INTEREST RATE SPREAD AND FINANCIAL INCLUSION NEXUS IN THE EAST AFRICAN COMMUNITY
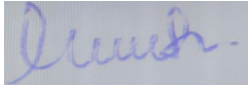
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A RESEARCH PROJECT PRESENTED IN PARTIAL FULLFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE FINANCE, SCHOOL OF BUSINESS AND MANAGEMENT SCIENCES UNIVERSITY OF NAIROBI

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DECLARATION

This research project is my original work and has not been submitted in any institution of higher learning for any awards.

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This research project has been submitted with my approval as the University Supervisor

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DEDICATION

I dedicate this project to my dear parents Mr. Peter K. Gitiri & Mrs. Margaret M. Gitiri, my

siblings; Mukiri, Mugambi and Makena and my beloved Husband. May God bless you.

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LIST OF ABBREVIATIONS AND ACRONYMS

ATM - Automated Teller Machine

CBK – Central Bank of Kenya

EAC – East African community

GDP – Gross Domestic Product

GMM – Generalized Method of Moments

NPLs – Non-Performing Loans

ABSTRACT

Despite a steady growth in financial inclusion in terms of the accessibility, other indicators particularly the usage is still low. About 60 percent of people in the East African Community region are excluded from using bank services such as loans and other credit facilities. This is highly accredited to the rising cost of borrowing. Interest rate rates have been on the rise around the region leading to high interest rate spreads of an average of 12 percent around the region in the financial year 2021. The objective of this study was to examine the nexus of interest rate spread and financial inclusion. To achieve this, this study hypothesized that interest rate spread is an endogenous variable that is affected by several bank specific factors such as the widespread level of Non-performing loans that the banks face, operation costs and the liquidity ratio of the bank which denotes the ability to liquidate its assets in the event it goes under. In light of this the study took this into account and adopted a two stage Generalized Methods of Moments approach to model the relationship and interactions of the variables. From the first stage analysis, the study established that NPL is positively associated with interest rate spread (β=0.034, p-value=0.011). This study also concluded that the relationship between liquidity ratio and interest rate spread was a negative one (β = -0.124, p-value=0.079). From the second part of the modeling, this study obtained positive yet statistically significant coefficients for the lag of financial inclusion (β=0.65, p-value=0.018). This study also obtained negative and statistically significant coefficient for interest rate spread (β=-3.826, p-value=0.000). The study concluded that interest rate spread has a negative relationship on financial inclusion within the East African Community. The study recommends that, to address the interest rate problem there is need to address the factors that contribute to increases in the interest rate spread. Firstly, there is need for East African banks to institute seamless internal risk systems to ascertain the credit worthiness of borrowers. It can be accomplished through adoption of digital technologies across the loan value chain. This will aid in curbing non-performing loans problems that are

quite rampant in the banking sectors. Secondly, it is imperative for banks to strive to increase their liquidity ratios in order to reduce interest rate spread. This can be achieved through the liquidation of the unneeded assets through disposing them off. This can also be achieved through proper management of overheads.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Existing, is a well-established discussion around the importance of financial system in an economy. Extant literate has put across various conduits through how this happens and as a result three strands of ideologies have been presented. Firstly, Allen, Demirguc-Kunt, Klapper, and Martinez Peria (2016) opines efficient financial systems often tend to be favorable for both economic growth and poverty eradication. In reiteration, Li (2018) opines that it is imperative to have a robustly structured banking system that will facilitate an all-inclusive financial system. However, the pioneer arguments can be traced back to the Schumpeterian process that

was dubbed the 'creative destruction' theory that postulates that economic development is achieved by financial development though the emergence of new firms (Schumpeter, 1949), and in the case of financial sector introduction of new financial models and systems (Demirguc-Kunt, Klapper, & Singer, 2017). Once the systems are up and running seamlessly, World Bank Group (2021) observe that financial access is raised and different clients' basic needs are met including health, education and safety.

In recent times the planet has witnessed a tremendous revolution in the financial sector that has been characterized by advanced technology and a shift from the customary banking systems. Non-bank financial institutions for example microfinance institutions have been introduced as instruments for poverty alleviation in developing countries. In the same breath, the rise of mobile banking has disrupted the finance industry and ultimately resulted to more access to finance (Wieser, Bruhn, Kinzinger, Ruckteschler, & Heitmann, 2019). However, putting into consideration the increased usage of financial services the question of total financial inclusivity in terms of quality and impact has started to emerge. They are particularly linked to consumer protection challenges for the vulnerable population, specifically the low-income earners and youth (OECD, 2020).

The study is underpinned by several theories. The dealership theory attempts to critically analyze the factors that determine or influence the interest rate spread while attempting to explain the reasons why banks charge higher interest rates on loans than deposits. The main argument put across for this is the uncertainties present in the financial market that causes financial institutions such as banks to become risk-averse (Ho & Sunders, 1981). Ozili, in his study in the public good theory of financial inclusion advocates a need for financial institutions to eliminate bottlenecks and rising interest rates to encourage the individuals falling under the low-income group to consume financial products (Ozili, 2020).

1.1.1 Interest Rate Spread

This refers to the difference or the gap between the interest rates that financial institutions such as commercial banks charge on advances to borrowers and the rate that they pay for deposits (Cúrdia & Woodford, 2018). It is of germane importance to understand interest rates in terms of their composition. This is to emphasize the suitable aspects of its structure, not forgetting the way banks as well as micro finance institutions provide rational explanations for superfluous rates. The building blocks to an interest rate are of dire importance to any financial institution. The four noteworthy elements of an interest rate are first and foremost the profits the institution stands to generate, and the 'bad debt' situations also known as non-performing loans, which are a disadvantage since banks have to make provisions for them. Incurred overhead costs such as outreach costs while providing services, processing costs that the bank bares while processing or sanctioning loans, general overhead costs as well as the expenditure during acquisition of money used to lend customers remain as contributing factors to interest rates (Kasekende, Rubatsimbira, & Ntungire, 2020).

A disadvantage to the overhead cost is that it generates fixed costs creating a hindrance to entry. Small banks with great fixed overhead costs are expected to have considerably bigger gaps or spreads and potentially lower profits and in the same manner non- performing loans measuring the availability of bad debts obviously would impact the gap that is evident in lending and deposition rate. Challenges such as imbalances in information and the frustration on the side of the banks to diversify risks incurred creates circumstances for example risk premiums that contribute to a rise in interest rates that is unnecessary in covering marginal costs and transaction costs (Beck & Hesse 2006.)

Different sectors have different risk premiums. For example, the agricultural sector is identified by the presumption that most of the times people can't pay for interest rate that has not been

adjusted for inflation. This is referred to as ex-ante interest. Several authors have described this as a high risk premium situation. Other bank related factors relevant to understanding the differences in interest rates include how liquid a bank is, especially considering the risks involved. The liquidity of a bank is defined in terms of the short-term liabilities or the liquid assets available this is a critical aspect while considering the returns gained through assets as well as the profit to capital total ratio. These are the foundations that inform and mirror a banks success and profitability (Were & Wambua, 2014).

The operational costs exhibit three broad classifications of costs, the first being the general administration and operational costs related to managing a company structure which includes offices and branches. Secondly, cost of processing credit and assessment of loans. Finally, there are various outreach costs such as the enlargement of the bank network or the development and introduction of new product lines and services. The processing costs have the ability to push up prices which causes a difference between larger loans from banks and smaller loans from micro finance institutions. Operational costs differ considerably between creditors hence computing them as a ratio of the loan is a measure of institutional proficiency. It is imperative for lenders to cover the cost of non-performing loans. This will facilitate lenders with effective credit screening measures, the ability to lower rates in ensuing periods while reckless lenders should be penalized (Were & Wambua, 2014).

The study measures interest rate spread by deducting the deposit rate from the lending rate. Financial institutions acting as the link between savers and borrowers incur costs while outsourcing funds, this amount is known as the cost of borrowing. The cost of borrowing is sometimes also the interest given on deposits while other times it takes the form of cost of wholesale funds and government subsidies such as subsidized rates or funds provided through government or sometimes donors. This is mostly a case of commercial banks and deposit taking

micro finance institutions since different micro finance institutions, command possibility of acquisition of cheaply acquired funds through charitable donations.

1.1.2 Financial Inclusion

It facilitates inclusion of the unbanked group of individuals in a country in the formal financial system. Benefits of this incorporation includes poverty reduction, promotion of job security and enhanced social empowerment. Many jurisdictions have backed financial inclusion as a domestic legislature objective together with financial integrity, financial stability and the protection of consumers. It ensures that those who are in need of financial services access them efficiently. It focuses on motivating members of the populace that are not in any organized financial system to be integrated in one by explaining the needs and benefits of joining a formal financial system. It explains some of the advantages as facilitation to the easy accessibility of financial services including banking, payments and brokerage by the financial services providers (GPFI, 2011).

In general terms, financial inclusion may be explained as extensive accessibility of financial services by people in an economy and their utilization by the needy as well as any additional marginalized groups. According to Shetter (2016), the aforementioned is defined as the integration of the population that is both socially and economically marginalized from the ease of accessing safe and inexpensive financial services. Financial inclusion is integral to achieving numerous goals that entail economic objectives which facilitates the achievement of equitable growth, the attainment of financial objectives by encouraging more savings, social welfare objective mainly by alleviation of poverty and various financially geared political objectives whereby they provide productive government programs. Sharma & Kukreja (2013)

It is worth pointing out that not every member of the community can be financially included. Damodaran (2013) states that the main motives of financial exclusion are divided into two the first being demand driven and the second being supply driven. Firstly, the demand side includes absence of apprehension, illiteracy, poverty and meagre earnings. On the other hand, the supply side is characterized by long distance from physical branches, inapt products and bad branch timings. Self-non-participation can be defined as a situation where a portion of the populace choose non-inclusion in the financial services due to perceived lack of any use for it, or due to religious or ethical basis.

According to Singh (2017), adopting financial inclusion takes two stages in which, the first step includes accessing a transactional account. This brings the possibility of access of more financial services. It allows individuals to store money as well as facilitate sending and receiving payments. Also, it connects other financial services. Financial access facilitates everyday living as well as helping families in businesses organize everything ranging from long term goals to unforeseen emergencies. Secondly, transitioning out-of access towards more specific usage should be embraced in states whereby over 80% of the population have access to accounts.

CBK (2022), notes that to accurately achieve financial inclusion, financial access and usage are necessary but not sufficient to conclude that citizens are financially included. They have used other measures namely the quality of finance as well as the impact. Quality entails the significance of financial services to the consumer needs while impact details consumer life changes that are as a result of the utilization of financial devices or services to achieve their intended goals. Going by the aforementioned, the study will measure financial inclusion using the accessibility, usage and the quality of financial services.

1.1.3 Interest rate spread and financial inclusion

Greenacre (2020) argues that countries that had previously had wide gap between financially included and excluded are likely to be affected by the increased financial access experienced in the current epoch. For one, many lenders offer credit at extremely high interest rates some with or without the knowledge of consumers through hidden charges. In Kenya, this problem is particularly rampant among Savings and Credit cooperative societies, Microfinance institutions and mobile loan applications (CBK, 2022). Secondly, there are reported cases of inaccurate risk-pricing by lenders that lead to high interest rates charged to many low-income communities (CBK, 2021).

Interest rate spread is a critical factor in the finance sector of an economy because it steers the direction of intermediation and ultimately determines its level of efficiency. There is a need for concern in the spread as it can serve as a building block or a breaking point in the financial intermediation process. Any disruptions can cause ripple effects to other economic sectors such as consumption and investment and thereby hampering economic development. For instance, a higher spread can reduce the purchasing power of consumers as it will make financial access expensive whilst at the same time crowd out private investment as high interest rates are only favorable to governments. In a nutshell, high spreads are a depiction of inadequacies of the financial intermediaries' namely commercial banks and microfinance institutions considering the discrepancy between interests paid to savers and borrowers Mugume & Rubatsimbira (2019).

1.1.4 East African Community (EAC)

The East African Community which is made up of seven member states can be defined as an intergovernmental organization within the Eastern Africa region that was first formed by three

member states; that is the Republics of Kenya, Uganda and formally United Republic of Tanganyika (Tanzania) in 1967. Prior to 1967, the three countries operated in a union known as the East African Common Services Organization. It later dissolved in 1977 and was re-established again in July 2000. Over the last 22 years, it has grown to seven member states comprising seven countries. The three original member states include Republic of Kenya, Uganda and formally United Republic of Tanganyika (Tanzania). In July 2007 the Republics of Burundi and Rwanda joined, while the Republic of South Sudan became a member later in the year 2016. This year (2022), The Democratic Republic of Congo (DRC) joined making the EAC a seven member state organization. It is headquartered in Arusha, Tanzania.

The EAC is working towards regional integration in all areas. It is focused on ensuring that politically, economically and socially all member states mutually benefit. There is an ongoing process of establishing and fully implementing the East African Customs Union (EACU), the establishment of the East African Monetary Union Protocol and the formation of a common market in the year 2010. The EAC has a legislative Assembly that ensures continuation of the vision of the EAC. Member states are required to nominate participants who are sworn in into five year terms. The EAC is the oldest amongst Africa's intergovernmental organizations based on regional locations with a long history of integration and one amongst the continent's most promising organizations in terms of economic, social and geo-political growth. Economically, it is focused on covering integration, co-operation, development, trade and investments (Trouille & Uwimbabazi, 2021).

The EAC is home to about 285 Million people making it a major market not just for goods but also for financial services. The seven member states have over 100 financial institutions operating within their borders and about 10 mobile money service platforms. The Interest rate spread has been averaging 5.66% between the years 2016-2021 in Kenya, 8.24% in Tanzania

and 12.30% in Uganda, 18% in DRC, 8.5% in Rwanda, 12.63% in Burundi and 16.05% in South Sudan (World Bank, 2021). In the past few years Kenya's government has attempted to institute a series of reforms to narrow the spreads inter alia interest rate capping, enforcing of disclosure by commercial banks. These efforts have yet to bear fruit and interest rate cap policy was repealed. A key policy concern for Kenya is that increasing interest rate gap and rising credit interest rates may reflect irregular profits, and this may be due to inadequate competition in the industry. The implication of this is that majority of Kenyans risk being financially excluded or left in the hands of predatory lenders (Donovan & Park, 2022).

According to CBK (2021) financial access in Kenya rose to 83.7% up from 75% in 2016. This was attributed to the disruption in financial sector brought about by fintech service providers such as M-pesa which was the pace setter and still remains as the biggest mobile money service provider in EAC. There are various mobile banking participants who are part of the Fintech service providers in the seven member states that form the EAC. They include Halo Pesa, Mpesa, Orange Money, Airtel Money, Tigo Pesa, Ezy Pesa and MTN Mobile money. However, even though the access is high, questions emerge about other indicators of financial usage as provided by the CBK. The argument is that people own accounts and have subscribed to mobile money platforms, but usage, quality and impact remains largely low. The Financial access household survey conducted by world bank in 2021, established that still a notable percentage of Kenyans do not have access to credit and those that have especially in low-income bracket end up paying more for the credit due to hidden charges and high interest rate. This presents a challenge of consumer protection challenges and in some instances, consumers end up losing the money.

Secondly, according to CBK (2022) the quality of loans to borrowers is wanting. The CBK notes that majority source loans from non-traditional banks and mobiles apps that have been

using predatory tactics. This trend is particularly prevalent among Microfinance institutions and digital loan apps. This also leads to loss of money especially for mobile money users. In addition, quality of loans is an important determinant of where the loans are used. Majority of Kenyans end up spending the loans on basic needs and meeting daily expenses a factor that is likely to throw them into a vicious cycle of poverty. About 40.2% of Kenyans reported to take loans that was not sufficient to their needs and ended up not completing their projects, while 42.8% revealed to have taken loans but did not use the cash for intended purpose (CBK, 2022).

1.2 Research Problem

Interest rate spread has elicited concerns among policy makers and academicians. Interest rate is an important component of financial intermediation as it steers the direction of intermediation. It can be a building block or a breaking point to financial intermediation. If consumers perceive interest rates spread to go higher, they might abandon saving and taking loans all together from financial institutions (Tinta et al., 2022). High interest rate spread also is likely to affect, the purchasing power of consumers and ultimately having a series of effects on the other parts of the economy (Kasekende et al., 2020). High discrepancy between interests paid to savers and borrowers is an indication of the financial intermediaries and is likely to discourage financial inclusion (Mugume & Rubatsimbira, 2019).

Between the years 2016 to 2021 there has been a rise in interest rate spread averaging at 5.66% in that period (Trading Economics, 2020). Despite a raft of measures that the government has undertaken to reduce this spread such as enacting the interest rate cap–that was repealed in 2018– among other solutions but so far, the efforts remain largely futile. If this situation is not alleviated, the country risks staring at a population that is financially excluded. The potential victims are likely to be the underprivileged in the community who risk getting low quality credit mainly from predatory lenders (Donovan & Park, 2022). The Central Bank of Kenya (2022) notes that despite a steady growth in financial inclusion in terms of the accessibility

other indicators are still low. The Bank raised concerns about the usage and quality dimensions. More than 40.2% of loan borrowers are unable to get loans that can meet their needs while 42.8% divert the loans to other pressing needs unrelated to development projects that they had planned. They attributed this to the exorbitant interest rates levied by various financial agents.

There are several studies that have been advanced regarding the nexus between interest rate spread and financial inclusion at the global scene and locally. However, it's worth pointing out that the scarcity of the study is surprising considering the importance of financial inclusion in the 21st century. Among the existing empirical studies several factors have been identified that warrant further research. The gaps are identified in terms of scope, methodology and findings obtained. To begin with findings, some studies obtained varied results for example Were and Wambua (2014) established that larger banks have a larger interest rate spread in comparison to small and relatively medium banks. Likewise, the study confirmed that bank liquidity ratio has a negative effect on interest rate spread which is inconsistent with extant literature and theory. In terms of methodology some used content and discourse analysis that are qualitative in nature (see. Cúrdia & Woodford, 2018). Qualitative studies have been demonstrated to be susceptible to researcher's bias and therefore inferences cannot be fully drawn from the study.

From the scope, some studies have used a pool of countries in their studies (Alber, 2019; and Moraes et al.,2021). Secondly, in the computation of financial inclusion the studies have either used one of its dimensions for example (Moraes et al., 2021) only used financial access while Alber 2019 estimated two separate equations with usage and access as dependent variables. The current study combines the usage and access elements of financial inclusion to give a more realistic picture. It is in this regard, that this study seeks to establish what the nexus between interest rate spread and financial inclusion is within the East African Community.

1.3 Objective of the study

To examine the effect of Interest rate spread on financial Inclusion in East African Community.

1.3.1 Specific Objectives

i. To establish the determinants of interest rate spread in the East African Community.

ii. To investigate the causality between interest rate spread and financial inclusion in East African Community.

1.4 Value of the Study

This study is going to be useful to numerous stakeholders not only to the seven governments forming the EAC, but also any jurisdiction that has a monetary policy making authorities and institutions which includes federal banks and central banks worldwide. The Findings of the study will aid and guide them understand the depths at which interest rate spread affects financial inclusion and design effective policies to alleviate the problem.

The findings of this study will be relevant to commercial banks and other financial institutions. It will enable them to make informed decisions in designing loans for different clients to foster inclusion in the country particularly among the underserved in the society.

The contribution of the study to the academic fraternity is twofold. Firstly, from its limitations it will suggest possible areas of improvements through future studies. This can be picked up by future scholars in extension of this study. Secondly it an additional cognition in the library of knowledge in the nexus between financial inclusion and interest rate spread.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter begins by presenting the relevant theories related to both interest rate spread and financial inclusion. It goes ahead to present a conceptual framework which illustrates an abstracted relationship among the variables used in the study. The chapter also contains a review of empirical works conducted globally, regionally, and locally regarding the nexus. It ends with a research gap section which highlights the missing link identified and at the same time informing the readers why this study is worth pursuing

2.2 Theoretical Literature

Three theories in which the study is anchored on are presented in this section. The first theory being the dealership theory which explains what determines interest rate spread. This theory is critical as it addresses the first objective of this study. Public goods theory of financial inclusion is the second theory that underpins this study. It explains the nexus between interest rate spread and financial inclusion. Financial intermediation theory on the other hand, explains the causes of financial frictions in the financial market, it links it to financial inclusion and prescribes how the situation can be remedied.

2.2.1 Dealership Theory of Interest Rate Margin

Works on dealership theory was pioneered by Ho and Saunders (1981). The theory postulates that the deviation between commercial bank lending rates and deposit rate is a product of the many uncertainties that surround the entire financial value chain from the deposits to credit markets. The authors asserted that the financial market uncertainty is caused by the risk-averse nature of financial institutions. The averseness emanates from the difference in time intervals

between deposits and loans issued. Money is randomly deposited whereas the credit application follows a stochastic path, and these applications must be met in time. The implication of this interval is that banks experience an inventory risk which is offset by charging higher interest rates.

In an attempt to augment Ho and Saunders theory, Allen (1988) opines that in addition to the risk faced there are other costs that banks face and this may explain the margin. These may include the operation costs, and provisions for non-performing loans. Zarruk and Madura (1992) contend that interest rate spread might be linked to bank determinants and macroeconomic factors. Among the bank determinants they mentioned includes size of banks and liquidity. Larger banks are able to screen customers compared to their smaller counterparts because they have the capacity. On the other hand, macroeconomic factors that could contribute to the spread are inflation rate and income level in the economy (Zarruk and Madura 1992; Manasso, 2012).

This theory however fails to properly define with certainty the factors that affect the determination of deposit rate given to depositors and lending rates given to borrowers. It also fails to explain the deposit and borrowing rate of banks with high risk appetite.

The theory is significant for this study as it attempts to explain factors affecting the interest rate spread. It begins with the explanation of the origin of high interest rates charged by financial institutions. Finally, extension of the model gives empirical evidence of some of the factors that lead to this. The theory will be used to develop constructs of the determinants of interest spread which include, operational cost, liquidity ratio, bank size, and NPLs.

2.2.2 Public Good Theory of Financial Inclusion

The public good theory of financial inclusion was developed by Ozili (2020). The theory links financial inclusion to public good and avers that every member of the community has a right

to it. Public goods possess the characteristics of non-excludability and therefore no one should be left behind. This means that inclusion of one person does not deter the usage of another individual, as a results, there should be unrestricted access and usage. The theory also asserts that financial inclusion has a non-rivalry property and usage by one individual does not reduce the amount of money owned by another individual. Thus, being a public good, financial service providers ought to accord every member equal opportunity by eliminating the bottlenecks that would constrain some members especially those living below the poverty line.

The theory further postulates that when there is widespread financial inclusion in the formal financial sector every member will do better, and the country stands to gain in terms of efficiency. Ozili (2020) notes that transaction cost is a factor that majorly propels financial exclusions especially of low-income earners. The transaction cost mainly emanates from high interest rates, hidden costs and fees charged by banks for credit and withdrawals. Faced with the high costs, many low-income earners opt to hold money rather than save it in financial institutions. The theory proposes that this situation can only be alleviated by banks and governments working in close collaboration to reduce interest rate fees and transaction fees. Some of the costs can be borne by the financial providers whilst the government could step in by offering subsidies to financial providers to aid seamless provision of transaction services.

The theory has attracted several proponents among them Erlando, Riyanto and Masakazu (2020) who agree that transaction costs are the main drivers of financial exclusion. They argue that financial providers should employ product differentiation methods to suit the different needs of different clients. Products offered by financial institutions should be tailored based on income category of earners to ensure that very member is comfortable with transaction charges. Arun and Kamath (2021) in concurring with the theory, they underscore that the government needs to step up in its role of providing affordable interest rates to commercial banks. This will create an enabling environment in the financial service sector and low cost

will be passed on to consumers. If the government offers low interest rates to commercial banks, the interest rate spread will reduce and thereby providing a wide reach and access to financial services (Arun & Kamath, 2021).

The study finds this theory useful as it explains the main deterrence to financial inclusion. The main culprit identified by the theory is high transaction costs in terms of fees and high interest rates. The theory links interest rate spread with financial inclusion, and it demonstrates an inverse relationship between the two variables. The theory thus is suitable for discussing the results obtained in the study and informing policy recommendations.

2.2.3 Financial Intermediation Theory

Discussions around Financial Intermediation Theory were first put forward by Raymond Goldsmith in 1969. The theory opines that during the economic transitioning phase of a country, financial systems grow disproportionately to the wealth of a country, it is much faster than wealth. This is indicative that the size of financial systems is dependent upon the saving and investments from different economic players. Financial intermediation brings about creditors and savers together and their interaction is what makes the financial systems work. Any distortions, in both savings and borrowing is likely to crumble the financial system (Ndebbio, 2004).

The theory has attracted several proponents among them being Diamond (1984) who argues that banks have the ability carry out monitoring of borrowers. Whenever they feel that there are uncertainties in the market, or they perceive the borrowers to be risky ones they may end up increasing lending charges. Aduda and Kalunda (2012) aver that the banks as intermediaries have a role of providing secondary financial assets whilst they purchase primary financial assets. If intermediary fails to offer these services, there is a likelihood of investors to bypass the intermediaries and purchase the primary services directly. This brings about friction such

as transaction costs and information asymmetry in the financial market. It makes the financial intermediaries charge higher interests leading to financial exclusion of many customers and ultimately poverty trap. Kvangraven and Dos Santos (2016) contend that financial institutions need to work around the friction issue to foster inclusivity.

The theory is relevant to this study in that it tries to bring out the factors within the financial markets that bring about frictions in the market and hence inequalities in financial access. The theory explains that information asymmetry, high transaction costs in this case interest rate are likely to exclude a greater part of the population from accessing and using the services. Some of the proponents of the theory have also prescribed solutions to remedy the consequences of financial friction on financial inclusion.

2.3 Determinants of Financial Inclusion

2.3.1 Financial Inclusion

This refers to the incorporation of the wider unbanked section of the populace into the formal financial services. It takes the form of effective access to various financial products and services offered by the institutions and facilitates individuals to carry out transactions such as savings, advances and other transactions. Financial inclusion is achieved when every adult in the working group has access to these services (Demirguç-Kunt & Klapper, 2012). Several dimensions have been proposed to measure financial inclusion. Access is the first element, and it is defined as capability to utilize the available financial services from formal financial providers. Usage is the second element. It refers to the intensity and longevity of use of financial services. Quality is the third element, and it denotes the relevance of financial services in addressing the needs of the customer. Impact is the fourth element, and it refers to the observable and non-observable changes in the consumption of financial services as a result of

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usage and access (Singh, 2017). The data for financial access will be sourced form finance surveys and commercial banks websites.

2.3.2 Interest Rate spread

It is the gap between the lending rate charged to borrowers and the deposit rate offered to those who have excess money that has been deposited in banks, which embodies a financial provider's financial margins and the financial friction in the general economy. There is empirical evidence that links interest rate spread to financial inclusion. Among these is the study by Saunders and Schumacher (2000) shows that market power of financial intermediaries leads to higher margins that in turn lead to financial exclusion. Were and Wambua (2014) observe that high interest rate spread has deterred low-income consumers from accessing and using some financial services particularly credit. Data for this variable will be obtained from respective banks financial statements and the Kenyan central bank's supervision report.

2.3.3 Operational costs

Financial intermediaries incur various operation cost in their course of providing financial services. Among the operational costs are the overhead costs which include outreach costs while providing services, processing costs involved in sanctioning loans, the expenses related to acquisition of money from the central banks, and the day-to day management of office and branches (Kasekende, Rubatsimbira, & Ntungire, 2020). These costs are often times passed on to consumers and thereby increasing interest rates spread. One main flow of the overhead cost is that it generates fixed costs which creates an entry barrier to many consumers. Data for this variable will be obtained from the respective bank's financial statements.

2.3.4 Non-performing loans

This refers to unpaid credits for a period of more than 90 days (Wanjala & Gachanja, 2020). These loans are also known as bad-debts and banks have to set a provision for bad debts. Sometimes the debt can be written-off. This provision is often associated with uncertainty and risks in the financial markets. To ensure that they are breakeven, they always charge a cost of non-performing loans which is passed to borrowers as interest rate. The more the frequency of NPLs the higher the rate charged (Khaduli, 2021). Data for Non-performing loans will be sourced from the Banks website.

2.3.5 Liquidity Ratio

Liquidity of a bank is another aspect that is relevant to understanding the differences in lenders and depositors interest rates. It is a measure of risk, and one of the foundations that inform and mirror a banks success and profitability. Bank's liquidity is defined in terms of the short-term liabilities or the liquid assets available this is a critical aspect while considering the returns gained through assets as well as the profit to capital total ratio. Banks with higher liquidity ratio have been shown to have lower interest rate spread compared to their counterparts. (Were & Wambua, 2014). Data will be obtained from Banks' financial statements.

2.4 Empirical literature

2.4.1 Global Studies

Khalily (2017) analyzed the effect of government regulation on credit access in Bangladesh. The study used a mixed method approach to unravel how low interest rate brought about by interest cap regulation by the government of Bangladesh had affected financial inclusion. The study findings revealed that the move resulted in less that proportionate increase in credit access. The study had observed that commercial banks were shying away from granting loans to smaller enterprises and low-income households as they perceived them as high-risk

borrowers. The study concluded that access alone is not enough to guarantee financial access because banks are not necessarily designed to create opportunities for all those that need their services. They therefore recommended that government need to create opportunities for investment and even guarantee Small and Micro enterprises to influence inclusion. They also emphasized on the need for government regulations that compels banks to maintain proper risk management policies without the need to pursue non-competitive and non-inclusive methods. This study deviates from the current study because it looks at the reduced interest spread through the lens of government regulation that is, the interest rate cap. The point of departure in the latter is that it specifically focuses on how financial inclusion can be achieved through reducing interest spread by market mechanisms.

Cúrdia and Woodford (2018) on the nexus between credit friction and financial inclusion. The study mainly used systematic review methodology in meeting its objective. Their study asserted that a well-functioning economic system is one that extends affordable credit to every member of the community. Credit should be within reach particularly to the vulnerable and under-served populations. Conversely, failure to provide credit access will not only lead to financial exclusion but it is also detrimental to the larger economy. The study recommends that cheaper credit access is imperative, and failure to which can be considered a feature of financial exclusion, in the same fashion as being excluded in the basic banking services. The study reiterates that borrowing is inevitable, and it is easier for many households to purchase commodities and assets on loans rather than savings. It is also considered as a last resort during tough economic times that households face. The study mainly relied on qualitative analysis that can be susceptible to researchers' bias and therefore inferences cannot be fully drawn from the study.

Alber (2019) examined the variables influencing financial inclusion in 125 jurisdictions worldwide covering a 13-year period. In measuring financial inclusion, the study decomposed

it into Automated Teller Machine (ATM) ownership and deposit in commercial banks. The explanatory variables were inflation, Gross domestic products (GDP) and interest rate spread. The study used Generalized Methods of Moment (GMM) for estimation. Findings of the study revealed that interest rate spread has a negative effect on ATM ownership and bank deposits across the countries. One shortcoming of this study stems from the computation of financial inclusion that was disaggregated into ATM ownership and commercial bank deposit which mainly fall under the usage dimension respectively. The current study will address this weakness by creating composite score for the two measurements of financial inclusion namely, access and usage.

Moraes, Camilo and Gargalhone (2021) carried out a study on the nexus between interest rate spread and financial access on 68 countries and between 2006 and 2015. Financial access was measured using availability of ATMs per 1000 population and Bank Branches per 1000 people. The study used Systems Generalized methods of moments and Ordinary Least Square (OLS). The study established that bank branches and ATM networks had a negative effect on the net gap or spread in the sampled countries. The interest rate spread reduced significantly in countries with more ATM networks. The justification given is that as banks compete for customer numbers and customer deposits by extensively growing their physical network through increased number of branches and financial services accessibility, the ripple effect subsequently leading to an increase of the resources transferred into the financial system, leading to increased efficiency. Developed countries had reduced interest spread compared to developing countries. One limiting factor of the study is that it only concentrated the center of attention on financial access, which is one of the components of financial inclusion. Secondly, the study only pivoted on unilateral causality from financial access to interest rate spread. The current study seeks the reverse causality that is from interest rate spread to financial inclusion.

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2.4.2 Local Studies

Were and Wambua (2014) conducted a panel study of Kenyan banks to investigate the factors that caused interest rate gap or spread. The study undertook an exploratory analysis to show trends of interest rate spread. It also used regression analysis to investigate the factors affecting interest rate spread. The study used panel data analysis on data spanning between 2002 and 2011 on 31 banks. Among the variables used as explanatory variables included operating costs, liquidity risks, return on asset, market concentration and macroeconomic banks. The study found that large financial institutions such as banks have higher interest rate spread in comparison to their medium and smaller banks, which contradicts the A priori that asserts that larger banks have proper checks that can deter risks and thereby charge fare interest rates. The study obtained positive and significant coefficients for NPL ratio and operating costs and a negative coefficient for liquidity ratio.

Wokabi and Fatoki (2019) analyzed the determinants of financial inclusion in East Africa. The study adopted a panel approach on data spanning from 2000 to 2016. The study adopted a macroeconomic approach and had conjectured that interest rate, GDP and unemployment as primary contributors of financial inclusion. The results and findings of the study proved that interest rate was inversely related to financial inclusion and concluded that it had a negative impact on financial inclusion. The weakness of this study is its usage of advances to private sector as a proxy to financial inclusion. These only measures one aspect of financial inclusion in addition it could have used the ratio of access to credit over the total population to get the proportion of financial access which it did not.

Jefferis et al., (2020) investigated the factors influencing the interest rate spread in Uganda. The study considered the macroeconomic market and bank-specific determinants of interest rate spread. The study adopted a system GMM approach in the empirical investigation. The study findings was that interest rate spread was significantly and positively influenced by

overhead costs. The study had also hypothesized that NPL would have a positive effect on interest rate spread however the results obtained were insignificant. These findings were conflicting compared to previous studies and dealership theory that postulates a significant effect of NPL.

Wabwire (2020) investigated the determinants of financial inclusion and their interactions in influencing utilization of financial services among small scale traders in the agricultural sector such as farmers. Among the determinants included are interest rate, technological factors and financial literacy. The study was done on a sample of 560 smallholder farmers across the counties of Kirinyaga, Busia and Nakuru in Kenya. Through the use of multinomial logit regression, the study established that interest rate affected financial inclusion negatively. This study only focused on small holder farmers who are only a fraction of the population. The current study focuses on the aggregate population.

2.5 Conceptual Framework

A conceptual framework is a pictorial depiction of the constructs used in a study and how they interact with each other to answer the study questions. Following the arguments presented in section 2.4, this study conceptualizes that interest rate spread is determined by a mix of bank-specific factors. The bank specific factors include operational cost, bank size, liquidity ratio, NPLs. Further the study hypothesizes that interest rate spread is negatively related with financial inclusion. The conceptual framework in presented in Figure 2.1
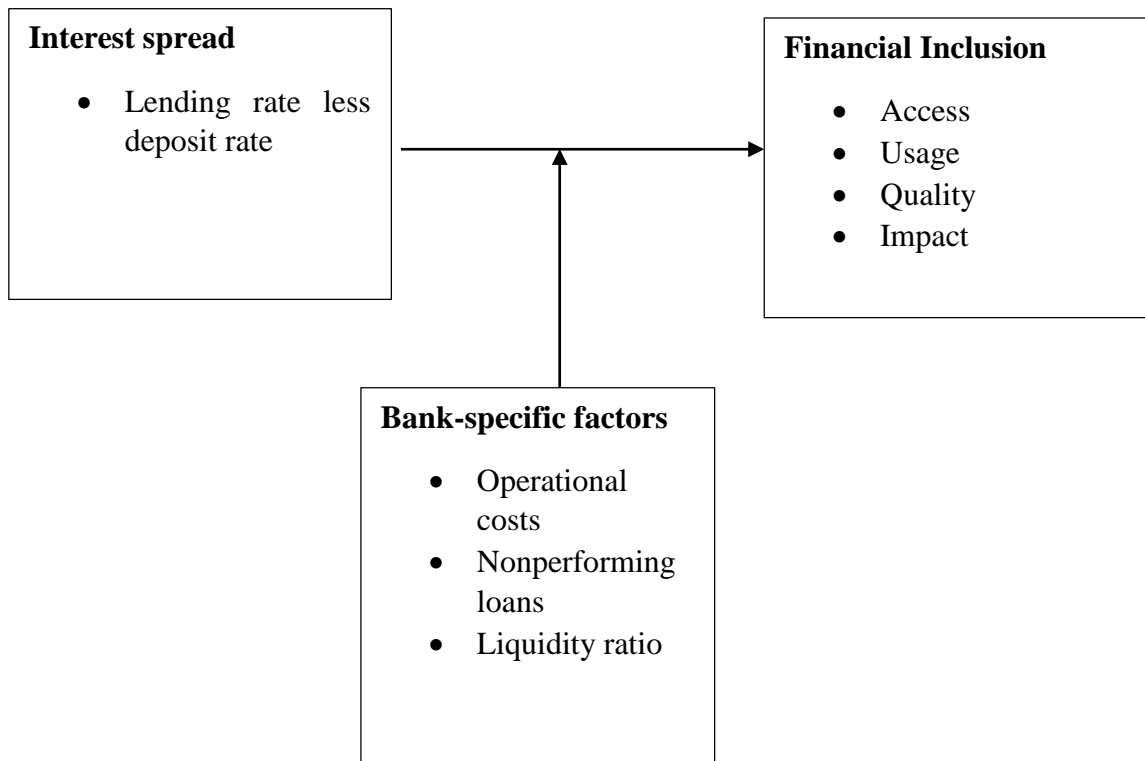
Figure 2.1: Conceptual Model

2.6 Summary of Literature Review

This section generally contained previous works that have been advanced towards the nexus between interest rate spread and financial inclusion. The dealership theory details the determinants of interest rate spread. Public goods theory of financial inclusion explains the nexus between interest rate spread and financial inclusion. The chapter moves ahead to present several empirical findings that have been done in the areas. However, from the review several gaps are identified that prompts the researcher to pursue this study. For one, there were methodological gaps. Cúrdia, and Woodford (2018), used content analysis which is a quantitative technique and susceptible to researcher's bias. Were and Wambua (2014)

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established discordant results from the a priori on the nexus between interest rate spread and financial inclusion. Further the study presents the factors determining financial inclusion and portrays a diagrammatic presentation of interest rate spread and financial inclusion nexus in the EAC.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodological approaches used to carry out the research. It begins with the research design section, followed by the population selection then sampling technique used. The third section explains the sources of data while the fourth section presents the analytical framework of the study. The chapter concludes with the test of significance.

3.2 Research Design

A research design is the road map that steers the direction of a research. It acts as a blueprint that guides the researcher in what methodology to use and how to measure the data (Akhtar, 2016). It is a critical stage of the research as it provides an account of the cradle to the conclusion stage of a research project, which is an important element in validating the research (Denscombe, 2011). This study used descriptive research design. This is scientific approach that entails observing and describing the behavior of a subject without influencing it in any way (Mohajan, 2018). The design helps in answering the study questions owing to its versatility. It allows the use of various analytical frameworks such as empirical and descriptive statistics. It also opens to different types of presentation of findings such as graphs, tables and statements.

3.3 Population

Lavrakas (2008) explains that population is the unit of observation in which a study sample is derived from. The population of the study serves to inform the inclusion criteria of the study subject. They contend that there is need for proper identification of the population to guarantee a shared experience, perceptions and geographical location among the subjects under study. In

light of this, the area of the study is the EAC. I will however use data from Kenya, Uganda and Tanzania as the three countries share a number of policies therefore making them easier to compare and they also have a number of Banks operating across all the three countries. Countries such as Rwanda, Burundi and Congo have a lot of their data in French which will be a limiting factor. South Sudan on the other hand just started as a country, and the Central Bank (The Bank of South Sudan) is only 10 years old, and therefore may not have put policies in place that could affect the interest rate spread. The commercial banks that have branches or subsidiaries in all the three countries are the unit of analysis in the study. As of May 2022, there were 14 commercial banks licensed to operate in Kenya, Uganda and Tanzania under the same trade name either as subsidiaries, branches or joint ventures. This makes the 14 banks population of the study. Since study is focused on interest rate spread and financial inclusion and owing to the small population of 14 banks, the study will adopt a census approach and all the 14 banks were included in this study. This makes the entire population the sample of the study.

3.4 Data Collection

The scope of the study is Kenya, Uganda and Tanzania and the study targets 14 commercial banks that operate across the three East African Countries. The data period spans from the years 2012 to 2021, the choice of this period is largely informed by data availability. This gives the study a data point of 140 which is critical for statistical power (Kothari, 2019). The study obtained data from various sources. Firstly, financial inclusion data which is the dependent variables of the study was obtained from the annual commercial banks' financial statements. The data for the rest of the variables namely interest rate spread, liquidity ratio, operation cost, and non-performing loans were also sourced from commercial banks annual reports. Details of measurement of variables is contained in Table 3.1.

Table 3.1: Variable measurement, Source and expected sign

Variable	Measurement	Expected sign and argument	Source
Financial Inclusion	Access- the number of deposit accounts Usage- Value of loans advanced Financial inclusion by the log of the ratio of loans advanced to deposit accounts	Dependent variable	Financial access survey, Commercial bank statements
Interest rate spread	Lender's interest rate - deposit interest rate	(-) high interest rate spread is likely to lock out low-income customers from financial services	Commercial bank statement
Non-performing loans	Unrepaid loans exceeding 3 months.	(+) Risk of default on credit compels banks to charge an implicit risk premium in their interest rates	Commercial bank statement
Operation cost	Overhead costs and outreach costs borne by banks in their daily operations	(+) Banks operating with higher costs are likely to charge higher interest rates to cover the cost	Commercial bank statement

Liquidity ratio	Ratio of current assets to liability	(-) It demonstrates the ability of a bank to convert assets to cash	Commercial bank statement

Source: Author's computation

3.5 Diagnostic Tests

The research carried out various diagnostic test to ascertain that the model does not go against the ordinary least squares assumptions (OLS) rendering the results inconsistent and inefficient. This is critical for robustness and credibility of results. These checks include normality, unit root, autocorrelation, and stability tests. The same are expounded on below.

3.5.1 Linearity Test

The overall model fit test was utilized to confirm that a linear relationship exists amid the regressor and the regressed variables. The test derives both linearity and nonlinear components of the variables. The F values will help determine this, if the F value for the non-linear component is below 0.05 then nonlinearity is significant.

3.5.2 Normality Test

For linear regression whole variables are expected to be multivariate normal. Tests for normality will be conducted through Shapiro wilk test tests which involves comparing a sample with a probability distribution. Log transformation will come in handy in the adjustment of data that are not normally distributed.

3.5.3 Autocorrelation Test

Autocorrelation is the test for successive association between two error terms. Econometrics assumptions require minimal or absence of autocorrelation in linear regression analysis. The Allerano-Bond test was used analyze autocorrelation in the data.

3.5.4 Model Specification

This study used Sargan test and Hansen test for over identification to check for model specification. The test is suitable for checking whether the model is underspecified or over specified.

3.6 Data Analysis

Two stage least squares was used to estimate the study. Two stage least squares is an augmentation of Ordinary Least Square technique. It is used when there is a set of structural equations, especially in situations where the outcome variable and error term are correlated. In addition, it is particularly helpful in the case of presence of feedback loop in the model (Greene, 2018). Therefore, for this reason the model was found suitable for the analysis. The first objective of the study was to determine the factors that determine interest rate spread. In this case these variables namely operational cost, liquidity ratio and NPLs were regressed against interest rate spread. This analysis formed the first part of the structural equation/feedback loop. The second objective aims to analyses the effect of interest rate spread on financial inclusion, in this regard, interest rate spread that was previously the dependent variable now became independent variable in this model.

Since the data was of panel nature, the Generalized methods of moment which is the panel model variation of cross sectional 2 stage least square was used. The model was specified as follows:

We first consider an ordinary least square given in the form:

$$Y = x\beta + \mu \ldots \ldots \ldots 3.1$$

And the model suffers from endogeneity problem that is, independent variables are correlated with the error term.

$$E[X|\mu] = Cov(X'\mu) \neq 0 \ldots \ldots \ldots 3.2$$

This renders the estimates obtained by OLS biased.

$$b = \beta + (x'\mu)^{-1}x'\mu, E(b) \neq \beta \ldots \ldots 3.3$$

Thus, the equation 3.8 is re-written in form of a structural equation:

$$y_1 = y_2'\beta_1 + x_1'\beta_2 + \mu \ldots \ldots \ldots 3.4$$

Where:

y_1 is the dependent variable in this case, financial inclusion

y_2 is endogenous variables in this case, interest rate spread

X_1 is exogenous variables that is operational cost, liquidity ratio, NPLs, inflation and GDP.

The structural equation uses a combined set of the exogenous and endogenous variables that is $X = [y_2, X_1]$. In this regard we need to find instruments $z = [X_1, X_2]$ where X_1 is instrument for itself and X_2 is instrument for y_2.

The two staged least approach replaces the endogenous variable with predicted values of this endogenous variable when regressed on instruments.

The first stage regresses the endogenous variables on the exogenous variables.

$$y_2 = x_1'y_1 + x_2'y_2 + e \ldots \ldots \ldots 3.5$$

We then Compute the predicted values $\hat{y}_2$ and substitute them in the structural equation model.

$$y_1 = \hat{y}_2' \beta_1 + x_1' \beta_2 + \mu \ldots\ldots\ldots 3.6$$

3.7 Test of Significance

The study adopted empirical methods which are mainly characterized by hypothesis testing. In this respect, the study adopted the 90% confidence interval as the threshold for rejecting the null hypothesis. This translates to 10% level of significance.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings and results of the study analyzed using descriptive approach and empirical approach. Data is presentation is tabulated. It begins with a summary of the statistics which sets the foundation of how the data was analyzed. It further analyses the possible correlation between the variables. This is followed by pre-estimation diagnostics which are important in informing the choice of estimation approach and the possible shortcomings in data and finally it ends by presenting regression results, their interpretations and discussion in connection to previous studies.

4.2 Descriptive Statistics

Descriptive statistics forms the inception point of analysis. It is important in the fact that it enables the researcher and readers of the research to get the feel of the variables prior to delving into empirical analysis. The main significance of descriptive statistics is that it provides a summary of the statistics which is crucial in the identification of possible outliers and detection of any general errors within the dataset. This informs the researcher about the course of action to be undertaken (Kothari, 2014). This study uses measures of central tendency and dispersion to provide a summary of the statistical results of the variables in the study. The outcome is tabulated in Table 4.2 displayed below.

Table 4.2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Average loan per borrower	140	7379313.6	18373278	7250	2.091e+08
Depositors	140	1386462	3334176	1000	16000000
Financial inclusion index	140	14.667	1.803	10.397	19.158
Interest rate spread	140	8.72	3.191	3.98	18.33
Operation cost	140	21523.429	31884.43	689	180379.6
NPL	138	12308.357	13054.179	35	84499
Liquidity ratio	140	50.161	13.358	29	84.5

Source: Author's computation

Table 4.1 shows summary statistics in by giving the values of the number of observations, the minimum figure, maximum figure, mean and the standard deviation,. There are a total of 140 observations which represents the total population that is the 14 banks sampled and the years of the study from 2012 to 2021. Individual bank's data was obtained from ten year-to-year financial statements for the period under study. Data collection sheet is presented as appendix I.

Financial inclusion index was calculated as a log of average loan per depositor and number of depositors as proposed by Ardic et al., (2012). Following this the paper presents the summary

for the components of financial inclusion as well as the index itself. Beginning with average loan per borrower, the study established that the mean is equivalent to Ksh 7,379,313.00 for the ten year period under study. The standard deviation of equivalent to Ksh 18,373,278.00 for the same data under study which is higher compared to the mean a factor that can be explained by the differences in sizes of banks where some offer higher loans compared to others. The maximum loan per borrower value is equivalent to Ksh 209 million while the least is equivalent to Ksh 72500.

Moving to the number of depositors, the mean is 1,386,462 with a standard deviation of 3,334,176 which is also higher than the mean. The minimum number of depositors is 1000 while the maximum is 16 million. Financial inclusion index resulted to a standard deviation of 1.803, a mean of 14.67, portraying a maximum value of 19.15 and 10.39 minimum value.

Proceeding to the independent variables and instruments, Interest rate spread portrayed a mean of 8.72 percent and a standard deviation of 3.191 percent. The minimum spread was 3.98 while the highest spread was 18.33 percent. The mean for operation cost for the 14 banks in 10 years was equivalent to Ksh. 21.523 billion with a mean equivalent to Ksh 31.884 billion. The minimum cost was equivalent to Ksh 689 million while the maximum was equivalent to Ksh 180 billion. Non-performing loans portrayed a mean of equivalent to Ksh 12.3 billion with a standard deviation of equivalent to Ksh 13.05 billion. The lowest recorded NPL was equivalent to Ksh 35 million while the maximum was equivalent to Ksh 84.4 billion. Finally, liquidity ratio averaged 50.161 percent for the period under study with a standard deviation of 13.358 percent. The lowest recorded liquidity ratio was 29 percent while the highest was 84.5 percent.

4.3 Pre-estimation Tests

The section presents findings for pre-estimation diagnostic test used in the study. These tests are critical in ensuring robustness of the data and the sound empirical results.

4.3.1 Normality of Data

The first pre-estimation test conducted is the normality distribution of data. This test is essential in guiding the researcher about the kind of empirical tests that they would adopt that is it informs a choice between parametric and non-parametric tests. For this purpose, the study used Shapiro-Wilk test for normality. The results of the test are tabulated in Table 4.3 below.

Table 4.3: Shapiro Wilk test for normal data

Variable	Obs	W	V	z	Prob>z
Financial inclusion index	140	0.316	75.02	9.753	0.000
Interest rate spread	140	0.932	7.478	4.545	0.000
NPL	138	0.92	8.616	4.861	0.000
Operation Cost	140	0.966	3.736	2.977	0.001
Liquidity ratio	140	0.971	3.168	2.605	0.005

Source: Author's computation

From Table 4.3 Shapiro Wilk Test was applied while measuring the normality of the data. The null hypothesis of the test states that the variable is normally distributed. Referring to the probability values in the Table, we reject the null hypothesis in all the variables and conclude that data is not normally distributed because (P-value < 0.05). This therefore led to transformation of the data to logarithms to normalize them (Greene, 2018).

4.3.2 Unit-root Test

Time series data is likely to suffer from non-stationary problems which infers that the mean and variance of the data did not remain constant over time. The implication of this is that the

results obtained may not be making sense leading to wrong inferences and non-credible results. The study used the Im Pesaran and Shin (2003) approach to check for presence of unit root in the data. The method is suitable for balanced panels.

Table 4.4: Panel unit root test

Variable	Statistic	In Levels	P-Value	First Difference	P-value	Intergration order
Financial Inclusion	t-bar t-tilde-bar Z-t-tilde-bar	- 3.3925 - 1.6726 - 2.0663	0.0194	-	-	I (0)
Interest rate spread	t-bar t-tilde-bar Z-t-tilde-bar	-1.332 -1.080 -1.005	0.8428	-2.5864 -1.8932 -3.3459	0.004	I (1)
LnNPL	t-bar t-tilde-bar Z-t-tilde-bar	- 2.5375 - 2.5093 - 1.0971	0.0453	-	-	I (0)
LnOperation	t-bar t-tilde-bar Z-t-tilde-bar	- 4.3516	0.3526	-39.7626 -2.0109 -3.9530	0.000	I (1)

		- 1.3470 - 0.3784				
LnLiquidity	t-bar t-tilde-bar Z-t-tilde-bar	-1.1 -1.874 - 3.1113	0.0009	-	-	I (0)

Source: Author's Computation

From the findings presented in table 4.4 above, financial inclusion, non-performing loans and liquidity are stationary in levels meaning that they lack the unit root. They are thus integrated of order zero. Alternatively, operations costs and interest rate spread are found to contain unit root, but become stationary after the first difference therefore integrated to order one. GMM estimation requires variables to be either integrated of order one or zero, all the variables in the study have met this condition. However, since some variables were not stationary there is a need to run two systems GMM with levels and at first difference (Roodman, 2009).

4.4 Correlation Analysis

Correlation is the measure of the linear relationship between two or more variables whose coefficient ranges from -1 to 1 on both the two extreme ends. Those that approach 1 in absolute terms signify strong association between the variables while those below 0.5 denote a weak correlation. The correlation results are displayed in Table 4.5

Table 4.5: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)
(1) Financial inclusion	1.000				
(2) ln_spread	0.049	1.000			
	(0.566)				
(3) lnNPL	-0.151	-0.104	1.000		
	(0.077)	(0.225)			
(4) ln_operations	-0.111	0.044	0.546	1.000	
	(0.190)	(0.606)	(0.000)		
(5) ln_liquidity	0.178	-0.184	0.032	-0.045	1.000
	(0.036)	(0.029)	(0.708)	(0.598)	

Values in Parenthesis are the P-values

From the Table 4.5, interest spread had a positive but weak correlation with financial inclusion $(r = 0.049)$. These findings are against the apriori and vast literature, on the plus side however, it is not statistically significant at any level. One assumption that this study has made is that interest rate is an endogenous variable that is explained by other factors such as NPLs, operation costs and liquidity ratio. This aspect could explain the results and therefore, further investigation through an appropriate regression technique is required in this respect. Financial inclusion and Liquidity ratio are positively correlated $(r = 0.178, \text{p-value} = 0.036)$ whilst NPL and financial inclusion are negatively correlated $(r = -0.151, \text{p-value} = 0.077)$. The study also finds liquidity ratio to be negatively associated with interest rate spread $(r = -0.184, \text{p-value} = 0.029)$.

4.5 Regression Analysis

Vast empirical findings have pointed out that there are factors that affect interest rate spread notable among them being, operation costs, the extent of NPLs and liquidity of banks. To this end, it makes interest rate spread endogenous as it is brought about by other factors. In the attempt to find out the impact of interest rate spread on financial inclusion among banks, the study took cognizant of this, and treated interest rate spread as endogenous. This meant that a suitable regression method had to be applied, in this case GMM which is a modified two stage least squares for panel data was used. It is a two-stage approach with the first part representing the determinants of interest rate spread. The second part, uses predicted values of interest rate spread obtained from the first equation as the independent variable that is regressed against financial inclusion. Results of the first stage regression are tabulated in Table 4.6 below.

Table 4.6: Regression results for the first stage

ln_spread	Coef.	St.Err.	t	p-value	[95% Conf	Interval]	Sig
lnNPL	0.034	.013	2.55	0.011	.006	.08	**
ln_operations	0.02	.019	1.07	0.285	-.017	.057	
ln_liquidity	-0.124	.071	-1.76	0.079	-.262	.014	*
Constant	3.316	.312	10.62	0.00	2.704	3.928	***
Mean dependent var		2.729	SD dependent var			0.194	
Overall r-squared		0.47	Number of obs			140	
Chi-square		10.745	Prob > chi2			0.013	

*** p<.01, ** p<.05, * p<.1*

From Table 4.6, log of interest rate spread was the dependent variable as the study had hypothesized that it is affected by operation cost, liquidity rate and non-performing loan. From the results the chi-square of the model is 10.745 and p-value is 0.013 which denotes a 5 percent level of significance depicting that overall this model is significant compared to another model that does not contain any of the variables included in the model. R-squared which is the coefficient of determination falls as 0.47 meaning that 47 percent of the variation I of the model can be explained by the variables.

The second or following step of the regression analysis results are tabulated in Table 4.7. The model uses the predicted value of interest rate spread obtained from the first regression as the independent variable in modeling interest rate spread and financial inclusion nexus. In addition, year's dummy and first lag of financial inclusion is included as explanatory variable (Bundell & Bond, 1998). Finally, operation cost, liquidity rate and non-performing loan are used as instruments.

Table 4.7: Second stage regression results

ln_inclusion	Coef.	Robust St.Err.	t	p-value	[95% Conf	Interval]	Sig
L.Inclusion	0.65	.239	2.72	0.018	.133	1.166	**
lnspread	-3.826	.787	-4.86	0.000	-5.527	-2.125	***
Yr2013	2.452	1.02	2.40	0.032	.249	4.655	**
Yr2014	2.462	1.442	1.71	0.111	-.653	5.578	
Yr2015	3.952	1.395	2.83	0.014	.939	6.966	**
Yr2016	4.317	2.16	2.00	0.067	-.349	8.983	*

Yr2017	3.958	1.976	2.00	0.066	-.31	8.226	*
Yr2018	-1.682	1.593	-1.06	0.31	-5.123	1.759	
Yr2019	-1.019	.386	-2.64	0.02	-1.854	-.185	**
Yr2021	.988	.243	4.06	0.001	.462	1.513	***
Constant	21.332	17.322	1.23	0.24	-16.09	58.754	

Mean dependent var	14.652	SD dependent var	1.786
Number of obs	124	F-test	3.492
Prob > F	0.019	Number of instruments	8

*** p<.01, ** p<.05, * p<.1

From the findings presented in Table 4.7 it is noted that the number of instruments is less than the number of observations in terms of period under research (8 < 10). This indicates that the model is a good model. It depicts an F-statistics of 3.492 and a P-value of 0.019 indicating an adequate model. Year dummies are included as independent variables. The base year in the model was 2012. From the results, year 2020 was excluded due to multicollinearity. The coefficient for year dummies are plotted and displayed in Figure 4.1 to show the trend of financial inclusion over the study period.
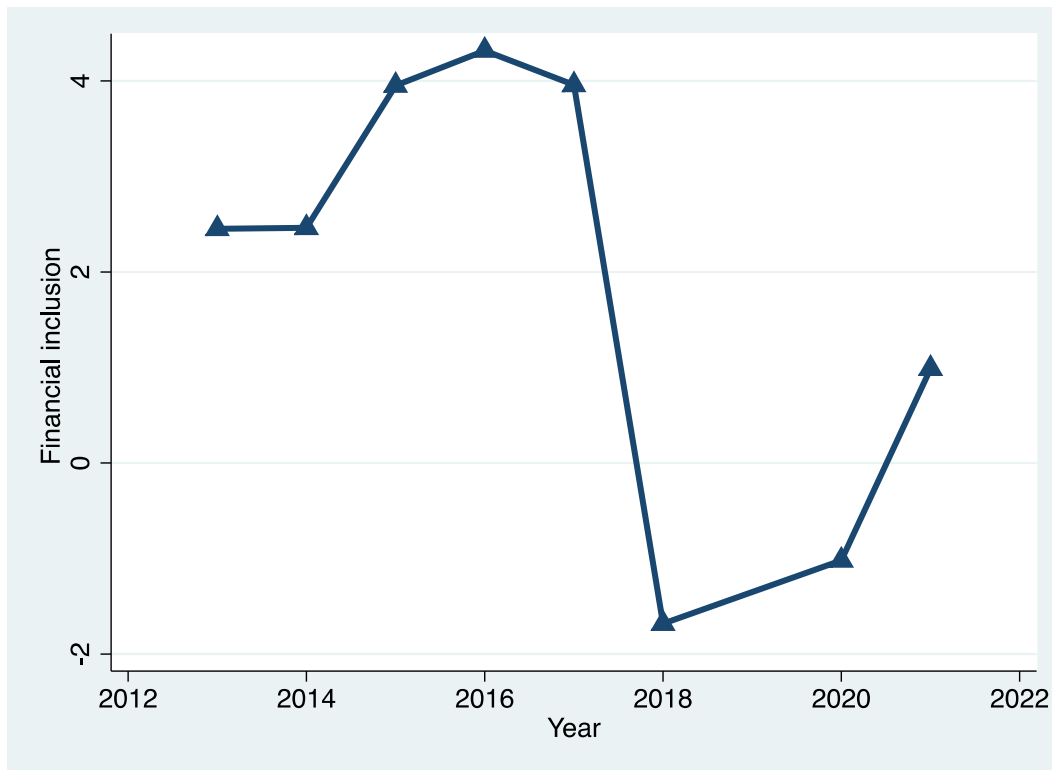
Figure 4.1: Generalized Methods of Moments Plots for Year Dummies.

The findings show that financial inclusion has been fluctuating over the years relative to the base year 2012. It started off on a higher note with 2.452 percentage points higher in 2013 compared to 2012. It increased gradually to a peak in 2016 with 4.317 percentage points higher than in 2012. However, financial inclusion started to decline in 2017 and recorded lowest percentage points of -1.682 in 2018. There was steady increase afterwards and closed at 0.988 percentage points in 2021 relative to 2012.

4.6 Interpretation and Discussion of Results

From the first part of the model, the research study establishes that NPL is positively associated with interest rate spread (β=0.034, p-value=0.011). These results indicate that at 1 percent level a percentage change in NPL is associated with 0.034 percent increase in interest rate spread on average, *ceteris paribus*. Hence interest rate spread and NPL exhibit an inelastic relationship. The results and findings correspond with the ubiquity of literature present. Empirical studies

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have argued that the risk of default on credit compels banks to charge an implicit risk premium in their interest rates. For banks to breakeven when they face uncertainties of non-performing loans in the market, they always tend to charge risk premium which increases the cost of borrowing to loan customers (Khaduli, 2021).

Similar to the expectation, this study establishes a negative association between liquidity ratio and interest rate spread (β=-0.124, p-value=0.079). This implies that at 10 percent level a 1 percent rise in liquidity ratio will lead to a reduction in interest rate spread by 0.124 percent every other factor held constant. The findings are consistent with other empirical works. Liquidity ratio is an important financial ratio to financial institutions. It demonstrates the ease of conversion of current assets to cash. It also a depiction of bank size where larger banks are able to offer cheaper loans due to robust systems of ranking credit scores compared to their smaller counter parts (Were & Wambua, 2014).

Moving to the second model, which is the second stage model. The study obtained positive and statistically significant coefficient for the lag of financial inclusion at 5 percent (β=0.65, p-value=0.018). This implies that at 5 percent level, the lag of financial inclusion for instance in 2021 would lead to a growth in financial accessibility hence financial inclusion in the next year 2022 by 0.65 percent. Interest rate spread has a negative and statistically significant coefficient (β=-3.826, p-value=0.000). This means that a 1 percent level of growth in interest rate spread would lead to a fall of financial inclusion by 3.826 percent and vice versa. The greater than 1 percent coefficient change is a depiction of the high elastic association between financial inclusion and interest rate spread. The study is consistent with the public goods theory of financial inclusion that asserts when the bottlenecks and borrowing costs are reduced the net interest margins will be low and thus foster financial inclusion (Arun & Kamath, 2021). The findings are also in tandem with the various studies conducted around this nexus. Moraes, Camilo and Gargalhone (2021) established that loan access was negatively affected by interest

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rate spread. Similarly, Wokabi and Fatoki (2019) observed an inverse relationship between interest rate spread and financial inclusion.

4.7 Post-estimation Tests

Several tests are normally conducted as part of the post estimation tests to gauge the robustness of the model. GMM estimation however, does not suffer from problems of heteroscedasticity, since the model corrects it through obtaining robust standard errors (Kripfganz, 2019). In this regard, these tests were excluded in the study and only tests that GMM technique is susceptible to were conducted. Among these were autocorrelation test and model specification tests.

4.7.1 Test for Autocorrelation

The most appropriate test for autocorrelation after estimation of GMM is the Allerano and Bond (1991) Autoregressive test for serial correlation. This test is important in the determination of the validity of the instruments which in the case of this study led to failing to reject the null hypothesis and further suggests that the differenced residuals do not show significant AR behavior. The findings after the analysis are tabulated in Table 4.8 below.

Table 4.8: Allerano-Bonds test for autocorrelation

Arellano-Bond test for AR(1) in first differences: z = -2.63 Pr > z = 0.007
Arellano-Bond test for AR(2) in first differences: z = 1.03 Pr > z = 0.305

4.7.2 Test for Model Specification

In the specification test, the study conducted the Hansen (1958) test and Sargan (1982) Tests for over identification. These tests are compatible with the GMM estimation. From the tests it is evident that the model did not suffer from identification and was well specified.

Table 4.9: Specification Test

Sargan test of overid. restrictions: chi2(5)   =   13.85 Prob > chi2 = 0.018   (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(5)   =   1.49 Prob > chi2 = 0.915   (Robust, but weakened by many instruments.)

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATION

5.1 Introduction

This chapter does not only summarize the findings of this study, but also it also provides conclusions of the study and finally the recommendations of this study.

5.2 Summary of Findings

The objective of this study was to examine the nexus between interest rate spread and financial inclusion. To achieve this the study had hypothesized that interest rate spread is an endogenous variable that is influenced by a couple of different bank specific factors such as the widespread level of Non-performing loan that the bank faces, operation costs and the liquidity ratio of the bank which denotes the ability to liquidate its assets in the event it goes under. In light of this the study took this into account and adopted a two stage GMM approach to model the relationship and interactions of the variables.

Before modelling, several analysis and tests had to be carried out to determine the adequacy of the variables, the data and choice between parametric and non-parametric tests. The analysis begun with descriptive analysis to enable the researcher to get the basic foundation of the data. In this regard this meant that simple quantitative and qualitative analysis such as mean, standard deviation, maximum and minimum values were computed. The aim was to identify outliers in the dataset and give possible explanations why they were present and suggest solutions of how they can be solved. Secondly the study went ahead to run some pre-diagnostic tests, among the test included Shapiro wilk test for normality. From this test it was established that none of the variables were normally distributed. To tackle this problem, the study transformed the variables to logarithm in a bid to linearize and normalize them.

The second test conducted as a pre-estimation was panel unit root test to confirm whether the data was stationary or otherwise. Im-pesaran-Shin approach was used in this case because the data was strongly balanced. The study established that financial inclusion, non-performing loans and liquidity were stationary in levels. Alternatively, operations costs and interest rate spread were found to be stationary after the first difference. Since the data were either integrated of order one or zero, this meant that GMM regression was suitable approach and two stage GMM with level and first level instruments had to be conducted.

Further, Pearson's correlation analysis was conducted. It was an important step towards giving a hint about the possible pairwise association between variables. And also checking for potential multicollinearity. The study established that the interest spread had a positive yet weak correlation with financial inclusion (r = 0.049). NPL is negatively correlated with financial inclusion (r= -0.151, p-value = 0.077) whilst Liquidity ratio was found to have a positive correlation with financial inclusion (r = 0.178, p-value = 0.036). The study also found liquidity ratio to be negatively associated with interest rate spread (r = -0.184, p-value = 0.029).

Finally, regression analysis was conducted. In this case GMM was used due to endogeneity within the dataset. From the first stage analysis, this study confirmed that NPL is positively associated with interest rate spread (β=0.034, p-value=0.011). This study also observed a negative association between liquidity ratio and interest rate spread (β=-0.124, p-value=0.079). From the second part of the modeling, the study obtained positive and statistically significant coefficient for the lag of financial inclusion (β=0.65, p-value=0.018). This study also obtained negative and statistically significant coefficient for interest rate spread (β=-3.826, p-value=0.000).

5.3 Conclusion and Recommendations

From the research conducted it can deduced that the objective of the study which was to analyze the effect of interest rate spread in financial inclusion in East African Community has been achieved. The framework of this study had conceptualized that operating cost, Non-performing loans and liquidity ratio as determinants of interest rate spread. This study had also hypothesized that interest rate spread negatively affected financial inclusion. Overall, this study concluded that interest rate spread has a negative effect on financial inclusion. Association between two variables is highly elastic. High interest rate increases the cost of borrowing and to savvy clients they would do away with borrowing. This will also exclude customers in the low-income bracket. This study recommends that, to address the interest rate problem there is need to address the factors that contribute to the rise in the interest rate spread. The next two paragraphs give details of the recommendations.

From the first hypothesis, the study concludes that NPLs have a positive impact on interest rate spread in the EAC. The association between the two variables is inelastic due to the less proportionate change in interest rate spread in response to a percentage change in NPLs. The study however recommends that there is need for East African banks to institute seamless internal risk systems to ascertain the credit worthiness of borrowers. It can be accomplished through adoption of digital technologies across the loan value chain. This will aid in curbing non-performing loans problems that are quite rampant in the banking sectors. Once this is done there will be no point of including implicit risk premium to the interest rate and thereby, interest rate spread will be contained.

Secondly, this study concludes that the ease of conversion of current assets into cash measured by the liquidity ratio has a negative effect on interest rate spread. Similar to the previous conclusion, the liquidity ratio and interest rate spread exhibit an inelastic relationship. This notwithstanding, it is fundamental for banks to strive to increase their liquidity ratios in order

to reduce interest rate spread. This can be achieved through liquidate unneeded assets through disposing them off. This can also be achieved through proper management of overheads. The study concluded that managing the factors that determine the interest rate spread will lead to reduction in interest rate spread and ultimately encourage financial inclusion.

5.4 Limitations of the Study

The newly formed African Continental free trade area is the center of attention in the public policy discourse within the African continent. It is likely to increase cross border transactions across the continent and this implies that banks will need to operate regionally to facilitate the transactions. There will be a need for banks to expand their scope. The study only focused on banks operating within the East African Region, this scope is limited considering the new developments in the continent.

This study utilized secondary data, which was limited by the availability of the data, difference in currency denomination due to lack of a common currency within the EAC and difference in economic environment. Further, the secondary data fails to incorporate the effect of interest rate spread over a short period of time less than one year and over a longer period unlimited period of time.

The study adopted a descriptive research design to describe the relationship between interest rate spread and financial inclusion in the East African community on a 10-year horizon. This was mainly involved by time constraints to collect longer period data

5.5 Suggested Areas of Further Studies

African economies have recently formed the African Continental Free Trade Area that seeks to integrate all the African economies, this study may be be replicated to include the entire African continent countries.

This study relied on secondary data but future study school could make use of both secondary and primary data. Primary data can be collected using a number of methods such as one on one interviews, surveys, interview guides, questionnaires and observation. Incorporating both secondary and primary sources will enhance comparison of finding for meaning decision.

Future researchers ought to use data collected over a shorter period of time which would be more likely ensure a higher number of observations decreasing margin of error unlike in this study where the data used was secondary data collected on an annual basis hence less number of observations.

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APPENDICES

Appendix 1: Population

The population will be all the 14 Commercial Banks Operating in Kenya, Uganda and Tanzania either as subsidiaries as branches or as joint ventures. This includes the following trade names;

1. Absa Bank
2. Bank of Africa
3. Bank of India
4. Bank of Baroda
5. CitiBank
6. Diamond Trust Bank
7. ECO bank Limited
8. Equity Bank Limited
9. Guaranty Trust Bank Limited
10. Investment and Mortgages Bank (I&M)
11. Kenya Commercial Bank
12. Stanbic Bank
13. Standard Chartered Bank Limited
14. United Bank for Africa Kenya Limited

Appendix 2: Data Collection Sheet

Years	Operational Costs	Non-Performing Loans	Liquidity Ratio
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			