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Abstract

Commercial banks are vital as they play an important role in allocation of resources for nations which span from linking of funds to investors from depositors. They are however susceptible to the various uncertainties relating to lending. Banks' executives require reliable and sufficient measures to reduce or minimize the risk arising from capital being outside the limits established. The banking industry of Kenya has been characterized by several banks going under due to miss-management and also lack of preparedness in risk mitigation. Risks are in reality uncertainties and the banking industry is faced with large number of risks. This study was to examine the impact of risk management on commercial banks' performance in the context of Kenya. The specific aims were to assess the impact of credit, liquidity and interest risks on performances of Kenya's banks. The examination made use of the theories of Risk Theory, Moral Hazard Theory, Modern Portfolio Theory and Agency Theory. Descriptive design was utilized in this examination where the target populace comprised of the forty Kenyan banks. The study therefore was a census as it covered all the 40 commercial banking organizations in Kenya. It was based on the time period 2013 to 2017. Secondary data was utilized. The analysis was based on descriptive analysis (means and standard deviations) and inferential analysis (multiple regression technique). Ethical considerations were observed in the course of the research. Based on the panel regression approach, the conclusion of the study was that credit risk was not key in affecting the financial performance of commercial banks in Kenya. The study also concluded that liquidity risk is not a key determinant of financial performance of commercial banks in Kenya. Likewise, the study concluded that interest rates were key factors which influenced the commercial banking performances. Thus, interest rates should be continually adjusted by bank management to be in line with the prevailing economic conditions.

Keywords: Credit Risk, Financial Performance, Interest Rate Risk, Liquidity Risk, Non-Performing Loans, Return on Equity, Risk management, Risk Monitoring.

1.0 Introduction

1.1 Background of the Study

The current competitive global environment is dynamic, complex and mostly characterized by an unpredictable nature. Therefore, in order to remain in operations and competitive, a lot of thinking ought to be done by organizations (Washington, 2014). Commercial banks notably carry out various functions towards the growth of the economy of nations. Banks perform the roles of intermediation through collecting of excess money (deposits) and in turn lending to investors (borrowers) for consumption and establishments of investment projects, thereby contributing to the growth economies (Kallberg & Udell, 2015). Banks and financial intuitions in Nepal have been facing the problem of credit risk and the issue is becoming difficult to manage. Similarly, the 2008 global financial crisis stand as the worst in history since the era of 1930s which adversely affected the global structures of financial setups. This was though arising from the womb of subprime mortgage sector, specifically in housing industry, in the United States of America due to extensive and imprudent provision of loan facilities from the financial sector. However, due to the notable interdependence of the global economy, its contagion effects made it a global phenomenon thereby leading to various resultant implications for both developed and developing economies (Nazir, Safdar & Akram, 2012). In Africa, the complexity of banking business is not as simple; due to the fact that banking institutions are usually faced with multiplicity of risks that threaten their operations and existence. As such the poor mis-management or mis-management of these risks poses a noteworthy impact on performance of lending institutions (Adeusi, Akeke, Adebisi, & Oladunjoye, 2013; Fofack & Hippolytem, 2015). As a continent comprising of developing countries, many banks have in various countries such as Kenya and Nigeria from the commencement of banking and financial institutions, grappled with the problem of bad practices of managing risks in the sector. Therefore, synchronization between administration of risk, banking systems, culture and processes is paramount (Waweru & Kalani, 2014). The banking sector in some countries in Africa has witnessed numerous cases of fall down, for instance; the Alpha Merchant Bank Limited, Savannah Bank Plc, Societe General Bank Limited (in the case of Nigeria), Chase bank and Imperial bank among others (in the case of Kenya).

In Kenya, over the last decade, a striking loss accompanied with the mis-management of banks has been experienced in the nation's banking industry (Omondi, 2015). Various banking institutions which had long been performing optimally were marred by poor performances leading to closure of operations due to imbalanced credit exposures and as well as reciprocating failure to curb risks effectively. in view of the forgoing, risk management remains common and vital in the banking sector than any other sector of the economy. The traditional motivation of banking institutions is to generate additional income (profits) while offering value addition to the investments of shareholders of banks through the provision of different financial services while at the other end ensuring proper risk management (Muteti, 2014). These however are accompanied by various uncertainties attached.

Risk management is defined by ISO, 31000 as the process of risk identification, risk assessment, and risk prioritization in a company which precedes the coordination and use of resources that are available with a goal of controlling and lowering the possibility or impact of adverse events that interfere with the realization of the established objectives. The ultimate objective of managing risk is to make sure that there is a non-interruption to the goals set in an organization (ISO, 31000). Financial Performance is referred to as the way which firms assess its performance using monetary terms as compared to its strategic goals for a specific period of time (Epure & Lafuente, 2012).

1.2 Statement of the Problem

Banking organizations carry out various functions relating to financial intermediation which entails distribution of scarce economic resources. However, in the quest of these roles and profitability at large, there are laid down regulatory requirements which banks are expected to adhere to in the course of operations. The management of commercial bank managers require reliable and adequate risk measures for purposes of reducing and eliminating the likelihood of capital of banks depleting or being off set limits (Ferreti, 2017). As such, the managers of commercial banks require various mechanisms for monitoring and projecting positions and as well as adequate incentives for credit for efficient and effective management of risk by business divisions.

The banking industry of Kenya has been characterized by several banks going under due to mismanagement and also absence of preparedness in risk lessening. Within the years 2015 and 2016, the number of banks that are commercial that were placed under receivership by the CBK due to its practices were three. In October, 2015, due to deficiencies in liquidity and capital, Dubai Bank was put under receivership. Similarly, due to malpractices and irregularities, Imperial Bank and Chase Bank in 2016 were also placed under receivership by the Central Bank. Poor risks management is reported to play a principal duty in the letdown and collapse of these banks. Kenyan Banks have been rocked by reduced financial performance in the recent years. Credit risk has been linked to banking performance.

Risks are in reality uncertainties and the banking industry is faced with risks. Not only is Bankruptcy costly within the financial sector and to debt and equity holders in banks, but it is equally costly to taxpayers hence the ultimate objective of banks' executives is maximization of the shareholder's value (Yijun, 2014). Risk is therefore inherent in the operations of banks as its lack of avoidance will imply no progress, no achievement and ultimately no reward. Risk is associated with possibility of an investment yielding negative outcome (Fredrick, 2013). On the other hand, risk serves as the probability that the actual return on an investment will be different from expectation and a primary finance concept is the link between risk and investment returns.

Yijun (2014) indicated that risks managing considerably contribute to performance of banks in Europe. Oluwafemi and Obawale (2010) carried out an empirical examination on risk management and banks' performance in Nigeria. The study reported that enhanced risk managing in areas such as funds managing, cost minimising in the area of advances and value of obligations that result in high financial performance. It is therefore apparent that an efficient management of risk by banks is essential.

In a similar vein, Wanjohi (2013) observed that managing financial risk robustly affected the Kenyan banks' performance. Despite the theoretical and empirical link between risk managing and performance, it remains unclear the nature and extent to which the latter affects the former. Studies on risk managing and performance were large on developed countries, similarly, local examinations were marred by gaps. The examinations were largely emphasized on other financial institutions besides banks, the examinations were also focused on a single measure of performance. From the viewpoint of the eminent poor Kenyan banks' performance from the finance standpoint and the documented research gaps above, this examination's focal point was the effect of risk management on performance of Kenyan banks. While many studies have, in the past, been conducted on this topic, different variables and measures of financial performance were employed, some were carried out on general financial institutions and many

of which were not in the Kenyan context, and this study presents the most current state of affairs with regard to the topic of this study.

1.3 Objectives of the Study

1.3.1 General Objective

The broad object of this examination was to investigate the effect of risk management on performances of Kenya's commercial banks.

1.3.1 Specific Objectives

- i.** To assess the effect of credit risk on performance of Kenya's commercial banks.
- ii.** To determine the effect of liquidity risk on performance of Kenya's commercial banks.
- iii.** To establish the impact of interest rate risk on performance of Kenya's commercial banks.

2.0 Literature Review

2.1 Theoretical Review

These were theoretical reviews with respect to each variable, detailing their relationships with this study.

2.1.1 Moral Hazard Theory

The concept over the years has widely been utilised in literature in the finance and economic fields. The theory rests on the argument that a party in a contract undertakes more risks due to another party elsewhere bearing the possible costs associated with these risks. This can arise if a person's action changes to the harm of another party involved in the same transaction (Krugman, 2009).

The theory provides explanation which opine that moral hazard comes into play under a scenario of asymmetric information where a party seeking to cover the risk for financial transaction has added knowledge about transactions and its accompanying intent as compared to the other or second party who is covering the risk and paying in the event the risk in the transaction occurs. Krugman, (2009) gives a description as a scenario in which a party decides on when and how risks can be taken on pretext that the other party would bear the risks and costs.

The theory is often seen in a standard case where there are in place agency settings such as banking or insurance institutions. There is scanty information concerning the insured and principal. The problem is also common in automobile insurance companies, where an additional inducement is created for careless and risky drivers on the base that another party is going to settle part of the cost in case of an accident due to careless driving. This phenomenon is highly witnessed in the insurance sector.

The theory supported the variable of credit risk and its linkages with financial performance of commercial banks in Kenya. Credit risk in banks is influenced by moral hazard when debtors prolong beyond set time limits of or defaults in repaying their loans due to presence of collateral deposited with banks and/or guarantors being in place. Subsequent impact is transmitted to the banks' financial performance.

2.1.2 Modern Portfolio Theory

The concept was formed by Markowitz in 1952. The concept is of the view that financial analyst in an organization can develop various portfolios with an aim of expanding the returns

expected in stock while taking in consideration of the speculated market risks levels. The idea here being that with high risks the returns expected should be higher.

Modern Portfolio Theory has its prepositions hinged on the notion that it is workable for financial analyst to come up with unique and efficient portfolios, which present the mainly conceivable and projected returns at a specified risk level. The theory advocates that it is not sufficiently just for investors to focus on just a single stock return but should rather put resources into a combination of stocks. Through this, a financial analyst can diversify and win broadening the risks in the given portfolio. The hypothesis endeavors to assess the merits of augmentation. In the case of most investors, the risk lies of the fact that returns on investments may be lower than expected. This is largely as a result of the variations emanating from expected returns on stock. This theory opines that each stock in the market is characterized by its own deviation from the overall mean of stock. The risk therefore stands as the standard deviation from the mean (Markowitz, 1952).

This presumption therefore provides assertions on the capital asset pricing model (CAPM). In line with CAPM, financial analyst ought to include portfolio of market, deleveraged or utilized with position in the risk-free resource. Regardless, CAPM brings about beta that stands for an advantage's normal return. This concept provides a conception on the link between rewards and risks. It has expansively founded the basis of the way monetary portfolios of institutions are managed. A comprehension of CAPM and this hypothesis is used in administering the systems in risks connected to money.

In relation to this presumption, interest rate risk variable come to play as commercial banks in Kenya have an obligation to look into all ventures by examining the normal returns through setting of fair interest rates that will take care of commercial banks' financial performances.

2.1.3 Risk Theory

Halling and Hayden (2006) contend that a bank should determine and evaluate its liquidity risk in all its entire subsidiaries, branches, entities in its area of jurisdiction. The bank's product mix and its business, cash flow position and off and on balance sheet obligations. Consequently, banks should assess each main on and off-balance sheet position, together with the impact of entrenched options alongside other exposures that may impact the bank's uses and funds' sources, and delve into how it can influence liquidity risk. Exposure to funding liquidity risk and market liquidity risk should be closely considered by banks (Berríos, 2013).

In line with the examination in progress, institutions within financial sector assess the interactions between liquidity risks alongside other risks that they are susceptible to as a result of their nature of operations. These risks span from operating and financial risks which include operational, interest rate, reputational, credit and legal risks as they influence the liquidity level of a bank. Liquidity risk sometimes arise from inability to manage other risks. Therefore, it is eminent for banks to recognize events that would likely influence the perception of the public and market about its soundness (Ezra, 2013).

Therefore, risk theory supported the linkages between liquidity associated risk and financial performance of commercial banks in Kenya in that banks have to constantly evaluate risks their businesses are exposed to so as to maintain a sound liquidity position that favours their financial performance.

2.1.4 Agency Theory

This idea is largely traceable to Meckling and Jensen (1976). This concept has emerged as a prominent theory in recent time when issues of performance of institutions are being discussed. The theory is based on prepositions linking the owners of institutions and as well as those in charge of managing them (managers) (Mulwa, 2015). These managers of the institutions serve as agents to the owners of the institutions. However, conflicts sometimes occur in their relationship. Under this presumption, it is expected that agents would serve and act by putting the firms' interest in the foremost by making sure that there is the enhancement of value of shareholders while guaranteeing that performance is maximum (Waweru,2013). This is however not necessarily what happens since executives in many instances go against this expectation.

In line with this study, the assertions of the theory give more insight on performance in the banking sector as it is dependent on the way and manner by which management maximize the wealth of shareholders and as well as bank assets in carrying out their assigned roles. The perception herein is that executives are agents who have the propensity to get entangled in activities that serve their own interests rather than guaranteeing that the wealth of shareholders is enhanced (Macharia, 2013). Thus, from the viewpoint of this presumption, practices such as these are a hindrance to the banks' performance financially. The theory therefore supported the dependent variable; performance. The performance is a product of the underlying association among principal (owners and shareholders) and agent (managers of banks).

2.2 Empirical Review

These were empirical reviews with respect to each variable in relation to this study, detailing gaps in each case.

2.2.1 Credit Risk Management and Financial Performance of Commercial Banks

Githaiga (2015) carried out an analysis on the effect of credit risk management on the banks' financial performance. The examination used descriptive research and analysis through multiple regressions. The findings of the study were presented in the form of regression equations and tables. The study also established that asset quality has a negative and insignificant relationship with ROA. This examination arrives at a conclusion that CAMELS may be utilised as tool for credit related risk managing in measurement of performance. The examination was based on CAMELS. The enquiry applied questionnaires whereas this was based on panel data which is secondary data.

A study was also carried out by Yijun (2014) on credit risk administration practices and how they influence European banks' performance. Analysis through regression was utilised in assessing the influence of credit related risk practices on commercial banks' performance. Monetary performance of the European banks was assessed using ROE and ROA. The regression analysis indicated that risk management considerably contributes to European banks' performance. The research however was based on the association between risk managing and banks' performance in European context. This examination was hence focused on the linkage between risk management and financial performance of Kenya's banks.

Obawale & Oluwafemi (2010) carried out an empirical scrutiny on risk managing and performance of Nigeria's banks that are commercial. The populace targeted were ten (10) banks covering the time period 2006-2009. The performance was evaluated using ROE and ROA. The predictor variables were; capital, credit and liquidity risks. The outcome clearly disclosed the presence of a relationship between performance and administration of risks. The

conclusion of the examination was that management of risks in terms of funds, costs, advances and value of obligations can lead to improved performance. It was concluded that adequate risk managing practices is essential. The study was however revolved around Nigerian banks but this examination was carried out in the context of Kenyan banks.

An examination was done by Salina (2010) which sought to investigate the relationship between risk management and financial execution of Islamic banks in Malaysia. The focus of the study was the period 2006 to 2008. The risk management variables used were the firm policies, procedures, the firm risk management environment, risk measurement procedures, monitoring, risk mitigation and controls that exists internally. Financial performance of banks (that is ROA and ROE) were determined as a function of risk management components. The analysis which used regression technique indicated that risk management components were key in predicting the Malaysian bank performance. The examination was notably focused on Islamic banks in Malaysia whereas this examination was focused on Kenya's banks.

2.2.2 Liquidity Risk Management and Financial Performance of Commercial Banks

A study was undertaken by Annor and Obeng (2017) on liquidity risks, profits of six listed banks at Ghanaian exchange. Annual reports were the source of secondary data utilised along with banking survey reports. The investigation utilised ROE in measuring banks' non-performing loans, profitability, loan loss provisions ratio, liquidity risk, loan and asset ratio and credit risk. Liquidity risk had inverse relationship with a bank's profitability. However, the study was done in the context of commercial banking institutions in Ghana which is different from the focus of this examination.

A study was done by Muteti (2014) on the effect of liquidity risk on financial performance of commercial banks in Kenya. Forty-three banks formed the study populace and considered the time from December 2013 to 2017. SPSS aided in data analysis using multiple regression. While focusing on risk of liquidity and performance, findings showed that banks' performance is significantly predicted by liquidity risk. This study was based on panel regression technique.

Washington (2014) did a study on the effect risk management on financial performance of Kenyan commercial banks. Causal design of research was relied on with the collection of data relying on secondary source. It was ascertained that liquidity considerably influences bank's performance. This examination, unlike the previous one, was based on panel regression approach.

2.2.3 Interest Rate Risk Management and Financial Performance of Commercial Banks

Muteti (2014) scrutinized on the link between financial risk management and financial performance of Kenya's banks that are commercial in nature. Forty three banks operating as at December 2013 formed the populace. SPSS aided in data analysis guided by multiple regression model. Performance was determined by ROA. The predictor variables were; forex, credit, interest rate, liquidity risks along with deposits, size and capital. The scrutiny found that interest rate risk significantly influenced performance of Kenya's banks. This study, however, was focused on 40 Kenya banks.

Wanjohi (2013) carried out an analysis on the linkage between financial risk managing and performance of Kenya's banks that are commercial in nature. The research utilized regression analysis where the risk management variables were regressed alongside bank performance from the financial standpoint. Performance was measured through ROA where the period 2008 to 2012 was the time frame of the study. It was ascertained that administering financial risk

influenced strongly the performance of Kenyan banks. Interest rate risk was reported to significantly predict the financial performance of banks. The study, however, did not consider credit risk and its effect on financial performance of commercial banks. The study though on Kenyan banks, was not based on panel regression analysis.

Kamau (2010) did a research which sought to ascertain the risk management adopted by Kenyan banks and how it affects banking performance. The populace was forty four banks. The study was therefore a census survey which was carried out for all Kenyan licensed commercial banks. The research instruments were questionnaires which were administered to staff dealing with risk management. Data was analyzed based on descriptive and inferential analysis using SPSS. Results were presented using tables and graphs. The examination reported that interest related risk was a noteworthy predictors of bank performance. It was further ascertained that most banks predominantly utilise quantitative and qualitative methods of managing risks. Despite the study being carried out in the context of Kenyan banks, the examination also measured performance of banks based on questionnaires which is subjective in nature as compared to the use of secondary data.

Kargi (2011) did an assessment on how performance of Nigerian banks is influenced by credit risk. Annual reports were the principal source of secondary data. 2004 through 2008 formed the period of study. From the results, risk management significantly affected banks' performance. The study concluded that there exists an inverse relationship between interest rate risk and performance of commercial banks. Though the study shaded more light on the connection existing between risk management and banks' performance, the study was based on the Nigeria context.

Siba (2012) assessed the correlation between practices of managing risk and Kenyan banks performance. The populace was Kenyan 40 commercial banks. Questionnaires were employed in assembling primary data, while CBK Yearly Supervision Reports aided in secondary data. The outcome disclosed that a formal system of managing risk was in place in all banks having comparable environment of managing risk, procedures and policies. Interest rate risk was key in affecting the performance of Kenyan banks. The current study however focused on all the 40 licensed banks.

Adeusi, Adebisi, Akeke, and Oladunjoye (2013) did an examination which focused on the connection of practices of risk managing and banks' performance in Nigeria. Ten banks were examined over a period of four years. A panel model was utilised. The outcome indicated that an inverse correlation exists between performance and doubtful loans while a significant and positive relationship existed between capital assets ratio and performance. Likewise, it suggests that the higher the managed funds by banks, the higher the performance. The relationship between interest rate risk and performance was significant. The recommendation of the study was that banks need to put in place prudent practices of curbing risks so as to have investors' interests protected. The research notably was based on Nigerian banks.

2.2.4 Financial Performance of Commercial Banks

Performance of banks from financial standpoint is key for the financial intermediation roles which influences their performance and ultimately survival. Various studies have linked risk management to financial commercial banks' performance from the finance viewpoint.

Muteti (2014) evaluated the association between administration of financial risk and Kenyan banks' performance. The study findings indicated that risk management significantly predicts the financial performance of commercial banks.

Githaiga (2015) likewise did a study on credit risk management effects on performances of banking organizations. The study findings revealed linkages between performances and credit risk management.

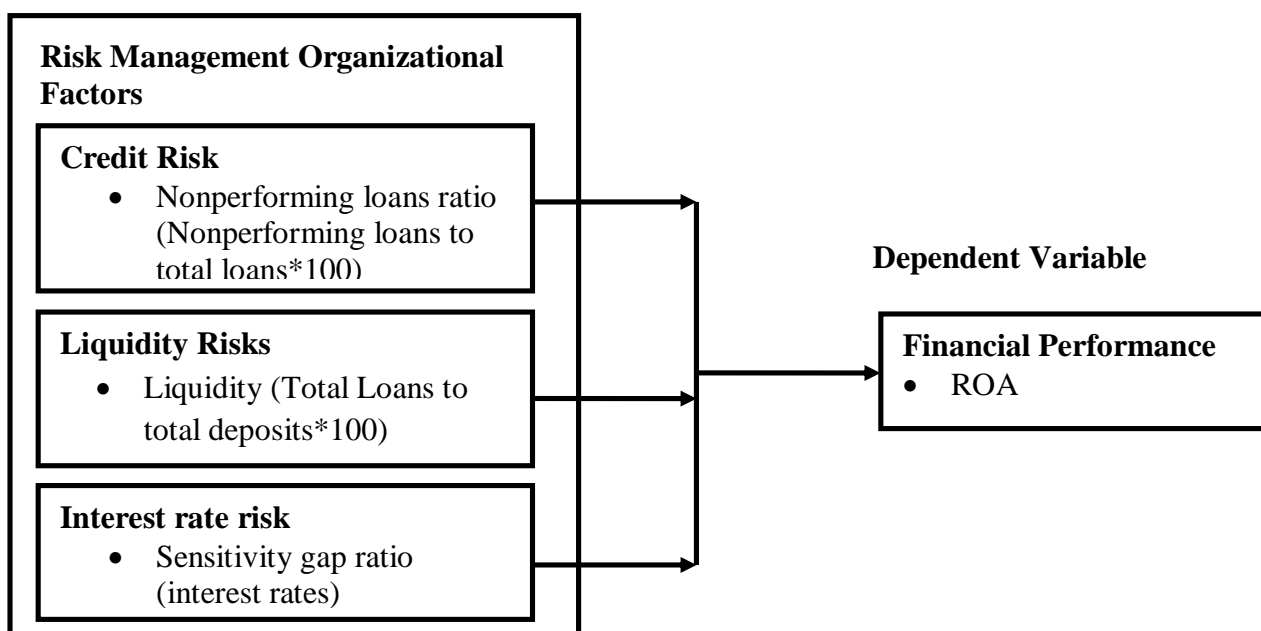
Yijun (2014) in the context of Europe did a research on credit risk administration practices and how they affect the performances of Europe's banks. The research outcome shows that risk managing considerably contribute to performance of banks in Europe. Unlike the study which concentrated on banks in Europe, this examination in progress is going to scrutinize the Kenya's banks that are commercial.

Also, Wanjohi (2013) carried out an analysis on the link existing between financial risk administering and Kenyan banks' performances. It was ascertained that risk managing considerably impacts on performance of Kenya's banks from the financial viewpoint.

2.3 Conceptual Framework

The concept structure of the examination depicts the visual representation of the linkages between the predictors and the dependent variable. The independent variables are risk management (credit, liquidity and interest rate risks), while the dependent variable is financial performance of banks. Figure 1 below presents the conceptual framework.

Independent Variables



Source: Researcher (2020).

3.1 Research Methodology

The study was based on descriptive design which is utilized in a research that aims to delve into the where, how and why of a phenomenon. Forty banks operating from 2013 through 2017 were the target populace in the current examination. The examination did a census; the rationale being that the populace was small. Secondary data for the period spanning from 2013 to 2017 was utilized in this examination. Besides, the examination utilised both descriptive statistic and inferential statistics to analyze the data.

4.0 Data Analysis, Presentation and Interpretation

4.1 Descriptive Analysis

The descriptive analyses were carried out which provided the basic features of the study data. These features span from min, mean and max values. Table 1 presents the descriptive statistics

Table 1: Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
ROA	170	0.016	0.060	-0.544	0.421
CREDITRISK	156	0.105	0.155	0.000	1.000
LIQUIDITYRISK	152	41.970	15.822	9.500	99.300
INTRATERISK	170	0.061	0.080	0.000	1.000

Research Findings (2020)

The values in Table 1 reveal various descriptive statistics of the study variables. ROA had a total observation of 170 with a mean and standard deviation of 0.016 and 0.060 respectively. The minimum and maximum values for ROA were -0.544 and 0.421 respectively. Credit risk was reported to have a mean of 0.105, standard deviation of 0.155 and a total observation of 156. The mean and corresponding stand deviation for credit risk indicated that over the years, credit risk relatively fluctuated with the study time scope.

Liquidity risk had a total observation of 152 and a mean of 41.970. The standard deviation for liquidity risk was 15.822 which implied that over the study period, liquidity of banks had been highly volatile. Lastly, interest rate risk reportedly had 170 total observations. Interest rate risk had a mean and standard deviation of 0.061 and 0.080 respectively, which implied that interest rates relatively fluctuated within the study period.

4.2 Correlation Analysis

Correlation analysis was performed for purposes of establishing the association between risk management and financial performance of commercial banks in Kenya. The study used the correlation matrix as presented in Table 2.

Table 2: Correlation Matrix

	ROA	CREDIT~K	LIQUID~K	INTRAT~K
ROA	1.0000			
CREDITRISK	-0.0945	1.0000		
	0.2409			
LIQUIDITYR~K	-0.0455	-0.0458	1.0000	
	0.5774	0.5897		
INTRATERISK	0.3185*	-0.0117	-0.0082	1.0000
	0.0000	0.8852	0.9205	

Source: Research Findings (2020)

The output from the correlation matrix in Table 2 revealed that credit risk had an insignificant and negative correlation with financial performance of commercial banks as proxied by return on assets. This was evidenced by a coefficient of -0.0945 and p-value of 0.2409 . Similarly, the correlation matrix revealed that liquidity risk had an insignificant negative correlation with performances i.e. ROA as shown by a p-value of 0.5774 and coefficient of -0.0455 .

Lastly, interest rate risk reportedly had a coefficient of 0.3185 and probability value of 0.000 which implied that interest rate risk had a key positive correlation with performances. This can be linked to the assertion that higher interest rates lead to increased earnings of commercial banks and subsequently improved financial performance.

4.3 Test for Fixed and Random Effect

The research carried out the test for fixed effect and random effect model. The test was so as to identify the ideal model to be utilized for estimation. The test was done using the hausman test and results presented in Table 3.

Table 3: Hausman Test

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) Fixed	(B) Random		
CREDITRISK	.0047836	-.0034557	.0082393	.0035998
LIQUIDITYR~K	-.0002853	-.0001556	-.0001297	.0000539
INTRATERISK	.4276484	.4286817	-.0010333	.0025622

b = consistent under H_0 and H_a ; obtained from xtreg
 B = inconsistent under H_a , efficient under H_0 ; obtained from xtreg

Test: H_0 : difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(3) &= (b-B)' [(V_b-V_B)^{-1}] (b-B) \\ &= 7.24 \\ \text{Prob}>\text{chi2} &= 0.0646 \end{aligned}$$

Source: Research Findings (2020)

The hausman test is guided by a threshold of 0.05 significance level. The null hypothesis states that the random effect model is the preferred model. Conversely, the alternative hypothesis favours the fixed effect model being the as the appropriate model. Based on the findings presented in Table 3, the test established a p-value of 0.0646 which therefore favored the random effect model. As such, the null hypothesis was not rejected, thus, the random effect model was applied in the study.

4.4 Regression Analysis

The inferential analysis was panel regression methods. Panel regression becomes appropriate for this study due to the nature of data used. Table 4 presents the study findings on the panel regression analysis.

Table 4: Regression Results

Random-effects GLS regression	Number of obs	=	141
Group variable: Bank	Number of groups	=	34
R-sq:	Obs per group:		
within = 0.9158	min =		2
between = 0.7317	avg =		4.1
overall = 0.8020	max =		5
corr(u_i, X) = 0 (assumed)	Wald chi2(3)	=	1207.65
	Prob > chi2	=	0.0000

ROA	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
CREDITRISK	-.0034557	.0082606	-0.42	0.676	-.0196461 .0127348
LIQUIDITYRISK	-.0001556	.0000923	-1.69	0.092	-.0003365 .0000252
INTRATERISK	.4286817	.0123408	34.74	0.000	.4044942 .4528693
_cons	-.0007371	.0046786	-0.16	0.875	-.009907 .0084327
sigma_u	.01373191				
sigma_e	.00991181				
rho	.65745913	(fraction of variance due to u_i)			

Source: Research Findings (2020)

As per the outcome in Table 4, the regression output yielded an R squared of 0.9158 which implied that 91.58 percent of the variations in the financial performance of commercial banks in Kenya are collectively explained by risk management. The model further yielded a p-value of 0.000 which implied significance.

4.5 Hypotheses Testing

The hypothesis testing was based on the output of the panel regression analysis. This was informed by the specific objectives as well as research questions of the study. The study sought to establish the effects of credit, liquidity and interest rate risks on performances of Kenya’s commercial banking.

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

First, the research strived to examine the effect of credit risk on Kenyan banks performances.

The first hypothesis tested was:

H₀₁: Credit risk has no significant effect on financial performance of commercial banks in Kenya

The hypothesis on the effect of credit risk on performances was tested based on panel regression technique in Table 4 The criterion for this hypothesis test was to reject the null hypothesis in the case where $p < 0.05$, conversely, fail to reject the null hypothesis in the case where $p > 0.05$. Credit risk was reported to have a coefficient of -0.0034 and a p-value of 0.676 which implied non significance. The study therefore found that credit risk had a negative and significant effect on performances of commercial banking. A unit improvement in credit risk translates into a 0.0034 depreciation in financial performance which is however insignificant.

The study failed to reject the null hypothesis which stated that credit risk has no significant effect on performances banking, Kenya.

The research results corresponded with the ones for Githaiga (2015) who did an analysis on the effect of credit risk management on the banks' financial performances and established that asset quality has a negative and insignificant relationship with ROA. Similarly, Obawale & Oluwafemi (2010) carried out an empirical scrutiny on risk managing and performance of Nigeria's banks that are commercial. The outcome clearly disclosed that negative relationship exists between credit risk and performance.

4.5.2 Effect of Liquidity Risk on Financial Performance of Commercial Banks in Kenya

The second objective of the study was to examine the effect of liquidity risk on financial performance of commercial banks in Kenya.

The second hypothesis tested was:

H₀₂: Liquidity risk has no significant effect on financial performance of commercial banks in Kenya

The hypothesis on the effect of liquidity risk on financial performance was tested based on panel regression technique in Table 4. The criterion for this hypothesis test was to reject the null hypothesis in the case where $p < 0.05$, conversely, fail to reject the null hypothesis in the case where $p > 0.05$. Liquidity risk had a coefficient of -0.0001 and corresponding p-value of 0.096. Therefore, it was established a unit increase in liquidity risks leads to 0.0001 decreases which is insignificant at 0.05 level of significance. The study failed to reject the null hypothesis that liquidity risk has no significant effect on financial performance of commercial banks in Kenya

The study findings were in line with those of previous studies. Annor and Obeng (2017) studied the influences of liquidity risk on profitability of six listed banks at Ghanaian exchange. Liquidity risk had inverse relationship with a bank's profitability. A study was done by Muteti (2014) on the effect of liquidity risk on financial performance of commercial banks in Kenya. Forty-three banks formed the study populace and considered the time from December 2013 to 2017. Findings show that bank' performance is negatively influenced by liquidity risk.

4.5.3 Effect of Interest Rate Risk on Financial Performance of Commercial Banks in Kenya

The third aim of the research was examining interest rate risk effects on financial performances of commercial banks in Kenya.

The third hypothesis tested was:

H₀₃: Interest rate risk has significant effect on financial performance of commercial banks in Kenya

The hypothesis on the effect of interest rate risk on financial performance was tested based on panel regression technique in Table 4. The criterion for this hypothesis test was to reject the null hypothesis in the case where $p < 0.05$, conversely, fail to reject the null hypothesis in the case where $p > 0.05$. Interest rate risk was reported to have a coefficient of 0.4286 and a p-value of 0.000 which shows significance. Therefore, a unit increase in interest rate leads to a 0.4286 increase in the financial performance of commercial banks in Kenya. The null hypothesis

which stated that interest rate risk has no significant effect on financial performance of commercial banks in Kenya was therefore rejected at the threshold of 0.05 significance level.

The study findings are consistent with those of previous literature. Muteti (2014) scrutinized on the link between financial risk management and financial performance of Kenya's banks that are commercial in nature. The scrutiny found that interest rate risk significantly influenced performance of Kenya's banks. Wanjohi (2013) carried out an analysis on the linkage between financial risk managing and performance of Kenya's banks that are commercial in nature. Interest rate risk was reported to significantly predict the financial performance of banks.

Kamau (2010) did a research which sought to ascertain the risk management adopted by Kenyan banks and how it affects banking performance. The examination reported that interest related risk was a positively associated with bank performance. Kargi (2011) did an assessment on how performance of Nigerian banks are influenced by credit risk. The study concluded that there exists a significant relationship between interest rate risk and performance of commercial banks. Siba (2012) assessed the correlation between practices of managing risk and Kenyan banks performance. Interest rate risk is key in affecting the performance of Kenyan banks. Adeusi *et al.* (2013) did an examination which focused on the connection of practices of risk managing and banks' performance in Nigeria. The relationship between interest rate risk and performance was significant.

4.5.4 Financial Performance of Commercial Banks in Kenya

The financial performance of commercial banks remains key for their continued existence. The analysis in Table 4 revealed that out of the risk management variables, only interest rate risk had strong influences on commercial banking profits, Kenya. Credit risk had insignificant effect on effect on performances of banks, Kenya. Liquidity risk also had insignificant influences on banking performances, Kenya. Interest rate risk had positive effect on commercial banking performance, Kenya. Conversely, credit risk and liquidity risk had negative consequences on performances of banks in Kenya.

The results were in agreement with those of previous studies. Annor and Obeng (2017) studied the influences of liquidity risk on profits of six listed banks at Ghanaian exchange. Liquidity risk had inverse relationship with a bank's profitability. Githaiga (2015) did an analysis on the effect of credit risk management on the banks' financial performance and established that asset quality has a negative and insignificant relationship with ROA. Similarly, Obawale & Oluwafemi (2010) carried out an empirical scrutiny on risk managing and performance of Nigeria's banks that are commercial. The outcome clearly disclosed that negative relationship exists between credit risk and performance. Kamau (2010) did a research which sought to ascertain the risk management adopted by Kenyan banks and reported that interest related risk was a positively associated with bank performance.

4.5 Summary of Hypotheses Testing

This section presents the summary of hypotheses testing which includes the specific objectives, hypotheses, rule, threshold and conclusion.

Table 5: Summary of Hypotheses

No	Objective	Hypotheses	Rule	P-value	Comment
1	To assess the effect of credit risk management on financial performance of commercial banks in Kenya.	H₀₁ : Credit risk has no significant effect on financial performance of commercial banks in Kenya	Reject H₀₁ if p-value <0.05	P>0.05	Credit risk has no significant effect on financial performance of commercial banks in Kenya
2	To evaluate the effect of liquidity management on financial performance of commercial banks in Kenya	H₀₂ : Liquidity risk has no significant effect on financial performance of commercial banks in Kenya	Reject H₀₂ if P- value <0.05	P>0.05	Liquidity risk does not significantly affect performances of banks
3	To determine the effect of interest rate risk on financial performance of commercial banks in Kenya	H₀₃ : Interest rate risk has no significant effect on financial performance of commercial banks in Kenya	Reject H₀₃ if p-value <0.05	P<0.05	Interest rate risk does have significant effect on performances

Source: Research Findings (2020)

5.1 Conclusion

On the effect of credit risk on financial performance, the conclusion of the study was that credit risk was not key in affecting the financial performance of commercial banks in Kenya. Therefore, increases and decreases in credit risk were not key determinants of financial performance of commercial banks in Kenya.

With respect to the effect of liquidity risk on financial performance of commercial banks, the study concluded that liquidity risk was not a key determinant of financial performance of commercial banks in Kenya. As such, changes in liquidity risk of banks do not have strong effect on the performance of commercial banks in the context of Kenya.

On the effect of interest rate risk on financial performance, the conclusion of the study was that interest rates were key factors which influenced the financial performance of commercial banks in Kenya. Interest rates were key in the lending activities of commercial banks, therefore higher rates translate into improved financial performance of commercial banks.

6.1 Recommendations

The study found that among the risk management variables considered; only interest rate risk had significant effect on financial performance of commercial banks in Kenya. In view of this finding, the study therefore recommended that interest rates should be continually adjusted by bank management to be in line with the prevailing economic conditions. This can be ensured by studying other factors such as inflationary trends and money supply which have influences on interest rates. Additionally, efficient and effective risk management systems should be put

in place in banks as these will help in curtailing the adverse effect of severe risk exposures in the financial performance of commercial banks in Kenya. This in turn will lead to a sustainable banking sector in Kenya.

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