

Effect of Financial Risks on Financial Performance of Tier One Commercial Banks in Kenya

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Abstract: For a given time and a specific benchmark, an investment's risk may be expressed as an uncertainty measure of the investment's future reward. When business initiative fails to pay off, there is the potential for capital loss to those involved. Studying how Kenya's tier one commercial banks financial performance is affected by financial risks is the main purpose of this research. The specific objectives of this study was to establish the effect of Liquidity risk, interest rate risk, credit risk, and foreign exchange risk on the financial performance of tier one commercial banks. The independent variable in this study were interest rate risk, liquidity risk, credit risk and exchange rate risk while the dependent variable was financial performance of tier 1 commercial banks in Kenya. This research employed a variety of theories which include; the loanable fund theory, information Asymmetry theory, purchasing power parity theory and the theory of bank liquidity. The financial statements of Kenya's nine major commercial banks were utilized in this research. A simple research design was used in this investigation. The research employed Census sampling method that is, it focused on the nine-tier 1 CBK-licensed commercial banks. The secondary data information was obtained from audited financial statements of the commercial banks under study. The study covered a period of 5 years from 2016- 2020. The data was arranged and financial ratios calculated. IBM SPSS statistics version 22 was used to construct tables, charts, correlations, and regressions. The study found out that liquidity risk and Return on Assets are positively and significantly related ($\beta=0.348$, $p=0.00$), credit risk and Return on Assets are positively and insignificantly related ($\beta=0.018$, $p=0.667$), foreign exchange risk and Return on Assets are negatively and significantly related ($\beta=-0.028$, $p=0.392$) and Interest rate risk and Return on Assets is negatively and insignificantly related ($\beta=-0.281$, $p=0.155$). The study concluded that liquidity risk and credit risk have a positively related to Return on Assets while foreign exchange risks and interest rate risk have negatively related to Return on Assets. The study recommends that tier one commercial banks should hold more of their assets in liquid form to enhance borrowing. Bank management should carry out a rigorous due diligence before loaning out their funds to avoid default risk. The central banks should reduce its reserves to enable commercial banks to have more liquid assets and money to loan because increase in reserves puts excessive strain on banks and reduces liquid assets.

I. BACKGROUND OF THE STUDY

Through banking, a sector, and a segment of the economy, financial assets may be leveraged to generate greater wealth. The economy is significantly affected when funds are shifted from surplus to deficit units. Ongore is the name of the

game (2013). Depositors' liquid deposits support illiquid loans, and banks serve as a go-between for depositors and investors. It's part of the bank's responsibility to create financial liquidity for investors and to help the system distribute resources more effectively (Strahan,2008). A bank's ability to carry out its purpose effectively depends on its ability to generate a steady flow of revenue. This may not come to fruition due to huge financial concerns.

Since the bank's financial performance and risk are intertwined, according to Boermans (2011), they must be reviewed together. Various factors, both internal and external, might have an impact on a company's financial performance and risk. Inflation, real interest rates, GDP growth, and off-balance sheet goods are all examples of this. Within a certain timeframe, banks throughout the world aim to achieve set goals (Aebi, Sabato & Schmid, 2013). To be profitable, a business must be more efficient and successful in bringing in new customers and revenue. As a result of their ability to withstand external shocks, commercial banks that perform better contribute to the stability of a country's economy (Athanasoglou et al., 2008). According to Dash and Dash (2013) due to profitability issues, private banks outperformed government-owned banks in India, Because of a lack of understanding on how to handle financial risk, government-owned banks' financial performance was mediocre.

The banking sector in Africa has experienced drastic changes as compared to the past years; the financial liberalization, institutional and regulatory upgrades and globalization have changed the outlook of financial systems across the region. There has been an improvement in informational efficiency in sub-Saharan Africa, yet controlling financial risks for commercial banks has remained a somewhat important issue in some cases (Deloitte, 2013). This region's currency market improvement is generally sluggish despite efforts to improve local equity and interest rates. RMB Global Research reported in March 2013 that the lack of liquidity in this sector is exacerbated by banks' refusal to participate.

The banking system in Kenya plays a crucial role in allocating scarce societal funds to the most productive projects and in facilitating the effective distribution of risk across investments (Diamond & Dybrig, 1983). Entrepreneurs who own enterprises in Kenya can apply for credit loans from the banks. The emergence of covid 19 pandemics put the financial

industry in jeopardy, which slowed down commercial activity. Growth in gross loan-to-total asset ratio from 55.34 per cent in December 2020 to 55.0 percent in March 2021 was a small but significant improvement. The Kenyan central bank conducted a quarterly credit officer survey to understand better the factors contributing to credit risk in the country. This led to some improvement in the banking sector, such as the Gross loans increased by 1.4% from ksh.2999.47Billion in December 2020 to ksh.3040.45Billion in March 2021; this was due to increased advances in financial services and energy (CBK,2021). As a result of the decrease in performance, some banks like National Bank has been acquired by KCB bank. Other banks such as equity have diversified their financial risks by opening a department called Equity Afia for their customers.

Kenya's Central Bank of Kenya (CBK) placed Imperial and Dubai bank under receivership in August 2015 and October. The CBK acknowledged that it had to pay special attention to the banking industry since they were the cause of the receivership of these two banks. 2016 was the year when Chase bank was thrown into receivership as well (CBK, 2016).

1.1.1 Financial risks

Risk is an uncertainty measure of the future payoff of an investment, measured for some time horizon relative to a specific benchmark (Bessisand,2015). For a given time and a specific benchmark, an investment's risk may be expressed as an uncertainty measure of the investment's future reward. When an investment or business initiative fails to pay off, there is the potential for capital loss to those involved (Adam,2021). Tier 1 commercial banks suffer the financial risk of their demise if precautions are not taken.

A company's financial performance might be volatile due to a combination of credit risk, liquidity risk, exchange rate risk, and interest rate risk (Gathiga, 2016). As Juma (2018) described, a firm's financial risk might result in a loss of money for the business involved. Interest rate volatility, liquidity, credit risk, and currency risk will all be considered part of the study's financial concerns. As a result of the interest rate war, banks' returns are in danger; thus, they need to keep interest rates within acceptable ranges to avoid incurring interest risk exposure. For further information, see the book Charumathi (2008). Liquidity risk can harm a financial institution's equity or profits if it cannot meet its current commitments on time and in full. A lack of appropriate cash to operate their businesses led to the closure of Dubai, Imperial Bank, and Chase Bank by CBK. Kenyans who have confidence in a bank will spread the information if one of them is hurt, causing the rest of the populace to lose trust in that bank as well (Achavya, Schaefer & Zhang, 2015). Kenyan banks must have a specific level of liquid assets on hand. These new regulations guarantee that a commercial bank can withstand a bank run.

1.1.2 Financial Performance

Over a while, the financial health of a corporation may be evaluated. Liquidity, size, ownership, productivity, and leverage are just a few of the metrics used to gauge a financial institution's success. Profitability, dividend growth, and sales turnover are all measures of financial performance. Various fields of study disagree on assessing the best financial institutions' performance and the elements that influence it (Skandalis & Liargoras, 2008). To build a competitive edge, a corporation must be able to acquire and manage resources in various ways (Anshoria, 2007). On the financial side, the success of the banks is based mainly on factors that are directly connected to the financial statement.

Financial crisis causes imbalance over the economy and hence affects the business surrounding. According to Chen et al. (2013), informed managers opt for internal financing, while optimistic managers focus on maximizing the firms' profitability levels to enable internal financing and ensure optimal cash inflows associated with debt financing. Risk-averse managers would opt for external financing despite the finance costs (Proenca et al., 2014). Since there is a direct link between debt financing and fund deficit, there is no space for equity financing (Chen et al., 2013).

1.1.3 Financial risk and financial performance

Bank profitability and safety are directly related to the bank's ability to accept risks, according to Athanasoglou et al. (2005), who argue that a bank's ability to see, take care of, and prevent any risk in the future is critical to its ability to recover from losses caused by risks. Liquidity, foreign exchange, interest rate, and credit risk are all examples of financial risk affecting financial performance (Taffri et al.,2009; Dimitropoulos et al., 2010).

Credit risk has the most significant impact on Kenya's Tier 1 commercial banks. According to Psilaki and Tsolas (2010), commercial banks that properly manage their credit risk contribute significantly to economic stability and significant deployment of capital. This contributes to the long-term health and prosperity of their businesses and assets. Additionally, Tier 1 commercial banks have interest rate risk, which refers to the potential for interest rates to fluctuate on loans or deposits. Risk occurs when the lending interest rate is lower than the deposit rate, or the deposit interest rate is lower than the market rate, negatively impacting the bank's capacity to function. Because of an increased cost and decreased output, the local currency has depreciated during the past few months. (Burument&Dincers 2004). If a bank fails to set a fair price for currency while selling and buying foreign currency, the bank's exchange rate risk grows. Bank loan default, liquidity management, interest rate and foreign currency fluctuation are all financial risk factors. Risk elements that have a broad influence on bank performance across a range of metrics, including net income, ROA, and ROE, should be included in measures involving banking activities (Athamsoglou et al.,2005).

1.1.4 The Tier 1 Commercial banks in Kenya

It is the responsibility of the Kenyan central bank to supervise commercial banks in Kenya. According to Cytton (2016), the banking sector is over-banked because of its competitive character and large number of participants. At the end of December 2020, there were 41 commercial banks held by both local and international investors (CBK, 2020). After interest rate limits were abolished in 2019, the sector was performing well in 2020. A total capital adequacy ratio of 19 percent, much above the statutory limit of 14.5 percent, was achieved at the end of the year. Because the liquidity ratio of 54.5 percent above the 20% statutory requirement, it was considered to comply with regulations. From December 2019 to December 2020, the total assets expanded by 12 percent, from ksh.4.8 trillion to ksh.5.4 trillion. From ksh.3.5trillion in December 2019 to ksh.4trillion in December 2020, customer deposits climbed by 13.6 percent.

Net asset ownerships, capital and reserve balances, and the number of deposit and loan accounts are used to classify commercial banks by the Kenyan central bank. Depending on the size of the bank, they are categorized as Tier 1, Tier 2, or Tier 3 commercial banks in Kenya. The investigation will focus on Kenya's top tier banks. According to asset ownership and the number of depositors, Kenya has eight tier-one commercial banks (CBK, 2018). To name only a few of Kenya's top-tier commercial banks: Equity bank, KCBC, ABSA bank Kenya PLC (Kenya), KBC, Cooperative bank, Standard Chartered bank, NCBA bank, DTB bank, and Stanbic.

1.2 Statement of the problem

According to 2020 Bank supervision reports, NCBA bank reported 41% decline in profits, that is from 7.8billion in 2019 to 4.6billion in 2020, where the decline was attributable to an increased cover for loan defaults which rose from 6.3 billion to 20.4 billion. In 2019, DTB had recorded 4.1 billion net earnings and 2.6 billion in 2020 as a result of restructuring its huge chunk of loans. The lenders cash balance decline from 7.2 billion to 6.9 billion, customer deposit which is key item in balance sheet also declined from 283.1 billion to 280.4 billion during the same period (CBK 2020). Knowledge of the interrelationships between bank performance indicators, macroeconomics factors, and microeconomic variables is required to comprehend commercial bank performance (Kimani, 2013). To thrive in today's unstable economic climate, Kenyan commercial banks need to keep up with technological advancements and globalization (Maina, 2017). Chase Bank and Imperial bank were placed into receivership due to purported hard economic circumstances in Kenya's banking industry due to the dynamic business climate (Irungu, 2017). Commercial banks' financial performance is impacted by both internal and external elements, which may be classed as micro-economic and macro-economic factors, respectively (Ongore, 2013). Liquidity and credit risks are examples of internal factors; interest rate and foreign currency risks are examples of macroeconomic variables. Commercial banks'

profitability is defined by the amount of money they make in a specific period. Banks like this have not done well in the recent decade (Onuonga,2014). The research aims to determine the impact of various financial risks on Kenya's Tier 1 commercial banks. Among them are credit risks, liquidity and currency hazards, and interest rate and foreign risk.

1.3 Objectives of the study.

The study's general objective was to determine how financial risks affect the performance of tier one commercial banks in Kenya. The study was guided by the following specific objectives;m

- i. To establish the effect of interest rates risks on the performance of tier one commercial banks in Kenya.
- ii. To find out the effect of liquidity risks on the performance of tier one commercial banks in Kenya.
- iii. To determine the effect of credit risk on the performance of tier one commercial banks in Kenya.
- iv. To investigate the effect of exchange rate risk on the performance of tier one commercial banks in Kenya.

II. LITERATURE REVIEW

2.1 Theoretical review

The study is based on the loan-able funds theory, the theory of bank liquidity requirement, purchasing power parity theory and information asymmetry theory. The theories are used to enlighten more about the relationships of the study variables.

2.1.1 The loan-able fund theory

Dennis Robertson (British), Knot Wick-sell (Swedish), and Bertil Ohlin (Swedish) are the ones who came up with this in the 1930s. The theory maintains that interest rates are governed by the demand and supply of loanable money, including loans, bonds and savings accounts. According to Bernake (2005), loanable funds are in demand from various sources, including governments, corporations, and individual consumers looking to invest or spend their money. Borrowing for public works, public consumption, and deficit budget compensation are all examples of borrowing by the government (Mankiw, 2013). Government borrowing needs are unaffected by interest rates, though. For the purchase of capital goods and new investments, the businesspeople borrow money. A variety of capital items are needed to run and grow their businesses. If they lack the necessary capital goods, they must take out loans to fund this. The amount of their output dictates the demand for loanable cash by businesses. There is a direct correlation between interest rates and a company's investment need for loans. As a result, lower interest rates will be more in demand and higher interest rates will be less so. To buy things, people take out loans. They want to spend more money than their current salary, which will allow them to take out loans. They utilize credit cards to make purchases of both long-term investments and everyday necessities, and they form credit accounts with the vendor to

continue making purchases on credit. Investing and speculative reasons are also covered by the loans they get.

According to Woodford (2010), savings, bank credit and dis-hoarding are the primary sources of loans. The higher the interest rate, the more people are willing to save, and the lower the interest rate, the fewer people are willing to save. (Sinn, 2010) This is due to the positive correlation between interest rates and the availability of loanable money. The supply curve will rise from left to right because of this. The demand and availability of loanable money determine market interest rates by establishing an equilibrium. The equilibrium interest rate is the point when the supply and demand of loanable money are equal and hence the two curves intersect. There will be an increase in interest rates if there is a rise in the demand for loanable money and vice versa. Demand for loanable funds will cause interest rates to rise if supply falls, and supply will cause interest rates to decrease if supply rises—Horn & Lindner (2011). Price stability can be pursued by an interest rate manoeuvre-based monetary policy rule, according to Woodford (2003). A key component of money supply, according to the loan-able fund hypothesis, is the bank credit. As a result, it acknowledges the crucial part played by money in today's economic system. Despite the theory's advantages, changes in interest rates cannot restore the equilibrium between the demand for and supply of loanable money. Tier one Kenyan commercial banks' interest rate risk and financial performance will be examined using this theory in the current study.

2.1.2 *The theory of bank liquidity requirement*

Calomiris, Heider & Hoeroua created this idea back in 2014. A prudential regulatory mechanism and a safeguard against liquidity risk are outlined in the document. It is claimed by Goodhart (2008) that the incentives of cash holdings and cash reserve requirements enable improved market functioning and their utility does not depend on a bank's capacity to pay out the cash to address liquidity risk. Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) are two new worldwide liquidity requirements that the Basel committee has recommended in response to the global financial crisis between 2007 and 2009. Liquidity risk is at the heart of the increasing interest in banks' liquidity management.

Banks' short-term liquidity risk profile is bolstered by ensuring sufficient unencumbered high-quality cash on hand. Assets can be quickly turned into cash in the private sector to fulfil a 30-calendar-day liquidity stress scenario's demands (Basel committee on banking supervision, 2013). Regulating the asset side of a bank's company rather than its cash reserves is a model of liquidity requirement. Goodhart (2008) and Weldmann (2014) argue that cash restrictions reduce the risk of default and encourage prudent risk management. Financial requirements play a unique role in enticing banks to enhance their risk profiles by promoting good risk management through cash incentives.

According to Diamond and Dybvig (2016), physical expenses associated with liquidation make liquidity risk expensive, which might encourage the stockpiling of liquid assets as a hedge against this risk. Banks hold liquidity requirements to protect themselves from the danger of a small number of misinformed early withdrawals. Banks selling demandable loan contracts would incur extra expenses without those reserves when they fail to fulfil the depositor's early withdrawal requirements. The hypothesis is critical to the study because it establishes the link between liquidity risk and the financial performance of Kenya's tier one commercial banks.

2.1.3 *Information Asymmetry Theory*

In the 1970s and 1980s, the notion of information asymmetry was developed to explain market failures. According to this idea, market failures might be caused by an information gap between buyers and sellers. George Akerlof's 1970 essay, "the market for lemons," is an excellent study on the economics of knowledge. Secondhand automobile sales were used as an example of Akerlof's "lemons dilemma" to show how a lack of information from the seller might have an enormous effect and even lead to market failures. Akerlof believes that in markets, buyers typically utilize market statistics to estimate the worth of a product.

Information asymmetry, therefore, describes a situation of non-disclosure of information to all players in a market (Eppy, 2005). According to Stiglitz (2001), such markets may lead to inter-temporal competitive market behaviour. The information asymmetry may pose two technical issues to the firm, adverse selection and moral hazard, thus making an inappropriate lending decision. When a creditor lacks sufficient information about a borrower's risk rating and repayment capacity, adverse selection happens on the credit markets. Moral hazard, on the other hand, can be defined as the improper use of borrowed monies. In this case, the creditor is unable to keep tabs on the borrower's activities. The borrower may engage in dangerous projects that the creditor may not like, but he or she has little choice but to accept the terms of the loan (Stiglitz 1981)

According to Robinson (2010), the theory claims that lenders cannot tell the difference between high- and low-risk borrowers when making a loan decision. Lenders lack the knowledge essential to calculate loan prices that should represent the riskiness of the borrower. As a result, lenders would incur fees for screening safe candidates from dangerous applicants and for monitoring borrowers' activities. Because lending organizations share information about borrowers' creditworthiness, this hypothesis is important. They can cut the interest rate on a loan, which lowers the chance of default (Weinberg 2006).

Due to information asymmetry, creditors head towards credit rationing to minimize credit risk. Credit rationing is described as the imposition of limits by the banks upon the number of loans to be granted. Credit Reference Bureaus (CRB) develop

credit risk management practices to minimize credit risk, hence reducing the information asymmetry among the lenders and borrowers. This theory will significantly impact the study as it draws the relationship between credit risk and financial performance of tier one commercial banks in Kenya.

2.1.4 Purchasing Power Parity Theory (PPP)

Gustav Cassel, a Swedish economist, created the Purchasing Power Parity hypothesis in the 1920s to examine the link between international trade charges. The PPP hypothesis explains products' relative costs and changing quotations (Shapiro & Rutenberg 1976). According to PPP, when the buying power of two currencies is equal in both nations, the exchange rate is said to be in equilibrium. According to PPP, a currency's depreciation is equivalent to the difference between the inflation rates in the home nation and the foreign country, which measures price changes (inflation). All commodities in the market basket are equal. There are no transportation expenses, taxes, tariffs, or exchange laws, and the relative inflation cost can only modify alternative fees. There are two types of PPP: relative and absolute, according to Menon and Viswanathan (2005). A basket of commodities should have the same value once two currencies have been exchanged, according to the fundamental PPP theory, known as absolute PPP. Converting foreign currencies into US dollars is how it works. According to the idea, inflation, consumer spending, and transportation costs and customs all influence the fast exchange rate.

On the other hand, relative parity is an extension of PPP, which maintains a constant value for a given product across nations. According to the theory of relative purchasing power parity, price inflation and currency exchange rates appear to be linked. As inflation rates fluctuate, it examines how much a single currency unit can purchase, changing over time. So, according to the principle outlined above, inflation must be considered to adjust PPP correctly. To get a sense of a currency's long-term value, traders can utilize any difference between the PPP and exchange rates. The rates may be used to anticipate the direction of a currency pair and used to determine whether to buy or sell a currency pair. Arbitrage, or the ability to acquire an item in one location and instantly sell it for a more excellent price in another, is a key component of the PPP hypothesis. The hypothesis also assumes that the things in the basket are precisely the same. When it comes to analyzing the financial performance of Kenya's tier one commercial banks, this hypothesis will be crucial.

2.2 Empirical Literature Review

Ahmed and Supro, (2018). Analysis of interest rate changes, the impacts of advances and loans on commercial banks' financial performance in Pakistan, and an investigation into market interest rates' correlation with bank profitability in Pakistan were some of the study's goals. The research was conducted over seven years, from 2007 to 2014. They found a positive correlation between the profitability of commercial banks and their capacity to lend money and invest in the stock

market. Interest rate swings have a considerable influence on profitability, according to the findings of this study. Bank lending rates may rise as a result of well-regulated and well-managed institutions. It also recommended that banks' portfolio managers focus on long-term profitability. The government should increase bank profit margins.

Odaro (2016) revealed that the financial performance of commercial banks listed on the Nairobi Securities Exchange is influenced by interest rates, using data from the Nairobi Securities Exchange. Research on commercial banks listed on the Nairobi Securities Exchange aimed to find out how interest rates affected their financial performance. In a study of Kenya's commercial banks' financial performance, interest rate considerations had a substantial impact, according to Maigua and Maoni (2016) found that performance of commercial banks was demonstrated to be negatively impacted by reserve requirements, whereas discount rates, inflation, and exchange rates were found to be positively impacted. Increases in discount, inflation, and currency rates all have a detrimental influence on the profitability of Kenya's commercial banks, according to the findings of the study. Central banks' reserve requirements shouldn't place an undue pressure on financial firms.

In research by Hacini, Bou-lenfed, and Dahon, liquidity risk management by Saudi Arabian banks was evaluated (2021). According to the data, cash deposit rates have a significant impact on the bank's financial success. In the case of a liquidity crisis, a bank's liquid investments should be readily available. Dassie (2018) study showed that commercial banks' financial performance was found to be inversely correlated with their ability to handle liquidity risk. In order to maximize returns on assets and guarantee that banks can survive any financial system shocks, management should foster a culture of responsible liquidity management. Siriba (2020) result showed that there was no discernible impact of the null hypothesis on the ROE of LA. Credit risk was shown to be adversely correlated with a company's financial success, according to NPLs and LLPs' research. The performance of banks was significantly impacted by the LAs. According to the study's conclusion, banks boosted the amount of default risk factors in their loan rates beyond the real default risk to improve their profitability. In a case study of Ghana commercial Banks limited, Kwabena (2014) learned about credit risk management in financial institutions. In a financial institution, credit risk management begins with establishing solid lending standards and an efficient framework for managing risk, according to Kwabena (2014). Risk management committees or departments develop all policies, industry-specific recommendations, and risk concentration limitations. Using the insights, Ghana commercial Bank Limited and other financial institutions in Ghana can improve their credit processes.

III. RESEARCH METHODOLOGY

This study used a quantitative research design. Cooper and Schindler (2014) state that a quantitative research design aims

to demonstrate the causal relationship between two independent variables by measuring the effect on the dependent variable of the independent variable. This study's design was deemed appropriate since it involves gathering, verifying, and synthesizing quantifiable observations to produce facts that answer our investigation's research questions. The target population is the group of individuals or participants who have the impute and relevance. The accessible population was reached after taking the participants of the target population, who can or cannot be accessed during the study period (Bartlett et al., 2012). The study targeted tier one commercial banks in Kenya. Etikan&Bala (2017) described a sample as the individuals who have a chance to be included in the study among those selected in a sample selection process. The sample frame is the list of features from which this sample is gotten (Kothari, 2014). The research employed a Judgmental sampling technique under non-Probabilistic sampling technique by directly selecting the Nine-tier 1 CBK-licensed commercial banks which were Equity bank, Kenya commercial bank, Absa bank of Kenya PLC, Cooperative bank. Standard chartered bank, NCBA bank, I&M bank DTB bank, and Stanbic bank without employing the use of chance, probability or randomness.

A data collection schedule was used to gather secondary data for the investigation. The information gathered entailed commercial banks' financial health data gathered from commercial bank's audited financial statements from the banks' websites and the CBK (supervision reports) for a 1-year study period marked by changes in the banking industry's operating environment, such as the introduction of interest rate capping and fluctuations in currency exchange rates. Non-performing loans, exchange ratios, and return on assets (ROA) are some of the metrics that were gleaned from audited financial statement. It is easier for researchers to study and anticipate future possibilities and trends when using secondary data since it is readily available and reliable.

The study used SPSS version 22. The empirical model of the study was a fixed effect (regression) model based on least squares dummy variable. The study used the fixed effects model to identify dynamic changes caused by liquidity risk, credit risk and interest risk on Return on asset and if any significant relationship exist between them at a 95% confidence level and 5% significance level. The significance of the variables (Explained and Explanatory variables) was tested using the probabilistic value.

The empirical model for the study was a fixed effects model which was based on Least squares dummy variable regression technique because of longitudinal data (panel data) that combined different cross-sections ($i=9$ Banks) across different time periods ($t=5$) observations (Time series) which gave us a total of 225 observations. The model was then obtained by taking Liquidity risk, Credit risk, foreign risk and interest risk

as X-vector regressor variables and Return On asset as Y-vector regress and eight dummy variables were created instead of nine because of the nine banks in order to avoid the dummy variable trap of perfect collinearity. The reference category was the cooperative bank.

Return on Asset (ROA) was given as a function of the four regressor variables and that statistical was given by

ROA=f (Liquidity risk, Credit risk, foreign risk and Interest risk)

the FEM basing on LSDV was therefore given in the form of

$$Y_{it} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \alpha_7 D_{7i} + \alpha_8 D_{8i} + \alpha_9 D_{9i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \mu_{it}$$

Where:

α_1 is the intercept of Cooperative bank (Intercept for reference category)

$\alpha_2, \dots, \alpha_8$ are the differential coefficients that tell us how much intercepts vary from the assumed first intercept of reference category (Cooperative bank).

D_{2i}, \dots, D_{8i} are dummy variables where;

$D_{2i} = 1$ if the observation is in Standard Chartered bank, 0 otherwise.

$D_{3i} = 1$ if the observation is in NCBA bank, 0 otherwise.

$D_{4i} = 1$ if the observation is in I&M bank, 0 otherwise.

$D_{5i} = 1$ if the observation is in DTB bank, 0 otherwise.

$D_{6i} = 1$ if the observation is in Equity bank, 0 otherwise.

$D_{7i} = 1$ if the observation is in Absa bank, 0 otherwise.

$D_{8i} = 1$ if the observation is in KCB bank, 0 otherwise.

$D_{9i} = 1$ if the observation is in Stanbic bank, 0 otherwise.

$\beta_2, \beta_3, \beta_4$ and β_5 are the regression coefficients for Liquidity risk, Credit risk, foreign risk and interest risk respectively.

Y_{it} = Return on Asset

X_{2it} represents Liquidity risk at i^{th} cross-section and time t , X_{3it} represents Credit risk at i^{th} cross-section and time t , X_{4it} represents Foreign risk at i^{th} cross-section and time t and X_{5it} represents Interest risk at i^{th} cross-section and time t .

μ_{it} is the error term.

IV. RESULTS AND DISCUSSIONS

4.1 Descriptive Statistics

Table 4.1 Descriptive findings

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
LR	45	.30054195	1.4077063	.6125248458	.30240313323	1.560	.354	1.521	.695
CR	45	.01091095	.75899734	.1216094678	.13550526529	3.951	.354	16.099	.695
FR	45	-.38131503	.93207438	.0936769048	.21276080748	1.938	.354	6.455	.695
IR	45	-.11463805	.09178316	.0594002512	.03192541773	-4.014	.354	20.468	.695
ROA	45	.00303875	.26288308	.0401777102	.04428943652	4.076	.354	17.661	.695
Valid N (listwise)	45								

A total of 45 observations were made which entailed yearly analysis of the 5 variables in each cross-section. Liquidity risk had a mean of 0.6125248458. Liquidity risk was highest at 1.40770639 and lowest at 0.30054195. Liquidity risk was found to be positively skewed which meant that most of the observations was found to lie within the right side of the mean. The kurtosis findings showed that the observations for Liquidity risk were normally distributed and the graph was flat because the kurtosis statistic was between -3 and +3.

Credit risk had an average of 0.1216094678 with the lowest and highest observation being 0.01091095 and 0.75899734 respectively. LR was positively skewed with majority of the observations lying on the right side of the mean. LR observations were found to be peaked as shown by the Kurtosis statistic of 16.099 which way far above the -3 and +3 range for normal distributions.

Foreign risk, Interest risk and Return on Asset had an average of 0.0936769048, .0594002512 and 0.0401777102 respectively. Foreign risk and Return on Asset were found to be positively skewed with majority of the observations high than the mean while Interest risk was found to be negatively skewed with majority of the observations being lower than the mean. Foreign risk, Credit risk and ROA were found to be peaked because their Kurtosis statistics were above the -3 and +3 range.

4.2 Normality test

Normality test was done using Shapiro-Wilk test to determine if the data was normal

Table 4.2: Shapiro-wilk test

	Shapiro-Wilk		
	Statistic	Df	Sig.
LR	.778	45	.000
CR	.473	45	.000
FR	.793	45	.000
IR	.604	45	.000
ROA	.474	45	.000

a Lilliefors significance correction

The significance level for Shapiro-Wilk test statistic for Liquidity risk, credit risk, foreign risk, Interest risk and return on asset indicates that the data was not normal because their probability value (0.00) was below the significance level of 5%.

4.3 Correlation results.

Table 4.3 Correlation analysis

		LR	CR	FR	IR	ROA
LR	Pearson Correlation	1	-.208	.341*	-.095	.273
	Sig. (2-tailed)		.171	.022	.533	.069
	N	45	45	45	45	45
CR	Pearson Correlation	-.208	1	.046	.050	-.063
	Sig. (2-tailed)	.171		.765	.744	.681
	N	45	45	45	45	45
FR	Pearson Correlation	.341*	.046	1	.031	-.017
	Sig. (2-tailed)	.022	.765		.840	.910
	N	45	45	45	45	45
IR	Pearson Correlation	-.095	.050	.031	1	-.001
	Sig. (2-tailed)	.533	.744	.840		.993
	N	45	45	45	45	45
ROA	Pearson Correlation	.273	-.063	-.017	-.001	1
	Sig. (2-tailed)	.069	.681	.910	.993	
	N	45	45	45	45	45

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

The findings show that there is a weak positive correlation between Liquidity risk and foreign risk and Liquidity risk and Return on Asset because there Pearson correlation coefficient are positive and below the 0.7 requirement. The correlation between Liquidity risk and credit risk and liquidity risk and interest risk is weak and negative. There correlation coefficient is negative and below 0.7 regardless of the sign.

4.4 Analytical Model

The study used a fixed effects model which was based on Least squares dummy variable regression technique because of longitudinal data that combined different cross-sections (i=9 Banks) across different time periods (t=5) observations (Time series)

4.4.1 Coefficient of Determination

Table 4.4 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.742 ^a	.550	.382	.03482751536	2.469
a. Predictors: (Constant), IR, I&M, F, CR, STDCHATD, DTB, NCBA, KCB, STANBIC, EQUITY, ABSA, LR2016					
b. Dependent Variable: ROA					

As per the findings, 55% of the variability in ROA is explained by the X-vector variables including the dummies. The model fairly fitted the data because the coefficient of multiple determination was fairly close to one. A model is said to be a good fit if its R square is close to one.

4.4.2 ANOVA

Table 4.5: ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.	
1	Regression	.047	12	.004	3.263	.004 ^b
	Residual	.039	32	.001		
	Total	.086	44			
a. Dependent Variable: ROA						
b. Predictors: (Constant), IR, I&M, FR, CR, STDCHATD, DTB, NCBA, KCB, STANBIC, EQUITY, ABSA, LR						

The findings from the ANOVA Table4.4 showed that the FEM model was statistically significant in explaining the relationship between the explanatory variables LR, CR, FR and IR and the predicted variable ROA because the significance level of the F- statistic (0.04) was lower than the chosen Probability value of 0.05.

4.4.3 Empirical model

The FEM based on LSDV model for panel data is given by

$$Y_{it} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \alpha_7 D_{7i} + \alpha_8 D_{8i} + \alpha_9 D_{9i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \mu_{it}$$

Table 4.6 Empirical model

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	
	B	Std. Error	Beta			
1	(Constant)	-.092	.031		-3.012	.005
	STDCHATD	-.053	.024	-.378	-2.185	.036
	NCBA	-.020	.026	-.143	-.776	.443
	I&M	-.020	.023	-.143	-.876	.388

DTB	-.036	.025	-.256	-1.446	.158
EQUITY	-.306	.064	-2.193	-4.781	.000
ABSA	-.132	.038	-.948	-3.499	.001
KCB	.037	.024	.265	1.561	.128
STANBIC	-.043	.025	-.307	-1.733	.093
LR	.348	.064	2.376	5.458	.000
CR	.018	.042	.056	.434	.667
FR	-.028	.032	-.132	-.868	.392
IR	-.281	.193	-.202	-1.457	.155
a. Dependent Variable: ROA2016					

The FEM based on LSDV regression model was: $Y_{it} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \alpha_7 D_{7i} + \alpha_8 D_{8i} + \alpha_9 D_{9i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \mu_{it}$

$$\text{ReturnonAsset}_{it} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \alpha_7 D_{7i} + \alpha_8 D_{8i} + \alpha_9 D_{9i} + \text{LiquidityRisk} X_{2it} + \text{Creditrisk} X_{3it} + \text{Foreignrisk} X_{4it} + \text{interestrisk} X_{5it}$$

$$\text{ReturnonAsset}_{it} = -0.92 - 0.053 D_{2i} - 0.20 D_{3i} - 0.20 D_{4i} - 0.036 D_{5i} - 306 D_{6i} - 0.132 D_{7i} + 0.037 D_{8i} - 0.043 D_{9i} + 0.348 X_{2it} + 0.018 X_{3it} - 0.28 X_{4it} - 2.81 X_{5it}$$

The results of the empirical model were discussed as follows:

4.5 Discussions

The dummy variables simply gave the difference between the categorical reference bank (Cooperative bank) and the other eight banks conditioned on LR, CR, FR AND IR and are therefore not of statistically significance in explaining the findings. Return on Asset (ROA) is positively correlated with Liquidity risk, according to the estimates. Using the ceteris paribus principle on Credit risk, international risk, and Interest risk, the data indicated that a 1% rise in liquidity risk increased the return on asset by 0.348 percent. Because the P-value (sig as shown in the output table) was 0.00, which was lower than the study's significance of 0.05, the association between liquidity risk and Return on Asset was statistically significant. A statistically significant association exists if the p-value is less than the significance level, and the variable has a meaningful impact on the model. There were no significant differences between the findings of this study and those of Muriithi and Waweru (2017) on the impact of liquidity risk on the financial performance of Kenyan commercial banks over a nine-year period from 2005-2014. LCR and NSFR indicated that NSFR has a long-term and short-term negative effect on bank profitability... Bank executives should give liquidity management the attention it deserves.

Re-search by Hacini, Boulenfed, and Dahon (2021) who studied the impact of Saudi Arabian banks' liquidity risk management on their financial performance mirrored the findings of this study. The financial performance of selected Saudi Arabian conventional banks was investigated as a factor in the management of liquidity risk. The study's quantitative research approach used data from banks' annual financial

reports. Banks' financial success was also strongly influenced by the pace at which cash was deposited. The findings of Dassie (2018)'s study in Sierra Leone, however, which used descriptive techniques and multiple regression analysis on data acquired from a survey of eight banks, did not match the findings of this study in Sierra Leone. Liquidity risk management was shown to be negatively associated with commercial banks' financial performance.

The results demonstrated a link between financial success and credit risk. With all other variables held equal, a 1% rise in Credit risk improves the financial performance of commercial banks by 0.18 percent. Though Credit risk and Return on Investment had a statistically significant association, the p-value was 0.667, which is much over the 0.05 level of significance required by the study. This meant that, despite the positive correlation, credit risk was not a substantial contributor to the model. Siriba's research was in agreement with the conclusions of this study (2020) For a five-year period, researchers in Kenya set out to discover how credit risk impacts commercial banks' financial performance and how sound credit management might reduce loan defaults while also boosting the financial performance of Kenyan commercial banks (2014-2018) A non-significant negative influence on the Bank's ROE ($p=0.001$) was found for LLP ($p=0.653$), whereas a substantial positive impact on ROE ($p=0.001$) was found for LA ($p=0.001$). Thus, the null hypothesis had no meaningful impact on the ROE of the Bank. Credit risk was shown to be adversely correlated with a company's financial success, according to NPLs and LLPs' research. The performance of banks was significantly impacted by LAs. According to the findings of the study, banks artificially increased the risk of default in their lending rates in order to increase profitability. There was no statistically significant relationship between foreign risk and Return on Asset, according to the study's findings, which showed that the P-value of 0.392 was above the 0.05 level of significance determined by the researchers. Assuming all other factors remain constant, a 1% rise in international risk lowers the Return on Asset by 0.028%.

Demissie (2020) found that the financial performance of private commercial banks in Ethiopia was consistent with the findings of this study. Ethiopian private commercial banks that were registered with the National Bank of Ethiopia (NBE) before 1999 and have kept a nineteen-year straight annual statement from 2000 to 2018 have been studied for the impact of bank size, interest rate spreads, and foreign exchange rates on financial performance. Foreign currency rate movements in Ethiopia have a direct and negative impact on commercial banks in the country. Ethiopian private commercial banks' performance does not appear to have a substantial association with inflation rates, according to the research data. The study found that ROA is negatively correlated with interest risk. The return on asset improves by 0.287 percent when interest risk rises by 1 percent. Interest risk and asset return were negligible since the IR coefficient had a probability value of 0.155 that was below than the 5% significance limit.

According to statistics from the Nairobi Securities Exchange, commercial banks listed on the Nairobi Securities Exchange have their financial performance impacted by interest rates, as found by Odaro (2016). Borrowers are harmed by an increase in interest rates, according to Odaro (2016). Following these investigations, Odaro (2016) proposed that financial institutions and banks take their clients into account when setting interest rate policies. This is because customers would suffer if interest rates and borrowing prices rose. Central Bank of Kenya monitoring of interest rates is necessary to limit the spread of interest rates in Kenyan financial institutions.

The findings were also in accordance with those of Maigua and Maoni (2016), who discovered that interest rate considerations strongly influenced the financial performance of Kenya's commercial banks. To better understand the financial performance of commercial banks in Kenya, Maigua and Maoni (2016) studied how interest rate de-terminants affect financial performance, established how inflation rate affects the financial performance of commercial banks in Kenya, determined discount rates' effects, and evaluated reserve requirements' effects on financial performance. The profitability of commercial banks in Kenya is negatively affected by rises in discount rates, inflation rates, and currency rates, as was demonstrated in the 2016 study by Maigua&Maoni. Central banks' reserve requirements shouldn't place an undue pressure on financial firms. There was no evidence to support Ahmed's claims, which focused on interest rates and Pakistani banks' financial performance. In the span of seven years, Supro (2007-2004). According to Ahmed (2018), the profitability of commercial banks and their ability to lend money and invest in the stock market are positively correlated. Profitability can be affected by interest rate changes, according to this study.

V. RECOMMENDATIONS AND POLICY IMPLICATIONS

It is recommended that tier one commercial banks hold more of their assets in liquid form to enhance borrowing. It is also recommended that tier one commercial banks should loan out more funds to borrowers as it was found that the more the credit risk improved and this can be effective only if levels of non- performing loans are reduced and this can be achieved by doing rigorous due diligence before giving out loans, the more returns are realized by commercial banks. Under policy implications, it is recommended that the central bank as the authority behind supervision of all commercial banks lower its interest rates so that people would borrow more because higher interest rates increase the cost of borrowing and therefore discouraging customers from borrowing. The study also recommends the use of forward exchange contracts which will help banks to caution from the adverse shifts in exchange rates. In addition, the central banks should reduce its reserves to enable commercial banks to have more liquid assets and money to loan because increase in reserves puts excessive strain on banks and reduces liquid assets. Albeit, these policies should not be raised to levels that would cause increase inflation caused by increase in demand and currency

depreciation because of too much money in circulation in the economy.

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APPENDIX A: TIER ONE COMMERCIAL BANKS

1. Equity Bank
2. Kenya Commercial Bank
3. Absa Bank of Kenya PLC
4. Cooperative Bank
5. Standard Chartered Bank
6. NCBA Bank
7. DTB Bank
8. Stanbic Bank
9. I& M Bank

Source: CBK (2021)