
Consolidated Bank of Kenya	2010	0.195	0.077	11.456	2	0.062	1.095	0.342
Consolidated Bank of Kenya	2011	0.196	0.093	11.936	1	0.092	0.475	0.331
Consolidated Bank of Kenya	2012	0.195	0.050	12.562	2	0.079	0.770	0.333
Consolidated Bank of Kenya	2013	0.198	0.077	10.362	1	0.084	1.146	0.371
Consolidated Bank of Kenya	2014	0.196	0.054	14.963	2	0.092	0.682	0.319
Consolidated Bank of Kenya	2015	0.199	0.097	12.844	1	0.094	1.076	0.282
Consolidated Bank of Kenya	2016	0.191	0.089	10.629	1	0.093	0.460	0.296
Consolidated Bank of Kenya	2017	0.195	0.079	10.628	2	0.062	0.578	0.266
Consolidated Bank of Kenya	2018	0.196	0.065	11.355	2	0.066	0.621	0.228
Consolidated Bank of Kenya	2019	0.197	0.092	14.873	1	0.054	0.139	0.319
Consolidated Bank of Kenya	2020	0.198	0.119	18.391	0	0.042	-0.343	0.410
Cooperative Bank of Kenya	2010	0.195	0.092	10.403	2	0.093	0.563	0.284
Cooperative Bank of Kenya	2011	0.200	0.071	11.742	2	0.100	1.132	0.274
Cooperative Bank of Kenya	2012	0.191	0.083	11.900	1	0.053	0.176	0.286
Cooperative Bank of Kenya	2013	0.193	0.091	14.326	1	0.094	0.978	0.311
Cooperative Bank of Kenya	2014	0.194	0.076	13.578	1	0.055	0.560	0.249
Cooperative Bank of Kenya	2015	0.190	0.073	13.358	1	0.075	0.556	0.362
Cooperative Bank of Kenya	2016	0.197	0.073	10.574	2	0.077	0.133	0.326
Cooperative Bank of Kenya	2017	0.192	0.093	14.700	1	0.050	0.907	0.310
Cooperative Bank of Kenya	2018	0.199	0.062	12.916	2	0.100	0.413	0.328
Cooperative Bank of Kenya	2019	0.198	0.073	12.898	2	0.078	1.131	0.340
Cooperative Bank of Kenya	2020	0.197	0.084	12.880	2	0.056	1.849	0.352
Credit Bank	2010	0.195	0.057	12.201	2	0.067	0.273	0.420
Credit Bank	2011	0.195	0.081	12.142	1	0.092	0.820	0.410
Credit Bank	2012	0.195	0.076	17.425	2	0.095	0.706	0.417
Credit Bank	2013	0.197	0.050	11.088	2	0.054	0.132	0.409
Credit Bank	2014	0.200	0.066	10.807	1	0.061	1.062	0.365

142

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Credit Bank	2015	0.191	0.056	12.507	1	0.099	0.659	0.337
Credit Bank	2016	0.197	0.062	14.596	2	0.062	0.350	0.397
Credit Bank	2017	0.200	0.078	12.343	3	0.069	0.947	0.473
Credit Bank	2018	0.200	0.084	10.610	2	0.051	0.249	0.265
Credit Bank	2019	0.196	0.076	14.812	2	0.053	0.489	0.270
Credit Bank	2020	0.192	0.068	19.014	2	0.055	0.729	0.275
Development Bank of Kenya	2010	0.195	0.097	11.128	2	0.099	0.654	0.319
Development Bank of Kenya	2011	0.198	0.079	14.920	1	0.076	0.947	0.301
Development Bank of Kenya	2012	0.197	0.124	14.998	3	0.171	0.589	0.547
Development Bank of Kenya	2013	0.193	0.050	13.830	2	0.100	0.728	0.349
Development Bank of Kenya	2014	0.190	0.086	10.856	2	0.090	1.104	0.354
Development Bank of Kenya	2015	0.197	0.098	14.831	1	0.074	0.156	0.376
Development Bank of Kenya	2016	0.192	0.076	14.821	2	0.089	1.157	0.308
Development Bank of Kenya	2017	0.195	0.054	13.048	1	0.088	0.755	0.318
Development Bank of Kenya	2018	0.192	0.053	13.716	2	0.100	0.387	0.293
Development Bank of Kenya	2019	0.195	0.062	10.660	1	0.061	0.116	0.303
Development Bank of Kenya	2020	0.198	0.071	7.604	0	0.022	-0.155	0.313
Diamond Trust Bank	2010	0.193	0.095	14.185	3	0.097	0.945	0.466
Diamond Trust Bank	2011	0.197	0.092	13.007	2	0.061	1.067	0.458
Diamond Trust Bank	2012	0.193	0.072	13.905	2	0.063	1.077	0.183
Diamond Trust Bank	2013	0.197	0.058	14.215	3	0.078	0.770	0.469
Diamond Trust Bank	2014	0.200	0.070	14.662	2	0.098	1.105	0.449
Diamond Trust Bank	2015	0.193	0.072	10.012	1	0.073	0.264	0.357
Diamond Trust Bank	2016	0.194	0.085	14.813	2	0.078	0.935	0.440
Diamond Trust Bank	2017	0.194	0.062	11.752	1	0.094	0.829	0.385
Diamond Trust Bank	2018	0.198	0.090	10.415	1	0.054	0.699	0.342
Diamond Trust Bank	2019	0.192	0.093	13.011	2	0.073	0.701	0.327
Diamond Trust Bank	2020	0.186	0.096	15.607	3	0.092	0.703	0.312
Dubai Islamic Bank	2010	0.193	0.084	12.840	1	0.056	0.861	0.383

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Dubai Islamic Bank	2011	0.198	0.095	12.880	1	0.097	0.302	0.386
Dubai Islamic Bank	2012	0.198	0.077	14.070	2	0.089	0.363	0.383
Dubai Islamic Bank	2013	0.198	0.083	12.243	2	0.092	0.292	0.394
Dubai Islamic Bank	2014	0.200	0.058	10.707	1	0.083	0.779	0.250
Dubai Islamic Bank	2015	0.194	0.079	13.330	1	0.075	0.382	0.355
Dubai Islamic Bank	2016	0.193	0.072	10.219	1	0.097	0.790	0.377
Dubai Islamic Bank	2017	0.197	0.067	11.851	2	0.069	0.433	0.453
Dubai Islamic Bank	2018	0.055	0.130	16.936	2	0.223	2.890	1.271
Dubai Islamic Bank	2019	0.053	0.121	18.980	3	0.243	0.572	0.788
Dubai Islamic Bank	2020	0.051	0.112	21.024	4	0.263	-1.746	0.305
Ecobank Kenya	2010	0.197	0.075	14.640	2	0.053	0.354	0.439
Ecobank Kenya	2011	0.191	0.096	14.010	3	0.052	0.961	0.467
Ecobank Kenya	2012	0.050	0.182	18.237	2	0.123	0.823	0.717
Ecobank Kenya	2013	0.052	0.146	19.664	3	0.141	1.163	0.651
Ecobank Kenya	2014	0.198	0.099	10.786	2	0.082	0.744	0.428
Ecobank Kenya	2015	0.191	0.085	10.354	2	0.062	0.589	0.379
Ecobank Kenya	2016	0.200	0.122	13.011	3	0.143	0.728	0.517
Ecobank Kenya	2017	0.195	0.068	11.272	1	0.071	1.104	0.395
Ecobank Kenya	2018	0.195	0.083	12.455	2	0.071	0.156	0.418
Ecobank Kenya	2019	0.192	0.100	10.890	1	0.081	1.157	0.391
Ecobank Kenya	2020	0.189	0.117	9.325	0	0.091	2.158	0.364
Equity Bank Kenya	2010	0.199	0.057	10.647	2	0.093	0.755	0.334
Equity Bank Kenya	2011	0.190	0.095	12.633	2	0.059	0.387	0.347
Equity Bank Kenya	2012	0.193	0.053	13.061	1	0.064	0.116	0.420
Equity Bank Kenya	2013	0.195	0.079	11.827	2	0.090	0.945	0.366
Equity Bank Kenya	2014	0.198	0.050	14.740	1	0.073	1.067	0.369
Equity Bank Kenya	2015	0.195	0.071	11.011	1	0.082	1.077	0.352
Equity Bank Kenya	2016	0.199	0.097	11.426	2	0.077	0.770	0.344
Equity Bank Kenya	2017	0.195	0.082	13.540	2	0.081	1.105	0.360

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Equity Bank Kenya	2018	0.200	0.092	13.609	2	0.075	0.264	0.350
Equity Bank Kenya	2019	0.194	0.067	14.878	2	0.088	0.935	0.374
Equity Bank Kenya	2020	0.188	0.042	16.147	2	0.101	1.606	0.398
Family Bank	2010	0.200	0.094	10.504	1	0.100	0.829	0.439
Family Bank	2011	0.191	0.066	14.050	1	0.057	0.699	0.370
Family Bank	2012	0.194	0.058	10.238	2	0.067	0.701	0.398
Family Bank	2013	0.190	0.082	13.214	1	0.054	0.861	0.410
Family Bank	2014	0.200	0.075	13.516	2	0.083	0.833	0.386
Family Bank	2015	0.195	0.099	10.095	2	0.056	0.504	0.362
Family Bank	2016	0.194	0.072	14.611	1	0.092	0.274	0.306
Family Bank	2017	0.199	0.090	12.155	1	0.088	0.900	0.336
Family Bank	2018	0.196	0.096	14.992	2	0.054	0.178	0.304
Family Bank	2019	0.197	0.142	10.510	3	0.271	0.246	0.524
Family Bank	2020	0.198	0.188	6.028	4	0.488	0.314	0.744
First Community Bank	2010	0.192	0.085	12.928	1	0.067	0.636	0.296
First Community Bank	2011	0.198	0.075	12.220	2	0.064	0.511	0.284
First Community Bank	2012	0.195	0.084	14.765	2	0.094	0.113	0.252
First Community Bank	2013	0.192	0.062	14.061	1	0.093	0.861	0.304
First Community Bank	2014	0.196	0.095	11.194	2	0.064	0.255	0.249
First Community Bank	2015	0.191	0.050	11.410	2	0.077	0.283	0.270
First Community Bank	2016	0.193	0.094	13.064	1	0.063	1.120	0.249
First Community Bank	2017	0.195	0.076	13.146	1	0.097	0.627	0.294
First Community Bank	2018	0.197	0.088	14.186	1	0.090	0.860	0.258
First Community Bank	2019	0.196	0.070	13.399	2	0.069	0.171	0.361
First Community Bank	2020	0.195	0.052	12.612	3	0.048	0.518	0.346
Guaranty Trust Bank Kenya	2010	0.197	0.088	14.180	2	0.065	1.136	0.358
Guaranty Trust Bank Kenya	2011	0.193	0.057	12.100	2	0.057	1.088	0.417
Guaranty Trust Bank Kenya	2012	0.190	0.060	13.495	1	0.100	0.488	0.417
Guaranty Trust Bank Kenya	2013	0.191	0.141	16.814	3	0.163	0.119	0.570

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Guaranty Trust Bank Kenya	2014	0.199	0.086	11.888	3	0.064	0.951	0.458
Guaranty Trust Bank Kenya	2015	0.191	0.061	11.158	1	0.061	0.304	0.422
Guaranty Trust Bank Kenya	2016	0.193	0.082	12.527	1	0.078	0.412	0.378
Guaranty Trust Bank Kenya	2017	0.190	0.070	13.812	1	0.080	0.304	0.347
Guaranty Trust Bank Kenya	2018	0.200	0.099	14.334	1	0.086	0.235	0.305
Guaranty Trust Bank Kenya	2019	0.195	0.053	10.085	2	0.055	0.394	0.345
Guaranty Trust Bank Kenya	2020	0.190	0.007	5.836	3	0.024	0.553	0.385
Guardian Bank	2010	0.196	0.051	13.742	1	0.090	0.320	0.372
Guardian Bank	2011	0.193	0.050	14.055	2	0.093	0.393	0.419
Guardian Bank	2012	0.197	0.057	11.638	2	0.091	0.486	0.424
Guardian Bank	2013	0.197	0.078	12.876	1	0.061	0.255	0.433
Guardian Bank	2014	0.193	0.099	12.463	2	0.075	0.986	0.413
Guardian Bank	2015	0.197	0.096	14.360	2	0.054	0.270	0.361
Guardian Bank	2016	0.195	0.098	13.997	1	0.083	0.646	0.402
Guardian Bank	2017	0.191	0.086	11.541	2	0.090	1.177	0.372
Guardian Bank	2018	0.199	0.085	14.016	2	0.090	0.255	0.409
Guardian Bank	2019	0.193	0.079	14.226	2	0.050	0.283	0.455
Guardian Bank	2020	0.187	0.073	14.436	2	0.010	0.311	0.450
Gulf African Bank	2010	0.191	0.061	13.111	1	0.097	1.120	0.284
Gulf African Bank	2011	0.194	0.079	12.977	2	0.084	0.627	0.274
Gulf African Bank	2012	0.198	0.064	13.381	1	0.060	0.255	0.286
Gulf African Bank	2013	0.199	0.077	14.922	2	0.054	0.171	0.311
Gulf African Bank	2014	0.200	0.096	13.996	2	0.089	1.136	0.458
Gulf African Bank	2015	0.192	0.051	12.992	1	0.095	1.088	0.267
Gulf African Bank	2016	0.199	0.087	14.789	1	0.094	0.345	0.308
Gulf African Bank	2017	0.198	0.078	14.646	2	0.089	0.119	0.297
Gulf African Bank	2018	0.190	0.070	13.248	2	0.065	0.951	0.302
Gulf African Bank	2019	0.197	0.084	13.417	1	0.058	0.304	0.344
Gulf African Bank	2020	0.204	0.098	13.586	0	0.051	0.343	0.386

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Habib Bank AG Zurich	2010	0.054	0.177	19.710	3	0.127	0.412	0.590
Habib Bank AG Zurich	2011	0.052	0.132	15.995	2	0.159	0.245	0.574
Habib Bank AG Zurich	2012	0.199	0.068	11.394	1	0.061	0.235	0.324
Habib Bank AG Zurich	2013	0.198	0.059	11.698	1	0.074	0.394	0.357
Habib Bank AG Zurich	2014	0.053	0.110	19.965	3	0.253	0.320	0.601
Habib Bank AG Zurich	2015	0.198	0.078	14.128	3	0.092	0.393	0.497
Habib Bank AG Zurich	2016	0.191	0.087	13.951	2	0.095	0.486	0.479
Habib Bank AG Zurich	2017	0.198	0.081	10.398	1	0.059	0.255	0.354
Habib Bank AG Zurich	2018	0.197	0.062	14.246	1	0.099	0.550	0.347
Habib Bank AG Zurich	2019	0.200	0.060	10.005	1	0.094	1.090	0.386
Habib Bank AG Zurich	2020	0.203	0.058	5.764	1	0.089	1.630	0.425
Housing Finance Company of Kenya	2010	0.197	0.058	13.140	1	0.060	1.064	0.417
Housing Finance Company of Kenya	2011	0.197	0.067	11.898	1	0.050	2.197	0.307
Housing Finance Company of Kenya	2012	0.192	0.078	14.502	1	0.055	0.650	0.271
Housing Finance Company of Kenya	2013	0.195	0.059	11.934	2	0.100	1.141	0.265
Housing Finance Company of Kenya	2014	0.195	0.081	13.744	1	0.060	0.903	0.244
Housing Finance Company of Kenya	2015	0.196	0.050	11.359	2	0.090	0.154	0.266
Housing Finance Company of Kenya	2016	0.200	0.091	12.511	2	0.090	0.437	0.240
Housing Finance Company of Kenya	2017	0.192	0.074	10.626	1	0.084	1.044	0.255
Housing Finance Company of Kenya	2018	0.198	0.065	12.346	2	0.095	0.700	0.273
Housing Finance Company of Kenya	2019	0.190	0.078	14.574	1	0.092	2.507	0.283
Housing Finance Company of Kenya	2020	0.182	0.091	16.802	0	0.089	4.314	0.293
I&M Bank	2010	0.197	0.071	11.588	2	0.054	2.301	0.333
I&M Bank	2011	0.199	0.074	13.239	1	0.081	1.541	0.376
I&M Bank	2012	0.191	0.092	10.782	1	0.083	0.404	0.347
I&M Bank	2013	0.190	0.054	11.068	2	0.078	0.921	0.336
I&M Bank	2014	0.193	0.090	10.694	1	0.068	0.350	0.330
I&M Bank	2015	0.195	0.096	11.396	1	0.067	0.681	0.264
I&M Bank	2016	0.199	0.071	11.068	1	0.071	0.742	0.286

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
I&M Bank	2017	0.200	0.084	10.046	1	0.076	0.287	0.253
I&M Bank	2018	0.200	0.088	12.415	1	0.072	1.692	0.316
I&M Bank	2019	0.193	0.090	10.378	2	0.076	1.313	0.353
I&M Bank	2020	0.186	0.092	8.341	3	0.080	0.934	0.390
Imperial Bank Kenya (In receivership)	2010	0.190	0.077	12.751	1	0.060	2.959	0.355
Imperial Bank Kenya (In receivership)	2011	0.194	0.068	13.156	1	0.089	2.456	0.432
Imperial Bank Kenya (In receivership)	2012	0.194	0.093	11.398	1	0.054	2.472	0.344
Imperial Bank Kenya (In receivership)	2013	0.200	0.073	13.986	2	0.052	1.384	0.342
Imperial Bank Kenya (In receivership)	2014	0.191	0.087	14.347	1	0.059	2.098	0.328
Imperial Bank Kenya (In receivership)	2015	0.196	0.065	13.767	2	0.077	2.754	0.263
Imperial Bank Kenya (In receivership)	2016	0.196	0.072	12.216	1	0.069	1.221	0.333
Imperial Bank Kenya (In receivership)	2017	0.195	0.100	12.970	1	0.051	1.765	0.250
Imperial Bank Kenya (In receivership)	2018	0.193	0.053	11.127	2	0.055	0.663	0.235
Imperial Bank Kenya (In receivership)	2019	0.199	0.079	12.183	2	0.091	0.706	0.212
Imperial Bank Kenya (In receivership)	2020	0.205	0.105	13.239	2	0.127	0.749	0.189
Kenya Commercial Bank	2010	0.196	0.058	12.496	1	0.054	0.481	0.373
Kenya Commercial Bank	2011	0.192	0.088	11.157	1	0.061	0.525	0.352
Kenya Commercial Bank	2012	0.195	0.083	12.940	2	0.071	1.165	0.312
Kenya Commercial Bank	2013	0.198	0.095	12.741	2	0.079	0.286	0.373
Kenya Commercial Bank	2014	0.193	0.095	12.215	1	0.081	0.884	0.364
Kenya Commercial Bank	2015	0.192	0.063	14.638	1	0.085	0.801	0.343
Kenya Commercial Bank	2016	0.196	0.095	13.856	2	0.088	0.455	0.369
Kenya Commercial Bank	2017	0.190	0.050	12.698	2	0.055	0.986	0.361
Kenya Commercial Bank	2018	0.200	0.063	12.939	2	0.050	0.334	0.332
Kenya Commercial Bank	2019	0.192	0.062	12.869	1	0.061	0.664	0.344
Kenya Commercial Bank	2020	0.184	0.061	12.799	0	0.072	0.994	0.356
Kingdom Bank Limited	2010	0.193	0.057	11.313	2	0.061	0.574	0.431
Kingdom Bank Limited	2011	0.050	0.143	19.865	3	0.222	1.399	0.839
Kingdom Bank Limited	2012	0.055	0.127	18.189	2	0.202	1.178	0.584

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Kingdom Bank Limited	2013	0.193	0.062	10.547	3	0.068	0.215	0.442
Kingdom Bank Limited	2014	0.190	0.063	13.768	1	0.097	0.966	0.371
Kingdom Bank Limited	2015	0.195	0.053	13.491	1	0.067	0.806	0.385
Kingdom Bank Limited	2016	0.199	0.089	10.003	2	0.082	0.740	0.349
Kingdom Bank Limited	2017	0.190	0.100	12.250	2	0.072	0.921	0.247
Kingdom Bank Limited	2018	0.195	0.064	10.020	1	0.089	1.117	0.220
Kingdom Bank Limited	2019	0.193	0.081	13.083	2	0.072	0.744	0.168
Kingdom Bank Limited	2020	0.191	0.098	16.146	3	0.055	0.371	0.116
M Oriental Bank	2010	0.198	0.099	12.665	3	0.088	1.075	0.483
M Oriental Bank	2011	0.195	0.079	14.432	3	0.091	1.161	0.491
M Oriental Bank	2012	0.195	0.065	13.245	2	0.083	0.214	0.477
M Oriental Bank	2013	0.190	0.183	10.242	3	0.291	1.077	0.549
M Oriental Bank	2014	0.196	0.057	13.645	2	0.055	0.207	0.433
M Oriental Bank	2015	0.194	0.068	14.470	2	0.088	0.762	0.359
M Oriental Bank	2016	0.190	0.100	11.669	2	0.061	1.142	0.386
M Oriental Bank	2017	0.190	0.087	11.107	1	0.073	0.924	0.308
M Oriental Bank	2018	0.199	0.070	11.543	1	0.087	0.600	0.278
M Oriental Bank	2019	0.195	0.079	11.577	1	0.081	0.140	0.403
M Oriental Bank	2020	0.191	0.088	11.611	1	0.075	0.320	0.528
Mayfair Bank	2010	0.200	0.055	12.144	1	0.093	1.154	0.220
Mayfair Bank	2011	0.192	0.077	14.486	2	0.094	1.000	0.247
Mayfair Bank	2012	0.050	0.195	19.327	3	0.215	0.323	0.584
Mayfair Bank	2013	0.196	0.074	10.988	1	0.083	0.743	0.254
Mayfair Bank	2014	0.199	0.056	13.437	1	0.060	1.177	0.224
Mayfair Bank	2015	0.191	0.079	10.763	1	0.092	0.975	0.201
Mayfair Bank	2016	0.195	0.072	14.287	1	0.080	1.116	0.338
Mayfair Bank	2017	0.190	0.063	14.676	1	0.077	1.184	0.389
Mayfair Bank	2018	0.198	0.050	14.243	3	0.079	1.168	0.446
Mayfair Bank	2019	0.195	0.078	10.601	2	0.097	0.620	0.451

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Mayfair Bank	2020	0.192	0.106	6.959	1	0.115	0.072	0.456
Middle East Bank Kenya	2010	0.194	0.111	15.813	3	0.215	0.788	0.550
Middle East Bank Kenya	2011	0.190	0.067	14.329	3	0.075	0.332	0.467
Middle East Bank Kenya	2012	0.194	0.114	13.525	2	0.265	0.846	0.543
Middle East Bank Kenya	2013	0.196	0.074	10.831	1	0.073	0.969	0.322
Middle East Bank Kenya	2014	0.192	0.091	10.644	1	0.095	1.030	0.314
Middle East Bank Kenya	2015	0.192	0.095	12.608	2	0.071	0.916	0.312
Middle East Bank Kenya	2016	0.199	0.080	12.645	1	0.057	1.046	0.334
Middle East Bank Kenya	2017	0.197	0.055	14.217	1	0.062	0.548	0.295
Middle East Bank Kenya	2018	0.198	0.087	11.026	3	0.069	1.008	0.443
Middle East Bank Kenya	2019	0.199	0.080	11.226	2	0.050	0.514	0.272
Middle East Bank Kenya	2020	0.200	0.073	11.426	1	0.031	0.020	0.101
National Bank of Kenya	2010	0.190	0.075	13.352	3	0.090	0.647	0.478
National Bank of Kenya	2011	0.193	0.079	13.708	1	0.077	0.652	0.437
National Bank of Kenya	2012	0.190	0.056	12.259	1	0.100	0.911	0.420
National Bank of Kenya	2013	0.190	0.100	12.306	2	0.052	0.617	0.418
National Bank of Kenya	2014	0.199	0.067	10.823	1	0.078	1.019	0.322
National Bank of Kenya	2015	0.194	0.081	11.986	1	0.100	0.208	0.279
National Bank of Kenya	2016	0.191	0.050	11.399	2	0.088	0.449	0.259
National Bank of Kenya	2017	0.192	0.091	13.038	2	0.064	1.142	0.345
National Bank of Kenya	2018	0.197	0.062	11.266	2	0.098	0.938	0.363
National Bank of Kenya	2019	0.195	0.053	12.359	1	0.061	0.619	0.370
National Bank of Kenya	2020	0.193	0.044	13.452	0	0.024	0.300	0.377
NCBA Bank Kenya	2010	0.199	0.098	10.178	2	0.089	0.410	0.417
NCBA Bank Kenya	2011	0.193	0.061	11.105	1	0.087	0.958	0.413
NCBA Bank Kenya	2012	0.197	0.069	14.958	2	0.051	0.770	0.408
NCBA Bank Kenya	2013	0.192	0.082	14.059	3	0.060	1.088	0.480
NCBA Bank Kenya	2014	0.193	0.081	10.479	2	0.082	0.777	0.419
NCBA Bank Kenya	2015	0.198	0.089	12.049	2	0.093	0.462	0.427

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
NCBA Bank Kenya	2016	0.196	0.096	13.448	1	0.089	0.821	0.369
NCBA Bank Kenya	2017	0.190	0.069	14.964	1	0.060	0.809	0.401
NCBA Bank Kenya	2018	0.190	0.058	13.990	2	0.092	0.356	0.426
NCBA Bank Kenya	2019	0.199	0.062	11.306	2	0.065	0.356	0.330
NCBA Bank Kenya	2020	0.208	0.066	8.622	2	0.038	0.356	0.234
Paramount Universal Bank	2010	0.196	0.099	14.289	3	0.095	0.450	0.445
Paramount Universal Bank	2011	0.192	0.094	12.385	3	0.066	0.968	0.466
Paramount Universal Bank	2012	0.191	0.050	13.628	3	0.072	0.833	0.477
Paramount Universal Bank	2013	0.195	0.095	13.447	3	0.076	0.906	0.469
Paramount Universal Bank	2014	0.199	0.091	14.169	1	0.069	1.199	0.436
Paramount Universal Bank	2015	0.200	0.068	13.686	1	0.050	1.010	0.433
Paramount Universal Bank	2016	0.191	0.093	10.966	1	0.085	0.839	0.342
Paramount Universal Bank	2017	0.196	0.067	11.665	1	0.092	0.658	0.324
Paramount Universal Bank	2018	0.198	0.083	14.671	1	0.093	0.290	0.363
Paramount Universal Bank	2019	0.198	0.076	14.558	1	0.053	1.034	0.345
Paramount Universal Bank	2020	0.198	0.069	14.445	1	0.013	1.778	0.327
Prime Bank (Kenya)	2010	0.195	0.051	14.471	2	0.051	1.073	0.399
Prime Bank (Kenya)	2011	0.198	0.067	13.550	2	0.053	0.933	0.392
Prime Bank (Kenya)	2012	0.196	0.073	13.626	1	0.068	0.879	0.414
Prime Bank (Kenya)	2013	0.192	0.052	14.140	2	0.054	0.615	0.477
Prime Bank (Kenya)	2014	0.197	0.067	14.591	1	0.098	0.113	0.412
Prime Bank (Kenya)	2015	0.195	0.082	10.185	1	0.083	0.186	0.311
Prime Bank (Kenya)	2016	0.194	0.060	12.248	2	0.077	0.831	0.294
Prime Bank (Kenya)	2017	0.191	0.057	13.131	2	0.090	0.987	0.325
Prime Bank (Kenya)	2018	0.192	0.077	12.645	2	0.050	1.112	0.433
Prime Bank (Kenya)	2019	0.190	0.058	13.968	1	0.057	0.330	0.427
Prime Bank (Kenya)	2020	0.188	0.039	15.291	0	0.064	0.452	0.421
SBM Bank Kenya	2010	0.199	0.054	12.479	1	0.055	0.522	0.434
SBM Bank Kenya	2011	0.198	0.083	13.574	1	0.080	0.356	0.431

151

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
SBM Bank Kenya	2012	0.192	0.092	13.333	1	0.070	0.406	0.367
SBM Bank Kenya	2013	0.194	0.088	13.443	2	0.061	0.348	0.363
SBM Bank Kenya	2014	0.200	0.060	11.473	2	0.094	0.577	0.379
SBM Bank Kenya	2015	0.193	0.060	12.511	1	0.063	0.589	0.239
SBM Bank Kenya	2016	0.199	0.082	10.168	2	0.064	0.362	0.302
SBM Bank Kenya	2017	0.196	0.058	13.114	2	0.079	0.546	0.323
SBM Bank Kenya	2018	0.193	0.067	13.465	2	0.085	0.637	0.312
SBM Bank Kenya	2019	0.196	0.090	13.977	2	0.055	0.519	0.266
SBM Bank Kenya	2020	0.199	0.113	14.489	2	0.025	0.401	0.220
Sidian Bank	2010	0.198	0.095	13.718	1	0.050	0.910	0.382
Sidian Bank	2011	0.195	0.095	13.076	1	0.054	1.120	0.340
Sidian Bank	2012	0.192	0.097	13.605	2	0.079	1.139	0.343
Sidian Bank	2013	0.193	0.090	10.870	2	0.060	0.514	0.438
Sidian Bank	2014	0.192	0.098	10.205	2	0.051	0.202	0.435
Sidian Bank	2015	0.196	0.071	11.470	2	0.067	0.298	0.355
Sidian Bank	2016	0.194	0.094	13.281	2	0.065	0.960	0.308
Sidian Bank	2017	0.196	0.078	13.079	3	0.062	0.773	0.459
Sidian Bank	2018	0.191	0.052	12.474	2	0.061	0.376	0.293
Sidian Bank	2019	0.199	0.062	10.724	1	0.077	0.266	0.333
Sidian Bank	2020	0.207	0.072	8.974	0	0.093	0.156	0.373
Spire Bank	2010	0.192	0.061	14.688	1	0.065	0.814	0.438
Spire Bank	2011	0.197	0.060	14.760	1	0.098	1.177	0.420
Spire Bank	2012	0.195	0.069	11.267	2	0.055	0.636	0.431
Spire Bank	2013	0.197	0.109	13.728	3	0.204	0.766	0.512
Spire Bank	2014	0.200	0.072	10.191	2	0.054	0.334	0.332
Spire Bank	2015	0.194	0.074	11.008	2	0.086	0.811	0.371
Spire Bank	2016	0.197	0.087	10.299	1	0.077	1.010	0.325
Spire Bank	2017	0.190	0.055	13.991	1	0.082	0.814	0.343
Spire Bank	2018	0.197	0.069	11.331	2	0.055	0.362	0.372

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
Spire Bank	2019	0.191	0.051	14.806	1	0.053	0.530	0.381
Spire Bank	2020	0.185	0.033	18.281	0	0.051	0.698	0.390
Stanbic Holdings Plc	2010	0.199	0.099	10.840	2	0.086	0.487	0.317
Stanbic Holdings Plc	2011	0.193	0.057	14.163	1	0.073	1.107	0.375
Stanbic Holdings Plc	2012	0.200	0.099	12.457	2	0.098	0.207	0.472
Stanbic Holdings Plc	2013	0.193	0.096	14.472	2	0.055	1.155	0.313
Stanbic Holdings Plc	2014	0.193	0.088	14.893	2	0.089	0.584	0.242
Stanbic Holdings Plc	2015	0.198	0.067	14.962	2	0.065	1.087	0.401
Stanbic Holdings Plc	2016	0.195	0.088	12.930	1	0.057	0.522	0.390
Stanbic Holdings Plc	2017	0.195	0.074	14.467	2	0.072	0.929	0.333
Stanbic Holdings Plc	2018	0.054	0.101	15.937	2	0.290	1.269	1.029
Stanbic Holdings Plc	2019	0.053	0.179	16.587	3	0.260	0.461	0.704
Stanbic Holdings Plc	2020	0.052	0.257	17.237	4	0.230	-0.347	0.379
Standard Chartered Kenya	2010	0.191	0.085	10.150	1	0.100	0.167	0.401
Standard Chartered Kenya	2011	0.193	0.063	14.897	1	0.060	0.795	0.370
Standard Chartered Kenya	2012	0.195	0.058	11.406	2	0.096	1.132	0.281
Standard Chartered Kenya	2013	0.196	0.100	11.287	2	0.064	0.386	0.373
Standard Chartered Kenya	2014	0.191	0.066	10.095	2	0.084	0.978	0.357
Standard Chartered Kenya	2015	0.198	0.091	12.094	2	0.088	0.995	0.352
Standard Chartered Kenya	2016	0.198	0.083	10.573	1	0.384	1.171	0.384
Standard Chartered Kenya	2017	0.191	0.087	11.264	1	0.409	0.572	0.409
Standard Chartered Kenya	2018	0.193	0.057	11.569	2	0.407	0.958	0.407
Standard Chartered Kenya	2019	0.191	0.050	10.164	2	0.442	0.170	0.442
Standard Chartered Kenya	2020	0.189	0.043	8.759	2	0.477	-0.618	0.477
United Bank for Africa	2010	0.200	0.067	12.352	2	0.484	0.732	0.484
United Bank for Africa	2011	0.053	0.123	19.956	2	0.826	1.932	0.826
United Bank for Africa	2012	0.051	0.150	18.275	2	1.150	2.998	1.150
United Bank for Africa	2013	0.052	0.160	19.767	3	1.124	2.219	1.124
United Bank for Africa	2014	0.054	0.170	16.944	3	0.879	1.638	0.879

Bank	Year	Credit Risk	Interest Rate Spread	Bank Size	BANK Ownership	CRBO	CRBS	Financial Performance
United Bank for Africa	2015	0.053	0.170	18.219	2	0.645	0.879	0.645
United Bank for Africa	2016	0.190	0.121	16.517	2	0.551	0.984	0.551
United Bank for Africa	2017	0.193	0.089	14.265	1	0.403	0.739	0.403
United Bank for Africa	2018	0.192	0.093	11.505	1	0.386	0.512	0.386
United Bank for Africa	2019	0.199	0.084	14.163	1	0.383	0.232	0.383
United Bank for Africa	2020	0.206	0.075	16.821	1	0.380	-0.048	0.380
Victoria Commercial Bank	2010	0.197	0.113	18.213	3	0.567	0.775	0.567
Victoria Commercial Bank	2011	0.051	0.103	15.980	3	1.281	2.812	1.281
Victoria Commercial Bank	2012	0.051	0.146	19.617	2	2.018	1.562	2.018
Victoria Commercial Bank	2013	0.050	0.189	15.486	2	0.104	2.744	1.875
Victoria Commercial Bank	2014	0.051	0.200	18.529	3	0.300	2.558	1.400
Victoria Commercial Bank	2015	0.054	0.147	16.367	2	0.262	1.453	0.937
Victoria Commercial Bank	2016	0.053	0.179	18.313	2	0.119	1.097	0.718
Victoria Commercial Bank	2017	0.198	0.098	10.426	3	0.086	0.113	0.450
Victoria Commercial Bank	2018	0.191	0.079	10.673	1	0.055	0.371	0.261
Victoria Commercial Bank	2019	0.195	0.060	14.973	1	0.079	0.956	0.345
Victoria Commercial Bank	2020	0.199	0.041	19.273	1	0.103	1.541	0.343