MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
SULEYMAN DEMIREL UNIVERSITY
SDU BUSINESS SCHOOL

«Approved»
Head of department
«Economics and Business»
PhD. Azimbekova Aigerim
«14» 06 2023

THESIS WORK

Theme: **«Revenue management and scheduling»**

Specialty **«Economics»**

Submitted by Student — Abilkassymov Nurzhan
2-nd course, group
«7M04101-Economics»
(signature of the student)

Scientific Supervisor
PhD, Associate Professor — Oskenbayev Yessengali
(signature of the supervisor)

Kaskelen, 2023

Abstract

Purpose: The primary objective of this study is to investigate the correlation between specific factors like and asset returns within the banking industry of Kazakhstan. The Capital adequacy ratio is a metric that assesses the proportion of a financial institution's capital to its assets, with the aim of evaluating its capacity to meet its obligations. Because our country's banking sector is one of economy's strongest features, it is widely known that banks use the capital adequacy ratio to maintain the abundant capital holdings on hand when taking risky exposures into ongoing operations.

Study covers the period 2013-2020 containing information about 38 banks of Kazakhstan, author hopes that the studies will give clear evidence of the correlation between capital adequacy, operational expense ratio, interest rates spread and cash-asset ratio to return on assets of commercial bank in Kazakhstan. It will rely on secondary data derived from National Bank of Kazakhstan reports.

Relevance: The capacity of a corporation to enhance its is indicative of its efficacy and productivity in administering its balance sheet to generate earnings. Conversely, a reduced ROA implies that there exists potential for the enterprise to effectuate enhancements. The study's findings will enable the management team to optimize revenue and improve its allocation.

Key methodological aspects: The study was conducted using a descriptive and quantitative approach. The data were analyzed by using econometric techniques in this study: the fixed effects model and the random models.

Summary of Key Findings: The findings suggest that capital adequacy and operating costs exhibit a positive correlation with asset returns and possess a statistically significant association. Conversely, interest rates and cash-asset ratio demonstrate a negative correlation with return on assets.

Key conclusion: Managers can assess internal performance and detect and correct potential flaws in the company's investments. Having a better understanding of relations between the characteristics makes it easier to achieve success with financial procedures and make the business more profitable and sustainable.

KEYWORDS: Return on Assets. Capital Adequacy Ratio. Operating Expenses Ratio. Interest rates spreads. Cash-Assets Ratio.

List of figures

List of tables

List of abbreviations

CAR	Capital adequacy ratio
OER	Operating expense ratio
ROA	Return on Assets
ROE	Return on Equity
RWA	Risk-Weighted Assets

Introduction

According to Islam and Khan (2019), the banking sector plays a crucial role in enhancing the overall economic performance of a nation. Financial institutions known as banks perform multiple functions as intermediaries in the financial sector. At the outset, the funds obtained from investors are restructured into loans that are subsequently disbursed to corporate entities.

Return on Assets, abbreviated as ROA, is a measure of a bank's profitability that is calculated by contrasting the amount of profit that is retained after taxes with the total value of the bank's assets. It demonstrates the ability of the capital that has been invested in overall assets to generate profits, which describes the productivity of the bank as being concerned with a brief understanding of how much wealth must be collected and used in order to generate a certain amount of profit.

According to Disemadi (2019), the consolidation of small deposits from individual investors can facilitate the provision of large loans to firms. The health of a bank's finances serves the interests of all of the parties involved, including the owners of the bank, the managers (management) of the bank, and the community of people who use bank services. The parties may make use of information regarding the condition of a bank in order to evaluate the performance of the bank with regard to the establishment of prudential principles, compliance with existing regulations, and risk management. The conclusions drawn from the analysis of the bank's current status are one of the factors that can be considered when formulating an enterprise strategy for the foreseeable future.

ROA is a ratio that is used to measure the ability of bank management in obtaining profitability and managing the level of business efficiency of the bank. (ROA) is also known as the return on assets ratio. A higher value for this ratio indicates that the level of profitability of the bank's business is improving or becoming more robust. ROA is a comparison between profit before tax and the average total assets in a period. This comparison is performed over time. This ratio provides a useful indicator of the state of a bank's finances. This ratio is extremely

significant due to the fact that a bank's level of operational effectiveness can be inferred from the profits that are generated from the utilization of its assets.

The CAR is a measure that has been instituted by regulatory authorities within the banking sector, and functions as an instrument for assessing the stability of the banking system. The two main categories of capital within banks can be considered as having qualitative differences. The Tier 1 category of capital in a bank's financial statements encompasses the core capital, equity, and disclosed reserves of the bank. In the event of substantial losses incurred by a bank, the Tier 1 capital serves as a buffer that enables the bank to withstand the strain and maintain its operations in spite of unfavorable circumstances.

In contrast, the term Tier 2 refers to the additional capital that a bank possesses, which can include undisclosed reserves as well as unsecured subordinated debt instruments. Tier 1 capital is distinguished from Tier 2 capital by its higher level of liquidity and perception of safety. The total capital of a bank is found by adding both of the bank's tiers together. As per the guidelines outlined in Basel III, a bank is obligated to maintain a minimum total capital ratio of 8% of its risk-weighted assets (RWAs), while the minimum required ratio for Tier 1 capital is 6%. The Basel III accord stipulated that financial institutions are required to uphold a minimum of 2.5% of risk-weighted assets as reserves during periods of economic growth. Thus, individuals would be expected to possess a greater amount of capital during periods of economic downturn, such as a recession, in order to mitigate the risk of incurring substantial losses. The adherence to regulatory directives holds significant significance for financial establishments. In relation to regulatory measures in Kazakhstan, the NBK authorities mandate that banks, which have been identified as systemically important financial institutions as of 1 January 2020, must maintain a minimum total capital adequacy ratio (K2 ratio) of 12.0% and a Tier 1 capital adequacy ratio (K1-2) of 10.5% (inclusive of buffers applicable to such banks as systemically important financial institutions). Furthermore, banks are obligated to provide monthly reports on the aforementioned ratios to the NBK.

The crucial nature of the CAR pertaining to commercial banks has garnered significant attention in financial literature. So CAR is calculated by sum of Tier I and Tier II capital divided by RWA.

Numerous academic studies carried out by scholars abroad suggest that diverse capital adequacy factors exert a favorable influence on the banking industry. The importance of recognizing efficiency in empirical models that link a bank's capital and risk has been emphasized by Kwan and Eisenbeis (1995). Furthermore, it is crucial to differentiating between effective and inefficient risk management in enterprises is crucial. The concept of capital adequacy has been extensively studied and researched, with the prevailing view being that it serves as a profit indicator (Bourke, 1989; White & Morrison, 2001). The current state of research in our country regarding the impact of capital adequacy on the operational efficiency of Kazakhstan's banking sector is insufficient.

The primary aim of this investigation is to determine the influence of asset repatriation on the capital adequacy of the banking sector in Kazakhstan. This study incorporated a set of variables that are infrequently employed by authors and researchers, namely ROA, CAR, OER, interest rates spreads on loans, and the cash asset ratio. The subsequent sections of the paper comprise an exposition of the study's research methods and empirical analysis, along with the presentation of the empirical data pertaining to the impact of capital sufficiency on asset returns. The section also expounds on the study's findings.

Literature Review

Due to the correlation between the health of the banking industry and the expansion of the economy, the banking industry is known to have a significant impact on the overall economic development of a country (Rajan and Zingales 1998, Cetorelli and Gambera 2001, Beck and Levine 2004). This is one of the reasons why the banking industry is often referred to as the "engine room" of an economy. Comprehending the influence of capital adequacy on the financial sector's profitability is a crucial matter not only for bank management but also for all diverse stakeholders and the National Bank of Kazakhstan.

There were many different arguments that could be made in favor of the idea that adequate capital should be maintained. The first argument proposes that the implementation of capital adequacy regulation encourages meticulous adherence to established standards; however, it fails to elucidate the rationale behind the necessity of regulating capital adequacy, which is a significant flaw in the argument. The second point is concerned with the regulation of capital adequacy as a means to address the moral hazard predicaments that are faced by regulators (Keufman, 1988). The third and final point is that legislation regarding capital adequacy protects small depositors in banks. Small depositors make up the majority of bank customers, so this protection is critically important.

The concept of capital adequacy has been extensively explored and researched due to its perceived significance as a key determinant of profitability in financial institutions. As per Al-Sabbagh's (2004) definition, capital adequacy denotes a quantifiable assessment of a bank's vulnerability to risk. It is generally accepted that credit risk, market risk, and operational risk make up the three subcategories that make up the classification of bank risk. This is due to the fact that capital is commonly understood to function as a mechanism for absorbing losses.

Kishore (2005) defines "capital adequacy" as the minimum level of funds required for a financial institution to operate in a prudent and cost-effective manner,

while also satisfying the demands of depositors for their funds. In other words, capital adequacy is the minimum amount of funds that a financial institution must maintain in order to operate its business. Financial institutions possessing sufficient capital will be capable of fulfilling their obligations while simultaneously preserving their portfolio of assets.

Pandey's (2005) research indicates that adequate capital refers to a predetermined amount of the capital balance that the banking sector employs to effectively execute its primary function of absorbing losses and preventing failure. Alternate theories, on the other hand, contend that the structure of capital and, as a consequence, the regulation of capital, are irrelevant in the hypothetical case of perfect financial markets (Modiglian and Miller, 1958).

In 1999, Demirguc-Kunt and Huizinga conducted a study on the effect of adequate capital to the comprehensive evaluation of the banking sector in 80 different countries during the time period that spanned from 1988 to 1995. According to the findings of the study, ensuring that adequate levels of capital are maintained has a positive impact on asset return, which was quantified as ROA. It was found that the CAR and ROA are positively correlated, while it had a negative effect on the return on equity (ROE), according to the findings that were presented by Abreu and Mendes (2002). They also did research on the banking systems of Germany, France, Portugal, and Spain between the years 1986 and 1999. Their focus was on the period between the two dates. According to the results of their research, it appears that these banking systems had a favorable effect on the CAR in terms of ROA and return on equity (ROE).

In 1969, Haslem conducted a significant investigation on the impact of financial reports on bank profitability. For the purpose of the study, information was gathered income and balance sheets from all of the financial institutions that were members of the Federal Reserve System in the United States. According to the results of his research, a sizeable number of financial reports displayed significant

associations with profitability. These associations were found to be most prominent in relation to the indicators of capital adequacy, interest expenses, bank magnitude, and loan magnitude. Wall's (1985) research indicates that the profitability of banks is significantly impacted by the bank deposit ratio.

Within the Kazakhstani banking industry, not much research endeavors have been carried out in order to determine the potential impact that the CAR may have on the ROA. An empirical investigation was carried out by Durguti (2020) with the purpose of analyzing the assumptions that were made concerning the determinants. The author has reached the conclusion, which is based on the initial hypothesis, that ROA has a positive influence on increasing the capital adequacy ratio in accordance with the standards established by Basel. According to the research that Berger (1995), the CAR demonstrates an upward trend. This would imply that banks have the potential to manage higher risk exposure by increasing the amount of share capital they have.

As per the findings of Groop and Heider (2007), banks that generate profits tend to exhibit a higher capital-to-assets ratio. Consequently, a correlation of a favorable nature is commonly observed between ROA and CAR.

Numerous studies have demonstrated diverse determinants that influence the capital adequacy of banks in general. The extent of research conducted in Kazakhstan on the subject of capital adequacy and its impact on asset return, particularly the ROA, is insufficient. The aim of this study is to develop a theoretical framework that can be used to evaluate the influence of capital adequacy on the profitability of the banking sector in Kazakhstan, based on empirical evidence.

A comparison of operating costs and operating income is what we mean when we talk about operational efficiency, also known as operating expenses operating income or operating expense ratio (OER). According to Iskandar (2017), this ratio is a useful tool for determining the extent to which a bank is capable of conducting its business in an effective and efficient manner. According to the findings of research

carried out by Heggestad (1977), which state that a significant effect on ROA is partially influenced by OER variable, this proposition is supported. Furthermore, according to the findings of research carried out by Al Iqbal and Budiyanto (2020), OER has a significant impact on Return On Assets (ROA).

The impact of interest rate spread was investigated by Mujeri and Younus (2009) through the utilization of panel data from 48 banks between 2004 and 2008. The study revealed that a negative correlation exists between the spread and the noninterest income as a proportion of assets, indicating that an increase in the latter leads to a decrease in the former. It was found that a correlation exists between the spread and the noninterest income as a ratio of assets, indicating that a lower spread results in a higher noninterest income as a ratio of assets. The study conducted by Daley and Dacosta (2012) investigated the impact of market interest rate on the profitability of two commercial banks in Jamaica between 2000 and 2008. The results revealed that the effect of market interest rate on bank profitability was insignificant, specifically in relation to treasury bills. This conclusion was reached as a result of the researchers' examination of the relationship between these two variables. Nevertheless, the impact of interest rate volatility on a company's profitability is negligible at best. Irungu (2013) conducted research between 2011 and 2013 on 43 commercial banks operating in Kenya and came to the conclusion that interest rate spread has a significant and positively correlated relationship with financial performance. Using the random effect model, Raza et al. (2013) investigated the factors that led to the profitability of 18 different banks across Pakistan between the years 2001 and 2010. Their research focused on the period from 2001 to 2010.

A liquidity ratio known as the current ratio is determined by dividing a company's current assets by its current liabilities. It provides an indication of the company's ability to pay its short-term obligations that are due within the next year. Research conducted by Bolek and Wili'nski (2012) revealed that a high current ratio has a detrimental impact on a company's profitability.

The researcher conducted an empirical literature review and discovered inconclusive findings regarding the relationship between interest rate spread and profitability. The financial performance of an organization has been found to have a strong positive and significant relationship with interest rate spread, according to various studies conducted by Bikker and Hu (2002), Musah and Gakpetor (2018), Karki (2020), Jui and Rafsan (2020), and Ullah and Khan (2021). Obidike et al. (2015) have reported that the interest rate spread has a negative and statistically significant impact on the long-term performance of banks. Khan and Sattar (2014) have reported that profitability is significantly and positively influenced by interest rate.Similarly, Gormus and Minny (2017) as well as Noreen and Parveen (2018) have reported that alterations in interest rates have a favorable effect on the profitability of a business. Ahmed et al. (2018) discovered that profitability is negatively impacted by interest spread.

Econometric analysis and model specification

The present investigation involves the econometric analysis of thirty eight commercial banks that operate within the banking system of Kazakhstan. The present investigation incorporated information sourced from a selection of financial institutions. The data was gathered over a decade-long span, from 2013 to 2020. The data was collected through audited reports obtained from each thirty eight banks who are mandatory to report their information to National Bank of Kazakhstan. The present study uses a regression model specification to examine the impact of CAR, OER, Interest rates spread and Cash-Asset Ratio on ROA in the banking sector of Kazakhstan.

$$ROA_{i,t} = A_0 + A_1\ CAR_{i,t} + A_2\ OER_{i,t} + A_3\ Interest\ Rate\ Spread_{i,t} + A_4\ Cash\text{-}Asset\ Ratio_{i,t} + u_{i,t}$$

The dependent variable in our study was identified as ROA. This metric is indicative of a company's profitability in relation to its overall assets. Several academic studies have used the linear regression model to investigate the relationship between internal factors and bank performance. The findings of the previously mentioned research demonstrate a strong negative association between the CAR and the ROA. The variable CAR has been used as an independent variable in our research as it serves as a gauge of the bank's capital, expressed as a percentage of the bank's credit risk exposures.

The study conducted reveals that interest spread can have a positive effect on the ROA when used as a secondary independent variable. Abre and Mendes (2000) assert that interest spread is a lucrative asset that yield high rates of return. Banks can generate greater income and profit by offering a larger number of loans. It is important to consider that a decrease in bank loans may lead to reduced profitability for banks if there is a corresponding increase in deposits.

In their investigation into the profitability of the Turkish banking sector, Tunay and Silpar (2006) found that the Cash-Asset ratio had a detrimental effect on ROA.

This was one of their key findings. interest rates spread have a primarily negative influence on ROA. Interest rates spread spread have an average of 4% -5% in practically every country. However, because some banks fail to declare interest rates spread, it is possible that the interest rates spread problem is worse than the published official data. In terms of the influence of interest rates spread on ROA, a study conducted by Kaya (2002) found that ROA had a negative impact on interest rates spread.

We employed methods such as linear regression and correlation model to test these variables. The regression model produces the findings that will be interpreted.

The hypotheses set out based on the studies of this kind are:

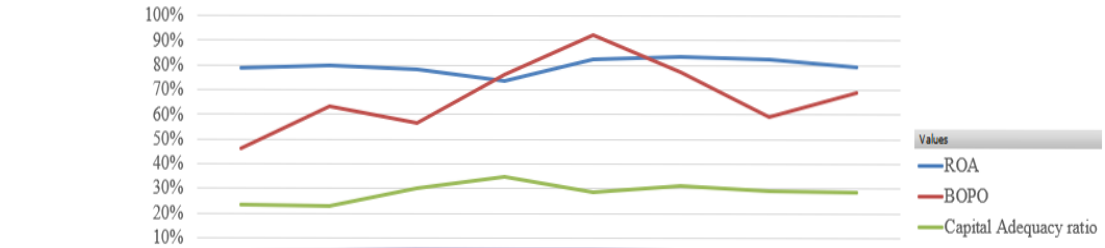
Hypothesis (H1): *The ROA and capital adequacy are positively correlated.*

Hypothesis (H2): *OER have a positive impact on asset return.*

Hypothesis (H3): *Cash-Asset Ratio has a negative impact on asset return.*

Hypothesis (H4): *Interest rates spread have a negative impact on asset return.*

Figure 4.1. Graphical illustration of financial ratios 2013-2020



	2013	2014	2015	2016	2017	2018	2019	2020
ROA	79%	80%	78%	74%	82%	83%	82%	79%
BOPO	46%	63%	56%	76%	92%	77%	59%	69%
Capital Adequacy ratio	23%	23%	30%	35%	29%	31%	29%	29%
Interest Rates	4%	5%	5%	5%	5%	5%	5%	5%
Cash-Asset Ratio	2%	2%	2%	3%	2%	2%	2%	2%

Source: Compiled by the author.

Furthermore, the graphical representation of the financial ratios of the banking sector in Kazakhstan is also provided, in addition to the tabular format. The graph

depicting the ROA exhibits a fluctuating trend over the years, characterized by both upward and downward movements. The banking industry exhibited a ROA of 79% in 2013, which went up to 79% in 2020. However, there was an decrease in ROA in 2016 and 2020 when compared to the previous year. From 2016 to 2019, the ROA continued to grow.

As shown in the figure, it is observed that the banking industry of Kazakhstan exhibits a commendable level of capitalization. The CAR in 2013 was recorded at 23%, a relatively low figure when compared to subsequent years. Also, in 2015, the CAR increased to 30%, yet remained way above the minimum threshold mandated by the NBK. The CAR exhibited a notable rise in 2016, reaching 35%. However, in 2017 the CAR experienced a decline, with values of 29% . Financial institutions have consistently upheld the CAR at a level that exceeds the minimum requirements established by the NBK.

OER starts from 46% in 2013 and fluctuates up and down till 2020 and reaches 69%. From this, we can draw the conclusion that banks are looking into various methods by which they can decrease their expenses and increase their revenue.

The graph shows that the banks of Kazakhstan exhibit a stable level of interest rates spread and Cash-Asset Ratio. Interest rates spread start at 3% in 2013 and remain constant till 2020 at level of 5%. Cash-Asset Ratio are at level of 2% from 2013to 2020, except 2016 when it increased till 3%.

The study's econometric outcomes and discoveries.

The tabulated econometric outcomes are utilized to scrutinize the impact of capital adequacy (CAR) on ROA. The present investigation employs the econometric technique through regression analysis, as depicted in the aforementioned equation, to conduct data analysis and ascertain the existence of a significant association between the dependent variable of ROA and independent variables, including CAR, OER, interest rates spread on loans, and Cash-Asset Ratio. The regression model and correlation is utilized for the purpose of interpreting the outcomes.

Regression model

The regression model's tabulated empirical findings indicate that banks' asset returns are positively influenced by capital adequacy (CAR) and that this relationship is statistically significant. The present favorable result is associated with the investigations conducted by Shiang Liu (2013), which indicate that in the banking industry, CAR exerts a positive influence on ROA. However, this finding is in contrast with the outcomes of Kamande's (2016) study, which suggests that CAR has an adverse effect on ROA.

Table 4.1 Regression model outcomes

VARIABLES	(1) ROA
OER	0.0169**
	(0.00771)
CAR k1	0.00719
	(0.0699)
CAR k12	-0.322***
	(0.106)
CAR k2	0.392***
	(0.0779)
Interest spread	-0.0509
	(0.160)
Cash-Asset Ratio	-0.267
	(0.379)
Constant	0.778***
	(0.0656)

Observations	774
R-squared	0.071

Source: computed by Stata software

$$ROA_{i,t} = 0.778 + 0.00719\ CAR\ k1_{i,} - 0.322\ CAR\ k12_{i,t} + 0.392\ CAR\ k2_{i,} + 0.0169\ OER_{i,t} - 0.0509\ Interest\ Rate\ Spread_{i,t} - 0.267\ Cash\text{-}Asset\ Ratio_{i,t} + u_{i,t}$$

The model of regression that is discussed in the statement is a multiple linear regression model. The dependent variable in this model is called ROA (Return on Assets), and there are seven independent variables: CAR k1, CAR k12, CAR k2, OER, Interest Rate Spread, Cash-Asset Ratio, and an error term (ui,t). The value model has calculated the constant as 0.778. It means that if there is no influence from the independent variables, then the value of the ROA would be at the level of 77.8%.

The strength and direction of the relationship between an independent variable and a dependent variable is represented in the model by the coefficients of each independent variable. For instance, the coefficient for CAR k1 suggests that there will be a 0.00719 increase in ROA for every unit increase in CAR k1. This is the case because the coefficient for CAR k1 is a linear relationship. In a similar vein, the coefficient for CAR k12 indicates that the ROA will decrease by 0.322 percentage points for every unit increase in CAR k12 that is observed.

Similar to the coefficient for OER, the coefficient for ROA suggests that there will be a 0.0169 increase in ROA for every unit increase in OER. However, the coefficient for Interest Rate Spread is negative, which indicates that there will be a decrease in ROA of 0.0509 for every unit increase in Interest Rate Spread. This is because the coefficient for Interest Rate Spread is negative.

The coefficient for Cash-Asset Ratio is also negative, which suggests that an increase in Cash-Asset Ratio will lead to a decrease in ROA. This means that a company that maintains high levels of cash may lead to the underutilization of its assets, which will reduce the earning potential of the company. The error term stands

for any factors that have not been observed or measured, but may have an effect on ROA. In general, the objective of the regression model is to establish a connection between the independent and dependent variables and to provide an explanation of the unique ways in which each independent variable has an impact on the dependent variable (ROA). These models can be helpful in determining the factors that influence the performance of a company, assisting organizations in optimizing their use of resources, and assisting investors in making informed decisions about their investments.

The current investigation demonstrates that there is a significant relationship between the interest rates spread on loans and the ROA, with the former having a favorable impact on the latter. If the interest spread on loans goes up by one percentage point, the ROA will go up by 0.16 percentage points in response to the change. The table that is presented reveals that there is a significant correlation between interest rates spread (interest rates spread), and the detrimental effect that these interest rates spread have on the Return on Bank Assets (ROA). To be more specific, there is a correlation between a 1% increase in interest rates spread and a 0.10% decrease in ROA. This finding is consistent with the theory that high interest rates spread present a risk to financial institutions because loans may not be repaid, which has a knock-on effect on the profitability of the financial institution.

There is a statistically significant correlation between these two variables, and the empirical findings of this research indicate that capital adequacy has a positive impact on the return of bank assets. Additionally, there is a correlation between these two variables. The purpose of this report is to promote the stability and efficiency of the financial system while also working to ensure the protection of depositors. The capacity of CAR's minimum ratios to guarantee that banks have adequate risk management strategies in place to absorb a reasonable amount of losses prior to reaching a state of insolvency is the primary reason for the significance of these ratios. This ensures that depositors' money is safeguarded. The adoption of CAR is aimed at enhancing the effectiveness and resilience of a country's financial system by

reducing the probability of banks encountering bankruptcy and non-payment. There is a direct correlation between the bank's CAR and the degree of protection afforded to depositors' funds.

Hypothesis 1: There is a positive correlation between the CAR and the ROA. The findings derived from the econometric models utilized to test the initial hypothesis posited in this investigation, which asserts that capital adequacy exerts a positive influence on asset return, have been validated. It comes from all the three CAR types, k1, k1-2 and k-2 all together combined they make up positive impact on ROE.

Hypothesis 2: The hypothesis posits that OER have a positive impact on asset returns. The hypothesis was confirmed by the empirical results obtained from the regression model. According to the relationship between the coefficient for OER and the coefficient for ROA, it appears that there will be an increase in ROA of 0.0169 for every unit increase in OER.

Hypothesis 3: The Cash-Asset Ratio tends to have a negative effect on the ROA. The coefficient for Cash-Asset Ratio is also negative, which suggests that an increase in Cash-Asset Ratio will lead to a decrease in ROA. This can be deduced from the fact that ROA is negatively correlated with CAR. This indicates that a company that maintains high levels of cash may lead to the underutilization of its assets, which will result in a reduction in the earning potential of the company.

Hypothesis 4: There exists a negative correlation between interest rates spread and asset returns. The coefficient of -0.267, which is negative, indicates that there exists an inverse relationship between the cash-asset ratio and the ROA of the bank. Specifically, an increase in the former is linked to a decrease in the latter. It can be inferred that financial institutions possessing elevated cash-asset ratios may encounter a reduced return on assets.

The results of this study have provided insights into the factors that significantly affect the asset returns of financial institutions. Accepting all four

hypotheses has confirmed the initial assumptions and established the relationships between the variables. The study's findings reveal that capital adequacy, operating expenses, and interest rate spread play crucial roles in driving asset returns. A positive correlation is present between capital adequacy and return on asset, which indicates that higher levels of capital adequacy can lead to better asset returns. The study establishes a positive effect of operating expenses on asset returns, indicating that companies that invest more in operating expenses may achieve higher asset returns. Additionally, the study concludes that maintained high levels of cash in the financial institution lead to reductions in the earning potential of the company.

A unique element of this study is that it analyzes the impact of multiple variables on asset returns, which can provide a more comprehensive understanding of the process. It is evident that managing operating expenses and maintaining an optimal capital adequacy ratio are essential for financial institutions to achieve higher asset returns. The study's findings suggest that financial institutions should focus on balancing the level of cash assets with earning returns for achieving maximum asset returns. These results could be useful for financial professionals and policymakers who seek to optimize the performance of financial institutions.

Correlation model

The correlation coefficient is a statistical metric that quantifies the degree of a linear association between two variables. The range of values for this variable spans from negative one to positive one. A correlation coefficient of -1 indicates a complete negative or inverse correlation between two variables. This means that as the values of one variable increase, the values of the other variable decrease and vice versa. A coefficient value of 1 indicates a complete positive correlation, which implies a direct relationship between the variables. A correlation coefficient of zero denotes the lack of a linear relationship.

Correlation coefficients are utilized in both scientific and financial contexts to evaluate the extent of correlation between two variables, factors, or sets of data.

Given that high oil prices are advantageous for crude producers, it could be inferred that there exists a strong positive correlation between oil prices and forward returns on oil stocks. The analysis of market data indicates a moderate and inconsistent correlation between the variables over extended time periods, as evidenced by the calculation of the correlation coefficient.

Correlation coefficients are employed to evaluate the magnitude of relationships among variables in data. The Pearson correlation coefficient is a widely used statistical measure that evaluates the magnitude and direction of a linear association between two variables.

The values of a correlation coefficient typically vary between -1, indicating a perfectly inverse or negative relationship, and 1, indicating a perfectly positive correlation. Values that are situated at or in proximity to zero signify the absence of a linear association or a correlation that is exceedingly feeble.

The determination of significant correlation coefficients is contingent upon the specific context in which they are employed. The determination of statistical significance for a correlation can be computed based on the correlation coefficient and the sample size, under the assumption of a normal distribution of the population. We ran a Pearson's correlation model in Stata software, to see the statistical analysis of the connection between variables. Table 2. shows the all information on the correlation of ROA to other variables.

Table 4.2 Correlation model outcomes

Name	*ROA*	OER	*CAR (k1)*	*CAR (k1-2)*	*CAR (k2)*	*Interest spread*	*Cash-Asset Ratio*
ROA	1,00						
Operating Costs	0,08	1,00					
CAR (k1)	0,13	-0,07	1,00				

CAR (k1-2)	0,14	-0,08	0,97	1,00			
CAR (k2)	0,17	-0,07	0,95	0,98	1,00		
Interest spread	-0,03	0,19	0,01	-0,02	-0,04	1,00	
Cash-Asset Ratio	-0,06	-0,02	-0,18	-0,21	-0,20	0,08	1,00

Source: computed by Stata software

The presented tabular data illustrates the correlation existing between ROA (return on assets) and various factors that exert an influence on a firm's financial performance.

The expenses associated with the day-to-day functioning of a business or organization are commonly referred to as operating costs. A positive correlation exists between the operating costs and return on assets (ROA), albeit with a relatively low correlation coefficient of 0.08. The empirical evidence suggests that there exists a positive but weak correlation between the increase in operating costs and the rise in return on assets (ROA).

The Capital Adequacy Ratio (CAR) is a metric utilized to evaluate a bank's capacity to withstand losses. The study reveals a positive correlation between CAR (k1) and ROA, which is marginally stronger than the correlation observed with operating costs (0.13). Typically, an elevated CAR is indicative of a favorable financial performance for a banking institution.

The two CAR variants, CAR (k1-2) and CAR (k2), are the subjects of discussion. The capital adequacy ratio can be computed using various methods, however, it is noteworthy that both approaches exhibit a strong positive correlation with the return on assets, with coefficients of 0.14 and 0.17, respectively. The statement posits that the sustenance of a robust capital foundation is a crucial factor in the attainment of profitability by a financial institution.

The interest spread is a metric utilized to quantify the variance between the interest rate that a financial institution disburses on deposits and the interest rate it

accrues on loans. The study reveals a negative correlation (-0.03) between interest spread and return on assets (ROA), indicating that an increase in interest spread is typically linked to a decrease in ROA. This observation suggests a positive correlation between the level of interest income generated by banks and the degree of risk they undertake.

The liquidity of a bank's assets can be assessed by means of the Cash-Asset ratio metric. There exists a negative correlation (-0.06) between Cash-Asset ratio and ROA. This proposition implies that an increased degree of liquidity could potentially correlate with diminished profitability. Nonetheless, the correlation coefficient exhibits a comparatively modest value, suggesting that the association between the variables is not particularly robust.

To summarize, the profitability of a bank as measured by ROA appears to be primarily influenced by the capital adequacy ratio and operating costs. The correlation between the interest spread and ROA is paradoxical in nature and necessitates additional investigation.

Now we will check our four hypotheses on our correlation model outcomes:

Hypothesis 1: A direct relationship exists between the CAR and the ROA. The results obtained from the correlation models employed to examine the initial hypothesis proposed in this study, which suggests that capital adequacy has a favorable impact on asset return, have been confirmed. The positive impact on return on equity (ROE) is derived from the collective contribution of the three distinct categories of capital adequacy ratios (CAR), namely k1, k1-2, and k-2.

Hypothesis 2: The hypothesis suggests that OER exert a favorable influence on ROA. The empirical results obtained from the correlation model confirmed the hypothesis. Based on correlation observations the coefficients for OER and ROA, there is a positive correlation between the operating costs and return on assets (ROA), although the correlation coefficient is relatively low at 0.08. Based on empirical data,

it can be inferred that there is a positive albeit modest correlation between the escalation of operating expenses and the upsurge in return on assets (ROA).

Hypothesis 3: The Cash-Asset ratio and Return on Assets have a weakly negative correlation (-0.06) with one another. According to this proposition, a higher degree of liquidity could potentially correlate with lower levels of profitability. Despite this, the correlation coefficient has a value that is relatively low, which indicates that the relationship between the variables is not particularly strong.

Hypothesis 4: According to the findings of the study, there is a significant negative correlation (-0.03) between interest spread and return on assets (ROA). This indicates that an increase in interest spread is typically associated with a decrease in ROA. Based on this observation, it appears that there is a positive correlation between the amount of risk that banks are willing to take and the amount of interest income that banks generate. So Hypothesis 4 is also accepted.

In summary, the four hypotheses put forth in this investigation have been validated through the implementation of correlation models. The research has substantiated the correlation between capital adequacy and asset return, wherein the favorable effect on return on equity (ROE) was obtained from the three discrete groupings of capital adequacy ratios. The hypothesis that suggests a positive impact of operating expenses on return on assets (ROA) has been verified, although the correlation coefficient was found to be relatively low. The study revealed a negative correlation of weak strength between the ratio of cash assets and return on assets (ROA), suggesting that increased liquidity may be associated with reduced profitability. Finally, it was hypothesized that there exists a noteworthy inverse correlation between interest spread and ROA, wherein an escalation in interest spread is linked to a reduction in ROA. The aforementioned discoveries offer significant perspectives on the interplay among diverse elements that impact the financial gain of financial institutions. Such insights can facilitate the process of making informed decisions and devising effective strategies. The findings of the study underscore the

significance of upholding a suitable degree of capital adequacy, managing operational costs, maintaining a balance between liquidity and profitability, and overseeing interest spreads to achieve optimal bank performance.

Conclusion

The findings of the present research, which aimed to examine the association between the dependent variable, namely ROA, and the independent variables, CAR, OER, interest spread, and cash asset ratio, revealed that all four hypotheses were supported. The aforementioned statement implies that the four selected independent variables exerted a noteworthy influence on the Return on Assets (ROA).

ROA is a widely recognized and commonly used financial ratio. The profitability of a firm is evaluated by analysts and financial variables and events are predicted by researchers through the utilization of this tool. The present investigation reveals that there exist at least five variables that affect ROA as described in this research. Consequently, in light of the aforementioned analysis, it is advisable to conceptualize ROA not as a solitary ratio but rather as a grouping of ratios. This classification encompasses nearly all ratios that contrast a figure pertaining to earnings from the income statement with either Total Assets or Average Total Assets.

In summary, the observed positive correlations between the independent variables and ROA serve to underscore their influence on financial performance. The results obtained from regression and correlation models indicate that all four variables tested are statistically significant. Specifically, two of the variables exhibit a positive effect on asset return, while the remaining two variables have a negative impact on asset return. The observed empirical outcomes exhibit similarity with those reported in the extant literature, wherein several investigations conducted by various scholars have been scrutinized. The present study's literature review and empirical findings support the hypothesis that capital adequacy positively influences asset returns. Banks exhibiting a high CAR, slight correlation on higher operational expense ratio, lower interest spread, and lower cash asset ratio are likely to attain elevated levels of revenue The findings indicate that it would be prudent for investors and financial analysts to take into account the interconnections among these ratios when formulating investment strategies. It is advisable that corporations endeavor to

enhance their financial standing by prioritizing the aforementioned ratios. Enhancing the financial standing of the organization can lead to an augmentation in investment returns, a better liquidity position, and an increase in profitability.

The present study's results make a valuable contribution to the finance field by emphasizing the significance of crucial financial ratios in elucidating financial performance. The research has yielded noteworthy findings that could be leveraged by corporations to enhance their fiscal outcomes and guide investment choices. The affirmation of all four hypotheses implies that it is imperative for investors and financial analysts to take into account these multiples and strive towards enhancing them.

Moreover, it is imperative for banks to give due consideration to their portfolios, particularly in relation to the four variables that were examined in this research, namely cash asset ratio, operational expense ratio, and interest spread. It is imperative for banks to maintain a sound financial standing by regulating these multiples, as they facilitate the enhancement of financial stability, risk mitigation, and profitability.

To conclude, the utilization of regression and correlation models is a valuable methodology for evaluating the financial performance of companies. The study's findings have made a valuable contribution to the finance discipline by emphasizing the significance of crucial financial ratios in determining financial performance. Additionally, the study has provided investors and analysts with valuable insights into profitable investment strategies and. The insights from this study can be utilized by companies to enhance their financial position, leading to increased profitability and value creation for their shareholders. This, in turn, can bolster investor confidence in their capacity to attain sustainable economic growth. Author hopes that the study findings would help interested parties to retain their goal revenues and adjust them and schedule new revenue levels.