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RELATIONSHIP BETWEEN SYSTEMATIC RISK FACTORS AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS LISTED AT THE NAIROBI SECURITIES EXCHANGE.

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Abstract: A regression inquiry was also required to complete the regression to which this analysis contributed. The interest rate established by the CBK, the inflation rate calculated by the CPI, the M2 money supply, and the exchange rate all serve as independent variables in this study. One of the additional indicators is the current value of one currency in relation to another. The current investigation used an explanatory research methodology. This study's sample population consists of eleven commercial banks listed on the NSE. Furthermore, throughout the course of the investigation, all commercial banks in Kenya that were listed on the official listing of the Nairobi Securities Exchange (NSE) in the year 2020 were thoroughly reviewed. A census-like approach was adopted, and all eleven of the chosen financial institutions were counted. The great majority of the data utilized in this inquiry originates from official agencies such as the Kenya National Bureau of Statistics, the Central Bank of Kenya, and the financial statements of the relevant commercial banks. We evaluated the association between Kenyan commercial banks' stock performance and systemic risk indicators using regression analysis. The study focused on these Kenyan banks and other financial organizations. The findings of the study indicate a statistically significant and favourably correlated positive relationship between the financial performance of commercial banks in Kenya and a variety of parameters, including the level of inflation (r=0.014, p=0.041), the exchange rate (r=0.039, p=0.000), the interest rate (r=0.002, p=0.000), and the money supply (r=0.003, p=0.000). The findings of the research indicate that it would be advisable for the Central Bank to adopt policies pertaining to bank discount rates. In order to mitigate the occurrence of loan defaults resulting from variable payback amounts, it is essential for commercial banks to promote the adoption of fixed interest loan repayment choices over flexible repayment arrangements among their clientele. In conclusion, it is essential for commercial banks to prioritize their focus on monetary policy adjustments pertaining to the money supply, while strictly following to the rules set out by the Central Bank and making appropriate modifications to their variables in response. It is recommended that the Central Bank implement a regulation mandating banks to periodically disclose the currency rates applied to consumers.

Key words: - Systematic Risk, Financial Performance, Commercial Banks, Nairobi, Security Exchange.

INTRODUCTION

Analyzing a company's financial performance involves determining how its decisions and actions have influenced its bottom line. The evaluation of a company's long-term financial health is the major goal of this instrument. Additionally, it can make it simpler to compare companies operating in the same industry or even whole sectors or industries (Wild, 2012). According to Kahuria and Waweru (2015), a company's overall performance is determined by the profits and losses it has accrued over a certain period of time. It is a measurement of how efficiently a company can generate revenue by using the resources it has in relation to its primary line of business. Specific measures on the company's financial success are included in the company's financial records. According to Franklin, Graybeal, and Cooper (2019), the income statement, balance sheet, and cash flow statements may be leveraged in a variety of different ways to help firms improve, define goals, and become more successful. These uses can be accomplished via the use of horizontal analysis, vertical analysis, and ratio analysis.

One method for determining the performance of the bank is to investigate its profitability. According to Graca, Barry, and Doney (2015), in order for a bank to be successful, it must be capable to draw in more money throughout each fiscal year than it pays out in the form of expenses and taxes. Banks earn money via the charging of fees for their services as well as the accrual of interest on

their assets. The interest that is paid on the commitments that banks have is, on the contrary hand, their most significant yearly expense. In the work of Delaney et al. (2015), the profitability of a financial institution may be determined by examining the positive difference that exists between the firm's earnings and its expenses.
Some types of assets that contribute in revenue for the institution include securities that are held by the bank as well as loans made to various other organizations, businesses, and individuals. The majority of a bank's liabilities are comprised of customer deposits, credit that is borrowed from other banks and financial institutions, and funds that are traded in the form of commercial paper on the money market. The profitability of a bank may be measured using two different metrics: return on equity (ROE) and return on assets (ROA). Both outcomes have the potential to have an effect on profitability. The majority of the money that banks make comes from their assets, which might include things like loans and securities. To calculate the return on assets (ROA) of an institution, just divide the net interest revenue of the bank by the standard deviation of its total assets. This will give you the ROA. After that, you will be provided with the ROA from the bank. The use of a percentage in ROA calculations is considered to be normal operating practice. According to Graca, Barry, and Doney (2015), the first step in finding the nett interest income is to remove the interest generated from the principle. This is done so that the net interest income may be calculated. The end result is referred to as the "net interest income."

NEED OF THE STUDY.
The The major purpose of this research was to evaluate the relationship between measures of systematic risk and the soundness of the monetary systems at Kenyan commercial banks.

Commercial banks in Kenya
This research will provide valuable insights for professionals in the banking industry, namely commercial bank managers, who are seeking to enhance their understanding and identify the critical aspects that impact performance. Employees of commercial banks possess valuable knowledge on the holistic performance of their respective organizations, therefore enabling them to comprehend the systemic risk elements that might potentially impact the entire success of their businesses.

Policy Makers
This research will provide valuable insights for policy makers in discerning the precise determinants of pricing, therefore serving as a foundation for formulating rules that control the commercial banking industry. Additionally, this study will provide insights into the techniques that may be used while making investment choices in the capital market, therefore providing policy makers with valuable information.

Investors
The provided material aims to provide investors with valuable and sufficient knowledge, allowing them to gain a comprehensive grasp of the risk-return trade-off, which plays a crucial role in constructing an investment portfolio. Investors will have the opportunity to safeguard their interests against self-interested stockbrokers that use uninformed investors for personal gain, so disadvantaging the investors. Additionally, it is beneficial to evaluate and mitigate any risks via the implementation of suitable measures.

Future scholars
Along with this, it would be beneficial to scholars as it provides avenues for further research. Additionally, this research the user's text will add to the existing corpus of literature, serving as a valuable resource for other academics in their own investigations from.

Theoretical framework
The maturity gap analysis, advocated by Donald Simonson (1965) and Frank Fabozzi (1995), guided this study. The use of maturity gap analysis by financial institutions as a risk management tool for interest rate exposure is the presumption behind the concept. According to Lubinska (2020), maturity gap analysis consists of examining the due date of a bank's assets and liabilities in order to uncover any gaps that might potentially expose a bank to systemic risks. This is done in order to detect any gaps that could expose a bank to systemic risks.
The maturity gap analysis operates under the assumption that the monetary worth of assets that reach maturity or undergo repricing within a certain timeframe is equal to the monetary worth of creditors that reach maturity or undergo repricing within the same timeframe. If the aforementioned assumption is shown to be erroneous, it would result in the failure of the maturity gap study. The need of conducting a maturity gap analysis lies in the requirement to consider the value of obligations that are either maturing or being repriced concurrently. Mwania (2023) defines the word "reprice" as the act of potentially acquiring a revised interest rate. Isanzu (2017) states that a positive maturity gap signifies that the bank has a larger quantity of rate-sensitive assets compared to rate-sensitive liabilities during the specified time period. A negative maturity gap in the banking context indicates that the bank has a higher number of interest rate-sensitive obligations that are scheduled to mature within the specified time period. These liabilities will need to be settled in due course. If there are changes in market interest rates before the specified time, the difference between assets and liabilities might indicate the level of potential risk or volatility associated with the value of the holdings. The reason for this is because the gap signifies the percentage of assets that are not accounted for by liabilities.

Conceptual Framework
The present study's conceptual framework elucidated the interconnection between the independent variable of systematic risk variables, namely inflation rates, interest rate volatility, liquidity, and inflation levels. The variable under investigation in this research will be the Return on Assets (ROA), a measure often used to assess the financial well-being of commercial banks. The existence of systemic risk has had an adverse effect on the financial well-being of commercial banks. The present research examined the dimensions and relationships between variables that served as both independent and dependent factors. The methodology for ascertaining this is shown in Figure 1.1;

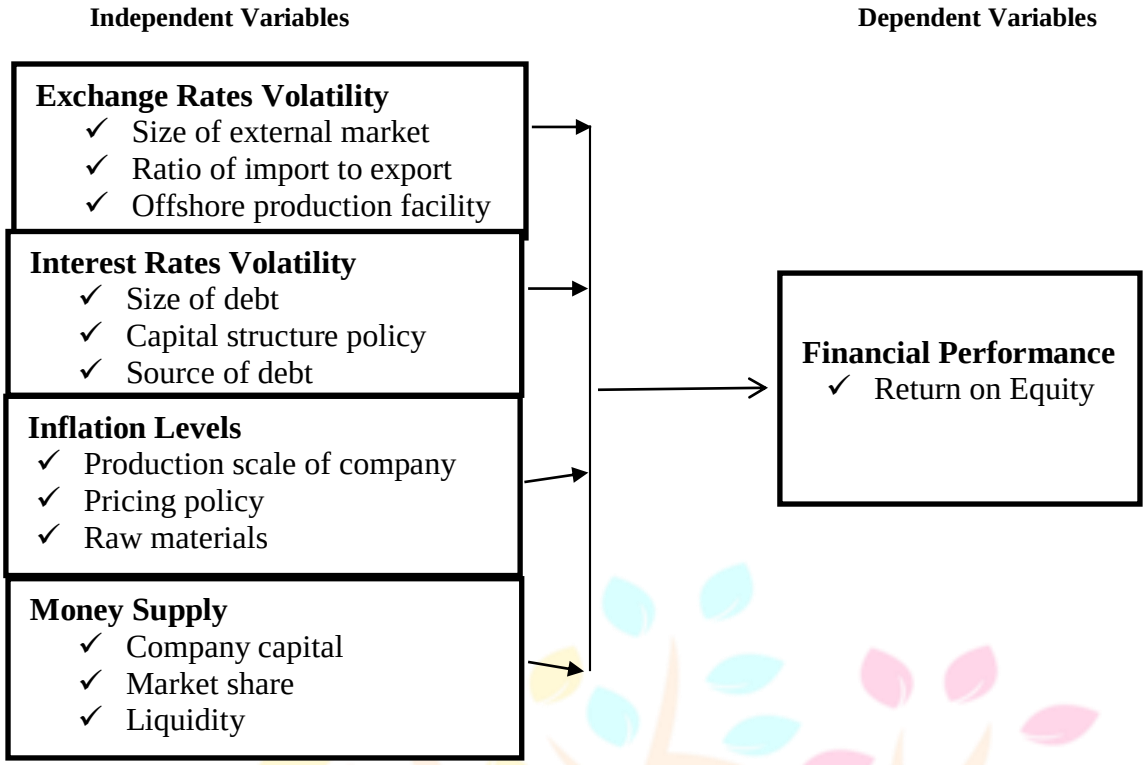

Figure 1.1 Conceptual Framework
Source: (Author, 2020)

Problem Statement

Commercial banks play a pivotal role as primary players within the financial system of Kenya. The stability and growth of a nation's economy are significantly influenced by the financial well-being of large commercial banks. Similarly, the viability of a bank or firm is often assessed based on its financial performance (Meshak & Nyamute, 2016). The reduction in the return on equity (ROE) of Kenyan commercial banks in 2016 may be attributed significantly to the implementation of the 2016 interest rate limiting legislation in Kenya, notwithstanding its significance in the financial sector. The interest cap rate exhibits a 4% increase when compared to the Central Bank base rate. The shift in question has taken commercial banks by surprise, resulting in adverse effects on their financial results and a decrease in previously experienced additional earnings. Consequently, banks are compelled to downsize their workforce in order to allocate funds towards the heightened operational expenditures (Mbua, 2017).

The banking industry in Kenya, particularly commercial banks, has seen a decline in return on assets during the duration of the research, although seeing consistent growth in profitability on an annual basis. According to data from the Central Bank of Kenya in 2018, the banking sector had a decline in profit before tax during the period from December 2014 to December 2018. Specifically, there was a fall of 5.03 percent, with the profit before tax dropping from Ksh. 141.1 billion to Ksh. 134.0 billion. The period under consideration saw a decline in the return on assets, which reached a value of 2.9%. Therefore, it is evident that more inquiry is required to determine the influence of systemic risk variables on the financial outcomes of commercial banks.

RESEARCH METHODOLOGY

Research Design

The organizing of aspects for data gathering and analysis is known as "study design." This structure makes an effort to strike a balance between relevance to the research aim and economy in method. The design of explanatory research was used for the conduct of this particular investigation. According to Saunders, Lewis, and Thornhill (2009), the primary objective of research with an explanatory purpose is to investigate a phenomenon with the intention of explaining (rather than just reporting on) the relationships that exist between the many variables being studied. The goal of the study was to identify and specify the precise nature of the connection that exists between routinely following safety protocols and the steady state of the monetary system maintained by Kenya's listed commercial banks.

3.1Population and Sample

Target Population

According to Borg and Gall (2007), a researcher's target population is "all members of a real or hypothetical set of people, events, or objects from which they wish to generalize the results of their research. “The eleven commercial banks make up the population of interest for this piece of study. Appearing on the stock exchange in Nairobi (see appendix, II).

3.3 Description of sample and sampling procedures

Through the use of a census method, each and every Commercial Bank that is registered on the NSE was located and included into the research. Because of this, eleven commercial banks that are traded on the NSE (National Stock Exchange) were taken into consideration for inclusion in the research. When compared to other financial companies, those who differentiate themselves by

making their financial statements available for the general public to peruse are the ones that succeed in doing so. The specifics are included in Table 3.1.

Table 3.1: Sampling Frame

Listed Banks at NSE	
Absa Bank Ltd	**ABSA**
Stanbic Holdings Plc.	**SBK**
I&M Holdings Ltd	**I&M**
Diamond Trust Bank Kenya Ltd	**DTB**
KCB Group Ltd	**KCB**
National Bank of Kenya Ltd	**NBK**
NCBA Group PLC	**NCBA**
Standard Chartered Bank Ltd	**SCB**
Equity Group Holdings	**EQB**
The Co-operative Bank of Kenya Ltd	**COOP**
Housing Finance Group	**HF**

3.4 Description of Research Instruments

For this particular piece of study, a method known as documentary analysis was used to compile secondary data. The annual financial statements that are available to the general public, the National Stock Exchange (NSE) also publishes annual reports and Handbooks for its members. Appendix I contains all of the material that is pertinent to this discussion.

3.5 Description of Data Collection Procedures

According to Flick (2015), data collection is the process of gathering and measuring information with the purpose of providing answers to the questions that sparked the research. The researcher approached Cuea in an effort to acquire research licences, which would assist him in obtaining authorisation to carry out the experiments. The National Commision on Science, Technology, and Innovation (NACOSTI) was contacted and requested permission to do study before to getting started on the enquiry. After acquiring them, the researcher travelled to each of the financial institutions and received permission to carry out the study from the administration of the institution. For the objectives of this study, data was gathered on an annual basis beginning in the fiscal year 2012/2013 and continuing through the fiscal year 2019/2020. The researcher obtained data to explore the variables using the document analysis guide as his primary resource.

3.6 Measurement of variables

These variables are measured differently as discussed below;

Variable	**Measurement**	**Authors**
Exchange Rates Volatility ✓ Size of external market ✓ Ratio of import to export ✓ Offshore production facility	a yearly average derived from monthly averages of local currency units relative to the dollar in the United States)	Pandey (2017). Lambe (2015)
Interest Rates Volatility ✓ Size of debt ✓ Capital structure policy ✓ Source of debt	Average quarterly interest rate **Simple interest**=principal × interest rate × time	Warue (2013), Gezu (2014)
Inflation Levels ✓ Production scale of company ✓ Pricing policy ✓ Raw materials	Quarterly inflation rate Equity Price index, based on a representative basket of goods and services	Warue (2013), Washington (2014)
Money Supply ✓ Company capital ✓ Market share ✓ Liquidity	Deposit liabilities and currency liabilities	Pandey, 2017). Hoggarth, (1996).
Financial Performance ✓ Return on Equity	Company's annual return (net income) divided by the value of	Saunders & Cornett, 2014). Graca, Barry &Doney, (2015).

	its total shareholders' equity, expressed as a percentage	

Source; Researcher (2020)

ε is the random error term

3.8 Diagnostic Tests

The investigator carried out a battery of feasibility assessments to determine whether or not the proposed study design was practicable. The tests for heteroscedasticity, stationarity, multi-collinearity, normality, and autocorrelation are all included in this study. Additionally, there are tests for multi-collinearity.

3.8.1 Normality

Regression model assume that residuals follows the normal distribution. These errors arise due to difference in observed values endogenous and exogenous variables. The test for normality will be done at univariate levels that is focusing on individual variable. quartile- quartile (Q-Q)(Hair et al.,2006) and Shapiro &Wilks,1965) are normally were used to examine the shape of distribution. In order to assess the feasibility of the study model, the researcher conducted a series of diagnostic tests. The tests included in this analysis consist of the test for normalcy, the test for multi-collinearity, the test for heteroscedasticity, the stationarity test, and the autocorrelation test.

3.8.2 Multi-collinearity

Due to the influence of exploratory factors, it may be difficult or even impossible to record the maximum number of exploratory variables that may be accommodated by a statistical method. This problem is also often referred to as having a high correlation level. The VIF is a measure of how much the variance of each regression coefficient has increased in contrast to the situation in which all predictor variables are uncontrolled. According to Lind, Marchal, and Wathen (2012), the two cut-off values that are utilized the most often for determining the existence of multi-collinearity are a tolerance value of less than 0.10 or a VIF value of more than 10. These values are used to determine whether or not there is multi-collinearity.

Collinearity, which is a relationship between two predictor variables, or multi-collinearity, which are relationships between more than two predictors, is the existence of correlations between the predictors. In cases of extreme multi-collinearity, the coefficient estimates for each individual predictor are unstable, and the standard errors and confidence intervals are exaggerated (Belsley, 1980). The employment of a different estimate technique, such as ridge regression (Montgomery, 2001) or principal components regression (Chatterjee & Hadi, 2012), may be an appropriate approach to multi-collinearity. It may be thought about eliminating some of the highly correlated variables, however this is often not the best course of action (Chatterjee & Hadi, 2012).

3.8.3 Heteroscedasticity

Heteroscedasticity is seen when the error terms of a regression model exhibit a non-constant variance, hence deviating from the statistical assumption of constant variance. This phenomenon may be understood as the impact of earlier error terms on subsequent error terms. Classical regression models make the assumption that heteroscedasticity does not manifest. Homoscedasticity, as defined by Garson (2012), refers to the condition in which the dependent variable has a consistent level of variability across all values of the independent variables, in contrast to heteroscedasticity. Yu, Liu, and Chen (2019) argue that if the assumption of homoscedasticity is violated, it might lead to imprecise estimations of parameters and incorrect conclusions. The hypothesis of homoscedasticity asserts that the variability of the error terms included in the regression model stays the same across all of the data. For the purpose of carrying out this diagnostic evaluation, you have the option of using either the Breusch-Pagan/Cook-Wesberg test or the Cameron and Trivedi's breakdown of IM test. The homogeneity of the linear regression model is often evaluated with the use of the Breusch-Pagan/Cook-Wesberg test, which was first established by Breusch and Pagan in 1979.

3.8.4 Autocorrelation

This phenomenon takes place when the residuals reveal a dependent relationship with one another. On the other hand, when it is thought that the value of y(x+1) is not independent of the value of y(x). The Durbin-Watson test is one method that may be used to evaluate the autocorrelation of the linear regression model. However, a scatter plot is another method that can be used to determine whether or not autocorrelations are present. Using Durbin-Watson's d, one may test the hypothesis that the residuals do not exhibit linear autocorrelation, which is the null hypothesis. d may take on any value between 0 and 4, with 0 being the minimum and 4 the maximum. Nevertheless, figures that are quite near to 2 demonstrate that there is no autocorrelation. The lack of autocorrelation in a dataset is often indicated by a heuristic value range that falls between 1.5 and 2.5. In contrast, the Durbin-Watson test only assesses linear autocorrelation, focusing solely on the relationship between adjacent observations, so capturing first-order effects (Sreevidya & Sunitha, 2011).

3.8.5 Test for Stationarity

The examination of stationarity is a fundamental statistical characteristic that is often assessed in time series analysis, since many statistical models need the fundamental generating processes to exhibit stationarity (Hyndman & Athanasopoulos, 2018). Stationarity tests are often used to evaluate the stationarity of a series. In the context of time series analysis, various tests are employed to assess the stationarity of a series. To interpret the test, if the ADF critical value is different at different levels of confidence, the data is said to be stationary, and thus reject Ho (Panel data is non-stationary).

3.9 Model selection

For the purpose of estimating the regression model that makes use of panel data, either pooled least squares (PLS) or the common effect model will be used. Since this model does not take into consideration time or individual dimensions, it is reasonable to assume that the behaviour of c will be calculated using either the Ordinary Least Squares (OLS) approach or the least squares methodology. The equations for the ordinary least squares method and the formulae for the panel data regression method are quite similar:

$$y_{it} = \alpha + \beta' X_{it} + \varepsilon_{it}$$

Description: For i = 1, 2, ..., N and t = 1, 2, ..., T.
In this particular case, the overall count of persons or cross-sectional units is denoted by the letter N, while the overall count of time periods is denoted by the letter T. The proposed model might result in the creation of an equation with the notation N x T, where N is the total number of equations and T is the time series. This equation is precisely the same as the cross equation that must be satisfied by T as well as a coherent collection of N equations throughout time.

RESULTS, FINDINGS AND DISCUSSIONS

The findings from the field are presented, covered, and interpreted in this chapter. This chapter presents the analytical findings, which were gleaned from the study's research questions. Statistics, both descriptive and inferential, played a role in the process of arriving at the study's conclusions. The aims of the study were on answering four different research questions.

4.1.2Descriptive Statistics

Table 4.1 presents the descriptive data of currency volatility, supply of money, interest rate fluctuation, inflation levels, and return on equity (ROE), along by their corresponding trend analysis. The purpose of doing trend analysis is to examine the patterns of movement shown by the variables under research. This analysis is also helpful in facilitating the assessment of unit root and determining when to finish the analysis. Additionally, graphical representation of the variables' patterns of movement is used in this process.

Table4.1:DescriptiveStatistics

Variables	Minimum	Maximum	Mean	Std.Dev
ROE	-0.136	0.104	0.027	0.028
Exchange rate volatility	0.100	0.900	0.430	0.220
Inflation levels	-0.200	1.000	0.085	0.260
Interest rate volatility	0.200	23.900	2.923	2.492
Money supply	0.100	22.600	0.996	2.307

Source: Field data (2021)

The existence of inflationary tendencies is shown by the fact that the data set has a minimum value of -2.00 percent and a maximum value of 1.00 percent, as well as an average mean of 0.085 and a standard deviation of 0.260. This indicates that the standard loan rate will grow as inflationary pressures become greater in the economy. As a possible explanation for this phenomena, rising inflation would reduce the buying power of money, which would need the bank to charge a higher basic loan rate in order to compensate for the increased credit risk.

4.2 Inferential Statistics

In order to examine the nature of the connection that exists between the variables under investigation, a Pearson product moment correlation analysis was carried out. In addition, panel regression analysis was used by the researcher in order to evaluate the relationship that existed between systematic risk indicators and the financial performance of commercial banks.

4.2.1 Correlation Analysis

An analysis of the strength and direction of the relationship between two continuous variables was conducted. Pearson's correlation was employed to look at how closely related the research variables were. Interest rates, currency rates, inflation, and the money supply are all indicators of systematic risk that have been studied in relation to the dependent variable of financial performance, as assessed by return on assets, in the present study. The connection between these two groups of factors is investigated. The aforementioned data may be found in Table 4.2.

Table 4.2 Correlation Analysis

Variable	Exchange Rates	Inflation Levels	Interest Rate	Money Supply	ROE
Exchange Rates	1				
Inflation Levels	0.3693	1			
Interest Rate	0.2484	0.3385	1		
Money Supply	0.1074	0.2028	0.4201	1	
ROE	0.621	0.6346	0.7840	0.0143	1

Source: Field data (2021)

According to Table 4.2 (r=0.621, p0.05), there is a strong association between ROE and currency rates, and it is often a positive correlation as well. This would indicate that changes in exchange rates have a substantial correlation with return on equity (ROE), which is a gauge of financial success that is used by commercial banks. These results provide support for the findings of Maigua and Mouni (2016), who discovered that the reserve requirement ratio had a negative impact on the performance of commercial banks, despite the fact that discount rates, inflation rates, and currency rates all had a positive affect on the performance of commercial banks. In 2016, Lagat and Nyandema revealed a significant positive association between changes in financial performance measures and changes in foreign exchange rates. This correlation was shown to be significant in both directions. Given the correlation that exists between currency exchange rates and financial performance, it is quite likely that the fluctuating and unstable exchange rate was a contributing factor in the increasing profitability of banks. The contention that there is a correlation between different currency exchange rates and financial success lends credence to the above statement.

According to the data, there is a substantial and favorable correlation between interest rate and ROE (r=0.784, p0.05); this association is significant.This suggests that interest rate ratios follow the financial success of commercial banks in a step-for-step fashion, as demonstrated by ROE. According to Ngalawa and Ngare's (2014) research on interest rate risk management and the financial performance of Kenyan commercial banks, income gaps are sensitive to market interest rates as established by the CBK via the use of treasury instruments. This was found in their study on interest rate risk management and the financial performance of Kenyan commercial banks. One of the conclusions of their investigation was precisely this one.

According to the findings of the correlation analysis (r=0.0143, p0.05), there is a significant but uncertain connection between return on equity (ROE) and money supply.This suggests that ROE and money flow, both significant elements, have an effect on the financial success of commercial banks. This is in line with Wafula's (2015) argument that the amount of money in circulation has a significant impact on the profitability of Kenyan commercial banks. According to Mulwa (2015), the instruments of monetary policy used by the Central Bank of Kenya do not have a significant influence on the overall financial performance of Kenyan Commercial Banks. The findings of this investigation showed a different result.

4.2.2 Regression Analysis

Regression analysis was used to assess the degree of the direct relationship between the attributes of the board and the financial performance of the organization. The accuracy of the models was evaluated using OLS regression model estimation, with currency exchange rates, rates of interest, price increases, money supply, and return on equity serving as the variables that were dependent. It was determined, based on the F-statistics, whether or not the models were appropriate for analysis and whether or not their overall significance was significant. According to the assumption known as the null hypothesis, the coefficients associated with regression are all zero.

4.2.2.1 Diagnostic Tests

Post estimating and pre assessment tests were carried out in advance of generating the regression model. As part of the pre-estimation process, both the unit's root tests and the multi-collinearity tests were carried out. The normality test, the autocorrelation test, and the heteroscedasticity test are all included in the post estimation tests. Because of this, it becomes easier to prevent the appearance of misleading regression findings.

4.2.2.1.1 Test for normality

The researchers used the Jarque-Bera test to evaluate the conformity to normality in the study. When the p-value is determined to be less than 0.05, it signifies that there exists enough evidence to reject the null hypothesis of normality at a significance level of 5%. Given that the p-value for the marginal is less than five percent, the null hypothesis is rejected. This observation suggests that there exists enough data to make an inference that the residuals adhere to a normal distribution.The findings of the Jarque-Bera test are shown in Table 4.3, indicating that the residuals have a normal distribution.

Table4.3: Test for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)adj	chi2(2)	Prob>chi2
ROE	247	0.0000	0.00000	71.28	0.000
Exchange Rates	247	0.0000	0.00710	22.69	0.000
Inflation Levels	247	0.0000	0.00000	25.9	0.000
Interest Rate	247	0.0000	0.00000	74.49	0.000
Money Supply	247	0.0000	0.00000	123.08	0.000

Source: Field data (2021)

4.2.2.1.2 Testing for Homoscedasticity

The Breusch-Pagan test was developed as a means of assessing heteroskedasticity in ordinary least squares (OLS) regression models, with the ROE serving as the dependent variable. An experiment was conducted to see if the remainder of the variance remained constant. Based on the null hypothesis, it is posited that the residuals exhibit a regular distribution. During the study, the null hypothesis asserts that the variability in the number of error terms stays constant.The findings shown in Table 4.4 demonstrate that the error terms display homoscedasticity, as indicated by the p-value of 0.0710, which falls below the standard significance threshold of 5%.

Table4.4: Test for Heteroskedasticity

Breusch –Pagan Test
H0:sigma(i)^2= sigma^2for alli
Prob>chi2= 0.0710

Source: Field data (2021)

4.2.2.1.3 Test for autocorrelation

To determine if there was serial correlation in the residuals across time, the Wooldridge test for autocorrelation was used. The absence of first-order serial/autocorrelation is claimed by the null hypothesis.Table 4.5's findings reveal that the null hypothesis—which contends that there is no autocorrelation—is supported. A p-value of 0.0525 indicates that it may be concluded that the residuals do not show autocorrelation.

Table4.5:Correlation Tests

Wooldridge test for autocorrelation in panel data
H_0:nofirst-orderautocorrelation
F(1, 40) = 6.840
Prob>F = 0.0525

Source: Field data (2021)

4.2.1.4 Hausman Test for random and fixed effects

When deciding whether to employ a model with fixed effects or one with random effects for the model, the Hausman test, which is covered in section 4.6, was used. In the Hausman test, the starting point was the assumption that the model with fixed effects would perform better than the model with random effects. The Hausman test determined that the chi-square value of the model, which had an ap-value of 0.9855 and a chi-square value of 1.09, did not meet the criteria for statistical significance at the 5% level. Since the fixed effect model for return on assets was not shown to be significantly inferior to the random effects model, Greene's (2008) stated null hypothesis that the random effects model was superior to the fixed effect model was supported. According to Greene's hypothesis, the results were more favorable with the random effects model compared to the fixed effect model.

Table4.6: Test for random and fixed effects

Column1	**(b)**	**(B)**	**(b-B)**	**sqrt(diag (V_b-V_B))**
	fixed	random	Difference	S.E.
Exchange Rates	0.049384	-0.052279	0.003562	0.00742
Inflation Levels	-0.027458	-0.028134	0.000676	0.001307
Interest Rate	0.007855	0.007356	0.000499	0.000893
Money Supply	0.232333	0.2389956	-0.00666	0.011326

b= consistent under Ho and Ha; obtained from xtreg

B=inconsistent under Ha, efficient under Ho; obtained from xtreg Test :Ho: difference in coefficients not systematic

chi2(4)=(b-B)'[(V_b-V_B)^(-1)](b-B)=1.09

Prob>chi2= 0.9855 (V_b-V_Bis not positive definite)

Table4.7: Test for Multicollinearity

Variable	**VIF**	**1/VIF**
Exchange Rates	2.04	0.491022
Inflation Levels	1.93	0.518038
Interest Rate	1.79	0.559570
Money Supply	1.74	0.575291

Source: Field data (2021)

According to the findings in Table4.7, each of the variables that were independent had a variance inflation factor that was lower than 10 (vif 10) and a Tolerance Statistics value that was higher than 0.10 (1/vif> 0.10). As a consequence of this, the findings of the research came to the conclusion that multicollinearity was not an issue.

4.2.2.1.5 Stationarity Test

A test for unit roots was performed in this research to verify that there were no unit roots present (which indicates that the panel data are stationary). The Harris-Tzavalis unit-root test was used in this experiment with the null hypothesis that Panels are not

stationary. The p-values for the study variables need to be more than 0.05 in order to rule out the null hypothesis. Table 4.8 displays the outcomes of the stationary test.

Table4.8: Stationarity Test

Variable	Statistic	z	p-value
ROE	0.3321	-2.11597	0.0124
Exchange Rates	0.3718	-0.4408	0.0277
Inflation Levels	0.4376	-1.8334	0.0257
Interest Rate	0.3663	-1.9622	0.0414
Money Supply	0.3512	-2.2242	0.0223

Source: Field data (2021)

A comprehensive overview of the results of the Stationarity test can be found in Table 4.8. These results were derived from the information that was received throughout the examination. A p-value that is more than 0.05 suggests that there are unit roots (H0), while a p-value that is less than 0.05 suggests that there are no unit roots. The results of the stationarity test, which are shown in Table 4.8, demonstrate that not a single one of the variables had p-values that were higher than the significance threshold of 0.05. As a consequence of the fact that one is driven to suppose that the panels being examined revealed stationarity, one arrives at the conclusion that the null hypothesis should not be accepted. This is because the assumption leads one to believe that stationarity exists.

4.2.2.2.1 Model Summary

The model summary use the R-Squared metric to assess the degree of fit of a model. The information is shown in Table 4.9.

Table 4.9 Model summary

R	R Square	Adjusted Square	R Std. Error of the Estimate
.865[a]	.749	.737	.37250

Source: Field data (2021)

Table 4.8 provides a summary of the data obtained from the model, and it demonstrates that the coefficient of determination, also known as R square, is 0.749. This value suggests that the model's independent variables may explain for about 74.9% of the variation in the variable that is being studied (the dependent variable). The square root of the adjusted correlation coefficient is 0.737, and it was calculated so that it takes into account the entire number of predictors in the model. The estimation has a standard error of 0.372, which indicates that there is a discrepancy of 0.372 units on average between the values that were observed and the values that were predicted. It is possible to draw the conclusion, based on the fact that the value of the correlation coefficient (R) is 0.865, that the independent variable and the dependent variable have a significant positive association. The value of the coefficient of determination, which is also often referred to as the R-squared value, was determined to be 0.749. According to these findings, 74.9% of the variation in the financial performance of Kenyan commercial banks can be ascribed to the predictor variables, which include exchange rates, interest rates, inflation, and money supply. This is a significant amount of variation in the financial performance of Kenyan commercial banks. This demonstrates that there is a significant and favorable connection between the financial performance of Kenyan commercial banks and a change of one unit in the predictor variables. These predictor variables include exchange rates, interest rates, inflation, and money supply. The findings of this study point to the possibility that the observed difference in variance of 25.1% is due to factors that have not been well addressed.

4.2.2.2.2 ANOVA

The findings of the analysis of variance (ANOVA), as shown in Table 4.9, demonstrate the assessment of the model's adequacy. The results revealed a statistically significant correlation ($F = 61.171$; $p < 0.05$) between the variables that were both dependent and independent. The economic performance of Kenyan commercial banks is influenced by several predictive variables, such as currency rates, interest rates, inflation, and the supply of cash, resulting in a direct impact. Furthermore, the observed value of F is 61.171, indicating statistical significance as shown by its p-value of 0.000, which falls below the predetermined alpha level of 0.05. As a result of this, it can be seen that the independent variables have a significant influence on the predictive capability of commercial banks in Kenya.

Table 4.10 ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.951	4	8.488	61.171	.000[b]
	Residual	11.378	242	.139		
	Total	45.329	246			

Source: Field data (2021)

4.2.2.2.3 Regression coefficients

In order to ascertain the statistical significance of the individual regression coefficients in the study, the researchers used regression coefficients. The results are shown in Table 4.11.

Table 4.11 Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.096	.256		.375	.000
Exchange Rates	0.039	.005	.483	8.062	.000
Inflation Levels	0.014	.057	.094	3.180	.041
Interest Rate	0.002	.001	.236	3.780	.000
Money Supply	0.003	.001	.207	4.417	.000

a. Dependent Variable: Financial Performance

Source: Field data (2021)

The specific model therefore was;

$ROE=0.000+0.039X_{1t}-0.014X_{2t}+0.002X_{3t}-0.003X_{4t}$

It is reasonable to draw the conclusion from the regression equation that an increase of 0.039 units in the financial performance of Kenya's commercial banks is correlated to an increase of one unit in the value of the exchange rate. This occurs as a result of the value of the exchange rate increasing by one unit. There is a link, as shown by the regression equation, between a one-unit rise in inflation levels and a corresponding shift of 0.014 units in the financial performance of Kenyan commercial banks. This shift occurs when inflation levels increase by one unit. The movement in this direction is going in the opposite direction. It is also possible to demonstrate that a change in interest rates of one unit corresponds to a change in the financial performance of Kenyan commercial banks of 0.002 units. This is something that can be shown. This may be shown by solving a series of mathematical equations. One way to demonstrate this is by establishing a correlation between the two variables in question. An increase in the money supply by one unit has the same effect on the financial health of Kenya's commercial banks as an increase of 0.003 money supply units. This information originates from research carried out in Kenya. The information necessary for this was given by the Central Bank of Kenya.

References,

Abdou, A. A., & Annis, R. M. (2011). Review of literature linking corporate performance to mergers and acquisitions. *The Review of Financial and Accounting Studies*, *1*(1), 89-104.

Aburime, T.U. (2017). D*eterminants of Bank Profitability: Macroeconomic Evidence from Nigeria*. *Journal of Development Economics* 63, 113-135

Al-Khouri, R. (2017). Assessing the Risk and Performance of the GCC Banking Sector, *International Journal of Finance and Economics*, 65 (3), 72-80.

Austin, J. L. (2013). Performative utterances. *The semantics-pragmatics boundary in philosophy*, *21*.

Bennett, W., Lance, C. E., & Woehr, D. J. (Eds.). (2014). Performance measurement: Current perspectives and future challenges.

Bishop, J A C (2017): "*Bank Capital Regulation in Contemporary Banking Theory: A Review of the Literature",* BIS Working Paper, no. 90, Basel. September

Black, F. , Jensen M.C Scholes, M.(1972). *The Capital Asset Pricing Model: Some Empirical Tests*. New York. Praeger Publishers Inc.

Borg, W. (2007). *Educational Research: An Introduction, 8th Edition.* New York. Longman.

Borio, C (2006): "*Market liquidity and stress: selected issues and policy implications*", BIS Quarterly Review, Basel, November, pp 38-48.

Borio, C, B English and A Filardo (2015): "*A Tale Of Two Perspectives: Old Or New Challenges For Monetary Policy*?", BIS Working Paper, no 127, Basel, February

Brock, P.L. and Suarez, L.R. (2013), Understanding the behavior of bank spreads in Latin

Chen, H., Lim, E. P. and Chen, G. (2015). Business Intelligence and Analytics: Research Directions. Singapore Management University Institutional Knowledge

Chen, Nai-Fu; Roll, Richard; Ross, Stephen (1986). "Economic Forces and the Stock Market" (PDF). *Journal of Business.* 59 (3): 383–403.

Cheng, M. H., Tzeng, Z. C., & Kang, W. L. (2017). *The impact of non-macroeconomic events on Taiwan electronic industry stock index returns.* Global Economy and Finance Journal, 4 (1), 80-101.

Cooper, D.R., & Schindler, P.S. (2006).*Business Research Methods* (9thed.). Boston: McGraw-Hill Irwin.
Detragiache, E. (2015). Monitoring Banking Sector Fragility: A Multivariate Logit Approach. IMF Working Paper, No. 106.

Egetache, T. (2015). The Impact of Exchange Rate of Commercial Banks in Ethiopia. Addis Ababa University College of Business and Department of Accounting
Fama, E. (1970). "Efficient Capital Markets: A Review of Theory and Empirical Work". *Journal of Finance.* 25 (2): 383–417.
Franklin,M., Graybeal, P & Cooper, D. (2019). *Principles of Accounting Volume 2 - Managerial Accounting.* Houston, Texas. 12th Media Services.
Goodhart, C and Danielsson, J. (2006): "*The inter-temporal nature of risk", 23rd SUERF Colloquium on "Technology and finance: challenges for financial markets, business strategies and policy makers"*, Brussels, October.
Gu, Z. & Kim, K. (2002). Determinants of Restaurant Systematic Risk: A Reexamination. *Journal of Hospitality Financial Management*. 10 (2) 1-1-2002
Harker, P.T & Satvros, A.Z. (1998). What drives the performance of financial institutions? The Wharton School, University of Pennsylvania, Philadelphia, PA, working paper.
Healy, K. S., & Ruback, R. (2013). Corporate mergers and financial performance: a new assessment of Indian cases. *Nankai Business Review International*.
Henry, W. (2007). "Embedding risk management: structures and approaches", *Managerial Auditing Journal*, pp.392– 409, 20
Hoggarth G (1996) *Introduction to Monetary Policy: Handbooks in Central Banking, no. 1*
Karumba, M. & Wafula, M. (2017). *Collateral Lending: Are there Alternatives for the Kenyan Banking, KBA Centre for Research on Financial Markets and Policy* Working Paper Series Industry, WPS/03/12
Khasawneh, A.Y (2017). The Determinants of OBS Activities in Jordan Banking System: Panel Data Analysis. *European Journal of Economics, Finance and Administrative Sciences*
Khrawish, H.A. (2017). *Determinants of commercial banks profitability: Evidence from Jordan.* International Research Journal of Finance and Economics, 5 (5), 19-45.
Kiganda, E.O (2014). Effect of Macroeconomic Factors on Commercial Banks Profitability in Kenya: Case of Equity Bank Limited. *Journal of economics and sustainable development*. 5 (2) 2014
Kithinji, A.M. (2016). Credit Risk and Profitability of Commercial Banks in Kenya, African International Business and Management Conference 2017.
Kothari, C. R. (2015). *Research Methodology -Methods & Techniques.* New Delhi: Wiley Publishers.
Lagat, C.C. and Nyandema, D.M. (2016). The Influence Of Foreign Exchange Rate Fluctuations On The Financial Performance Of Commercial Banks Listed At The Nairobi Securities Exchange. *British Journal of Marketing Studies* 4 (3).1-11.
Lambe I. (2015). Assessing the Impact of Exchange Rate Risk on Banks Performance in Nigeria. *Journal of Economics and Sustainable Development*. 6 (6) 2015
Lintner, J. (1965). "The *Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets*". The Review of Economics and Statistics. The MIT Press. 47 (1): 13–39.
Lole, T. M. (2012). *The effects of mergers and acquisitions on financial performance of insurance companies in Kenya: A case study of APA Insurance Limited* (Doctoral dissertation, University of Nairobi).
Low, R.K.Y.; Faff, R.; Aas, K. (2016). "Enhancing mean–variance portfolio selection by modeling distributional asymmetries". *Journal of Economics and Business*.
Mahdavi D. B. (2013). "*The Non-Misleading Value of Inferred Correlation: An Introduction to the Cointelation Mode*l". Wilmott Magazine.
Maigua, C. and Mouni, G. (2016). Influence of Interest Rates Determinants on the Performance of Commercial Banks in Kenya. *International Journal of Academic Research in Accounting, Finance and Management Sciences*. 6 (2) 121–133
Makinde, O.H. (2016). Effect of Interest Rate on Commercial Bank Deposits in Nigeria (2013-2013) Proceeding of the First American Academic Research Conference on Global Business, Economics, Finance and Social Sciences (AAR16 New York Conference)] New York, USA.
Markowitz, H.M. (March 1952). "Portfolio Selection". *The Journal of Finance.* 7 (1): 77-91.
Maysami, R. C. and Kho, T. S.(2013). *A Vector Error Correction Model Of The Singapore Stock Market.* International Review of Economics and Finance, 9 (3)79-96.
Mossin, Jan. (1966). "*Equilibrium in a Capital Asset Market."*Econometrica, 34(.2) 768-83
Mugenda, O.M and Mugenda, A.G. (2015).*Research Methods, Quantitative and Qualitative Approaches*. Nairobi: Acts Press.
Mulwa, G. K. (2015). The Effect of Monetary Policy on the Financial Performance of Commercial Banks in Kenya. Thesis, University of Nairobi
Mwahunga, J.S (2013). Challenges of Safeguarding the Intangible Cultural Heritage of Elements Listed in the Urgent Safeguarding and Representative Lists of the 2015 ICH Convention.· *SSRN Electronic Journal*
Myers, S. C. (1984). *The capital structure puzzle.* Journal of Finance, 39:3, 575-592.
Nairobi Securities Exchange Website: www.nse.co.ke Accessed on 25th May, 2015.
Ngure, I. M. (2014). The Effect of Interest Rates on Financial Performance of Commercial Banks in Kenya. Thesis University of Nairobi
Njeri, B.K., Ombui, K. and Kagiri, A.W. (2015). Determinants of Interest Rate Spread of Commercial Banks in Kenya. *International Journal of Science and Research* (IJSR)ISSN (Online): 2319-7064. 4(11)2015
Obidike, P. C., Ejeh G. C. Ugwuegbe. S. U. (2015). The Impact of Interest Rate Spread on the Performance of Nigerian Banking Industry. *Journal of Economics and Sustainable Development*. 6 (12) 2015
Oleka C. D., Eyisi A. S. and Onyeze C. N. (2014). Empirical Study of the Impact of Inflation on Bank Performance: Implication for Investment Decision Making in Banking Industry in Nigeria. *Humanity & Social Sciences Journal* 9 (2): 61-71.
Ongore, V. O., &Kusa, G. B. (2013). Determinants of financial performance of commercial banks in Kenya. *International journal of economics and financial issues*, *3*(1), 237.
Opuodho G. O. (2014). Effects of Inflation on Commercial Banks' Lending: A Case of Kenya Commercial Bank Limited. United States International University Africa

Otweyo, E. S. (2014). *Market Factors that affect Returns for Companies Quoted at the Nairobi Securities Exchange*. Unpublished Project. KCA University
Pandey, I.M. (2017). *Financial Management*. New Delhi, India: UBS Publishers.
Pinto, N.,Igbal, C, B., & Rahman, I, (2015). Determinants of banks' performance: evidence from EU 27 banking systems. Procedia Economics and Finance, 20, 518-524.
Prasanna, G. (2013). *Systemic Risk: The Dynamics of Modern Financial Systems.* Oxford University Press
Rijbarova, D. (2017). *Research Methods for Business Students*. Fourth Harlow. England, FT Prentice Hall, Pearson Education
Ross, S.(1976). "The arbitrage theory of capital asset pricing". *Journal of Economic Theory*. 13 (3): 341–360.
Saunders, A. and Cornett, M. M. (2014). Financial Institutions Management: A Risk Management Approach. [e-book] New York: McGraw-Hill Higher Education.
Sharma, E., & Mani, M. (2017). *Impact of macroeconomic and financial market indicators on the banking sector: Some evidence from India.*International Journal of Research in Finance & Marketing, 2 (2), 171-185.
Sharpe, W. F. (1964). "Capital asset prices: A theory of market equilibrium under conditions of risk". *Journal of Finance.* 19 (3): 425–442.
Simpasa, A.M. (2017). Competitive Conditions in the Tanzanian Commercial Banking Industry, African Development Review, 23 (1) 88-98
Thiel M (2017) Finance and Economic Growth – A Review Of Theory And The Available Evidence. European Communities.
Ueda K, Mauro BW (2013) Quantifying Structural Subsidy Values for Systemically Important Financial Institutions. International Monetary Fund, Washington DC.
Wafula, E.E. (2015). Effect of Plastic Money on the Financial Performance of Commercial Banks in Kenya. Thesis University of Nairobi
Yanan, E. M., Hamza, S. M., & Basit, A. (2016). Impact of merger and acquisitions on firms financial performance: A study on United States of America. *International Journal of Accounting and Business Management*, *4*(2), 159-169.
Yichilal S (2019), Adoption of international financial reporting standards (IFRS) in Ethiopia. 04 (03) 50-51
Zikmund, C. Babin, M. Carr, K. & Griffin, W. (2016). *Educational Research: An Introduction* (Fifth ed.) New York: Longman.