FINANCIAL RISK HEDGING AND FINANCIAL PERFORMANCE OF COMMERCIAL BANK LISTED IN NAIROBI SECURITIES EXCHANGE, KENYA

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Abstract: **In Kenya financial institutions play key role in economy development; they receive and lend money to the investors. Due to the nature of their function's commercial banks face financial risks that originate from the market which affects their financial performance. In the past 10 years, the commercial Banks reported decline of Return on Asset. The hedging techniques are tools used to minimize the financial risks that can affects value of firms. This study's specific goal is to determine whether financial risk hedging and Kenyan commercial banks' financial performance which are publicly traded on the Nairobi Security Exchange (NSE) are related.**

The study's specific objectives include forward contract, future contract, currency diversification of currencies, and swaps hence bank size is used as moderating variables. The agency theory, profit maximization theory, and enterprise risk management are all supporting hypotheses in the study. The study used a descriptive correlational approach to target all publicly traded commercial banks in Kenya and conducted a census. Secondary data was gathered annually over a five-year period (2017-2021) from publications by the Nairobi Securities Exchange and the respective commercial banks using a data collection form. Normality, multicollinearity, heteroscedasticity, and stationarity tests were performed as part of the diagnostic process, where hence the data collected shown normality. Data was therefore transformed in order to ensure that regression analysis was undertaken without carrying out a spurious regression. Means and standard deviation from the mean were used for descriptive statistics. Correlation and regression analysis were used to test hypotheses and develop conclusions. The correlation analysis revealed that using forward contracts as a hedging strategy has a strong positive and significant impact on financial performance. The futures, swaps, and currency diversifications also they had positive correlation against financial performance, and they had significant relationship. The regression study revealed a strong positive link between risk hedging and financial success, indicating a noteworthy correlation. Forward and future contracts were revealed to be risk-hedging approaches with significant effects on commercial bank financial performance, implying that currency diversification and swaps had a positive and significant effect on financial performance. Size had a strong favorable impact on the link between risk hedging and financial performance. The study suggested that commercial banks should implement risk-hedging measures such as forward contracts, future contracts, currency diversifications, and swaps since they increase financial performance. The report proposed that commercial bank management develop policies to encourage the usage of these risk hedging methods.

Keywords: **financial risk hedging, economy development, commercial banks, Nairobi Security Exchange (NSE).**

1. INTRODUCTION

1.1 Background of the Study

Cavusgil, Knight, Riesenberger, Rammal, and Rose (2014) acknowledged banks as significant drivers of global economic progress. They play a principal part in the growth of the economy through collecting reserves from firms with excess cash and mobilizing those funds for industrial endeavors. Commercial banks lend funding to start-up businesses and grant loans to government agencies, offer training to business owners, and provide payment services to their customers (Issahaku, 2018). The growth of the economy in any country is dictated by commercial banks. By channeling a variety of services, the banking industry helps both surplus and deficit units around the world (Frensidy & Mardhaniaty, 2019).

The global crisis had a negative impact on banking systems around the world, slowing financial market growth, while the Return on Assets (ROA) indicator, which measures the profitability and soundness of the banking industry, fluctuated between 2006 and 2010, first declining and then improving as the economy recovered from the financial crisis. In 2016, worldwide commercial banks had the following average ROAs: France 0.4, Germany 0.3, Greece 1.0, Italy 0.7, Japan 0.7, the United Kingdom 0.4, and the United States 1.2. In terms of ROA, emerging markets performed as follows: Russia 3, China 0.9, India 0.9, Malaysia 0.5, and Brazil 3.4 (Butnariu, Luca, & Apetrei, 2018). The commercial banks of Kenya have grown rapidly since the 2000s, and the performance of the banks has been improving, although they have faced many challenges. The profit growth of the Kenyan banking sector has been noticeable, as the total net income of the banks has increased, with a 3.3% increase in income observed in 2018 (KBA, 2019). The total net assets of the commercial banks have also increased, reflecting the banks' aggressive deposit mobilization strategies and risk aversion during lending (KBA, 2019). However, the ROA has experienced fluctuations, reaching 5% in 2012 but declining to 3% in 2017, with a slight increase in 2018 followed by a decline in 2019 (CBK, 2018; KBA, 2020).

Financial risks are uncertainties that originate from financial markets and can affect businesses operating in those markets, either causing the business to incur losses or reducing its financial performance, which hampers shareholder wealth maximization (Bartram, Brown & Waller, 2015). The source of financial risks can be changes in market prices, which expose businesses to risks related to interest rates, foreign exchange rates, and commodity prices, as well as risks associated with transactions with other organizations or customers (Allen & Carletti, 2013). Hedging is a strategy used to mitigate risks by achieving stability in cash flow and business operations (Aiba, Odajima & Khou, 2018). It involves reducing the risk of future price swings that, if not adequately managed, could harm a company (Horne & Wachowicz, 2012).

Hedging is a strategic method used by businesses and individuals to reduce the impact of price changes on their financial gains (Brigham & Ehrhardt, 2014). According to Firouzi and Vahdatmanesh (2019), this investment strategy offers cost-effective and easily convertible positions, similar to those found in stock portfolio diversification. Companies can achieve their hedging objectives by using a variety of financial instruments such as forward agreements, futures contracts, options, and swaps (Bartram et al., 2011). Hedging reduces the risk of future price swings, which, if not managed properly, might harm a corporation (Horne and Wachowicz, 2012). According to research conducted on non-financial firms in 47 countries, adopting these financial instruments can help organizations minimize their total risk, which is common among those confronting interest rate, currency, and commodity price issues.

Globally, hedging is used as a tool to prevent market-associated risks. Foreign exchange risks, in particular, are shielded through hedging (Longe & Ayoola, 2019). Hedging is widely acknowledged as a risk management method.Businesses' decision to hedge is influenced by their size and the quantity of foreign currency debt, as seen in the example of Brazilian corporations (Rossi, 2007). Larger firms in the United Kingdom use more derivatives than medium and smaller firms, and public corporations use more derivatives than private organizations; international companies also use derivatives more frequently (Berghöfer & Lucey, 2014). However, in poorer countries, the use of derivatives as a risk-reduction technique is still controversial, and some governments, such as South Africa, limit derivatives to short-term contracts (Ramlall

2009). Hedging has been found to be positively related to business size and age in Mauritius, highlighting the importance of high fixed costs and knowledge in constructing a derivative framework (Abor, 2015). Similarly, in Ghana, most firms hedge against foreign exchange risk using over-the-counter foreign exchange forwards and hard currency swaps (Abor, 2015).

Locally, Kenya is significantly reliant on imports, making it an excellent market for hedging, especially for companies that offer corporate and institutional clients foreign exchange derivatives. As international trade expands, Kenyan businesses recognize the importance of investigating foreign exchange hedging techniques to mitigate currency risk. Managing foreign currency risk has become a vital aspect, as volatile rates can turn profits into losses when settling financing and purchase obligations in various hard currencies (Kiptisya, 2017). Although suitable institutions have been established in Kenya to support risk hedging in commercial banks, there is no statistical data showing the percentage of Kenyan enterprises that hedge against risk (Luo & Wang, 2018). Inflation is the most significant cause of financial risk in Kenya, and the country has recently experienced high levels of inflation (CBK, 2010). Kenyan businesses employ a variety of hedging strategies to manage these risks, but the impact of hedging on commercial bank performance in Kenya remains uncertain.

1.1.1. Financial Risk Hedging

Financial risk management is required to remove or minimize financial risk in financial institutions. Financial risk management is the process of managing risks that business operations in the markets are facing. Risk management in business is developing methods to mitigate uncertainty (Deng 2020). In financial sector, the financial risk management has been seen as the most important pillars in order to mitigate the risk and maximize the shareholders wealth. Eventually, financial risk management strategies that the financial sector applies are hedging which is an appropriate strategy to cap foreign exchange exposures and interest rate exposures. Hedging is an investment tool used to control and minimize the losses that can originate from the fluctuations of rates of foreign exchanges (Kelvin, 2010). It is used in the management and reduction of foreign exchanges risks through using derivatives (Pandey, 2015). The risk management of firms using hedging strategies contributes many advantages to the corporate firms such as when the firms make loss or the profit is low and hedging has been used, the shareholders will definitely know that there is poor management in the firm. Through hedging, managers concentrate on operation improvement hence they turn back to factors that are not in their hands (Steve and Chris, 2017).

According to Commer, Eckles, Hoyt, and Miller (2014), highly leveraged organizations in the United States hedge highly against financial risk, while growth-oriented firms were less likely to do so, owing to their low debt ratio. Survival of major, non-financial German enterprises is the primary goal of risk management, according to Henschel and Durst (2016). Yang, Ishtiaq, and Anwar (2018) observed significant differences in Swiss firms' foreign-exchange rate risk-management methods, particularly in the type of risk to control and the hedging instruments used. Financial risk hedging strategies in this study include futures, forwards, currency diversification swaps, and options.

A forward contract is a derivative instrument employed by financial organizations to mitigate financial risks. A forward contract is a legally binding agreement to purchase or sell commodities or exchange foreign currency at a certain future date and at a specified price or exchange rate (Kelvin, 2010). Forward contracts are becoming increasingly common in financial systems as a risk-mitigation strategy for variations in foreign currency rates and interest rate movements. Junttila, Pesonen, and Raatikainen (2018) found that forward contracts are ineffective at mitigating the volatility of foreign exchange prices when employed as hedging methods against FX risks. Rosemary (2016) established a positive relationship between forward contracts, currency bills, and the financial performance of non-financial enterprises listed on the NSE. According to Ahmed's (2014) research, advance contracts show a favorable correlation with enterprise value. Forward contracts were analyzed using the currency forward formula and the interest forward contract formula.

Future contracts are financial instruments meant to mitigate the risk of an upcoming event. Forward contracts grew faster than future contracts. A future contract is a legally binding agreement between two parties to buy or sell assets, commodities, or foreign currencies at a future price or exchange rate (Kelving, 2010). Future contracts are conventional agreements that stipulate the asset's quantity and quality, as well as the delivery time and location. The future contracts agreement binds both sides hence no one breach unlike the forward contracts. According to Torbira (2017) there is positive relationship between future contract hedging and interest rate while future contracts and foreign exchange rate related negatively.

Diversification of currencies is the use of many foreign currencies to adverse a risk that associated with one currency (Pandey, 2015). It was found that the diversification currency minimizes the risk that associated with foreign currency (Álvarez-Díeza, Alfaro-Cidb & Fernández-Blanco, 2016). Eventually the investor will use the one which has suitable exchange rate rather than going to the one that has high volatility. The commercial Banks use several currencies in order to minimize and control the fluctuation of exchange rate that can arise from one currency. The currency diversification risk hedging will be evaluated using the VaR and CVAR algorithms. Both are used to measure the Market risk and Basel Committee recommends using them (Harris & Shen, 2006). The currency diversification as hedging can reduce the financial risk that the commercial banks if the one currency is used than the risks that affect that currency can make the firm to incur loss or reduction of value of the firms is wise to maintain some currency diversification in a portfolio (Giraldo-Prieto, Uribe, Bermejo & Herrera, 2017). The Herfindehi-Hirschem index (HHI) is used in currency diversification to determine the market share of foreign currencies utilized by banks, and it is subsequently used to measure hedging activities.

Swaps are financial derivatives that are used to manage risk associated with banking institutions. It is primarily because swaps are so popular hence they provide opportunities to firms and individuals to exchange currencies based on debt obligations interest rates, products risk exposures and hedging preferences. Swaps create contracts used for risk management purposes (Dimitris, 2015). The swaps originated from USA and UK Companies in 1970s to Swap Dollars and pound by parallel companies to overcome exchange rates and impossibilities and barriers during that period. The previous purpose of the swap markets was to raise a cheap funds through using the comparative advantage concept. The EIB–TVA transaction in 1996, (Richard, 2010). The Banks use swaps for many ways to cap the risks the most popular they use is interest rate swaps, the larger banks that is with huge total and capital use more than the smaller banks, (Lyes, 2002). The interest rate swaps become most popular tool to manage the risk of interest rates from 1980s by the banks (Andrew, 2011).

1.1.2. Financial Performance

Firms' financial performance is critical, and every organization prepares, analyzes, and manages its resources to maximize shareholder wealth. Financial performance is described as an organization's capacity to meet financial goals (Brookes, Hargreaves, Lucas, & White, 2000). Firms' worth is established by their outcomes, therefore performance is measured using profitability ratios, efficiency ratios, return on equity, and return on assets.

Ratios are used to determine whether a business is expanding by producing a profit or shrinking due to losses. Businesses' profitability is defined by their return on investment (ROI) (Carbonneau, 2021). Calculating the ROI seeks to determine if the firm is on course to meet its objectives, with the primary goal of maximising shareholder wealth.

Ultimately, in order to satisfy shareholders, a business must generate profit. Profitability is the main goal of corporate firms and businesses worldwide. These firms allocate their resources to increase profits from their operations, with the output being the profit they earn. Some businesses prioritize profit without considering the welfare of their employees and society (Pandey, 2015).

A corporation's profitability indicates how effectively its resources are managed by management. Several indicators are used to analyze profitability, including return on equity (ROE) and return on assets (ROA) (Chege, 2016). Firm size, sales turnover, return on shareholders' investment, profitability index, and return on total assets are frequently used to measure profitability worldwide (Berger & Patti, 2002). Another measure is the return on investment, as highlighted by Olweny & Shipho (2011). Increasing shareholder wealth is the overall goal of every organization, and profitability may be measured in a variety of ways, including ROA and ROE.

A bank's primary goal is to make a profit, but it also serves other economic and social purposes. Quach (2005) proposes that three ratios are used to assess a bank's profitability. The first is return on equity (ROE), which compares a bank's profits to its shareholders' stock. A high ROE shows wealth maximization and bank stability, as well as the efficient use of shareholders' equity (Khrawish and Al-Sa'di, 2011).

The asset return ratio compares a bank's net income to its average total assets to determine its capacity to earn cash from those assets. Commercial banks achieve increased return on investment by effectively utilizing their available resources. A large net interest margin is indicative of profitability since it represents the difference between interest paid and interest received. But this could result in loan loss provision.

The commercial banks in Kenya have experienced rapid growth since the 2000s, with vertical improvements in their performance despite numerous challenges. The total net assets of commercial banks have increased due to aggressive deposit mobilization strategies and risk aversion during lending to borrowers (KBA, 2019). ROA has shown rapid growth, reaching 5% in 2012 but declining to 3% in 2017 (CBK, 2018). There was a slight increase in ROA in 2018, followed by a decline in 2019 (KBA, 2020). These details are presented in appendix III.

In 2009, ROE declined from 26% to 24.9%, but it increased in 2010 and 2011. The banking sector achieved the highest ROE of 31% in 2011. However, from 2012 to 2015, ROE decreased and reached 23.9% (CBK, 2015). ROE increased to 24.6% in 2016 but declined again to 20.8% in 2017. There was a recovery in 2018, with an ROE of 22.88%, but a decline occurred in 2019, with the banking sector recording 21.7% (KBA, 2020). The information on ROE of commercial banks is shown in appendix V.

1.1.3 Size of Commercial Banks

Commercial banks exhibit a range of sizes due to their divergent growth patterns following the implementation of an expansion plan in the 1990s. The size of banks determines their financial stability, which is divided into three categories: tier 1, tier 2, and tier 3 (CBK Report, 2017). This classification is based on the total value of banks' net assets, capital, consumer deposits, and capital reserves (Cytonn, 2018).

The bank's market share is shown by its total assets, which represent the bank's magnitude. The bank's significant market dominance makes these assets crucial in shaping the future direction of the market. According to the 2018 CBK Report, the bank's authority stems from its substantial deposits and ability to repay large loans. Commercial banks' financial success is evaluated in terms of market size and stability. According to Cytonn's (2018) findings, tier one banks provide the most superior financial performance, followed by tier two banks, and finally tier three banks, as shown in appendix IV.

### 1.1.4. Commercial Banks listed on the Kenyan National Stock Exchange

Commercial banks perform a variety of functions, including payment processing, issuing bank drafts and cheques, accepting fixed-term deposits, providing loans, protecting documents and valuables in safe deposit boxes, providing distribution or brokerage services, managing cash and treasury functions, and providing merchant banking and private equity financing. Historically, prominent commercial banks participated in underwriting bonds and enabling the trade of financial instruments, including shares and bonds (Geyer-Klingeberg, Hang & Rathgeber, 2019). The banking sector in Kenya is governed by a number of laws, including the Companies Act, the Banking Act, the Central Bank of Kenya Act, and several regulations and recommendations made by the Central Bank of Kenya (CBK).

In 1995, a decision was taken to deregulate the banking system, leading to the total elimination of exchange controls in the financial sector. In terms of size and development, Kenya is the most and largest developed in financial system in sub-Saharan Countries in African hence it has a significant Banking Sector. Banks, nonbanking financial institutions, microfinance institutions, and building societies are all regulated by the Kenyan central bank, which is known as the Bank of Kenya (James, 2010). In Kenya, banks take necessary position in the development of the society. They provide employments and loans to the investors. The economics of the Kenya strives from 1990s; this is because of the growth of commercial banks who connects the savers and investors (Kiemo, Olweny, Muturi & Mwangi, 2019). In past two decades the Kenyan commercial banks have grown hence the contributed economy through provisions of services such as loans for investors (Kenya Banking Industry, 2019).

The commercial banks that are registered by CBK are 44 while only 12 commercial banks are listed at NSE. This group of publicly traded Kenyan commercial banks has made a concerted effort over the last three years to expand their products to rural and urban areas with low income, people with no access to banking systems as well as small and medium enterprises hence It is believed that this decision was prompted and encouraged by the Steve competitions in the market shares which made the banks to expand their products to the needy personals and small enterprises through coming up products with low cost hence it increases market share and the profits of the banks (Richard, 2010).In this study only the listed commercial banks are used. This is due to their important role in the economy and their enormous market share. Their success affects enormous populations, including investors and the general public.

Commercial banks' performance over the last three years has been strong and quick, notwithstanding fluctuations in Return on Assets (ROA) and Return on Equity (ROE). The ROA increased between 2009 and 2012, but decreased between 2013 and 2019. The ROE decreased in 2009 but increased in 2010 and 2011. It decreased again in 2015 but showed slight improvements in 2016. However, it declined once more in 2017. In 2018 and 2019, the ROE followed a similar pattern to 2015 and 2016, showing both increases and declines. The graphs below show the ROA movements in past 12 years.

Figure 1.1: ROA Trend
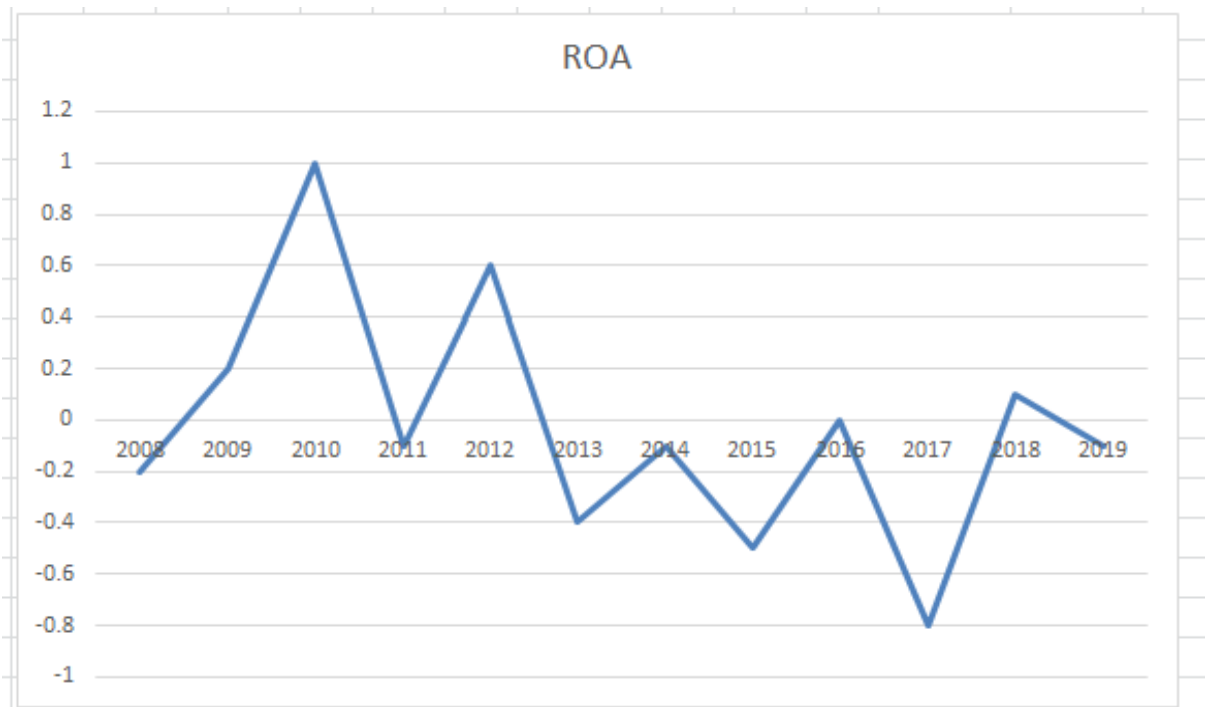
Source: Author

1.2 Statement of the Problem

Commercial banks in Kenya play an important role in the economy. Commercial bank growth is a measure of economic growth. Because of the large population served by commercial banks, their performance has a direct impact on the whole public. The decline of several banks in past years shown how banks directly affects businesses and public at large and trauma they create in the economy. Due to this the banks try to resist risk hence the daily operations of commercial banks involve taking risks and effectively managing them to achieve desired objectives (Kiio & Jagongo, 2017). Management is in charge of managing both internal and external risks that bring opportunities and hazards to their companies. The global financial crisis demonstrated the critical role that banks play in minimizing the risks that contribute to bank imbalances. Due to lack of effective hedging and the use of costly procedures to reduce these risks, commercial banks in Kenya are losing money (Murungi, Murage & Wanjau, 2014). The performance of commercial banks was not stable since 2009 as it recorded ROA of 3.5%, 2010 was 4.5% and 2012 reached up to 5% but in 2012, the ROA declined and eventually dropped to 3% in 2017. In the year 2018, the banking sector realized slight growth of 0.5% but in 2019 went back to the decelerating period as shown in figure 1.1.

Several research projects have been conducted to demonstrate the relationship between financial risk hedging and commercial bank financial performance; nevertheless, the outcomes of these studies have been in dispute with one another. Other studies failed to mention whether financial risk has any significant relationship or the direction of the relationship with performance. Karimunde (2009) studied financial risk hedging strategies and focused on identifying the common financial risk hedging strategies that are used in the banking sector and policies that are used for hedging financial risks. There was little association between commercial banks' financial success and their usage of financial risk management (Jenifer 2014). Anyango (2016) looked into the relationship between commercial banks' financial derivatives and financial performance and discovered no meaningful correlation.

Kiio and Jagongo (2017) performed research on the practices and performance of NSE-listed enterprises in terms of financial risk hedging. The researchers conducted a thorough analysis of the broader economy and observed a strong relationship between controlling foreign exchange risk by hedging and achieving positive financial outcomes. The study discovered no significant correlation between interest rate risk hedging and return on assets (ROA) or return on equity (ROE). Githinji (2016) conducted research to investigate the effect of bank deposits and liquidity risk on financial performance. However, there was no apparent link found between credit risk, capital management, and performance. The study on the impact of financial risk management on the financial performance of Kenyan commercial banks discovered that foreign exchange had no discernible effect on financial performance. Mauko (2016) investigated the effects of financial risk management on commercial banks. The findings revealed that financial risk management techniques implemented by commercial banks in Kenya had a significant impact on their financial performance. More particular, it was revealed that the effect of interest rate risk on profitability was minimal.

Muteti's (2014) study intended to determine the impact of financial risk management on bank overall performance. The findings found that there was no statistically significant link between risk management and commercial bank financial performance in Kenya. Shaofang and Metej (2014) investigated the use of financial derivatives and risk management in American banks. Their findings demonstrated a strong correlation between financial derivatives and systematic risk, notably for interest rate and foreign currency rate exposures. Pankaj Sinha and Saksh Sharma did a study in 2013 to look into the use of derivatives and its impact on total risks faced by Indian banks. A significant link between the two variables was discovered. Financial derivatives can help to manage systemic risks like foreign exchange and interes trates. The examined study had limitations because it was carried out in countries other than Kenya, such as India, the United States, and the United Kingdom. Furthermore, some of these studies used derivatives rather than financial risk hedging as the independent variable. This study aims to bridge research gaps by looking into the effect of financial risk hedging on the financial performance of Kenyan commercial banks.

1.3. Research Objectives

1.3.1 General Objective

The primary purpose of the study is to examine the influence of financial risk hedging on the financial performance of commercial banks listed on Kenya's Nairobi Securities Exchange.

1.3.2. Specific Objectives

The study's specific objectives are the following:

i)   Is to examine the impact of forward contracts on the financial performance of Kenyan commercial banks listed on the Nairobi Securities Exchange (NSE).

ii)   To assess the impact of future contracts on the financial performance of commercial banks listed on the Nairobi Securities Exchange in Kenya.

iii)   To evaluate the effects of currency diversity on the financial performance of Kenyan commercial banks listed on the Nairobi Securities Exchange.

iv)   To assess the effects of swaps on the financial performance of commercial banks listed on the Nairobi Securities Exchange in Kenya.

v)   To investigate the moderating effects of bank size on the connection between financial risk hedging and the financial performance of commercial banks listed on the Kenyan National Stock Exchange.

1.4 Research Hypothesis

The study tested the following hypotheses:

H_{01}: Forward contracts does not have significant effect on financial performance of commercial banks listed at NSE, Kenya.

H_{02}: Future contract does not have significant effect on financial performance of commercial banks listed at NSE, Kenya.

H_{03}: Currency diversification does no have significant effect on financial performance of commercial banks listed at NSE, Kenya.

H_{04}: Swaps do not have significant effect on financial performance of commercial banks listed at NSE, Kenya.

H_{05}: The size of a bank does not have a moderating effect on financial risk hedging and financial performance of commercial banks listed at NSE, Kenya.

1.5 Significance of the Study

The findings of this study will help top executives of Kenyan commercial banks. All commercial bank managers in Kenya will now have a greater understanding of financial risks. They are also better positioned to comprehend financial risk and how its management affects the financial performance of Kenyan commercial banks. The study's findings will also help commercial bank policymakers and central bank supervisors determine the success or failure of their policies and measures aimed at preventing financial risks, as well as the impact of these policies on clients' funds and financial performance, among other things. Understanding the impact of financial risks on financial performance enables bank financial risk managers to develop policies and solutions to improve their respective institutions' financial performance.

The research might be extremely beneficial to both the government and CBK. The CBK may use this data to decide if the CBK's risk management framework is acceptable, as well as how to strengthen the financial industry's systems in terms of policies for assessing the extent and gravity of financial threats. The study's findings could be a useful resource for the general public who want to learn more about the ramifications of financial risk hedging. Aside from that, the study may provide information that allows the government to adopt policy measures that assist the seamless creation, implementation, and hedging of financial institutions' risk management policies, among other things.

This study will help academics and researchers do additional research and obtain a better knowledge of financial risk hedging in Kenyan commercial banks. The goal of this research is to assess the present impact of financial risk hedging on commercial bank performance in Kenya. As a result, it offers important insights and information regarding the variables investigated in the study.

1.6 Scope of the Study

The study centered on commercial banks that are formally listed on the Nairobi Securities Exchange. The study investigated how commercial banks' financial performance corresponded with their use of risk-reduction methods. The study's primary focus was on the effect of forward contracts, future contracts, and currency fluctuations on Kenyan commercial banks' financial performance. Furthermore, the study investigated how bank size influenced the relationship between financial risk hedging and commercial bank financial performance. The study spanned five years, from 2017 to 2021. Over the course of five years, accurate and dependable information was acquired, and it was regarded reliable and satisfactory. During this period, commercial banks' asset and equity returns fell. The study focused on commercial banks listed on the Nairobi Securities Exchange. The secondary data was sourced from the NSE and commercial bank financial statements, which were accessed through the NSE and relevant institutions' official websites.

1.7 Limitation

Despite the fact that the researcher relied on data from audited financial statements, the accuracy and completeness of the secondary panel data utilized in the study could be limited by the quality of the data in the source papers. Data may be incomplete or inconsistent at times, and inaccuracies can have a negative impact on data quality.

The financial derivatives in Kenyan market is not developed hence it effects data collections because of data availability limitation which eventually consumes time and needs many authorities to requested from it hence it rises to the researcher to face many questions for authentications of his study. The findings of the study may also be affected by causality issues as it is limited to establish causality and other factors beyond those considered in the study, which may impact the relationship between the study variables.

1.8. Organization of the Study

The inquiry is broken into three major areas. The first chapter covers a number of components, including the investigation's background, an overview of the difficulties, the study's relevance, scope, limitations, and organization. The second phase of this research involved a thorough examination of existing literature, a practical analysis, and the creation of a conceptual framework to guide the research process. Chapter three gave a more extensive discussion of the research methodology. Chapter four reviews the collected data, including descriptive statistics, and performs a complete analysis that includes both correlational and regression analysis. Chapter 5 offers the overview, conclusion, and suggestions.

2.   LITERATURE REVIEW

2.1. Introduction.

The relevant literature for the topic is reviewed in this chapter. It consists of a conceptual framework, actual data, and a theoretical review. All of this is covered in detail, and the ideas are contrasted with the research that is underway

2.2 Theoretical Review

Theoretical discusses the theories that underpin the research; it provides context for the investigation, such as how independent and dependent variables connect to one another. The theories examined in the paper include agency theory, profit maximization theory, and enterprise risk management.

2.2.1. Modern Portfolio Theory

Markowitz developed modern portfolio theory in 1952. Its primary goal is to explain to investors the relationship between return and risk in investments. The theory aims to maximize financial returns while minimizing risks through risk management methods and formulas for calculating returns. Fundamentally, the theory places significant emphasis on the inherent trade-off between returns and risks. Investors, who are cautious about taking risks, aim to maximize the returns on their portfolios while limiting potential dangers that could affect their invested assets.

The modern portfolio theory serves as the foundation for other theories used to determine portfolio returns and associated risks. Numerous scholars have developed various theories, tools, and methods to manage, identify, and analyse risks. These theories provide support for the contemporary portfolio theory. Jack coined the term "Market Value of Risk Asset" in 1962, with an emphasis on the portfolio's market value and associated risks. This concept aligns with the MPT theory, assuming that Jack's comparison of market value and risks holds true. In 1965, Sharp modified the MPT and introduced the Capital Asset Pricing Theory (CAPM). Sharp included risk-free rates of returns alongside other rates of returns with risks. The CAPM theory assumes the existence of risk-free rate of return and, in 1972, Ross expanded on this concept in her working paper, proposing the Arbitrage Pricing Theory (APT). APT is derived from CAPM, making the capital asset pricing model an offspring of the MPT. Ross described the occurrence of arbitrage in asset pricing, anticipating that it would gradually decline as market mechanisms adjusted.

The Modern portfolio theory asserts that asset returns follow a normal distribution in the market, indicating that no person can achieve higher returns. Additionally, it presupposes that investors possess rationality and actively steer clear of avoidable dangers. Investors dedicate substantial effort to optimize the returns on their investments. The hypothesis posits that all investors possess equitable access to market information. Nevertheless, the current portfolio theory is not without its limitations. It fails to take into account transaction expenses or fluctuations in market conditions. Moreover, it depends on historical performance to estimate future pricing, which may not reliably forecast future performance.

The modern portfolio theory calculates investment returns, thereby linking the financial performance of investments with the associated financial risks. It has become a vital tool for analysing and managing market risks, aiming to enhance the value of investments through value maximization for firms.

2.2.2 Profit Maximization Theory

The origin of the idea of profit maximization can be attributed to Adam Smith's book "The Wealth of Nations," which was released in 1776 (Thomas, 2012). According to Smith, corporate entities and firms operate in their own self-interest to maximize profits and increase their value. The benefit of this pursuit extends to society as a whole. Organizations strive to achieve their goals through profitability, creativity, and resource utilization. They invest in goods and/or services, subsequently selling or offering them to customers in order to generate profits. The success of a company depends on its

ability to generate income, as revenue is essential for future profitability and the replacement of existing assets (Thomas, 2012).

The motivation behind financial risk management, as per the profit maximization theory, is primarily driven by the long-term objective of maximizing an organization's revenues. The ultimate goal is to establish a sustainable competitive advantage (Gerhart, 2017). This perspective suggests that increasing productivity and performance in an organization serves the purpose of profitability and, by extension, profit maximization. Productivity and performance indicators include revenue generation, innovation, and the ability to provide services (Gerhart, 2017).

The profit maximization theory is incredibly essential since it connects the study's dependent and independent variables. Risk hedging tries to increase investment profits, eventually leading to wealth maximization. Every organization strives to maximize profits for its own benefit, thereby improving its market position while fulfilling its mandates and obligations (Thomas, 2012). State corporations endeavour to fulfil their mandates through income generation, innovation, improved service delivery, and the conversion of resources into goods and/or services that can be sold to customers for a profit. The performance and productivity of firms are determined by the revenue generated, but it is crucial that these revenues are reinvested in the company to enhance innovation and service delivery (Gerhart, 2017).

2.2.3 Enterprises Risk Management Theory

The theory of Enterprise Risk Management (ERM) has become a crucial tool adopted by many businesses to effectively manage risks. The need for ERM has grown significantly over the last 20 years as a result of the increased focus on risk management. Gates (2006) suggests that ERM helps businesses operating in high-risk markets to minimize risks and improve performance. Risk management can be approached in two ways: partial or comprehensive. An enterprise risk management process involves addressing numerous threats simultaneously (ERM). Tseng (2007) defines ERM as a continuous and systematic technique for managing multiple hazards faced by corporations. According to Gordon et al. (2009), ERM is a strategy that involves analyzing, monitoring, and recognizing hazards that hinder a company's objective achievement. ERM can be implemented at all levels within a company's hierarchy.

ERM takes into account a variety of risk management strategies employed by a company's risk manager, including intellectual assets, personnel, brand values, skills, business expertise, the regulatory environment, and the primary source of profit (Searle 2008). To remain in operation, businesses must strike a balance between meeting stakeholder expectations and managing risks. Risk is consistently monitored, and the risk manager is prepared to adjust strategies as necessary to maintain risks within acceptable limits. The concept of ERM reinforces the significance of risk management and highlights its practical application in eliminating risks within business environments.

2.2.4. Capital Asset Pricing Model

The conclusions of portfolio theory are inextricably linked to the concept of risk. Sharpe and Lintner created the Capital Asset Pricing Model (CAPM) in 1964, which was later modified by Black in 1972. It is a simplified version of Markowitz's model (1952), which helped to build the risk-reward framework. According to Markowitz's model, the number of optimal portfolios is equal to the number of risk preferences exhibited by investors. Ideally, efficient portfolios should lie close to the mean-variance investment frontiers, where additional risk is required to achieve higher returns (Gossy, 2008). The CAPM takes this idea further by introducing a state of equilibrium. It posits that all investors, regardless of individual risk preferences, will hold the same efficient portfolio (the market portfolio) in pursuit of high returns. Consequently, the CAPM can estimate the market price of risk for a specific asset and provide an acceptable risk measure (Gossy, 2008).

Over time, finance scholars have discovered anomalies in the CAPM, leading to debates about its applicability in the strategic management field. One such contribution came from Bettis (1983), who identified points of contention between

finance and strategic management regarding the role of risk. Bettis highlights the impact of the CAPM on strategic management, particularly in the context of corporate risk management. He suggests an alternative perspective, arguing that business risks are connected to a firm's resources, competencies, and environmental operations. In contrast to the CAPM's recommendation, Bettis proposes that businesses should focus on specific risks they encounter in the market. He emphasizes the need for efficient portfolios that maximize returns while minimizing risk in order to implement Enterprise Risk Management (ERM) effectively.

2.3 Empirical Review

Under this topic the previous studies that are relevant to financial risk hedging and financial performance are provided in order to present empirical evidence.

2.3.1 Forward Contract and Financial Performance

Onchari, Moabe, and Onwonga (2020) investigated the relationship between forward contracts and the financial performance of publicly traded multinational corporations in Kenya. The study employed a descriptive cross-sectional methodology, concentrating on nine businesses in the energy and banking sectors. Three firms were specifically chosen from this group to serve as the study's sample. The inquiry gathered data from preexisting sources spanning the time frame of 2009 to 2018. The major findings underscored the substantial influence of forward contracts on the financial performance of businesses, underscoring their significance for market participants in managing future price fluctuations. This study focuses primarily on commercial banks listed on the NSE, which allows for a more diverse target and sample size than earlier studies on international firms. It is crucial to underline the distinction.

Miller and Podwol (2020) investigated the relationship between forward contracts, market structures, and the effect of mergers on welfare. The inquiry analyzed the relationship between mergers and their impact on the economy within wide-ranging market frameworks. The study determined that forward Contracts are essential for regulating market controland mitigating the effects of fluctuations in output levels on profitability. Furthermore, Vargas and Kessakorn (2013) carried out a study comparing forward contracts and options as strategies to reduce currency risk in globally diversified portfolios. Their research specifically examined U.S.-based investors and concluded that the utilization of currency futures for static hedging did not improve the overall performance of portfolios held by U.S. investors who had investments in other major nations. It is noteworthy that although previous investigations were undertaken in the United States, the present research was conducted in Kenya.

Khakhar and Mittal (2015) conducted research on the role of hedging in risk management, with a focus on assessing the effectiveness of forward contracts in controlling foreign exchange risk in specific Indian enterprises. The study encompassed the timeframe of 2013 to 2014 and collected data from secondary sources, comprising a total of 100 entities. The results showed that companies widely employed forward contracts because of their capacity to effectively reduce foreign exchange rate risks. Contrastingly, the present investigation was carried out in Kenya, spanning from 2009 to 2019, with the aim of producing more reliable and consistent findings compared to the shorter timeframe of Khakhar and Mittal's study.

Yin and Han (2011) assessed the benefits and drawbacks of using forward contracts to hedge foreign portfolios. Their objective was to determine the circumstances under which forward contracts should be preferred over alternative strategies. The study demonstrated that leveraging future contracts can outperform the use of protective puts for foreign exchange hedging. It also highlighted the efficiency of forward contracts, recommending their primary use for hedging purposes. Similarly, Hasan (2015) studied how importer companies reduce importing costs by hedging foreign exchange risks using forward contracts and floating procedures. The study focused on international online retail stores and employed secondary data. Data analysis was conducted using Pearson chi-squared tests. The research revealed that using futures contracts to hedge foreign exchange risk resulted in lower daily transaction expenses. While the original study was

conducted in China and may not be directly applicable to the Kenyan market, the current research was conducted in Kenya.

2.3.2. Future Contracts and Financial Performance

Bin and Wen (2014) investigated the impact of introducing new futures contracts on the Chinese futures market. After two decades of growth, China's futures market has matured. It is crucial to evaluate the potential impact of new futures contracts on the existing ones. Investors in the futures market closely monitor future price volatility, as it is a critical factor in setting futures contracts. This study looks at how recently announced futures categories affect the volatility of existing contracts. The study focuses on eight different kinds of metal futures traded on the Shanghai Futures Exchange. The findings show that introducing more futures contracts into the market reduces the price volatility of existing contracts. It is critical to note that this study was conducted in the Asian market and cannot accurately predict the scenario in the Kenyan market; nonetheless, this study will be conducted in Kenya.

Yilgor and Mebounou (2016) investigated the effect of futures contracts on stock market volatility, focusing on persons linked with the Istanbul stock exchange. The purpose of this study was to examine the role of derivatives in mitigating risks associated with price volatility, interest rate variations, and foreign exchange rate changes as a result of deregulation and financial liberalization. Given the close relationship between derivatives markets and spot markets, experts must conduct a thorough analysis of the impact of derivatives on spot pricing changes. This study looked at how futures contracts affected the volatility and liquidity of the spot market between January 2001 and December 2014.

The investigation used the EGARCH and ARMA models to investigate the relationship between futures contracts and changes in spot market conditions and liquidity. According to the data, participating in futures trading reduces the volatility of the spot market while having no effect on the trading volume of the spot market. Unexpected swings in future trading volume increase spot market volatility, but expected future trading volume has little effect on spot market volatility. The first study was conducted in Turkey, but this one was undertaken in Kenya.

Pok and Poshakwale undertook a study in 2004 to assess the impact of futures contracts on spot market volatility, with a focus on the Kuala Lumpur Stock Exchange. The purpose of this study was to look at how recently added futures contracts affected the volatility of spot markets in established and highly liquid marketplaces. The study aimed to investigate the impact of futures trading on spot market volatility by collecting data from both underlying and non-underlying companies in Malaysia's stock market. According to the findings, participating in futures trading in the spot market can have a positive impact on market volatility, notably the behavior of underlying equities in response to present conditions.

The study also looked into the relationship between futures trading activity and spot market hazards. The VAR analysis reveals a transient but favorable relationship between futures trading activity and market volatility over a single day. The Granger causality test gives factual support for the claim. The inquiry took place in Kenya, and the study was conducted in Malaysia.

Islam and Chakraborti (2015) conducted a study on the use of futures and forward contracts as instruments for mitigating risk. Effective risk management is essential in today's volatile corporate landscape. Derivatives, including as futures and forward contracts, have been implemented as crucial instruments in financial advancements for the effective management of asset risks. Derivatives are effective methods for mitigating uncertainty and volatility related to underlying assets. This study especially examines futures and forward contracts, which are the predominant types of derivatives utilized in financial markets. They can be used to mitigate the consequences of price volatility in a wide range of financial assets, including stocks, fixed income instruments, commodities, currencies, interest rates, and market benchmarks. It is worth noting that the study was carried out abroad, although the current study was only completed in Kenya.

2.3.3 Diversification of Currency and Financial Performance

The study done by Pedrono (2017) aimed to investigate the correlation between financial volatility, currency diversity, and banking stability. The balance sheets of European global banks are significantly influenced by the US and Eurozone financial markets as a result of the global financial cycle. This paper provides an overview of the benefits of the global framework and highlights the specific conditions under which exposure to the foreign market helps to establish financial stability. The study commences by establishing a theoretical framework to elucidate the interplay of asset returns, funding costs, and currency rates in the context of bank stock volatility. It efficiently diversifies banks' balance sheets through the decomposition of each hedging method to reduce equity volatility. The current study employs the DCC-GARCH model to calculate and visually depict the fluctuations of the financial markets in the United States and Eurozone from 2000 to 2015. This research involves studying the conditional correlations between asset returns, funding costs, and volatility in exchange rates. The findings suggest that the existence of foreign currency exposure helps to reduce market volatility, especially during major financial crises such as the 2008 crisis. The inclusion of the currency component in a bank's balance sheet, along with the Basel III regulatory framework, provides a possible regulatory mechanism to strengthen bank resilience and understand the impact of foreign exposure on financial stability. This study specifically investigated the impact of currency diversification on financial volatility in the banking sectors of Europe and the United States. In contrast, the current study examined the relationship between currency diversity as a risk mitigation technique and commercial bank profitability in Kenya.

Maurer and Valiani (2007) conducted research on currency futures and currency options, specifically investigating the efficiency and effectiveness of different hedge strategies for managing currency risk in globally diversified mixed asset portfolios. The study examines the use of currency futures and currency options as hedging strategies. Data from the stock and bond markets of the United Kingdom, Germany, Japan, Switzerland, and the United States from January 1985 to December 2002 were examined for potential manipulation. This report includes the viewpoint of a German investor. The inclusion of options inside a portfolio presents difficulties for the conventional mean-variance method used in portfolio optimization, primarily due to the pronounced dispersion of returns associated with options. In order to tackle this matter, a mean-LPM model is employed. Furthermore, an examination is conducted on currency trends in order to ascertain the presence of a correlation between the temporal patterns of currency fluctuations and the prospective benefits derived from risk management strategies. This study looks at the association between currency diversity, a risk-mitigation technique, and commercial bank performance in Kenya. It differs from a prior study that looked at the effects of currency diversification on financial volatility in the European and American banking sectors.

Gnangnon (2021) conducted a study to investigate the relationship between currency rates and the diversification of services exports. The primary goal of this research was to investigate the relationship between currency rates and the diversification of service exports. The study used Generalized Methods of Moments (GMM) approaches to evaluate a sample of 125 nations from 1985 to 2014. The two-step Generalized Method of Moments (GMM) technique was used.

The findings indicate that when the actual exchange rate falls, the diversity of service exports and the total number of service export lines increase in both high- and low-income countries. The findings emphasize the critical relevance of implementing appropriate real exchange rate strategies to promote the diversification of service exports across income levels.

It is crucial to acknowledge that this study encompassed a substantial number of countries, including developing nations, which may have altered the results due to disparities in market development. Conversely, the research conducted in Kenya had a specific emphasis on the banking industry.

Mwamba, Weirstrass, Djemo, and Raoul (2019) looked into how swings in foreign exchange rates effect a South African entrepreneur's business earnings while diversifying their overseas stock portfolio. The study quantified risk using the

Value at Risk (VaR) model, which is based on the GJR-GARCH distribution. Data from 10 emerging stock markets were reviewed from January 1, 2000 to March 6, 2019, to draw conclusions about how fluctuations in foreign currency rates affect the returns of a South African investor's firm.

2.3.4 Swaps and Financial Performance

In their 2010 study, Lorenzo and Cheng examined the effects of FX swaps on global financial stability and economy. The study demonstrated that foreign exchange swaps exert a substantial influence on both financial stability and the global economy, specifically within the banking industry as instruments for hedging and facilitating cross-border transactions. Nonetheless, the study did not provide precise details about the methodology used to demonstrate the association between foreign exchange swaps and financial stability. The current study aims to evaluate the impact of swaps on financial stability by employing rigorous research models that provide comprehensive insights within a global context.

Torbira and Joshua (2016) looked into how financial derivatives affected the performance of both financial and non-financial businesses. The study ran from 2005 to 2014. The study aimed to assess the relationship between hedging activities and two financial indicators: Return on Assets (ROA) and Capital Employed. The study sought to investigate the effects of various financial derivatives on key performance indicators. To establish the association, researchers used a panel least squares regression model. The study's findings demonstrated a significant relationship between financial derivatives and performance, even though no explicit link was discovered in swaps. The first study was conducted within the boundaries of the United Kingdom, but the present study was undertaken in Kenya.

2.3.5 Bank Size, Risk Hedging and Financial Performance

Nelly, Ambrose, and George undertook a 2019 study to investigate how bank size and trust in financial risk affect the financial performance of Kenyan commercial banks. The research findings, which were published in the Journal of Banking and Finance, shed insight on the relationship between these characteristics and the impact of macroeconomic conditions on bank performance. The study examined data from a broad sample of 43 commercial banks in Kenya using both a descriptive and a positivist methodology. Data were acquired from the Kenya Bankers Association and the Central Bank of Kenya, spanning 2009 to 2015. The relationship between variables was studied using the statistical software STATA, which took into consideration the panel data format and performed diagnostic tests. The study's findings show that banks' size has a substantial impact on their financial performance. Furthermore, the research focuses on Kenya's average asset return, which is comparable to that of Sub-Saharan Africa.

In a recent study, Muiru (2019) examined the hedging techniques used by publicly traded Kenyan companies to manage foreign exchange risk. The study investigated the effects of firm characteristics, corporate governance, and financial performance on these strategies. The research strategy included a combination of longitudinal and cross-sectional methods, including transaction cost theory, financial economic theory of risk management, international fisher effect theory, and purchasing power parity theory. The study examined the whole sample of 54 firms that had a regular presence on the Nairobi Securities Exchange between 2011 and 2016. The analysis made use of both primary data from cross-sectional studies and secondary panel data. The study used descriptive and inferential statistics with STATA software to examine the impact of hedging tactics, firm characteristics, and corporate governance on financial performance. The study discovered that the combined impact of these factors outweighed the effect of implementing currency risk hedging measures alone.

Muriithi (2016) investigated the effect of financial risk on the financial performance of Kenyan commercial banks. The study primarily focuses on the 43 commercial banks regulated by Kenya's Central Bank as of December 2014. The analysis relied on Time Series Cross Sectional Unbalanced Secondary Panel data obtained from a range of sources, including the Central Bank of Kenya, the Kenya Banking Survey, and commercial banks' publicly available financial statements and accounts. The data covers ten years, from 2005 to 2014. To address constant, unobservable firm-specific

factors and mitigate endogeneity difficulties, the study included financial ratio analysis and panel data methodologies such as random effects estimation, fixed effects estimation, and the generalized method of moments (GMM). The study investigated the relationships between variables using a number of statistical methods, including pairwise correlation analysis, the R2 coefficient of determination, and the Wald and F-tests. According to the test results, the fixed effects model outperformed the pooled OLS model. Furthermore, the tests showed that the random effects model is reliable. The findings indicated that credit, market, liquidity, and operational risks all had a significant negative influence on return on equity (ROE). Furthermore, the analysis identified the specific financial risk indicators that had the greatest impact on the cost-to-income ratio, hence altering the companies' overall financial performance.

2.4 Summary of Literature and Knowledge Gaps

Table 2.1 Summary of the reviewed studies with gaps.

Author & year	Study	Finding	Gap	Focus of present study
Gnangnon (2021)	exchange rate and services export diversification	Real exchange rate depreciations encourage service export diversification and enhance the total amount of services exported by both high-income and low-income countries.	This study Focused on service export diversification how it can reduce exchange volatility in more than 125 countries	This study will use currency diversification in commercial banks and how it hedges risks that banks will face
Onchari *et al.* (2020)	an evaluation of forward contracts and their link with financial performance of Kenyan listed Multinationals	forward contracts and directly and significantly linked with financial performance of an entity.	The study covered how forward contracts affects the performance of Kenyan listed multinationals firms	This study will look at how financial risk hedging, such as forward contracts and futures, may affect the financial performance of commercial banks listed on NSE.
Miller and Podwol (2020)	link between forward contracts, structures of the markets and welfare outcomes arising from mergers	forward contract ensures there is a discipline in use of market power since it ensure that profit has less sensitivity to variation in level of output	This study focused on market structure and how forward contracts might affect the profit of the firm in the market share without mergers and merges; hence, the study examined the association between the forward contract in the market power of the company and its profit.	This study focused on risk hedging and financial performance, hence forward contracts are used to measure hedging and financial performance of banks.

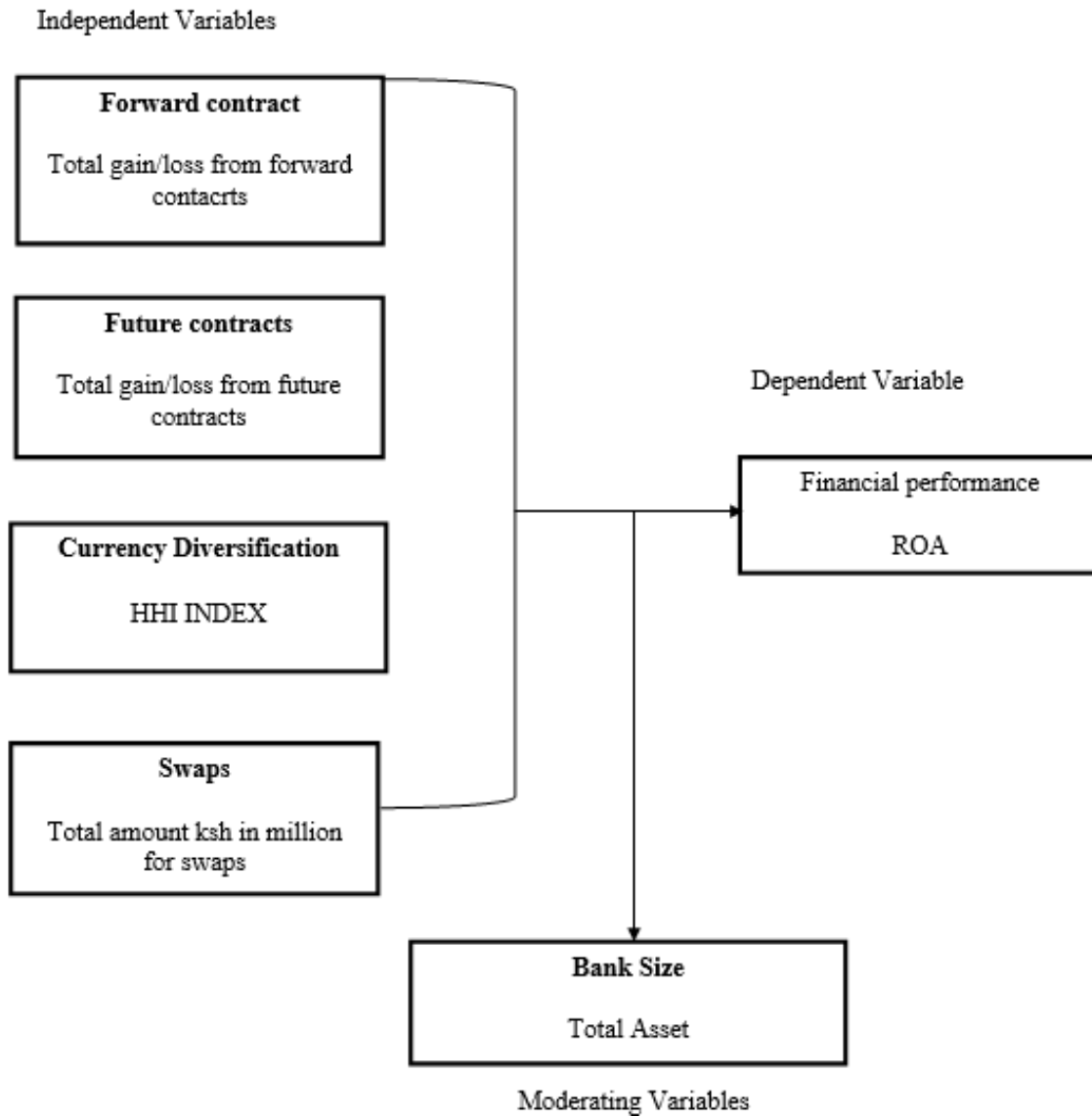|				
Mwamba et al. (2019)	exchange rate risk and international equity portfolio diversification: A South African investor's perspective	When employing the variance-covariance technique, exchange rate risk is underestimated since the swing movement of currency is not captured in the minimum-value at risk optimization.	The study used the Value at risk model to compute the FX rate risk and performance of south African investors portfolio.	This study uses the regression model to measure the effects of financial risk hedging on financial performance of commercial banks listed at NSE.
Nelly, Ambrose and George (2019)	The bank size and financial risk exposure on financial performance of commercial banks	The bank size has a significant relationship impact on financial performance.	Bank size was examined alongside financial risk exposure	Bank size was examined alongside financial risk hedging
Muiru (2019)	Hedging approaches for foreign exchange risk, specific firm characteristics, corporate governance, and financial performance of listed companies in Kenya	Hedging strategies, company specific characteristics, and corporate governance had a combined influence on financial performance that was bigger than exchange risk effect hedging techniques.	The study focused on foreign exchange risk hedging independent variables to measure the financial performance. Also the study targets the general specific factors and good governance as mediators	Bank size was specifically considered as a firm specific factor in the study hence the independent variables carries specific hedging instruments such as forward, future, swaps and currency diversifications
Pedrono (2017)	financial volatility, currency diversification and banking stability	Even in times of severe financial turmoil, such as 2008, foreign currency exposure minimizes equities volatility.	This study is emphasis the currency diversification exposure and effects it has on volatility also this is done outside Kenya	This study focused on currency diversity as a hedging tool and how it affects the financial performance of commercial banks in Kenya; hence, performance is measured using ROA.

Muriithi (2016)	Effect of financial risk on Commercial Banks in kenya	Return on equity is positively significant to credit, market, liquidity, and operational risks.	The study focused on financial risk that banks faces and used market risk, credit, liquidity and operation risk to determine their effects on financial performance.	This study will employ forward, future, swaps, and currency diversification as hedging methods to investigate how risk hedging affects the financial performance of commercial banks listed on the NSE.
Yilgor and Mebounou (2016)	Impact of futures contracts on stock market volatility In Turkey	Derivatives markets lower spot market volatility while having no substantial impact on spot market volume.	This study was conducted in Turkey hence it derivatives hedging against the spot market volatility	This study was carried out in Kenya, hence derivatives such as future and forward hedging will be used against the performance of commercial banks listed on the NSE.
Islam and Chakraborti (2015)	Future and forward contract as risk hedging are vital options	Derivatives are a good way to deal with the risk that comes with uncertainty and volatility in the underlying assets.	The study was looking for future and forward contract as risk management instruments and not whether they have influence on financial performance of entities.	This study will research on how financial risk hedging using instruments such forward and future and effect they have on financial performance of commercial banks in Kenya
Mittal *et al.* (2015)	Hedging and the role it plays in risk managements	The study discovered company regularly used forward contracts due to the strength they provide in terms of total risk coming from the volatility of FX rates.	This research was studying The FX volatility and forward contract and found that the forward contract has ability to reduce the risks of FX	This study will look for financial risks not only FX and how the hedging will affect the financial performance of Banks in Kenya

Hasan (2015)	How importer companies cut importing costs by hedging against currency risk with forwards and floating procedures.	Forward contracts were used to hedge FX hence it resulted delay transactions	The study focused on Forex risk exposure	Financial risk hedging was the main focus of the present study.
Kroencke, Schindler and Schrimpf (2014)	international diversification benefits with foreign exchange investment styles	In terms of second and third order stochastic dominance, multinational portfolios supplemented by FX investment approaches outperform.	This study focuses on diversification of portfolio internationally against FX Exposures	This study focuses on currency diversification as hedging of financial risk and was done in Kenya
Vargas and Kessakorn (2013)	comparison of the forward against options in consideration of the need to hedge for currency risk in the internationally established portfolio	to management of risks through forward contract don't improve investors portfolio performance.	The study focused the effectives of currency hedging of forward and option in international portfolio using Chinese Yuan and Indian Currency	This study analysis the financial risk hedging using some of hedging tools such as forward, future, swaps and currency diversifications and financial performance in Kenyan banks
Maurer and Valiani (2007)	currency forwards versus currency options for hedging exchange rate risk in international portfolio diversification	When options are incorporated, the usual mean-variance framework for portfolio optimization is dubious due to the extremely skewed return distributions of options.	This study was carried in Germany	The present study was done in Kenya
Pok and Poshakwale (2004)	The impact of futures contracts on spot market volatility	The study found that the future contracts affects the underlying stock than the non-underlying stock in spot market	The research focused on future contract as risky hedging and spot market volatility that is stock market in malazia	Commercial banks listed at NSE was the focus of the present study

2.5 Conceptual Framework

The framework concept is critical to the study since it gives structure, direction, and recommendations for the study's objectives, resulting in predictable and consistent results. A succinct explication is a brief and scholarly description of a phenomenon that is supported by a visual picture of the major components at work (Mugenda, 2018). The conceptual

framework of this study describes the relationship between the independent variable, financial risk hedging, and the dependent variable, Return on Assets (ROA). Financial risk hedging comprises reducing the risks associated with forward and future contracts, currency diversification, and swaps. The variables listed above will be assessed and examined to identify their impact on the dependent variable (ROA).

Independent Variables

Forward contract

Total gain/loss from forward contacrts

Future contracts

Total gain/loss from future contracts

Dependent Variable

Currency Diversification

HHI INDEX

Financial performance

ROA

Swaps

Total amount ksh in million for swaps

Bank Size

Total Asset

Moderating Variables

Source: Author

3. RESEARCH METHODOLOGY

3.1 Introduction

The methods employed in the study is covered in detail in this chapter. Data collection techniques, data analysis frameworks, and ethical considerations for research are just a few of the components that make up the study design process.

3.2. Research Philosophy

A research philosophy denotes a collection of convictions pertaining to the gathering, examination, and utilization of evidence on a specific subject (Pranas & Regina, 2014). It serves as the foundational framework for a study and guides the selection of research questions. In this investigation, the positivist research philosophy was adopted due to its

relevance in shaping the strategy, problem formulation, data collection, processing, and analysis. According to the positivism theory, knowledge should be objective and independent of the researcher's values and opinions (Philips & Barbules, 2000). In positivism, the researcher's personal thoughts and beliefs are not considered part of the scientific inquiry. Positivism represents a philosophical approach to inquiry that is based on principles such as phenomenalism, reductivism, objectivity, and inductivism, among others (Bryeman, 2008).

3.3 Research Design

The study design specifies the criteria under which data is collected and evaluated, with the goal of achieving a balance between relevance to the research purpose and research process efficiency (Kother and Garg, 2019). It functions as a structure for strategizing, coordinating, and carrying out the research procedure, allowing the researcher to operate with greater efficiency. Various study designs exist, each fulfilling its distinct function. This study utilized explanatory research to investigate the underlying reasons for the interactions among the variables under consideration. Explanatory research provides the advantage of being adaptable in the formulation of hypotheses (Tasfeya, 2018). Explanatory variables were developed to establish causal relationships and/or effect links between different variables, and the design is well-organized. This makes it possible to analyze how the explanatory variable and its predicted effect on the dependent variable function together. The study examined the connection between financial risk hedging and financial performance using a cross-sectional methodology and a descriptive correlational approach. Using a descriptive research design, the researcher carried out a comprehensive investigation into the impact of financial risk hedging on financial performance. To assess the formulated hypotheses, a correlation design was necessary. The researcher gathered data from various publicly traded commercial banks in Kenya, employing a cross-sectional methodology simultaneously.

3.4 Empirical Model

The study employed a panel data regression model to evaluate the association between financial risk hedging and the financial performance of commercial banks listed on the National Stock Exchange (NSE). Multiple regression models, according to Kothari and Garg (2019), are helpful in situations where there are a lot of variables.

3.4.1 $ROA_{it}=\alpha+\beta_1 F_{it}+\beta_2 F_{it}+\beta_3 CD_{it}+\beta_4+\varepsilon$

Where;

ROA= Return on Asset

α= Constant term

$\beta_1, \beta_2, \beta_3, \beta_4$ = are coefficient of independent variables

ε= Error Term

F= Forward contract

F= future contract

CD= Currency diversifications

3.4.1 Moderating Effects Model

Whisman and McClland (2005) devised two methodologies that were used to investigate the link between financial risk hedging and the financial performance of commercial banks listed on the National Stock Exchange of the United Kingdom (NSE).

Approach one

3.4.3 $ROA_{it} = \alpha + \beta_1 F_{it} + \beta_2 F_{it} + \beta_3 CD_{it} + \beta_4 BZ + \varepsilon$

Approach Two

3.4.5 $ROA_{it} = \alpha + \beta_1 F_{it} + \beta_2 F_{it} + \beta_3 CD_{it} + \beta_4 BZ + \varepsilon + \beta_5(F_{it}*BZ) + \beta_6(F_{it}*BZ) + \beta_7(CD*BZ) + \varepsilon$

Where

BZ= Bank Size

F*BZ= Interaction Between Forward Contract and Bank Size

F*BZ= interaction between Future contract and Bank Size

CD*BZ= interaction between Currency diversification and Bank size

Table 3.1 The table shows how the moderator, represented by bank size, affects the link between financial risk hedging and the financial performance of NSE-listed commercial banks.

Table 3.1: Operationalization of Moderating Variable

Analysis	Outcome	Decision
Step1	Significant coefficient of bank size	Bank size is explanatory variable
Equation 3:4:3 & 3.4.4		
Bank Size as an Explanatory		
Variables	Insignificant coefficient of bank size	The correlation between risk management strategies and financial performance is contingent upon the size of a commercial bank.
Step2		
equation 3:4:5&3:4:6		
Bank Size as Moderator Variables	Significant coefficient of bank size	The relationship between total commercial bank financial performance and financial risk management is influenced by a bank's size.
	Insignificant coefficient of bank size	Regardless of the size of the bank, there is a constant correlation between financial risk mitigation strategies and the financial success of commercial banks.
	Significant coefficient of Interaction	Bank Size is a moderator
	Insignificant coefficient of Interaction	A moderator is not bank size.
	FRH*Banksize	

Source: Researcher (2023)

Where

FRH= Financial Risk hedging

3.5. Measurement and operationalization of research variables

Table 3.1 Shows a list of study variables, definitions, and measurements.

Table 3.2: Quantitative Analysis of Variables

Category	Variable	Operationalization	Measurement	Scale of measurement	Hypothesized Direction
Dependent	Performance of Commercial banks	ROA	EBIT/Total Asset Income/Total Shareholder's equity	Ratio	Positive/ Negative
Independent	Forward contract	Total gain/loss from forward contract	Natural logarithm of total gain/loss from forward contract	Ratios	Positive/ Negative
Independent	Future contract	Total gain/loss from future contract	Natural logarithm of total gain/loss from future contract	Ratios	Positive/ Negative
Independent	Diversification of currencies	Foreign exchange rate	HHI INDEX	Ratios	Positive/ Negative
Independent	Swaps	Total amount Ksh Millions	Natural Logarithm of Total ksh Millions	Ratios	Positive/ Negative

3.6 Target Population

The things or items of interest to the research groups constitute the target population, according to Saunders, Lewis, and Thornhill (2009). Twelve commercial banks with Kenyan Central Bank licenses and NSE registrations served as the samples.

3.7 Sampling Design and Techniques

It is an organized plan for acquiring samples from target population also known as sampling design (Kothari & Garg, 2019). The sampling design techniques are plans of selecting units to study from the target population that has same characteristics. In research, it is sometimes not possible to study the whole population, for saving time and money the researcher must select specific units from the target population. Because of the magnitude of the target population in this study, a census method will be used. Census is a circumstance in which the entire population can be studied (Mohsin, 2016).

3.8 Data Collection

Data collection entails a systematic technique to acquiring and analyzing information from relevant sources. Its goal is to answer research questions, test hypotheses, and evaluate results (Kabir, 2016). The study relied on secondary data

gathered from Kenyan publicly traded commercial banks. The secondary data was compiled by combining information from commercial banks' annual reports, reports from the Kenya Bankers Association, and Central Bank of Kenya publications. In addition, reports from pertinent commercial entities and NSE and CMA publications were consulted for further data. The data was chosen for its present relevance and was gathered over a five-year period, from 2017 to 2021.

3.9 Data Collections Procedure

The researcher secured a research permission from the National Commission for Science, Technology, and Innovation as well as a letter of affirmation from Kenyatta University Graduate School to resolve any potential legal or environmental difficulties. With the aid of a data collection form, the study collected secondary data from already-existing sources.

3.10 Data Analysis

Data analysis is a methodical procedure that converts unprocessed data into valuable insights, enabling the acquisition of knowledge or the resolution of issues. This process consists of several stages, namely data collection, data preparation for analysis, application of models to analyze the data and construct variable connections, and verification of hypotheses or evaluation of the significance of the results. This study used descriptive and inferential analysis. Descriptive analysis helps organize data to improve comprehension of the relationship between variables (Parampveet & Vikas, 2019).

Regression and correlation models are commonly utilized in inferential data analysis. The relationship and strength of the connection between variables are shown using correlation statistics. In this study, the link between the two variables was examined using the Pearson correlation coefficient. Kothari (2019) states that a coefficient of one indicates a positive or negative relationship, depending on the circumstances, whereas a coefficient of zero indicates no association. A panel regression model was used to assess the data hypothesis's viability. In order to accomplish the goals of the research and evaluate the validity of the theories, a panel regression model was employed. The statistical significance of the hypotheses was assessed at the 0.05 level using the statistical program SPSS. Tables and figures presenting the research findings were given.

3.11 Diagnostic Test

The diagnostic test is crucial in the regression model. This test is conducted prior to analyzing the regression model to mitigate the potential bias in the data results, which could impact the regression assumptions. Tests for normality, multicollinearity, heteroscedasticity, and stationarity were conducted.

3.11.1 Multicollinearity

When predictor variables in a multivariate regression model have a substantial association with each other, this phenomenon is referred to as multicollinearity, or near-linear dependency (Jalan and Selangor, 2017). The study's predictors may change as a result of this statistical phenomena, losing their importance and producing skewed and inaccurate results. The presence of multicollinearity was assessed using the variance inflation factor (VIF). A moderate correlation is shown by a VIF score of less than 5, which is considered acceptable. On the other hand, a significant correlation is indicated by a VIF number larger than 9, which is considered troublesome and requires attention.

3.11.2 Heteroscedasticity

Heteroscedasticity is a circumstance in which the error components of a linear regression model vary inconsistently and independently of one another. When the variability of the error components in a linear regression model is consistent and unrelated to one another, it is referred to as homoscedasticity (Thomas, 2003). A variety of statistical approaches can be used to assess heteroscedasticity in a regression, including the graphical method, Durbin Watson Test, Spearman's rank correlation test, and Goldfeld-Quintet Test. In a research investigation, heteroscedasticity is typically discovered by

rejecting the null hypothesis. The Durban Watson Statistics test was utilized in this investigation to ascertain the existence of heteroscedasticity.

3.11.3 Normality Test

It is crucial to consider the normalcy of the data during the study period. For the study, it is important that the target population exhibits a normal distribution in terms of variance. Another perspective is that the distribution ought to exhibit symmetry (Shukla, 2015). The formula for Skewness and Kurtosis is utilized to compute and assess the normality of data. In a normal distribution with skewness and kurtosis, the coefficient of Sk should be between -3 and 3. The data's variance distribution was found to be normally distributed using the Jarque-Bera residual regression model.

3.11.4 Stationarity Test

This study included time series data; hence the data's stationarity and stability were verified (Christopher 2009). Variance and mean throughout time are the focus of stationarity statistics, which states that time series data is stationary when its mean and variance are constant and non-stationary when they are not. Stationarity means that series is lacking walking random or it has unit roots while non-Stationarity data has random walk and unit root which means the OLS ordinary linear squares is high and makes the result Spurious regression (Lyocsa, Stefan & Vyrost, 2011). To prevent the research to be spurious regression a test is done.in this study, Dicky- Fuller test method was used to look if the data was stationary.

3.12 Ethical Consideration

The ethical foundation of research is centred on the principles of avoiding harm and striving to benefit both the participants involved in the project and the broader field (Williman, 2011). Ethical considerations encompass adhering to regulations governing research and ensuring that any infringement on the rights of individuals is avoided in order to foster trust among academic communities and the general public. Ethical norms play a critical role in research as they contribute to the production of accurate and error-free outcomes that advance knowledge. For instance, the prohibition of creating, manipulating, or misrepresenting research data promotes truthfulness and minimizes the risk of errors. Additionally, given that research often involves collaboration and coordination among individuals from diverse disciplines and institutions (Nilesh, 2013), the researcher in this study took ethical considerations into account by properly attributing the work of other scholars to avoid plagiarism and providing appropriate references.

4. RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter covers data evaluation, descriptive statistics application, diagnostic test execution, and correlation analysis. Furthermore, moderation testing and regression analysis are carried out. A summary of the research findings and their interpretation is also provided in this chapter.

4.2 Descriptive Statistics

Information was collected regarding the financial value of contracts involving bank investments, covering the period from 2017 to 2021. The study analyzed the financial performance, specifically using the ROA ratio as a measure. The assessment of currency diversification involved the utilization of the HHI index, along with the evaluation of investments in forward contracts, futures contracts, and swaps. Size has an effect on the relationship between risk minimization and financial performance. Table 4.1 includes descriptive statistics such as mean, standard deviation, minimum and maximum values, skewness, and kurtosis.

Table 4.1. Summary of Descriptive

	Observed	Minimum	Maximum	Mean	STD Deviation
ROA	60	-0.03	0.036	0.02	0.013
HHI-CD	60	0.52	0.98	0.8211	0.12
Forwards	60	0.32	0.091	0.0028	0.014
Futures	60	0.000006	0.0045	0.00043	0.00095
Swaps	60	0.024	0.451	0.312	0.0062
Size	60	10.88	14.08	12.76	0.75

Financial performance is determined by ROA. This ratio assesses how well management is able to produce results with the resources at its disposal. The mean for ROA is 0.020 and indicates that commercial Banks performed profitably with volatility of 0.013 hence minimum was -0.03 which was some banks not performed will and maximum of 0.036 indicates that some banks performed accordingly.

The currency diversification was therefore determined by the Herfindahl Hirschman Index (HHI) which was calculated by determining the ratio of foreign currency held by the bank. The mean HHI index was 0.8211 with a standard deviation of 0.12. This is a high index indicating that the banks hold more of some foreign currency with just a few percentages of the others. The maximum of HHI was 0.98 showing some banks have more foreign currencies and few of local currency while 0.52 is the minimum and indicates also there is some banks that have less foreign currency compared to others.

The forward contract of risk hedging had minimum of 0.000009 as shown above table 4.1 which indicate some banks invested in forward contract as risk hedging in small amount while the maximum of 0.091 indicate others bank invested will. The mean of forward contract is 0.0028 which indicate small investment of forward contracts of listed banks with standard deviation of 0.014.

The valuation of futures contracts was determined by the reciprocal of the total investment made in these contracts. This had a comparable effect on shifting the measure's direction, resulting in a negative link between futures measure value and futures contract investment. The futures contract had a mean value of 0.00043, a high value of 0.0045, and a minimum value of 0.000006. In contrast, swaps ranged from 0.024 to 0.450. An average value of 0.312 and a standard deviation of 0.0062 indicate that while most banks used swaps extensively, other institutions used them infrequently. This indicates a little degree of volatility.

On the other hand, the study employed size as a moderating factor. This study set out to find out how the size of commercial banks affected the correlation between financial performance and risk hedging. Based on their total assets, Kenyan commercial banks are categorized into three groups according to their size. Banks are categorized into three groups by Muhindi and Ngaba (2018): Tier I, Tier II, and Tier III. The natural logarithm of the bank's total assets was used as a criterion to calculate the bank's size. The standard deviation was 0.75 and the reported mean was 12.76. 10.88 is the lowest limit and 14.08 is the highest.

4.3 Inferential Analysis

The table in section 4.3.1 presents the findings of the inferential analysis carried out utilizing Karl Pearson correlation. Examining the relationship between financial risk hedging, the independent variable, and commercial bank financial performance, the dependent variable, was the aim of this study. For inferential analysis, panel data is frequently utilized.

4.3.1 Correlations Analysis

The relationship between the variable is shown by the below result Karl Pearson matrix

Table: 4.2: Correlations analysis result

	ROA	HHI-CD	Forward	Futures	Swaps	Size
ROA	1					
HHI-CD	0.492	1				
Forwards	0.563	0.569	1			
Futures	0.654	0.709	0.636	1		
Swaps	0.706	0.652	0.551	0.736	1	
Size	0.477	0.533	0.536	0.608	0.668	1
OBS	60	60	60	60	60	60

Source: author 2023

The relationship between the performance of commercial banks listed on the National Stock Exchange and the practice of decreasing financial volatility is displayed in table 4.2. Return on assets (ROA) is favorably and significantly correlated with the HHI index, which gauges currency diversity. The forward, futures, and swaps, on the other hand, have positive correlations, suggesting a strong relationship between them. This suggests that financial performance is impacted by the usage of high-risk hedging instruments such currency diversifications, forward contracts, futures, and swaps. More specifically, the improvement in financial performance increases with the extent of hedging against risky scenarios. financial outcomes.

4.3.2 Diagnostic Test

Diagnostic tests were undertaken by the study, to determine whether statistical assumptions that are made while carrying out regression analysis are upheld by the data collected. The normality, multicollinearity, heteroscedasticity, and stationarity tests must be conducted in order to meet the statistical assumptions for regression analysis.

4.3.2.1 Normality Test

The test statistic, degrees of freedom, and p-value are obtained from the Shapiro-Wilk normalcy test. It is not justifiable to reject the null hypothesis of normality in this instance if the estimated p-value is greater than the predefined significance level of 0.05. However, the null hypothesis can be disproved and the variable shown not to have a normal distribution if the p-value is less than the predefined significance level.

Table: 4.3: Normality Test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ROA	.196	60	.952	.826	60	.567
HHI - CD	.138	60	.632	.931	60	.765
Forwards	.130	60	.756	.960	60	.876
Futures	.279	60	.675	.710	60	.673
Swaps	.283	60	.056	.817	60	.067
Size	.218	60	.976	.862	60	.0756

a. Lilliefors Significance Correction

Source: Researcher, (2023)

In the above tables shows that the variables exceed the 0.05 hence this shows that the null hypothesis is excepted.

4.3.2.2 Multi-collinearity Test

If the VIF is less than 9 then that VIF is accepted hence the table below shows that VIF is less than hence is not rejected and accepted

Table 4.4: Collinearity Statistics

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Zscore: HHI – CD	1.369	7.207
	Forwards	1.437	8.286
	Zscore(Futures)	1.130	6.691
	Zscore(Swaps)	2.263	7.807

4.3.2.3 Heteroscedasticity Test

If errors in a regression model are not uniformly distributed at various predictor variable values, this can be determined statistically. In short, it's an assessment of whether the degree of mistakes in a dataset stays constant throughout all observations or if it changes depending on the values of the independent variables. Regression model precision may be impacted by heteroscedasticity, leading to imprecise regression coefficient estimations.

Using robust standard errors, weighted least square regression, or changing the dependent or independent variables are some methods for reducing heteroscedasticity. Numerous methods, such as the Breusch-Pagan test, White's test, Park test, and scatterplot graph, can be used to conduct the assessment. The tests examine the relationship between the squared residuals and the predictor factors.

A scatter graph plots the residuals versus the projected values. If there is no heteroscedasticity, the dots on the scatterplot should be evenly distributed around a horizontal line with zero residual values. When the dots form a pattern that differs from the horizontal line shown in figure 4.1, heteroscedasticity is present.Figure 4. 1: Scatterplot Graph
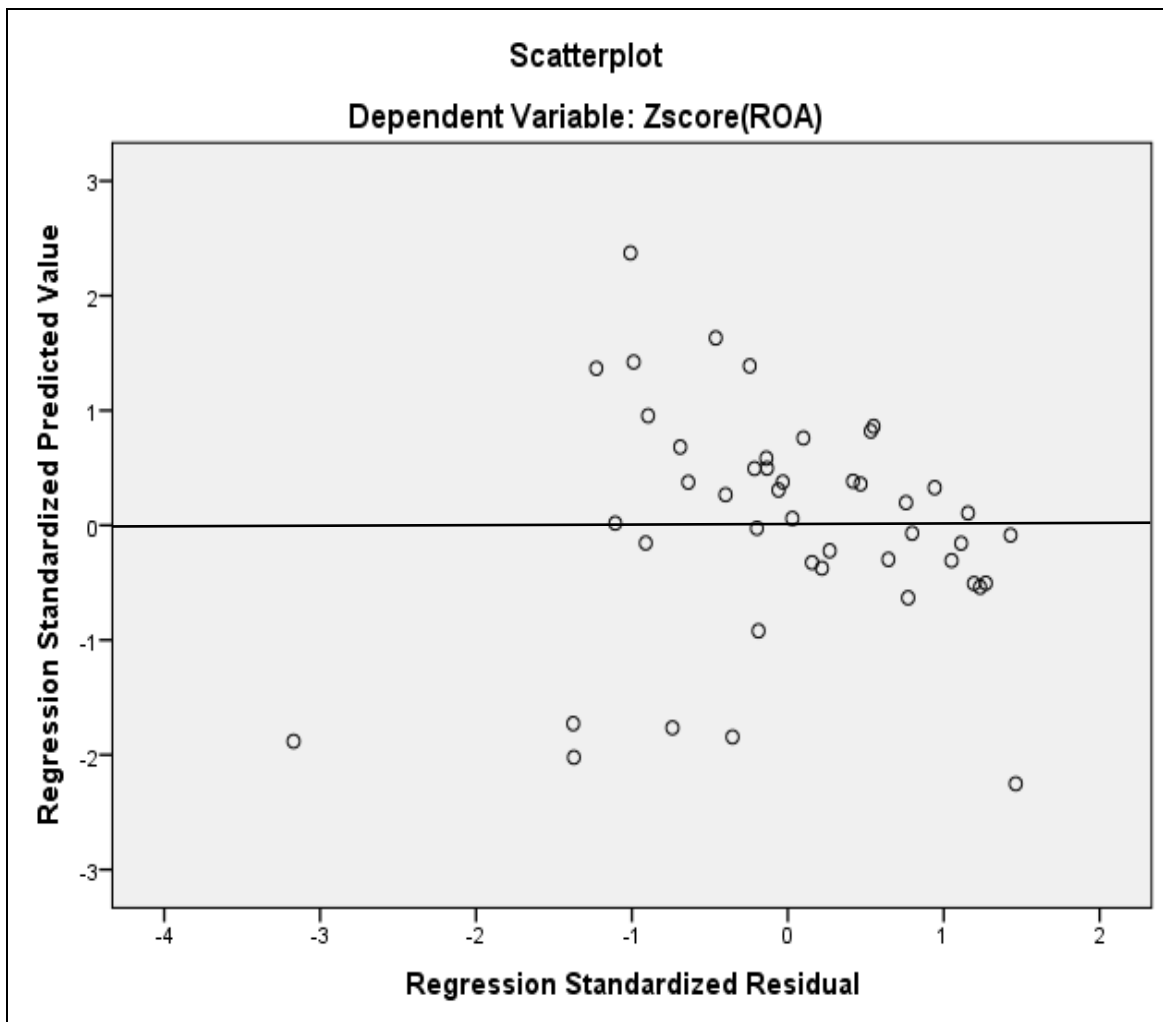
Source: Researcher, (2023).

The funnel-shaped pattern in figure 4.1 indicates the presence of heteroscedasticity, as it shows that the residuals have differing variances across the independent variable's whole range.

Robust standard errors, weighted least squares regression, or altering the dependent or independent variables can all be used to overcome heteroscedasticity. Standardized values were utilized to fix the independent variables in order to mitigate the problem of heteroscedasticity in this research.

4.3.2.4 Stationary test

The primary objective of doing a stationarity test is to determine if time series data exhibits stationarity or non-stationarity. Trends, rather than only changes in external factors, might impact the variations in the variables in time series. Therefore, it is crucial to determine the stationarity of the data. A stationary time series is defined by a steady mean and variation over the whole period. Stationarity is required for regression analysis because non-stationary data can produce incorrect regression results. To achieve stationarity, data that is not stationary is modified further using procedures known as detrending. In this work, the Dickey-Fuller test was employed to determine panel data stationarity. When tested at a 5% level of significance (alpha), all variables in the Dickey-Fuller test have test statistics that exceed the crucial value of 0.05. Consequently, it is suggested that the variables are stationary and the null hypothesis is rejected.

4.4 Regression Analysis

A strong statistical method for determining the association between variables and forecasting future results is regression analysis. By creating a mathematical equation that accurately captures this relationship, regression analysis aims to ascertain the correlation between the dependent variable and one or more independent variables. A regression model with the following format was employed in the study:

$$ROA_{it} = \alpha + \beta_1 CD_{it} + \beta_2 F_{it} + \beta_3 fit + \beta_4 S + \beta_5 Sz_{it} + \varepsilon$$

Whereas

ROA represents financial performance (Returns on Assets)

CD represents currency diversification

F stands for Forward contract,

f stands for future contract,

S stands For Swaps

Table 4.5: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.853[a]	.728	.701	.54665098

a. Predictors: (Constant), Zscore(Size), Zscore: HHI - CD, Zscore(Forwards), Zscore(Futures), Zscore (Swaps)

As can be seen in Table 4.3, 72.8% of the variability in the dependent variable can be attributed to the independent variables in the model. It is important to note, nevertheless, that other factors are responsible for the remaining 27.2% of differences in financial performance that the model is unable to explain. A big standard error of the estimate of 0.55 and a goodness of fit of 70.1% when all independent variables are included indicate that there is a considerable connection between the independent and dependent variables in the model.

4.4.1 Hypothesis test

Each independent variable's coefficient in the regression model indicates how relevant it is. The aggregate prediction power of the model's various variables accounts for its strength.

Table 4.7: Hypothesis test table

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.284E-16	.129		.000	1.000
	Zscore(Forwards)	.652	.197	.652	3.312	.002
	Zscore(Futures)	.376	.361	.376	1.041	.0.003
	Zscore: HHI - CD	.352	.214	.352	1.643	.0021
	Zscore(Swaps)	.417	.254	.417	1.641	.0041

Source: Author

The aforementioned table demonstrates the robust correlation between financial performance and financial risk hedging. It makes it clear that the financial performance of commercial banks listed on the NSE is impacted by the Financial Risk Hedging variables.

4.4.1.1 Hypothesis test one

The study looked into the null hypothesis, which states that forward contracts have no discernible impact on financial performance. Table 4: 7 shows that the Forward contract has a P-value of 0.002. The null hypothesis is rejected since the P-value is less than 0.05. This demonstrates how the financial performance of commercial banks listed on the NSE is significantly impacted by forward contracts. This result is consistent with that of the Onchari and Onwonga research (2020), which found a relationship between forward contracts and the Kenyan multinational companies' financial performance. The results align with the research conducted by Miller and Powdwol (2020) on the correlation between market structure and forward contracts, as well as the study conducted by Khakhar and Mittal (2015) on financial risk hedging through the use of future contracts and foreign exchange.

4.4.1.2 Hypothesis test two

The future contract's P-Value is 0.003, which is less than 0.05, as Table 4.7 demonstrates. This shows that the null hypothesis is rejected and that the future contract has a significant impact on the financial performance of commercial banks listed on the NSE. The results of this investigation align with those of Bin and Wen (2014), who examined the effects of incorporating future contracts in Chinese markets. Future contracts' effects on stock market volatility were studied by Yilgor and Mebounou (2016), future contracts' effects on spot market volatility by Pok and Pokshakwale (2004), and future contract and forward contract use as risk mitigation strategies by Islam and Chakrabort (2015).

4.4.1.3 Hypothesis test three

Table 4:7 shows that the HHI-CD currency diversification index has a P-value of 0.0021. The null hypothesis is rejected because this is less than 0.05, suggesting that currency variety influences the financial performance of commercial banks listed on the NSE. Pedrono's (2017) research on the relationship between financial volatility, currency diversification, and bank stability is in line with this finding. Research on currency futures and currency options was carried out by Maurer and Valiani (2007), who specifically looked into the efficacy and efficiency of several hedge strategies for managing currency risk in mixed asset portfolios that are globally diversified.

4.4.1.4 Hypothesis test Four

The swaps' P-Value of 0.0041, which is less than 0.05, is shown in table 4:7, and as a result, the null hypothesis is rejected. This implies that swaps have a big influence on commercial banks' financial results. This result is in line with the research conducted by Torbira and Joshu (2016), who looked into how financial derivatives affected the performance of both financial and non-financial organizations, as well as the study conducted by Lorenzo and Cheng (2010), which examined the effects of FX swaps on the economy and global financial stability.

4.5 Moderating Effects of Size

By examining the link between the independent variables and the moderator variable, this study seeks to assess the impact of size. The size variable modifies the relationship between the independent and dependent variables, as indicated by a statistically significant interaction term (p-value < 0.05).

Following a review of the independent component, moderator variable, and interaction term coefficients. Considering the moderator variable, the independent variables' coefficients show how directly they affect the dependent variable. While accounting for the effects of the independent variables, the moderator variable's coefficient estimates the direct impact of size on the dependent variable. The impact of the interaction between the moderator and independent variables on the dependent variable is computed using the interaction coefficient.

$$ROA_{it}=\alpha+\beta_1 F_{it}+\beta_2 Sw_{it}+\beta_3 CD_{it}+\beta_4 BZ+\varepsilon+\beta_5(F_{it*}BZ)+\beta_6(Sw_{it*}BZ)+\beta_7(CD*BZ)\ \beta_8(F_{it*}BZ)+\varepsilon$$

Where

BZ= Bank Size

F*BZ= Interaction Between Forward Contract and Bank Size

Sw*BZ= interaction between Swaps contract and Bank Size

CD*BZ= interaction between currency diversification and bank size

F*BZ= Interaction between Future and Bank Size

Table 4.8: Interaction Coefficients

Coefficientsᵃ

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.497	5.952		-.084	.934
Zscore(Forwards)	.058	.150	.058	.390	.699
Zscore: HHI - CD	-.190	.139	-.190	-1.363	.181
Zscore(Swaps)	-.183	.142	-.183	-1.288	.206
BZ	.045	.465	.034	.096	.924
InteractionZF	-.268	.237	-.340	-1.131	.265
InteractionZCD	.226	.348	.251	.649	.520
InteractionZSW	-.217	.409	-.181	-.531	.598

a. Dependent Variable: Zscore(ROA)

Source: Researcher, (2023)

P-values greater than 0.05 are found for all interaction factors between size and forward contracts, currency diversification, and swaps, suggesting no significant interaction between size and independent variables. Therefore, the analysis indicates that there is no size-related difference in the association between risk hedging and financial performance of Kenyan listed commercial banks.

Table: 4.9 Moderating Effects of Size

Model	Unstandardised Coefficients		Standardised Coefficient		Significant
	B	Std. Error	Beta	t	
Forward	0.058	0.015	0.058	0.392	0.004
HHI-CD	0.191	0.0139	0.191	0.363	0.0181
Swaps	0.183	0.0142	0.183	0.288	0.0206
Futurs	0.068	0.0423	0.068	0.382	0.0042
BZ	0.045	0.0465	0.034	0.096	0.924

interaction ZF	0.0268	0.0237	0.034	0.0131	0.0265
interaction ZF	0.0352	0.0364	0.032	0.0132	0.0364
interaction ZCD	0.026	0.0348	0.0251	0.0449	0.0431
interaction ZSW	0.0217	0.0409	0.0181	0.0331	0.0241
Constant 1	0.497	0.952		0.084	0.934

Source: Researcher

The table above depicts the interaction between bank size and the independent variables of forward, future, swaps, and currency diversification. The interaction values are smaller than 0.05, indicating that the bank size influences the independent variable due to substantial associations.

5.   SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Introduction

The study as a whole is fully summarized in this chapter. This document includes a succinct analysis of the study's findings together with a clear explanation of the goals and objectives of the research. It also offers suggestions in light of these discoveries.

5.2. Summary

The purpose of this study was to look into how risk hedging affected the financial results of commercial banks that are publicly traded in Kenya. Because of the unstable environment in which commercial banks operate, risk management is essential to improving performance. Furthermore, they function in a carefully controlled atmosphere in which the bank's management is responsible for making important decisions that assure effective issue solving and long-term profitability. The ROA ratio was used to assess financial performance, while total investments in Forward, Future, and Swap contracts were employed to identify risk hedging elements. Nevertheless, the study used the HHI index to assess currency diversification. The banks have quantified their foreign cash reserves. The bank's size was decided by its total assets, which served as a moderating variable.

A strong association between the independent factors and financial risk hedging was found by the correlation research. A number less than 0.05 indicates that the forward contract, which is frequently used for risk hedging, has a significant correlation with financial performance. Similarly, the correlation for the future contract was less than the 0.05 criterion, at 0.003. However, there was a strong correlation between the financial performance of commercial banks listed on the NSE and currency diversification (as determined by the HHI index). Ultimately, the Swaps' value was less than the 0.05 threshold at 0.0041. This suggests that there is a strong correlation between swaps and financial outcomes. Variable-bank size interaction values that were all less than 0.05 indicated that there was a statistically significant relationship between the variables and bank size.

5.3 Conclusions

Research indicates that financial risk hedging and the performance of commercial banks are highly correlated. It is evident from the data that employing riskier hedging techniques can significantly enhance financial performance. The researcher found that the financial performance of commercial banks is significantly impacted by forward contract

hedging. This demonstrates how using more forward contracts can help commercial banks function better and keep the required rate of return on equity.

The gathered data showed a significant impact that future contracts have on the financial performance of commercial banks. Future contract increases will raise the necessary rate of return on equity. The study supports the use of futures contracts by demonstrating how they can enhance the financial performance of commercial banks. The collected and analyzed data show that using currency diversification as a risky hedging technique has an impact on financial performance. Specifically, more currency variety across the financial system, particularly among commercial banks, has been linked to better financial performance. This is due to the efficiency of hazardous hedging in limiting negative performance implications, which promotes currency diversity as a feasible approach.

The strong and positive correlation between swaps and the NSE-listed commercial banks' financial performance cannot be overstated. This suggests that the financial performance of the banks was significantly impacted by swaps. The financial performance of commercial businesses is enhanced by the increased usage of swaps, demonstrating their usefulness as hedging instruments. Financial risky hedging tools were investigated in this study as independent variables, and it was found that they significantly improved performance. Commercial banks and other financial institutions looking to maximize their profits will find this information beneficial.

5.4 Recommendations

This study offers valuable insights for bank executives and stakeholders about the role of risk management approaches and diversity in boosting financial performance in the banking industry. The research provides practical strategies to improve financial performance and stability in Kenya's banking industry.

To lessen or completely remove financial market risks, the research advises bank management to use financial risk hedging techniques. There is a significant association, according to the observed relationship between the financial performance and the hedging variables. To improve the effectiveness of derivatives, it is advised that the Central Bank of Kenya create regulations to regulate the use of high-risk financial hedging products. Furthermore, banks should be required by the CBK to reveal the financial derivatives they utilize in their financial statements. The employment of financial derivatives, which can enhance the performance of commercial banks, should be promoted by the government through the establishment of a policy. As a result, the nation's economy will grow and become more stable as more viable financial institutions are formed.

5.5 Areas for Further Research

The limitations of the study can assist identify particular areas that require more research. Only a few risk-reduction techniques, including forward contracts, futures, swaps, and options, were examined in this study. Different risk hedging techniques, such as credit default swaps, interest rate swaps, or other derivatives, could be the subject of future study to see how they affect financial performance.

Further research is advised to explain the 27.2% of variables that affect the fluctuations in the financial performance of commercial banks, as the study only included 72.8% of the variables that affect the dependent variable. These traits should be the subject of further research to ascertain how they affect the relationship.

The study focused exclusively on 12 commercial banks that are listed on the NSE. To find out if additional commercial banks have the same relationship between risk hedging and financial success, more research on commercial banks not listed on the Nairobi Security Exchange may be conducted. In order to evaluate the validity of the correlation between risk hedging and long-term financial performance, more extensive study should examine a longer time period. The study looked into the relationship between risk hedging and financial success using regression analysis and correlation. It did

not, however, prove a causal connection. Subsequent research ought to investigate methods that might demonstrate causation, including experimental setups or longitudinal.

The study also examined return on equity (ROE) and net interest margin (NIM) as alternative financial performance metrics that, in some cases, would be more appropriate. To determine the validity of the correlation between risk hedging and financial performance over a wide range of indicators, more research is required to examine additional performance metrics.

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APPENDICES

Appendix I: Listed Commercial Banks in Kenya

1. Absa Bank Kenya PLC

2. BK Group PLC

3. Diamond Trust Bank Kenya Ltd

4. Equity Group Holdings

5. HF Group Ltd

6. I&M Holdings Ltd

7. KCB Group Ltd

8. National Bank of Kenya Ltd

9. NCBA Group PLC

10. Stanbic Holdings Plc.

11. Standard Chartered Bank Ltd

12. The Co-operative Bank of Kenya Ltd

Source: NSE (2021)