EFFECT OF FINANCIAL RISK ON FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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DECLARATION

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than the University of Nairobi for examination.

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D63/19196/2019

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

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DEDICATION

This research project paper is dedicated to my family, who have always encouraged and supported me throughout my life. They have been, and still are, the pillar of strength in my life. I thank you.

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ABBREVIATIONS

ADF	Augmented Dickey-Fuller
ANOVA	Analysis of Variance
CBK	Central Bank of Kenya
FP	Financial Performance
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
KDIC	Kenya Deposit Insurance Corporation
LR	Likelihood Ratio
NIM	Net Interest Margin
NPL	Non-Performing Loans
NSE	Nairobi Securities Exchange
ROA	Return on Assets
ROE	Return on Equity
SPSS	Statistical Package for Social Sciences
VIF	Variance Inflation Factors

ABSTRACT

Central in the field of finance is financial performance. The need to explain how two firms operating within the same environment perform differently is a concern and several research works in finance have been devoted towards understanding this mystery. It is theoretically hypothesized that an increase in financial risks like liquidity, credit, interest rate risks among others leads to a reduction in FP. The general objective of this research was to investigate how financial risk impacts the financial performance Kenyan commercial banks. The independent variables in this study were; credit risk, liquidity risk, interest rate risk and operating risk while the dependent variable was financial performance. The control variables were capital adequacy and bank size. The research targeted a population of all the 42 banks in Kenya. Data was from 37 out of the 42 which was a response rate of 88.1% which was considered adequate for the study. The study was conducted for 5 years, 2015-2019. The research design used during the study was descriptive cross-sectional. Secondary data was gathered from published bank's financial statements and annual reports. Analysis was made using the descriptive, correlation and multiple regression models. The analyzed data was illustrated in tables, charts, percentages, mean and standard deviation. From the results of regression, it was found that the selected independent variables (credit risk, liquidity risk, interest rate risk, operating risk, capital adequacy and bank size) combined explain 32.9% of changes in performance of the banks. The overall model was also found to be statistically significant with a $p<0.05$. The study further revealed that individually, credit risk and interest rate risk are negatively statistically significant to financial performance while capital adequacy is positively and statistically significant to performance. The rest of the variables (liquidity risk, operating risk and bank size) had a statistically insignificant impact on performance. The study recommends the need for banks to come up with measures aimed at reducing credit risk as this will go a long way in improving their performance. The study further recommended the need for banks to enhance their capital adequacy and interest income as this will have a significant influence on financial performance.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Financial Performance (FP) is a domain of management that has remained and will continue to be the focus of management executives and scholars for a long time to come because of its centrality in the life of an organization. Because of the importance attached to financial performance, great attempts have been made to understand it over time in terms of factors that contributes to its realization or none realization (Abata, 2014). It is beneficial to grasp how financial risks impact performance (Kolapo, Ayeni & Oke, 2012). It is theoretically hypothesized that an increase in financial risks such as liquidity risk, credit risk, interest rate risk among others leads to a reduction in FP (Gathiga, 2016).

The study was based on the Merton's default risk theory, liquidity preference theory and the adverse selection theory. The default risk theory by Merton (1970) is the anchor theory and has been used to determine the ability of debtors to pay their debt obligations and can thus help credit analysts to determine an organization's credit default risk. The theory of adverse selection by Pagano and Jappelli (1993) describes the scenario of a bank which is unable to isolate the risky borrowers from safe borrowers. Liquidity preference theory establishes the combination of assets and liabilities that an entity can hold. Therefore, a bank's decision problem will therefore be on how to balance returns and liquidity, consequently growing its FP (Dafermos, 2009).

The focus that this study was on Kenyan banks and this choice arises from the fact that the commercial banking sector has been one of the most demanding on managers in terms of performance improvement. Commercial banks have been performing

differently with some recording increased performance while others have been on a downward trend. Over the last few years, there have been cases of banks collapsing such as the case of Chase bank and poor performance such as National bank. The financial risks facing banks also differ from bank to bank. Consequently, there was need to conduct a study on whether financial risks influences performance.

1.1.1 Financial Risk

This is the unforeseen unevenness or returns volatility. It is caused by credit, liquidity, operating and interest rate risks that cause the instability of performing financially (Gathiga 2016). Juma (2018) defined financial risk as the risk that causes firms' financial loss. The causes of this risk are the instabilities and losses in financial markets arising from stock price movements, variations in currencies and interest rates. The financial risk for banking sector is composed of credit, liquidity, interest rate and foreign exchange risks. Omondi (2019) states that financial risk components are credit, liquidity, operating and interest rate risks. In this study, financial risk will be the combination of interest rate volatility, liquidity, credit and operating risks.

Risk is the primary factor driving financial behaviour (Shukla, 2016). In its absence, the system will be greatly simplified. It is however ever-present in the realistic world. It is therefore the responsibility of Financial Institutions to manage it efficiently to ensure their survival in a world full of uncertainty. The future of banking certainly stems on the dynamics of risk management. It is only the institutions that have efficient risk management systems that will ensure their survival in the long term (Ahmed, 2015). According to Diffu (2011), the crisis that affected worldwide financial steadiness and the economy in 2007-2009 has strengthened the need to

reconsider some of the methods implemented by the financial community in evaluating the performance of banks.

Different researchers have operationalized financial risk differently. Most of them however agree that the main elements of financial risk include credit, liquidity, interest rate, operating and exchange rate risks (Eckles, Hoyt & Miller, 2014). The current study will consider credit, liquidity, operating risk and interest rate risks. Credit risk is the probability that a debtor or borrower will default and hence not repay the lender. The risk is given by the ratio of nonperforming advances to total loan (Julie & Rebert, 2015). Liquidity risk is the inability of a bank to manage a bank's changes in funds on the financing of credit and the portfolio investment often measured as total assets to liquid assets ratio (Greuning & Bratanovic, 2019). Operational risk denotes a financial loss to an organization because of undertaking it in a wrong and insufficient way and is operationalized as operating expense to net operating income ratio (Al-Tamimi, Hussein, Miniaoui & Elkelish, 2015). Interest rate risk is the probability of obtaining losses in and off-balance-sheet situations arising from changes in interest rates and it is usually presented as a ratio of interest expense to interest income (Ngalawa & Ngare, 2013).

1.1.2 Financial Performance

According to Almajali, Alamro and Al-Soub (2012), this is a firm's ability to achieve the range of set financial goals such as profitability. FP is a degree of the extent to which a firm's financial benchmarks has been achieved or surpassed. It shows the extent at which financial objectives are being accomplished (Nzuve, 2016). As outlined by Baba and Nasieku (2016) FP show how a company utilizes assets in the generation of revenues and thus it gives direction to the stakeholder in their decision

making. The current study defines financial position as the degree to which a bank uses its assets in generating income.

Financial performance is important to the shareholders, those investing and the entire economy by extension. To the investors, the returns are totally worthwhile and having a good company may offer increased and long lasting revenue to those investing (Fatihudin & Mochklas, 2018). The FP of a firm is fundamental to their health and survival. A high performance of a company proves its efficiency and effectiveness for the control of its assets during operations, investing and financial actions (Karajeh & Ibrahim, 2017). Performance measurement provides important valuable information so that management can monitor firms progress (Deitiana & Habibuw, 2015).

Measurement of FP can be done using a number of ratios, for instance, Net Interest Margin (NIM) and Return on Assets (ROA). This is a measurement that shows the capability of the bank to make use of the available assets to make profits (Milinović, 2014). ROA is given by the quotient of operating profit and total asset ratio which is used for calculating earnings from all company's financial resources. On the other hand, NIM measures the spread of the paid out interest to the lenders of banks, for instance, liability accounts, and the interest income that the banks generates in relation to the value of their assets. Dividing the net interest income by total earnings assets expresses the NIM variable (Crook, 2008).

1.1.3 Financial Risk and Financial Performance

Many theories have been applied to explain how financial risks and financial productivity/performance relate. The arbitrage pricing theory, for instance, explains that risks and their associated returns can be represented through a linear relationship. In the linear relationship, an increase in risk is projected to result in an increase in

returns. Theorists have tried deriving a connection between different forms of risk and the overall effect on the performance of an organization or entity (Muthinja & Chipeta, 2018). Theoretically, therefore, increased financial risk lowers performance.

Financial risk stems from uncertainties linked to bank loan defaults, how volatile the rates of interest are, liquidity management and variations in foreign rates of exchange. Resolutions that involve banking activities should hence include elements of risk that have an overall impact on performance of the banks given by a variety of parameters including net income, ROA and ROE (Athanasoglou et al., 2005). Babakovia (2003) noted that the ability of a bank to identify, assess, control and monitor risks impacts on the profitability of the entity.

Different work has been done on determining the connection that financial risk and productivity have. Kemboi (2018) assessed how credit risk impacts the financial productivity of a bank. In a different study, Juma (2018) purposed to study the resulting effect of liquidity risk had on financial productivity of banks. These are some of the studies that address how the two variables relate. In investigating this relation, one needs to determine the scope of risk to be studied. In the two examples, the researchers focused on credit and liquidity risks. In the study, the connection between financial risk and a return on investment will be established. Theoretically, an ries in credit risk is expected to translate to a decline in performance.

1.1.4 Commercial Banks in Kenya

The CBK defines a bank as a business which carries out, or intends to conduct banking activities in Kenya. Commercial banking business involves accepting deposits, giving credit, money remittances and any other financial services. The industry performs one of the principal roles in the financial sector with a lot of

emphasizes on mobilizing of savings and credit provision in the economy. From the Bank Supervision yearly Report (2018), the banking industry comprises of the CBK as the legislative authority. The industry also has 1 mortgage finance, 42 commercial banks and 13 microfinance banks. Among the 42 commercial banks in the country 30 have local ownership while 12 have foreign ownership. 11 of the 42 are listed at the NSE.

All commercial banks are expected to adhere to specific regulations to cushion them from financial risks such as loan to deposit ratio, lowest cash reserves and liquidity ratios with the central bank. The controller has the obligation to make sure that commercial banks uphold the necessary liquidity parameters, remains solvent and function efficiently and effectively so as to benefit all stakeholders. The checks and licensing of commercial banks is provided by the Act of Banking containing the rules and regulations to be followed and observed. The industry of banking has been reserved as a main pillar to the accomplishment of vision 2030 through improved savings, encouragement of foreign investments which will conserve the economy and boost Kenya as a country financially as one of the best in Africa (The National Treasury, 2016).

In regards to financial performance, commercial banks have been performing differently with some recording increased ROA while others have been on a downward trend. Over the last few years, there have been cases of banks collapsing such as the case of Chase bank, poor performance such as National bank and increased mergers as banks strive to survive in the industry. Dubai Banks and Imperial Bank have also been subjected to liquidation with the Kenya Deposit Insurance Corporation (KDIC) (CBK, 2017). This is a clear indication for the

necessity of investigating on whether financial risk have an influence on financial performance and make policy recommendations that would safeguard banks' financial risk and the stakeholders' funds.

1.2 Research Problem

Central in the field of finance is financial performance. The need to explain how two firms operating within the same environment perform differently is a concern and several research works in finance have been devoted towards understanding this mystery. This led to studies which focus on various internal factors as well as external issues thought to be the cause of differing FP. It is hypothesized that financial risks such as liquidity, credit, interest rate and liquidity risks cause failure in financial productivity if unmanaged (Gathiga, 2016).

Following the review of CBK regulation on banks in 2013, a number of major banks were placed under liquidation such as Dubai bank, and under receivership such as Chase bank and Imperial bank in 2015 and 2016 resulting from deficiencies in capital, fraudulent and unsafe financial conditions respectively. Over the same period, a Sh.1.2 billion loss was recorded by National Bank at the close of the 2015 fiscal year which almost equaled their profit of Sh.1.3 billion at the close of the 2014 fiscal year (National Bank, 2016). This depicted clearly that, some Kenya's banks continue to experience problem in financial performance notwithstanding the review of the regulations of CBK in the year 2013 meant to address the performance improvement issue and commercial banks' financial stability (CBK, 2018). However, the other banks like; KCB, Equity and Co-operative Bank have demonstrated positive performance following the regulation review by CBK (CBK, 2018). Therefore to create more comprehension on why some banks are demonstrating positive

performance while others negative, the purpose of this study was to examine the influence of financial risk on financial productivity among Kenyan commercial banks.

Empirical studies done in the past have concentrated on several aspects of financial risk on FP of banks but their findings have been conflicting. For example findings of (Gathiga 2016; Muteti, 2014; Mwangi 2014) indicated that there is a substantial adverse impact of financial risk on performance. Akonga, (2014) and Githinji (2016) findings indicated a substantial positive relation between financial productivity and the management of financial risk. Others such as Maniagi (2018) had mixed findings where credit risk showed a substantial negative relation with performance while two risks (market and interest rate) showed a substantial positive relation with the same variable.

Although a number of studies have been undertaken on how financial risk impacts financial performance, there have been incomplete and contradicting results in these studies. Some of the researchers obtain a positive relation between financial performance and financial risk; others get a negative, while others find a mixed relation (both positive and negative). In addition, the operationalization of financial risk has been different among the researchers. This study thus sought to bridge this gap, by studying the effect that financial risk has on financial performance Kenyan commercial banks. The research question that the study sought to answer was: What is the effect of financial risk on the financial performance of commercial banks in Kenya?

1.3 Research Objective

To assess the effect that financial risk has on financial performance of commercial banks in Kenya. The specific objectives were

i. To assess the effect of credit risk on financial performance of commercial banks in Kenya
ii. To establish the effect of liquidity risk on financial performance of commercial banks in Kenya
iii. To determine the effect of interest rate risk on financial performance of commercial banks in Kenya
iv. To assess the effect of operating risk on financial performance of commercial banks in Kenya

1.4 Value of the Study

The findings of the study are critical to future researchers, because it will be a reference point. They might also be beneficial to researchers, in the identification of study gaps on similar areas and in the review of empirical literature to find additional research areas. In addition, this study will contribute in theory building on the association amongst financial risks and performance.

The stakeholders of the banking industry will find this research very useful as this study will generate vital information in management of the industry. These stakeholders include researchers, managers in the sector and the legislative authorities in the sector. Banks' management will derive the most out of this since it illuminates ways in which they can utilize financial risk information as a channel to improve FP in their banks.

Inference from the study will benefit the government and other policy makers, in guiding and formulating legislation that would be helpful to commercial banks and other institutions in the sector in adopting financial risk management measures meant to enhance their FP and thereby improve sector performance.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

A review of theories which on which this study was based is presented in this section. Additionally, prior research on this subject and related areas was presented. Other discussions in this chapter covers the determinants of FP, framework showing how the variables under study relate and a literature summary.

2.2 Theoretical Framework

This section gives a review of theories surrounding the impact financial risk has on FP. The theories covered are stakeholder theory, liquidity preference theory and the adverse selection theory.

2.2.1 Merton's Default Risk Theory

Merton's default theory was conceived by Merton (1970). The theory has extensively been utilized in the assessment of defaults in banks and other financial firms. Merton's model postulates that credit analysts are required to appraise financial institutions, while also checking on the firms' liquidity throughout the period of analysis and debt expiry (Jorion, 2014). It has been used to determine the ability of debtors to pay their debt obligations and can thus help credit analysts to determine an organization's credit default risk.

Merton's theory was based on standard assumptions on the firm's capital structure (Merton,1970). In the case of a default, the firm's assets market value in relation to the liabilities of the company fall below the required limit and thus, the firm is said to have defaulted. A reason for the default in the banks and other financial firms is

attributed to credit risk one of the risks experienced by financial institutions (Jorion, 2014).

Credit appraisal is the primary step in the process of customizing a solution to befit the needs of customers. The evaluation begins with a comprehensive understanding of the needs of customers and capability to make sure a good fit concerning financing solutions. Credit appraisal is quite a necessary activity as it guarantees that only quality loans are taken up and is regarded as critical activity of credit risk management since the credit analyst is able to establish credit worthiness of a mortgagor and also the value of security offered (Cade, 2009).

This model is critiqued by Jones (1984) who asserts that in the Merton Model the default risk is quite low such that pricing investment grade bill is almost that same as the pure model that has the assumption that default risk does not exist.. Afik et al. (2016) investigation found that simple applications of the Merton model are additional better in comparison to more complex and arithmetic intensive methods and recommended use of a more simpler model.

The theory has purpose to the study as it seeks to evaluate credit risk analysis in financial institutions which is a key variable in the study. The Merton's model asserts that analysts should assess the ability of the firm to remain liquid throughout the period under analysis which delves into the financial stability of the firm. The theory is of great importance to this study as it affirms the importance credit analysts being able to establish the ability of a borrower to pay their debts and thus establishing the overall organization's credit risk.

2.2.2 Liquidity Preference Theory

This theory was formulated by Keynes (1936) and it laid a foundation for liquidity management. In this theory, Keynes argues that holding all other factors constant, investors will have a preference for liquid investments as opposed to long-term investments and will seek a higher return for investments that will take more time to mature. Liquidity is the expediency of holding cash. An individual or firm will hold money for various reasons at a given time (Bitrus, 2011). Based on the theory, firms hold cash to enable them meet their transaction, precaution, speculative and compensation motives.

Bibow (2005) suggests that liquidity preference establishes the balance of assets and liabilities that an entity can hold. Therefore, a bank's decision problem will therefore be on how to balance returns and liquidity, consequently growing profitability (Dafermos, 2009). The importance of this theory is that it will enable the bank to balance holding short and long term loans and hold more of short term securities that are more liquid. Since short term investments are more liquid, a bank can easily convert them into cash, which can then be used to cushion the bank against operational risk that can arise. This theory therefore explains how banks holds liquid asset to reduce liquidity risk and by so doing reduce operational risk that is expected to enhance overall bank performance. By holding liquid assets, banks are able to meet their obligations when they arise therefore mitigating the negative effects of inability to meet obligations when they fall due and this is hypothesized to enhance financial performance.

2.2.3 Adverse Selection Theory

This was pioneered by Pagano and Jappelli (1993) and it argues that it is important for banks to share information as it minimizes adverse selection and improves the banks loans applicant's data. The theory explains asymmetric information concept, showing how it is not easy to differentiate between borrowers who are creditworthy and those who are not (Richard, 2011), leading to adverse selection and moral hazard issues. According to the theory, in a market setting, the person that possesses extra information on actual thing to be transacted; herein the lender has a bigger hand for optimal negotiation for favorable terms in the transaction compared to the one with lesser information herein, the borrower (Auronen, 2003).

Therefore, one with less information concerning the same actual item in lieu of transaction is most likely to make correct or incorrect decision pertaining to the transaction. This has led to a lot of high in non-performing loans (Bester, 1994; Bofondi & Gobbi, 2003). It's relevance to the study is that it relates to how credit risk management can have an influence on FP. Banks can charge high interest rates that are non-favorable to borrowers concealed as lending risk. This increases non-performing loans because of the burden of payment by clients and eventually can impact on FP.

2.3 Determinants of Financial Performance

The determination of the FP of a firm can be determined by several factors both within and outside the organization. Internal factors are different for every bank and can be manipulated by the bank. These consist of credit risk, liquidity risk, interest rate risk, operating risk, capital adequacy and bank size. External factors that affect performance are mainly gross domestic product, Inflation, stability of macroeconomic

policy, Political instability and the rate of Interest (Athanasoglou, Brissimis & Delis, 2005).

2.3.1 Credit Risk

This shows a bank's asset risk situation and financial strength. Credit risk forecasts the degree of asset quality among the dynamics which affects the health status of a bank. The value of assets controlled by a specific bank relies on the amount of credit risk, and the assets quality controlled through the bank also relies on liability to particular risks, tendencies on NPLs, and the cost-effectiveness of the debtors to the bank. Preferably, this ratio ought to be at a minimum. If the lending books are vulnerable to risk in a smoothly operated bank, this would be reflected by advanced interest margins. On the other hand, if the ratio decreases it entails that the risk is not being appropriately recompensed by margins (Athanasoglou et al., 2009).

The asset of a bank asset comprises loans portfolio, current asset, fixed asset, and other investments. Asset quality in most cases gets better with age and size of a bank (Athanasoglou et al., 2005). The primary income-earning assets of banks are loans. The quality of a loan portfolio therefore highly determines the FP of a bank. Good quality assets lower the losses relating to NPLs, and this in effect influences FP (Dang, 2011).

2.3.2 Liquidity Risk

Bank liquidity is the capacity of banks to accomplish their monetary obligations when they fall due. Dang (2011) hold a view that adequate of liquidity in banks is positively linked with their success. Liquidity risk control is an obligatory factor of the general risk mitigation charter for all financial institutions (Majid, 2003). An efficient bank ought to adhere to a well-documented framework for alleviation of liquidity risk and

shun losses (Guglielmo, 2008). Gatev and Strahan (2003) suggest that customer deposits offer an innate cushion against liquidity risk in commercial banks. The banking sector is interconnected meaning cash flows in one bank harmonize other banks whereby the inflows hedge other banks from outflows emanating from customer withdrawals and loan advancements. This assertion underpins the need for risk management in commercial banks since, banks use deposits to hedge against the liquidity risk.

There are contradictory views on whether liquidity influences financial performance of commercial banks. Shen et al. (2010) note that liquidity risk has a positive correlation to net interest margin which implies that banks with substantial liquidity levels earn higher interest revenue. On the flipside, Molyneux and Thornton (1992) documented that an inverse relation exists amid bank success and liquidity.

2.3.3 Interest Rate Risk

This is considered as an outlay of funds and an upward or downward movement in interest rate could influence the savings choice of the financiers (Omondi & Muturi, 2013). According to Rehman, Sidek and Fauziah (2009), the use of an interest cap causes banks to decrease loans. This in turn will lead to slowed growth of the banks. The banks can mitigate this situation by skyrocketing fees and other levies to arrest the situation. Barnor (2014) stated that unexpected variations in interest rates have an impact in investment decisions; hence investors tend to adjust their savings arrangements from capital market to fixed profits securities.

According to Khan and Sattar (2014), interest rate impacts performance either positively or negatively depending on its movement. A decrease in interest rate to the depositors and an increase in spread discourage savings. An increasing interest rate to

the investor adversely affects the investment. The banking sector is the most sensitive to movements in interest rates in comparison to other sectors because the largest proportion of banks' revenue comes from the differences in the interest rates that banks charge and pay to depositors.

2.3.4 Operating Risk

Management of operating risk is a key qualitative internal factor measuring and determining a firm's operational efficiency. Management's ability to effectively utilize firm resources, increase funding and effectively allocate those funds are ways of assessing the operating risk (Ongore & Kusa, 2013).

Operating risk being a qualitative measurement and determinant of performance, it can be measured through staff quality, how effective and efficient internal controls are, organizational discipline and management system effectiveness (Athanasoglou, Sophocles & Matthaois, 2009). Management control quality influences operating expenses that subsequently affects the standard of a firm hence managing operating risk substantially affects the FP of firms (Ongore & Kusa, 2013).

2.3.5 Capital Adequacy

Athanasoglou et al., (2005) state that capital is a key variable in the assessment of bank FP. It refers to the contribution by owners that supports the activities while cushioning against negative events. In imperfect capital markets, well-capitalized banks should lower borrowings to support a particular index of assets, thereby lowering anticipated costs of bankruptcy and thus face lower costs of funding.

A bank that is well capitalized gives the market an indication that an above average performance is expected. Athanasoglou et al., (2005) found that capital contributions are positively related to the profitability of a bank, which is a reflection of a good

financial position of Greek banks. Additionally, Berger et al., (1987) found that capital contributions have a positive causality with firm profitability.

2.3.6 Bank Size

The size of a bank determines the degree by which legal and financial factors impact a firm. The size has a close linkage to capital adequacy since large banks acquire less costly capital thereby generating huge profits. Bank size is positively correlated to returns on assets which indicates that these types of banks can achieve large economies of scale thereby reducing costs of operation and improving FP (Amato & Burson, 2007). Magweva & Marime (2016) linked the size of banks to capital rations stating that they have a positive relation suggesting that an increase in size raises profitability.

According to Amato and Burson (2007), the size of an organization is primarily determined by the amount of assets it owns. An argument can be made that the larger the assets a firm owns, the more its ability to take a large number of projects with greater returns in comparison with small firms with a smaller amount of assets. Additionally, the bigger the firm, the larger the amount of collateral that can be pledged in a move to access credit facilities in comparison to smaller competitors (Njoroge, 2014). Lee (2009) concluded that the amount of assets in control of a firm has an influence on the level of profitability of the said firm from one year to the next.

2.4 Empirical Review

Local and international studies support the relation between financial risk and FP; however the studies have arrived at varied conclusions.

2.4.1 Global Studies

Festus and Fatoki (2015) studied on how operational risk management influences financial development and economic growth in Nigeria. A descriptive survey design was used during the study. Quantitative analysis was done on the variables so as to achieve the objectives of the project. To obtain information from the respondents, convenience method was used. The study used descriptive statistics to conduct the study. Data from 150 employees was collected from different financial institutions. The hypothesis of the study was tested using Analysis of Variance (ANOVA). The primary data from the employees was coded and analyzed using SPSS. Findings showed that operational risk management is positively related to financial economic growth and development in the financial sector. This study was localized on one aspect of financial risk and it did not address its relationship with FP.

Nora and Maytham (2015) did an empirical study of liquidity risk and Malaysian Banks' performance. The study targeted 21 commercial banks. The study was based on the period 2005-2013. Panel data was used during the study. Total loans to total deposit ratio, liquid assets to total assets ratio and capital to asset ratio were the measures of the independent variables while ROE and ROA measured financial performance. Findings showed that loan to deposit ratio had an insignificant relationship with measures of bank performance. Liquid assets to total asset ratio and capital ratio, had a substantial relation to measurements of banks performance. Capital ratio had mixed results, whereby it negatively impacted ROE and positively impacted ROA. This study did not address credit, interest rate and operating risks which are also indicators of financial risk that the current study will focus on.

Akyut (2016) studied how market and credit risk influence bank performance in Turkey. The study was conducted for the period 2002-2015 by use of data collected on a daily basis. The study used GARCH approach as the model for analysis and it also used descriptive statistics. The results obtained two key findings: Credit risk has a negative and foreign exchange rate has a positive effect, but interest rate has an unsubstantial effect on the profitability of the banking sector, and there was a positive significance of credit and market risk has a positive on volatility of stock return on conditional banks. The study was done in a different context and therefore its findings cannot be applied in the current one.

Rasika, Hewage and Thennakoon (2016) conducted a study on if credit risk influences performance of Sri Lankan banks. The research conducted a research on 2 state banks and four private domestic banks. The research was conducted for the period between 2005-2014.The research used secondary data to obtain and gather information from the financial statements of the bank. The data collected was analyzed using panel data analysis method. Findings indicated a negative relationship on non performing ratio and capital adequacy ratio on the financial performance which was given by ROE. This study only addressed one measure of financial risk while the current study will focus on four.

Ahmad (2017) did a study on how credit, liquidity and market risks impact profitability of Indonesian foreign exchange banks. He adopted the causal method of research in the study. The Population in the study included all banking shares private foreign exchange category for public banks quoted on the Indonesian Stock Exchange and the sample was selected through purposive sampling to obtain a qualified research data. Through an analysis made using the SPSS 21 software, results showed that NPL

variable has no substantial effect on ROE variable but the NIM variable showed a substantial impact on ROE. This study did not address operating risk and interest rate risk as measures of financial risk. In addition, it was conducted in a different context.

2.4.2 Local Studies

Akong'a (2014) studied how financial risk management influences the FP of Kenyan banks. The target population was the 44 Kenyan licensed banks. The design used by the researcher was the descriptive design. The study was based on a 6 year period between 2008 and 2013. The annual reports of the banks provided secondary data for the study. In undertaking data analysis multiple regression was applied. Findings showed that the relation amongst financial risk management and the performance of banks was positive. The study had its focus on management of financial risk while the current will focus on financial risk itself by breaking it down to its four sub components.

Githinji (2016) did research to determine how financial risk management impacts performance of Kenyan banks. A descriptive design was adopted. The period of study was for the period 2011 to 2015. The study had a target population of 43 Kenyan banks. Reliance was placed on secondary data from banks financials. The study obtained results that indicated that the commercial banks were doing well financially. The results showed that the relation amongst financial risk management and performance of Kenyan banks was positive. This study did not address the expected relationship between individual financial risk components and FP.

Gathiga (2016) studied how financial risk impacts performance of Kenyan banks. The study used a quantitative design. The study targeted all the 43 Kenyan banks. The research embraced use of secondary data obtained from the published annual reports

of the commercial banks. The research was based on a ten year period between 2005 and 2014. To study the relation between financial risk and financial performance ratio analysis and GMM methods were used. Findings showed a negative relation between financial risk and FP of Kenyan banks. The research concluded that the association amongst financial risk and financial performance was inverse. This study failed to consider interest rate risk as a financial risk variable.

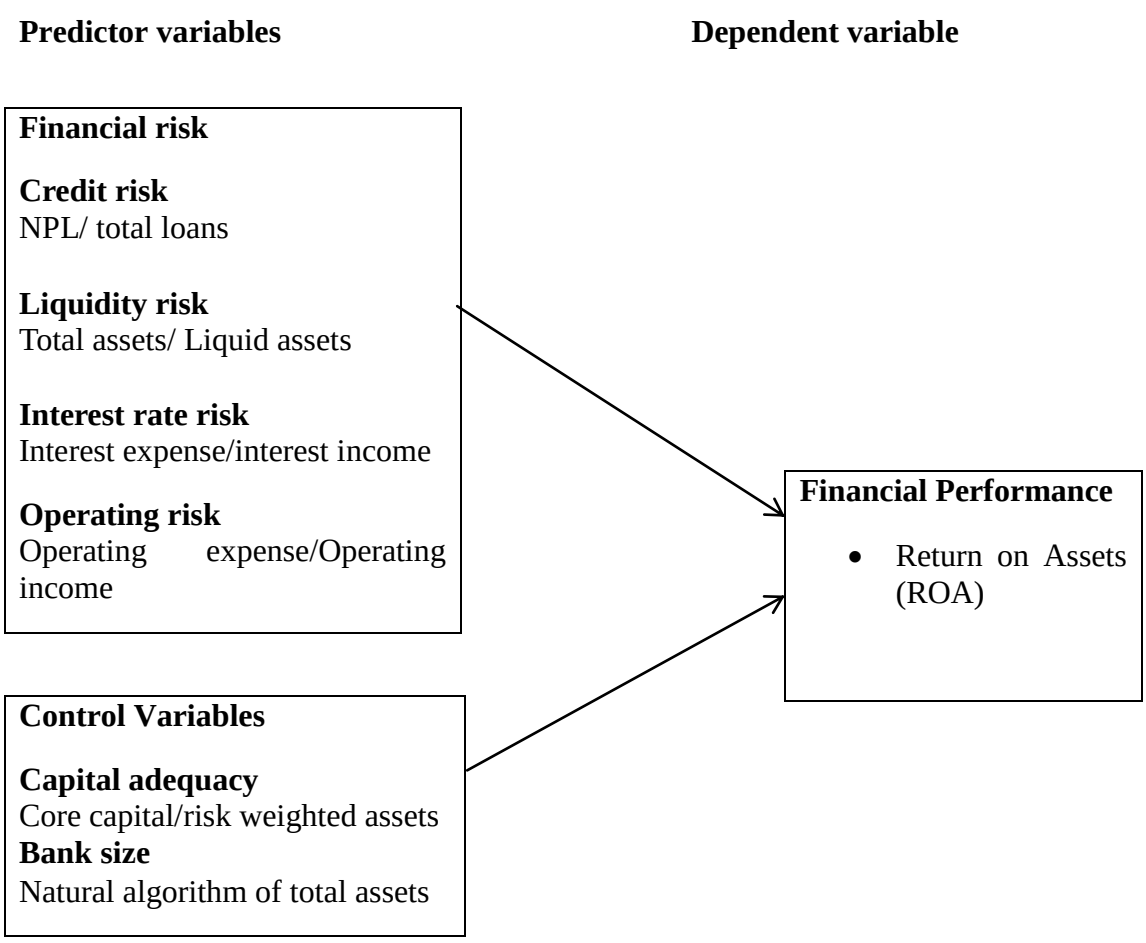
Wanjohi, Wanjohi and Ndambiri (2017) studied how financial risk management and financial performance of Kenyan banks relate. The study was based on a five year period between 2008 and 2012. Primary data was gathered using questionnaires from different employees on the banks. In undertaking data analysis multiple regression was applied. The findings of the study showed that financial risk management's impact on this was positive. This study relied on primary data while the current study will rely solely on secondary data.

Maniagi (2018) did a study to investigate the impact financial risk had on the financial performance Kenyan banks. Both primary and secondary data was used. Descriptive survey design was used during the study. The study targeted all the 44 Kenyan banks, in that year, two were placed in receivership and one in statutory management. The study was conducted for 10 years between 2006 and 2015. The data was obtained from the CBK and the banks website. The methods used for analyzing data were correlation analysis, descriptive statistics and the data was coded using SPSS so as to obtain results. The outcomes were that credit risk had an inverse effect on the performance of banks, and interest rate risk and market risk showed a positive impact. This study did not consider liquidity risk and operating risk as financial risk measures.

2.5 Conceptual Framework

The illustration below shows the predicted association existing among the variables. The predictor variables was financial risk with four measures (credit, liquidity, interest rate and operating risks). The control variables were capital adequacy as given by the ratio of core capital to risk weighted assets and bank size given as the natural log of total assets. FP was the response variable that the study wanted to explain given by return on assets.

Figure 2.1: The Conceptual Model



Source: Author (2020)

2.6 Summary of the Literature Review

Several frameworks have described the anticipated theoretical relation existing between financial risk and FP of banks. The theories reviewed are; stakeholders'

theory, liquidity preference theory and adverse selection theory. Primary determinants of FP have also been discussed in this section. Both local and global empirical studies have been done on financial risk and FP. The findings related to these studies have also been discussed in this section.

Although there are several studies locally on this area, some only look at how the systems to manage credit risk impacts financial performance of banks. Majority of them studies focus on financial risk influence on FP forget to capture the element of operating and interest rate risks. Therefore most researches have concentrated on managing credit and liquidity risk and forgotten to investigate on how operational risk and interest rate risk affect the financial performance of institutions, as variables of financial risk.

Researchers such as Akonga (2014); Gathiga (2016) and Maniangi (2018) arrived at conflicting empirical results using similar indicators of financial performance and financial risk have been employed. In the studies, some showed a positive relation between financial risk and financial performance, others showed a negative relationship, others showed both positive and negative, and others showed no relation between the two. Therefore, the studies did not obtain a definite relation between financial risk and FP. Therefore, the effect of financial risk on FP remained unsettled.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

To ascertain how the FP of banks in Kenya is affected by financial risk, a methodology was essential in outlining how the research was done. The section was composed of four sections; the design, ways of collecting data, diagnostic tests and lastly data analysis.

3.2 Research Design

The research utilized a descriptive longitudinal design in determining how financial risk and FP of commercial banks relate. This design was suitable because the researcher sought to describe the nature of conditions as they are (Khan, 2008). It was also appropriate because the nature of the phenomenon being studied and how they relate was of major interest. Additionally, a descriptive research represented the variables validly and accurately and this aided in providing responses to the research queries (Cooper & Schindler, 2008).

3.3 Population

This is the totality of observations of interest from a collection such as persons or events as specified by a research investigator (Burns & Burns, 2008). All the 42 banks operating in Kenya as at 31st December 2019 were the study population. Because of a finite population, a census of the 42 banks was performed for the study (see appendix I).

3.4 Data Collection

This study relied solely on secondary data which was obtained from the published annual reports published by banks in operation from January 2015 to December 2019

and recorded in a data collection sheet. The source of the reports was the CBK web page and banks yearly reports. The final result was annual data on the predictor variables and the response variable for the target population. The specific data collected included net income, total assets, NPLs, total loans, liquid assets, operational expenses, net operating income, interest expense, and income, core capital and risk weighted assets.

3.6 Data Analysis

SPSS version 23 was used in data analysis and findings were quantitatively presented in the form of graphs and tables. Descriptive statistics summarized and explained the variables observed. The results were presented using percentages, frequencies, measures of dispersion and central tendencies and recorded in tables. For inferential statistics both regression model and correlation were undertaken also coefficient of determination was used and ANOVA for significance testing.

3.6.1 Diagnostic Tests

To determine the viability of the study model, the researcher carried out several diagnostic tests, which included normality test, stationarity test, test for multicolinearity, test for homogeneity of variances and the autocorrelation test. Normality tests the presumption that the residual of the response variable have a normal distribution around the mean. The test for normality was done by the Shapiro-wilk test or Kolmogorov-Smirnov test. In the case where one of the variables is not normally distributed it was transformed and standardized using the logarithmic transformation method. Stationarity test was used to ascertain whether statistical properties like the mean, variance and autocorrelation overtime. Stationarity was

tested using augmented Dickey Fuller test. In case, the data fails the assumption of stationarity, the study used robust standard errors in the model (Khan, 2008).

Autocorrelation measures how similar a certain time series is in comparison to a lagged value of a similar time series in between successive time periods. This was measured by the Durbin-Watson statistic and incase the assumption is violated the study employed robust standard errors in the model. Multicollinearity occurs when an exact or near exact relation that is linear is observed between two or several predictor variables. Variance Inflation Factors (VIF) and the levels of tolerance were used. Any multicolinear variable was dropped from the study and a new measure selected and substituted with the variable which exhibits co-linearity. Heteroskedasticity tests if the variance of the errors from a regression is reliant on the independent variables. The study assessed for heteroskedasticity using the Levene test and incase, the data failed the assumption of homogeneity of variances the study used robust standard errors in the model (Burns & Burns, 2008).

3.6.2 Analytical Model

The regression model below was used:

$$Y= \beta_0 + \beta_1X_1+ \beta_2X_2+ \beta_3X_3 + \beta_4X_4+ \beta_5X_5 + \beta_6X_6 +\varepsilon.$$

Where: Y = Financial Performance given by ROA on an annual basis

β_0 =y intercept of equation.

β_1, β_2, β_3, β_4, β_5, β_6=are the coefficient of the independent variables

X_1 = Credit risk given by the ratio of non-performing loans to total loans on an annual basis

X_2 = Liquidity risk as given by the ratio of liquid assets to total assets

X_3 = Operating risk given by operating expenses to net operating income ratio

on an annual basis

X_4 = Interest rate risk given by the ratio of interest expense to interest income on an annual basis

X_5 = Capital adequacy as given by the ratio of total core capital to risk weighted assets

X_6 = Bank size as given by the natural log of the total assets

ε =error term

3.6.3 Tests of Significance

The researcher to establish how significant the general models were the individual parameters as well as the overall model carried out parametric tests. The F-test was used in the determination of the significance of the entire model and was tested using ANOVA whereas a t-test determined statistical significance of individual variables.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This section details the analysis, findings and interpretation of the secondary data collected from the CBK and individual banks websites. The aim of the study was determining the effect of financial risk on the FP. The independent variable for the study was financial risk while the dependent variable was the FP given by ROA. Regression analysis was adopted to determine the relation amongst the variables of study in relation to the study's objectives. In ascertaining the suitability of the analytical model, ANOVA was applied. The findings were illustrated in tables and figures.

4.2 Response Rate

This study sough to collect data from all 44 commercial banks in Kenya as at 31st December 2019 for 5 years (2015 to 2019). Data was acquired from 37 out of the 42 banks giving a response rate of 88.1% which was considered adequate. Cooper and Schindler (2008) states that a response of 70% and above is considered good.

4.3 Descriptive Analysis

The descriptive statistics presented is a representation of the mean, minimum and maximum values of variables of the study together with the standard deviations. Table 4.1 below displays the qualities of each variable. An output of each variable was extracted using SPSS software for a five-year period (2015 to 2019) on an annual basis.

Table 4.1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	185	-.24	.07	-.005	.0308
Credit risk	185	.001	38.6	.358	2.8320
Liquidity risk	185	4.4	2313.6	33.108	170.5483
Interest rate risk	185	.15	1.1	.454	.1687
Operating risk	185	-327.5	640.9	6.378	56.9158
Capital adequacy	185	-.2	2.1	.236	.2173
Bank size	185	14.8	20.6	17.726	1.3658
Valid N (listwise)	185				

Source: Research Findings (2020)

4.4 Diagnostic Tests

The data collected was subjected to diagnostic tests. The study presumed a significance level of 5% or 95% confidence interval so as to make variable deductions on the data adopted. Diagnostic tests were useful for ascertaining the falsity or truth of the data. Therefore, the nearer to 100% the confidence interval, the more accurate the data used is presumed to be. In this case, the tests conducted were multicollinearity test, normality test, autocorrelation test, stationarity test and heteroscedasticity tests.

4.4.1 Multicollinearity Test

Multicollinearity can be defined as a statistical state where more than one predictors are highly correlated in a multiple regression model. It is an unwanted situation for independent variables to have a strong correlation. A combination of variables is said to exhibit high Multicollinearity in case there is one or more exact linear correlation amongst the study variables.

Table 4.2: Multicollinearity Test

	Collinearity Statistics	
Variable	**Tolerance**	**VIF**
Credit risk	0.366	2.732
Liquidity risk	0.398	2.513
Interest rate risk	0.388	2.577
Operating risk	0.368	2.717
Capital adequacy	0.376	2.659
Bank size	0.372	2.688

Source: Research Findings (2020)

VIF value and Tolerance of the variable were utilized where the values below 10 for VIF and values more than 0.2 for Tolerance imply no Multicollinearity. From the results, all the variables had a VIF values <10 and tolerance values >0.2 as illustrated in table 4.2 suggesting that no Multicollinearity.

4.4.2 Normality Test

Shapiro-wilk test and Kolmogorov-Smirnov test was utilized for normality testing. The level of significance in the study was 5%. The outputs of the test are depicted in Table 4.3. The null hypothesis is that the data is distributed normally. If the Shapiro-wilk test and Kolmogorov-Smirnov tests contradict, the later test is picked over the former because it is more statistically sound. Since the p value in both tests of all the variables is greater than the α (0.05), then the null hypothesis is not rejected. Hence the data series of all the variables is normally distributed.

Table 4.3: Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
ROA	Statistic	Df	Sig.	Statistic	Df	Sig.
Credit risk	.173	185	.264	.918	185	.822
Liquidity risk	.180	185	.264	.894	185	.790
Interest rate risk	.176	185	.264	.892	185	.784
Operating risk	.178	185	.264	.893	185	.787
Capital adequacy	.181	185	.264	.896	185	.792
Bank size	.188	185	.264	.892	185	.788

a. Lilliefors Significance Correction

Source: Research Findings (2020)

4.4.3 Autocorrelation Test

To test for autocorrelation, Durbin-Watson statistic was applied which gave an output of 1.945 as displayed in Table 4.4. The Durbin-Watson statistic ranges from point 0 and point 4. If there exist no correlation between variables a value of 2 is shown. If the values fall under point 0 up to a point less than 2, this is an indication of an autocorrelation and on the contrast a negative autocorrelation exist if the value falls under point more than 2 up to 4. As a common rule in statistics, value falling under the range 1.5 to 2.5 are considered relatively normal whereas values that fall out of the range raise a concern. Field (2009) however, opines that values above 3 and less than 1 are a sure reason for concern. Therefore, the data used in this panel is not serially autocorrelated since it meets this threshold.

Table 4.4: Autocorrelation Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.574[a]	.329	.307	.0257	1.945

a. Predictors: (Constant), Bank size, Liquidity risk, Capital adequacy, Operating risk, Credit risk, Interest rate risk

b. Dependent Variable: ROA

Source: Research Findings (2020)

4.4.4 Stationarity Test

In nature, most economic variables are non-stationary and earlier to running a regression analysis. In testing for existence of stationary or not unit root tests were undertaken using Augmented Dickey-Fuller (ADF). The reason for this was to ensure that the regression outcomes were not biased due to use of non-stationary data. As indicated in Table 4.5 below the were stationary at 5% level of significance. Hence, differentiating some variables was not necessary.

Table 4.5: Unit Root Tests at Level

Variable name	ADF test	5% Level	Prob	Comment
ROA	-3.753547	-3.540328	0.0312	Stationary
Credit risk	-4.262276	-3.540328	0.0093	Stationary
Liquidity risk	-4.522157	-3.540328	0.0520	Stationary
Interest rate risk	-3.98997	-2.91452	0.0043	Stationary
Operating risk	-2.78574	-1.53674	0.0381	Stationary
Capital adequacy	-3.453231	-3.23456	0.0037	Stationary
Bank size	-3.387451	-3.22754	0.041	Stationary

Source: Research Findings (2020)

4.4.5 Heteroscedasticity Test

The study checked for panel level heteroscedasticity by use of the Likelihood Ratio (LR) as indicated in the Table 4.6. This test used the null hypothesis that the error variance was homoscedastic. A chi-square value of 32.36 was produced by the likelihood-ratio test with a 0.0000 p-value. The chi-square esteem was statistically significant at 1 percent level and in this manner the invalid speculation of consistent

fluctuation was rejected meaning the nearness of homoscedasticity in the examination information as suggested by Poi and Wiggins (2001).

Table 4.6: Heteroskedasticity Test

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance
Variables: fitted values of ROA
chi2(1) = 32.36
Prob > chi2 = 0.0000

Source: Research Findings (2020)

4.5 Correlation Analysis

Correlation analysis shows whether there is a relationship amongst two variables. The relation ranges from strong negative correlation to perfect positive correlation. This study utilized Pearson correlation to analyze how between ROA and financial risk are related. The study used a confidence interval of 95%, as it is most commonly used in social sciences. A two tailed test was utilized. Table 4.7 shows the correlation analysis outcome.

Existence of a moderate negative and statistically significant correlation (r = -.483, p = .000) between credit risk and FP was revealed. Further results discovered a weak negative and significant correlation between interest rate risk and commercial banks' performance as demonstrated by (r = -.309, p = .000) existed. Bank size was noted to have a weak positive substantial association with performance as evidenced by (r = .260, p = .000). Liquidity risk, operating risk and capital adequacy exhibited a positive relationship with FP but the association was not statistically significant as evidenced by p values above 0.05. The study further found that although there was an association between the independent variables, it was not strong enough to result to Multicollinearity. In statistics, multicollinearity is a situation where there is existence

of a perfect relationship between the predictor variables. Existence of an exact or a perfect among the predictor variables makes it challenging to derive dependable estimations of individual coefficients. Thus, it leads to improper conclusions of the relationships among the independent and the dependent variables.

Table 4.7: Correlation Analysis

		ROA	Credit risk	Liquidity risk	Interest rate risk	Operating risk	Capital adequacy	Bank size
ROA	Pearson Correlation	1						
	Sig. (2-tailed)							
Credit risk	Pearson Correlation	-.483**	1					
	Sig. (2-tailed)	.000						
Liquidity risk	Pearson Correlation	.011	-.007	1				
	Sig. (2-tailed)	.886	.920					
Interest rate risk	Pearson Correlation	-.309**	.125	.098	1			
	Sig. (2-tailed)	.000	.089	.184				
Operating risk	Pearson Correlation	.023	-.006	-.008	-.013	1		
	Sig. (2-tailed)	.760	.939	.911	.857			
Capital adequacy	Pearson Correlation	.110	.145*	-.016	-.028	.037	1	
	Sig. (2-tailed)	.135	.049	.829	.708	.615		
Bank size	Pearson Correlation	.260**	-.172*	.009	-.531**	-.117	.026	1
	Sig. (2-tailed)	.000	.019	.899	.000	.112	.721	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=185

Source: Research Findings (2020)

4.6 Regression Analysis

At significance level of 5% a regression analysis was conducted between FP and the six independent variables selected for this study. The F critical value was compared against the F calculated.

Table 4.8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.574[a]	.329	.307	.0257	1.945

a. Predictors: (Constant), Bank size, Liquidity risk, Capital adequacy, Operating risk, Credit risk, Interest rate risk
b. Dependent Variable: ROA

Source: Research Findings (2020)

From the output in Table 4.8, the R-square value was 0.329, implying that 32.9 % of the deviations in FP of banks is as a result of variations in credit risk, liquidity risk, interest rate risk, operating risk, capital adequacy and bank size. Other factors not incorporated in the model are attributed to 67.1% of the changes in FP. The correlation coefficient (R) value of 0.574 shows that there exists a strong relation between the predictor variables included in the study and financial performance.

Table 4.9 provides the outcomes of the ANOVA; the essence of F-test was to establish the model's significance. The formulae for calculating the critical value for the F test is;

$$\mathbf{F} = (SSE_1 - SSE_2 / m) / SSE_2 / n\text{-}k$$

Where;

SSE = Residual sum of squares,

m = No. of restrictions

k = Number of independent variables.

A critical value of 2.46 was obtained from the F-Test tables. The F statistic indicated in the study findings is more than the critical value, thus the whole model is significant to predict FP.

Table 4.9: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.057	6	.010	14.560	.000[b]
	Residual	.117	178	.001		
	Total	.175	184			

a. Dependent Variable: ROA

b. Predictors: (Constant), Bank size, Liquidity risk, Capital adequacy, Operating risk, Credit risk, Interest rate risk

Source: Research Findings (2020)

To ascertain the significance of each variable individually variable in this research as a predictor of the performance of banks in Kenya it was important for t-test to be employed. P-value was utilized to indicate the significance of the relationship between the response and the predictor variables. Confidence level at 95% and value of p below 0.05 was understood as an index of statistical significance of the concepts. Therefore, a p-value more than 0.05 depicts an insignificant variable. The outcomes are demonstrated in table 4.10.

Table 4.10: Model Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.017	.033		-.503	.615
	Credit risk	-.005	.001	-.469	-7.436	.000
	Liquidity risk	5.504E-006	.000	.030	.493	.623
	Interest rate risk	-.039	.013	-.215	-2.935	.004
	Operating risk	9.956E-006	.000	.018	.296	.768
	Capital adequacy	.024	.009	.170	2.739	.007
	Bank size	.001	.002	.063	.847	.398

a. Dependent Variable: ROA

Source: Research Findings (2020)

The coefficients are used to indicate size and direction of the relation that the independent and the response variable have. The T values were applied to establish how significant the relation amongst the independent variables had to the dependent variable. The values obtained are contrasted to the critical values. A confidence interval of 95% and a two tailed T test critical value of ±2.04523 was obtained from the T test tables. A T test value that lies out of this range is significant.

The results revealed that credit risk and interest rate risk have negative and significant influence on FP. Implication of this is that a unit increment in either credit risk or interest rate risk will result to a decline in financial performance by 0.005 and 0.039 respectively. The findings also revealed that capital adequacy have a positive and significant influence on FP. This implies that if capital adequacy was to be increased by 1 unit, FP would rise by 0.024. The findings further revealed that although liquidity risk, operating risk and bank size had a positive influence on financial performance, the influence was not statistically significant. The constant coefficient -0.017 implies that when the six-selected independent variables have a zero value, financial performance would be equal to the figure.

The regression equation below was thus estimated:

$$\mathbf{Y_i = -0.017 - 0.005X_1 - 0.039X_2 + 0.024X_3}$$

Where;

Y_i= Return on Assets

X_1 = Credit risk

X_2 = Interest rate risk

X_3 = Capital adequacy

4.7 Discussion of Research Findings

The researcher studied the influence of financial risk on the commercial banks' FP. Credit risk, liquidity risk, interest rate risk, operating risk, capital adequacy and bank size were the predictor variables in this study while performance of banks was given by ROA which was the dependent variable. The adequacy of the overall model in predicting FP was examined. The influence of each predictor variable on the dependent variable was also examined with respect to strength and direction.

From the results of Pearson correlation, the study found an existence of a negative and statistically substantial correlation between credit risk and financial performance. Further a negative and significant correlation between interest rate risk and commercial banks' performance existed. Bank size was found to have a positive and significant association with performance. Only liquidity risk, operating risk and capital adequacy were found to have a positive but insignificant link with FP.

The independent variables from the model summary revealed that: credit risk, liquidity risk, interest rate risk, operating risk, capital adequacy and bank size explains

32.9% of variations in the dependent variable according to the R square which suggests that 67.1% changes in performance is explained by factors not incorporated in this model. With the F-value at 13.692 the model was considered suitable at 95% confidence level. This means that the model is suitable to be used to predict and explain how commercial banks' FP is affected by the independent variables. This implies that credit risk, liquidity risk, interest rate risk, operating risk, capital adequacy and bank size are good predictors of financial performance.

This study agrees with Gathiga (2016) who studied how financial risk impacts performance of Kenyan commercial banks. The study used a quantitative design. The study targeted all the 43 Kenyan banks. The research used secondary data which was obtained from the published annual reports of the banks. The research was based on a ten year period between 2005 and 2014. To study the relation between financial risk and financial performance ratio analysis and GMM methods were used. The results of the study showed a negative relation between financial risk and FP of Kenyan banks. The research concluded that the relation between financial risk and performance was inverse.

The study agrees with one done by Rasika et al. (2016) who conducted a study on if credit risk influences financial performance of Sri Lankan commercial banks. The research conducted a research on 2 state banks and four private domestic banks. The research was conducted for the period between 2005-2014.The research used secondary data to obtain and gather information from the financial statements of the bank. The data collected was analyzed using panel data analysis method. Findings

indicated a negative relationship on non performing ratio and capital adequacy ratio on the financial performance which was given by ROE.

The study findings differ with that conducted by Ahmad (2017) who did a study on how credit, liquidity and market risks impact profitability of Indonesian foreign exchange banks. He adopted the causal method of research in the study. The Population in the study included all banking shares private foreign exchange category for public banks quoted on the Indonesian Stock Exchange and the sample was selected through purposive sampling to obtain a qualified research data. Through an analysis made using the SPSS 21 software, results showed that NPL variable has no substantial effect on ROE variable but the NIM variable showed a substantial impact on ROE.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The main goal of the study was determining the effect of financial risk on the performance of Kenyan commercial banks. This chapter gives an overview of the results from the previous chapter, conclusion, limitations faced during the study. Moreover, it recommends policies that policy makers can use. Additionally, the chapter gives recommendations for future researchers.

5.2 Summary of Findings

The aim of the research was to ascertain how financial risk influences FP of banks in Kenya. To conduct the study, financial risk was operationalized as credit risk, liquidity risk, interest rate risk and operating risk. The control variables were capital adequacy as given by the ratio of core capital to risk weighted assets and bank size given as the natural log of total assets. FP was the response variable that the study intended to explain and it was be given by return on assets. The researcher reviewed available theoretical foundations and empirical reviews to get an understanding on the generally accepted relationship among the selected dependent and independent variables. From this review, a conceptual framework was developed that hypothesized the expected association between the study variables.

Descriptive research design was employed. All the 42 banks as at December 2018-year end comprised the population of this study and from this data was obtained from 37 banks giving a response rate of 88.1%. Data secondary in nature was acquired

from CBK and individual banks financial reports for a period of 5 years spanning 2015 to 2019 was used. The researcher carried out descriptive, correlation analysis as well as regression analysis. So as to confirm that the data is fit for analysis the researcher transformed the data using natural logarithms and conducted diagnostic tests to make sure that the data has the required characteristics before conducting inferential statistics. Regression analysis was applied in testing the strength of the association between the study variables and to test both the model's significance and individual parameters. SPSS software version 23 was used to carry out the analysis.

Pearson correlation found an existence of a moderate negative and statistically significant correlation between credit risk and FP. Further, a negative and significant correlation between interest rate risk and commercial banks' performance existed. Bank size was noted to have a positive and significant association with performance. Liquidity risk, operating risk and capital adequacy were found to have a positive but insignificant link with performance.

The coefficient of determination similarly denoted as the R square shows the disparities in the response variable triggered by changes from the predictor variable. As indicated by the findings, R square was 0.329, an indication that 32.9% of the variations in performance stems from variations credit risk, liquidity risk, interest rate risk, operating risk, capital adequacy and bank size. Other factors that have not been incorporated in this model make up 67.1% of the variation in financial performance. Correlation analysis results revealed that the chosen variables strongly correlated with FP of banks (R=0.562). Further findings of ANOVA test indicated the F stastistic was

significant at the 5% level of significance with P value being 0.000. This indicated that the model was suitable in explaining the variables relationship.

The study further found that a unit increment in credit risk or interest rate risk will lead to a decline in financial performance by 0.005 and 0.039 in that order. Further, a unit increment in capital adequacy would result to an increase in FP by 0.024. The findings further revealed that although liquidity risk, operating risk and bank size had a positive influence on financial performance, the influence was not statistically significant. The constant coefficient -0.017 implies that when the six selected independent variable have a zero value, financial performance would be equal to the figure.

5.3 Conclusion

The findings of this study show that the FP of Kenyan banks is significantly impacted by credit risk, interest rate risk and capital adequacy. This research shows that an increment in a unit in credit risk and interest rate risk significantly decreases the FP of commercial banks while a unit increase in capital adequacy significantly increases FP. The study also showed that liquidity risk, operating risk and bank size for significant determination of financial performance and thus found that these variables do not have a significant effect on performance.

The conclusion of this study is that the independent variables selected for this study (credit risk, liquidity risk, interest rate risk, operating risk, capital adequacy and bank size) largely have a notable influence on the performance of banks in Kenya. The conclusion that these variables have a significance impact on the performance of banks given the p value in anova summary therefore is correct. The findings that

32.9% of the changes in financial performance are due to the six factors incorporated in the model suggest that factors not incorporated in the model accounts for 67.1% of the variations in financial performance..

This study partly concurs with Maniagi (2018) findings who did a study to investigate how financial risk impacts performance of banks in Kenya. The study relied on both secondary and primary data. Descriptive survey research design was used during the study. The study targeted all the 44 Kenyan banks, in that year, two were placed in receivership and one in statutory management. The study was conducted for a 10 year period between 2006 and 2015. The data was obtained from the CBK and the banks website. The methods used for analyzing data were correlation analysis, descriptive statistics and the data was coded using SPSS so as to obtain results. The findings of the study were that credit risk had a negative impact on the performance of Kenyan banks, and interest rate risk and market risk showed a positive impact.

This study diverges with Nora and Maytham (2015) who did an empirical study of liquidity risk and performance of Malaysian Banks. The study targeted 21 commercial banks. The study was based on the period 2005-2013. Panel data was used during the study. Total loans to total deposit ratio, liquid assets to total assets ratio and capital to asset ratio were the measures of the independent variables while ROE and ROA measured financial performance. Findings showed that loan to deposit ratio had an insignificant relationship with measures of bank performance. Liquid assets to total asset ratio and capital ratio, had a substantial relation to measurements of banks performance. Capital ratio had mixed results, whereby it negatively impacted ROE and positively impacted ROA.

5.4 Recommendations of the Study

Leveraging on the study findings, below recommendations have been drawn. The study recognized that there exists a negative substantial influence of credit risk on FP of banks. Thus, the study findings were that an increase in a bank's NPL's relative to total loans will significantly influence financial performance and in a negative way. It is recommended that policy makers should prioritize credit risk when crafting policies to enhance ROA. It can also be recommended to financial institutions, and their boards that credit risk should be considered when carrying out strategic management practices to boost profitability. Thus, it is necessary to adopt sufficient measures by managers of these banks to raise their FP by reducing the level of NPLs in their books. Commercial banks in Kenya should work on increasing their asset quality by undertaking measures such as stringent vetting of customers and other controls.

The findings showed that a negative relationship is existent between FP and interest rate risk. This means that an increase in interest expense relative to interest income have a significant negative influence on financial performance. The recommendation is that banks' management and directors should increase their interest income by formulating policies aimed at enhancing interest bearing assets while at the same time reducing interest expense as this will directly influence FP of the bank.

A positive relationship between FP and capital adequacy position was found to exist in this study. Following are some suggestions that will facilitated policy change; a heavy investment by banks in capital adequacy since it will improve the FP of the banks. It is the mande of CBK to come up with policies that will create an enabling

environment for commercial banks to operate and increase their capital adequacy as this will favor growth of the economy.

5.5 Limitations of the Study

This study focused on some factors that are hypothesized to influence FP of banks in Kenya. Specifically, the study focused on six explanatory variables. In reality however, there are other variables that are likely to influence FP some which are internal such as management efficiency and leverage while others are not under the control of management such as economic growth exchange rates, balance of trade, and unemployment rate among others.

The study adopted the analytical approach which is highly scientific. The research also disregarded qualitative information which could explain other factors that influence the association between financial risk and commercial banks' performance. Qualitative methods such as focus group discussions, open ended questionnaires or interviews can help develop more concrete results.

The research concentrated on 5 years (2014 to 2018). It is not certain whether the findings would hold for a longer time frame. It is also unclear as to whether similar outcomes would be obtained beyond 2019. The study should have been executed over a longer time frame in order to incorporate major forces such as booms and recession.

In achieving the analysis of the data, the study used a multiple linear regression model. Because of the restrictions involved when using the model like erroneous and deceptive outcomes that lead to the value of the variable changing, it was therefore not possible the findings of the study to be generalized with accuracy. More so the

result could be different if more data was added in the regression. Hence the model was another limitation.

5.6 Suggestions for Further Research

A suggestion is given that more research ought to include a qualitative analysis of the association amongst financial risk and FP of banks in Kenya. That study would deal with interviewing of vital respondents in the banks and this would reveal concealed insights into the fine detailed association amongst financial risk and FP of commercial banks.

The study did not exhaust all the independent variables influencing performance of Kenyan commercial banks and a recommendation is given that more studies be carried out to constitute other variables for instance ownership structures, industry practices, growth opportunities, political stability and age of the firm. Determining the impact of each variable on financial performance shall enable the policy makers to understand the tools that can be used to control performance.

The research only focused on the commercial banks. The study's recommendations are that further studies be carried out on other institutions in Kenya. Future studies can also focus on how financial risk influences other aspects other than FP such as credit accessibility by those excluded from traditional banking, poverty eradication and overall economic growth.

The attention of this study was drawn to the latest five years because it was the readily available information. Subsequent studies may cover big time frame like ten or twenty years which can be very impactful on this study by either complementing or disregarding the findings of this study. The advantage of a longer study is that it will

enable the researcher to capture effects of business cycles such as booms and recessions.

Finally, this study was based on a multiple linear regression model, which have its own limitations such as erroneous and misleading results resulting from a change in variable value. Future researchers should focus on other models for instance Vector Error Correction Model (VECM) in exploring the various relations between financial risk and financial performance.

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APPENDICES

Appendix I: Commercial Banks in Kenya

1. ABC Bank (Kenya)
2. Bank of Africa
3. Bank of Baroda
4. Bank of India
5. Barclays Bank of Kenya
6. Chase Bank Kenya (In Receivership)
7. Citibank
8. Commercial Bank of Africa
9. Consolidated Bank of Kenya
10. Cooperative Bank of Kenya
11. Credit Bank
12. Development Bank of Kenya
13. Diamond Trust Bank
14. Dubai Islamic Bank
15. Ecobank Kenya
16. Equity Bank
17. Family Bank
18. First Community Bank
19. Guaranty Trust Bank Kenya
20. Guardian Bank
21. Gulf African Bank
22. Habib Bank AG Zurich
23. Housing Finance Company of Kenya
24. I&M Bank
25. Imperial Bank Kenya (In receivership)
26. Jamii Bora Bank
27. Kenya Commercial Bank
28. Mayfair Bank
29. Middle East Bank Kenya

30. National Bank of Kenya
31. NIC Bank
32. Oriental Commercial Bank
33. Paramount Universal Bank
34. Prime Bank (Kenya)
35. SBM Bank Kenya Limited
36. Sidian Bank
37. Spire Bank
38. Stanbic Bank Kenya
39. Standard Chartered Kenya
40. Trans National Bank Kenya
41. United Bank for Africa
42. Victoria Commercial Bank

Source: CBK (2019)

Appendix II: Research Data

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
ABC Bank	2015	0.008	16.934	18.375	0.165	0.143	0.539	5.935
	2016	0.003	16.945	15.177	0.153	0.157	0.637	8.527
	2017	0.006	17.058	10.079	0.156	0.183	1.075	10.424
	2018	0.000	17.145	15.788	0.184	0.199	0.586	10.685
	2019	0.002	17.196	13.340	0.154	0.149	0.595	9.867
Bank of Africa	2015	(0.015)	18.054	11.637	0.164	0.232	0.602	(3.524)
	2016	0.000	17.841	8.759	0.162	0.261	0.536	(327.473)
	2017	0.001	17.808	10.517	0.158	0.282	0.696	96.782
	2018	0.004	17.709	4.944	0.160	0.338	0.651	12.826
	2019	(0.046)	17.600	4.756	0.108	0.414	0.659	(1.814)
Bank of Baroda	2015	0.030	18.038	21.055	1.962	0.075	0.512	0.628
	2016	0.036	18.233	20.448	0.305	0.085	0.479	0.096
	2017	0.041	18.381	21.978	0.323	0.059	0.447	0.154
	2018	0.032	18.628	19.251	0.347	0.088	0.450	0.334
	2019	0.029	18.781	18.292	0.327	0.083	0.511	0.418
Barclays Bank	2015	0.035	19.300	13.250	0.184	0.042	0.193	1.440
	2016	0.028	19.375	19.414	0.179	0.052	0.206	1.920
	2017	0.026	19.420	16.606	0.180	0.056	0.199	1.920
	2018	0.023	19.600	13.825	0.164	0.061	0.243	1.977
	2019	0.020	19.740	12.982	0.167	0.056	0.253	1.779

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
Bank of India	2015	0.026	17.557	27.638	0.423	0.020	0.517	0.385
	2016	0.034	17.683	29.848	0.457	0.014	0.440	0.259
	2017	0.037	17.852	25.569	0.540	0.021	0.419	0.249
	2018	0.031	17.954	29.442	0.439	0.071	0.455	0.377
	2019	0.037	17.951	23.432	0.484	0.094	0.451	0.253
Citibank	2015	0.039	18.295	9.013	0.283	0.058	0.211	0.561
	2016	0.033	18.453	14.872	0.264	0.019	0.152	0.489
	2017	0.040	18.403	11.970	0.256	0.037	0.160	0.493
	2018	0.037	18.266	11.628	0.276	0.016	0.171	0.626
	2019	0.030	18.386	8.200	0.272	0.026	0.146	0.661
Commercial Bank of Africa	2015	0.017	19.189	12.347	0.179	0.106	0.512	1.897
	2016	0.029	19.251	7.441	0.184	0.075	0.536	1.656
	2017	0.023	19.320	10.565	0.173	0.083	0.503	1.974
	2018	0.023	19.317	13.257	0.157	0.080	0.568	2.287
Consolidated bank	2015	0.003	16.464	18.606	0.094	0.055	0.480	40.301
	2016	(0.015)	16.449	21.316	0.079	0.118	0.590	(6.195)
	2017	(0.025)	16.415	15.687	0.051	0.153	0.629	(3.910)
	2018	(0.042)	16.372	14.028	0.028	0.153	0.541	(4.996)
	2019	(0.045)	16.289	13.086	0.135	0.257	0.555	(3.380)
Credit bank	2015	(0.006)	16.146	40.549	0.155	0.064	0.492	(5.573)

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
	2016	0.009	16.320	40.316	0.228	0.072	0.490	6.810
	2017	0.009	16.490	49.840	0.148	0.075	0.483	6.557
	2018	0.014	16.701	43.767	0.145	0.072	0.490	4.014
	2019	0.010	16.891	54.965	0.150	0.087	0.571	4.925
Co-operative bank of Kenya	2015	0.034	19.652	11.628	2.126	0.034	0.369	1.426
	2016	0.036	19.679	13.699	0.228	0.039	0.302	1.398
	2017	0.029	19.774	15.946	0.227	0.062	0.304	1.557
	2018	0.031	19.841	12.737	0.162	0.101	0.284	1.428
	2019	0.031	19.940	15.743	0.151	0.098	0.283	1.345
Development Bank of Kenya	2016	0.004	16.613	201.239	0.251	0.260	0.724	5.396
	2017	0.002	16.607	252.638	0.236	0.210	0.730	7.743
	2018	0.007	16.545	128.661	0.232	0.298	0.706	2.169
	2019	0.070	16.547	42.494	0.315	0.369	0.697	0.362
Diamond Trust Bank	2015	0.024	19.420	62.797	0.146	0.024	0.383	0.793
	2016	0.024	19.609	55.567	0.185	0.032	0.395	0.763
	2017	0.019	19.711	47.602	0.190	0.067	0.404	0.955
	2018	0.019	19.750	47.641	0.211	0.063	0.404	0.962
	2019	0.019	19.772	47.137	0.209	0.068	0.389	0.943

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
Dubai Bank	2017	(0.230)	14.775	23.820	0.701	38.554	0.677	(1.016)
	2018	(0.119)	15.474	10.100	0.299	0.004	0.709	(1.155)
	2019	(0.064)	16.011	7.919	0.149	0.010	0.608	(1.278)
Ecobank	2015	0.002	17.775	14.611	0.250	0.062	0.592	32.435
	2016	(0.043)	17.668	20.959	0.194	0.163	0.887	(1.446)
	2017	(0.021)	17.794	11.745	0.160	0.377	0.398	(3.049)
	2018	0.004	17.813	13.454	0.166	0.174	0.366	19.439
	2019	0.002	18.138	33.262	0.162	0.145	0.310	11.416
Equity Bank	2015	0.040	19.875	12.281	0.202	0.027	0.175	1.237
	2016	0.035	19.976	20.251	0.197	0.063	0.186	1.209
	2017	0.036	20.078	19.662	0.204	0.055	0.226	1.067
	2018	0.035	20.167	23.541	0.159	0.071	0.218	1.025
	2019	0.036	20.328	14.094	0.198	0.087	0.243	1.123
Family bank	2015	0.024	18.213	13.180	0.144	0.037	0.363	2.193
	2016	0.005	18.057	12.652	0.208	0.120	0.369	13.206
	2017	(0.014)	18.052	12.254	0.199	0.192	0.379	(5.724)
	2018	0.004	18.020	10.668	0.195	0.162	0.346	15.122
	2019	0.012	18.183	11.328	0.187	0.141	0.300	4.679
First Community Bank	2015	(0.001)	16.494	5.935	0.115	0.235	0.096	123.887
	2016	(0.004)	16.521	6.728	0.140	0.320	0.232	4.941

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
	2017	0.009	16.670	7.465	0.153	0.408	0.208	(35.988)
	2018	(0.012)	16.699	7.867	0.091	0.488	0.271	(5.237)
	2019	0.010	16.747	5.959	0.081	0.415	0.245	5.448
Guaranty Trust Bank	2015	0.009	17.528	12.717	0.265	0.092	0.440	2.865
	2016	0.013	17.286	4.413	0.255	0.111	0.428	2.362
	2017	0.007	17.277	5.106	0.239	0.109	0.430	6.767
	2018	0.002	17.452	20.952	0.260	0.147	0.428	4.632
	2019	0.020	17.186	19.008	0.243	0.109	0.359	2.745
Guardian Bank	2015	0.016	16.497	11.064	0.176	0.030	0.526	2.587
	2016	0.016	16.504	9.599	0.190	0.017	0.509	3.084
	2017	0.010	16.576	12.784	0.202	0.045	0.513	2.578
	2018	0.014	16.600	11.582	0.227	0.076	0.486	1.000
	2019	0.011	16.612	10.410	0.222	0.069	0.535	1.000
Gulf African Bank	2015	0.029	17.023	11.239	0.158	0.084	0.180	1.605
	2016	0.018	17.117	7.823	0.187	0.092	0.185	2.247
	2017	0.005	17.260	9.133	0.162	0.093	0.222	9.359
	2018	0.004	17.322	11.550	0.187	0.106	0.229	9.180
	2019	0.005	17.374	15.587	0.171	0.153	0.295	11.380
Habib Bank Ltd	2015	0.029	16.141	19.009	0.321	0.079	0.322	0.715
	2016	0.024	16.342	14.935	0.391	0.187	0.387	0.692

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
	2018	0.011	16.885	31.045	0.246	0.074	0.476	2.024
	2019	0.010	17.027	32.838	0.273	0.092	0.474	2.117
Housing finance Company ltd	2015	0.017	18.087	2,313.610	0.181	0.044	0.554	1.488
	2016	0.013	18.091	14.301	0.177	0.069	0.543	1.935
	2017	0.002	18.028	16.557	0.170	0.108	0.583	10.950
	2018	(0.010)	17.919	21.778	0.153	0.249	0.597	(7.923)
	2019	(0.002)	17.849	19.832	0.146	0.236	0.560	(118.929)
I&M Bank	2015	0.037	19.072	19.272	0.202	0.025	0.440	0.532
	2016	0.037	19.165	18.995	0.182	0.029	0.377	0.879
	2017	0.030	19.297	20.212	0.186	0.087	0.372	1.204
	2018	0.026	19.332	20.716	0.179	0.108	0.411	1.047
	2019	0.033	19.429	22.718	0.216	0.098	0.444	0.544
Jamii Bora Bank Ltd	2015	0.001	16.636	15.453	0.163	0.052	0.585	2.033
	2016	(0.011)	16.574	22.832	0.201	0.172	0.750	3.589
	2017	(0.037)	16.371	75.167	0.193	0.133	0.633	3.910
KCB Bank	2015	0.035	20.140	5.757	0.154	0.045	0.304	1.142
	2016	0.033	20.204	20.226	0.180	0.071	0.236	1.043
	2017	0.030	20.287	22.230	0.166	0.077	0.214	1.221
	2018	0.034	20.387	16.991	0.195	0.063	0.253	1.003
	2019							

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
		0.028	20.616	14.789	0.190	0.102	0.234	1.182
Middle East Bank (K) Ltd	2016	(0.013)	15.471	17.386	0.393	0.159	0.630	(3.661)
	2017	(0.005)	15.449	6.320	0.571	0.181	0.607	(7.274)
	2018	0.000	15.495	15.148	0.449	0.382	0.513	640.941
	2019	0.000	15.952	16.247	0.312	0.137	0.493	7.832
M-Oriental bank ltd	2016	0.003	16.110	12.482	0.387	0.082	0.478	19.790
	2017	0.009	16.174	10.852	0.332	0.072	0.470	5.753
	2018	0.008	16.168	9.057	0.309	0.094	0.527	5.658
	2019	(0.002)	16.333	11.696	0.344	0.193	0.615	8.859
National Bank of Kenya	2015	(0.009)	18.647	7.631	0.140	0.112	0.479	6.619
	2016	0.001	18.535	13.095	0.071	0.175	0.356	179.685
	2017	0.007	18.515	14.649	0.054	0.300	0.327	11.264
	2018	(0.001)	18.559	18.773	0.037	0.391	0.326	12.824
	2019	(0.008)	18.534	8.835	0.115	0.356	0.303	11.161
NIC Plc bank	2015	0.027	18.926	18.544	0.206	0.091	0.427	0.883
	2016	0.026	18.948	23.330	0.230	0.113	0.360	1.001
	2017	0.020	19.144	21.666	0.223	0.109	0.394	1.117
	2018	0.020	19.155	17.432	0.187	0.122	0.415	1.190
Paramount Bank Ltd	2015	0.015	16.169	10.443	0.241	0.052	0.585	2.033

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
	2016	0.011	16.059	12.317	0.274	0.083	0.750	3.589
	2017	0.012	16.071	8.672	0.295	0.106	0.633	3.910
	2018	0.024	16.107	8.009	0.285	0.132	0.636	2.188
	2019	0.009	16.161	11.548	0.245	0.121	0.609	4.428
Prime Bank	2015	0.031	17.990	17.401	0.173	0.017	0.520	0.693
	2016	0.029	17.995	24.199	0.222	0.036	0.531	0.945
	2017	0.029	18.172	16.359	0.225	0.049	0.508	1.346
	2018	0.023	18.422	11.419	0.373	0.061	0.530	1.227
	2019	0.024	18.505	18.840	0.414	0.102	0.525	1.225
SBM Bank	2015	(0.005)	18.798	12.530	0.151	0.102	0.697	(9.727)
	2016	(0.192)	16.087	32.524	(0.128)	0.883	0.658	(1.303)
	2017	(0.029)	16.261	11.408	0.164	0.729	0.748	(2.041)
	2018	0.019	18.073	8.996	0.243	1.253	0.581	3.978
	2019	0.012	18.099	17.070	0.231	0.852	0.557	4.339
Sidian Bank	2015	0.019	16.766	6.414	0.247	0.128	0.392	3.430
	2016	0.001	16.854	6.730	0.232	0.238	0.386	39.346
	2017	(0.022)	16.776	5.024	0.165	0.278	0.480	3.692
	2018	(0.015)	17.047	11.825	0.144	0.204	0.498	4.750
	2019	0.004	17.091	8.000	0.179	0.197	0.562	35.141
Stanbic Bank Kenya Ltd	2015	0.024	19.155	18.366	0.187	0.041	0.374	1.169

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
	2016	0.021	19.185	24.902	0.181	0.050	0.429	1.701
	2017	0.017	19.332	30.919	0.168	0.067	0.362	1.935
	2018	0.022	19.454	12.735	0.174	0.094	0.373	1.210
	2019	0.021	19.495	10.939	0.183	0.100	0.366	1.803
Standard Chartered Bank	2015	0.027	19.271	16.429	0.212	0.101	0.210	1.796
	2016	0.036	19.339	16.146	0.209	0.083	0.244	1.140
	2017	0.024	19.471	21.416	0.185	0.090	0.300	1.789
	2018	0.028	19.469	14.071	0.195	0.117	0.280	1.423
	2019	0.027	19.526	14.652	0.177	0.095	0.231	1.274
Spire Bank Ltd	2015	(0.034)	16.488	18.373	0.175	0.333	0.642	(2.214)
	2016	(0.054)	16.440	14.041	0.163	0.168	0.671	(1.870)
	2017	(0.101)	16.227	32.769	0.127	0.427	0.735	(1.349)
	2018	(0.244)	16.037	22.465	(0.220)	0.560	0.921	0.576
	2019	(0.069)	15.741	48.868	(0.206)	0.711	0.875	0.302
Transnational Bank	2015	0.016	16.162	10.262	0.216	0.110	0.404	3.014
	2016	0.011	16.155	8.052	0.223	0.116	0.393	5.787
	2017	0.004	16.142	7.187	0.291	0.242	0.388	17.006
	2018	(0.007)	16.141	7.753	0.211	0.221	0.438	(9.464)
	2019	(0.009)	16.047	11.510	0.202	0.286	0.394	(16.875)
UBA	2015							

Bank	Year	ROA	Bank size	Liquidity risk	Capital adequacy	Credit risk	Interest rate risk	Operating risk
Kenya Bank Ltd		(0.034)	15.867	32.013	0.238	0.018	0.727	(2.148)
	2016	0.004	15.539	27.286	0.387	0.019	0.579	10.817
	2017	0.003	15.688	13.646	0.388	0.044	0.443	42.471
	2018	0.003	16.545	11.633	0.332	0.128	0.521	28.736
	2019	0.004	16.594	39.089	0.254	0.243	0.516	7.927
Victoria Commercial Bank	2015	0.036	16.812	15.171	0.193	0.033	0.541	0.818
	2016	0.026	16.925	16.728	0.255	0.025	0.513	0.763
	2017	0.024	17.073	14.861	0.227	0.001	0.470	0.893
	2018	0.014	17.292	12.248	0.211	0.031	0.531	1.389
	2019	0.015	17.401	12.826	0.202	0.051	0.507	1.356