EFFECT OF INTEREST RATE CAPPING ON INTEREST EARNINGS AMONG COMMERCIAL BANKS IN KENYA (2013-2018)

BY

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DECLARATION

Declaration by Candidate

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DEDICATION

I dedicate this thesis to my wife Sylvia, Son's; Myles, Nyles and our little daughter Mayah. To you all, strive to trust in God and in your capabilities. May this document be the sparkle that lights your dreams.

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ABSTRACT

Interest rate earnings is one of the critical components in lending decision process of commercial banks. Capping on interest rates have been declining over the past several decades as most developed states and more of upcoming states continue relaxing their fiscal policies. The general objective of this study was to analyse effect of interest rate capping on interest earnings among commercial banks in Kenya. The specific objectives were to analyse the influence of: credit risk, capital adequacy, operation efficiency, and liquidity risk and bank size on interest rate earnings. The study adopted explanatory research design. Panel data was employed using annual data over the period before interest rate, covering 2013-2015, and after capping of interest rate, covering 2016 to 2018. Thirty-eight commercial banks in Kenya in normal operation as at 31st December 2018 were used giving 228 firm observations. Interest rate earnings was informed by Dealership Model. Dynamic Stochastic General Equilibrium modelling-Generalized Method of Moments approach was used in analysis. Results for the period before interest rate capping in Kenya indicated that before interest rate capping in Kenya, coefficients of lagged interest rate and capital adequacy $(p = 0.000 < 0.05)$ and $(p = 0.000 < 0.05)$ respectively, were positive and statistically significant at 5% level of significance. This implied that increasing one unit of previous year's interest rate earnings and capital adequacy had a positive effect of 0.7998 and 0.0197 units respectively. Coefficients of operation efficiency and liquidity risk were negative and significant, $(p = 0.036 < 0.05)$ and $(p = 0.000 < 0.05)$ respectively, at 5% level. This implied that as operation efficiency and liquidity risk increased by one unit, interest rate earnings reduced by 0.0165 units and 0.0375 units respectively. Higher amounts of operating expenses could be associated with higher volume of banking activities and therefore higher revenues necessitating the commercial bank in Kenya to reduce interest rate earnings. Coefficient of liquidity risk indicated that as one unit of liquidity risk increased, interest rate earnings reduced by 0.0375 units which implied that interest rate earnings for commercial banks in Kenya which were highly liquid were associated with lower interest rate earnings. Coefficient of bank size $(p = 0.087 < 0.1)$ was negative and significant at 10% level of significance. For every unit increase in bank size, interest rate earnings reduced by 0.1576 units. Results for the period after interest rate capping was relaxed showed that coefficient of lagged interest rate was $(p = 0.009 < 0.05)$ which implied that increasing one unit of previous year's interest rate earnings had a positive effect of 0.4246 units implying that one unit of the previous interest rate increased interest rate earnings by 0.426 units. Coefficient of capital adequacy was 0.0479 which was positive and significant at 10% level of significance which implied that for every unit coefficient of capital adequacy, interest rate earnings increased by 0.0479 units. Coefficient of bank size was 0.0304 which was negative and significant at 10% level which implied that for every coefficient of bank size, interest rate earnings increased by 0.0479 units. Government could consider relaxing now and in future interest rate capping in order to avoid effect of capital adequacy, operation efficiency, liquidity risk and bank size on interest rate earnings. Commercial banks could improve their operation efficient so that the cost of funds can be reduced leading to improvement of commercial bank performance. Commercial banks be encouraged to expand their market sizes in order to increase collection of deposits and consequently performance.

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ABBREVIATIONS AND ACRONYMS

CBK	Central Bank of Kenya
CBR	Central Bank Rate
ICT	Information Communication and Technology
KYC	Know Your Customer
MPT	Modern Portfolio Theory
ROI	Return on Investment
SWOT	Strength Weakness Opportunities & Threats
TCE	Transaction Cost Economies

OPERATIONAL DEFINITION OF TERMS

Bank is classified as a financial intermediary and has the role of channelling funds from savers to borrowers (Schmidt *et al.,* 2015). In this study, a bank is defined as financial intermediary which offers loans to borrowers and accepts deposits from savers, it further provides payment services.

Bank Size is measured as a ratio of net income to total bank's assets. According to Olowokure *et al*., (2015), bank size is defined in terms of assets, capital, deposits and loans influence the quality of decisions on the activities undertaken by a bank, which in effect, affects the strength of financial performance.

Capital Adequacy refers to the ratio of shareholder's funds to total assets of the bank. This is a decisive measure o how much of shareholders' own funds are at stake in the bank in comparison to the funds accessed through deposits. Capital adequacy is a percentage ratio of an establishment's capital to its assets and it is used as a measure of financial health, performance and stability. A relationship exists between a firm's financial performance and capital adequacy.

Credit Risk is the risk of loss due to a debtor's non-payment of a loan or other line of credit (either the principal or interest (coupon) or both). This was proxied by the ratio of gross non-performing loans to the total loans. An increase in provision for loan losses implies a higher cost of bad debt write offs hence a higher credit risk. The higher this ratio, the more the bank is exposed to loan default risk, and banks would resort to higher margins to cover this risk. This is the probability that customers cannot pay their loans back to banks which leads to significant losses to the financial institutions and affects their cash balance negatively (Subrahmanyam, et al., 2016).

Interest Rate Capping: A capped interest rate is an interest rate that is allowed to fluctuate, but which cannot surpass a stated interest cap, (Maimbo and Henriquez, 2014).

Interest Rate Earnings is defined as the difference between the interest income less interest expense divided by total loan and advances. According to Okoth *et al.* (2013), NIM reflects the cost of banks intermediation services and the efficiency of the bank. The higher the net interest earnings, the higher the profit earned by the bank and the more stable the bank is.

Liquidity Risk: This a risk that a given security or asset cannot be traded quickly enough in the market to prevent a loss (or make the required profit). This was proxied with the ratio between liquid cash and total assets of the bank. This is tendency of the assets to be easily converted into cash. This is the risk of not having enough cash or borrowing capacity to meet deposit withdrawals or new loan demand. Liquidity risk is expected to affect interest rate earnings positively (Angbazo, 1997). Liquidity of the bank means that it can easily convert their assets any time to cash when it needs.

Non-Performing Loans - Credit exposure is consisted of: regular loans, non-performing loans, regular interest, other claims and off-balance sheet items

Operation Efficiency is measured by the ratio of operating expenses to total income. Operating costs are the day-to-day expenses incurred in running a business, such as sales and administration. They are also called operating expenses. Operating costs include both fixed costs and variable costs. Fixed costs, such as overhead, remain the same regardless of the number of products produced; variable costs, such as materials can vary according to how much product is produced or how much work is done.

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter examined the background of the study discussing the banking sector, current interest rate environment and response to monetary policy in Kenya. This section also provides the statement of the problem, objectives and hypotheses of the study. It also defines the scope, significance, assumptions and limitations of the study.

1.2 Background to the Study

Among other common forms of government financial control, caps on interest rates have been declining over the past several decades as most developed states and more of upcoming states continue relaxing their fiscal policies. However, in most states the last financial downturn reintroduced the discourse on interest levy restraints as a means to safeguard customers. Usually, the main role of any banking system is the offering of credit and most of these institutions' resources is created out of such credit (Fungacova *et al.*, 2014). In this regard, interest rate earnings is an important measure of not only bank profitability but also the social cost of financial intermediations. According to Maudos and Guevara (2004), observed that higher interest rate earnings could create increased returns and enhanced stability for the banking sector, especially for a non-well-functioning economy. Interest rate earnings is one of the critical component in the lending decision process of commercial banks. Commercial banks are independent business entities that set their own interest rate earnings based on the central bank base rates. The interest rate earnings is the percentage of the loan amount that is added to the central bank base rate so as to arrive at the interest rate charged on customers who borrow from commercial banks. When banks give funds on credit to clients, levy is assigned on it for a numerous reason, among them being value

preservation, recompense for risk, and returns among others (Sheriff & Amoako, 2014).

The main goal of every banking institution is to operate profitably, commercial banks in any country play an important role in the economy by undertaking intermediation functions. Commercial banking has become a very critical business which has contributed to the furtherance of economic activities around the world. Banking business involves receiving funds from the public and utilizing such funds in whole or in part for granting loans, advances and credit facilities and for investing funds. The intermediation function of a bank is observed in the process of channelling capital from customers with surpluses to those with deficits. By undertaking this intervention role banks gather extra funds from savings and assigns them to those with shortfall in credit (the intermediation function), thus channelling funds from savers to borrowers at a price (charged as interest income, this interest charged sometimes has a ceiling as per the law in a capped environment but we find banks charging clients different rates below the ceiling) these habits makes them competitive in the business environment thereby increasing economic efficiency by promoting a better allocation of resources.

One way in which commercial banks can increase their profit margins is through increasing interest rate earnings and lower deposit rates. Banks do not add low interest rate earnings to the central bank base rate because the revenue from the interest income would not be enough to cover the cost of deposits, general expenses and the loss of revenue from non-performing loan portfolio. On the other hand, they cannot add a high interest rate earnings because they will not be able to keep the banking relationship with the borrowers with high lending rate. As such, identification of the suitable interest rate earnings often is a serious concern in banking. Additionally, the issues that shape the numbers in banking interest rate earnings are vital both for

individual banks and to policy formulators, the banking industry and the public at large.

Moreover, the loanable funds model regards the interest rate earnings as the product of four factors: savings, venture, the desire to hoard money and supply of money. Rational expectation theory have posited that the best estimation for future interest rates is the current spot rate and that changes in interest rates are primarily as a result of uncertain information and or variations in economic aspects (Irungu, 2013).

Asgharpur *et al.* (2016) posited that there was a unidirectional causality relationship between interest rate to economic factors; the findings had practical policy ramifications for deciders in the region of macroeconomic strategizing, specifically in developing countries. The results implied that banks had to reduce interest rate to decrease the negative impacts of the economic factors.

1.2.1 Commercial Banking Industry in Kenya

In Kenya, the banking segment plays a leading function in the fiscal sector, specifically regarding the marshalling of savings and provision of credit. An evaluation of bank levy rate leading to the interest rate earnings is thus important to the apprehension of the fiscal intermediation strategies and the macroeconomic context where banks exist. The Companies Act, the Banking Act, the Central Bank of Kenya Act and the various commonsensical procedures issued by the Central Bank of Kenya (CBK) regulate the Banking industry in Kenya.

According to Central Bank of Kenya (CBK) (2018), the Bank Supervision Report indicated that there were 43 commercial banks operating in Kenya out of which three (Dubai bank Ltd, Chase bank Ltd and Imperial Bank Limited) were in receivership. Two banks, that is, DIB Bank Ltd and Mayfair Bank Ltd, were licensed to commence

operations in April 2017 and June 2017 respectively. This meant that a total of 38 commercial banks were in normal operation in Kenya since 1st January 2013 up to 31st December 2018, the period under study. The Kenyan banking sector fulfils an important function in the economy through its provision of deposit and loan facilities. Kenya had 40 banks and a wide network of financial organisations which provided KES 1.78 trillion in loans as of June 2018. In addition to introducing a range of new services and innovations, such as mobile banking, the largest banks have been rapidly expanding over the last few years, with the Co-operative Bank and equity banks alone growing by over 32 percent (Deloitte Consulting Limited, 2018). The sector appears to exhibit good competitive fundamentals: 38 percent of the market is held by the four largest banks, making it less concentrated than many other banking markets including Tanzania, South Africa and Germany. Since 2004 the largest banks have lost market share, with Barclays' share more than halving. Over this time, challenger banks have grown, with Equity Bank – the most significant – increasing from a negligible share to become the second largest bank in the market, after Kenya Commercial Bank (KCB). Other players have emerged with emergence of mobile money. Equity is the largest bank by branches, CBA bank is currently the biggest by customer numbers having taken over Mpesa customers driven by the popular mobile loans Mshwari.

Profits in the sector appear high in absolute terms, but are much more moderate when measured in proportion to the scale of the banks. Combined banks made over 100 billion in returns in 2018. They have also diversified from the traditional interest's income after interest rate capping came into being in 2016 to more conservative non funded income segments, trade finance, foreign exchanges and insurance. By these measures, they are consistent with the profit levels observed in a range of other Kenyan businesses and regional banks. There is a long-standing political concern in

Kenya regarding the effectiveness of competition in the banking sector and, in particular, a perception that lack of competition is resulting in high lending rates in the country that triggered capping (Finance Act Amendment, 2016). The size of the difference between lending rates and deposit rates (the interest rate spread) was publically called into question. The spreads between deposit and lending rates tend to be larger for large banks, suggesting that this could be a manifestation of market power, which would imply an absence of competition or efficiency in the market. However, also acknowledges that the effect observed for market size is small and may be explained by other market dynamics. As of July 2014, the average lending rate for Kenyan banks stood at 16.91 percent, down from 17.02 percent in 2013 and 20.15 percent in 2012 from 2016 the average has been 13 percent as the law capped the chargeable rate at Central Bank Rate (CBR) plus four. However the plus four varies with different clientele, the margin is the negotiation range. There has also been a slight rise in the deposit rate since 2013, and together these have resulted in a narrowing of the spread. Interest rates charged within this margin are influenced by a wide range of market, economic and competitive factors. The purpose of this thesis was to examine the way that bank specific factors were affecting interest rates spreads within the capped margin in Kenya and identify policy interventions that could increase the affordability of credit in the market.

1.2.2 Functions of Commercial Banks in Kenya

Commercial Banks are generally categorized as a service industry, and their main activities are customer-service oriented. According to CBK (2011), the licensed commercial banks are expected to perform a number of general bank functions. One of the main functions of commercial banks is providing a safe storage for the clients' money. Banks keep the money deposited by customers in vaults. They also undertake

to make the money accessible to customers when the latter need it (CBK, 2012).This is done for customers who have accounts with that bank.

The customer accounts are of various types and include current account, personal account, children account, and saving account, to name a few. Commercial banks also facilitate the movement of finances across various accounts. This service comes in handy, particularly for customers wanting to transfer large sums without moving around with the money. The commercial banks facilitate transfer of funds within and across other banks, locally and internationally. This is very convenient for customers (CBK, 2010).

Another vital role of banks is offering money lending services. The loans banks give are repaid in instalments over a certain period of time that is agreed upon the bank and the borrower during the time of applying for the loan, and they attract interest on the amount borrowed. There are several types of loans, and the rate of interest charged depends on the repayment period and the amount that the customer borrows. Banks also offer financial advice to their customers, for example on the best approach to funding a business start-up (CBK, 2010, 2011).In such cases they provide the customers with the best repayment plan and even business management tips.

Banks offer foreign exchange services which include selling foreign currencies to the customers, exchanging foreign currencies for shillings and selling foreign currency to make cross-border payments. This is called foreign currency dealership. Also, foreign suppliers normally want to know the creditworthiness of local importers before they ship the goods and corresponding local banks provide guarantees in form of letters of credit. Thus, banks act as the collateral for the local trader to secure the deal (CBK 2008). The banks also offer their customers investment services. They do this by

selling and buying shares of listed companies to the customers or for the customers. Other times they sell their own shares to the customers, offering the latter investment opportunities (CBK, 2009).

Banks act as trustees whereby they are authorized to manage the property of a deceased person on behalf of the family so that the inheritance wrangles that normally follow one's death do not destroy the business or estate of the deceased. Banks also keep valuable items for customers. These valuables include: title deeds, expensive jewellery among others (CBK, 2012). Like any other services that they offer, they charge a fee for the safe keeping of valuable items. Banks also offer their customers advice on taxation matters. They guide their customers in preparing tax returns. This is important for customers as it pre-empts defaulting on taxes and the attendant penalties that can kill a business.

Commercial banks engage in activities such as facilitating payments by telegraphic transfer, EFT, POS, Internet banking, issuing bank drafts and bank cheques. Other functions of commercial banks include accepting money on term deposit, lending money by overdraft, instalment loan, and providing documentary and stand-by letters of credit, providing guarantees, performance bonds, securities underwriting commitments and other forms of off-balance sheet exposures (CBK, 2010).Other services include documents and precious items safekeeping, sales, distribution or brokerage, unit trust and similar financial product deals; cash management, merchant banking and private equity financing; underwriting bonds treasury bills and similar credit-related money market securities. However, nowadays most large commercial banks have established a function to handle investment banking (CBK, 2012).

1.2.3 Evaluation of Interest Rate Cap

Interest rate caps, in the form of usury laws, likely represent the longest, and most repeated, government intervention in financial markets. The earliest proponents of usury regulations preferred a levy percentage of zero. Aristotle stated that money was barren and should generate no levies. Governments dating from ancient Egypt through the modern day have imposed interest rate ceilings for a variety of reasons (Smith, 1896).

Glaeser and Scheinkman (1999) noted that usury laws play many roles throughout history and sought to explain why interest rate caps have had a pervasive historical presence. In their formal model, assuming money was available to borrow at the cap rate, interest rate caps were welfare-enhancing because they provided a means for individuals to protect themselves inexpensively against financial uncertainties. In their framework, customers could not self-protect with reserves; as such, they had to solicit from other customers.

Benmelech and Moskowitz (1997) observed that in the eighteenth century, usury laws in Britain mandated a 5 percent interest rate ceiling. The British laws had created the platform for usury regulations in the US. They showed that the maximum legal interest rate by state from the year 1641 to 1891 ranged from 5.73 percent in Virginia to unbounded in California. The maximum legal rate had a median of 8 percent. The higher rate caps legislated in America likely helped to attract investment capital. They concluded that usury laws, when binding, reduced credit and economic activity.

Blitz and Long (1991) stated that legal rate ceilings could reduce the interest rate earnings of personal loan credit to some borrowers, but when ceilings were sufficiently low to affect the observed market rate in a significant way, there was a

substantial lessening on the number of borrowers involved in the legal market. Relatively low risk borrowers who remained in the legal lending market appeared to gain from the lower cost loans made when higher risk potential borrowers were excluded.

Zinman (2004) showed that imposing a binding interest rate cap harmed those with huge credit facilities in commercial banks because of reduction in access to credit increased foreclosures, defaults, and bankruptcies. Further, the results showed that the borrowers were forced to shift into more expensive substitutes for installment credit facilities. A shift into products such as cheque overdrafts and pawn shops worsened the financial conditions of borrowers.

Imposing more regulations on payday lenders would render customers poorer, muzzle competition, and hardly safeguard them from issues of over-indebtedness and high-cost lending. He argued that unintended consequences, such as shifting borrowers into more expensive credit facilities products, could occur because of heavy constraints on end of the month when the salary is being paid to the lenders (Zywicki, 1999).

The monetary and civil justification for putting caps on crediting ratios is to safeguard customers from interest or to render credit affordable and more reachable. Overall, 76 nations globally (over 80% of world GDP and financial resources) implement some control on credit rates. These states are not grouped in specific provinces or income categories, but are strewn across all physical and financial scopes. Of the states with usury rate control, one-third rolled them out to safeguard customers from extortion. This rationale is particularly used by high income countries (Ferrari *et al.*, 2018).

Across the world, interest rate capping has been utilized by some countries. Most states in Africa have put in place interest levy caps to guard customers from excessive

rates charged by micro-creditors. Such controls are mostly the reaction of governments undergoing civil or social tension to reduce levy rates. The overall position is that levy ratios caps reduce the likelihood of some financiers to raise their interest output, particularly in marketplaces coupled with limited transparency, disclosure systems and poor levels of monetary awareness.

Despite good intentions by many African counties, lending levy rate restrictions can in fact harm low-income groups by lowering their reach to finance and reducing price transparency. If controls are reduced drastically, financiers struggle to retrieve costs and tend to develop slowly, lower service offerings to upcountry contexts and other more expensive sections, become less accountable on the full cost of credit, and even abandon the market altogether.

Table 1.1: Use of Interest Rate Caps around the World

Serial No.	Europe and Central Asia	Sub-Sahara Africa	Middle East & North Africa	Asia Pacific	Latin America & Caribbean	North America
1.	Armenia	Benin	Algeria	Australia	Bahamas	Canada
2.	Belgium	Burkina Faso	Egypt, Arab Rep.	Bangladesh	Bolivia	United States
3.	Estonia	Cameroon	Lebanon	Cambodia	Brazil	
4.	Finland	Central African Rep.	Libya	China	Chile	
5.	France	Chad	Malta	India	Colombia	
6.	Germany	Congo, Rep.	Morocco	Indonesia	Ecuador	
7.	Greece	Côte d'Ivoire	Syrian Arab	Japan	El Salvador	
8.	Ireland	Equatorial Guinea	Tunisia	Korea, Rep.	Guatemala	
9.	Italy	Gabon		Lao PDR	Honduras	
10.	Kyrgyz Republic	Guinea Bissau		Myanmar	Jamaica	
11.	Netherlands	Kenya (2016-January 2020)		Nepal	Nicaragua	
12.	Poland	Mali		Philippines	Paraguay	
13.	Portugal	Niger		Sri Lanka	Uruguay	
14.	Russian Federation	Nigeria		Thailand	Venezuela, RB	
15.	Slovak Republic	Senegal		Vietnam		
16.	Slovenia	South Africa				
17.	Spain	Togo				
18.	Switzerland					
19	Turkey					
20.	United Kingdom					

Source: EIU Global Microscope for Financial Inclusion (2018)

In African, there were twenty four countries which had introduced interest rate capping as indicated in Table 1.1.

1.2.4 The Economics of Interest Rate Caps

Friedman (1980) posited that Economists may not know much. But they have mastered a key issue: how to generate excesses and deficiencies. Do you desire an excess? Let the government enact a least price that is higher than that which would otherwise dominate. This is what they undertook at a given period to generate excesses of wheat, of sugar, of butter, of many other merchandises. Do you desire a deficiency? Let the government enact a highest possible price that falls under that which would otherwise dominate. That was seen in New York City and, more currently, other cities have effected for rental residences, which explains why they all faced housing shortfalls. That was why there were various shortfalls during World War II. That was why there was an energy dilemma and a gasoline deficiency.

He indicated that shortage could be created by the government by legislating a maximum price that is below the price that would otherwise prevail. If one wishes to generate a deficiency of tomatoes, for instance, just legislate that sellers cannot give out tomatoes for a price higher than two cents per pound. Instantly you'll have a tomato shortage

1.2.5 Country Descriptions of Interest Rate Caps

According to World Bank (2014), there were 76 countries around the world which were using some form of interest rate caps on loans. Countries like Australia, Canada, and also the United States also cap interest rates. Australia and Canada have interest rate ceilings on payday loans. In Australia, payday lenders face a cap of 4 percent per month and a maximum official fee of 20 percent, while in Canada, payday lenders can

charge up to 60 percent. In the United States, regulations vary across states in both methodology and applicability. For example, state of Arkansas the consumer interest rate is capped at 17 percent. However, in Colorado the interest on consumer loans may not exceed 12 percent unless made by a regulated lender. In the sub-Saharan Africa, usury ratios on credit are currently capped in 24 countries. Those include the eight countries in the West African Monetary Union (WAEMU) (Benin, Burkina Faso, ivory coast , Guinea-Bissau, Niger, Mali, Senegal, and Togo), plus Eritrea, Ethiopia, Ghana, Guinea, Mauritania, Namibia, Nigeria, South Africa, and Sudan. Countries in CEMAC and Zambia use interest rate caps.

Continuing with the trend of introducing interest rate controls in African countries, Economic and Monetary Community of Central Africa (CEMAC) which includes Cameroon, Central African Republic, Chad, the Republic of Congo, Equatorial Guinea, and Gabon – capped interest rates in 2012. The microfinance sector, the ceiling was calculated as the average effective interest rate charged by microfinance institutions during the previous six months plus a margin of 33 percent. In 2013, Zambia introduced interest rate cap on commercial lending at nine percentage points over the policy rate. It had also introduced a ceiling on the annual effective interest rate on loans charged by nonbanking financial institutions (NBFIs). The lending levy rate cap was 42% for NBFIs defined as micro financiers by the Bank of Zambia, while rates charged by other NBFIs were not to exceed 30 percent (World Bank, 2014).

In the Middle East and North Africa, six countries currently apply interest rate controls on loans. Tunisia has had a microcredit law since 1999 that sets a ceiling on interest rates on loans at 5 percent including all commissions and fees. Since the regulation binds only local associations, the ceiling is not imposed on the

multinational NGO, ENDA-IA (Khaled, 2011). In *Malta* interest rates on loans have been fixed since 1868 by the civil code. This law was subject to exceptions; thus, for example, banks were excluded from the ceiling. In Egypt, civil and commercial transactions were subject to a ceiling of 7 percent, while banks could determine their interest rate freely (Allaire *et al.,* 2009). Algeria, Libya, and Syria also control interest rates on loans (Porteous *et al.,* 2010).

1.2.6 Interest Rate Environment in Kenya

While interest rates and spreads above CBR have been controlled in Kenya relative to many developed and developing countries up to January 2020 through an amendment on finance act 2016, section 34 was deleted, removing interest rate capping entirely, literature review and theories suggests that these are largely driven by the economic and not strictly regulatory environment. Commercial banks in Kenya face a high cost of funds relative to developed markets. One key reason for this has been the liquidity shortages arising because of unpredictable government spending and macroeconomic instability. The high yield on government Treasury Bills (cumulated, over 8 percent in August 2014, 19 percent in August 2015 compared to 0.4 percent in the same month in the UK and settling between 9 to 12 percent after capping came into place) also contributes by increasing the cost of funds to banks. These liquidity shortages result in high levels of volatility in the interbank market, which varied between 3.8 percent and 13.2 percent in the three months ending August 2014 compared to fluctuations between 5.3 percent and 5.7 percent in South Africa. (Deloitte Consulting Limited, 2014).

The interbank market is a crucial source of short-term finance for the commercial banks to enable them to manage differences between the value of long-term loans and short term deposits and other assets. This volatility therefore results in higher lending

rates as banks need to factor in the risk that short-term finance may be expensive to acquire. Additionally, the operating costs and the risk faced by Kenyan banks are high relative to many developed countries. This reflects Kenyan macroeconomic conditions as well as high security and legal costs. Kenya is ranked 151st in the world for ease of enforcing contracts as at 2014 but has improved considerably as at 2017 scoring position 112th. Commercial banks in Kenya also conduct more business with relatively risky borrowers than banks in other Sub-Saharan African (SSA) countries with 17.4 percent of Kenyan bank lending being to SMEs, compared to only 8.0 percent in South Africa, 5.0 percent in Nigeria, 14.0 percent in Tanzania and 17.0 percent in Rwanda. (Deloitte Consulting Limited, 2014).

1.2.7 Interest Rate Capping in Kenya

Kenya Gazette (1965) indicated that immediately after attaining independence in 1963, Kenya embraced policies which had a market orientation of diversified economy. The release of the Sessional Paper No. 10 of 1965, defined the government aim to roll out policies to promote African socialism, progress and change. Included in the plethora of policies defined in the document was the regulation of assets to guarantee that assets are deployed in the joint interests of all. By then, it was believed so as to regulate successfully, adequately and not disproportionately many forms and ranges of regulations were needed, starting with none, via influence, direction and limitation of a few factors like costs and amounts, to complete regulation marked by state tenure and actions.

After liberation in 1963, Kenya went after a raft of lending levy ratios limits and quantitative loan regulations so as to promote venture and stir economic progress. Lending rate regulations included defining the least possible saving quantities for all deposit accepting financiers and highest crediting rates for all creditors, and building

societies. Consequently, the spread between the credit-giving and deposit rate were steady. The government requirement of keeping low lending levy rates led to negative real interest, particularly in moments affected by uncertainties. After the inflationary tensions linked with the financial uncertainties that struck the state at the start of 1970s, lending levy rates on both payments and borrowings were elevated for the first time since freedom in 1963. However, the real lending levy rates stayed negative up to the middle of 1980s. Diminished and mostly negative real ratio influenced deposits mobilization resulting to low deposits. Regulation of deposit levels led to suppression of promotion of fiscal savings and quantity of creditable funds. Subsequently, credits offered by banks were prejudiced towards temporary credit to government and major institutions. Additionally, the mechanisms under the lending levy regulation policy system were not adequate to address or counterbalance the negative effects of external uncertainties (Kenya Gazette, 1974).

In August 2016, the President of Kenya signed the Banking (Amendment) Bill 2015, which came into full effect in mid-September 2016 (Table A.2). This meant that Kenya embarked on an ambitious path to regulate the cost of commercial credit by imposing a government cap on interest rates. The limit was enforced when the President of Kenya ratified the Banking (Amendment) Bill 2015, which brought a limit on lending fee rates levies on credits and a consistent floor on the lending fee rate given for savings accounts by bankers. This new law was in reaction to the public position that credit rates in Kenya were too elevated, and that bankers were undertaking exploitative lending activities. The lending rate limitations were thus meant to relieve the settlement burden on loanees and enhance fiscal inclusion as more persons and companies would be capable of taking up at the decreased repayment rates. The law limits the highest possible interest rate levied for a loan in

Kenya by banks at no more than 4 percent of the lowest rate set by the Central Bank of Kenya and provided a floor for the deposit rate held in interest earning accounts to at least 70 percent of the base rate. Interest rate earnings in Kenya averaged 10.1 percent between 2001 and 2015, with profits (48 percent) and overheads (40 percent) accounting for a large portion of these margins (Dennis *et al, 2016*).

As at 31st December 2018, the value of CBR had been adjusted thirteen times as depicted by Table 1.2.

Table 1.2: Adjustment of Central Bank Rate since Interest Rate Capping in Kenya

Date	Central Bank Rate (CBR) (%)
28th November 2016	10
30th January 2017	10
27th March 2017	10
29th May 2017	10
17th July 2017	10
18th September 2017	10
23rd November 2017	10
22nd January 2018	10
19th March 2018	9/5
28th May 2018	9.5
30th July 2018	9
25th September 2018	9
27th November 2018	9

Source: Central Bank of Kenya (2019)

Out of the thirteen times the CBR was adjusted, the rate has been reducing. The highest CBR charged was 10 percent while the lowest was 9 percent over the three years since inception of the interest rate capping in Kenya.

The regulation of interest rates was intended to prohibit banks from charging interest on loans at more than 4% above the Central Bank Rate (CBK, 2018). Interest rate caps can result in financial exclusion and even make loans more expensive to clients (Maimbo & Henriquez, 2014).

1.2.8 Response to Monetary Policy

In addition to the level of rates in Kenya, there is a concern that banks have a tendency to quickly respond to increases in the CBR, but have been much slower to reduce rates once the CBR fall. In particular, when the CBR was increased in response to high inflation in 2011, lending rates rose rapidly, but when the CBR decreased again in 2012, lending rates did not decrease at the same rate (Deloitte Consulting Limited, 2014) While explaining this observation would require more detailed analysis, this thesis highlights two possible contributors: In the same period as the high inflation and the rise in the CBR, the discount window rate (the rate at which banks can borrow from the Central Bank of Kenya (CBK)) was changed. In June 2011 it was at the same level as the CBR, but it was subsequently set at a penalty level above the CBR. This meant that even after the CBR decreased in 2012, the cost of borrowing from the CBK remained significantly above the CBR. After experiencing the very sharp increase in the CBR in 2011, banks may potentially have factored the risk that a similar event would occur again into their maturity transformation process, making them more cautious about lowering lending rates. This thesis will attempt to analyse determinants of economic and competitive factors that potentially explain interest rate differences levied on clients within the margin of capping overhead the CBR in Kenya.

Although significant work has already been undertaken to improve the functioning and competitiveness of the Kenyan banking market, most recently the introduction of the Kenya Banks' Reference Rate (KBRR), Central bank reference rates (CBR)   and the Annual Percentage Rate (APR), this thesis was sought to find evidence of a series of economic factors that are negatively impacting the market and resulting in higher and different interest rates on loans. While some of these factors reflect the broader

macroeconomic environment, there are a number of practical steps that regulators could take to promote more affordable credit in Kenya. This thesis therefore focuses on the effects of these economic factors in influencing interest rates charged by commercial banks in Kenya.

Aburime (2015) noted that the value of bank determinants of economic factors can be evaluated at the micro and macro planes of the economy. At the micro stage, strategy is the vital condition of a viable banking firm. It is not barely a result, but also a necessity for successful banking in a period of growing competition on financial markets. The main purpose of every bank system is to optimize profit, as a prerequisite for undertaking venture. At the macro phase, a solid and viable banking system is best placed to face negative uncertainties and lead to the constancy of the fiscal system. Bank incomes offer a vital source of equity particularly if re-devoted into the venture. Good economic strategies should lead to safe banks, low interest rates and high profits that could promote financial stability (Flamini *et al.*, 2014).

The banking industry in Kenya has faced various regulatory and fiscal changes. These changes have created various structural alterations in the industry and have subsequently heartened foreign banks, standard chartered, Barclays, Eco bank, Stanbic bank, and GT bank among other banks to enter and expand their operations in the country (Kamau, 2014). Kenya's fiscal sector is mostly bank-oriented as the capital market is still regarded as tapered and superficial (Ngugi *et al.*, 2006). Banks lead the fiscal sector in Kenya and subsequently the process of fiscal intermediation relies mostly on these financiers (Kamau, 2014). Oloo (2009) posited that the banking sector in Kenya as a bond that held the country's economy together. Sectors such as the agricultural and manufacturing virtually depended on the banking sector for their very survival and growth. The productivity of the banking sector in the country had

grown in leaps and bounds over the last twenty years, as only four banks had been placed under CBK statutory management during this period (Dubai bank in 2014, Imperial Bank in 2015, Chase Bank and Charterhouse Bank in 1998) with only two complete closures, Chase bank though was temporarily suspended has since regained clout, this is good compared to 37 bank-failures between 1986 and 1998 (Mwega, 2009).

The overall economic factors influencing interest rates in the banking system in Kenya have grown greatly in the last 10 years. However despite the overall good picture a critical analysis indicates that, not all banks have responded to the factors in a way that have made them profitable. For example the small and medium financial institutions which constitute about 57 percent of the banking sector posted a combined loss before tax, of Ksh 0.09 billion in 2009 relative to a return prior to tax of Ksh 49.01 billion registered by the big fiscal firms (CBK, 2009; Deloitte Consulting Limited, 2014). The huge profitability enjoyed by the large banks vis-a-vis the small and a medium bank indicates that there are some significant aspects that shape the productivity of commercial banks.

Flamini *et al.* (2009) and other several studies have shown that interest rate earnings is influenced by bank-specific economic factors and industry strategic specific factors. Nevertheless, these investigations relied on information from other states and their observations may not be relevant to the Kenyan banking sector. The aim of this thesis was to provide knowledge by analyzing the bank specific factors, within the banking sector that influence the bank margins interest rates of commercial banks in Kenya with emphasis of non-consistent rates for different clients charged by the banking sector.

1.3 Statement of the Problem

Beyond the intermediation function, the financial performance of banks has critical implications for economic growth of countries. Good financial performance rewards the shareholders for their investment. This in turn, gives confidence for additional investment and brings about economic growth. On the other hand, poor bank performance could lead to banking failure and crisis which have negative consequence on the economic growth (Okoth et al., 2013)

The financial sector in Kenya has been rapidly growing and thus the number of players going into the market has been rapidly increasing. Various factors are pushing banks to redesign their strategies and adopt economic variables. To begin with there is the factor of competition from other banks, secondly non-bank financial institutions have given banks a run for their money by providing financial services and products conveniently to their customers thus curtailing the role of intermediation that is core to any bank. With increased competition from non-bank financial institutions, such as mobile money and loans. Mshwari, M-kesho, KCB Mpesa, Timiza and Tala. It is good to note that banks more than ever, have found the need to redesign response to economic forces to remain competitive and their profitability and their customer base. Attracting large amounts of deposits is crucial for any bank. Consequently, paramount question arises including; what extent do economic determinants such credit risk, capital adequacy, bank diversification, operation efficiency and liquidity risk affect the interest rate earnings within the capping interest rate environment in Kenya?

Interest rates in the Kenyan banking system keeps on changing along the mentioned spread and influenced by factors varying and can thus greatly affect the performance of such banking institutions. According to Robinson (2014), banks interest margins were affected by unanticipated changes in interest rates where a shift on CBR could

move to the bank interest rate either down or up to the ceiling. The exposure of banks' viability and net worth to unpredictable variations in lending rates is what is referenced by the notion of interest rates risk. The possible effect of interest rates on commercial banks fiscal productivity has for a time been a concern for policy formulators and banks. Matu (2015) observed that poor performance of commercial banks put pressure on them to retain high lending rates as mentioned in the maximum chargeable rate in a bid to limit the loses linked to the credits and in the process influencing the bank's clients. Proper interest rate management reduced bank exposure to risk and provided an opportunity to stabilize and improve their net income. This had become a serious issue for many banks in Kenya. Interest rates tend to determine the profitability of a commercial bank among other cited factors (Gadner *et al.,* 2016). Charging maximum allowable interest rates have remained a serious macroeconomic problem that has always been difficult to eliminate as banks would prefer charging even more. Flannery (2016) posited there is a negative link between the bank lending rates and its net asset position. Bosson and Jog-Kun (2015), nevertheless reported that productivity of Ghanaian banks was biased towards large firms and that there was a link between bank size and viability.

Banks that originally focused on local markets have extended their range in terms of markets and products to a national, multinational, and even globally. Other banks that majored in asset financing have resorted to expanding their bank services to consumer banking. Banks have chosen to respond to forces in a positive way so as not to overlook customer values, increased global competition, liberalization and other economic, political, and social dynamics (Kotler, 1999). Such dynamism of the environment has forced banks to redesign their strategies and redefine their business priorities to focus on cost reduction, product differentiation, increase deposits, and

customer-centric services. Failure to constantly redesign strategies that adapt the bank to its environment could lead to a strategic mismatch between what an organization offered and what markets demanded. Although the ways in which banks implement these vary, but the underlying objectives remain the same.

Locally, most studies that have been done on interest rate including Ngari (2013) who found that there was a positive linear correlation/ relationship between banks interest rate spread and banks Return on Assets (ROA). Kipngetich (2014) observed that for banks to attain high financial performance, then interest rates was among the key determinants. Different factors influenced the comportment of interest rates thus leading to the manner in which they affect the banks' productivity. Commercial banks therefore should come up with opportunities and avenues of improving advantages in offered interest rates and maximize in basic quality portfolio in order to improve on their overall financial performance. While the above studies provided valuable insights on interest rates and financial performance they only provided partial insight on the influence of specific interest rates elements and productivity of commercial banks.

The importance of analysing the effect of bank specific economic determinant on interest rate earnings is more pronounced in developing countries like Kenya because financial markets are usually underdeveloped and prone to shocks and risks of closures. Recent closures cited as Charterhouse bank, Dubai bank limited, Imperial bank and Chase bank limited considering that banks are typically the only major home of funds for most companies and are often the key depository of monetary savings (Athanasoglou *et al.*, 2015).

The interest rate earnings for selected commercial banks in Kenya before capping of central bank interest rate (year 2013) and after capping of central bank interest rate (year 2018) is provided in Table 1.3.

Table 1.3: Lending Interest Rate (%) for a Five Year Loan for Selected Commercial Banks in Kenya

Bank Year	Guardian	KCB	SBM (Fidelity Bank	Credit Bank	Consolidated
2015	14.1	16.6	21.0	24.5	25.4
2018	13.0	13.5	12.5	14.0	12.0

Source: Central Bank of Kenya (2015:2018)

From Table 1.3, it could be deduced that different commercial banks in Kenya charged different interest rate earnings which raises the concern as to what informed the variations. Comparing the lending interest rates for the year 2015, which was before the formation of the capping of interest rate indicated that there was variations of lending interest rates for all the commercial banks in Kenya. This was an indication that there were determinants influencing the interest rate earnings across the commercial banks in Kenya. Considering lending interest rates for the selected commercial banks in Kenya for the year 2018 which was after enactment of a law capping interest rates, some banks were adding less than the bank interest rate of 4 percent prescribed as the maximum rate which any commercial bank in Kenya could add to the CBR. This was depicted by commercial banks such as Guadian Bank Ltd, Kenya Commercial Bank Ltd, SBM Bank and Consolidated Bank Ltd.

As financial intermediaries, commercial banks play an important role in the operation of an economy. They channel funds from savers to borrower for investment which is an important thing for one's country economic growth. As such, examining the determinants of financial performance of banks is crucial to the stability of the

economy. In banking literature, the determinants of financial performance can be divided into two namely, internal factors and external factors. Internal factors could be controlled by bank management. As per Mohana *et al.*, (2012), the major internal factors in an institution reflect differences that are associated to policies and various decisions of a bank's top management with regard to how they source and uses of funds, capital, manage liquidity and expense management. Furthermore, external factors are largely beyond the control of the banks management, or the external environment within which a specific bank operates and the industry to which it belongs.

Despite, the capping of central bank rate in Kenya, commercial banks in Kenya continue to charge different lending interest rates. Rationally, it was expected that commercial banks would add the 4 percent, which was the maximum allowable interest rate earnings, to the CBR. However, this was not the case in commercial banks in Kenya. Some commercial banks added less than the 4 percent to the CBR while others added the 4 percent, being the maximum interest rate earnings. Understanding the bank specific economic determinants, that is, credit risk, capital adequacy, operation efficiency, liquidity risk and bank size before and after the introduction of capping of CBR and their influence on interest rate earnings is very crucial to the top management of various commercial banks, aligned stakeholders and other sector interested groups such as the central bank decision making organ and the government of Kenya.

1.4 Objective of the Study

1.4.1 General Objective

The general objective of this study was to analyse the effect of interest rate capping on interest earnings among commercial banks in Kenya for the period covering 2013-2018.

1.4.2 Specific Objectives

Specifically, the study endeavoured to realize the following objectives:

1. To analyse the influence of credit risk on interest rate earnings in the midst of capping among commercial banks in Kenya

2. To analyse the influence of capital adequacy on interest rate earnings in the midst of capping among commercial banks in Kenya

3. To analyse the influence of operation efficiency on interest rate earnings in the midst of capping among commercial banks in Kenya

4. To examine the effects of liquidity risk on interest rate earnings in the midst of capping among commercial banks in Kenya

5. To establish the influence of bank size on interest rate earnings the midst of capping among commercial banks in Kenya.

1.5 Research Hypotheses

The study postulated the following hypotheses:

Ho_1: Credit risk has no significant effect on interest rate earnings in the midst of capping among commercial banks in Kenya.

Ho_2: Capital adequacy has no significant effect on interest rate earnings in the midst of capping among commercial banks in Kenya.

Ho_3: Operation efficiency does not significantly influence interest rate earnings in

the midst of capping among commercial banks in Kenya.

Ho4: Liquidity risk does not significantly influence interest rate earnings of in the midst of capping among commercial banks in Kenya.

Ho5: Bank size does not significantly influence interest rate earnings in the midst of capping among commercial banks in Kenya.

1.6 Significance of the Study

This study aimed at generating knowledge regarding performance of the commercial banks sector in Kenya, especially during the period between the year 2013 and 2018 when there was the introduction of the capping of interest rates in Kenya. The research investigated the bank specific factors affecting the interest rate earnings in commercial bank in Kenya. The results could be of benefit to various categories of interested stakeholders as follows:

1.6.1 Scholars and Researchers

The study would add to the body of knowledge on the area of factors influencing bank interest rate and especially after introduction of the control of lending charges in Kenya. Since the study was carried out in Kenya, then the findings could be of great help to scholars interested in understanding the various factors influencing interest rate earnings by Kenyan banks. The scholars also may benefit in understanding the relationship of credit risk, capital adequacy, operation efficiency and liquidity risk and interest rate earnings of commercial banks sector in Kenya and conducting further studies.

1.6.2 Commercial Banks in Kenya

The findings of this study would be important to the commercial banks in Kenya in informing on the effect of the bank specific economic factors on the bank margins interest rate. This study will also provide the evidence on the impact of bank margins interest rate considering competitive environment in which banks operate trying to attract customers to their banks. Therefore, as the commercial firms strive to optimize their returns, it is vital to determine which determinants have the greatest effect on their basic gains so as to critically plan on how well to manage them.

This study could assist organizations to adopt the best response to economic and apply such response to make proper investment decisions and determining the rates of interests charged while still complying with the capping law hence returns from such projects and giving them an insight in decision making; such thesis of the core determinants would help in replacement of long term assets.

1.6.3 Policy Makers in Commercial Banks in Kenya

The study could be of great help to policy makers, as it could help them know how they can derive a sustainable interest rate earnings which can work in mutual benefit to the commercial banks and business community. This is of importance especially for the commercial banks operating in rapidly changing environment, considering the introduction of the capping of interest rate.

1.6.4 Government

The knowledge could be also be of help to the Central Bank of Kenya as a government agent. The study could also benefit other government bodies seeking to understand how to ensure that capping interest rate exist at the same time providing the necessary support to business drive in the economy. CBK, on behave of the

government, stands to benefits from the study while carrying out commercial bank supervision by drawing on the study's recommendations to the policy makers.

1.7 Scope of the Study

All the 38 Commercial banks licensed and listed by Central Bank of Kenya which operated in Kenya as at the end of 31st December 2018 (Appendix Figure A.1) were employed in the study.

1.8 Assumptions of the Study

Firstly, it will be assumed that the sample data picked for variables under analysis represented the population hence the conclusion and recommendation would be used by all the commercial banks in Kenya. Using scientific statistical method in obtaining the sample size would be utilized. Secondly, the assumption that variances in the populations from which the samples are drawn are equal; as in the case of the t-test, this assumption is referred to as the sameness of alteration. Though in the presence of heteroscedasticity, the General Method of Moments estimator produces consistent and efficient estimates of the unknown parameters. Thirdly, it will be assumed that all data entries in the study were randomly and independently drawn from the population.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter presents the theories of the financial intermediation and determinants of interest rate while presenting literature review on credit risk, capital adequacy, operation efficiency and liquidity cost in relation to the determination of interest rate earnings. In addition, the chapter further explores the premise upon which this study is anchored, the theoretical background, the empirical literature as well as conceptual discussion to support the study.

2.2 Theoretical Literature

This section provides interest rate theory, modern monetary theory, interest rate parity theory, resourced-based view, modern portfolio and transaction cost economies theories. Empirical studies linking credit risk, cost of capital, profit margin, cash reserve ratio and liquidity cost to bank margins interest rate.

2.2.1 Financial Intermediation

Commercial banks are considered the financial intermediaries, meaning they receive funds from remaining consumers and avail the funds to deficit consumers. The main reasons why banks undertake to become financial intermediaries could best be explained by the agency theory, theory of asymmetric information and the transaction cost concept examined in this segment.

2.2.1.1 Agency Theory

The agency theory is a construct that accounts for the connection between principals and proxies in a firm, and attempts to resolve issues that tend to arise in agency networks. Therefore, the third explanation for financial go-betweens has to do with

their function of controlling money generation and funding of an economy (Fama, 1980; Merton, 1995).

The theory presumes both the principal and the proxy- are driven by self-interest, and this presupposition forces the model to unavoidable inherent discord. The inherent risks and concerns of solvency in a financial system require the monetary and prudential supervision that is not possible in direct interaction of savers and investors. Various Governments should has a considerable role in ensuring that information failures are largely reduced or eliminated. Banks are regulated in their offering of services as financial intermediation and hence do exists to reduce and eliminate conflicts between parties in financial transactions.

2.2.1.2 Asymmetric Information Theory

The primary reason for financial intermediation is informational asymmetries between participants of financial system. Some people or all may have no perfect knowledge in the market, or one individual may have information more than others, and such scenario will enable some people to invest much or less compared to others for the same product. The existence of banks will enable information to be available to the market at a more relatively standard manner. Financial intermediaries therefore are expected to mitigate these explicit and implicit costs. In a world of asymmetric data, there is a tendency for a misallocation of limited assets, with customers forfeiting too much or too little, and businesses generating too much or too little, hence there is market failure. Possibly, this could be a detrimental scenario since one stakeholder may exploit the other's lack of information. Markets do work best when knowledge is perfect and is shared evenly by all parties involved in a transaction. As such, asymmetric knowledge is a financial dilemma. The presence of banks as fiscal go-betweens rectifies the dilemma of imbalanced information.

2.2.1.3 Transaction Cost Economies

When an organization has economies of scale, total unit prices assumes a downward trend including interest rates in lending pricing. Big banks may wield market power attracting economic factors working in their favour to have lower pricing. This theory inform when firms should organize new activities within the boundaries of the firm and how firms can benefit from sharing resources across different businesses within their own firm boundaries. This theoretical framework suggests that economic and competitive allows firms to obtain greater market power by blocking out competitors and through vertical integration to amass power which can lead to offering lower interest rates. More specifically, diversified companies are able to cross-subsidize their businesses, and reduce prices, which helps raising barriers for entry and/or squeezing competitors out of the market (Miller, 2009). Vertical integration allows companies to avoid market costs, control product quality and prevents its technology from spilling over to suppliers, and other intermediaries (Penrose, 1959). Hence, from a transaction cost perspective firms should diversify whenever doing so increases their market power and/or they can organize the additional activities more efficiently than the market or their competitors.

2.2.2 Determinants of Interest Rate Earnings

Determinants of interest rate earnings are categorized into three indicators: bank-specific, industry-specific and macroeconomic. Bank specific indicators include: credit risk, capital adequacy, operational efficiency and liquidity. The common measure for industry-specific determinant include bank-concentration, degree of competition or market concentration, regulatory requirements such as statutory reserve requirements or regulated minimum deposit rates. While on the other hand,

the key macroeconomic variables include: growth in Gross Domestic Product (GDP), GDP-per-capita and inflation.

The empirical evidence reviewed provided that the various methods employed in studying bank profitability using these determinants. Much of the empirical literature agreed that bank level as well and macroeconomic factors largely influence bank profitability. There is however limited evidence that industry-specific factors have any significant influence on interest rate earnings. Some studies focused on one category of factors while others considered two or all the three categories of factors. It is against this background that this study utilized only bank level and macroeconomic factors to estimate bank profitability in SSA.

2.3 Theories

There exist theories on the determination of interest rates. The study will utilize these propositions to explore possible determinants of interest rates spreads with respect to the Kenyan banking sector.

2.3.1 Dealership Theory

Dealership theory is the starting point for analysing the determinants of banks' intermediation spreads which was the seminal work by Ho and Sanders (1981). In their unprecedented work, Ho and Sanders (1981) conceptualize banks as mere go-betweens among loaners and loanees and whose scope of work is shaped by four basic aspects: (i) the extent of bank risk dislike; (ii) the extent of competition in the banking sector; (iii) the mean range of bank activities, and (iv) lending rate risk. Subsequently, other scholars have extended this model to incorporate additional factors explaining net interest margins.

The literature on spreads consists of studies on the determination of interest margins as well as interest rate spreads. The most impactful theoretical construct of determination of loaning charge margins is the bank dealership construct by Ho and Saunders (1981), where the size of bank interest margins is explained on the basis of the uncertainties associated with deposit and loan markets, hedging behaviour and expected utility maximization. Banks are thought to be uncertainty-averse brokers in their function as fiscal go-betweens. The construct is grounded on the idea that banks receive payments in unsystematic intervals whereas the applications for loans come in a stochastic way and these applications have to be satisfied. This arbitrariness, and subsequently the improbability caused by the way payments come and the how consumers apply for credit means that banks experience an inventory uncertainty, which has to be made up for via a spread between credits and deposit rates - this is the pure interest spread. The interest range coming out of Ho–Saunders construct is framed on the foundation of banks that give similar or homogeneous credits and savings, and variations in interest margins across the banks is on account of average transaction costs, changes in interest rates, risk taking behaviour of bank managers and the extent of competition in the bank's environment (Allen, 1988).

Further researches have adjusted some of the conventions in the Ho-Saunders (1981) framework. For example, McShane and Sharpe (1984) posit that banks face risks in temporary money market interest charges, unlike savings and credit interest ranges. In effecting the intermediation role among savers and loanees, they expect that banks optimize expected utility and threat aversion in credit and savings markets.

Allen (1988) extends Ho-Saunders construct (1981) to regard banks as passive brokers, or specialists, on securities exchanges. Therefore, they alter their rates so as to enhance demand for their services - deposits and loans. Lending charges are set by

deducting default-risk modified real costs of the credit while savings rates are arrived at by placing a mark-up on default-risk modified real costs of savings. Allen (1988) states that the ranges are shaped by monopoly control and risk premium. In scenarios of risk neutrality, interest ranges are limited since a risk premium is unnecessary to reimburse banks for the uncertainty stemming from the emergence of savings and credit requests.

Overall, numerous issues have come up from past works on the definition of interest levies ranges and limits. Among these are the extent of bank uncertainty aversion, market configuration for banking amenities, unpredictability of money market interest levies, control, effectiveness of banks and bank-portfolio. Other issues are credit uncertainties, solvency of banks, share of foreign capital, bank magnitude, and economic forces that are industry-oriented or macro in nature

2.3.2 Interest Rate Theories

The theory of Interest explains the relationship between inflation and the real and nominal interest rates arrived at. This relationship is described as the Fisher Effect. The effect posits that a rise in the growth proportion of the fiscal supply will lead to a rise in inflation and a rise in the nominal interest range and with interest range capping the growth goes towards the control ceiling, which will correspond the increase in the inflation rate. Fisher (1930) proposed that the link between interest ranges and inflation is described as the Fisher Effect. It posits that the nominal interest range in any duration is a product of the sum of the real interest range and the anticipated range of inflation. Fisher (1930) argued that the nominal interest range may be broken down into two aspects, a true rate added to an expected price rises range. He further showed that there is a link between the inflation and interest ranges in an ideal world, with real interest ranges being unconnected from the anticipated

rate of price increases and defined wholesomely by the real aspects in an economy, like the productivity of capital and depositor's time choices.

The Fisher effect concept has the same deductions with the International Fischer Effect (IFE). The IFE notion posits that foreign monies with comparatively high interest ranges will likely depreciate since the high nominal lending charges reflect anticipated rate of inflation (Madura, 2000). This model also averred that variations in the spot exchange range between two states will also tend to associate the variations in their nominal interest ranges (Craigwell, 2000). Fisher's rate of interest is important because it provides a basis for the idea that monetary policy should be concerned mainly with managing inflation expectations so as to keep true lending charges at a steady level that encourages saving and venture. Fisher (1930) looked into the association between nominal interest rates and the rate of prices rises for the US and the UK. Using yearly data from the 1890 to 1927 for the US and 1820 to 1924 for the UK, Fisher noted that inflationary anticipations were not immediately seen in interest rates. In the US, the top-most correlation, 0.86, between long-standing interest rates and price variations was defined when the latter was trailed over 20 years, whereas in the UK, a correlation coefficient of 0.98 was obtained when price changes were spread over 28 years. High interest rates affect demand for credit, hinder economic growth and consequently hurt the economy (Solnik, 2000). Connecting of exchange rates with variations in interest rates and price rises, the IFE framework avers that the future spot rate of exchange can be defined from nominal interest differential.

2.3.3 Modern Monetary Theory

Modern monetary theory attempts explains exclusively on how the government, its central bank and the country's commercial banking sector interacts, with some economists attempting to argue that understanding of reserve accounting is critical to

understanding monetary policy options. This particular theory was developed by a group of monetary economist like Randal Wray (2009) and Bill Mitchell. All of the various commercial banks must as required have an account with the central bank. This permits the banks to manage their reserves that is, the amount of available short-term money that a particular bank holds. As such, when the government expends, treasury will deduct its cash operating account in the central bank and pay these funds into private bank accounts (and subsequently into the commercial banking system). This money contributes to the overall reserves of the commercial bank regime. MMT avers that duties and bond offerings are not properly defined as fiscal sources for the Treasury, but instead as asset depleting tools to keep price and interest-rate steady (Tymoigne, 2013). In modern most countries, various commercial banks' reserve accounts with the central bank must have a positive balance at the end of every day; in some countries, the amount is specifically set as a proportion of the liabilities a bank have that is on its customers. This is known as a reserve requirement. At the close of each day, a commercial bank will have to look at the state of their asset accounts. Those in shortage have the choice of soliciting the needed monies from the central bank, in which case they may be levied a lending fee, also referred to as the discount rates on the amount they borrow. In a stable structure with barely adequate total assets for all the banks to meet needs, the immediate interbank crediting rate will lie between the support rate and the discount rate. Both the Treasury and the central bank are involved in these reserve management operations to maintain interest rate stability (Palley, 2012).

2.3.4 Interest Rate Parity Theory

Interest Rate Parity theory (IPRT) assumes that differences in charged interest rates between a country and its trading partners account for the rate of noted change in the

nominal exchange rate. The model of interest rate parity relates to the variance between foreign and domestic interest ranges with the variance in spot and future exchange rates. This parity condition posits that the domestic interest range has to be equal the foreign interest range added to the anticipated change of the exchange range. The interest rate variance between local and global is equal to the anticipated variation in the domestic exchange rate (Bhole & Dash, 2002).

The IPR model posits that interest rate variances between two different regimes will be indicated in the premium or discount for the forward exchange range on the foreign currency if there is no activity of buying shares or currency in one financial market and selling it at a profit in another. The model also opines that the magnitude of the forward premium or discount on a foreign currency ought to be equivalent to the interest rate variances between the countries in comparison (Fielding, 2005). Sargent and Wallace (2001) posited that a high interest rate policy may lead to a reduction in demand for money and increase in price level. This is as a result of an increase in interest rate portends a rise in government liability. If all investors are risk-neutral and noted to have rational expectations, the recorded future exchange rate should automatically and perfectly adjust given the known present interest rate differential.

2.3.5 Resource-Based View

The Resource-based view (RBV) provides the earliest theoretical arguments in favour of economic factors influencing interest rates. Penrose (1959) points out that at any point in time a firm has certain productive resources, which could be used to exploit productive opportunities to allow the firm to grow successfully. Researcher would identify a wide range of resources that create a unique advantage for a bank organization by sharing them across businesses.

Goold and Campbell (2008) highlighted the benefits of sharing know-how and tangible resources, coordinated strategies, vertical integration, and pooling negotiating power. These resources allow a firm to generate economies of scale and scope by increasing the efficiency in the use of these resources (Contractor *et al*, 2009). Hence, from the Resourced-Based View a firm should try to maximize exploiting the valuable resources it has by sharing them across as many businesses as possible.

2.3.6 Modern Portfolio Theory

Scholars have tried to explain the benefits of economic factors influencing interest rates using portfolio theory. Modern Portfolio Theory (MPT) is a construct of venture that attempts to optimize portfolio expected output for a particular amount of portfolio uncertainty, or equivalently limit risk for a particular level of anticipated output, by diligently selecting the shares of various assets. These scholars argue that the allocation of assets across different markets with independent of cash flows reduces the impact of un-systemic risk resulting from external eventualities in each of the various markets (Lewellen, 2001).

2.4 Empirical Studies

In order to understand interest rate earnings for commercial bank in Kenya, studies on interest rate earnings were reviewed largely focusing on credit risk, capital adequacy, operation efficiency and liquidity, as common measures.

2.4.1 Interest Rate Earnings

The proposition that the real rate of interest equals the nominal rate minus the expected rate of inflation had a long history extending back over 240 years. William Douglass articulated that the idea as early as the 1740s to explain how the over issue of colonial currency and the resulting depreciation of paper money relative to coin

raised the yield on credits designated in paper compared to the returns on those designated in silver coin. The research carried out also originated the notion that the equilibrium nominal rate must fully adjust for changes in the value of money so as to leave the real rate unchanged, and the corresponding concept of the neutrality of equilibrium changed in the nominal ratio in regard to various distributive shares.

Henry Thornton (1760-1815) had employed the real nominal rate relationship of interest rates, what he founds was a milestone in the later evolution of the two-rate analysis. In terms of analytical insight of the economist, clarity, rigor, and completeness, the same study also used the notion to try and explain how an inflation premium was incorporated into and led to an increase in UK lending levies during the old Napoleonic wars.

John Stuart Mill (1806-1873) in his study echoed the former's contention that interest rates included a premium for expected inflation. Thus, in the sixth (1865) version of his *Principles of Political Economy*, Mill wrote in the study that the expectation of any further depreciation of the local currency that raises market overall yields because the lenders who expected interest rate could be reimbursed, and the principal amount applied possibly returned, in a less valuable currency than they lent, they will of course require and demand a rate of interest that is sufficient to cover this possible contingent loss. Mill's work and contribution consisted of recognizing, first, of considering that real inflation reduced the real value of the earned interest as well as the principal of a particular loan, and second, that various lenders could therefore justifiably demand an inflation premium to cover both types of expected loss. This was a knowledge and insight for the earlier writers had only concentrated solely on the expected loss of principal and had said nothing about the corresponding contingent loss of interest expected rates.

Jacob de Haas (1889) writing employed the real nominal interest rate idea to explain the third inflationary element in usury ratios, the rest being a reward for capital and a payment for carried risk. Given some conditions, high net usury margin was generated with a high uncertainty premium, while the circumstances of raising competition could encourage speculative behaviour of the banking system that could result to financial unpredictability (Hellman, Murdock & Stiglitz, 2000). Net interest margin was the difference between interest income received from bank loans and other earning assets at a given time period reduced by the amount of interest given to savers and holders of bank credit over the mean number of earning assets in the same period. In line with Bank of Indonesia regulation on asset quality rating for commercial banks was done.

Drakos (2003) suggested that a reduction in lending levy rate limits represented an achievement of the market-based changes rolled out in transition countries. In this paper, it was investigated the determinants of bank interest rate earnings. Among the determinants, examined both bank specific and macroeconomic variables. While the former could had policy implications for bank supervision, such as how different market structures affected financial intermediation, the latter could convey useful information on how macroeconomic policies in general could contribute to the stability of the banking industry.

Gelos (2006) found that there were significant differences between the Net Interest Margin banking in Latin American countries and the Net Interest Margin of banks in developing countries. The study concluded that the high Net Interest Margin of banks in Latin American countries due to the low level of competition, resulting in less efficient banks and interest rates were relatively high. Irving Fisher (1896) notioned that the nominal interest rate analysis was a strong 20th century phenomenon

originating with disproved in the study of price Appreciation and Interest where it was made clear that it was by no means the first to present that results of the analysis. Fisher further noted that the minimal lending levy could not be negative in a scenario where funds can be costless held. That is, it was contended that because people would ordinarily hoard money rather than lending it at a negative rate, the money rate of interest could never be expected to be less than zero. And if the nominal rate could not be less than zero, it followed, that various prices could never fall at a fully anticipated rate that is greater than the real rate of interest-as can be seen by setting the nominal rate at zero and sorting the formula for the subsequent rate of price fall.

The magnitude of charged interest rate spread, is noted to have varied across the world. It was antithetical to the extent of efficiency of the financial and fiscal industry, which was a branch of a competitive situation. The nature and efficiency of the financial sectors had been found to be the major prospering reasons behind differences in spread in countries across the world. In regions with weak fiscal systems, the intermediation prices which were used in deposit enlistment and deploying them into useful ends, were much larger (Jayaraman & Sharma, 2003).

The result of differences in market lending levy rates on banks' profitability was ambivalent; it mainly relies on the extent of reactions of asset and liability ratios. In general, since both sides of banks' balance sheets were affected by market interest rates in a parallel fashion, the net impacted on banks' profitability could be understood by examining the feedback of both moneys and obligations as market lending rates vary (Emmanuelle, 2003). Svensson (2007) warned that a low interest rate as a macro-economic policy, over a prolonged period of time, could be risky and could lead to the creation of a financial fizz where huge sums of reserves are issued

into the real-estate and stock marketplace. In advanced systems, interest-rate modifications were therefore effected to retain inflation within a target array for the well-being of economic practices or restrict the lending levy rate concurrently with economic growth to safeguard economic momentum.

In 2014 the Polish banking sector generated a net profit of PLN 16 billion. The main revenue component for the banks was the result on banking activity in the amount of PLN 57.7 billion, of which 64.4% was income from interest.Net interest income, after taking into account the cost of liabilities, was therefore a key source of profit in the banking sector. Analysing the structure of this result, we could consider the profitability of both sides of the balance sheet: assets represented to a major extent by loans, and liabilities generated largely by payments made by professional groups, namely non-banking fiscal firms and banks, on the interbank fair were the least stable. Financial stability was taken into account in the calculation of capital adequacy, which made deposits from individuals valued at a higher level than other deposits their yields were normally more than the lending levy ratio on payments obtained from other bodies (Ötker-Robe, Pazarbasioglu *et al.*, 2010).

The stabilization of interest rate policies and actions of Vietnamese Central Bank for a long period before 2007 had created the neglect in interest charged rate risk management of the Vietnamese banking institutions. Due to the global economics recession, at the beginning 2008, the Vietnamese macro-economic situation appeared adverse elements caused by the increase in two-digit inflation number and government monetary tightening policy, which pushed the banking institutions into a liquidity crisis. Consequently, banking institutions joined the race of mobilizing fund. Almost all the banks used interest rate as a strategic weapon in winning the market shares. However, the high interest rate was not a good strategy because it might cause

so many risks for banks. Besides, due to the lack of knowledge and experience in risk management, many Vietnamese firms could hardly avoid revealing their weakness in risk management, especially in interest rate risk management (Tran & Le, 2008).

The origin of the determination of the net interest margin had been formed by Ho and Saunders (1981). Theoretical attempted to make sense of Net Interest Margin started with the pioneer work and the model regarded the bank as a risk-averse dealer operating in financial markets. In their work, key role of banking was given as providing service to both depositors and borrowers. There are some restrictive assumptions embedded in this model. For instance, a financial institution was assumed to have a homogenous product portfolio. A typical bank was assumed to operate in a single period and it decided on deposit and loan rates at the start of the period to maximize the wealth at the end of the period. However, since loan demand and deposit supply are random during that period, any deficit of funds were invested by engaging transactions in money market. Thus, financial institution had a burden of reinvestment and refinancing risk. To account for that risk, it was a rational behaviour for risk averse expected utility maximizer entity to charge a positive interest rate earnings.

Ho and Saunders (1981) in which the interest rate spread was decomposed into a pure rate spread and the remaining rate component that was explained by existing market structure, government regulation and idiosyncratic underlying bank factors. The pure spread was explained by the degree of specific bank risk aversion and the market structure of the banking sector. The unpredictability of the money market interest rates was reported to have a long-lasting influence on the range. Other forces that shape the interest range were the regulatory mechanisms, effectiveness of banks and

bank-portfolio determinants. Credit risk was reported to play a negligible function whereas higher bank liquidity was linked to lower interest rate limits.

McShane and Sharpe (1984), in their study suggested a theoretical model of determining bank interest margins based on various hedging performance of interest margin determination the dealer model of the bank interest margin determination and applied this model to Australian banks. Their model assumed the following about banks in undertaking intermediation between suppliers of funds and borrowers: maximization of expected utility and risk aversion in credit and savings markets. Angbazo (1997) observed that banks' interest rate ranges should create adequate income to raise the capital base as risk exposure rises. Schumacher (2000) proposed that it was unclear whether high interest rate ranges were good or bad from a social wellbeing dimension. High interest rate earnings added to the profitability and capital of banks so that they could insulate themselves from macroeconomic and other shocks.

Ndung'u (2000) pointed out that the liberalization experience in Kenya showed that domestic interest rates have remained high even when inflation has been low and declining. That is, the economy has been on a deflationary trend since 1994, save for a few blips in 1997, and the exchange rate has been volatile. These ramifications of banking sector ineptitude have stirred diverse discourse in developing states on the bases of banking service interest rate ranges. Considering the rising levies charged on credits compared to those given to savings, these levy rates vary among commercial banks in the country.

A research by Klein (1971) and Monti (1972) on banks' interest rate setting behaviour posits that banks could enforce a mark of market costing influence in determining

loan and deposit rates. The Monti-Klein model demonstrated that interest rates on bank products with smaller demand elasticity's were priced less competitively. Hence, both the levels of bank interest rates and their changes over time were expected to depend on the degree of competition. The study showed that an increase in banks' market power caused a reduction in competitive pressure resulting to a higher net interest margins.

The net interest margin was essentially the difference between interests earned minus the interest paid divided by the earning assets. This compensated for the fact that the earning assets and borrowed funds differed in volume or instrument, and was also called the banker's mark-up (Allen, 1988). This study saw banks as merely intermediaries between lenders and borrowers and saw the net interest spread as pure spread. This pure spreads was the variant between the bank crediting rate and the payment rate. A bank could ask for a positive interest levy as the cost of offering promptness of loan service in the face of the transaction uncertainty. This uncertainty was generated by the deposits and loans tended to differ over time, which imposed costs on banks. Due to this banks had to hold either a long or short position in the money market. This meant that the net interest margin was affected by the volatility of the interest rate and the interest rate risk. The author also stated that the competitive structure of the markets was a determinant of the net interest margin.

According to Saunders and Schumacher (2000), impact of bank's interest margin on the level of welfare of a country could be twofold. In situations where the range is low, it usually means a competitive market with low intermediation prices for their customers. Conversely, a high interest range could mean that banks are well-funded and stronger towards market shocks, profiting high return levels but this causes the clients to bear higher costs. Sargent and Wallace (2001) hold that a high interest rate

regime could lead to a fall in demand for funds and raise the price level. This was because an increase in interest rate implied an increase in government debt. If savers are risk-neutral and had rational expectations, the next exchange rate could perfectly adjust given the present interest rate differential. The theory further stated that the magnitude of the frontward quality on a foreign currency could be equal to the interest rate differentials between the states in contrast.

The interest rate variance between local and global was equal to the anticipated difference in the domestic exchange rate (Bhole & Dash, 2002). The Interest Rate Parity theory stated interest rate variances between two varied currencies will be indicated in the discount for the forward exchange rate on the foreign currency if there was no activity of buying shares or currency in one financial market and selling it at a profit in another. Lower interest rates reduced margins, banks gained from their business with customers, since the spread between the interest rate on deposits and the nominal interest rates declines. However, there were equally other forces, like new entrants in the markets that led to a reduction in bank interest rate earnings. More competition meant lower prices, which forced banks, to reduce their interest rates on loans issued to customers and increased interest rates on deposits, in order to retain existing customers and acquired new ones. In order to thwart the reduction in margins, banks were forced to seek alternate sources of earnings (McDonald & Keassey, 2002).

According to Drakos (2003), interest rate earnings serve as indicators of the efficiency of a particular banking system and consequently used for competition policy evaluation. Conversely, the rise in banking competition might slacken fiscal steadiness (Weill, 2004). Due to lower profits and banks accepting more uncertainties, a rise in the potential for insolvency could be induced. Brock and Franken (2003)

studied interest rate spread in Chile, showing that the influence of industry concentration, business cycle variables, and policy variables on interest rate ranges varied significantly based on whether the ranges were calculated from balance sheet records or from disaggregated credit and savings records.

The present literature advocated that the main factors that determine differences in interest rate spreads for banks and its changes over the time were bank-specific characteristics were total assets, equity to assets ratio, liquidity level, market share, level of concentration in the system, entry regulations, restrictions on bank activities, institutional structure (Demirgüç-Kunt *et al.,* 2004).

Gambacorta (2004) studied the explainers of cross-sectional variances in interest levels of Italian banks by examining micro and macroeconomic aspects. The variables considered included credit and saving demand, operating prices, credit uncertainty and interest rate unpredictability, impact of fiscal policy via alterations in policy rates and the reserve needs and the outlay of particular industry. Results of the study showed that interest the rates on short term lending of liquid banks and well capitalized banks reacted less to various monetary policy shocks. In count, banks that predominantly lend for long term did not change their interest rates more frequently as those whose lending was largely for short term. Bank magnitude was reported to be inconsequential in affecting interest rate ranges. Lending charges had a positive link with real GDP and price rises. A rise in real economic activity rendered programmes that would else seem untenable to be productive when reduced to the present.

Chirwa *et al.* (2004) used panel data techniques to look into the grounds for interest rate ranges in the Malawian banking sector over the relaxed 1990s. Their results showed that the charged high interest rate spreads were directly attributable to

particular monopoly power, high central bank reserve requirements, high central bank discount rate and country inflation. This could though affect Individuals negatively through increase in credit card and mortgage interest rates, especially if they carried a variable interest rate. In the study by Dowd (2005), he observed that one common method to measure interest rate risk was gap analysis. The difference between the amount of the whole portfolio and the amount of the part that had to be re-priced during a specific period of time was the gap, which was also called interest-rate exposure and represented the change in interest income due to changes in interest rates. A second method was duration analysis, which dealt with the weighted average term to maturity of a bond's cash flows, where the weights were the present worth of each cash flow relative to the present value of all cash flows. Compared to gap analysis, duration analysis had the advantage of analysing changes in values of the asset or the portfolio and not just in income.

Bawumia *et al.* (2005) observed that the efficiency and effectiveness of the financial system of a country affected its interest rates spread but Ghana's interest rates had remained quite elevated over the times in spite efforts by the central bank to cut it down by limiting the prime range. The increased interest range system in Ghana was a key issue to private sector firms as they incapable of obtaining loans for operational processes and still remained competitive.

Sollogoub (2006) posited that high interest rate was an indicative of some inefficiency in the country's banking sectors of most developing countries, as it was widely acknowledged that the interest rate earnings were a sufficient framework of the bank intermediation effectiveness.

Matu (2006) holds the view that the low productivity of commercial banks places tension on them to keep high crediting rates in a bid to cut down on the harms linked with the credits and in the process affecting the bank's clients. The Proper interest rate management tends to reduce bank exposure to risk and also provides an opportunity to stabilize and improve their overall net income. This high interest rates had become a macroeconomic dilemma that was difficult to rid had been a key issue for many financiers in Kenya.

Beck and Hesse (2006) used bank-level information on the Ugandan banking sector to investigate the determinants of the regularly high lending charge ranges. While non-Ugandan banks had reduced lending charges, there was no strong and economically useful link between interest range and denationalization, influx of foreign financiers, market outlay and banking effectiveness. At the same time, macroeconomic factors hardly explained the over-time variance in loaning interest rate earnings. Bank-level factors, however, like bank magnitude, operating expenses and contents of the credit profile, explained much of the interbank, durational alteration in interest rate earnings.

Interest rate is outlined as the price that customers pay for the use of money they borrow from a lender or financial institution, or fee paid on borrowed assets. Fiscal intermediaries like financiers levy a fee for the work they offer under risk and set the interest rate ranges for savings and loans. When the intermediation fee is increased, indicated in the elevated interest rate range, the loanee may be incapable of remitting the credit due to the price of such credit. The more raised the exposure of a financer to credit uncertainty, the higher its tendency to face financial problems (Crowley, 2007).

Mwanza (2007) investigated whether the level of various banks derivative activities was associated with the market perception of banks interest rates and exchange rate

risk. The study found a positive relationship between bank stock return and long term and short-term interest rates and exchange rates. The extent of derivative functions was positively linked with long-lasting interest fee exposure but negatively associated with immediate lending fee and exchange rate exposure. Crowley (2007 and Grenade (2007) observed that there was a pervasive view amongst some stakeholders that high interest rate earnings were caused by the various internal characteristics of particular the banks themselves, such as their tendency to maximize profits in an oligopolistic market, while many others such as Hassan and Khan (2010) argued that the interest rate earnings were imposed by the macroeconomic, regulatory and institutional environment in which banks operated.

Grenade (2007) estimated the factors of banking lending fee ranges in the Eastern Caribbean Currency Union using annual panel data of the financiers. The empirical model included regulatory variables as well as market power, operating costs as a ratio of earning assets, ratio of provisions for loan losses to total earning assets as a measure of credit risk, liquidity risk delegated by the ratio of liquid assets to total assets and real GDP as an indicator of economic activity. Market power was deputed by the Herfindahl-Hirschman index computed using the market shares of loans and advanced in the banking industry. The range was reported to rise with a rise in market dynamics, the controlled savings deposit levels, real GDP growth, reserve regulations, provision for credit losses and operating expenses.

Aboagye *et al.* (2008) studied the direct response of net interest margin of banks to exposed changes in various factors that are particular or bank-specific, banking industry specific and the Ghanaian economy macroeconomic factors in particular. It found that a rise in the following aspects elevates the net interest range of financiers: bank market share, bank magnitude, staff prices, administrative charges, degree to

which a financier is risk opposed and price rises. Conversely, a rise in excess surplus of banks, central bank crediting limits and management efficiency reduction of the net interest range of financiers

Chen and Liao (2011) carried out the study analysis with banking data of commercial banks, savings banks and bank holding companies in 70 countries for the period between 1992 and 2006 had an aim to identify empirical factors explaining Net Interest Margins. It was stated that when the results 17 related to Net Interest Margins, it was observed that bank specific variables such as operation costs, bank size, credit risk, liquidity risk and capital strength were found as significant empirical determinants of Net interest rate earnings.

Liebeg and Markus (2005) in the research carried out stated that Bank interest rate earnings had been declining in most EU Member States over the last decade. Examining a special selection of supervisory information for the Austrian banking regime from 1996-2005, this article investigated the shapers of bank lending levy rate limits. The key forces influencing the lessening of these banks' interest rate earnings were reducing operating expenses, the rising value given to foreign currency crediting combined with a rising share of non-interest revenues as well as increasing competition. Unlike the reports from the studies it was documented that a positive outcome of association banks on limits, with the loss of relationship banking being another explanation for the reduction in interest limits.

In the EU-25 section, many banking markets had witnessed a fall in their lending levy rate limits (ECB, 2006). In fact a look at the Bureau van Dijk Bankscope Database revealed that only 5 out of 25 Euro United Member States the Czech Republic, Greece, Hungary, Slovakia and the United Kingdom had seen a stable increasing

interest margin since 1999. Austria was not exception in this regard. The interest rate earnings of Austrian banks had decreased substantially over the last ten years. This paper investigated the major determinants of banks' interest rate earnings in Austria and identified the reasons behind the decrease of margins over the last decade. With interest income still accounting for nearly one half of Austrian banks' operating income, the observed margin reduction was relevant the drivers behind decreasing margins could enable the country to assess prospective changes in the margin reduction process. Regarding the financial stability aspect, the reduction of the interest rate earnings was of double importance.

In a study of the monetary policy regime and interest rate spreads in Barbados, et al., (2006) found that the factors advanced in the literature on the determinants of bank spreads are the macroeconomic environment, the banking sector's market structure, bank-specific factors, and financial regulation. Regarding the first determinant, macroeconomic imbalances were on overall linked to high bank distribution. Unpredictability in the macro economy was expected to raise the chances of non-payment by bank borrowers. Exchange rate instability and increased and inconstant inflation could constrain corporations' and households' capacity to address their credit liabilities, if it adversely affects their balance sheets.

Williamson (2008) in the study described that the interest rate risk arose when there were various mismatches between maturity of the bank's assets and the liabilities. In a bank where the long-term liabilities were used to fund its short-term assets, interest rate risk tend to expose itself as a reinvested risk due to assets mature before liabilities. If the interest rate falls, the reinvestment of those assets could be at a lower rate than the existing rate payments on liabilities. Obviously, the bank could earn profit from the risk as the interest rate increases. In other case, short-term liabilities

were a source for long-term assets, which required rollover of liabilities until the mature of the assets to repay the liabilities. Thus, the bank interest rate risk could ordinarily occur as a rise of the interest rate because the rate of the rollover of various liabilities was greater than the rate earned on applied assets. Obviously, in case of decrease of interest rate, the bank could obtain profits from the risk.

The history showed that real negative interest rates, was calculated as a difference between nominal interest rates and inflation, and it were widely observed before. The most notable example was the United States, which experienced high inflation and accommodative monetary policy in 1974-77 following the stock market crash caused by oil price shock. In the United Kingdom, short-term interest rates were also in negative territory during this period as country was affected by the secondary banking crisis of 1973–75 (Barro and Sala-i-Martin, 1990).

The recent findings by Claessens et al., (2016) investigated the link between interest rates and Net Interest Margins for different interest rate environments using cross-country analysis. The analysis considered the sample of 3,418 banks from 47 countries for 2005-2013. The results confirmed their initial hypothesis that low rates contributed to weaker net interest margins and this effect was higher when 13 interest rates were low. Specifically, 1% decrease in the short-term rate was corresponding to a 9 by decrease in net interest margin in countries with high-rate environment.

Mettle (2013) carried out a research that in Ghana, there was a widespread perception that interest rate spread was too wide. Banks, on the other hand, had justified the wide interest rate spread on the origin of some economic variables that affect the banks. The aim of this study was to explore the bases of the bank lending ratios in Ghana. Founded on the obtainability of information, the study zeroed on select banking

sector-specific and macroeconomic factors of Interest Rate spread. Mettle realized that the forces behind the definition of lending fee ratio spread included Exchange Rate, Prime Rate, Treasury Bill Rate, Liquidity, Overhead Costs, Loan Loss Provisioning and Profit Margin.

The study carried out by Tirole (2010) indicated that short term interest rates were a vital tool of monetary policy, and were measured using variables like investment, inflation and unemployment. The author further added that the central banks of countries generally tended to reduce interest rates when they could increase investment and consumption in the country's economy. Kipngetich (2011) carried out a study on different factors influencing the variations of lending fee rates thus leading to how they affect the banks' productivity. He observed that commercial banks could come up with opportunities to take advantage of interest rates in order to improve on their financial performance. While the above studies provided valuable insights on interest rates and financial performance they only provided partial insight on the influence of specific interest rates determinants and performance of commercial banks.

Hamid (2011) indicated that interest rate could be decomposed into the different components. Various Banks charge higher interest rates to its riskier borrowers in its anticipation of them to default, and so interest rate therefore account for the banks loan loss provisions in the calculated decomposition. Interest rate also account for overhead costs, taxes, and required reserves, all the above are factors that contribute to higher interest rate earnings.

Mang'eli (2012) noted that noted fluctuations of the market interest rates spread exerted a significant influence on the performance of particular commercial banks.

Under general circumstances, bank returns increased with elevated lending fee rates. The study further posited that the entire banking system is immeasurably supported instead of being thwarted by a rise in interest rate range. As Karumba and Wafula (2012) found out in a recent study of collateral-backed lending in Kenya, interest rate earnings increased with rise in the collateral pledged. This was contrary to what would had been expected that higher interest rate earnings for firms pledging little or no collateral.

Lamarana (2012) in the study examined the performance of the various Malaysians local banks and foreign banks and compares their resultant profitability in the financial sector. This comparative study aimed to investigate the factors influencing bank overall profitability in Malaysia for the period 2005-2011 covering 16 major commercial banks (8 locally owned and 8 foreign owned). The author used ROA and ROE as a study dependent variable. On the other hand, capital adequacy, asset quality, management efficiency, liquidity and bank size are the noted independent variables. The researcher employed regression analysis to the panel data. The resultant comparison between the two categories of ownership indicates that foreign banks are more profitable compared to the domestic banks.

Siddiqui (2012) estimated the lending fee range in Pakistan based on individual bank specific factors assessing the elements of interest fee range of commercial banks in Kenya: An empirical investigation using annual panel data of 22 banks. The variables include market share measured as deposits of the bank as a percentage of total deposits of the banking sector, liquidity risk variable, administrative expenses as a portion of all assets, non-performing loans as a portion of net advances, net interest earning as a portion of all income and return on assets after payment of tax as a percent of average assets. The interest rate earnings was reported to be substantially

impacted by administrative costs, non-viable credits and return on assets in all the regression.

Ngari (2013) found that there was a positive linear relationship between interest rate spread and return on assets. While the above studies provided valuable insights on interest rates and financial performance they only provided partial insight on the influence of specific interest rates factors and productivity of banks. The research was thus targeted at ascertaining the impact of interest rates determiners and productivity of Kenya's commercial banks. In a study to determine the determinants of interest rate transmission, Saborowski and Weber (2013) examined whether financial dollarization affected interest rate pass-through. The results showed that financial dollarization had a significant and sizable influence on pass-through which suggested that the loan amounts held by foreign firms influence local interest rates.

An inquiry on determiners of loaning interest ranges in the sub-Saharan Africa was undertaken by Ahokpossi (2013) utilizing a selection of 456 banks in forty-one states. The results showed that bank-oriented aspects such as credit risk, liquescency risk and bank equity. Assessing the determinants of interest rate spread of commercial banks in Kenya. Friedberg (2015) defined interest rates for lending as the compensation lenders received from giving up their excess funds and interest, which had to be paid for borrowing as the amount charged to the individual or organization for use of the borrowed money. Depending on the transaction, there could be intermediaries like banks involved, which were compensated by a fraction of the interest rate. This led to a difference in the interest rate of the borrower and the lender.

This research endeavoured to ascertain the effect of interest rate components on the productivity of Kenya's commercial banks. Credit fee rates are the key economic

shapers that influence the overall fiscal health of a nation. They could be used to control inflation and to boost economic development. The interest tariffs determinants that were looked at are price changes margins, discount degrees, exchange tariffs and reserve prerequisite to ascertain the effect they have on performance of banks. In Kenya, the bankers play a central function in the fiscal sector, specifically on enlistment of deposits and offering of loans. African states, specifically at the bank-level, are still tackling the task of higher interest tariff ranges (Maigua and Mouni, 2016).

Erickson (2018) in the study he carried out on effects of capping interest rate on profitability of Kenya Commercial Bank showed that interest rate capping was negatively and statistically related to the bank's profits at 5% level of significance. The study noted that banks always lend with the objective of increasing income from interest income that increases profitability. This implied that interest rate was a tool which could be used to increase the margins of profits hence the higher the interest rate earnings, the higher the profits on the bank, holding other factors steady.

2.4.2 Credit Risk Bank and Interest Rate Earnings

The theoretical model of Ho at el. (1981) indicated that there was a noted positive correlation between interest rate and bank credit risk. The model also argued that when various banks were faced by deterioration in their credit risk, they tend to hedge against the impending loss by transferring a portion or all of it to their borrowers. The finding was done by increasing the applied lending rate or decreasing paid interest on deposits. The study indicated that increase in lending rates compromised the ability of borrowers to repay the borrowed funds.

Stieglitz and Weiss (1981) cautioned banks against high interest rates. The two scholars point out that higher interest rate negatively affected the quality of a bank's loan mainly because of incentive and adverse selection effects. First, it raised the overall riskiness of the portfolio of assets. Rising interest rates reduced the returns on all projects and made less risky projects unprofitable. This could make firms revert to other risky schemes as interest tariffs go up. Secondly, the banks had to screen borrowers before on boarding them. This was because at a high borrowing interest rate, the borrowers may be less worried about default or the prospect of non-payment. Banks could monitor the behaviour of borrowers but information was at a cost and also, not perfect. This implied that the rational profit maximizing banks had to practice credit rationing, which defeated the assumption generally made in financial liberalization literature, that of interest tariff relaxation eliminating credit rationing.

Leopold and Friiuhwirth (2001) showed ideally how to integrate the interest rate on credit risk. They proposed a modest two-factor framework in which the default degree of loanees was motivated by interest tariffs and the stock index, which subsequently were correlated. The study indicated that interest rate changes had an impact on the overall credit quality of assets, showed that in terms of the hedging of a bond portfolio, both credit and interest rate risk had to be considered.

Gizycki (2001) looked into the general changeability of Australian banks' credit risk aversion in the 1990s and noted that the impaired asset ratios of smaller financiers incline to be more changeability than for the larger banks. The Foreign banks with small assets bases within Australia experienced noted particularly high levels in their books impaired assets and low but variable profits between 1990 and 1992. The variance of the full panel data was decomposed to distinguish variation across banks and variation through time. The study further argued that more wealthy banks were

capable of pulling higher income due to lower expected insolvency outlays, which allowed them to reduce interest on unsecured debt.

A study carried out by English (2002) concluded in the research that it was unlikely that interest rate changes were an important factor for the stability of a banking system, even though English acknowledged that interest rate risk could be an important source of volatility of profits. English props his deductions by an econometric evaluation of yearly aggregate net interest earning in various states. The study carried out only found weak support that changed in the slope of the yield curve as well as long- and short-term interest rates impact on net interest earning in a research on interest tariff risk in the Belgian banking industry.

Maudos and de Guevara (2004) in their study, according to the findings they carried out suggested that credit risk required that banks should implicitly include a risk quality in interest rates and therefore the net interest margin. In the analysis variations in monetary strategy affected saving and credit rates through the interest tariff and bank lending. For instance, a monetary tightening that raises policy rate and short term interest rates made it more costly for banks to get funds and they passed these costs to loanees via higher lending tariffs. The bank crediting avenue operates via moral dilemma and adverse sampling. Following monetary tightening led to higher interest rates, banks tended to attract more risky customers and compensated for the higher risk hence increased lending rates (Gambacorta, 2004).

Barnhill et al. (2004) in their analysis attempted to measure the credit and market risk for the whole portfolio of banks. They developed a reproduction model to re-assess asset and obligations based on the condition of several methodical risk components, such as the term arrangement of risk-free and risky interest rates, stock indices and

property prices. The activity involved the integration of interest rate and the credit risk for corporates by a process of simulating the equity to the debt ratio conditional on the systematic risk factors and then to map it into different rating of asset classes. Also, for loans to individuals it was simulated the loan to value ratio conditional on systematic risk factors and assume that a borrower defaults if the loan to value was under a given set standard.

Fofack (2005) the research stated that a rising interest rate could trigger the cost of investment and thereby necessitated higher possibility of failure to honour debt obligations, resulting to dormant credits. When left unsolved, the non-performing assets could then compound into financial crisis, the moment the assets exceeded the overall bank capital in a relatively large number of banks. In Sub-Saharan Africa, of which Kenya is a case, the probability of a banking crisis occurring could be even more important because non-performing asset-related risks were complicated by the arrangement of the banking arrangement which was led by a few large firms. It was therefore hypothesized in this study that loading of the credit risk factor on creditworthy customers will automatically increases the cost of borrowing which ends up reducing the borrowing appetite of borrowers and increasing the risk of their default.

Tennant (2006) concurred that when the macro-economic situation falters led to a decrease in solvency of the banks' customers, hence growth in credit risk. The study also found that there were more factors besides the interest rate that accounted for overall credit risk in most Kenyan commercial banks. These aspects explained up to 31.7 percent of all non-performing loans advanced by commercial banks, and this could form an important basis for further studies on reduction of credit risk.

On a study on simulated correlated interest rates and credit spreads carried out by Jobst *et al*. (2006), noted that there were defaults for a portfolio of corporate bonds and track future profile valuations, integrating all coupon deposits. Using this data they calculate the ideal portfolio allotment if there were only one investment choice ex-ante or if the portfolio could be rebalanced at each point in time. Credit spreads could not be used from bond data when looking at banks' portfolios which include a broad range of non-traded resources and obligations. Instead, a model corporate and household credit risk directly was applied. The approach also took account of interest rate sensitive off-balance sheet items.

The key sources of credit risk include diminished institutional capacity, unsuitable credit strategies, volatile interest tariffs, poor control, unfriendly laws, low investment and solvency levels, directed loaning, increased licensing of financiers, poor or laxity in credit underwriting, uncontrolled loaning, poor credit evaluation, absence of non-executive managements, poor loaning practices, government influence and insufficient monitoring by the central bank. To cut down these uncertainties, it was critical for the fiscal structure to have well-funded banks, service to a broad range of clientele, exchange of data about applicants, steadying of interest tariffs, decrease in dormant loans, raised bank savings and increased loans extended to applicants. Loan non-remittance and dormant loans needed to be reduced (Sandstorm, 2009).

Mugendawala (2010) pointed out that the principals' macroeconomic determinants of interest rates and thus higher credit risk such as inflation which was the rate of change in the general price levels of consumer goods and services captured annually within the country. This was usually measured by the annual changes in the consumer price index. High and volatile inflation and the uncertainty created led to an increase in interest rates. Similarly, in any weak macroeconomic environment, and mostly in

developing countries in particular, the noted quality of offered collateral was likely to be weak, which in this case increased the costs to banks in their effort to recover loans after default. This could increase the amount of non-performing loans provisioning and led to higher interest rate earnings.

The approach of Olokoyo (2011), explained the attendant risks of banks having to set high interest rates in order to optimize returns from lending. When banks set very high interest rates, they induced the problem of adverse selection and moral hazard. This attracted applicants with very unpredictable schemes into the banks' portfolio. In return, the already high interest rates incentivized the borrowers into adding more risk to their investment portfolio due to high affinity for high returns.

The exposures to credit risk in banking industry has turned the lending sour, interest rate positions adopted and derivative exposures that could have been assumed to cushion balance sheet risk did not seem to be adequate (Olusanya *et al.,* 2012). According to Nazir *et al.* (2012) carried out a study on determinants of interest rate differentials in Pakistan. Their study used a 4-year data for 30 banks using correlation, descriptive and regression approaches in the analysis. They noted that credit risk affected positively interest rate earnings. Mannasoo (2012) investigated the role of the current worldwide fiscal downturn on interest ranges in Estonia. The approach had followed works of Ho and Saunders (1981) in which the interest spread was decomposed into a pure rate spread and the remaining component that was explained by the market structure, the regulation and idiosyncratic various bank factors. The Credit risk was found to play a minimal role in determining interest rate earnings.

According to Saad and el Moussawi (2012), credit risk was among the aspects with the strongest influence on banks' interest margins. Banks was predicted to charge

higher interest rates to borrowers in order to compensate for covering various anticipated and unanticipated credit risk. The significant inverse relationship between the real economic growth and bank interest rate earnings was based on the argument that the improved financial situation of borrowing firms could improve their crediting performance, thereby reducing nonperforming loans and allowing banks to cope with lower interest margins. Depreciation of domestic currency decreases banking margin, due to the deterioration of foreign currency loan quality. This effect was significant due to the considerable share of foreign currency loans in total bank loans.

Saad and Moussawi (2012) observed that credit risk was among the factors with the highest impact on the interest margins of the banks. Banks were expected to charge higher interest rates in order to compensate for covering anticipated and unanticipated credit risk. However, analysis of Latin American banking systems, had showed a negative correlation between the two variables. The decrease of loan rates or increase of deposit interest rates, besides the increase of non-performing loans share on total credit was a strategy pursued by commercial banks aiming to increase the market share.

Mang'eli (2012) noted that credit risk management technique remotely affected the value of a bank's interest rates spread as interest rates were benchmarked against the associated non-active credits and non-performing loans was a result of increased cost of credit. The study recommended that commercial banks in Kenya should assess their clients and charge interest rates accordingly in order to mitigate the risks associated with the defaulters since the lending interest rate on loans had an effect on the non-performing loans, as ineffective interest rate policy could increase the level of interest tariffs and subsequently non-performing assets.

According to the Central Bank of Kenya (2013), the study concluded that there was a positive and strong relationship between borrowing interest rates and non-performing loans in Kenyan banks. This meant that in order to ensure the stability and profitability of the banks, there was need to check the interest rates charged on loans. Lowering of interest rates could also be a big incentive for borrowers to repay their loans on time, besides stimulating borrowing for economic development. Since banks' internal efficiencies and cost of offering financial services were important contributors to the final value of interest rate charged on loans, enhancing such procedures and faster adoption of technology could lead to lower interest rates and hence reduced levels of credit risk.

Ahokpossi (2013) observed that importance of credit risk for the determination of interest margins, because credit risk was positively and significantly associated with net interest margins. During recessions, the default rate increased, credit risks were higher, and banks covered themselves with higher margins. Conversely, during booms, defaults decreased, activity was higher, and banks charged smaller margins.

The higher the better net interest margin, meant that the bank had the potential gains derived from the difference between interest incomes resulted in increased income and investment as one of the fiscal assets that could be utilized to prop up intermediation task particularly the availing of loans. Study carried out by Sitorus (2013) stated, the result of the research indicated that net interest margin influence the Loan to Deposit Ratio. The results showed interest that net interest margin variables could not strengthen the influence of a variable loan to deposit ratio to changes in foreign exchange incomes on the banks in Indonesia.

Were and Wambua (2013) observed that bank-related aspects play a substantial function in the definition of interest tariff ranges. These included credit uncertainties as approximated by non-active credits to total credits ratio, which had a positive relationship with interest rate spreads. Banks were compelled to then shift the credit expected risk premium associated with non-performing loans to the borrowers, which necessitated squeezing greatly the rates offered to the depositors.

According to the estimation carried out for the Mongolian banking system, the evidence revealed that credit risk affected net interest margin negatively. Credit risk influences negatively bank interest margins which had a coefficient of non-performing loans which was statistically significant (Chuluunbaatar, 2014). The approximated outcomes show that credit risk had negative and substantial impact on the productivity of Nigerian saving fund banks (Ogunbiyi & Ihejirika, 2014).

The capacity to analyse the risks and adopt suitable decisions would be paramount to success as they constitute an opening and a peril and have dissimilar implications for diverse users. The banking industry is exposed to dissimilar risks including; variable interest rate risk, operational risks, forex volatility risk, market play risk, and credit risk. These have been reported to negatively affect both its profitability as well as its overall financial health. Risk management has hence cropped out as a current as well as demanding field in banking. Basel II proposed to advance safety and reliability of the financial sector by laying substantial emphasis on a banking institution's internal control along with risk management procedures and standards (Kiliswa and Bayat, 2014).

Credit risk had no substantial impact on the Interest rate earnings. The average size of operations and the co-movement of interest rate and credit risk had no significant

impact on the Interest rate earnings either. In terms of the control variables, the extent of relationship banking wields a significant positive influence on interest rate earnings. This, however, was astonishing considering earlier reports on the topic by Ergungor (2005), in the study found no influence of relationship banking on bank interest tariff ranges. Our results, on the contrary, showed that an increase in the share of relationship banking loans to total loans by one percent drives up a bank's Interest rate earnings by more than 2 foundation points in the subsequent period and by roughly 4 foundation points in the long run.

In a study carried out by Bonga (2016) covering the period 2009 – 2015using financial data from five listed commercial banks in Zimbabwe, four locally owned banks and one foreign owned, posited that interest rate earnings was positively influenced by credit risk. As for banks, the increase in credit risk volume in conjunction with stable interest margin leads to positive increase in the bottom line.

Rodnyansky and Darmouni (2016) showed that banks' response to implementation of quantitative easing was not in line with the market expectations. This was caused by banks' unwillingness to reduce their excess holdings at the central banks, even when the rates became negative hence affecting the rate of interest rate earnings. Kalsoom *et al*. (2016) concluded that credit risk was a prominent factor behind profit margins of bank. Some other factors also existed that affect the profit level of banks but the focus was on the relationship of credit risk and bank profitability as it was a prominent factor among factors of interest rate earnings.

Wambari and Mwangi (2017) established that credit risk influenced the financial performance of commercial banks in a negative way. The study deduced that there was a positive significant relationship between lending rate ratio and fiscal

productivity of commercial banks. Beutler *et al.* (2017) showed that in the analysis of the transmission of realized interest rate risk from the gain or loss in a bank's economic capital was caused by movements in interest rates to bank lending the influence of an interest tariff jolt on bank lending substantially relies on the person's exposure to interest tariff risk. When a bank's exposure to interest tariff risk goes up, the influence of an interest tariff jolt on its loaning goes up. The estimates indicated that a year after a permanent one percentage point upward shock in nominal interest rates, the average bank in 2013 quarter three would reduce its collective credit growth by an estimated 300 foundation points. An estimated 12.5 percent of the impact would result from realized interest rate risk weakening the bank's economic capital. Second, the various bank lending appeared to be mainly driven by capital rather than available liquidity, suggesting that in a higher capitalized and efficient banking system can better shield its creditors from the various shocks in interest rates.

The inconstant credit was integrated into the framework to quantify asset quality and credit risks. The results indicated that credit risk had negative but statistically insignificant relationship with Rate of Assets but significant with Rate of Equity implying that the higher the credit risk of banks the higher the interest rate. When the provision for bad credit to advances ratio goes up, the credit uncertainty and the gathering of unpaid credit and interest go up. This finding was consistent with that of Musah (2017) where the study asserted that poor asset quality could had adverse impact on bank profitability reducing interest earning capital and elevating the provisions charge. Ultimately, the findings further showed that foreign-held banks are more viable than locally-held banks in Ghana.

According to Qi and Zhang (2018), credit risk was the key aspect in promoting the viability of the Chinese homeland banks. Conversely, the banks required increased

interest ranges to pay up for the liquid, unpaid and credit uncertainty exposures. Following the liberalization of the banking industry in China, domestic banks did not hold as many liquid assets and loan loss provisions as before.

2.4.3 Capital Adequacy and Interest Rate Earnings

The rule of thumb is that banks should progressively convert some of their earnings into capital to cover any liabilities that could occur in the future. For institutions with limited earnings there are strategic decisions that need to be taken to ensure capital adequacy. These include right issues, initial public offers, mergers and acquisitions or direct injections from shareholders. It is imperative that a bank is not being run on depositors' funds since these are liabilities on call at any time.

In the study the size of the bank could affect the attitude towards wholesale funding, including the access to the markets (Allen *et al.,* 1989) and the cost of the funds that were obtained. Furthermore, the importance of the bank's size was derived by the economies of scope and scale that could be achieved. For example, a larger bank could have better access to financial markets and interbank markets because of its larger counterparty network and its wider range of collateral. Moreover, the business model of a bank, which distinguished banks from other financial institutions.

The model results suggested that a higher ratio of capital adequacy was associated with lower interest margins. The finding was reiterative of the proposition by Brock and Franken (2003), under which less funded financiers had reasons to take up more risk linked with higher margins, in order to obtain higher profits. Likewise, more capitalized banks invested more carefully, as the risk of capital was larger. The researchers could be able to afford shocks to their balance sheets, but also gave up on

financial leverage, which could lead to lower interest rate earnings and lower returns on capital.

Higher capital adequacy of a bank was associated with lower interest margins. The dealership model, which predicted a positive association, as net interest tariff ranges could raise the capital platform as the contact with the risk increases. The finding was in accordance with the proposition by Brock and Franken (2003), that less funded banks had the drive to take up more risk related with a higher spread in order to receive higher returns.

This work had two key aims, amenability of capital sufficiency and non-active loan ratios prudential requirement and evaluation on the impact created by capital adequacy, productivity, and credit growth on dormant loans. Banking practices ratios as documented by the monitoring body Bank of Tanzania were employed in the investigation. The banking sector ratios showed that commercial banks in Tanzania had strong Capital adequacy ratio greater the 10 percent required by the Bank of Tanzania. Nevertheless, the banking business failed to fulfil non-active loans 5 percent threshold. Conversely, when regression scrutiny was deployed to examine the effect, it emerged that capital sufficiency, viability posed unimportant impact on non-active credits whereas loan to asset quotient and interest rate range had a substantial influence (Malimi, 2017).

Capital sufficiency ratio was popularly employed as a substitution for solvency of the financier. Capital adequacy rules aimed at preventing banks from taking up excess risk and guaranteeing banking sector steadiness (Claeys and Vander Vennet, 2008). The relationship between net interest margin and capital adequacy ratio can be affirmative or undesirable, based on the size of transferal of these components to

clients. Higher capital adequacy ratio implied that banks hold more capital compared to total assets. If competition on the market does not allowed the bank to transfer the cost of excessive capital to the clients, the more capitalized banks would had lower net interest margins. On the other hand, it could also be expected that less capitalized banks were inclined to accept more risk seeking for higher returns, what could result in moral hazard behaviour.

Coricelli and Roland (2008) posited that the findings could subsequently be understood as more proof in support of price-steadiness related central banking. Higher capital sufficiency of a financier was linked with reduced interest range. The study was thus reiterative of the proposition that less funded financiers had the drive to take up more risk related with an increased range so as to receive higher returns.

The relationship between net interest margin and capital adequacy ratio can be affirmative or undesirable, contingent upon the size of transferal of these components to clients. Higher capital adequacy ratio implied that banks hold more capital compared to total assets. If competition on the market does not allow the bank to transfer the cost of excessive capital to the clients, the more capitalized banks would had lower net interest margins. On the other hand, it could also be expected that less capitalized banks are inclined to accept more risk seeking for higher returns, what might result in moral hazard behaviour (Schweiger and Liebeg, 2009). The literature suggested an ambiguous effect of non-interest income on interest margins. In a market with a high level of competition, where banks could hardly affect interest rates, banks tend to lower the margins if they compensated the lower interest income by charging higher non-interest income. In this case, commission income and other non-interest income are expected to be a substitute of interest income and the relation could be

negative. Banks with high capital adequacy ratio, liquidity ratio and nonperforming loans ratio had lower net interest margin.

Barajas *et al.,* (2010) argued that capital option held by the bank is a function of the optimal amount of loans disbursed in the future. With option values, there was a difference between the optimal amounts of loans in the future with banks' lending capacity. Since capital was formed by withhold a portion of the bank's assets, not all the bank fund could be channelled as loans. By the time of optimal number of loans extended in the future increases, banks could increase the capital in order for the future banks had a higher capacity to extend their loans. On the other hand, the declining demand for loans in the future could not provide incentives to banks to hold capital or increase its capital. Therefore, it could be concluded that current level of capital was positively correlated with required levels of capital in the future.

Capital sufficiency is an indicator of the inner power of a bank, which could steady it in tough times (Beck *et al.*, 2010). It may have an impact on the general output of a financier, like opening of new subsidiaries, new loaning in high risk but viable regions, personnel recruitment and diversification of business through subsidiaries or through specially designated branches (Moosa & Bhatti, 2010).

Khediri and Khedhiri (2011) looked into the shapers of net interest ranges in Tunisia employing the dealership model of Ho and Saunders (1981). They observed that capital adequacy was positively correlated with interest margin, and thus showing consistency with the Ho and Saunders (1981) model. An inquiry by IMF found that the needed rise of loaning interest tariff by 120 foundation points gradually in 2 years for each 2 percent rise in capital sufficiency quotient (Roger & Vlcek, 2011).

Khedhiri (2011) observed that there was a positive and significant relationship between capital adequacy and net interest margin, in line with the theoretical and empirical literature. The research also found a rather negative and not statistically significant relationship between capital adequacy and net interest margins across all model estimations using pooled ordinary least squares, fixed effects and random effects models, in their study of bank net interest margins in Fiji. The fact must however be alluded to that the determinants of Net Interest Margin.

Several studies on the consequences of tighter capital regulations based on Basel III tried to identify the impact of these regulations to the economy by using changes in interest tariffs and the count of credits disbursed as an indicator of the economic downturn. As published in BIS report, the study Long-term Economic Impact Working Group research had concluded that each noted percent change in the capital structure while using the Total Capital ratio Equity vs. Risk Weighted Assets could then require lending rate increases by 13 basis points (Bank for International Settlements, 2011).

Wangui (2012) established that capital sufficiency rules created by Basel 1 had an adverse impact on credit generation by financiers in Kenya. This was proven particularly in 2000 when the rules were announced in Kenya and in 2009 when more enforcement of minimum statutory capital rules from Kshs 250 million to 350 million, up to 1 billion by December 2012. The trend in credit created had been shifting course every four years, which could be credited to jolts emerging from the fragmentary augmentation of capital sufficiency rules by the Central Bank of Kenya. The study generally showed that the volume of existing bank capital could act as binding constraint on liquidity and credit creation.

The elasticity of loan rates to capital requirements according to the calibration in Miles *et al.* (2013) found that it was consistent with a Modigiliani Miller offset of about 30 percent. The effects of increased capital requirements were modest, but not negligible. If there were considerable paybacks to elevated investment of the banking structure, from the findings it would mostly be supportive of current controlling endeavours to raise capital obligations in the commercial banks.

According to Rosman *et al.* (2014), banks worldwide, particularly in transitional states, are focused on elevating their capital sufficiency levels to 8% as recommended by the Basel committee so as to minimize the risk level of their balance sheets. This is believed would contribute to the long run improvement of banks' performance and prevent massive losses in case of future adverse financial conditions.

Obillo (2014) argued that capital adequacy had significant effect on return on assets. The study concluded that the model containing that capital could explain 80.5 percent of the changes in commercial banks profit margins. Obillo proposed that strategies be drafted to protect bank loaning tariffs and guarantee supervision of the same.

Dalecka and Konovalova (2014) suggested that a sufficiently important role in increasing the capital adequacy in the future would influence interest rate earnings in Republic of Latvia. It was known that in 2013, compared with 2012, the size of profit of the banking sector in Latvia increased by 40 percent which was 1.4 times. It was expected that in the period from 2014 to 2019 the profitability of the banking sector of Latvia would rise considerably. The average annual growth rate of profit since 2014, could reach more than 20 percent. This means that profits will replenish the banks' capital.

Although most banks in Africa already hold more capital than the minimum required raising the minimum capital adequacy requirements could still benefit African countries over the long term if it helped to ensure that their banking systems continue to hold high levels of capital to safeguard against the risks they face, which are mostly higher than the uncertainties experienced by financiers in developed regions (Brownbridge, 2015).

A study that examined the impact of liquidity was carried out by Marozva (2015). This study examined the impact of liquidity on bank performance for South African banks and for the period 1998-2014. In particular, in this study liquidity was measured in the context of funding liquidity risk and market liquidity risk. According to the results, there was a negative significant association between net interest ratio and funding solvency risk. Besides that, there was an inconsequential co-integrating association between net interest range and the two liquidity measures.

Murerwa (2015) assessed the factors of banks' fiscal productivity in developing states, examining specifically Kenyan banks. A positive relationship between capital adequacy and interest rate earnings of commercial banks in Kenya was established. The study recommended that banks put a lot of focus on their own internal processes since bank specific factors had the biggest impact on their profit margins. In the study carried out on how capital requirements affect bank loan rates, Dagher *et al.* (2016) noted that one percentage point increase in capital requirements varied widely, ranging from around 2 basis points up to about 20 basis points. The results showed that higher risk weights resulted in decreased lending to German firms, with no effect on interest rates. As banks face a regulatory minimum ratio of total capital to risk weighted assets of 8 percent, this implied that after the implementation in 2015 banks had to fund 12% of a High Volatility Commercial Real Estate credit with equity,

paralleled to 8% prior to 2015. As such, if a higher number of the life of a credit happens after 2015 then loaners could generate increased average capital obligation. Conversely stated, a 1% point rise in capital obligations resulted in approximately an 8.8 basis point rise in loan rates, an approximated about the middle of the range of numbers offered in the prior study.

Papavangjeli and Leka (2017) the results indicated that a higher ratio of capital adequacy was associated with lower interest margins. The results indicated that more capitalized banks invest more carefully, as the risk of capital is larger. Consequently, capitalized banks were able to afford shocks to their balance sheets, but they also gave up financial leverage, which could lead to lower margins and lower returns on capital. This is inconsistent with the model of Ho and Saunders (1981), which provides a positive correlation between the two variables. Their finding was reiterative of the proposition of Brock and Franken (2003) that less funded banks have motivation to take up more risk.

The standardized Financing Gap ratio that was employed in this study was used to proxy liquidity risk. Banks with a high financing gap had to use their cash, or even sell some liquid assets in order to fund this gap. It consequently increased the cost of funding and reduced the banks' profitability. In previous studies, it was found that a negative relationship of this ratio with return on assets and return on assets Equity and a positive relationship with the Net Interest Margin. Ferrouhi (2014), found that there was a negative relationship with Return on Assets, indicating that banks with high financing gap ratio, lack stable and cheap funding.

Winda *et al.* (2017) in their research carried out on the impact of increasing bank overall capital against the lending interest rate, total amount of loans, and the banks'

credit risk exposure. The study employed panel data from 18 strongest banks in 5 Southeast Asian states from 2008-2015. The findings showed that there was no significant relationship between capital increase and lending interest rate in Southeast Asia. This was a result of loaning interest tariff shift was motivated mostly from cost of the bank structure, rather than capital charge. Although lending interest rate had significant relationship with amount of loans, there was no transmitted impact of the capital increase to the economy.

A comparison between the large Swedish banks and niche banks indicated that capital requirement ratios seem to have a negative and statistically significant correlation with the return on equity for equally large and niche banks. Conversely, requirement ratios appear to have an affirmative and statistically substantial association with the interest rate range for niche banks (Stovrag, 2017).

The analysis of financial intermediation around the World provided evidence that the capital adequacy were negatively associated with income levels, that is, net interest ranges were substantially heightened in least income states. On the other hand, a regional focus showed that capital adequacy were especially high in Latin America and Sub-Saharan Africa (Calice & Zhou, 2018).

Glancy and Kurtzman (2018) in their study carried out observed that the High Volatility Commercial Real Estate ruled that increased interest rate for loans by 35 basis points for loans, High Volatility Commercial Real Estate showing that a one-point rise in required investment pushes up loan tariffs by about 8.8 basis scores.

2.4.4 Operation Efficiency and Interest Rate Earnings

According to Ndung'u and Ngugi (2000), financial reforms and liberalization could improve efficiency in the intermediation process. This implied that the spread could

decline over time as liberalization is accomplished and the financial sector develops. But in Kenya, financial liberalization seems to have led to a widening interest rate earnings. Studies had shown that there was a relationship between operational efficiency and interest rates margin. However, the evidence had been contrasting as the effect had not been conflicting. Findings of various studies had revealed inconsistencies regarding the relationship between operational efficiency and interest rate spread. The study further noted that it had been observed that large interest rate earnings occurred in developing countries due to high operating costs, financial taxation or repression and lack of a competitive banking sector among other factors.

Maudos and Guevara (2004) in a single-stage study of the determinants of net interest income in the banking sectors of Germany, France, UK, Italy and Spain, covering the period 1993 to 2000, employed the dealer model where they incorporate operating costs. They observed that bank interest margin was impacted by the average operating expenses.

Birungi (2005) amended the Ho and Saunders (1981) model to include the effects of administrative costs. The variables introduced were administrative costs where he observed that the interest margin depended on competitive operating costs, risk aversion of banks, among other factors not overtly into the theoretical framework such as opportunity cost of surplus, payment of implicit interest and the quality of control.

Ofori (2005) indicated on the research that high operating cost, which was noted to be mainly due to the labour costs, and the banks' determination to maintain high profit margins were the two greatest bank specific factors which contributed significantly to the wider interest spreads. The study further noted that if banks were efficient, then

the analysis could anticipate enhanced lucrativeness, increased quantities of monies intermediated, enhanced prices and service value for clients, and better security and reliability if some of the efficiency savings were subjected towards bolstering capital buffers that take in risk. Nevertheless, the converse attached to inefficient go-betweens, with the extra risk of taxpayer-funded industry bailouts if considerable losses are incurred.

Stiroh (2004) and Elsas *et al.* (2006) looked at model indeed suggested that an increase in the share of noninterest revenues in total revenues by 1 percentage point decreases the interest rate earnings of a bank by more than 2 basis points in the next period and by roughly 3.7 basis points in the long run. Reduction of Austrian banks' Interest rate earnings since 1996 could mainly be attributed to decreasing operating costs, increasing foreign currency loans and rising competition. The growing importance of noninterest revenues and a reduction in the extent of relationship banking drove margins further downward. In this respect, it was complemented the literature on relationship banking by documenting that relationship banking enabled Austrian banks to charge higher interest rate earnings. Hawtrey and Liang (2008) observed that most common validations given for the commercial banks' relatively large interest rate earnings included the uniquely high costs connected with running business in Jamaica. These factors, however, were downplayed by a few managers, and regulators and policy advisors as being overstated or simply immaterial.

Ariff and Can (2008) carried out a research on Chinese bank and Kenyan banks the study reported insignificant and negative effect of operational efficiency on interest rate spread. The interest rate spread among commercial financiers in Kenya had been widening over the years. During the post-liberalization period, it was expected the spread to taper to indicate efficiency improvements and reduced transaction costs with

the elimination of distortionary policies and strengthening of the institutional arrangements. However, Kenya's experience indicated a widening spread in the post liberalization period. In the past three year interest charged was fairly high in some banks up to 30% while interest earned by savers remains low. While interest rate charged was increasing interest rate earned remained static this resulted to a very wide spread over 20% and to some extent it meant that when interest rate increases bank were ultimate beneficiary. This provoked the members of parliament who threatened to have legislation to control interest rate.

Maudos and Solis (2009) model the Mexican interest rate earnings simultaneously including operating costs as determinants. The results indicated that in the Mexican context high margins could be mainly attributed to average operating costs measured by the Lerner index for total banking activity. Operating costs and operational efficiency were generally found to have a significant effect on net interest margin (Kasman *et al.*, 2010). Banks with high unit costs required higher margins in order to cover their higher operating expenses, while a higher operational efficiency allowed banks to lower interest margins through lower loan rates or higher deposit rates.

As restrained down in the study conducted by Campion *et al*. (2010), possibly the most important was the improved operational efficiency, a key driver of lower rates came primarily from five sources: competition, reinvestment of returns, learning by doing, strains from benefactors and stockholders on Microfinance Institutions to be publicly answerable, and the lack of interest tariff controls. Higher spreads and margins are often interpreted to signal greater inefficiencies and lack of competition in the banking sector. According to Kasman *et al.* (2010), operating costs and operational efficiency were generally found to have a significant effect on net interest margin. Commercial banks with high unit costs required higher margins in order to

cover their higher operating expenses while a higher operational efficiency allowed commercial banks to lower interest margins through lower loan rates or higher deposit rates.

As stated by Campion *et al.* (2010), a key driver of lower rates came primarily from five sources which included competition, reinvestment of profits, learning by undertaking, strains from benefactors and stakeholders on microfinance finance institutions to be publicly accountable, and the lack of interest tariff controls. As this variable was measured by the income ratio, an increase of this ratio meant a deterioration of management efficiency and could result in a decrease in the net interest rate earnings.

There was a considerable degree of agreement that the quality of management made the difference between sound and unsound banks. As this variable was measured by the income ratio, an increase of this ratio meant a deterioration of management efficiency and could result in a decrease in the net interest margin. Sarpong *et al.* (2011) in their study carried out conserved that variations in overhead and operating costs were reflected in variations in bank interest margins as financiers transmit their operating expenses on to depositors and lenders.

According to CBK report (2011), the most common risks in financial institutions were; strategic risk, credit risk, liquidity risk, interest rate risk, foreign exchange risk, price risk, operational risk, reputational risk and compliance regulatory risks. The management of financial firms should give substantial value to enhance the capacity to define, approximate, supervise and regulate the overall levels of risks undertaken. Strong risk control mechanisms allow administrators to take risks consciously, cut down risks when possible and endeavour to get set for a posterity that may not be

forecast with absolute certainty. Operating efficiency model based on bank specific performance indicators was intended to offer one approach to risk management of higher interest rate earnings in the banking sector.

There was a substantial extent of concurrence that the quality of control made the variation between good and worse banks. As this variable was measured by the income ratio, an increase of this ratio meant a deterioration of operational management efficiency and could result in a decrease in the net interest range. Sarpong *et al.* (2011) maintained that variations in overhead and operating costs were reflected in variations in bank interest margins as banks pass their operating costs on to depositors and lenders. The study further indicated that high operating cost, which was mainly due to labour costs, and determination of the bank to maintain high profit margins were the two bank related aspects that add considerably to wider interest ranges.

Olweny and Shipho (2011) investigated the impact of banking service elements on the lucrativeness of commercial financiers in Kenya, utilizing panel data from 2002-2008 of 38 commercial banks. They concluded that bank-related issues were more important in affecting the lucrativeness of banking services in Kenya compared to market forces. The study observed that lucrative bankers were those that endeavored to boost their capital foundations, cut down operational expenses, improve assets standards by limiting the rate of non-active credits, undertake revenue diversification strategies as opposed to focused strategies and maintain the right amount of liquid assets.

Siddiqui (2012) noted that in case of Pakistan, the State Bank of Pakistan observed that bank-specific factors such as administrative expenses positively influence the

level of banking spreads in Pakistan. The authors in the study in Pakistan concluded overhead costs are highest for foreign banks, resulting in the lowest return on assets (ROA) compared to private and public sector banks. The studies show that high overhead costs are largely reflected in high employee payments and highly automated and ell designed and furnished bank branches and contributes to interest rate earnings.

Haruna (2012) carried out a study on the forces behind cost of fiscal intermediation and approximated six models on the basis of six suggested conceptualisations of interest ranges. The study was for 13 Nigerian quoted commercial banks, and both popular panel data models was used; fixed effects model and random effects model. The study concluded that operating costs influenced the interest rate earnings. Sharma and Gounder (2012) examined the profitability determinants of deposit–taking firms in Fiji from 2000 to 2010 periods. The study used panel data techniques of fixed effects estimation and generalized method of moments (GMM) whereby they observed that market power (measured by the Lerner Index) was a key force behind lucrativeness. Hence, firms were permitted to transfer to their consumers the interest charges of increasing deposit liabilities and the overall cost of doing business.

Afzal and Mirza (2012) carried out a study on the factors of intermediary effectiveness for commercial financiers in Pakistan from 2004-2009, which was a post transition period. The study introduced a default indicator variable using a Black-Scholes option pricing model. Findings of the study pointed out that determinants of interest rate earnings included operation efficiency. Siddiqui (2012) in the study in Pakistan concluded overhead costs were highest for foreign banks, resulting in the lowest return on assets compared to private and public sector banks. The studies showed that high overhead costs were largely reflected in high employee payments

and highly automated and well designed and furnished bank branches and contributed to interest rate earnings.

On the study of determinants of net interest ranges across 4 regional segments in Sub-Saharan Africa and a comparative analysis with the Eastern Caribbean Currency Union, Boutin-Dufresne *et al.* (2013) noted that high operating costs was one of the most significant factor influencing the high bank interest margins in East African Community (EAC) compared to other sub-regions. An increase in operating costs was expected to have positive influence on interest rate spreads. High operating costs was to include expenses from inefficiency resulting to wider ranges and subsequently this factor was popularly utilized as a sign of operational ineffectiveness. An increased cost of fiscal intermediation could raise interest tariffs on credits while pushing down those on deposits (Were and Wambua, 2013).

Boutin-Dufresne *et al.* (2013) studied the determinants of net interest margins across four regional blocks in Sub-Saharan Africa and did a comparative analysis with the Eastern Caribbean Currency Union and found that high operating costs and a high equity capital and institutional actors such as the rule of law, are the most important factors explaining the high interest margins in the East African Community compared to other sub-regions. Overall it could also appear the generally high bank spreads in the Sub-Saharan African region could be explained by high switching costs between banks for bank customers which tend to slack competition among banks resulting in high bank spreads.

Wang *et al.* (2014) evaluated efficiencies of the Chinese commercial banks and observed that the Chinese banking reform improved its overall efficiency over the study period of 2003 to 2010. Upon Tsalkitzidis (2015) analysing determinants of

Banks' Profitability in Greece and Balkans before and during Financial Crisis, observed that operation efficiency came out as negatively related to bank's performance and statistically significant. The aforementioned result was the expected one and suggested that the higher the expenses of a bank, the lower its profits.

Interest rate spread remain a controversial area of study as some scholars link it to market forces and others to individual banks inefficiency, and even others link it to external macroeconomic forces. Banks that perform well managed to keep interest rate spreads wide. Most of the studies concluded that the spread was as a result of inefficiency in the banking sector. The general objective of this study was to investigate the effect of operational efficiency on interest rate spread among commercial banks in Kenya. The study concluded that operational efficiency positively and significantly influenced the interest rate spread among commercial banks in Kenya. The study recommended that the central banks could apply a contingent and stringent regulations on the interest rates charged by banks so as to regulate their interest rate spread (Mwangi, 2015).

The study concluded that the operational efficiency positively and significantly influenced the interest rate spread among commercial banks in Kenya. The study recommended that the central banks had to apply the stringent regulations on the interest rates charged by banks so as to regulate applicable interest rate spread (Mwangi, 2015).

Yao *et al.* (2018) observed that applying Herfindahl-Hirschman Index (HHI) on the profitability of Pakistan banks with the aim of evaluating the impact of market power and found results in support of Structure Conduct Hypothesis concluded that

operational efficiency was negatively and considerably linked to the lucrativeness of banks.

2.4.5 Liquidity Risk and Interest Rate Earnings

Angbazo (1997) posited that liquidity risk was expected to affect interest rate earnings positively. Banks with high liquidity risk tended to borrow emergency funds at high cost and therefore charged a liquidity premium that was displayed in higher interest rate earnings. Brock and Saurez (2000) carried out a study on a multi-country study of five Latin American countries made up of Bolivia, Chile, Peru, Argentina and Columbia, over the period 1991 to 1996, employing the Ho and Saunders (1981) two-step framework, and noted that for Latin America, interest rate earnings were determined by liquidity risk. The coefficient before liquidity ratio had a negative sign because banks with higher levels of liquid assets could receive less interest income than banks with less liquid assets. If the deposit market was sufficiently competitive, higher liquidity tended to be negatively correlated with net interest margins (Brock and Franken, 2003).

The liquidity risk premium theory stated that long-term rates were equal to the geometric average of the current and expected short-term rates plus a liquidity risk premium that 17 increases with the maturity of the security. For instance, considering the liquidity premium model, an upward-slanting yield curve could reflect the investors 'expectations that future immediate rates could rise, be flat, or fall, but because the liquidity premium increases with maturity, the yield curve could nevertheless increase with the term to maturity (Crouhy, 2005).

Kosmidou *et al.* (2005) argued that net interest margin was one of the most important determinants of bank performance measurement showing profitability of bank's

interest earnings business, but was negatively related to liquidity risk indicators found that when considering banks internal characteristics such as liquidity risk, there is a significantly negative link between solvency and Return on Assets. This do however became positive and insignificant when macroeconomics and others financial structure were taken into consideration. Doliente (2005) in the findings found a statistically significant negative relationship between net interest margins and liquid assets in Thailand and Malaysia in the study of South-East Asia That the results were negative in the non-monetary union Sub-Saharan Africa meant that within the non-monetary union Sub-Saharan Africa liquidity risk was likely to be relatively reduced because of deeper and more liquid markets deriving from the free movement of capital. As a result, banks factor in less liquidity risk premium in their interest rates than banks in the non-monetary union That the results were negative in the non-monetary union Sub-Saharan Africa meant that within the non-monetary union Sub-Saharan Africa liquidity risk was likely to be relatively reduced because of deeper and more liquid markets deriving from the free transfer of capital.

Cihak and Podpiera (2005) indicated that investors could always prefer short-term securities to long-term securities. In an uncertain world, then, saving and investment could be much more influenced by expectations and by exogenous shocks than by underlying real forces. One possible reaction of risk-averse depositors was to diversify the condition in which they hold their fiscal wealth based on what they think was likely to happen to assets prices- they were likely to vary the average liquidity of their portfolios. In periods in which people were confident that assets prices could increase, the study encouraged to hold a high proportion of their portfolios in liquid assets, benefiting from the higher rates of interest that they offered. Increased doubts

16 about future assets prices, on the other hand encouraged people to give up these higher rates of interest in search of greater security offered by more liquid assets.

Fielding and Shortland (2005) revealed in their research that liquidity absorption by monetary authority inclined to utilize monetary instrument tools such as central bank securities with high interest rate. This had made monetary policy transmission ineffective. The study concluded that in the long run, the implication of this policy was likely to increase the cost of monetary operation and therefore eventually made most commercial banks bankrupt. According to Pilbeam (2005), he observed that the higher short term interest rate induced banks to invest more in the short term instruments and enhanced their liquidity position Short term interest rates and banks liquidity were closely intertwined and, to a large extent, directly related. This relationship between the two variables short term interest rates and banks liquidity implied that an increase in one variable could have a similar effect on the other.

Government shortage affected banks liquidity of the firm in that an expected increase in government shortage signals a decline in gross domestic product, which could lead to decrease in banks liquidity of the firm due to the income effect. Also an increase in the level of inflation could affect liquidity of the bank negatively. Interest rates affected a financial institution's banks liquidity, both in the short and long terms. For instance, when the management of the firm expected the interest rates to go high or increase in the near future, then such a management could decide to hold less cash and opt to do more investment in order take advantage of the expected higher returns (Panico, 2008).

Shen *et al.* (2010) suggested that liquidity risk was positively associated to interest ranges in market based fiscal environments. This implied that banks with lower level

of illiquid asset were faced with lower interest income and those with higher liquidity assets encountered higher interest rates. Contrary to the above, their earlier findings in relation to interest margin concluded that unlike the earlier position, liquidity risk was negatively related to Return of Assets and inversely related to Return on Equity. In this context, they speculated that banks with higher illiquid asset incurred higher funding cost as extra funds to bridge the funding gap could be recouped from the market.

Kumbirai and Webb (2010) carried out a study on the performance of South Africa's commercial banking sector for the period 2005- 2009. The authors employed financial ratios to measure the profitability, liquidity and credit quality performance of five large South African commercial banks. They observed that overall bank performance increased considerably in the first two years of the analysis. A significant change in trend was noticed at the beginning of the global financial crisis in 2007, reaching its peak during 2008-2009. This resulted in falling profitability, low liquidity and deteriorating credit quality in the South African Banking sector.

Michael (2010) noted that high levels of banks liquidity made it easy for a financial institution to diversify its portfolios and invested in profitable ventures as a way of mitigating its risks of financial losses and monitoring its interest rates. A treasury bill is a temporary money market instrument which was released by the government. The Treasury bill rate is the discount at which the Treasury bill is issued. The TB rate is not stated on the bill itself, but like interest rates on bonds, has an inverse relationship to its price (Michael, 2010).

Vossen (2010) found that banks were tasked with regulating solvency creation and solvency risk. The study concluded that banks could change how to balance their

liquidity risk and their role as liquidity providers by restructuring their liquidity management strategies. Liquidity risk exposed banks to financial challenges hence causing high interest rate earnings.

Upon a studying the determinants of the interest rate spread of the banking sector in Uganda using time series data, Nampewo (2013) posited that interest rate earnings was positively influenced by liquidity risk. Utilizing a selection of 456 financiers in 41 Sub-Saharan African states from 1995 to 2008, Ahokpossi (2013) observed that liquidity risk was significant factor in the definition of bank interest ranges. According to Kimari (2013) an increase in the supply of liquidity of the bank, or an open-market sale of bonds could increase the interest rate in general, at least in the short term, while holding other market forces of demand and supply constant. He also found that Kenyan commercial banks attempted to control liquidity risk factors by balancing cash inflows and outflows and some even hold liquidity cushions for strategic purposes.

Tabari *et al.* (2013) observed that profitable operations and having adequate capital were among the major determinants of a safe and stable banking sector in any given country. The effectiveness of how assets and the managerial skills were used in organizations was attached on how profitable the said organizations were, in this case, the commercial banks in Kenya. Besides that, profitability acted as a mitigating factor to banks against short term risks. A bank noted to have higher liquidity may face lower liquidity risk hence is likely to be associated with lower rate spreads due a lower liquidity premium charged on lent loans (Were and Wambua, 2013). Banks with increased risk tend to solicit emergency monies at elevated costs and thus levy liquidness premium resulting to higher interest tariff ranges.

Under conditions of high volatility of wholesale funding on which banks had increasingly become dependent, bank interest rates could significantly diverged from the central bank rates, because of challenges in receiving liquidness. For example, during the 2007/8 financial crisis spill-over of tensions in the United States subprime mortgage markets to the banks' short-term wholesale funding market in the EU led to a rapid deterioration of liquidity conditions (Rixtel and Gasperini, 2013). According to Berríos, (2013) short term interest rate or Money market interest rates included the Treasury bill rate. As short term interest rate increases and since it had less default risk, banks tend to invest more in Treasury bill and other short term instruments and enhance their liquidity position. Treasury bill is considered as liquid asset according to the NBE.

An increase in liquidity may reduce the bank's liquidity risk, which alleviates the bank interest margin due to a lower liquidity premium charged on loans as posited by Ahokpossi (2013) who observed that banks with elevated risk are averse to solicit urgent funds at elevated costs and subsequently levy liquidity premium resulting to increased ranges of interest rates. Liquidity risk is usually obtained by calculating the portion of a bank's liquid assets to total assets. Liquidity risk differs across banks and relies on the sum of liquidity retained by the banks. The Commercial banks that have high liquidity tend to face lowered liquidity risks and vice versa hence they were likely to charge lower lending interest rates than banks with less liquidity. Banks with diminished liquidity also levy reduced liquidity dividends on credits. Commercial banks facing high liquidity risk are therefore forced to engage in bank interbank lending practices to cushion themselves hence cascading the costs to the borrowers of loans and as a result, they charged higher lending interest rates.

Khidmat and Rehman (2014) argued that liquidity risk was a bank's incapacity to fund additional productive assets and/or failure to repay the liabilities due. Under critical circumstances, lack of enough liquidity could result in bank bankruptcy, and could be placed under receivership by the regulatory authority, such as the Central Bank of Kenya in case of Kenyan Banks. Effective risk management approaches were necessary for banks to attain their strategic objectives.

Pasiouras (2015) Concluded that Banks could change how to balance their liquidity risk and their role as liquidity providers, restructuring liquidity management. In Kenya, empirical evidence on the application of both the traditional and contemporary techniques of assets liability management in the risk management process and in particular liquidity risks by commercial banks is scanty. According to Adoah Isaac (2015) on the study carried out on determinants of lending rates in Ghana came to the conclusion that non-performing loans had a positive and significant relationship with interest rate earnings.

Sumailla (2015) and Lartey *et al.* (2013) argued that the aftereffects of the 2008 financial downturn created liquidity difficulties in almost all advanced states and corporate bodies including banks the intense competition among commercial banks in Ghana and the increasing number of the microfinance and savings and loans companies that are competing for the available deposits and lending had slowed liquidity creation by main commercial banks. This meant that commercial banks in Ghana were supposed to pay more attention to their liquidity management. Research had established increasing interest rate in liquidity of firms worldwide and banks specifically, with stress on liquidity control.

Kenya and Gitonga (2016) concluded that high levels of liquidity provided adequate funds to lend which in turn increased interest rate earnings while Juma (2018) observed that liquidity risk has a significant influence on the financial performance of commercial banks in Kenya due to the increase in interest rate earnings.

Maithya (2016) posited that there was a weak positive correlation between banks liquidity of commercial banks and short term interest rates. The study therefore concluded that short term interest rates was not major determinant of bank liquidity in Kenya. Based on the findings on average, commercial banks in Kenya would register liquidity of negative units if the independent variables were excluded in the estimation model. This implied that there were other control variables that affected liquidity of banks.

The result seemed to confirm the reason why interest rate spread in Ghana was the highest or among the highest in Africa. The work looked into the conventional mechanisms of bank solvency like cash reserve requirement and solvency ratios, nature of liquidity control and financial ratio assessments. Banks in Ghana continue to make little on deposits but levy high tariffs on credits and payments to the public. The spread earned by Ghanaians banks therefore was high and considered to be the highest in Africa and other parts of the world. For example, the result was reiterative of those of Musah *et al.* (2018) who reported a positive association between interest rate spread measured by interest margin and profitability of commercial banks in Ghana.

2.4.6 Bank Size and Interest Rate Earnings

Large banks were hypothesized to have difficulty extending relationship loans interest rates to informational opaque small businesses due to Williamson-kind institutional

diseconomies of offering relationship lending services along with providing transactions lending amenities and other amenities to their large corporate clientele (Williamson, 1988). The omission of firm-centred data could have led to prejudices if big and small lenders are averse to loan diverse firms. Demirgüç-Kunt and Huizinga (1999) examined interest ranges in a cross-country scenario utilizing information covering banks from 80 states globally. The scholars established that differences in interest ranges and bank lucrativeness are accounted for by various forces like bank features, macroeconomic factors, direct and indirect bank taxation and deposit insurance regulation. After regulating for variables such as divergences in bank size, the degree to which these firms are leveraged, and the macroeconomic context, it was showed that decreased interest ranges and lower returns are linked with bigger banks asset to GDP proportion and a decreased market saturation ratio. Additionally, non-local banks are linked with increased interest ranges and elevated returns relative to local ones in growing states whereas the opposite was true for developed countries.

Moore and Craigwell (2000) used firm-level data of Barbadian banking industry on their findings to assess the relationship between interest rates and loan sizes. Six banks were reviewed for the period 1986 to 1998. Using fixed effects panel data framework, the study found a negative relationship between interest rates and bank sizes. The study concluded that interest rates differences were as a result of minor loans among other factors. This was different to traditional finance theory which discussed that as bank sizes rose, interest rates also would rise to accommodate the increase in associated risk of the loan. Large banks could also be disadvantaged because relationship lending often requires lower interest rates information that could be difficult to transmit through the communication channels of large organizations (Stein 2002). In the context of this argument, one literature examined whether large

banks are less inclined to make small enterprise credits. A number of studies found that large banks allocated a far lower proportion of interest rates on their assets to small business loans than do small banks where it induced decreased interest tariffs to lending clients.

The findings of a negative relationship between net interest margin and bank Size within the Euro and the non-Euro Areas are corroborated by the findings of Maudos and Fernando (2004) found who noted that a negative association of bank size with net interest margins point to cost reduction resulting from economies of scale. Logs and their square were used to capture the possible non-linear relationship between bank size and profitability in analysis of the determinants of bank profitability in Greece over the period 1985-2001.

Claessens and Laeven (2004) suggested that the concentration does not reduce institutional competition. Therefore Competition could also be affected by the magnitude of the banking sector in general or the size of the economy. In a smaller economy, the concentration of the banking sector would be greater and the number of banks smaller. However, in some small countries a very few large local companies represented the only reputable borrowers and banks competed fiercely to lend to them. The effect of reducing the size of the economy or the size of the banking sector on interest rate spreads could be negative if the small size results in a greater downfall in the count of dependable loanees than in that of banks.

Bank size positively and significantly influenced the interest rate spread among commercial banks in Kenya as per the study carried out by Boldbaatar (2006) who in order to examine commercial banks' interest rate earnings between lending and

deposit rates and found that bigger banks tend to operate with lower interest spreads due to better managerial efficiency.

Gelos (2006) in the study of bank spreads in Latin America found that in a defectively competitive scenario, larger lenders could be capable of taking advantage of economies of scale and lower interest margins. However, their proxy for size differs from Kenya commercial banks in that the researcher used the market share of each commercial bank in the deposit market as an indicator of size positive relationship of the bank size variable with net interest margin, and explained that it gave support to the economies of scale market-power hypothesis where larger banks made efficiency gains that could be captured as higher earnings.

Market size had an impact on banking sector Interest Rate Spread, as studies on small island developing states suggested that diseconomies of scale could increase per unit value in banks, thus keeping ranges high in line with Tennant and Folawewo (2007). This variable was anticipated to be adversely associated with Interest Rate Spread, as bankers in states with larger markets were more likely to benefit from economies of scale, thereby enabling them to keep their costs and spreads down. Ideally, the measure of economies of scale should reflect the market size of individual banks and not the whole economy. As a result of this problem, this variable could not be included in this study because the study do not use individual bank data.

Larger banks seemed to set lower margins. This was at variance with the supposition that large banks at their own volition could exercise their market power and exhibit larger rate spreads. De Prince and Morris (2007) found that larger banks in Latin America charged lower spreads and hypothesized that this reflected a greater scope

for risk diversification within large banks. The study further documented that the net interest margin was lower in a group of extra-large banks in the United States.

Allen and Liu (2007) noted that broadly, most studies on economies of scale in financial institutions found only small economies of scale in a firm's cost structure. Also within the empirical literature there exists the general feeling that economies of scale rise up to a certain level with size, beyond which financial institutions become too complex to manage and diseconomies of scale sets in. It was therefore anticipated that the effect of size could be nonlinear, meaning that net interest margin was likely to increase up to a certain level by achieving economies of scale and declined from a certain level at which banks become too complex to manage. As earlier noted because the possible collapse of some large and complex banks could generate negative externalities that could cascade into the real economy, for which reason governments and regulatory authorities endeavour to prevent always, S-efficiency could have a positive impact on Net Interest Margin.

Steffen (2008) examined the analysis on how loaning relationships affected loan rate flattening in United Kingdom and found that there was a negative but insignificant effect of loan size on interest rate spread. Theoretically, loan sizes could be positively related with interest rates because the interest rates proxy risks associated with higher loans but empirical studies has found mixed results as far as this relationship was concerned. Further, it was not empirically settled on whether there was a unidirectional or bidirectional relationship between interest rates and loan sizes and if unidirectional, from which end the relationship ran.

Bank size could be an important determinant of net interest margins. Bigger banks could have diminished costs per part of earning and thus higher net interest margins.

However, empirical findings in countries showed that the gain in efficiency by increasing the size was limited and was related mostly to very small banks. Staikouras *et al*. (2008) showed that, if there was economies of scale in banking, then a bank usually becomes more efficient when it agree to transform from small to medium size and much less efficient when it changes from medium size to big size. Bank size was the only one among bank-specific characteristics that was not significant. The impact of non-performing loans ratio on interest margin was negative for the Albanian banking sector. Even though the considered period had been characterized by very high rates, Albanian banks had been very cautious in non-transferring the increased costs to their clients.

Claeys and Vennet (2008) incorporated size in their study of the determinants of Net Interest Margin in the Central and Eastern European countries in the shape of market share which it was calculated as bank i's share of assets at time t in country j's total bank assets at time t, to proxy for relative market power. The research found that in the accession countries of Central and Eastern Europe the coefficient on the market share variable was not significant, which means, larger banks are not in a position to exploit their market power to achieve higher rents in terms of higher interest margins. The study also concluded that lower inflation and decreasing inflation expectations had a relatively considerable reducing effect on long-term interest rates than short-term interest rate, resulting in a reducing impact on interest margins.

Flamini *et al*. (2009) studied the forces behind bankers' lucrativeness in Sub-Saharan Africa, using the two-step General Method of Moments approach. They found that there was a significantly positive relationship of the bank size variable with net 199 interest margin, and explained that it gave support to the economies of scale market-

power hypothesis where larger banks made efficiency gains that could be captured as higher earnings due to the fact that they did not operated in very competitive markets.

The Bank size was generally brought about to explain existing economies of scale in the Banking market. The relationship between size and profitability was an important part of the firm's theory. Since larger Banks were more capable to realize economies of scale and reduce the cost of gathering interest rates and processing information. Dietrich and Wanzenried (2011) argued that larger Banks could had a higher degree of production and loans diversification than smaller banks which yielded high interest loans.

Radha (2011) observed that various parts of the banking segment in Kenya were faced with clients of diverse magnitude and kinds where the segmentation affected lending decisions. As a result segmentation of banks was affected significantly by bank size which was largely shaped by social factors that define the trust between banks and their clients. The positive link of bank magnitude with the ranges was determined by the type and arrangement of Kenya's banking segment.

Afzal and Mirza (2012) carried out a study on the factors of intermediary effectiveness for lenders in Pakistan from 2004 to 2009. The study introduced a default indicator variable using a Black-Scholes option pricing model. The results of the study indicated that one of the significant determinant of interest rate earnings was bank size among the other variables utilized in the study including asset quality, operation efficiency, liquidity, risk absorption capacity and national income growth rate.

Alkhatib (2012) examined the financial performance of five main Palestinian commercial banks listed on Palestine stocks and securities exchange with the aim of

assessing the overall financial performance of the Palestinian commercial banks. The author developed 3 different models; each consists of one main dependent variable and 4 identical independent variables for the study. The author used ROA as the internal financial performance indicator and the Tobin's Q model as a market financial performance indicator and finally the economic value was thereafter added as an economic financial performance specific indicator. The Bank size, credit risk, bank operational efficiency and asset management were used as independent variables. The study employed the correlation and multiple regression analysis of annual time series data from 200S-2010. The result of the research revealed that, the bank size and bank asset management were positively related with institutional ROA but the credit risk and overall operational efficiency were negatively correlated with ROA under the first model. under the second model it was noted that both bank size and asset management were positively correlated with the overall market performance of bank measured by Tobin's Q under the third model that is the model which use the economic reported performance of banks measured by EVA, except the operational efficiency, bank size, credit risk and asset management ratio which were positively correlated with EVA.

A study by Mwega (2012) suggested that it was monopolistic competition that best characterizes banks' market behaviour and provides further evidence of banking market segmentation in Kenya. Bank size was estimated as the log of total bank's assets. Ideally one would expect bigger banks to be associated with lower interest rate spreads, debatably because of large economies of scale and ability to invest in technology that would enhance efficiency. Nevertheless, to the degree that bank magnitude proposes control of the market in the savings and credit markets, a positive link between interest tariff ranges and bank size should not be surprising.

Calcagnini *et al.* (2012) sought to examine the link between loans, interest rates and guarantees in Italian banks. The study used 60 large Italian banks, 300,000 firms and 200,000 producer households which received loans of a certain amount. Using random effects panel data analysis technique, the study found that loan size was negatively related to interest rate earnings. Larger loans therefore tended to results in lower interest rate spread and vice versa. H further carried out a study on the impact of securities on credit interest rate prior to and during the current fiscal downturn in Italian firm financing. The data for 2006 – 2009 was used from the Bank Supervisory Reports. Loan size had a negative effect on bank loan interest suggesting that higher loan sizes were associated with lower bank loan interest while the lower loan sizes was associated to higher bank loan interest rates.

Akinlo and Owoyemi (2012) looked at the forces behind interest tariff margins in Nigeria utilizing a panel of 12 banking firms from 1986-2007. The pooled and fixed effects regression results showed that bank loan size had a positive effect on interest rate earnings. Thus as loan sizes rose, the interest rate earnings also rose. The interest rate on loans depended positively on real GDP and inflation.

Ghazouani *et al.,* (2013) assessed the main explanatory factors that might may affect the main banks performance in Tunisia. The authors used the internal factors namely; the size, bank capital ratio, reported credit quality, the operational efficiency, the bank deposit growth and ownership and the external factors included both the industry-specific variables such as concentration and size bank system and macroeconomic variables including GDP Growth and inflation. The scholars used data from the ten conventional commercial banks on the longest relevant period from1998 to 2011.The authors applied a dynamic panel data estimation approach, by employing the generalized method of moments (GMM). The empirical result suggested that the bank

total capitalization, as well as the best management efficiency, had a high positive and significant effect on the bank overall performance. The Private owned banks were more profitable in the study than state owned ones. The Industry-specific factors, such as the concentration and that of the system bank size had a negative and a significant effect on performance. As for the impact of the macroeconomic indicators, they concluded that the overall variables did not have a significant effect on bank performance. However inflation seemed to affect negatively bank's net interest earnings.

Bank size affects the firm's market share which affects profitability. The bigger the firms market share, the more the sales; so in this case commercial banks would be able for example to offer more loans hence they stand a greater chance of increasing interest income as well as profits. Bank size is normally used to capture potential economies or diseconomies of scale in the banking sector. Secondly, the size of banks as a variable control for cost differences and product and risk diversification (Rachdi, 2013).

In spite of the relaxation of the fiscal sector, high interest charge range was still a challenge in some of African states, not exempting Kenya. This paper looked into the determinants of interest charge range in Kenya's banking systems relying on panel data assessment. The empirical results showed that bank-related forces play a considerable function in the definition of interest charge range size of the bank is one of the factors, according to the research big banks had wider ranges unlike small ones. Further, the banking sector needed to explore internal as well as industry-driven strategies that countered some of the bank-specific factors associated with higher spreads. These could vary from broadening of goods to venture in cost-efficient and effective types of technology (Were & Wambua, 2013).

The results showed that loan size, credit risk, operating costs and liquidity had a weak negative effect on the interest rate spread of the banks while bank size and productivity had fragile positive impact on the interest charge range of the banks. All the effects were inconsequential at 5% level. The study therefore concluded that loan size does not influence the interest rate spread of the commercial banks. The study recommended that other factors that influenced the interest rates of commercial banks be used in order to ensure that commercial banks set optimal interest rate earnings and thus improve their income generation (Wambugu, 2014).

The West African Economic and Monetary Union had a far lower mean bank size which be interpreted as a case of the small bank market which could not support large banks. Again the relatively high level of market concentration in the West African Economic and Monetary Union, with the 3 largest banks taking up 60 percent of the market, and the five largest bank, 80 percent of assets (Leon, 2014), means the average bank size will diminish. Large banks had lower interest rates margin compared to small banks.

Bank size was the measure of how much in value the bank holds in terms of all its assets. Bank size was usually determined by a log of banks totals assets. From theoretical perspective big banks were expected to charge lower lending interest rates while smaller banks charge high interest rate because of the ability of these banks to utilize the economies of scale in their operation efficiency. Large banks also had high potential of investing in modern technology to enhance their efficiency compared to small banks (Were & Wambua, 2014).

Commercial firms are guardians of depositor's monies and work by getting cash deposits from individuals and crediting them out to the disadvantaged at statutorily

allowed interest rates. Loans size are founded on the credit strategy of the lender that is closely shaped by the central bank interest tariff regulations. These in effect determined the level of financial risk in a particular bank. A review of interest rate ranges by banks size showed that interest rates spreads were increased for bigger banks than for moderate and small ones. On average, small banks had lower margins. That could potentially be because small and low funded lenders find it relatively tough to gather capital and have to raise their deposit ranges to lure finances and reimburse for the view that they were more uncertain compared to bigger, more solvent, well-funded counterparts that were perceived to be too big to fail (CBK, 2014).

On the control variables, larger bank were more profitable than smaller banks (Amidu, 2007; Musah, 2017). This implied that bank size induces economies of scale thereby making larger banks more profitable. Economies of scale will limit the cost of collecting and managing data. The larger the bank size, the more profitable the bank in accordance with this large banks also induced lower interest rate compared to smaller banks which charged higher interest rates It could also mean that bank size is associated with diversification which may impact favourably on risk and product portfolio.

2.5 Conceptual Framework

The general objective of this study was to analysis the bank specific determinants of interest rate earnings of commercial banks in Kenya. This overall objective of the study was conceptually and diagrammatically represented in Figure 2.1.

Independent Variables   **Dependent Variable**
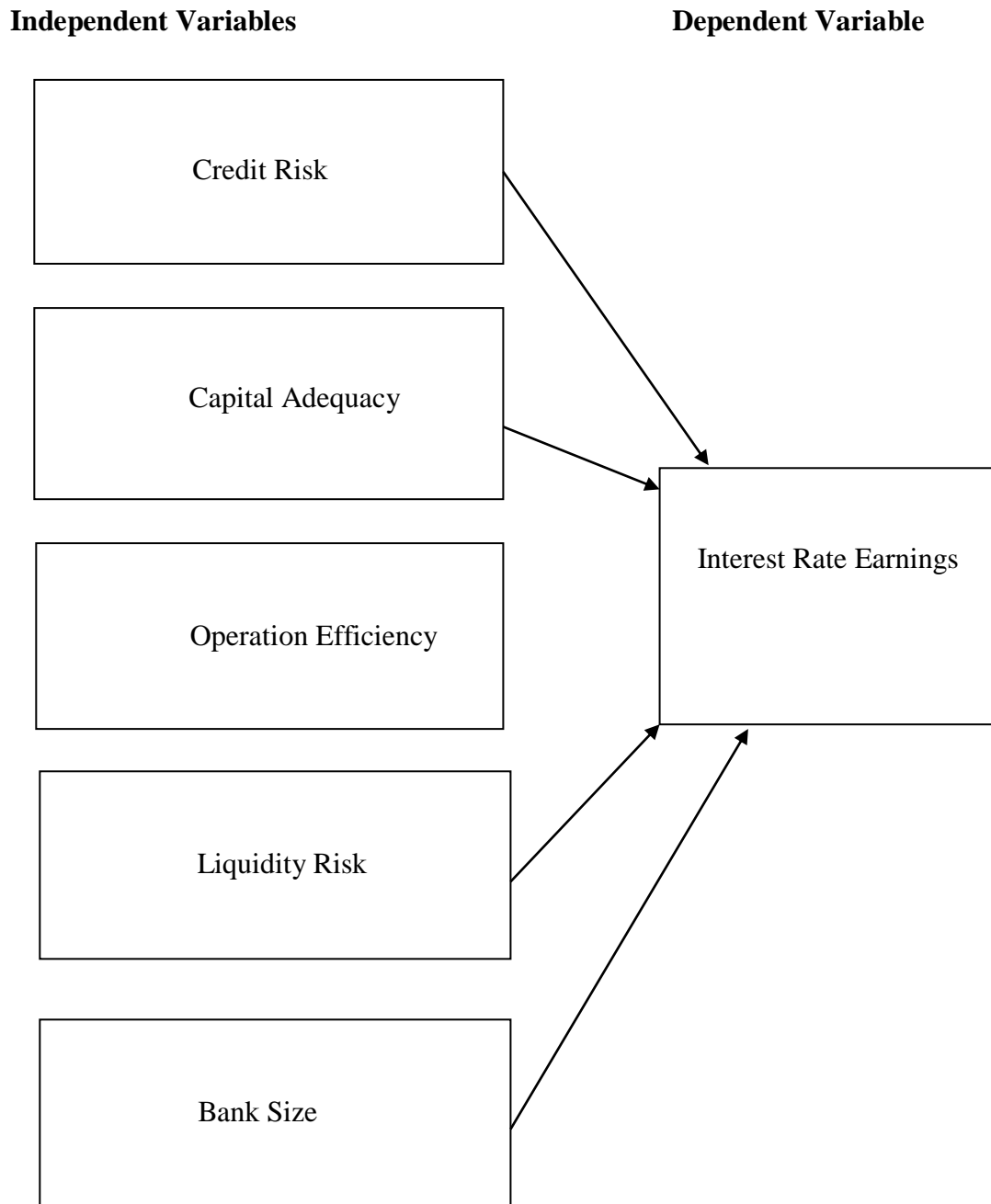

Figure 2.1: Conceptual Framework

Source: Author (2019)

This study adapted a model developed by Porter (1991), whereby in this study the dependent variable was bank specific factor while the independent variables were; credit risk, capital adequacy, operation efficiency, liquidity risk and bank size.

2.6 Research Gap

The study of interest rate earnings has been done for many countries and group of countries. Considering that there are bank specific factors, bank industry factors and macroeconomic factors, there has been no common variables agreed in the subject area. From the foregoing studies which extend the Ho and Saunder's (1981) dealership model it could be said that in the literature on interest rate earnings was normally expressed as a function of internal and external forces. The internal determinants emanate from factors specific to a bank over which bank management has control, while the external determinants derive from the industry, economic and legal environments that affect the operations and performance of the bank (Athanasoglou *et al*., 2008), but outside the control of the bank.

This study has looked deeply on the matter and found out that most scholars have recommended that bank specific factors and macroeconomic factors do influence interest rate earnings. Considering that Kenya introduced capping of interest rate, hence making Kenyan banking sector to be unique and consequently affecting policy formulation. This study, therefore utilized bank specific factors only since these are the internal factors which could be controlled by the bank management in coming up with interest rate earnings. Additionally, the study covered a more recent period ranging from 2013 to 2018 in which three years were characterized by unrestricted bank interest rate and three years characterized by capping of interest rate. This would enable comparisons of the effects of the determinants of interest rate prior and post period of capping of interest rate and draw policy implications thereof.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This section contains research methodologies; research design, philosophical paradigm, theoretical framework, operationalization of the theory, model specification, measurement of variables; data type, source, collection and refinement; diagnostic tests performed; estimations of the models and ethical considerations of the study.

3.2 Philosophical Paradigm

Saunders *et al* (2007) observed that social science research is based on two main philosophical approaches, positivism and interpretivism. Positivism deals with observable phenomena which emphasizes objectivism in putting forward explanations while interpretivism on the other hand deals with subjectivism and is focused more on understanding rather than explaining.

Saunders *et al* (2009) posited that the research philosophy considers the role of the assumptions we make about the way the world works; what different philosophies consider as being acceptable knowledge; and the role of our own values and research paradigms. These scholars indicate that research paradigm is a way of examining social phenomena from which a particular way of understanding these phenomena can be achieved and an explanation attempted.

This study employed positivism philosophy, which seeks to use existing theory to develop hypotheses that are tested and confirmed wholly, in part, or otherwise refuted, leading to further development of the theory to be tested through further research (Saunders *et al.,* 2009). A positivist stance on epistemology perceives

research as objective and value free observer who analyses the economic determinants, that is, credit, capital adequacy, bank diversification, operation efficiency and liquidity risk influencing interest rate earnings of commercial banks in Kenya.

3.3 Research Design

The study will employ an explanatory approach by using panel data research design. According Ranjit (2005), explanatory research attempts to clarify why and how there is a relationship between two or more aspects of a situation or phenomenon. Explanatory research aims at answering the question why. This type of research attempts to go above and beyond exploratory and descriptive research to identify the actual reasons a phenomenon occurs (Kumar, 2005). Hence explanatory research design was utilized employing panel data approach.

Panel data models tend to provide much more insights than ordinary time series models or cross section data models since it is usually theoretically possible to separate the effects of specific effects and actions (Hsiao, 2003). With panel data, variations across commercial banks in Kenya and time periods are accounted for. The analysis of the panel data is the subject of one of the most active and innovative bodies of writings in econometrics; the reason is that this type of data provide such a rich environment for the development of various estimation techniques and resultant theoretical results. Studies have been able to use panel data, that is, time-series cross-sectional data to examine issues that could not be studied in either cross-sectional or time-series settings alone.

With panel data, it was easy to control for unobserved heterogeneity across countries. This was upheld by Ben-Porath (1973) who observed that at a certain point in time, in

a cohort of women, 50 percent may appear to be working. It was ambiguous whether this finding implied that, in this cohort, one half of the women on average would be working or that the same one-half would be working in every period. These had very different implications for policy and for the interpretation of any statistical results. Cross-sectional data alone could never explain much on the issue. The main value of a panel data set compared to a cross-section is that it will permit the researcher sufficient flexibility in defining differences in behaviour across subjects the subject under study.

Hsiao *et al.* (1995) observed that in empirical studies investigators often encounter problems of shortage of degrees of freedom and multi-collinearity. That is, the information provided by the sample is not rich enough to meet the requirement of the specified model. To narrow this gap, investigators either often have to impose ad hoc prior restrictions. Exploratory research is used to develop a better understanding (Hair *et al.*, 2003) and provides useful information for a proper understanding of an issue or circumstance.

3.4 Theoretical Framework

Interest rate earnings is commonly defined as the difference between interest income and interest expense divided by total assets (Ho & Saunders, 1981; Wong, 1997; Demirguc-Kunt & Huizinga, 1999; Maudos & Guevara, 2004). The seminal paper of Ho and Saunders (1981), introduced Dealership Model, will be the reference framework for analysing the influence of economic determinants on interest rate earnings. This model tend to extend and integrate the hedging and various expected utility efficacy maximization approaches (Pyle *et al*, 1970). The bank in the estimated model is viewed as a risk-averse broker between the demanders and suppliers of funds. The bank will ask for a positive interest spread for providing immediate

liquidity service and risking a possible mismatch between the arrival of deposit surplus and loan demand. The net interest spread therefore equals:

$$s = (a + b)$$

Where s is the net interest rate; a is fee that is charged by the bank to provide immediacy of liquidity service, and b is the exposure /risk premium charged by banks to compensate for refinancing risk.

According to the Ho and Saunders model, the optimal spread is therefore:

$$s = (a + b) = \frac{\alpha}{\beta} + \frac{1}{2} R \sigma_i^2 Q$$

Where the term $\frac{\alpha}{\beta}$ represents the bank's net interest spread required by a risk-neutral bank in the model, under the given competitive conditions (α and β are the intercept and slope of symmetric bank deposit and the loan arrival functions respectively). R will corresponds to the bank's management coefficient to risk aversion, σ_i^2, variance of the interest rate on the deposits and loans and Q is the overall bank transaction size. The model shows that the optimal interest spread is a function of the four factors: (i) degree of bank risk-aversion; (ii) degree of competition in the market; (iii) the interest rate risk; (iv) transaction size.

Maudos and Fernandez de Guevara (2004) extended the Ho and Saunders model to take the banks' operating total costs explicitly into account, and also used a direct measure of the degree of competition in the market (the Lerner index) in addition to the degree of concentration of the market (Herfindahl index). Under these extensions, it is shown that the optimal spread is:

$$ s = \frac{1}{2}\left(\frac{\alpha_D}{\beta_D} + \frac{\alpha_L}{\beta_L}\right) + \frac{1}{2}\left(\frac{C(D) + C(L)}{2Q}\right) - \frac{1}{4}RX[(L + 2L_0)\sigma_L^2 + (L + D)\sigma_M^2 + 2(M_0 - L)]\sigma_{LM} $$

The term α/β is a proxy market power, L are bank loans, D are the deposits, Q is the average size of the bank's operations, R measure of absolute risk aversion by management, σ_L^2 is the adopted credit risk, σ_M^2 volatility in the money market interest rate (represent the reinvestment and refinancing risk), σ_{LM} is the interaction between the credit risk and open market risk, and C is the bank operating costs.

Our empirical analysis will be based on the framework of the Ho and Saunders (1981) model and its subsequent extensions. The most recent framework for the bank Dealership Model was given by Maudos and Fernandez de Guevara (2004), in which the theoretical motivated drivers of the net interest margins comprise operating costs, managerial risk aversion, credit risk, liquidity risk, interest rate risk, bank size, and market structure. In this study, Maudos and Fernandez de Guevara in which economic determinant influencing interest rate earnings comprising of credit risk, capital adequacy, bank diversification, operation efficiency and liquidity risk. The model will be specified as follows:

$$ Y_{ijt} = \alpha_0 + \alpha_1 CR_{ijt} + \alpha_2 CA_{ijt} + \alpha_3 BD_{ijt} + \alpha_4 OE_{ijt} + \alpha_5 LR_{ijt} + \varepsilon_{ij,t} \dots\dots\dots\dots\dots\dots 3.5 $$

Where $Y_{ijt}, CR_{ijt}, CA_{ijt} BD_{ijt}, OE_{ijt}, LR_{ijt}, \varepsilon_{ij,t}$ represents interest rate earnings, credit risk, capital adequacy, bank diversification, operation efficiency and liquidity risk respectively.

3.5 Model Specification

The Generalized Method of Moments (GMM) of estimation of DSGE model was employed in analysis of influence of bank margins interest rate on credit risk, cost of

capital, profit margin, cash reserve ratio and liquidity cost of the commercial banks in Kenya. The system GMM was applied to the entire commercial banks in Kenya since such estimator require large number of observations and small time period to provide consistent estimates. In the differenced GMM, the past values of dependent variable are used as the instruments for the current first differences of the dependent variable. One of the alternatives to the taking first difference is the using forward orthogonal deviations, suggested by Arellano and Bover (1995). The forward orthogonal deviation is implemented where the average of future values of each variable are deducted from the current value. This methodology is helpful in the availability of missing variables and it also protects the degree of freedom.

This implies that current realizations of the dependent variable are determined by past realizations. The problem in first difference GMM is the weak instrument. Estimation of dynamic model depicted in equation 3.5 was carried out:

$$Y_{ijt} = \alpha_0 + \alpha_1 Y_{ijt-1} + \alpha_{21} CR_{ijt} + \alpha_3 CA_{ijt} + \alpha_4 BD_{ijt} + \alpha_5 OE_{ijt} + \alpha_6 LR_{ijt} + \varepsilon_{ij,t} \ ....3.5$$

Where $Y_{ijt}, Y_{ijt-1}, CR_{ijt}, CA_{ijt} BD_{ijt}, OE_{ijt}, LR_{ijt}, \varepsilon_{ij,t}$ represents interest rate earnings, lagged interest rate earnings, credit risk, capital adequacy, bank diversification, operation efficiency and liquidity risk respectively.

3.6 Operationalization of Interest Rate Earnings

Considering that interest rate analysis has existed for long, various methods of operational are available.

3.6.1 Dynamic Stochastic General Equilibrium Modelling (DSGE)

Fernández-Villaverde (2010) indicated that DSGE models are dynamic in nature which assess how the economy evolves over time. DSGE models are based on the

assumptions of stochastic disturbance whereby considerations are made that the economy is subjected to random shocks. These shocks include sudden changes in productivity and prices, IT changes or unfavourable economic policies. The DSGE entails a unique category of dynamic stochastic macroeconomic constructs that feature a sound micro-founded general equilibrium framework, characterized by the optimizing behaviour of rational agent's subject to technology, budget, and institutional constraint (Smets *et al.,* 2010). According to Flotho (2012), Dynamic Stochastic General Equilibrium (DSGE) models have become preferred methodology used to analyse various questions in economic growth, business loops, commerce and financial decision challenges. DSGE models are based on the assumption of stochastic disturbance and assesses how the economy evolves over time.

This is an approximation formally defined by Hansen (1982). It has since become one of the popularly employed approaches in the approximation for models in economics. In this model, weighting matrix explains the serial correlation of unknown form, as well as for heteroscedasticity. Arellano and Bond (1991) indicated that use of GMM is one common method used to control for the heteroscedasticity, autocorrelation, biasedness and inconsistency when linear regression is used in estimation arising in dynamic panel data models.

The GMM is a numerical approach that tend to bring together observed economic data with available information in population moment conditions to generate the estimates of unknown parameters of this economic model. Once parameters have been obtained, inference can be performed about the basic question that is of interest in the research study.

The first step in GMM is to write the moment's conditions as a condition of orthogonality between regression and a set of instrumental variables. This involves specifying the list of instrumental variables. For the GMM estimator to be identified, at least as many tools as estimated parameters must be specified. A GMM estimation begins with an economic theory and the data are used to produce estimates of the model parameters. Estimation is done under minimal statistical assumptions, and often less attention is given to the fit of the model.

3.7 Justification of Using Dynamic Stochastic General Equilibrium (DSGE)

The motivation behind using a DSGE model to analyse the economic determinants of interest rate earnings are three-folds. First, since equations that describe DSGE models are derived from the explicit modelling of the optimization problems of economic agents, the effects of policy changes on the expectations of economic agents are captured by DSGE models. This makes DSGE models more suitable for policy analysis especially in monetary policy and business cycles as pointed out by Lubik and Surico (2006) where they observed that previous studies failed to detect structural breaks following changes in monetary policy, because they did not control for the heteroscedasticity problem induced by policy changes in their econometric tests. They showed that once heteroscedasticity was controlled for, structural breaks were detected in the data following policy changes. Secondly, current generation of DSGE models has been proven to have good empirical performance giving better results compared to reduced-form models, such as Vector Autoregression (VAR), SVAR models. Thirdly, the system GMM will be applied to the entire commercial banks in Kenya because such estimator requires large number of observations and small time period which provide consistent estimates.

DSGE models have gained popularity in contemporary macroeconomics, with greater interest coming from scholars, and then major economic decision-makers who are mainly interested in policy policy-making procedures in central banks across the globe (Tovar, 2009). These frameworks are vital as they clearly define the goals and challenges faced by households and businesses. As such, they help to define the prices and allocations based on marketplace relations in an uncertain environment. DSGE models permit analysis of important macroeconomic issues whereby numerical advances have made it possible to estimate models with many parameters without restrictions.

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Estimation is done under minimal statistical assumptions, and often less attention is given to the fit of the model. In a method of moments, a population moment condition is that a vector of observed variables, v_t, and unknown parameter vector θ with true value θ_0 which satisfy a $kx1$ element vector of conditions:

$$E[f(v_t,\theta)] = 0 \text{ for all } t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3.1$$

The method of moment estimator θ_T^* is used to solve the analogous sample moment conditions given as:

$$g_T\left(\theta_T^*\right) = T^{-1}\sum f\left(v_t, \theta_T^*\right) = 0 \quad\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.3.2$$

Where T is the size of the sample.

Consequently, under the usual regularity conditions, $\theta_T^* \xrightarrow{T} \theta_0$, where θ_0 is the solution for equation 3.2, in which there are k unknowns and k equations leading to unique solution. Suppose that f is a $q x 1$ vector and $q > k$ meaning there are k unknowns and q equations implying that there is no unique solution.

GMM picks a value for θ such that it approaches closest to satisfy equation 3.2. The closeness can be defined by the following criterion function:

$$Q_T\left(\theta\right) = \left[T^{-1}\sum f\left(v_t, \theta\right)\right]W_T\left[T^{-1}\sum f\left(v_t, \theta\right)\right] = g_T\left(\theta\right)'W_T g_T\left(\theta\right)\ldots\ldots\ldots\ldots.3.3$$

Where W_T is the weighting matrix, converges to a positive definite matrix W as T grows large.

The GMM estimator depends on the weight matrix $Q_{GMM}\left(W_T\right)$ which becomes the GMM estimator of θ_0 (true value) given as $\hat{\theta}$ can be obtained by finding argument of the minimum (argmin) of equation 3.3 as follows:

$$Q_{GMM}\left(W_T\right) = \hat{\theta} = \arg\min Q_T\left(\theta\right)\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.3.4$$

In applying the GMM approach, there are pertinent advantages including the requirement is a moment condition in which there is no need to log-linearize any

variable. Further, while non-linearities is not a problem when utilizing GMM approach, GMM is robust to heteroscedasticity and distributional assumptions.

The other advantage of using GMM is that the correlation of the error term and the dependent variable is eliminated. GMM methodologies, as linear and dynamic methodologies, are introduced to remove this correlation.

3.8 Measurement of Variables

This section provides description, unit of measurement, expected signs and measurement of credit risk, capital adequacy, bank diversification, operation efficiency and liquidity risk.

3.8.1 Interest Rate Earnings

Interest rate earnings is the dependent variable used in the study, and variables to explain its determinants are to be investigated. There is no agreed measure of interest rate earnings among the researchers. Various definitions have been put to use by past studies and no agreed measurement has been in place. The current study applied an ex-post measure approach which used the rates quoted on loans and the central bank base rate. The most widely used indicators is the net interest margin gap between interest earned and interest paid normalized by average earning assets or total assets and the banking spread gap between lending and deposits rates bank (Arshad, 2011).

3.8.2 Credit Risk

The total non-performing loans to total loans ratio (NPLR) was used as a main indicator of credit risk or quality of applied loans. If there is an increase in provision for loan losses implies there is a higher cost of bad debt write-offs. Given the risk-averse behaviour of management, many banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher rate spreads. Leading to the

higher risk, the higher the pricing of borrowed loans and advances to compensate for likely loss.

3.8.3 Capital Adequacy

This measured by the ratio of shareholder's funds to total assets of the bank. This is the measure of a bank's capital or net worth. It is used to protect the customers' deposits, strengthen the stability and soundness of reviewed banks, provide a stable resource to absorb the losses and promote the stability required and efficiency of financial systems in nations around the world obtained by lowering the risk of banks of becoming insolvent. The minimum capital ratio reserve requirement for a bank is set at 8 percent as stipulated by the Basel Accord (Basel I) of 1988; 6 percent of which must be provided by Tier one capital and the remaining 2 percent by Tier two capital. In Kenya, there are four tiers, that is, Tier I, Tier II, Tier III and Tier IV. During the process of winding-up, depositors can only lose their savings if a bank registers a loss that exceeds the amount of capital it possesses. Hence, the higher the bank's capital adequacy ratio, the higher the degree of protection of customers' deposits.

3.8.4 Operation Efficiency

This was computed as operating expenses as a ratio of total net operating income. This is a measure of how efficient the bank is utilizing its resources to generate income. Less efficient banks, experiencing larger operating costs, tend to require higher interest rate earnings.

Banks incur the costs of financial intermediation such as the screening of loan applications to assess the risk profile of all borrowers and monitor the reasons and projects for which loans are advanced. An increase in operating costs is expected to

have positive influence on interest rate earnings. High operating costs in a bank are likely as a result of various costs due to management inefficiency, leading to higher interest rate charged and hence, this variable is commonly used as an indicator of operational inefficiency. Therefore A higher overall cost of financial intermediation will tend to drive up interest rates on the loans while depressing interest rates on deposits. A higher cost of financial intermediation would drive up interest rates on loans while depressing interest rates on deposits. The study expected a positive sign.

3.8.5 Liquidity Risk

This was computed as the ratio of bank's liquid assets to total assets. Liquidity risk is the ability of the bank to meet maturity liabilities and customers' demand for cash. A bank must be liquid enough to meet its day-to-day obligations to its customers. Every bank seeking to maintain its integrity in the market and continue in banking business must ensure that it always has enough cash to pay its depositors.

The degree to which banks are exposed to liquidity risk varies across banks. This therefore means that a bank with high liquidity levels is expected to be less profitable than one with a liquidity level that is lesser. On the other hand, a bank with higher liquidity faces lower liquidity risk hence is likely to be associated with lower spreads due to a lower liquidity premium charged on loans.

3.8.6 Bank Size

Bank size was measured as a ratio of net income to total bank's assets. Ideally, one would expect bigger banks to be associated with lower interest rate earnings because of large economies of scale and ability to invest in technology that would enhance efficiency. Bigger banks are expected to attract large pool of deposits and hence a favourable loan rate to investors. On the other hand, bank size implies control of the

market in the deposit and loan markets. The study expects a negative sign between bank size and interest rate earnings. However, to the extent that bank size coin-notes control of the market in the deposit and loan markets, a positive relationship between interest rate earnings and bank size should not be surprising.

3.9 Population, Data Type, Source, Collection and Refinement

This section provides population, data type, sources of the data and how the variables were constructed.

3.9.1 Population

A population is the total collection of elements from which the researcher wishes to make some inference (Donald, 2000). The population of this research will be all commercial banks with normal operation in Kenya as at the end of 31st December 2018.

3.9.2 Data Type

Secondary data was used in carrying out this study.

3.9.3 Sources of Data

Secondary data, on annual basis, was used for the study covering the period 2013 to 2018. This data was obtained from Central bank of Kenya (CBK), Banking Survey, 2010, individual bank financial reports and World Bank. Much of the data for the study was gathered from published information from CBK.

3.9.4 Data Collection

A lot of secondary data are being collected and archived by researchers all over the world for research that are becoming more widespread (Andrews et al. 2012). Secondary data is usually collected by someone else for their primary research

purposes which may provide basic research principles. Secondary data was used in carrying out this study covering the period 2013 to 2018 on annual basis. Secondary data was extracted from published reports of all commercial banks from CBK Library. For the collection of secondary data, the entire population of 38 commercial banks in Kenya which were in operation as at 31st December 2018. With the 38 commercial banks in Kenya, there were 228 firm year observations.

3.9.5 Data Collection Procedures

Prior to commencement of collection of data, the researcher got authorization from Moi University, School of Business and Economics and the Ministry of Higher Education, under the National Commission for Science, Technology Research and Innovation (Appendix A.4 and A.5). The researcher was issued with research permit number NACOSTI/P/14/1442/3544 by the National Commission for Science, Technology, Research and Innovation. . Secondary data was collected using a developed data collection tool from CBK's Bank Supervision Annual Report, Published Data for individual banks on annual basis covering the period 2013 to 2018 both years inclusive.

3.9.6 Data Refinement

According to Central Bank of Kenya (CBK) (2018), the Bank Supervision Report indicated that there were 43 commercial banks operating in Kenya out of which three (Dubai bank Ltd, Chase bank Ltd and Imperial Bank Limited) were in receivership. Two banks, that is, DIB Bank Ltd and Mayfair Bank Ltd, were licensed to commence operations in April 2017 and June 2017 respectively. This meant that a total of 38 commercial banks were in normal operation in Kenya since 1st January 2013 up to 31st December 2018, the period under study.

Further, the data performed diagnosed tests before estimating the model to ensure that the required properties of the panel data using the specified model used were achieved. This was achieved by carrying out diagnostic tests relevant before conducting further analysis. Diagnostic tests for over-identification was carried out to check whether the model's moment conditions match the data well or not. Serial correlation test was tested for specification and serial correlation in error terms.

3.9.7 Data Analysis and Presentation

The main aim of this process is to assemble or construct data in a meaningful or comprehensible fashion. Yin (1994) noted that data analysis consisted the process of examining, followed by categorizing and tabulating or recombining the evidence to address the initial objective of a particular study. Once the secondary data were collected, the data were screened and edited to be in line with panel data expectations ready for use in the analysis. The study used descriptive statistics for the analysis of the data characteristics and presented results using tables, figures and graphs. The frequencies, mean, standard deviations and percentages were used to interpret the information all variables which were used for the inferential statistics analysis. Then GMM analysis was carried out using STATA 13.0 for inferential statistics analysis. The various analyses carried out using the STATA 13.0 were presented and discussed.

3.10 Diagnostic Tests

Diagnostic checks relating to the properties of data to be used in panel data modelling need to be implemented in empirical research. In econometric modelling and panel data, it was essential to diagnose the following tests:

3.10.1 Over-Identification Test

System GMM also assumes that there was no correlation of the unobserved effects and error terms across cross-section units. However, one of the difficulties of the System GMM is the over-identification problem. If the number of moment conditions is higher than the dimension of the parameter vector, the model is said to be over-identified. Identification issue allows us to test whether the model's moment conditions match the data properly or not. In GMM, the over-identifying restrictions can be tested via the commonly employed J statistic of Hansen (1982). If the model is correctly specified in the sense that $E[f(v_t, \theta)] = 0$, then the obtained sample analog to that condition should therefore hold at the estimated value of the parameters.

The hypothesis test for over-identification will be as follows:

Ho: There was over-identification restrictions (existence of mis-specification)

H₁: There was no over-identification restrictions (no mis-specification)

Over-identification problem exist if the applied number of moment conditions is higher than the dimension of the parameter vector, the model is said to be over-identified.

The Sargan–Hansen J-test is given as:

$$J = T \cdot \left(\frac{1}{T} \sum_{t=1}^{T} \left(g(Y_t, \theta) \right)^T \right) W_T \left(\frac{1}{T} \sum_{t=1}^{T} g(Y_t, \theta) \right) \xrightarrow{d} \chi^2_{k-l}$$

…………………3.3

Where T is the number of observations; Computation of the value of J from the data was done which is a nonnegative number. Comparison with the confidence interval of the χ^2_{k-1} distribution was performed.

If number of moment conditions in the model is greater than the dimension of the parameter vector θ, the model is said to be over-identified. The test of over-identification is enabled to check whether the model's moment conditions match the data well or not. In case there is no over-identification, it meant that there was no mis-specification and hence the model could be used to analyse the impact of credit risk, capital adequacy, operation efficiency, liquidity risk and bank size on interest rate earnings in commercial banks in Kenya.

3.10.2 Serial Autocorrelation Test

To test for serial autocorrelation, Wooldridge test, which was proposed by Wooldridge (2002) was employed. The proposed test for AR (1) serial utilizing the following test statistic can be stated as:

$$W = \frac{\sum_{i=1}^{N} \sum_{t=1}^{T-1} \sum_{s=t+1}^{T} \hat{u}_{it} \hat{u}_{is}}{\left[\sum_{i=1}^{N} \left(\sum_{t=1}^{T-1} \sum_{s=t+1}^{T} \hat{u}_{it} \hat{u}_{is}\right)^2\right]^{1/2}} \rightarrow \mathcal{N}(0,1)$$

……………….……3.19

Where $\hat{u}_{it}$ are the pooled OLS residuals. The test statistic W can detect many types of serial correlation in the error term u. Therefore, the test has power against both the one-way random-effects specification and the serial correlation in error terms.

Wooldridge (2002) suggested a test for the absence of an unobserved effect. Under the null hypothesis $H_0 : \sigma_\gamma^2 = 0$, the errors μ_{it} are serially uncorrelated.

3.11 Estimations of Models

Shamoo and Resnik (2003) in their study indicated that, data analysis involves the process of systematically applying available statistical and or the logical techniques to describe, illustrate, condense, recap, and then evaluate data. This section presents the specification used to estimate the coefficients of the economic factors influencing

bank margins interest rate of the commercial banks in Kenya under the studied period, 2013 to 2018 using GMM models.

The moment condition for OLS regression is $E(xu) = 0$, where x, the list of instruments, is the same as the list of regressors in the model. In the command, residual term, u, was defined inside parentheses by using a substitutable expression; because linear combinations declared in substitutable expressions do not include a constant term, (b0) was included. Inside the instruments ( ) option, listing of the instruments was done; by default, GMM includes a constant term among the instrument list. The GMM model in this case was used because the time variable has T > 3. The system GMM estimator as proposed by Arellano and Bover (1995) and Blundell and Bond (1998), a popular method for estimating panel data models. The conventional system GMM estimator is based on the assumption that the slope coefficients are constant over time, a restriction that typically results in a large number of over-identifying restrictions. The null hypothesis underlying the Sargan-Hansen test is that all over-identifying restrictions, including those resulting from assuming time constant coefficients, are valid. Hence, if the slope coefficients are in fact time varying, so that (some of) the over-identifying restrictions do not hold, the Sargan-Hansen test will tend to indicate that the model is mis-specified.

The GMM is a common method for constructing estimators, analogous to the maximum likelihood (ML). GMM uses assumptions regarding exact moments conditions of the random variables rather than those about the whole distribution, which makes it more accurate than ML at the cost of some efficiency. These assumptions are known as moment conditions. It generalizes the method of moments (MM), allowing the number of moment conditions to be higher than the number of

tested parameters. Using the extra moment conditions makes GMM more useful than MM. When there are more moment conditions than parameters, the estimator is said to be over-identified. GMM can efficiently bring together the moment conditions when the estimator is over-identified. GMM builds on the ideas of the expected values from sample averages. The Moment conditions are the expected values that specify the model parameters in terms of the true moments. The sample moment conditions are the sample of the equivalents to the moment conditions. GMM finds the parameter values that are the closest to satisfying the sample moment conditions of the tested parameter. The growing trend in regional disparities since the beginning of economic reforms in the late 1970s has led many scholars to examine the various aspects and changes affecting regional disparities.

The following equation was investigated:

$$Y_{ijt} = \alpha_0 + \alpha_1 Y_{ijt-1} + \alpha_2 CR_{ijt} + \alpha_3 CA_{ijt} + \alpha_4 OE_{ijt} + \alpha_5 LR_{ijt} + \alpha_6 BS_{ijt} + \varepsilon_{ij,t} \ldots\ldots\ldots 3.4$$

Where Y denotes the interest rates margin; Y_{t-1} represents the previous interest rate earnings; CR denotes the credit risk; CA is the capital adequacy; OE is the operation efficiency; LR represents the liquidity risk while BS represents the bank size. The coefficient parameters for these independent variables are given by α_{ij}.

In other studies done by scholars when there is a shock such as financial crisis and for this study, the introduction of capping of CBR, scholars like Dietrich and Wanzeried (2010) carried out the their research for the entire period and then separated the periods before and after the shock. In this study estimation of the entire period (2013-2015) will be carried out using equation 3.44. At a second step the separated data of the pre-capping of CBR period (2016-2018) and after capping of CBR ranging from

2016 to 2018 will be used to recalculate our model. Moreover, for each one of the above sub-samples assessing will be done using the bank specific economic determinants, that is, credit risk, capital adequacy, bank operation, operation efficiency and liquidity risk.

3.12 Ethical Considerations

In carrying out this study, formal approval was carried out for mutual interest between the researcher and the participants. Consequently, the following approval were obtained prior to commencement of the study:

a) Obtained a written permission from Moi University, School of Business and Economics through Economic Department (Appendix Table A.4).

b) Acquired research permit from National Council for Science and Technology-Kenya (Appendix Table A.5).

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Overview

The study employed different statistical techniques aided by STATA version 13.0 to analysis bank specific economic determinants influencing interest rate earnings of commercial banks in Kenya. This chapter describes the diagnostic tests performed, descriptive statistics, model selection, influence of credit risk, cash reserve ratio, diversification, operating efficiency and liquidity on interest rate earnings of commercial banks in Kenya and the results of hypothesis testing.

4.2 Descriptive Statistics

In this section summary statistics and graphical representation of the descriptive results are presented and discussed.

4.2.1 Summary Statistics

The secondary data indicated that commercial banks in Kenya were grouped under three categories: small, medium and large, based on the market share. A bank with market share below 1% is labelled 'small'; one with a market share bigger than 1% but less than 5% is labelled 'medium'; and one with a market share above 5% is labelled 'large'. The market share index used is a computed composite of net assets, deposits, capital, number of loan accounts and number of deposit accounts (CBK, 2018). Out of the 38 commercial banks, 6 were categorized as large, 9 as medium and the rest 19 as small as indicated in Appendix A.1 giving full list and grouping of each individual bank as at 31st December 2018.

The summary statistics before (period covering 2013 to 2015) and after (period covering 2016 to 2018) capping of interest rate for the thirty eight commercial banks in Kenya is presented in Table 4.1.

Table 4.1: Summary Statistics

	2013 – 2015				2016 – 2018			
Variable	**Mean**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Min**	**Max**
Interest rate earnings	0.1305	0.0238	0.0645	0.1926	0.1217	0.0283	0.0220	0.1991
Credit Risk	0.0673	0.0582	0.0000	0.2697	0.0948	0.0907	0.0000	0.6056
Capital Adequacy	0.1561	0.0459	0.0693	0.3211	0.1653	0.0602	-0.0749	0.4222
Operation Efficiency	0.6164	0.3307	0.2029	2.1789	0.6738	0.4147	0.0999	2.8111
Liquidity Risk	0.4176	0.0231	0.2024	0.9812	0.4176	0.1534	0.0911	0.8048
Bank Size	0.0250	0.0273	-0.0751	0.0725	0.0177	0.0452	-0.4380	0.0857

Source: Author (2019)

The results in Table 4.3 depicted that before the interest rate capping in Kenya, that is, the period over 2013-2015, the commercial banks in Kenya were charging a mean interest rate earnings of 13.05 percent. After the interest rate capping, that is, the period over 2016 to 2018, the mean interest rate earnings dropped to a mean of 12.17 percent. Upon comparing the bank sizes before and after the interest rate capping, the descriptive statistics showed that the mean was 0.0250 and 0.0177 respectively. This in essence indicated that after interest rate capping, variances of the bank size was reduced. This meant that the sizes of commercial banks in Kenya's variances was reduced.

The mean of credit risk showed that credit risk increased after capping of the interest rate depicted by the mean before interest rate capping was from 0.0673 and after

interest capping was 0.0948. This characteristic showed that commercial banks started to increase their provisions for loan losses after interest rate capping to cover higher cost of bad debt required to be written offs. Comparing the maximum credit risk points for the period before and after interest rate capping, the results showed that after interest rate capping a maximum value, 0.6056, was portrayed which was more than the maximum value, 0.2697, before interest rate was controlled. This characteristics showed that credit risk increased after interest rate capping.

The mean of capital adequacy increased after interest rate capping from 0.1561 to 0.1653 respectively. Also, on maximum points, commercial banks in Kenya portrayed a higher maximum value for the period covering 2016 to 2018, which was after interest rate capping, compared to the period covering 2013 to 2015, which was before interest rate capping.

Operation efficiency before interest rate capping was 0.6164 while operation efficiency increased after interest rate capping to 0.6738. The optimal efficiency ratio for commercial banks in Kenya is 0.50. This indicated that the characteristic of operation efficiency before and after interest rate was higher than the optimal efficiency required in the industry.

4.2.2 Graphical Representation

The summary statistics when presented graphically by country based on the bank interest rate trends over the years of 2013 to 2018 is presented in Figure 4.1.
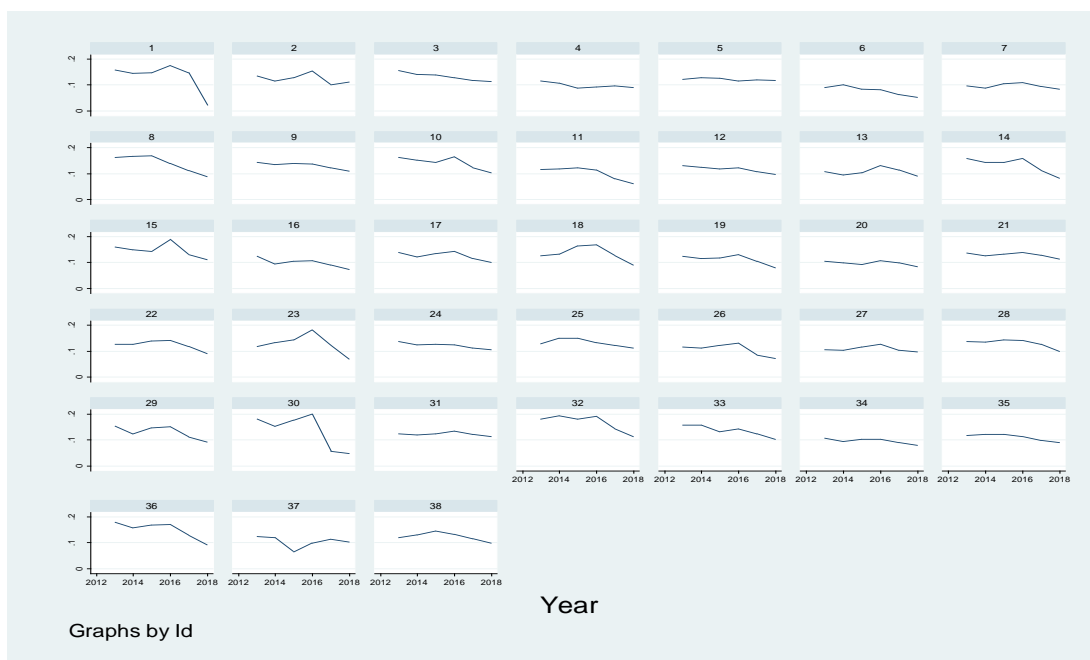
Figure 4.1: Interest Rate Trends for the Period 2013 to 2018

Source: Author (2019)

Where 1. African Bank of Kenya, 2. Bank of Africa 3. Bank of Baroda 4. Bank of India 5. Barclays Bank 6. Citibank 7.Commercial Bank of Arica 8. Consolidated Bank of Kenya 9. Co-operative Bank of Kenya 10. Credit Bank 11. Development Bank of Kenya 12. Diamond Trust Bank 13. Ecobank Kenya Limited 14. Equity Bank Kenya Limited 15. Family Bank Limited 16. First Community Bank Limited 17. Guaranty Trust Bank (K) Ltd 18. Guardian Bank Limited 19. Gulf African Bank Limited 20. Habib Bank A.G Zurich 21. Housing Finance Bank Limited 22. I & M Bank Limited 23. Jamii Bora Bank Limited 24. KCB Bank Kenya Limited 25. Middle East Bank (K) Limited 26. National Bank of Kenya Limited 27. NIC Bank Limited 28. M-Oriental Bank Limited 29. Paramount Bank Limited 30. Prime Bank Limited 31. SBM Bank Ltd (Fidelity Commercial Bank Limited) 32. Sidian Bank Limited 33. Spire Bank Ltd 34. Stanbic Bank Kenya Limited 35. Standard Chartered Bank Kenya Limited 36. Trans-National Bank Limited 37. UBA Kenya Bank Limited 38. Victoria Commercial Bank Limited

As shown in Figure 4.1, average interest rate in the thirty eight banks almost moved in the one direction except for UBA Kenya Bank Limited which reduced tremendously between the year 2014 and 2015. This was an indicative that UBA Kenya Bank Limited reduced interest rate earnings in that period despite the other banks maintain or increasing the interest rate earnings.

The summary statistics by country based on credit risk trends over the years of 2013 to 2018 is presented in Figure 4.2.
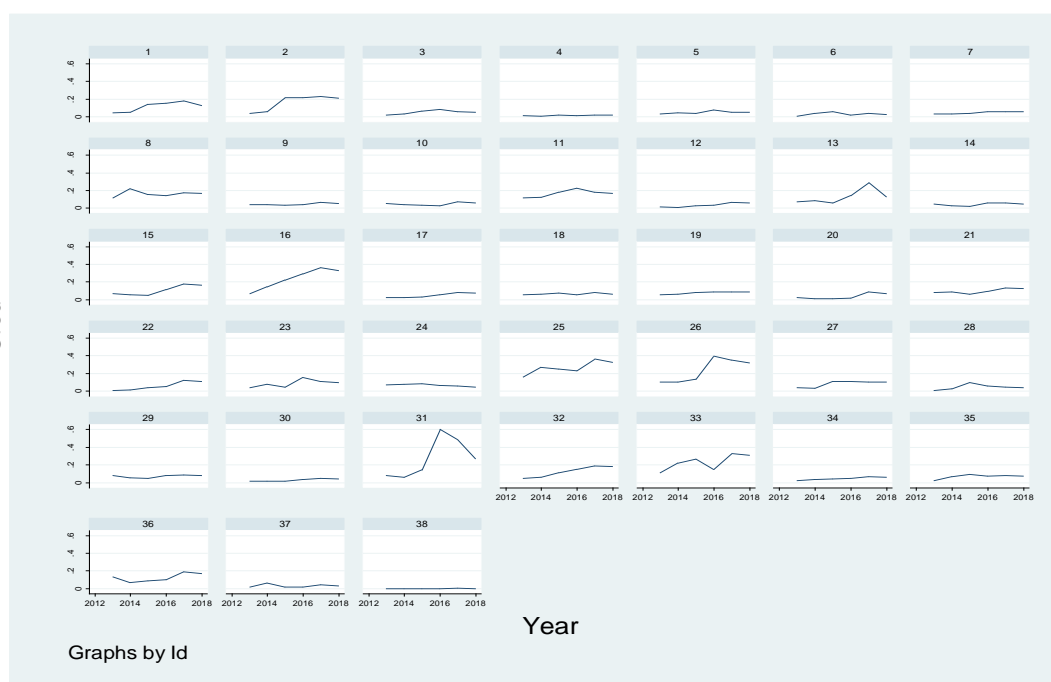

Figure 4.2: Credit Risk Trends for the Period 2013 to 2018

Source: Author (2019)

Where 1. African Bank of Kenya, 2. Bank of Africa 3. Bank of Baroda 4. Bank of India 5. Barclays Bank 6. Citibank 7.Commercial Bank of Arica 8. Consolidated Bank of Kenya 9. Co-operative Bank of Kenya 10. Credit Bank 11. Development Bank of Kenya 12. Diamond Trust Bank 13. Ecobank Kenya Limited 14. Equity Bank Kenya Limited 15. Family Bank Limited 16. First Community Bank Limited 17. Guaranty Trust Bank (K) Ltd 18. Guardian Bank Limited 19. Gulf African Bank Limited 20. Habib Bank A.G Zurich 21. Housing Finance Bank Limited 22. I & M Bank Limited 23. Jamii Bora Bank Limited 24. KCB Bank Kenya Limited 25. Middle East Bank (K) Limited 26. National Bank of Kenya Limited 27. NIC Bank Limited 28. M-Oriental Bank Limited 29. Paramount Bank Limited 30. Prime Bank Limited 31. SBM Bank Ltd (Fidelity Commercial Bank Limited) 32. Sidian Bank Limited 33. Spire Bank Ltd 34. Stanbic Bank Kenya Limited 35. Standard Chartered Bank Kenya Limited 36. Trans-National Bank Limited 37. UBA Kenya Bank Limited 38. Victoria Commercial Bank Limited

The results as depicted in Figure 4.2 indicated that out of the thirty eight commercial banks in Kenya, eleven commercial banks, that is, African Bank of Kenya, Bank of Africa, Development Bank of Kenya, First Community Bank Limited, National Bank of Kenya Limited, NIC Bank Limited, M-Oriental Bank Limited, SBM Bank Ltd

(Fidelity Commercial Bank Limited), Sidian Bank Limited, Spire Bank Ltd and Standard Chartered Bank Kenya Limited, had their credit risk on the rise over the period 2014 to 2015. Two commercial banks, that is, Consolidated Bank of Kenya and UBA, Kenya Bank Limited reduced their credit risk over the period 2014 to 2015.

The summary statistics by country based on capital adequacy trends over the years of 2013 to 2018 is presented in Figure 4.3.
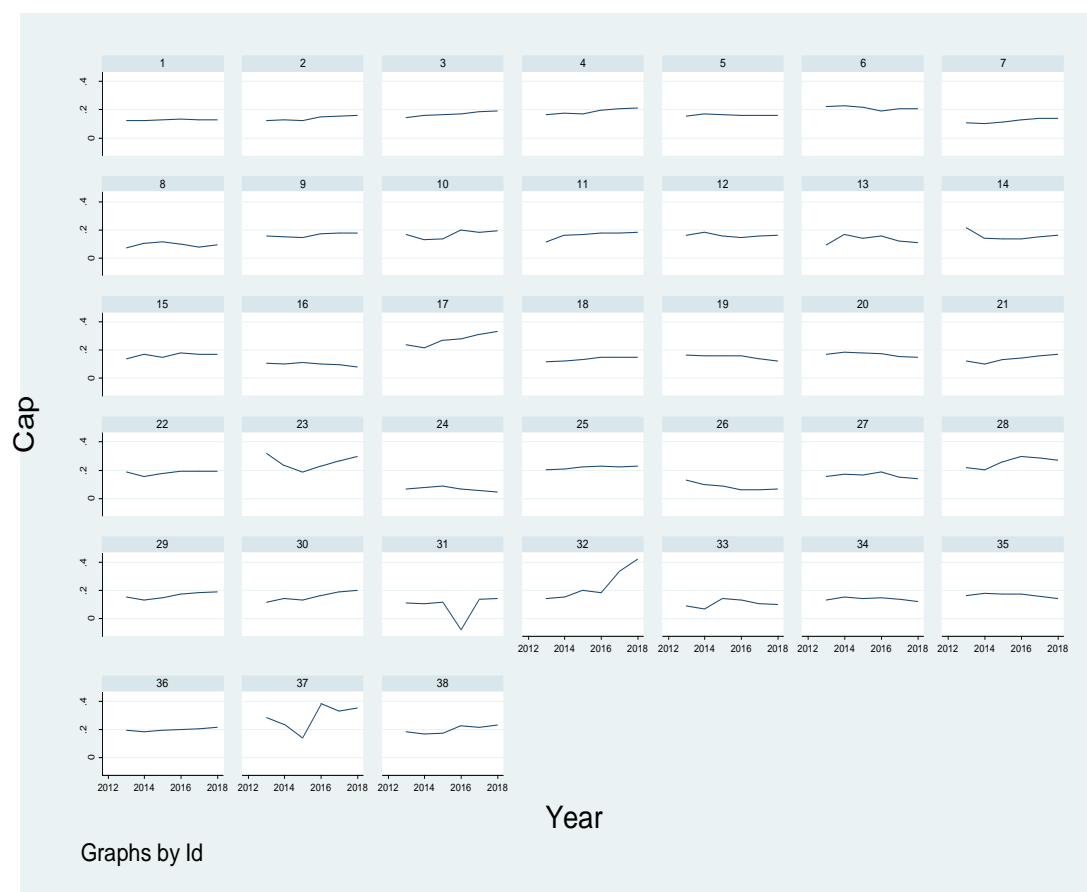

Figure 4.3: Capital Adequacy Trends for the Period 2013 to 2018

Source: Author (2019)

Where 1. African Bank of Kenya, 2. Bank of Africa 3. Bank of Baroda 4. Bank of India 5. Barclays Bank 6. Citibank 7.Commercial Bank of Arica 8. Consolidated Bank of Kenya 9. Co-operative Bank of Kenya 10. Credit Bank 11. Development Bank of Kenya 12. Diamond Trust Bank 13. Ecobank Kenya Limited 14. Equity Bank Kenya Limited 15. Family Bank Limited 16. First Community Bank Limited 17. Guaranty Trust Bank (K) Ltd 18. Guardian Bank Limited 19. Gulf African Bank Limited 20. Habib Bank A.G Zurich 21. Housing Finance Bank Limited 22. I & M Bank Limited 23. Jamii Bora Bank Limited 24.

KCB Bank Kenya Limited 25. Middle East Bank (K) Limited 26. National Bank of Kenya Limited 27. NIC Bank Limited 28. M-Oriental Bank Limited 29. Paramount Bank Limited 30. Prime Bank Limited 31. SBM Bank Ltd (Fidelity Commercial Bank Limited) 32. Sidian Bank Limited 33. Spire Bank Ltd 34. Stanbic Bank Kenya Limited 35. Standard Chartered Bank Kenya Limited 36. Trans-National Bank Limited 37. UBA Kenya Bank Limited 38. Victoria Commercial Bank Limited

The results in figure 4.3 showed that out of the thirty eight commercial banks in Kenya; Guaranty Trust Bank (K) Ltd, M-Oriental Bank Limited and Spire Bank Ltd increased their capital adequacy over the period 2014 and 2015. Jamii Bora Bank Limited sharply reduced its capital adequacy over the period 2013 to 2015 while UBA Kenya Bank Limited also sharply reduced its capital adequacy over the period 2014 to 2015.

The summary statistics by country based on operation efficiency trends over the years of 2013 to 2018 is presented in Figure 4.4.
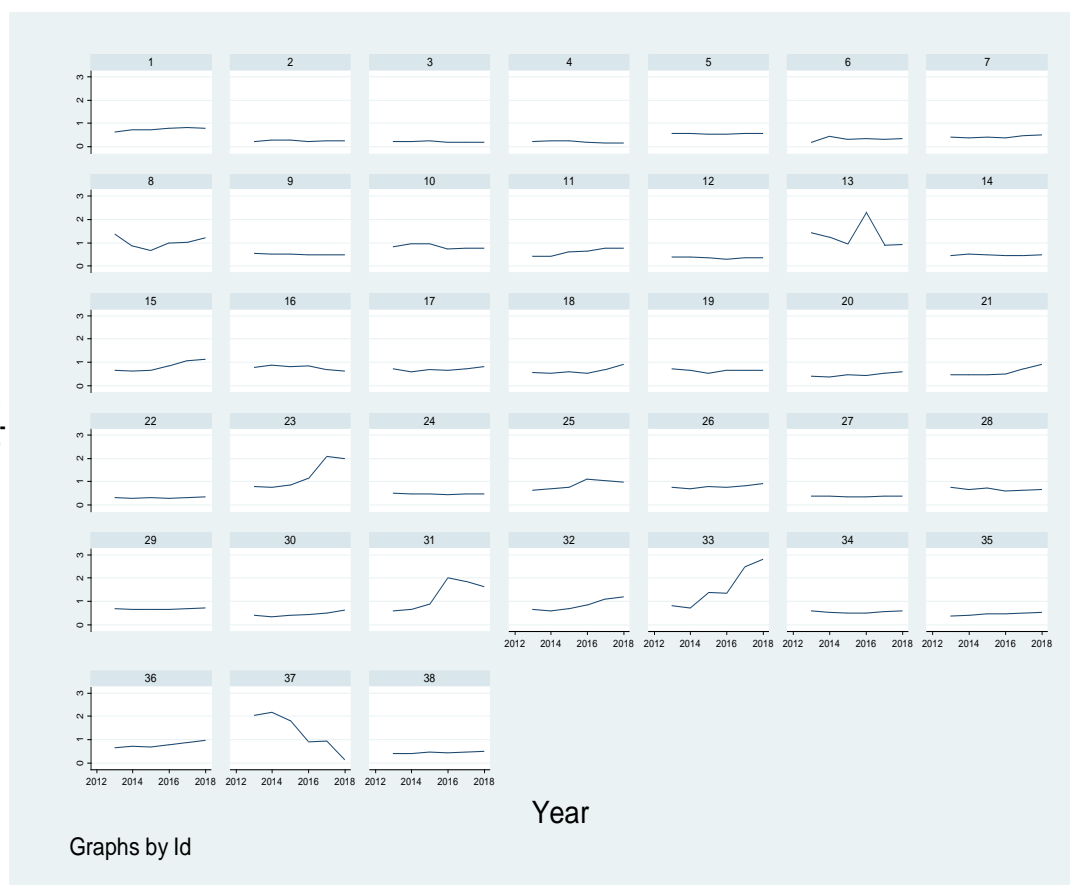
Figure 4.4: Operation Efficiency Trends for the Period 2013 to 2018
Source: Author (2019)

Where 1. African Bank of Kenya, 2. Bank of Africa 3. Bank of Baroda 4. Bank of India 5. Barclays Bank 6. Citibank 7.Commercial Bank of Arica 8. Consolidated Bank of Kenya 9. Co-operative Bank of Kenya 10. Credit Bank 11. Development Bank of Kenya 12. Diamond Trust Bank 13. Ecobank Kenya Limited 14. Equity Bank Kenya Limited 15. Family Bank Limited 16. First Community Bank Limited 17. Guaranty Trust Bank (K) Ltd 18. Guardian Bank Limited 19. Gulf African Bank Limited 20. Habib Bank A.G Zurich 21. Housing Finance Bank Limited 22. I & M Bank Limited 23. Jamii Bora Bank Limited 24. KCB Bank Kenya Limited 25. Middle East Bank (K) Limited 26. National Bank of Kenya Limited 27. NIC Bank Limited 28. M-Oriental Bank Limited 29. Paramount Bank Limited 30. Prime Bank Limited 31. SBM Bank Ltd (Fidelity Commercial Bank Limited) 32. Sidian Bank Limited 33. Spire Bank Ltd 34. Stanbic Bank Kenya Limited 35. Standard Chartered Bank Kenya Limited 36. Trans-National Bank Limited 37. UBA Kenya Bank Limited 38. Victoria Commercial Bank Limited

The results in Figure 4.4 showed that Consolidated Bank of Kenya, Ecobank Kenya Limited and UBA Kenya Bank Limited had their operation efficiency reduced, that is, cost of operation in relation to the total assets reduced implying that operation efficiency improved for these three commercial banks over the period 2014 to 2015.

Out of the thirty eight commercial banks Spire Bank Ltd had increased operation efficiency, that is, the operating expenses in relation to total assets increased, implying that operation efficiency dropped for this commercial bank over the period 2014 to 2015.

The summary statistics by country based on liquidity risk trends over the years of 2013 to 2018 is presented in Figure 4.5.
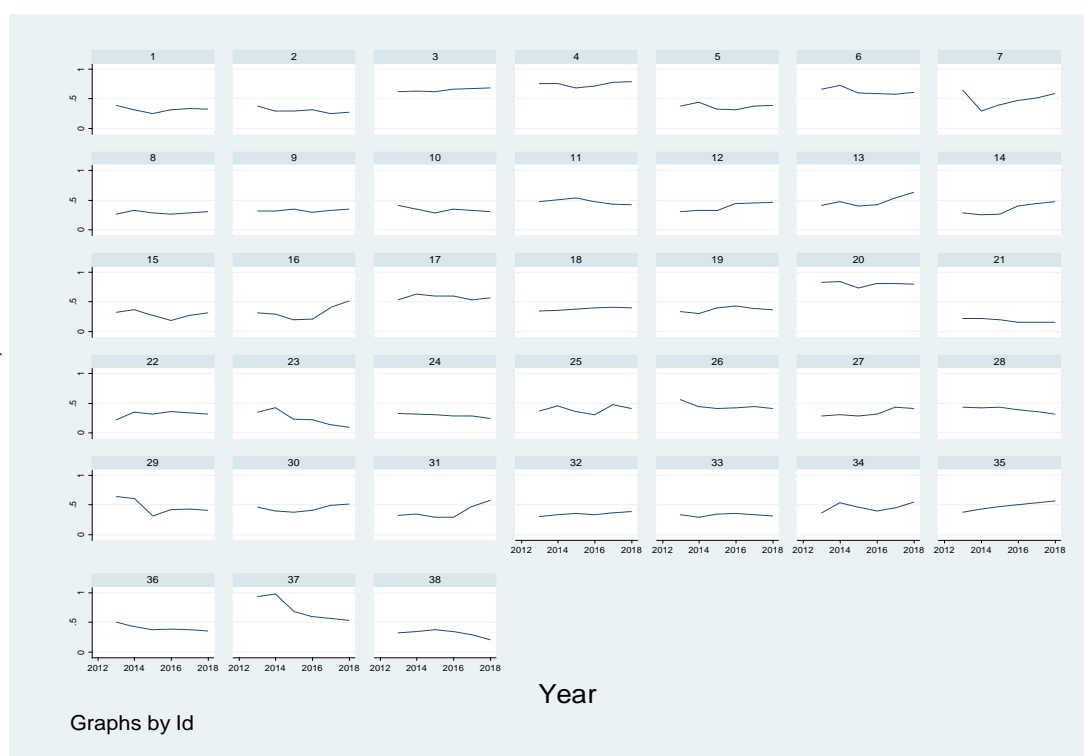

Figure 4.5: Operation Efficiency Trends for the Period 2013 to 2018

Source: Author (2019)

Where 1. African Bank of Kenya, 2. Bank of Africa 3. Bank of Baroda 4. Bank of India 5. Barclays Bank 6. Citibank 7.Commercial Bank of Arica 8. Consolidated Bank of Kenya 9. Co-operative Bank of Kenya 10. Credit Bank 11. Development Bank of Kenya 12. Diamond Trust Bank 13. Ecobank Kenya Limited 14. Equity Bank Kenya Limited 15. Family Bank Limited 16. First Community Bank Limited 17. Guaranty Trust Bank (K) Ltd 18. Guardian Bank Limited 19. Gulf African Bank Limited 20. Habib Bank A.G Zurich 21. Housing Finance Bank Limited 22. I & M Bank Limited 23. Jamii Bora Bank Limited 24. KCB Bank Kenya Limited 25. Middle East Bank (K) Limited 26. National Bank of Kenya Limited 27. NIC Bank Limited 28. M-Oriental Bank Limited 29. Paramount Bank Limited 30. Prime Bank Limited 31. SBM Bank Ltd (Fidelity Commercial Bank Limited) 32. Sidian Bank Limited 33. Spire Bank Ltd 34. Stanbic Bank Kenya Limited 35. Standard Chartered Bank

Kenya Limited 36. Trans-National Bank Limited 37. UBA Kenya Bank Limited 38. Victoria Commercial Bank Limited

The results in Figure 4.5 indicated that liquidity risk reduced for Jamii Bora Bank Limited, Paramount Bank Limited and UBA Kenya Bank Limited over the period 2014 to 2015 while liquidity risk for Commercial Bank of Arica reduced in the year 2013, then it started to increase from the year 2014 to 2015.

The summary statistics by country based on bank size trends over the years of 2013 to 2018 is presented in Figure 4.6.
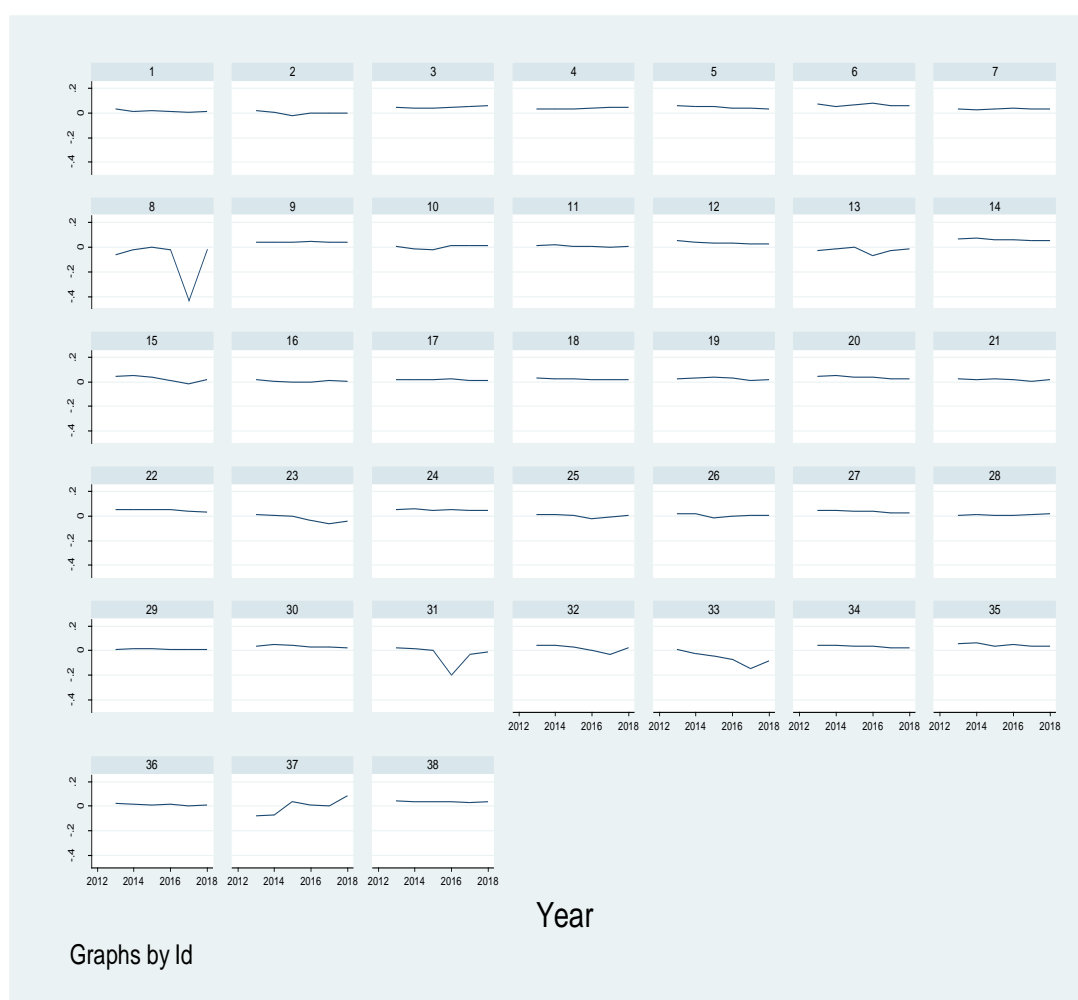

Figure 4.6: Bank Size Trends for the Period 2013 to 2018

Source: Author (2019)

Where 1. African Bank of Kenya, 2. Bank of Africa 3. Bank of Baroda 4. Bank of India 5. Barclays Bank 6. Citibank 7.Commercial Bank of Arica 8. Consolidated Bank

of Kenya 9. Co-operative Bank of Kenya 10. Credit Bank 11. Development Bank of Kenya 12. Diamond Trust Bank 13. Ecobank Kenya Limited 14. Equity Bank Kenya Limited 15. Family Bank Limited 16. First Community Bank Limited 17. Guaranty Trust Bank (K) Ltd 18. Guardian Bank Limited 19. Gulf African Bank Limited 20. Habib Bank A.G Zurich 21. Housing Finance Bank Limited 22. I & M Bank Limited 23. Jamii Bora Bank Limited 24. KCB Bank Kenya Limited 25. Middle East Bank (K) Limited 26. National Bank of Kenya Limited 27. NIC Bank Limited 28. M-Oriental Bank Limited 29. Paramount Bank Limited 30. Prime Bank Limited 31. SBM Bank Ltd (Fidelity Commercial Bank Limited) 32. Sidian Bank Limited 33. Spire Bank Ltd 34. Stanbic Bank Kenya Limited 35. Standard Chartered Bank Kenya Limited 36. Trans-National Bank Limited 37. UBA Kenya Bank Limited 38. Victoria Commercial Bank Limited

4.3 Diagnostic Tests

In order to test the hypotheses, Generalized Method of Moments was carried out using STATA 13.0. However, before carrying out the regression analysis, it was necessary to carry out diagnostic tests as recommended by Field (2009) in order to confirm the suitability of the data for regression analysis.

The diagnostic tests performed were normality test, test of endogeneity, over-identification test, heteroscedasticity and multicollinearity.

4.3.1 Test of Endogeneity

The Durbin-Wu-Hausman Chi-Square test was carried out to check the suitability of instruments which is also referred to as test of orthogonality conditions. This test requires an instrumental variable regression on the same parameters. The results for checking the suitability of the instruments for the period before interest capping in Kenya is presented in Table 4.1.

Table 4.2: Durbin-Wu-Hausman Chi-Square Test for Suitability of Instruments

Dependent Variable	Interest Rate Earnings		
	Coeff. (SE) Values	z-Values	p-Values
Independent variables			
Capital Adequacy	-0.4562 (0.1531)	-2.98	0.0003
Credit Risk	0.0102 (0.0549)	0.19	0.852
_Const.	0.2007 (0.0257)	7.81	0.000
Instrumented: Capital Adequacy			
Instruments: Credit Risk, Operation Efficiency, Liquidity Risk, Bank Size			
Model statistics			
GMM C Statistics Chi2(1)		12.854	0.0003
Wald Chi2(2)	12.10		0.0024

Source: Author (2019)

The result of the Durbin-Wu-Hausman Chi-Square Test indicated that $p = 0.0328 < 0.05$ which was significant at 5% level. This implied that the choice of instrumental variables was perfect.

4.3.2 Test of Over-identification

Hansen's J statistic was used to determine the validity of the over-identifying restrictions in the GMM model. This test required an instrumental variable regression on the same parameters using GMM estimators utilized in the study. The null hypothesis for this test was that there is no misspecification (that is, there is over-identification) in the model while the alternative was that there is misspecification (that is, there is no over-identification in the model. The results for over-identification before interest capping in Kenya is presented in Table 4.3.

Table 4.3: Hansen-Sargan Test for Over-Identification over the Period 2013-2015

Wald chi^2		11.59
Sig.		0.0030
Hansen's J chi^2(2)	0.6205	
Sign. $(p-value)$.	0.7333	

Source: Author (2019)

The results indicated that $p = 0.7333$ of Hansen's J chi^2(2) which was statistically insignificant. This implied that the null hypothesis was not rejected which stated that there is no misspecification (that is, there is no over-identification) in the model. This meant that the model did not suffer from over-identification problem. The results confirmed Sargan test of asymptotic chi-squared distribution that there existed homoscedastic error term in the model which was upheld by Arellano and Bond (1991) who showed that the one-step Sargan test did not rejected the null hypothesis test in the absence of heteroscedasticity.

4.3.3 Correlation Matrix

The correlation relationship between the explanatory variables for measuring interest rate earnings before the bank interest rate capping is illustrated in table 4.4.

Table 4.4: Correlations of Interest rate earnings Model for the Period 2013-2018

	Interest rate earnings	Credit Risk	Capital Adequacy	Operation Efficiency	Liquidity Risk	Bank Size
Interest rate earnings	1	0	0	0	0	0
Credit Risk	0.1956	1	0	0	0	0
Capital Adequacy	-0.0509	-0.2183	1	0	0	0
Operation Efficiency	0.0075	0.2512	0.0980	1	0	0
Liquidity Risk	-0.3476	-0.2508	0.4201	0.1717	1	0
Bank Size	-0.0975	-0.4800	0.0287	-0.7355	-0.0904	1

Source: Author (2019)

The results confirmed the level of correlation between the dependent variable (interest rate earnings) and independent variables (credit risk, capital adequacy, operation efficiency, liquidity risk and bank size). This analysis was also meant to demonstrate whether there was likely to be a problem of multi-co linearity in the regression results. When the correlation coefficient between any two variable combinations was analysed, results showed that the correlation coefficient between all of the two variable combinations was in the range of below 0.5. The overall correlation relationships between the explanatory variables ranged below 0.5, implying a lower degree of collinearity between the variables.

The correlation relationship between the explanatory variables for measuring interest rate earnings for the period 2016 to 2018, which was after bank interest rate capping, is illustrated in Table 4.5.

Table 4.5: Correlations of Interest rate earnings Model for the Period 2016-2018

	Interest rate earnings	Credit Risk	Capital Adequacy	Operation Efficiency	Liquidity Risk
Interest Rate Earnings	1	0	0	0	0
Credit Risk	0.0526	1	0	0	0
Capital Adequacy	0.0629	-0.3852	1	0	0
Operation Efficiency	0.0902	0.5590	-0.1193	1	0
Liquidity Risk	-0.3139	0.2126	0.1034	0.3319	1

Source: Author (2019)

The results confirmed the level of correlation between the dependent variable (interest rate earnings) and independent variables (credit risk, capital adequacy, operation efficiency, liquidity risk and bank size). This analysis was also meant to demonstrate whether there was likely to be a problem of multi-collinearity in the regression results. When the correlation coefficient between any two variable combinations was

analysed, results showed that the correlation coefficient between all of the two variable combinations was in the range of below 0.5. The overall correlation relationships between the explanatory variables ranged below 0.5, implying a lower degree of collinearity between the variables.

4.4 GMM Estimation

The results for the system GMM estimation before the bank interest rate capping is shown in Table 4.6.

Table 4.6: Regression Results for Commercial Banks before Capping of Bank Interest Rate in Kenya for the period 2013-2015

Dependent Variable	Interest Rate Earnings		
	Coeff. (SE)	z-Values	p-Values
Independent variables			
Lagged Interest Rate	0.7998*	13.09	0.000
	(0.0611)		
Credit Risk	0.0197	0.77	0.444
	(0.0258)		
Capital Adequacy	0.1244*	3.98	0.000
	(0.0312)		
Operation Efficiency	-0.0165 *	-2.10	0.036
	(0.0078)		
Liquidity Risk	-0.0375*	-4.46	0.000
	(0.0084)		
Bank Size	-0.1576**	-1.71	0.087
	(0.0921)		
_Const.	0.0329*	2.67	0.008
	(0.0123)		
Model statistics			
F	38.75		
Prob > F	0.0000		
R-squared	0.7711		
Adj. R-squared	0.7512		

Asterisks * and ** indicate significant at the 5% and 10% level respectively.

Source: Author (2019)

The model of analysis of bank specific economic determinants influencing interest rate earnings of commercial banks in Kenya was assessed. The results showed that the model had R-squared value of 0.7711 indicating that the model accounted for 77.11% of the variation in the bank specific factors which were used in the analysis and the model was good to be utilized in analysis of the bank specific factors, p=0.000< 0.05, at 5% level of significance. The model delivered an intercept estimate of 0.0329 which was a positive and significant, p=0.008< 0.05, at 5 percentage level of significance. According to Everitt (2002), the intercept is parameter in an equation that is derived from a regression analysis that corresponds to the expected value of the response variables when all the explanatory variables are zero. From the above regression equation, it was revealed that holding credit risk, capital adequacy, operation efficiency and liquidity to a constant zero; the intercept coefficient was positive and statistically significant at 5 percent level indicating that most of the variables were captured in the model which determined interest rate earnings for the thirty eight commercial banks in Kenya under the period of study.

The results showed coefficient of the variable representing lagged interest rate earnings (p=0.000< 0.05) which was positive and significant at 5 percent level of significance. This implied that the previous year's interest rate earnings had a positive effect on the current interest rate earnings. The results also showed that the coefficient for capital adequacy was positive and significant, p=0.000< 0.05, at 5 percent level of significance. This implied that increasing equity capital increases interest rate earnings in the commercial banks in Kenya. The coefficient of the variable for operation efficiency was negative and significant, p=0.000< 0.05, at 5 percent level of significance. This meant that as operation efficiency increased interest rate earnings reduced in the commercial banks of Kenya. Although the relationship between

operating expenditure and bank interest rates appears straightforward implying that higher expenses meant increased interest rate earnings and the opposite, this could not always be the case. The reason is that higher amounts of operating expenses could be associated with higher volume of banking activities and therefore higher revenues necessitating the commercial bank to reduce interest rate earnings for their customers. This was supported by Anjichi (2014) who observed that higher amounts of expenses was associated with higher volume of banking activities and therefore higher revenues and lower interest rate earnings.

The coefficient of the variable for liquidity risk was negative and significant, p=0.000< 0.05, at 5 percent level of significance. This implied that interest rate earnings for commercial banks in Kenya which were highly liquid were associated with lower interest rate earnings as they did not have to incur extra costs of sourcing funds when faced with increased demand for credit.

The results showed coefficient of the variable of bank size (p=0.087< 0.1) which was negative and significant at 10 percent level of significance. The bank size had a negative effect on the current interest rate earnings implying that as a banking institution grew it tended to add lower interest rate to the central bank base rate. The reason could be that the institution gains market power as it grows to attract more funds and also gains from economies of scale and technology thereby making cheaper funds available to its customers. This finding was supported by Radha (2011) who observed that different segments of the banking sector in Kenya was influenced by bank size influencing lending decisions.

The results for the system GMM estimation after the bank interest rate capping is shown in Table 4.7.

Table 4.7: Regression Results for Commercial Banks after Capping of Bank Interest Rate in Kenya for the period 2016-2018

Dependent Variable	Interest rate earnings		
	Betas (SE)	z-Values	p-Values
Independent variables			
Lagged Interest Rate	0.4246* (0.1636)	2.60	0.009
Credit Risk	0.0259 (0.0215)	1.20	0.230
Capital Adequacy	0.0479** (0.0291)	1.64	0.100
Operation Efficiency	-0.0061 (0.0047)	-1.28	0.200
Liquidity Risk	-0.0039 (0.0168)	-0.230	0.820
Bank Size	-0.0304** (0.0168)	-1.81	0.071
_Const.	0.0422* (0.0221)	2.00	0.045
Model statistics			
F	5.94		
Prob > F	0.000		
R-squared	0.3406		
Adj. R-squared	0.2832		

Source: Author (2019)

The model of analysis of bank specific economic determinants influencing interest rate earnings of commercial banks in Kenya was assessed. The results showed that the model had R-squared value of 0.3416 indicating that the model accounted for 34.16 percent of the variation in the bank specific factors which were used in the analysis and the model was good to be utilized in analysis of the bank specific factors, p=0.000< 0.05, at 5 percentage level of significance. The model delivered an intercept estimate of 0.0422 which was a positive and significant, p=0.045< 0.05, at 5 percentage level of significance. According to Everitt (2002), the intercept is the parameter in an equation derived from a regression analysis corresponding to the expected value of the response variable when all the explanatory variables are zero.

From the above regression equation, it was revealed that holding credit risk, capital adequacy, operation efficiency and liquidity to a constant zero; the intercept coefficient was positive and statistically significant at 5 percent level indicating that most of the variables were captured in the model which determined interest rate earnings for the thirty eight commercial banks in Kenya under the period of study.

The results showed coefficient of the variable representing lagged interest rate earnings (p=0.000< 0.07) which was positive and significant at 5 percent level of significance. This implied that the previous year's bank interest rate had a positive influence on the current interest rate earnings.

The coefficient of capital adequacy was 0.0479 which was positive and significant at 10 percent level of significance $(p = 0.1000 < 0.01)$ indicating that for every coefficient of capital adequacy, interest rate earnings increased by 0.0479 units in commercial banks in Kenya. The coefficient of bank size was 0.0304 which was negative and significant at 10% level of significance $(p = 0.071 < 0.01)$ indicating that for every coefficient of liquidity risk, interest rate earnings increased by 0.0304 units in commercial banks in Kenya.

4.5 Hypotheses Testing

The stated hypotheses were tested in various sections in this study and the summary of the results before and after the interest rate capping in Kenya were as follows:

Ho₁: Credit risk has no significant effect on interest rate earnings of commercial banks in Kenya.

The observed test statistic, $P = 0.444 > 0.05$, of the coefficient of credit risk among the commercial banks in Kenya was not significant at 5 percent level before bank

interest rate capping implying that credit risk determined the bank interest rate. Therefore, the null hypothesis was not rejected at the 5 percent level of significance.

After bank interest rate capping, that is, for the period covering 2016 to 2016, test statistic was $P = 0.230 > 0.05$, which was not statistically significant at 5 percent level of significance implying that credit risk did not influence determination of interest rate earnings among the commercial banks in Kenya.

Ho2: Capital adequacy has no significant effect on interest rate earnings of commercial banks in Kenya.

The observed test statistic, $P = 0.000 < 0.0.05$, relating to the coefficient of the capital adequacy among the commercial banks in Kenya was significant at 5 percent level. Therefore, the null hypothesis was rejected at the 5 percent level of significance. This implied that capital adequacy determined interest rate earnings influenced the interest rate earnings at 5 percent level of significance.

After bank interest rate capping, test statistic, $P = 0.100 > 0.05$, was not statistically significant at 5 percent level of significance implying that capital adequacy did not influence the interest rate earnings among the commercial banks in Kenya.

Ho3: Operation efficiency does not significantly influence interest rate earnings of commercial banks in Kenya.

The observed test statistic, $p = 0.036 < 0.05$, relating to coefficient of operation efficiency among the commercial banks in Kenya was significant at 5 percent level. Therefore the null hypothesis was rejected at the 5 percent level of significance. This implied that operation efficiency influenced bank interest rate earnings at 5 percent level of significance.

After bank interest rate capping, test statistic, $P = 0.200 > 0.05$, was not statistically significant at 5 percent level of significance. This therefore meant that the null hypothesis was not rejected at the 5 percent level of significance. Hence operation efficiency did not influence interest rate earnings among the commercial banks in Kenya.

Ho4: Liquidity risk does not significantly influence interest rate earnings of commercial banks in Kenya.

The observed test statistic, $P = 0.000 < 0.0.05$, relating to the coefficient of liquidity risk among the commercial banks in Kenya was significant at 5 percent level. Therefore the null hypothesis was rejected at the 5 percent level of significance. This implied that liquidity risk influenced the bank interest rate.

After bank interest rate capping, test statistic, $P = 0.820 > 0.05$, was not statistically significant at 5 percent level of significance. Therefore the null hypothesis was not rejected at the 5 percent level of significance. This implied that liquidity risk did not influence the interest rate earnings among the commercial banks in Kenya.

Ho5: Bank size does not significantly influence interest rate earnings of commercial banks in Kenya.

The observed test statistic, $p = 0.087 > 0.05$, relating to the coefficient of the bank size among the commercial banks in Kenya was not significant at 5 percent level. However, at 10% level of significance, $p = 0.087 < 0.10$, bank size was significant. This implied that bank size influenced the interest rate earnings at 10 percent level of significance. Therefore the null hypothesis was rejected at the 10 percent level of significance implying that bank size influenced the interest rate earnings.

After bank interest rate capping, test statistic, $P = 0.071 > 0.05$, was not statistically significant at 5 percent level of significance implying that bank size did not influence the interest rate earnings among the commercial banks in Kenya. Therefore the null hypothesis was not rejected at 5% level of significance. However, at 10% level of significance, bank size influenced interest rate earnings.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1 Overview

This section of the thesis deals with the following: Section 5.1 provides an overview of the chapter; Section 5.2 describes the summary of the research findings; Section 5.3 presents the conclusions from the study, Section 5.4 provides the policy implications and Section 5.5 displays the limitations of the study. Owing to the scope and limitations of the study, Section 5.6 gives suggestions and tools for further research.

5.2 Summary of the Study

The purpose of this study was to analyse the determinants of bank specific economic determinants influencing interest rate earnings of commercial banks in Kenya. To achieve this goal, the study used the following major techniques: first, descriptive analysis of the socioeconomic background of the commercial banks in Kenya was conducted followed by extensive review of the theoretical foundations and the empirical studies of the interest rate; secondly Generalized Method of Moments (GMM) Model was used to examine the effect of credit risk, capital adequacy, bank diversification, cash reserve ratio, operation efficiency and liquidity risk.

5.3 Conclusion

Upon application of GMM model before and after the interest rate capping, various results were depicted as discussed in this section.

5.3.1 Before Interest Rate Capping

Application of GMM model before the interest rate capping, indicated that holding credit risk, capital adequacy, operation efficiency and liquidity to a constant zero; the

intercept coefficient was positive and statistically significant at 5 percent level indicating that most of the variables were captured in the model which determined interest rate earnings for the thirty eight commercial banks in Kenya under the period of study.

The observed test statistic, $P = 0.444 > 0.05$, of the coefficient of credit risk among the commercial banks in Kenya was not significant at 5 percent level before bank interest rate capping implying that credit risk determined the bank interest rate. Therefore, the null hypothesis was not rejected at the 5 percent level of significance.

The results also showed that the coefficient for capital adequacy was positive and significant at 5 percent level of significance implying that increasing equity capital increases interest rate earnings in the commercial banks in Kenya. The coefficient of the variable for operation efficiency was negative and significant, at 5 percent level of significance. This meant that as operation efficiency increased interest rate earnings reduced in the commercial banks of Kenya.

The coefficient of the variable for liquidity risk was negative and significant at 5 percent level of significance. This implied that interest rate earnings for commercial banks in Kenya which were highly liquid were associated with lower interest rate earnings as they did not have to incur extra costs of sourcing funds when faced with increased demand for credit.

The observed test statistic, $p = 0.087 > 0.05$, relating to the coefficient of the bank size among the commercial banks in Kenya was not significant at 5 percent level. However, at 10% level of significance, $p = 0.087 < 0.10$, bank size was significant. This implied that bank size influenced the interest rate earnings at 10 percent level of significance. Therefore the null hypothesis was rejected at the 10 percent level of

significance implying that bank size influenced the interest rate earnings.

5.3.2 After Interest Rate Capping

The results showed coefficient of the variable representing lagged interest rate earnings which was positive and significant at 5 percent level of significance. This implied that the previous year's bank interest rate had a positive influence on the current interest rate earnings.

After bank interest rate capping, that is, for the period covering 2016 to 2016, test statistic was $P = 0.230 > 0.05$, which was not statistically significant at 5 percent level of significance implying that credit risk did not influence determination of interest rate earnings among the commercial banks in Kenya.

After bank interest rate capping, test statistic, $P = 0.100 > 0.05$, was not statistically significant at 5 percent level of significance implying that capital adequacy did not influence the interest rate earnings among the commercial banks in Kenya.

After bank interest rate capping, test statistic, $P = 0.200 > 0.05$, was not statistically significant at 5 percent level of significance. This therefore meant that the null hypothesis was not rejected at the 5 percent level of significance. Hence operation efficiency did not influence interest rate earnings among the commercial banks in Kenya.

After bank interest rate capping, test statistic, $P = 0.820 > 0.05$, was not statistically significant at 5 percent level of significance. Therefore the null hypothesis was not rejected at the 5 percent level of significance. This implied that liquidity risk did not influence the interest rate earnings among the commercial banks in Kenya.

After bank interest rate capping, test statistic, $P = 0.071 > 0.05$, was not statistically

significant at 5 percent level of significance implying that bank size did not influence the interest rate earnings among the commercial banks in Kenya. Therefore the null hypothesis was not rejected at 5% level of significance. However, at 10% level of significance, bank size influenced interest rate earnings.

5.4 Policy Implications

Considering that increasing equity capital increases interest rate earnings in the commercial banks in Kenya, cost of borrowing consequently tend to increase resulting in expensive credit facilities. The policy makers including Kenya government could consider removing interest rate capping.

With the increased operation efficiency, interest rate earnings reduced in the commercial banks of Kenya. This requires that commercial banks improve their operation efficient so that the cost of funds can be reduced hence credit borrowers can be able to be advanced more funds which would lead to improvement of commercial bank performance.

Since commercial banks with high liquidity were associated with lower interest rate earnings, more emphasize should be place by commercial banks to have more customer deposits. This would ensure costs of sourcing funds would be low hence able to advanced loans at a cheaper interest rate.

Commercial banks could be encouraged to expand their market sizes in order to increase collection of deposits which in turn would ensure interest rate earnings is low. Further, commercial banks would gain from economies of scale and technology thereby making cheaper funds available to its customers.

5.5 Contribution to Knowledge

To analysis of bank specific determinants of interest rate earnings in the midst of capping among commercial banks in Kenya. This study extended a number of bank specific variables model into 5-variable model, that is, using credit risk, capital adequacy, operation efficiency, liquidity risk, bank size with the aim of analyzing the effect of each specific variable.

Secondly, this research used current data for a period (2013-2018) on quarterly basis to establish the effect of bank specific determinants (credit risk, capital adequacy, operation efficiency, liquidity risk, bank size) on the capped interest rate. Rationally, more recent data was necessary for the analysis of the effect of interest rate earnings in order to capture the current status of the effect of interest rate capping.

Thirdly, analysis of bank specific determinants of interest rate earnings in the midst of capping among commercial banks in Kenya was carried out using GMM which has become the most preferred method used in estimating Dynamic Stochastic General Equilibrium on issues related to monetary shocks, demand and supply shocks among others. DSGE models anchored in rich micro-foundations have become a preferred methodology used to analyse monetary policy and economic growth in recent years (Tovar, 2008).

Fourthly, apart from analysing bank specific determinants of interest rate earnings in the midst of capping among commercial banks in Kenya, analysis was carried out on the impact of the bank specific determinants before interest rate capping. This enabled the comparison of the effect before and after interest rate on interest rate earnings.

5.6 Limitations of the Study and Areas for Further Research

This study was successfully undertaken but not without a few limitations. One such limitation was that bank management were very confidential in their dealings and were not willing to give the needed information fearing competition and competitive advantage exposures. In order to overcome this, published information were utilized.

Another limitation was that there quite a number of determinants which have to be used in analyzing the effect of interest rate earnings. These includes total deposits which was not utilized in this study.

Further studies could be done with the inclusion of the total deposits since this is one of the determinants of interest rate earnings.

Application of other models such as the Structural Vector Autoregression (SVAR) in order to analyse the effect of these determinants on interest rate could be explored by other scholars. This can be used to analysis the effects of the stated determinants on the impact of interest rate earnings.

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APPENDICES

Table A.1: List of Commercial Banks Operating in Kenya as at 31st December 2018

Serial No.	Name of Bank	Date Licensed	Peer Group
1	African Banking Corporation Limited	8th December, 1994	Small
2	Bank of Africa Kenya Limited	30th April 2004	Medium
3	Bank of Baroda (K) Limited	1st July, 1953	Medium
4	Bank of India	5th June, 1953	Medium
5	Barclays Bank of Kenya Limited	1916	Large
6	Citibank N.A Kenya	1st July, 1974	Medium
7	Commercial Bank of Africa Limited	1st January, 1967	Large
8	Consolidated Bank of Kenya Limited	18th December, 1989	Small
9	Co-operative Bank of Kenya Limited	1st July, 1968	Large
10	Credit Bank Limited	30th November, 1994	Small
11	Development Bank of Kenya Limited	20th September, 1996	Small
12	Diamond Trust Bank Kenya Limited	15th November, 1994	Small
13	Ecobank Kenya Limited	16th June, 2008	Medium
14	Equity Bank Kenya Limited	28th December 2004	Large
15	Family Bank Limited	1st May 2007	Medium
16	First Community Bank Limited	29th April, 2008	Small
17	Guaranty Trust Bank (K) Ltd	13th January, 1995	Medium
18	Guardian Bank Limited	20th December, 1995	Small
19	Gulf African Bank Limited	1st November 2007	Small
20	Habib Bank A.G Zurich	1st July, 1978	Small
21	Housing Finance Bank Limited	1965	Medium
22	I & M Bank Limited	27th March, 1996	Medium
23	Jamii Bora Bank Limited	2nd March, 2010	Small
24	KCB Bank Kenya Limited	1st January 1896	Large
25	Middle East Bank (K) Limited	28th November, 1980	Small
26	National Bank of Kenya Limited	1st January, 1968	Medium
27	NIC Bank Limited	28th September, 1995	Medium
28	M-Oriental Bank Limited	8th February, 1991	Small
29	Paramount Bank Limited	5th July, 1995	Small
30	Prime Bank Limited	3rd September, 1992	Medium
31	SBM Bank Ltd (Fidelity Commercial Bank Limited)	1st April, 1996	Small
32	Sidian Bank Limited	23rd March, 1999	Small
33	Spire Bank Ltd	23rd June, 1995	Small
34	Stanbic Bank Kenya Limited	1st June 2008	Medium
35	Standard Chartered Bank Kenya Limited	1910	Large
36	Trans-National Bank Limited	8th January, 1985	Small
37	UBA Kenya Bank Limited	25th September, 2009	Small
38	Victoria Commercial Bank Limited	11th January, 1996	Small

Source: Central Bank of Kenya (2018)

Table A.2: Secondary Data Collection Tool

Bank Name	Credit Risk						Capital Adequacy						Operation Efficiency					
	20 13	20 14	20 15	20 16	20 17	20 18	20 13	20 14	20 15	20 16	20 17	20 18	20 13	20 14	20 15	20 16	20 17	20 18

Source: Author (2019)

Table A.3: Banking Amendment Act, 2016 (Extract Relating to Interest Rate Cap)

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THE BANKING (AMENDMENT) ACT

No. 25 of 2016

Date of Assent: 24th August, 2016

Date of Commencement: 14th September, 2016

AN ACT of Parliament to amend the Banking Act

ENACTED by the Parliament of Kenya, as follows—

1. This Act may be cited as the Banking (Amendment) Act, 2016.

Short title.

2. The Banking Act in this Act referred to as "the Principal Act" is amended by inserting the following new section immediately after section 31.

Amendment of section 31 of Cap. 488.

Disclosure of information on loans.

31A. A bank or financial institution shall, before granting a loan to a borrower disclose all the charges and terms relating to the loan.

3. The Principal Act is amended by inserting the following new section immediately after section 33A.

Amendment of section 33A of Cap. 488.

Powers of Central Bank to enforce interest ceilings.

33B (1) A bank or a financial institution shall set—

(a) the maximum interest rate chargeable for a credit facility in Kenya at no more than four per cent, the base rate set and published by the Central Bank of Kenya; and

(b) the minimum interest rate granted on a deposit held in interest earning in Kenya to at least seventy per cent, the base rate set and published by the Central Bank of Kenya.

(2) A person shall not enter into an agreement or arrangement to borrow or lend directly or indirectly at an interest rate in excess of that prescribed by law.

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(3) A bank or financial institution which contravenes the provisions of subsection (2) commits an offence and shall, on conviction, be liable to a fine of not less than one million shillings, or in default, the Chief Executive Officer of the bank or financial institution shall be liable to imprisonment for a term not less than one year.

Source: Kenya Gazette (2016)

Appendix II: Moi University Authority Letter

MOI UNIVERSITY
SCHOOL OF BUSINESS AND ECONOMICS

Tel: (0321) 43620
Fax No: (0321) 43360
Telex No.35047 MOI VARSITY
RE: SBE/PHD/311/16

Box 3900
Eldoret
KENYA
DATE: 8th May, 2018

TO WHOM IT MAY CONCERN
Dear Sir/Madam,

RE: JAMES MAINGI NGANGA – SBE/PHD/311/16

The above named is a bonafide student of Moi University School of Business and Economics, undertaking a Doctor of Philosophy in Economics degree. He has completed coursework, defended his proposal, and is proceeding to the field to collect data for his research titled: *"Bank Specific Determinants of Interest Rate Margins in the Midst of Capping among Commercial Banks in Kenya*

Any assistance accorded to him will be highly appreciated.

Yours faithfully,

DR. JOEL TENAI
Ag. **DEAN, SCHOOL OF BUSINESS AND ECONOMICS.**

Appendix III: NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION.

Ref No: **484062**

Date of Issue: **19/March/2020**

RESEARCH LICENSE.

This is to Certify that Mr.. JAMES MAINGI NGANGA of Moi University, has been licensed to conduct research in Mombasa on the topic: BANK SPECIFIC DETERMINANTS OF INTEREST RATES MARGINS IN AN ENVIRONMENT OF INTEREST RATE CAPPING AMONG COMMERCIAL BANKS IN KENYA (2016-2019) for the period ending : 19/March/2021.

License No: **NACOSTI/P/20/4285**

484062
Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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Appendix IV: Publications

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IJARR

ISSN (Online): 2455-7277
Impact Factor: 6.717

Certificate of Publication

This is to certify that paper entitled

"BANK SPECIFIC DETERMINANTS OF INTEREST RATE MARGINS IN AN
ENVIRONMENT OF INTEREST RATE CAPPING AMONG COMMERCIAL BANKS IN
KENYA (2016-2019)"

authored/co-authored by

Nganga Maingi James, Dr. Thomas Agak, Dr. Richard Siele.,

is published in volume **6**, *issue* **10**, **OCTOBER**, **2021** *in*
International Journal of Advanced Research and Review

Dr. yasin mansuri
Editor-in-Chief

American Journal of Humanities and
Social Sciences Research (AJHSSR)

ISSN:2378-703X

Certificate of Publication

is hereby honoring this certificate to

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INFLUENCE OF CREDIT RISK ON INTEREST RATE MARGINS IN THE
MIDST OF CAPPING AMONG COMMERCIAL BANKS IN KENYA

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Appendix V: Plagiarism Awareness Certificate

EDU 999 THESIS WRITING COURSE

PLAGIARISM AWARENESS CERTIFICATE

This certificate is awarded to

NG'ANGA JAMES MAINGI

SBE/PHD/311/16

In recognition for passing the University's plagiarism

Awareness test with a similarity index of 19% and

Striving to maintain academic integrity

Awarded by:

Prof. John Changách, CERM-ESA Project Leader

Date: 09/12/2021