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FINANCE & ACCOUNTING

THE RELATIONSHIP BETWEEN FINANCIAL INCLUSION AND CREDIT RISK OF COMMERCIAL BANKS IN KENYA

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ABSTRACT

Purpose of Study: This research aimed to ascertain the effect of financial inclusion on credit risk in Kenyan commercial banks, specifically focusing on banking services availability, accessibility and usage.

Problem Statement: Commercial institutions are facing growing challenges with escalating credit risk, largely attributed to efforts to expand their loan portfolios. The drive for greater financial inclusion, combined with increasing competition, has led banks to innovate and strive for an all-inclusive economy. However, despite these efforts, credit risk measured by the rise in bad debts has continued to grow alongside financial inclusion.

Methodology: An explanatory research design was employed, the study's target population consisted of all 38 commercial institutions operating in Kenya as of 2022, and it relied on secondary data collected from the banks' financials and Central Bank of Kenya's supervision reports from 2018 to 2022. Descriptive statistics included measures such as frequency distributions, means, percentages and standard deviations. Inferential analysis was assessed through regression techniques.

Result: The study revealed that bank availability, bank accessibility and bank usage had positive and significant effect on credit risk of commercial banks in Kenyan.

Conclusion: Greater availability, accessibility and usage enables a wider population to utilize banking services, increasing the number of depositors and enhancing bank liquidity.

Recommendation: The banks should implement robust risk assessment frameworks that utilize advanced analytics and data modeling to help banks better understand and predict credit risks.

Keywords: *Bank Availability, Bank Usage, Banking Competition, Bank Accessibility, Credit risk and Financial Inclusion*

INTRODUCTION

Commercial bank's primary role is to intermediate between savers (excess economic units) and borrowers (deficit economic units) who are creditworthy and with good investment opportunities. These institutions attract deposits from individuals, businesses, and other entities. By channeling these savings into productive investments, they help promote capital formation, which is critical for economic growth. In addition, one of the fundamental functions of commercial institutions is to extend credit to people and businesses (IMF, E-Library, 2011). Hardy (1979) noted that, commercial institutions provide services, such as accounts evaluation, electronic funds transfers and payment cards and therefore play a significant role in stimulating financial inclusion.The financial institutions' single largest source of credit risk is the loan portfolio, the other sources are the bank activities on and off the balance sheet items such as inter-banking transactions, hedging instruments, trade financing and foreign exchange transactions (CBK Risk management guidelines, 2013). The financial institutions use the credit risk strategies to manage the loan portfolio, involves thorough screening of the prospective clients. This process is essential in maximizing the performance of the commercial institutions (Richard, 2006). The commercial institutions must design their own ways to determine the credit worthiness of their prospective clients given the non-uniformity of credit and adverse selection risks (Buro, 2019). Financial inclusion was placed under an enabler of the sustainable development goals with G-20 re-affirming these principles. Financial inclusion policies can enhance financial security system if well implemented (Musau, 2022). Many efforts and gains have been made regarding this concept but it remains a challenge to be sorted out. In addition, efforts to increase financial inclusion have also been accompanied by increasing credit risk among commercial institutions around the world. During and after Covid 19, the credit risk among commercial institutions has been increasing steadily (Global Fin index database, 2022).

Brazil has made strides in financial inclusion, but these efforts have also introduced new challenges in managing credit risk. About 84% of adults in Brazil have an account, which is the highest rate in South America (Feghali, Mora & Nassif, 2021). Furthermore, the rate of bad debts for commercial banks in Brazil was 3.2% in 2021. Although this figure is low in comparison to previous peaks, it is very important to watch the situation closely as financial inclusion grows. Chile is known for its strong financial system, but default risk for banks resulting from fiscal inclusion remains a challenge for them. Additionally, 78% of Chilean adults have a bank account, which is the second highest percentage in South America (Polloni-Silva & Sacomano, 2021). Chilian banks had a non-performing loan ratio of 2.1% in 2022, a rather low ratio that reflects

good credit risk management. One of the most extensive banking networks worldwide is in China, which, however, manages to cover a big part of the population. Yet, credit accessibility, particularly for small enterprises and farmers in the countryside, can be very limited. Although, the non-performing loans ratio of China has improved a little, it is still a worry. The ratio for commercial banks was approximately 1.75% in 2022, but the peaks in history were even more (Cheng & Qu, 2020).

In the context of Portugal, Jungo and Madaleno (2022) point out that financial inclusion and competitiveness, although in general, have the positive effect of financial security of an economy, still there are cases when they can evoke negative impacts, especially if not managed properly. The intense competition among the financial institutions drives them to adopt the risky lending practices to increase their profits. Meanwhile, as they try to win over clients, they permit low-credit ratings and lend money to borrowers who are more likely to default. Such a trend would result in the upsurge of NPLs and the rise of credit risk in the financial realm, thus probably affecting stability. In Southern African Development Community (SADC), Madaleno (2022) asserted no financial inclusion's bidirectional causation with credit risk. Nevertheless, unidirectional causality is identified, where financial inclusion improves credit risk. This implies that as financial inclusion increases, it positively affects credit risk by potentially reducing it.

In Egypt, the use of digital technologies as a means of enhancing financial inclusion, is an ongoing process, and the landscape has been evolving other the years. However, with digitalization, credit risk increases. Metawa and Itani (2023) observed that digitalization of the National Bank of Egypt had a direct negative impact on credit risk. This implies that as digitalization rises, credit risk decreases. In Nigeria, Olusegun (2022) indicates considered different fiscal inclusion dimensions, including availability, usage and penetration. The study established that higher levels of penetration (the percentage of the population with financial services access) had positive relationship with financial security. Similar to penetration, availability of financial services was also positively related to financial security. Interestingly, the study established that the degree of usage of financial services had a negative interplay with financial security.

Kenya bookkeeping has gradually and positively evolved over the years, Musau (2022) holds that financial inclusion directly and significantly connects to Kenya's bank stability. The research also pointed out that the development of banking facilities like branches, ATMs, agents, and mobile banking services along with the increase of customers led to better bank stability. This process is commonly referred to as "synergy" and is believed to be caused by factors such as increased deposit mobilization and improved credit accessibility. This is supported by Karanja (2020) observation that the expansion of banking services through branches, ATMs, agents, and mobile banking likely contributed to increased deposit mobilization. When customers have more access points to deposit their funds, it can lead to greater stability for banks by providing them with a more stable source of funds. However, Nganga and Ondabu (2020) observed that high credit amount borrowed in a bank, due to enhanced financial inclusion, resulted in a rise of credit risks. Additionally, the high interest rates imposed by commercial institutions contribute to a rise in non-performing loans.

Financial Inclusion

For a nation to achieve full financial inclusion, financial services must be both widely available and of high quality. According to the African Development Bank (AFDB), financial inclusion in the banking sector has three dimensions which are availability, accessibility and usage.

Accessibility is measured by formal and regulated financial services, which are affordable to the population (African Development Bank, 2022). Usage is measured by how many regular times that the service has been used (frequency and the duration). Availability dimension is measured by the distance or proximity of the physical presence of the bank to the population (Mostak & Sushanta, 2015).

The availability of commercial banks refers to physical bank branches, Automatic Teller Machines and related banking facilities that customers can visit in person (Wang & Dong, 2023). The physical presence of a bank is a vital aspect of its service delivery model and it also plays a key role in the bank's ability to cater to the needs of both customers and the larger community. Usually, commercial banks set up a chain of physical branches located in different areas and neighborhoods. Such outlets offer numerous face-to-face services such as opening an account, managing one's account, applying for a loan, and seeking financial counseling, among others (Wang & Chien-Chiang, 2023). Bank branches are the main points of customer service and support and they meet customer needs, fix problems, and provide information about the bank's products and services (Bernini & Brighi, 2018). Banks usually install ATMs at the most convenient places, such as inside the branches, shopping centers, and public transport stations, in addition, to other busy areas. Automated tellers allow the customers to take out money, see their account statuses, and execute very simple transactions like deposits. The research that is described here was mainly concerned with the physical presence of commercial banks in the form of branch networks, locations of ATMs, and agency banking locations.

Bank accessibility is a key component of financial inclusion and is vital in ensuring that broad spectrum of the population can access and benefit from the services provided by banks (Zeng, 2023). Many commercial institutions have adopted automation of their service delivery methods to ease accessibility. The use of online platforms has been a game changer in accessing the banks. The clients can use the online platform basic transactions, such as withdrawing cash, checking balances, and making deposits, without visiting a bank branch (Hao, Lan & Wu, 2019). Mobile money acts a link between the bank and the users, Muthegi (2022), noted that it is more preferred as it is faster and convenient accessibility platform.

Bank usage encompasses the frequency and diversity of activities conducted through a bank or a bank's channels (Muhongerwa & Mulyungi, 2022). Bank usage can involve a wide range of services and transactions, including but not restricted to deposits and withdrawals as well as payments and transfers. Deposits and Withdrawals include the frequency and amount of money deposited into or withdrawn from bank accounts, such as savings accounts, assessing accounts, or certificates of deposit (CDs). Payments and Transfers involve the use of a bank to make payments, transfers, and transactions (Zeng, 2023). It can involve the issuance of checks, the application of electronic funds transfers (EFTs), the execution of wire transfers, and the settlement of bills through the internet. It can include the use of credit services offered by banks like consolidating loans (personal, mortgage, or business), and the maintenance of credit lines through the usage of credit cards. The survey considered bank usage in the area of savings accounts, loans and credit cards.

Credit risk

Ceasing to satisfy obligations under the agreement would be the maximum risk for the debtor. This is the scenario where a borrower would not pay back the loan or would not be able to meet the obligations defined in the contract, thus leading to losses for the lender or investor. Credit risk is

not static and it can develop positively or negatively in direct relation with the changing financial condition of the borrowers (Buro, 2019). Thus, this is one of the factors that lenders, creditors, and investors circumspectly assess to make proper decisions about allocating money, determining interest rates, and investing in bonds and other related securities. Managing and mitigating credit risk are essential aspects of prudent risk management in the financial industry.

It serves a critical role in guaranteeing the stability and profitability of fiscal institutions, protecting investors, and making sound lending and investment decisions. According to Central Bank of Kenya (2020), Risk Management guidelines 2013, the huge chunk of credit risk emanates from loans and advances to the customers. However, there are also other sources of credit risk such as trading book, on and off (letters of credit, unfunded loan commitments and lines of credits) balance sheet items. Other activities that might give rise bank credit risk include trade financing, interbank exchanges, foreign trade transactions, swaps, forwards, bonds, equities, options, commitments and guarantees, as well as transactions' clearance.

Musau (2018) noted that NPLs are the primary indicator of credit risk in financial institutions. Non-performing loans (NPLs) refers to loans that have not been paid in regard to their contractual terms for a specified duration, usually 90 days or more. Commercial institutions strive at their best to maintain low levels of the Non-performing loans, indicating a healthy portfolio. Mukuru (2023) noted that the bad debts results in riskier loans, lower quality assets and inefficient resource allocation. Further, the author noted that bad debts are normally caused by poor client selection, soft loan conditions, poor risk assessment, difficult economic conditions such as high interest rates, and excess customer funding and fake loans by the officers. The European Central Bank (2022) defines a non-performing loan as a non-financially healthy borrower who can't pay loan installments and interests as scheduled. There are several guidelines on loan categorization whether it is a performing loan or not, the Basel Committee on bank supervision gives the below guidelines; that a 90-day default loan should be classified under the bad debts category; that when the interest equal to a 90 days or more have been refinanced or capitalized, or restructured, should be categorized under Non-performing loan; that there is an evidence to show that the borrower shall not repay the loan even if the 90 days have not elapsed, such as bankruptcy filing. The ratio of NLPs, serving as credit risk measure, has shown fluctuations across the years. Figure 1 illustrates the trend in the bad debts ratio among these banks.

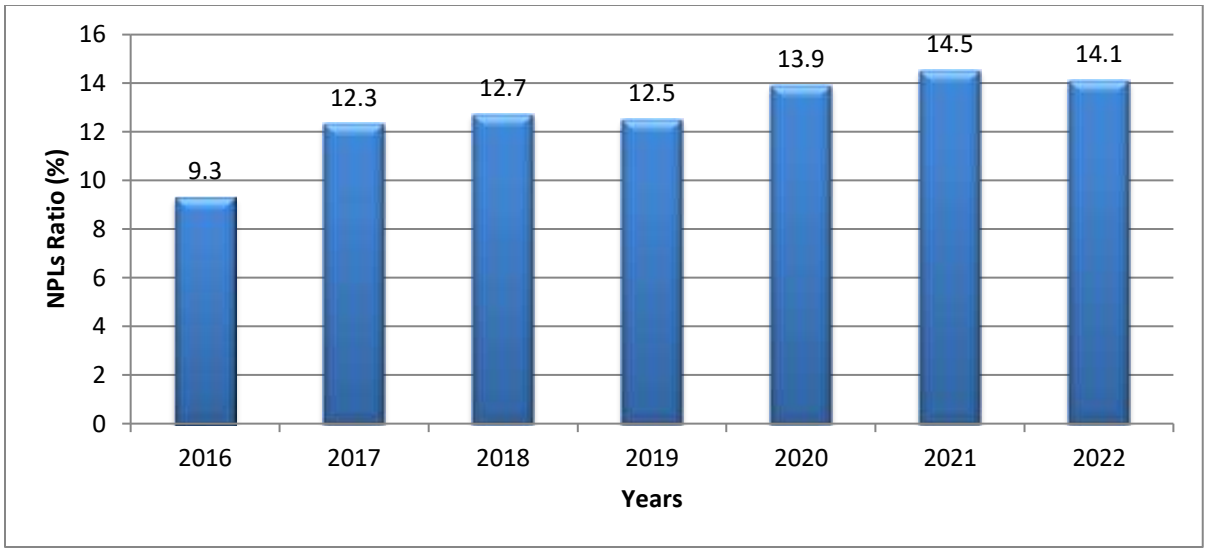

Figure 1: Trend of Non-Performing Loans Ratio

In the year 2016, the bad debts ratio in the Kenya commercial institutions was 9.3%, which increased to 12.3% in 2017, and 12.7% in 2018. However, bad debts ratio decreased to 12.5% in 2019, which later increased to 13.9% and 14.5% in 2021. However, this decreased to 14.1% in 2022.

Commercial Banks in Kenya

Kenyan commercial institutions are governed by the Banking Act, Companies Act, Central Bank of Kenya Act, and a number of prudential recommendations that are published by the CBK. There were forty-one commercial institutions in Kenya's finance industry as of December 2022. Besides, CBA and NIC banks merger took place in 2019 resulting in the formation of NCBA (Central Bank of Kenya, 2022). The growth of Kenyan commercial banks was not just one-off but rather a progressive process that was constantly influenced by new events such as the economy, technology, financial inclusion, and new market areas. Over the last twenty years or so, the expansion of banks in Kenya in terms of branches reached every corner of the country with urban and rural areas being their target. This move enabled the banks to attract more customers and bring their services closer to them (Kenya Bankers Association, 2021).

The swift acceptance of digital banking and mobile money services like M-Pesa have very much contributed to the banking service expansion. Banks have made it easier for their customers to access and manage their accounts by offering mobile applications and online banking platforms. Also, cash withdrawal and other banking transactions have become more convenient due to extensive ATM networks established by commercial banks (Central Bank of Kenya, 2022). Furthermore, a number of banks have come up with agency banking models that allow small-scale enterprises and individuals to perform basic banking services on behalf of the banks. This has broadened the field of banking services, particularly in rural areas. Banks have differentiated their product offerings to include various loan products, savings accounts, investment opportunities, and insurance products to cater to a wide range of customers (Kenya Bankers Association, 2021). Some Kenyan commercial institutions have expanded their operations into other East African countries and beyond. This international expansion allows them to hit into fresh markets and diversify their income sources.

PROBLEM STATEMENT

In an effort for the government to enhance economic growth, emphasis on a more financial inclusion economy has been put in place. Policies and resources have been diverted to prioritize enhanced financial inclusion (Demirguc-Kunt & Huizinga, 2010). Commercial institutions in Kenya have exploited the digital space, expansion of their branch network, mobile money and automation of their process, which in a great way enhanced financial inclusion (Nthiga, 2021). This has benefited the commercial institutions in reaching out the unbanked population and thereby increasing their loan portfolio.

Financial inclusion has also left commercial institutions struggling with ballooning credit risk, depicted in NPLs portfolio. The competition has also pushed the commercial institutions to be more innovative and push for an all financial inclusive economy. This has led to a new challenge: managing rising levels of bad debt, and inability to manage credit risk, a primary danger to survival of any financial institution (Murray, 2011). This has in the recent past given a rise of defaulting. Over 2.7Million Kenyans have been listed negatively by the Credit Reference Bureaus, thereby locking them out in access of credit (Nthiga & Simiyu, 2021). Further, bad debts ratio in Kenya has been in an increasing trend, in the year 2016, 2017, 2019, 2020, 2022, it was 9.3%, 12.3%, 12.5%, 13.9%, and 14.1% respectively.

Various researches have been undertaken on financial inclusion and its impact. For instance, Karanja (2020) examined how financial inclusion influences Kenyan financial development, Musau (2022) studied the link between deepening stability and Kenyan commercial institutions' financial inclusion and Nganga and Ondabu (2020) examined the influence of specific bank-factors on credit risk within Kenyan commercial institutions. However, these studies conceptualized financial inclusion differently. In addition, Karanja (2020) used financial development in Kenya as the dependent variable while Musau (2022) used stability. In their study, Nganga and Ondabu (2020) used bank specific factors as the independent variable. In addition, Karanja (2020) and Musau (2022) applied a descriptive research design, while Nganga and Ondabu (2020) used cross sectional research approach. Therefore, this study seeks to enhance understanding on financial inclusion impacts on banks' credit risk. This took into account, bank availability, ease of access and bank usage. The study took into account bank competition moderating variable which was earlier not delved in.

STUDY OBJECTIVES

i. To evaluate the effect of bank availability on credit risk of commercial banks in Kenya.
ii. To examine the effect of bank accessibility on credit risk of commercial banks in Kenya.
iii. To establish the effect of bank usage on credit risk of commercial banks in Kenya.

REVIEW OF LITERATURE

Theoretical Framework

Theory of Financial Intermediation

The theory emerged from Gurley and Shaw in 1960 then later enhanced by Diamond in 1984. It explains that the fiscal intermediation is movement of funds from surplus (lending units) economic units to deficit (borrowing) economic units (Scholtens & Wensveen, 2019). According to the theory, the financial institution's primary function is savings and borrowing. The theory assumes the existence of two distinct groups in the economy, savers and borrowers. Savers have excess

funds they want to invest or save, while borrowers require financing for various purposes, such as investments or consumption (King, 2019). Financial intermediaries collect funds from savers with relatively short investment horizons (deposits or savings accounts) and use these funds to offer longer-term loans and investments to borrowers (mortgages or business loans).

Middlemen play an essential role in the diversification of risk and its management. They can more skillfully distribute the risk by collecting money from a wide variety of depositors and giving out loans to different borrowers (Mayowa, 2020). The process of risk-sharing among financial intermediaries lowers the exposure of individual depositors and borrowers to market fluctuations. Financial intermediaries are also able to reach the level of cost-effectiveness where they turn over the money of many depositors and lend to a large variety of borrowers. The cost-effectiveness and the possible reduction in transaction costs are the results of the scale of the operation. The theory has it that financial intermediaries would take along risk and return when making lending and investment decisions. They would then try to get a return on assets (ROA) that is equal to the risk taken (King, 2019).

The theory of financial intermediation will be applied to explain the association between financial inclusion and credit risk in Kenyan commercial institutions. When banks are physically accessible to a wider population, individuals, and corporates have higher chance of accessing and using a range of banking services, including credit. Improved physical availability can lead to greater access to credit for previously underserved populations. Consequently, there is an increased demand for credit, leading to higher credit risk (Mayowa, 2020). Digital banking provides convenient and affordable access to monetary services, allowing people to save, process payments, and acquire credit through their mobile devices. However, the ease of access to credit may also raise credit risk. Borrowers who were previously exempted from the contemporary financial system may have different risk profiles. Further, as more individuals and businesses use bank products, there is an inherent increase in the credit risk exposure for commercial institutions.

Information Asymmetry Theory

The concept of Information Asymmetry, which was introduced by Akerlof in 1970 in his famous paper the Market for ‘Lemons’, is a revolutionary treatise of economics that deals with the problem of asymmetric information in markets. Akerlof’s (1970) main idea was that of adverse selection, a situation in which the sellers know more about the quality of their products than the buyers do. In such a scenario, the market may get flooded with low-quality or “lemon” goods which can eventually lead to a decrease in market efficiency (Lofgren & Torsten, 2019). Akerlof's research gave a strong argument in favor of information to be disclosed and also made the point of the role of asymmetric information very clear in the functioning of markets. The impact it made was considerable across different areas such as economics, finance, and public policy. It not only influenced the ways to handle the negative effects of information asymmetry but also the development of mitigating strategies. The paper brought Akerlof the Nobel Prize in Economic Sciences in 2001, and it is still considered one of the main works in the field of market imperfections and information economics (Dari-Mattiacci, Onderstal & Parisi, 2021).

The theory of information asymmetry is constructed upon a number of pivotal assumptions which support its reasoning that the lack of equal access to information may influence the economic and market outcomes. The theory presumes that in a transaction, at least one party is not fully informed or misinformed regarding the quality, value or attributes of the product, service, or asset being traded (Dari-Mattiacci, Onderstal & Parisi, 2021). Rationality is also assumed for economic agents

who will always try to maximize their utility or financial well-being. Decisions made by agents rely heavily on the information that they have. Unfavorable selection is a major hypothesis. It assumes that in cases where one party knows more than the other, the party that knows more can manipulate the situation in their favor (Lofgren & Torsten, 2019). As a result, the market is often distorted. The theory presumes that moral hazard exists, whereby one party can alter their conduct or actions after the contract is signed, usually to the disadvantage of the other party. This is most applicable in the case of insurance, job, and finance markets.

The theory of information asymmetry will elucidate the phenomenon of NPLs, i.e., non-performing loans in the Kenyan banking sector. Information imbalance might result in adverse selection in the loan issuing procedure. When applicants for loans submit their requests to the banks, the latter may not have the whole and exact picture of the former's creditworthiness (Dari-Mattiacci et al., 2021). More often than not, people with bad financial records or who are planning to take part in high-risk activities might find it easier to get funds lent to them. Banks being physically present only in a limited number of places in the countryside or unbanked areas could be a reason why adverse selection comes into play. Customers in such remote places might be cut off from the formal financial sector entirely, thus, it is possible for banks to know only a part of their creditworthiness (Lofgren & Torsten, 2019). Moreover, the enhancement of digital banking products has the potential to reduce the impacts of adverse selection to some extent by increasing the accessibility of financial services. On the downside, online loan provision platforms' utilization raises the likelihood of incurring bad debts. Furthermore, the popularization of bank products counters the effect of adverse selection by extending the access to a larger pool of trustworthy and creditworthy clients. As a caveat, however, that is, applicants who are new to banking may still experience information gaps that banks will have to deal with.

Economic Theory of Systemic Risk

Philip (1995) was the one who came up with the economic theory of systemic risk. This theory reveals that the interconnectedness, contagion, and amplification mechanisms of the financial system are the main factors that cause the extreme instability and the eventual economic downfall. It points out that through the inter-linkages of the various financial institutions and markets, there are channels opened for the transmission of the large scale company discontent and contagion, which leads to the very fast spreading of financial shocks and thus, possibly, the triggering of major systemic crises. Additionally, the theory is concerned with the amplification mechanisms which can be responsible for making the initial shocks more severe, for example, feedback loops and pro-cyclical behavior, which are causes of systemic instability aggravation (Cai, Eidam & Steffen, 2018).

The economic theory of systemic risk is based on a number of key hypotheses which enable the understanding of the dynamics of financial instability in the system (Brunnermeier, Dong & Palia, 2020). The first hypothesis is that the financial institutions and the markets are interlinked by several channels such as interbank lending, derivatives contracts, and common exposures, which create ways for the distress to propagate and thereby lead to the contagion. The second hypothesis of the theory is that the market participants might behave in a way which is similar to the herding, thus the initial shocks will be significantly magnified and fairly fast spreading of the contagion will be the contribution (Cai et al., 2018). The third assumption is made that the feedback loops and the amplification of the mechanisms, like leverage dynamics and fire sales, can increase the impact of the shocks and further weaken the stability of the system.

The Economic Theory of Systemic Risk could provide valuable insights into the relationship between financial inclusion and credit risk in banks and other financial institutions. Financial inclusion, which includes not only the availability and access to banks' services but also their usage, might have an impact on the credit risk through different routes. The greater bank availability and access can lead to a larger number of borrowers, and this could possibly mean that the credit risk for the commercial banks would be higher because those borrowers would include some that are not so good. Additionally, if the banks provide loans to the neighborhoods that were previously underserved without proper risk assessment and monitoring, it could lead to more loan defaults. But on the other hand, increased bank availability and accessibility can really help the financial situation of the customers by putting them in a position where they do not have to rely on informal and riskier credit sources, thus reducing systemic risk.

Agency Theory

The principal-agent relationship is the main notion of agency theory which was founded by Jensen and Meckling (1976). When the principal assigns certain functions or gives the agent the power to make a decision, the principal expects the agent to act in a way that is most beneficial to the principal. A major problem in the relationship between the principal and agent is that the agent usually knows more than the principal, and this condition is termed information asymmetry. Such a situation can cause the agent to prioritize their interests over those of the principal. When one party, referred to as the principal, delegates decision-making power or control over some tasks to another party, called the agent, expecting the latter to act in his/her best interests, a dilemma known as the principal-agent problem comes up(Payne & Petrenko, 2019). Nonetheless, there is a major conflict of interest as the agent might have motives or goals that are contrary to those of the principal. This divergence of interests may give rise to a number of difficulties and problems.

In agency theory, it's presupposed that the agents will always put their own interests first and hence, will try to reach the utmost utility or get the most to their personal comfort. Such a presumption accepts the fact that most of the time, people do put their own interests above the principal's which results in conflicts and misalignment of incentives (Tijjani & Bello, 2019). Furthermore, the theory assumes that there is information asymmetry, which implies that the agents have more awareness of their behavior and the situation around them than the principal. This lack of equal information can create opportunities for the agents to take advantage of their knowledge more than the principal. Both principals and agents are perceived to be rational decision-makers (Payne & Petrenko, 2019). They will make choices that maximize their expected utility, given their preferences and available information.

Agency theory will be employed to explain the outcome of financial inclusion on credit risk in Kenyan commercial institutions. In the context of Kenyan commercial institutions, the principal is the bank's depositors or shareholders, while the agent is the bank's management or loan officers. Shareholders and depositors entrust their funds to the bank, expecting it to be managed in their best interests (Marashdeh, 2021). There may be information asymmetry occurring between banks and their customers, as well as between bank management and shareholders. Customers may not have complete information about the terms and conditions of loans, while shareholders may lack detailed knowledge of the bank's lending practices.

Empirical Review

Bank Availability and Credit risk

Wang and Dong (2023) examined the outcome of bank branching deregulation on credit risk of the city commercial banks in China. The results showed that China loosened regulations on city commercial banks' ability to branch out across cities, which significantly increased the number of city commercial banks' nonlocal branches. The results also indicated that deregulation encouraged risk-taking behaviors among banks. Specifically, it led to "lowering lending criteria" and "attracting deposits with higher interest." These behaviors contributed to an elevated credit risk. When banks relax their lending criteria, they may extend credit to borrowers who are riskier and less creditworthy. This can result in a higher likelihood of loan credits and bad debts, thereby increasing credit risk. However, the assessment was in China, a nation with contrasting regulatory framework, business environment and macroeconomic that to Kenya's. In addition, the research period ranges between 2006 and 2011, but the current study used data from 2018 to 2022.

In a different study, Wang and Chien-Chiang (2023) investigated the link between commercial bank branch growth and energy efficiency. The research, which looked at data from 1998 to 2009, concluded that the energy efficiency of industrial enterprises had escalated as a result of the growth of commercial bank branches within a 10-kilometer radius of their locations. The investigation also discovered that there were several, diverse nexuses connecting the growth of bank branches and energy efficiency. However, energy efficiency a distinct variable from credit risk was the study's dependent variable. Furthermore, the research's scope was limited to the years 1998 to 2009; whereas, the current study encompassed the years 2018 to 2022.

In Italy, Bernini and Brighi (2018) assessed the connection between bank branches enlargement, efficiency and domestic economic growth. The findings indicated that an increased distance between a bank's main branch and its branches exacerbates the negative impact of expansion on efficiency. This suggests that the logistics and coordination challenges associated with managing geographically dispersed branches can reduce operational efficiency. Effective communication, management, and technology may be critical in mitigating these challenges. However, the study was limited to Italy, a developed country unlike Kenya which is a developing country.

Frotan and Imran (2023) evaluated the effect of bank services availability on banks credit risk in the banking sector in Afghanistan. The scope of the research encompassed the years 2010 to 2021 and employed a descriptive research methodology. The availability of bank services was measured by the total deposits, loan accounts, number of branches, and total ATMs. The outcome indicated that credit risk is statistically favorable and the large amount of loans has a significant influence on it. Even though the size of deposits has a positive correlation with credit risk, this relationship is not statistically significant, indicating that the amount of deposits might have a smaller effect. A bank with a wider branch network is very likely to experience more credit risks, as the number of branches indeed shows a statistically significant positive effect on credit risk. Meanwhile, a higher number of ATMs influences the credit risk aspect in a manner that is opposite to that of branches, i.e., it has a statistically significant negative effect, thus indicating that the availability of more ATMs goes hand in hand with a lower credit risk. However, the entire research was carried out in Afghanistan, hence the results are not applicable to the commercial institutions in Kenya.

In the course of research carried out by Ozili (2021) on the impact of bank availability on the performance of firms in Nigeria, regression analysis was used to evaluate the relationship between the indicators of fiscal inclusion and financial risk metrics. The results showed a significant

positive effect of bank availability on the performance of Nigerian firms. However, it must be pointed out that the results of this study might not be valid in Kenya since the banking landscapes of the two countries are so different. Moreover, the study of Ozili employed a descriptive research design, while the current research has taken an explanatory research approach. This change enables a more thorough investigation of the causal mechanisms that underlie the relationship between financial inclusion and credit risk, thus providing a more comprehensive understanding in various economic contexts like Kenya.

Musyoka (2019) investigated the impact of distribution of bank branches on the fiscal performance of the commercial banks in Kenya which was assessed through bad debts. The survey research methodology was employed, and secondary data from 2000 to 2010 was analyzed. The study results indicated that the establishment of a branch network in the commercial institutions had a connection with an increase in credit risk resulting from the occurrence of bad debts. This implied that a wider branch network might lead to a greater chance of loans not being repaid or written off as bad debts.

Bank Accessibility and Credit risk

Zhao, Lan, and Wu (2019) explored e-banking impacts on Taiwanese commercial institutions' credit risk. This study examined two important areas using panel data regression, rigorous robustness testing, descriptive statistics, and the KMV model. The results indicated that the KMV model, based on the credit distance, serves as a robust and accurate measure of banks' credit risk. In addition, the expansion of electronic banking services heightens credit risk, especially in the absence of adequate government and industry regulations. However, because this study was carried out in Taiwan and there are disparities in the legal system and socioeconomic conditions there, the results are not applicable in Kenya. Further, the study only focused on one component electronic banking, which was internet banking and hence did not cover other aspects like mobile banking.

Some of the studies include Li (2022) who explored Fin-tech application effects on bank risk taking of the Chinese city commercial institutions. The research showed that great uncertainty has emerged due to the development of fin-tech in the area of bank security and so does making sense of the relationship between the application of fin-tech and risk taking by banks. To measure the similarity of the sample banks and determine the specific fin-tech application of each, this particular analysis developed from text mining method made an extensive list of index. With the proper data of this research, this study established a regression model with a few variables and then compared it with the present social reality of China. The results suggested that application of fin-tech and risk-taking by the bank are inversely related to each other in terms of credit risk. While the application of fin-tech at the beginning increases credit risk taken by the banks, it will reduce the non-performing loan rates of banks with more developed applications of fin-tech. But the study was done on Chinese city commercial institutions and therefore the results cannot be applied on Kenyan commercial institutions.

Bad debts is one of the major concerns of the shareholder of Chinese commercial institutions and Zeng (2023) examined the role of digital finance in bad debts rate of Chinese Commercial institutions. The study adopted cross-sectional dataset from 2011 to 2020. Modern technology is crucial in managing and reducing credit risk of China’s commercial institutions. Furthermore, financial exclusion and growth disparities between east and west split fin-tech’s heterogeneity in different dimensions in different regions. However, this study was undertaken amongst Chinese

Commercial institutions, which in one way contrast legally and business-wise to Kenyan Commercial institutions.

The impact of the mobile cash lending procedure on bad debts in Rwandan commercial institutions was studied by Muhongerwa and Mulyungi in 2022. The findings showed that bad debts in commercial institutions were impacted by the mobile cash lending process in terms of loan appraisal, borrower paperwork, loan disbursement, and monitoring and assessment procedures. Not only was the study restricted to Rwanda, but it was carried out as an Ecobank Rwanda case study. Furthermore, primary data obtained through questionnaires were utilized in the study; however, data was extracted using a data extraction tool.

Ngui (2021) evaluated the connection between financial technology and commercial institutions' bad debts in Kenya. The investigation took a descriptive approach and was conducted among 42 Kenyan commercial institutions. The results showed that financial technology including mobile banking and online banking revealed a significant effect on commercial institutions' bad debts in Kenya. These digital financial technologies have significantly altered the landscape of banking operations and customer interactions, thereby influencing the incidence of bad debts. The development of mobile banking and internet banking has resulted in significant alterations in the way financial services are accessed and their convenience to customers. Customers are able to carry out transactions, make payments, and check their account balances either from home or while they are out and about. One of the consequences of this convenience is that there has been a decline in the number of late or missed payments, which, in turn, decreases the risk of bad debts. Nonetheless, the research has implemented a descriptive research approach, which is, however, different from an explanatory research approach. Additionally, the study conceptualized financial technology in terms of mobile banking and internet banking only.

Bank Usage and Credit Risk

In Vietnam, Nguyen (2019) investigated the credit risk management of commercial institutions' lending products. Email conversations with officers and supervisors of the proposed bank were used to conduct qualitative research. Apart from the main data obtained from the interviews, the study also incorporates secondary data amassed from credible sources, including the annual reports of the case bank, local government policies and global banking norms. The findings showed that credit risk control is an essential procedure used by commercial institutions to reduce the risk of loan defaults and bad debts for their loan products. It entails a collection of methods, procedures, and guidelines intended to evaluate, control, and reduce credit risk. However, as this study was carried out in Vietnam, its conclusions cannot be applied to Kenyan commercial institutions. In the Unites States, Canada and European countries, Scott and Zachariadis (2019) ascertained financial innovation diffusion impacts on company performance. The review used a total of 17 companies and covered the period between 1998 and 2005. The findings indicated that adoption of financial innovation had significant effects on profitability. The profitability impact has a stronger effect on smaller businesses than on larger ones, as it operates through increasing sales and decreasing expenses. Nevertheless, the study's conclusions cannot be applied to developing countries such as Kenya because the research was done in advanced economies.

Ayanbanke et al. (2022) performed a study on the influence of bank usage and financial literacy on Nigerian economy growing. The outcomes of the research showed that a rise in bank usage, especially through greater levels of deposit mobilization and lending activities, would result in improved dissemination of credit among people and businesses. The credit thus obtained would

enable the purchase of productive activities by the business, the expansion of the business and the creation of job opportunities, all contributing to economic growth. Nonetheless, the study employed economic growth as the explained variable, in opposition to credit risk.

Kyalo (2019) conducted a study in Kenya that looked at the impacts of credit card use on the financial results of commercial banks. The researcher employed casual research and gathered data from secondary sources for seven commercial banks operating from 2009 to 2013. Credit card usage was indicated to have a positive and significant impact on the financial performance of the banks. The study's dependent variable was fiscal success, which was measured by return on assets. Besides, the analysis was confined to seven commercial institutions and was limited to the time frame of 2009 to 2013.

Muriuki (2020) aimed to examine the extent to which fiscal innovation adoption influenced the financial performance of commercial institutions in Kenya. The research took advantage of a census survey, which was held in December 2016, to identify the entire population of the 42 commercial institutions. A checklist was used to gather secondary data on financial innovation indicators from 2011 to 2017. According to the findings, credit cards had no discernible impact on financial success, while online, agency, and mobile banking all had a favorable impact. But fiscal performance instead of credit risk was examined as explained variable.

Katutu (2019) investigated how financial innovation impacts Kenyan commercial institutions financial performance. The research targeted all eight tier-one commercial institutions in the country, sourcing data on their performance and related predictor variables from the CBK database. The findings revealed that self-service banking, internet banking, mobile banking and agency banking positively influenced tier-one Kenyan commercial institutions financial performance. However, the study was performed among eight (8) tier one commercial institutions and financial performance being the dependent variable that differs from credit risk.

RESEARCH METHODOLOGY

This research employed explanatory research approach. Explanatory research design, popularly called explanatory research, is a type of research methodology that aims at understanding the cause-and-effect relationships among variables (Latwal, 2020). Panel multiple regression model was utilized which is a statistical tool widely used in social sciences and econometrics for analyzing data collected across multiple time periods (Longitudinal data) and multiple individuals, entities, or units (cross-sectional data) (Krishna, 2020). The target population consists of all 39 presently operating commercial institutions in Kenya. This study utilized secondary data spanning 2019–2023, sourced from published reports, fiscal documents and official banking records.

RESEARCH FINDINGS AND DISCUSSION

Descriptive Statistics Results

Table 1: Descriptive Statistics Results

Variable	Minimum	Maximum	Mean	Standard deviation
Bank availability	10.594	19.548	4.596	1.265
Bank accessibility	5.261	11.264	8.512	4.561
Bank usage	16.216	23.541	10.139	6.123
Credit risk	15.695	21.006	12.231	3.364

Source: Survey Data (2025)

The main purpose of the review was to analyze the effects of the availability of banks on the credit risk of commercial banks in Kenya. The number of branch networks, ATMs, and banking agents were used to measure bank availability. The mean value of 4.596 indicates a generally low availability of banks, while a standard deviation of 1.265 indicates moderate variability, thus pointing out the existence of differences in accessibility. The findings indicate that access to banking services is restricted to a great extent, which probably raised credit risk by shutting the door for individuals and businesses to get financial services and, thus, having a negative impact on the stability of banks and the overall economy. The finding is supported by Wang and Dong (2023) who analyzed the impact of bank branching deregulation on the credit risk of Chinese city commercial banks. Their results revealed that the Chinese government eased restrictions on the establishment of city commercial banks' branches outside their respective cities, which led to an impressive rise in the number of branches established by city commercial banks in non-local areas.

The study aim was to look into how the factors affecting bank accessibility impacted the credit risk of the Kenyan commercial banks. The analysis of financial accessibility, which was assessed by mobile money services, online banking, and account availability, exposed considerable differences in financial accessibility. Generally, banks were providing medium access service, as proved by the mean score of 8.512, but at the same time a standard deviation of 4.561 suggested large discrepancy. When accessibility is different from one place to another, it can affect the creditworthiness of possible borrowers, because the people with no or limited access to banks may find it difficult to create credit histories, which then increases the credit risk for banks. The findings are in line with the study conducted by Ngui (2021) who looked at the relationship between monetary technology and the occurrence of bad debts in commercial institutions in Kenya. The findings indicated that financial technology like mobile banking and internet banking had a remarkable impact on the size of commercial institutions' bad debts in Kenya.

The variable of credit risk, represented by non-performing loans, had an average of 12.231 and a standard deviation of 3.364. This situation reflects great diversity in credit risk amongst the evaluated entities or over time. The massive amounts of non-performing loans will eventually take a toll on the banks, leading to a greater provision for loan losses and a lesser ability to lend, which could adversely affect the economy. The conclusion is in line with Buro (2019) research observation of credit risk being dynamic and its changing nature with time as the financial conditions of the borrowers change.

Correlation Analysis

Correlation test was conducted to ascertain if observed values exhibited a linear pattern, which is essential for validating the assumptions of various statistical analyses. Outcomes offer nuanced insights of the relationship being studied. Table 2 depicts the outcomes.

Table 2: Correlation Analysis

Variable		Credit risk
	Pearson Correlation	0.789
	Sig. (2-tailed)	0.002
	N	38
Bank availability	Pearson Correlation	0.815
	Sig. (2-tailed)	0.001
	N	38
Bank accessibility	Pearson Correlation	0.709
	Sig. (2-tailed)	0.004
	N	38
Bank usage	Pearson Correlation	0.776
	Sig. (2-tailed)	0.003
	N	38

Source: Survey Data (2025)

The performed linearity test showed that the Pearson correlation coefficients for different banking related factors such as availability, accessibility, usage, and bank competition were, respectively, 0.789, 0.815, 0.709 and 0.776 when related to credit risk. Importantly, all of these factors showed a significance level of less than 0.05. This result indicates that these financial inclusion factors are related to credit risk in a statistical and significant manner, which means that any movement in these variables will probably lead to a substantial change in the amount of credit risk faced.

Multiple Regression Analysis Results

The subsequent information pertains to regression analysis outcomes, as detailed in accompanying model summary, ANOVA, and coefficient tables.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.897	0.805	0.759	1.0065

Source: Survey Data (2025)

The analysis of model outcomes shows the most important statistical metrics. The correlation coefficient (R) is 0.897, which is a strong indication that there is a positive relationship between the variables. The R squared value is 0.805, meaning that approximately 80.5% of the variability

in credit risk is related to financial inclusion (bank access, and usage). Adjusted R value of 0.759 demonstrates that the model is very accurate in terms of the number of predictors used. The model provides a standard error of 1.0065, showing that it is quite accurate in predicting the outcomes. These results point out that financial inclusion has a major impact on commercial banks' credit risk in Kenya.

Table 4: Analysis of Variance

Model		Sum of Squares	Df	Mean square	F	Sig.
1	Regression	51.269	3	17.089	25.532	0.004
	Residual	22.758	34	0.669		
	Total	74.027	37			

Source: Survey Data (2025)

The statistical results presented in the ANOVA table show a mean square of 17.089, and at the same time, F= 25.532 and P=0.004 are indicated. It can be drawn from these results that there is a strong relationship between the variables of financial inclusion (which are the presence of banks, their being in the right place and their offering of services) and the credit risk of the banks in Kenya. This, in turn, means that differentials in these banking factors can change the risk of default on loans by the respective banks significantly.

Table 5: Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	0.694	0.301		2.306	0.003
Bank availability	0.785	0.297	0.0263	2.643	0.001
Bank accessibility	0.779	0.223	0.0311	3.493	0.003
Bank usage	0.706	0.182	0.0184	3.879	0.003

Source: Survey Data (2025)

The findings denote that the unchanging figure of 0.694 exhibits the credit risk of commercial banks without the influence of financial inclusion (bank accessibility, usage and availability). The regression coefficients predict that financial inclusion (bank accessibility, usage and availability) will positively affect the credit risk of commercial banks by 0.785, 0.779 and 0.706 in that order. Therefore, the regression equation resulted as follows;

$$Credit\ risk = 0.694 + 0.785(bank\ availability) + 0.779(bank\ accessibility) + 0.706(bank\ usage) + \acute{\varepsilon}$$

The bank's availability was characterized by a beta of 0.0263 and significance level of 0.001, thus, there was a very strong statistical significance assigned to the result. As a result, the null hypothesis was turned down and availability in banks was found to play an important role in the credit risk of Kenyan banks. The result is in agreement with Wang and Dong (2023) who investigated the impact

of bank branching regulation relaxation on the credit risk of Chinese city commercial banks. The study concluded that the Chinese government relaxed the rules related to the branching of city commercial banks which, in turn, led to a large increase in the nonlocal branches of city commercial banks.

Accessibility of the bank was associated with 0.0311 beta value and 0.003 significance level. This result carries significant implications for Kenyan commercial banks' credit risk management practices. The relationship was statistically significant, indicating that accessibility still plays a meaningful role. Therefore, the hypothesis was rejected and the study concluded that bank accessibility does significantly affect the credit risk of Kenyan commercial banks. The finding agrees with Zhao, Lan, and Wu (2019) who explored the impact of e-banking on commercial institutions' credit risk in Taiwan. The results indicated that the KMV model, based on the credit distance, serves as a robust and accurate measure of banks' credit risk.

Correlation between accessibility of banks and the credit risk was determined at 0.0184 beta coefficient, accompanied by p-value of 0.003 suggesting results' statistical significance. This implies that as the accessibility of banks increases, there is a significant impact on the credit risk profile of these financial institutions. Accordingly, the null hypothesis was dismissed, leading to affirmation that bank usage does significantly affect Kenyan commercial banks' credit risk. The finding concurs with Nguyen (2019) who investigated the credit risk management of commercial institutions' lending products. The findings showed that credit risk control is an essential procedure used by commercial institutions to reduce the risk of loan credits and bad debts for their loan products.

CONCLUSION

First of all, the research confirms that the larger access to the banking services empowers the most people and the service to the banks also the number of depositors is increased and the liquidity of the banks is thus improved. The banks' holding of a large amount of cash reduces credit risk since they are more adept at fulfilling their financial obligations and controlling the risks associated with lending. The accessibility of banks has opened new avenues for the utilization of non-traditional credit scoring models which, in turn, have a significant impact on the credit risk over the course of making informed decisions about the loans and less the risk of defaults. The banks opening up in more areas may result in the competition among the banks getting fierce. The winning banks may be the ones that will offer more attractive terms to the borrowers, thus, credit risk will, in general, be reduced through such a competition.

With respect to earlier objectives, the investigation reveals that an increase in the accessibility of banking services will enable banks to gather a wider range of data about potential borrowers, thus improving their risk assessment models and encouraging the banks to offer loans more cautiously. On the other hand, banking that is more accessible keeps encouraging people and enterprises to save more money, which in turn will lead to more money available for lending and more capital for productive investments, which eventually will result in a more stable economy and a lower amount of credit risk. Besides, banks by offering financial services to their customers, are very helpful in making them strong, and this in turn will enable them to manage economic shocks and reduce credits during the recession more efficiently.

Regarding the third objective, it is concluded by the study that banks provide a systematic method of risk assessment as well as management through sophisticated credit evaluation processes that

ascertain the borrowers' creditworthiness and thus reduce the likelihood of defaults to a minimum. Kenyan kiosks of banks get the advantage of a diversified funding base which in turn adds to their stability and reduces the overall credit risk. Also, lending to the private sector is the major role of the banks in the economic growth process. This access to loans facilitates investment in the productive sectors by the borrowers which in turn improves their repaying capacity.

RECOMMENDATIONS

The review suggests banks to resort to advanced analytics and data modeling risk assessment which by no means can be called basic would help banks a lot in the credit risk arena. It is the objective of such measure to increase the awareness of the applications and consequences of the credit granting process among the borrowers thus leading to the creation of decision-making individuals through informed choices. Through the partnership with the community groups banks can offer the financial literacy boosting workshops and resources. Moreover, the banks should change their lending criteria to be more flexible leading to better access to individuals and small enterprises that otherwise would be considered as high-risk and thus get ruled out.

It is suggested that banks work together with microfinance institutions which will enable them to reach the historically underserved populations. These alliances can be beneficial for banks since they will share the risk related to lending to high-risk borrowers. Banks need to create personalized financial products that meet the needs of different consumer groups to improve accessibility. For example, giving out microloans or having flexible repayment options can draw in the customers who might find it hard to deal with the conventional loan terms. Having dialogue with the regulators to support legislation which makes responsible lending possible and safeguards both banks and borrowers can turn the accessibility-enhancement along with credit risk management into a more favorable scenario.

In order to mitigate the risk of default, it is advisable that banks also spread their lending over various sectors and classes of borrowers. Such a tactic not only reduces the risk of a bank's financial performance being severely influenced by a sector's downturn but also enhances the overall stability of the bank's financial performance. Perform extensive due diligence processes before granting the loan, including the carrying out of detailed background checks, examination of the financial accounts, and assessment of the potential borrower's business model to guarantee that the lending decision is made with full knowledge of the circumstances. The establishment of good monitoring and reporting systems allows banks to keep on observing the performance of their lending portfolios constantly.

The report suggests that Kenyan commercial banks should implement advanced credit scoring models and risk assessment tools that rely on big data analytics. Through the use of technology, banks will have the ability to evaluate the creditworthiness of their clients and to take lending decisions based on this evaluation, which would be not only very considerate but also lead to lower credit rates. Creating avenues for the banks to share information with one another will be a good way to increase competition. The banks through sharing of data on the performance of borrowers and their credit histories will be able to know the market trends and borrower behavior and then rework their credit risk strategies and thus, offer loan products that are more competitive. The Central Bank of Kenya will have a big role to play in this by developing a regulatory environment that is favorable for competition among the banks.

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