

Investigating the impact of credit risk loss and bank specific factors on the financial sustainability of commercial banks in Egypt

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ABSTRACT:

The financial performance sustainability of banks across the world is important to its, managers, investors, shareholders, and governments. This study aims to investigate the impact of credit risk loss and bank-specific factors on commercial banks' financial (FSUS). The study uses measures such as non-performing loans (NPLs) and capital adequacy ratio (CAR) as credit risk measures, and the study uses cost-efficiency ratio (CER), average lending rate (ALR), and liquidity ratio (LR) to measure bank specific factors. Return on equity (ROE) and return on the asset (ROA) are used as (FSUS) measures. Data of the study was collected from 29 commercial banks from Egypt from (2018) to (2022). Results showed that (NPLs), (CER), and (LR) significantly negatively related to (FSUS), while (CAR) and (ALR) positively related to (FSUS). The study showed that the control variables like, size of bank, age of bank, have a significant positive impact on both measures of (FSUS). The effect of state-owned banks (D1) on sustainability is not statistically significant, while that of privately-owned banks (D2) positive and foreign banks (D3) have a negative. Also, A positive and significant relationship between inflation and (FSUS) but the effect of the crisis variable on (FSUS) is negative. Based on the Practical results, the study recommended that commercial banks in Egypt should adopt tough credit risk management policies, which should also be updated regularly to guide processes actions to granting of loans and monitoring credit risk. Furthermore, It is suggested that the value of depreciable assets committed to the banks as promises be regularly assessed to account for a decrease in their value. The study recommends policymakers in Egypt to create a strong financial environment by implementing monetary policy that stimulates interest rates and maintains liquidity positions to survive in high competition environments.

KEYWORDS: Credit Risk Loss, Bank-Specific Factors, Financial Sustainability, commercial banks in Egypt.

Introduction

The global financial crisis has highlighted the importance of understanding the sources of procyclicality in the financial cycle, particularly in the provision creation of financial instruments. Prior to (2018), provisions should reflect incurred losses, while since (2018), provisions should function as a buffer created in good times for use in bad times. This shift has a significant impact on bank profitability, capital adequacy, and lending capacity. The (IFRS 9) implementation was driven by the procyclicality of the (IAS 39) accounting approach, which was criticized for a large 'cliff effect' in

losses recognition when exposure was transferred from performing to non-performing. Provisions under (IFRS 9) should be created in advance, as they lower profit during economic upturns and create a buffer for future economic downturns [1](#).

Banks face various risks, including credit risk, liquidity risk, market risk, operational risk, nominal risk, and legal risks. These risks can negatively impact financial institutions' profitability, market value, liabilities, and equity. Credit risk is a significant risk, as it involves the probability of a partial or total loss of outstanding loans due to nonpayment [\[2-3\]](#). An increase in credit risk increases the marginal cost of debt and equity, leading to increased funding costs. Credit creation is the main income-generating activity for banks, but it also carries significant risks for both lenders and borrowers [\[4\]](#). Effective credit risk management is crucial for banks' survival and growth, as it affects their profitability, sustainability, and contributes to economic stability and efficient capital allocation [\[5\]](#).

Depository institutions play a crucial role in promoting financial stability and economic growth by mobilizing monetary resources across regions. They act as intermediaries, collecting excessive amounts from savers and issuing loans to borrowers, resulting in high interest rates. However, banks face high credit risk, which can lead to the collapse of the banking industry and the failure of the entire financial system. Asia, the most crucial continent, is facing high non-performing loans (NPLs), which weaken the economy and country's financial position [\[6\]](#). The high NPL ratio in Egypt, which reached 8. 2% in Sep 2022, is a major burden on commercial banks' financial position and has been a major cause of financial crises, including the Egypt currency crisis and subprime crises [\[23-4\]](#).

This study investigates the impact of credit risk and bank-specific factors on the financial sustainability of commercial banks in Egypt. The research uses secondary panel data from (29) commercial banks from (2018) to (2022), addressing autocorrelation and endogeneity issues. The results show that credit risk measures (NPLs) decrease the financial performance due to a negative relation, while capital adequacy ratio (CAR) has a positive relation with Egypt banks' financial sustainability. The study is unique in addressing these issues at a time, addressing autocorrelation and endogeneity issues simultaneously. The research is organized into sections, including a literature review, data and methodology, findings and suggestions, and conclusion.

Review of Literature

2.1 The nature of bank credit losses

Banks play a crucial role in capital flows from savings into productive activities by investing in financial instruments like loans, debt securities, and equity interests [\[7\]](#). However, most investments are expected to yield less than promised, leading to credit losses when the borrower fails to meet their contractual obligations [\[89\]](#). Changes in the probability of default (PD) can be driven by individual characteristics of the debtor and the financial asset or changes in economic conditions [\[10\]](#). To compensate lenders for the risk inherent in their loan portfolios, the initial yield on the instrument must include an appropriate premium [\[11\]](#). Banks recognize financial instruments on their balance sheets at the present value of expected cash receipts, which represents the economic value of the asset and already reflects any adjustments needed to compensate for expected losses due to the probability of future default [\[1213\]](#). After initial recognition, the accounting value of the financial asset does not necessarily reflect its economic value [\[14\]](#).

Estimating future expected losses is necessary to adjust for changes in the expectations of the borrower's PD and changes in interest rates [\[15\]](#). There are different approaches for recognizing loan losses: fair value accounting, expected credit loss approach, and incurred loss approach. Fair value accounting corresponds to the economic value of the loan, while expected credit loss approach recognizes only expected future credit losses. The incurred loss approach requires only the recognition of incurred losses, which are expected losses for which a credit event has already occurred as of the

balance sheet date and the expected PD of the borrower is nearly one [16]. Expected losses are calculated as follows [15]:

$$EL_t = \sum_{t=1} [PD_t(I_t) \frac{LGD_t(I_t)}{(1+dr)^t}] \quad (2.1)$$

where (EL) are the expected lifetime losses; $PD_t(I_t)$ is the probability of default; (LGD) is the loss given default; dr is the discount rate that is used to discount expected cash flows. The incurred loss approach acknowledges expected losses resulting from credit events occurring at the balance sheet date and a borrower's expected (PD) of nearly one.

2.2 Financial sustainability of commercial banks and its determinants

Financial sustainability is the ability of a commercial bank to meet its financial obligations over the long term [17]. It is important for banks to be financially sustainable in order to provide lending services to the economy and to support economic growth [1718]. Financial sustainability is a crucial concept for commercial banks, encompassing factors such as capital adequacy, profitability, liquidity, asset quality, and management. Key elements of financial sustainability include capital, which is the cushion that banks have to absorb losses, profitability, liquidity, which is the ability of a bank to generate earnings, asset quality, which is the likelihood of a bank's assets defaulting, and management, which is responsible for the overall operations of a bank [42]. Key determinants of financial sustainability for commercial banks include economic conditions, regulatory environment, and competition. Economic conditions can significantly impact the financial sustainability of banks, making them more likely to experience losses during times of economic downturn. The regulatory environment can also impose additional costs on banks, making it more difficult for them to be profitable [192021]. Competition from other banks can also affect the financial sustainability of banks, forcing them to take on more risk to remain profitable [22-23].

The objectives of financial sustainability for commercial banks include ensuring banks have the resources they need to meet their financial obligations, protecting depositors and other creditors, and promoting economic growth. Credit losses are a major risk for commercial banks, as they can lead to a decline in profitability and capital levels, ultimately threatening the bank's financial sustainability [172324]. Financial sustainability is essential for banks to be able to withstand credit losses, as financially sustainable banks are better able to absorb losses and remain solvent in the event of a downturn in the economy. By strengthening their capital adequacy, profitability, liquidity, asset quality, and management, banks can improve their financial sustainability and reduce their vulnerability to credit losses [22-25]. The International Financial Reporting Standard No.9 (IFRS 9) is a new accounting standard that mandates banks to report expected credit losses (ECLs) on all financial instruments, including loans and debt securities. This can significantly impact the financial sustainability of banks, potentially increasing their capital requirements and potentially reducing profitability and growth potential [17]. However, (IFRS 9) can also enhance transparency and efficiency in financial markets by providing a more accurate picture of banks' credit risk, enabling investors to make more informed investment decisions. Factors influencing the impact of (IFRS 9) on banks' financial sustainability include asset quality, risk management practices, and market conditions. High-quality assets are less likely to be exposed to increased capital requirements, while banks with strong risk management practices are less likely to experience an increase in (ECLs) [18]. Adverse economic conditions can also lead to increased (ECLs). Therefore, banks must understand the potential implications of (IFRS 9) before implementing it. The impact of (IFRS 9) on banks' financial sustainability will depend on factors such as asset quality, risk management practices, and the state of the economy [19].

Table 1. Relationship between (IFRS 9) Standard and Financial Sustainability of Commercial banks

Aspect	IFRS 9 Impact on Commercial Banks	Contribution to Financial Sustainability
Credit Risk Assessment	Enhanced credit risk assessment and provisioning lead to better risk management.	Improved ability to manage and mitigate credit risk, contributing to financial sustainability.
Asset and Risk Evaluation	Continuous asset evaluation helps identify potential impairments.	Better control over asset quality and risk, ensuring sustainability.
Financial Disclosures	Requires more comprehensive financial disclosures.	Increases transparency, bolstering investor and stakeholder trust and enhancing sustainability.
Asset and Risk Management	Effective asset and risk management is crucial.	Enables better risk mitigation, cost control, and long-term sustainability.

Source: By researchers

Table (1) illustrates how (IFRS 9) affects commercial banks and how it plays a role in enhancing their financial sustainability. the implementation of (IFRS 9) not only aligns banks with international accounting standards but also helps them fortify their financial sustainability through better risk management, asset quality assessment, enhanced transparency, and efficient management practices. This interplay is crucial in ensuring the long-term viability of commercial banks. [1927]

The CBE has raised capital requirements to ensure sufficient capital to absorb losses, issued regulations to improve banks' risk management practices, and required banks to improve the transparency of their financial reporting. These measures are helping to improve the financial sustainability of Egyptian commercial banks, enabling them to better support economic growth and development. The CBE has also required banks to improve the transparency of their financial reporting, further enhancing their ability to support economic growth and development. [2627-28].

2.3 Credit risk loss and financial sustainability

Credit risk is a significant issue in the banking industry, as it can negatively impact the profitability of banks. Banks generate income by issuing large amounts of credit to borrowers, which involves a significant amount of credit risk [29]. A lack of effective credit risk management can lead to banking turmoil and financial crises. Non-performing loans (NPLs) are related to information asymmetric theory, principal agency theory, and credit default theory [3029]. Effective management of credit risk increases profitability and enhances the development of the banking sector by allocating working capital in the economy [30].

Credit risk and financial sustainability pose significant challenges for financial institutions and companies alike. Previous studies have demonstrated a reciprocal relationship between credit risk and financial sustainability, whereby high credit risks can negatively impact an institution's financial sustainability, and vice versa. For instance, a study by (Okimoto& Takaoka, 2024) revealed that elevated levels of credit risks may lead to increased financial costs due to higher interest rates on debts and reduced access to financing, adversely affecting the economic growth sustainability of the institution [16]. Conversely, another study by (Belás et al 2017) indicated that companies implementing effective credit risk management measures might be better poised for long-term business survival, thereby enhancing their financial performance sustainability [15] .Therefore, understanding the relationship between credit risks and financial sustainability is crucial in developing risk management strategies and bolstering the financial sustainability of institutions and companies. A growing literature on credit risk and its relationship with monetary benefits has been conducted. (Ekinici and Poyra 2019) investigated the relationship between credit risk and profitability of deposit banks in Turkey, using data from (26) commercial banks from (2005) to (2017). The study found that credit risk and return on equity (ROE) were negatively correlated, and the ratio of (NPLs) was also significantly negative [30].

(Oluwafemi et al., 2013) examined the relationship between credit risk and monetary gain in the banking sector using (NPL) and Capital Asset Ratio (CAR). Results showed that both factors affected (ROE), but (CAR) was less significant than NPLs [32]. (Adebayo et al., 2011) study investigated the relationship between (NPLs) and bank profitability in rural Ghana, finding a significant positive interrelation between (NPLs) and bank profitability [31].

2.4 Bank-specific factors and financial sustainability

Bank-specific variables, or internal factors, are the product of business activity and can be reduced by efficient management [34]. These factors can be controlled compared to external factors, which are market risk. Mismanaged internal factors can adversely affect a firm's balance sheet and income statement. Studies have discussed different bank-specific variables and firm performance in various studies. The study used bank-specific variables such as cost-efficiency ratio (CER), average lending rate (ALR), and liquidity ratio (LR) [35].

Previous studies have shown a significant relationship between firm-specific variables such as capital adequacy, asset quality, management efficiency, earnings ability, and liquidity on the performance of banks. For example, (Ariyibi et al., 2020) found a positive relationship between loan-to-deposit ratio, capital adequacy, and return on assets [34]. (Kamande et al., 2016) found that asset quality has the highest influence on the return on assets (ROA) of Kenyan commercial banks [36]. Kandel (2019) found that liquidity moderately influences bank performance, while management efficiency has minimal impact on both (ROA) and (ROE). Earning and liquidity positions have a high influence on (ROA), while asset quality, liquidity, and earning have more influence on (ROE) [35]. (Gautam, 2020) found a positive relationship between (ROA) and capital adequacy but a negative relationship with assets quality [37]. (Hamal's, 2020) research found a negative association between size and long-term investment and financial performance [38].

(Aspal et al., 2019) used two types of macroeconomic factors (gross domestic product (GDP) and inflation) to examine their connection with the financial performance (FP) of commercial banks in India. They found that (GDP) was significant, while inflation was insignificant. All bank-specific factors significantly affected the (FP) except (CAR) (insignificant) [39]. (Hasanov et al., 2018) explored the interrelation between bank-specific and macroeconomic determinants with the banking performance of Azerbaijan (oil-dependent economy). The results showed that bank loans, size, capital, and some macro factors (inflation, oil prices) were positively and significantly interconnected with the (FP) of banks, while liquidity risk, deposits, and exchange rates were negatively bonded with the (FP) [40].

The (CER) variable is the ratio of how efficiently and effectively controlling the operating cost of a bank. (Lassoued, 2018) conducted a study on problem loans and cost-efficiency in commercial banks, making four hypotheses related to bad management. Some studies found a significant negative relationship between the (CER) and (FP), while others concluded a positive or insignificant relationship [41].

Lending is the core of the banking sector, with commercial banks primarily engaging in lending to earn profits. Monetary authorities use lending rates to control a country's economy. If banks or authorities increase lending rates, investors often invest in high-risk projects, increasing the risk of default. Empirical studies have investigated the relationship between bank lending rate and performance [38,39,40]. (Adebayo et al., 2011) conducted a research paper in Nigeria from (2000) to (2010) to determine the linkages between bank lending rate and performance. The results showed a significant positive relationship between a bank's lending rate and its performance in the short

and long run. However, some studies found a negative or insignificant relationship between lending rate and firm performance, leaving the situation unclear [2930].

Liquidity refers to the speed at which an asset can be converted into cash, used to fulfill short-term liabilities rather than long-term obligations [294243]. Bank failure is considered when banks cannot meet customer payments, affecting the entire financial system. Various studies have shown contradictory results regarding the relationship between liquidity and financial performance (FP) [42-4344]. Some studies reveal a negative tie-up between liquidity and financial performance, while others show no significant relationship. This study focuses on bank-specific measures (Liquidity Risk Ratio, ALR, and CER) and examines their interconnection with commercial banks' financial performance. The study uses bank-specific factors (unsystematic risk) to control this risk and improve FP). The study uses several important bank-specific variables, such as (LRR, ALR and CER) to provide a comprehensive understanding of the relationship between liquidity and financial performance [45464748].

2-5 credit risk loss and bank-specific factors on the financial sustainability of commercial banks

Credit risk and bank-specific factors have a significant impact on the financial sustainability of commercial banks in Egypt. The analysis of Egyptian banks showed that the level of risk disclosure is influenced by factors such as leverage, board size, audit committee size, auditor types, independence, duality, institutional ownership, bank social responsibility, and bad news [50]. The study also found that the financial performance of commercial banks, measured by return on assets (ROA), return on equity (ROE), and net interest margin (NIM), is affected by credit risk, as measured by the nonperforming loan ratio (NPLR) [51]. Additionally, the study revealed a negative relationship between the type of bank (Islamic or commercial) and (ROA) and (ROE), indicating that different economic factors affect these types of banks differently during financial crises [52].

Effective credit risk management is crucial for banks to maintain their profitability and contribute to the stability and efficient distribution of capital in the economy [53].

The relationship between credit risk, bank-specific factors, and the financial sustainability of commercial banks has been extensively studied in the literature. Various studies have explored this relationship in different contexts and regions. For instance, (Du et al., 2022) investigated the impact of credit risk on the financial sustainability of commercial banks in a developing economy, highlighting the significance of non-performing loans (NPLs) in determining financial stability [54]. Similarly, (Schutte et al., 2020) analyzed the role of bank-specific factors such as capital adequacy, liquidity, and asset quality in influencing the financial sustainability of commercial banks. Their findings underscored the importance of effective risk management practices in enhancing financial resilience [55]. Moreover, (Poudel, 2012) examined the relationship between credit risk and profitability in the banking sector, emphasizing the need for banks to adopt prudent lending policies to mitigate credit risk exposure and sustain profitability [56]. These studies collectively provide valuable insights into the complex interplay between credit risk, bank-specific factors, and financial sustainability in commercial banks, which can inform strategic decision-making processes in the Egyptian banking sector.

The impact of credit risk and bank-specific factors on the financial sustainability of commercial banks in Egypt has been examined in several studies. El-Faham's research focuses on the dimensions of bank performance, including profitability and risk, using data from listed banks in Egypt [57]. Eldomiaty et al. investigate the determinants of overall bank risks in the MENA region, including the effects of the financial crisis and unemployment rate [58]. (Abd Elghaffar et al., 2019) measure the risk disclosure level in Egyptian banks and identify factors such as board size, audit committee size, and auditor types that affect risk disclosure [59]. Kassem and Sakr find that bank size and loan loss provision ratio are the main determinants of bank profitability in Egypt [60]. (Abdelzaher, 2022) analyzes the

effectiveness of economic factors on Islamic and commercial banks during the Egyptian financial crisis, finding a negative relationship between bank type and profitability [52].

A thorough examination of the correlation between credit risk, bank-specific elements, and financial sustainability uncovers several significant findings. Rigorous regulatory supervision plays a crucial role in mitigating credit risk and fostering financial stability [61]. Sound lending practices and adequate capitalization are imperative for shielding banks from vulnerabilities associated with credit risk [62]. Furthermore, Bank-specific factors like asset quality, liquidity management, and governance structures significantly influence a bank's ability to withstand shocks related to credit risk [63]. Banks equipped with robust risk management frameworks and diversified loan portfolios demonstrate heightened resilience during economic downturns, thus enhancing their long-term financial sustainability [64]. These insights underscore the importance of implementing comprehensive risk management strategies and regulatory frameworks to fortify the resilience of commercial banks [65].

Based on the abovementioned discussion, our study develops these hypotheses:

H1: There is a significant relationship between credit risk loss and financial sustainability. H2: There is significant relationship between bank-specific factors and financial sustainability.

Research Design and Methodology

3.1 Data Collection and Sample Selection Database

The data of the study refers to (29) commercial banks (privately-owned banks, foreign banks and state-owned banks) operating in the Egyptian banking sector for the period (2018 : 2022). Data at the bank level is obtained from the Banks income statements and balance sheet. Data at the macro level is obtained from the Central Bank of Egypt (CBE). The number of observations recorded (145). So, the data of this research are a panel in nature. The final number of observations is (145= 29*5) for the analysis of this study (see Table 2).

The collection of data study has relied on Internet sites where income statements and balance sheet for commercial banks are available: <https://www.cbe.org.eg> www.egx.com.eg

3.2 Measurement of Variables

The independent variables in the present study are :

the credit risk loss: which can be measured through the non-performing loans (NPL) which is the ratio of non-performing loans to total loans. This indicator is the most important indicators which used in researches to clarify the credit risk and loan quality of commercial banks. the Lower the ratio the better asset quality and lower doubtful loan, which mean, lower credit risk loss. also, this study uses The capital adequacy ratio (CAR) as an indicator for credit risk loss which measures the financial ability of a bank which is tracked continuously by regulators. Theoretically, banks with a sound capital adequacy ratio have excellent financial performance. A bank with a reliable capital adequacy ratio may bear any losses and prevent insolvency

Bank specific factors are those which are under the control of the management of Egyptian commercial banks [22]. in our study we depend on cost-efficiency ratio (CER), Average lending rate (ALR) and Liquidity ratio (LR).

The dependent variable represented by Financial Sustainability (FSUS) which measured by: Return on assets (ROA): is the ratio between the income after tax to total/average assets. it determines the efficient utilization of bank's assets and profit generation proficiency from the assets of any company. (ROA) is best for evaluating the performance of commercial banks because it takes into consideration differences due to financial leverage and avoids distortions. It shows how effective the performance of the banks' management is regarding profit generation from limited resources.

Return on equity (ROE): is the ratio of income after tax to total/average equity. it determines the ability of a bank to use money which invested by shareholders to achieve a profit.

Control variables in this study shown as follow:

- Bank Size (SIZE): The natural logarithm of total assets as a proxy for size. Banks with a high size of asset have the ability to have more different portfolios. So, they have the opportunity to increase their profits and reduce their risks
- Ownership (OWN): is composed to analyze the impact of different ownership structure on profitability. This dummy variable is created for each deposit bank with foreign capital, private and public capital. If the bank is privately-owned (state owned or, foreign banks), it takes the value of (1), otherwise (0).
- Inflation (INF): is an important variable affect on bank performance.
- Crisis: To investigate the impact of the world crisis on profitability, we used a dummy variable which takes (1) for the years 2020-2021, and (0) otherwise. A negative effect is expected of financial crisis on bank profitability.

. Table 2 presents the summary of variables.

Type	Variable	Name	Symbol	Measurement Method
Independent Variable	Credit Risk Loss	Non-performing loans	NPL	Total Non-performing loans / Total Loans
		Capital adequacy ratio	CAR	Risk Weighted Assets/ Total Equity
	Bank Specefic Factors	Cost-Efficiency Ratio	CER	Total Operating Cost/ Total revenue
		Average Lending Rate	ALR	Net Interest income/ Total Assets
		Liquidity ratio	LR	Total Loans/ Total Deposits
Dependent Variable	Financial Sustainability	Return on assets	ROA	Net Income/ Total Assets
		Return on equity	ROE	Net Income/ Total Equity
Control Variables		Bank Size	SIZE	Log (Total Assets)
		Ownership	OWN	Dummy Variable (1 or 0)
		Inflation	INF	Annual inflation rate declared by Central bank
		Crisis	CRI	Dummy Variable (1 or 0)
		Age	AGE	how long a bank has been in existence

3.3. Estimation Method and Models

This study uses the multiple regression models in order to Investigate the Impact of Credit Risk Loss and Bank Specific factors on the financial Sustainability of Commercial Banks in Egyptian. Equations (1) used to study the impact of credit risk loss on financial sustainability. At the same time, Equation (2) will indicate the impact of specific bank factors on financial sustainability on commercial banks in Egypt.

This study uses (2) equations for the (29) samples with (145) total observations collected. To Investigate the Impact of Credit Risk Loss and Bank Specific factors on the financial Sustainability of Commercial Banks in Egyptian:

$$\begin{aligned}
 FSUS(ROA)_{i,t} &= \beta_0 + \beta_1 NPL_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CER_{i,t} + \beta_4 ALR_{i,t} + \beta_5 LR_{i,t} + \beta_6 BSIZE_{i,t} + \beta_7 OWN_{i,t} + \\
 &\quad \beta_8 INF_{i,t} + \beta_9 CRI_{i,t} + \beta_{10} AGE_{i,t} + \sum_{i,t} \quad (1) \\
 FSUS(ROE)_{i,t} &= \beta_0 + \beta_1 NPL_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CER_{i,t} + \beta_4 ALR_{i,t} + \beta_5 LR_{i,t} + \beta_6 BSIZE_{i,t} + \beta_7 OWN_{i,t} + \beta_8 \\
 &\quad INF_{i,t} + \beta_9 CRI_{i,t} + \beta_{10} AGE_{i,t} + \sum_{i,t} \quad (2)
 \end{aligned}$$

The symbol β_0 denotes the constant value, and the symbol \sum indicates the error term.

Analysis and Results

4.1 Descriptive Statistics

The mean value of (ROA) and (ROE) is (0.0285) and (3.7053) with a standard deviation of (0.0351) and (13.0519), respectively, which shows that (ROE) has much higher variation than (ROA). The standard deviation of (NPL) is (0.1315), where (CAR), whose standard deviation is (0.1846) among all bank-specific factors). This indicates that the banks are acting well and are making incomes. Factor (CER, ALR, and LR) have deviation. (0.1617, 2.310 and 0.0153).

4.2 Correlation analysis

Correlation analysis results are shown in Table 5. In terms of non-performing loans NPL is negatively with banks' financial sustainability (ROA ,ROE), this is due to the fact that a higher percentage of non-performing loans indicates that a larger portion of loans made are not repaid, which appears to have a detrimental effect on the bank's capacity to remain financially stable. This Results agree with [6101524285660]. This negative relationship means that as the (NPL)increase, the capital used by banks to carry out their investments and activities reduces, and therefore banks' profit.

On the other hand, the relationship between capital adequacy ratio (CAR) variable and banks' sustainability (ROA ,ROE) is positive as in studies by Embaye et al. (2017), Herath et al. (2021), and Kaimu and Muba (2021).

(ALR) had a significant and positive relationship with both measures of financial sustainability the result is supported by the study of (Veizi, Z., & Zhuli, B., 2023). (LR) has a significantly negative relationship with(ROA and ROE). This relationship is consistent with (Nguyen, H., 2023). who pointed out that the more liquidity is maintained, the lesser the profitability level. In the same level,(CER) has a significant negative relationship with (ROA and ROE, which is consistent with the study of (Ramzaeva, & Kravchenko, 2022).

The correlation shows that bank size has a positive relationship with banks' financial sustainability (ROA, ROE) This is because, Larger banks perform better because they are motivated to take advantage of economies of scale and diversification opportunities. The relationship between age and banks' financial sustainability (ROA, ROE) is positive as indicated in studies [1622]. This is based on the assumption that older banks are more experienced in managing credit risk, which lessens the detrimental effects on their financial sustainability. The effect of state-owned banks (D1) on sustainability is not statistically significant, while that of privately-owned banks (D2) positive and foreign banks (D3) have a negative. suggesting that banks have not profited enough from robust internal and foreign economies. Also, A positive and significant effect relationship between inflation and financial sustainability but, the effect of the crisis variable on financial sustainability is negative.

the capital used by banks to make their investments and activities reduces, and therefore banks' profit decrease. Which means that the credit risk, reduces the financial sustainability of banks, is an important topic for the Egyptian banking sector. Therefore, it claimed that banks direct to high profitgenerating activities that will help their capital to increase in their operations. Because of the fact that credit risk is a determinant on sustainability, the importance of credit risk management increases. The process of effective credit risk management is importance to banks. Banks should focus more on credit risk management, especially in monitoring loans. The fact that banks go to diversification in their income generating activities also strengthens the management of effective credit risk.

4.3 Regression analysis

Table (5) represented the result of regression analysis for the models of the study. Table include all independent, control variable coefficients, t-statistics, standard error and probability values. Additionally, table have the values of R-Square , adjusted R-Square and Durbin Watson statistics.

results from both the ROA and ROE models are reported. It is observed that non-performing loans NPL have a negative effect on both ROA and ROE which is consistent with the prior hypothesis.

column (4) and (7) show that The value of significance level is less than (0.05), Therefore, it has a significant effect, as it becomes clear to us that the sign of the regression coefficient (β) is negative, and this means that there is a negative, statistically significant correlation between credit risk loss (NPL) and financial performance sustainability (ROA, ROE), consistent with the results of the study [1523303750] Which means that the credit risk, reduces the financial sustainability of banks and it is an important topic for the Egyptian banking sector. The reason for the negative effect can be attributed to high-interest rates set by banks on loans disbursed. As a result, customers are likely not to reimburse loans, and this causes banks to make higher provisions for bad loans which tend to affect their profit and financial performance negatively.

The value of the R- Square was (0.362) and (0.283) respectively. This value indicates that the independent variable in the model, credit risk loss, explains (36.2%) and 28.3% respectively of the change in the dependent variable, financial sustainability(ROA,ROE).Furthermore, it is revealed that there is a positive and significant relationship between capital adequacy ratio CAR and return on asset and return on equity .

column (2) and (5) show that The value of significance level for capital adequacy ratio (CAR) with return on asset (ROA) and return on equity (ROE) is less than (0.05), Therefore, it has a significant effect, as it becomes clear to us that the sign of the regression coefficient (β) for each of them is positive, which proves the validity of the our hypothesis, and this means that there is a positive, statistically significant correlation because, banks with higher capital adequacy ratio have excellent financial performance consist [15242841-5060].

(CER) has a significant negative relationship with (ROA and ROE), which is consistent with the study of (Kiemo, et al., 2019) Therefore, banks need to adapt strategies to control these costs and tried to increase their profitability. (ALR) had a significant and positive relationship with both measures of (FSUS). (ALR) is significant at (1%) with (ROA) and (5%) significant with (ROE). The result is supported by the study of (Hasanov et al., 2018) (LR) has a significantly negative relationship with (ROA) and (ROE). Which consistent with (Abdelzaher, 2022) who pointed out that the more liquidity is maintained, the lesser the profitability level.

Table 3. Descriptive statistic

Variable	Mean	Median	Minimum	Maximum	Standard Deviation
ROA	0.0285	0.0155	−0.0155	0.2500	0.0351
ROE	3.7053	25.1519	−17.0753	15.5515	13.0519
NPL	0.1780	0.2074	0.0190	0.7317	0.1315
CAR	0.3561	0.3155	0.1451	1.1975	0.1846
CER	0.3295	0.3103	0.0535	1.4028	0.1617
ALR	1.0391	1.649	1.0190	3.0510	2.310
LR	0.3058	0.7029	0.1746	0.6513	0.0153
AGE	1.2587	1.1751	3.1575	1.5301	0.7345
BSIZE	17.0513	13.3045	25.6052	19.1725	1.0753
INF	0.2501	0.2613	0.0563	0.1715	0.3507

Table 4. Correlation analysis of variables

Variable	ROA	ROE	NPL	CAR	CER	ALR	LR	BSIZE	OWN(D1)	OWN(D2)	OWN (D3)	AGE	INF	CRISIS
ROA	1.000													
ROE	0.715	1.000												
NPL	-0.069**	-0.148**	1.000											
CAR	0.228**	0.090**	-0.681*	1.000										
CER	-0.056*	-0.068*	0.667*	-0.684**	1.000									
ALR	0.015**	0.312*	-0.481**	0.553*	-0.613**	1.000								
LR	-0.168*	-0.022**	0.069*	-0.014**	0.415*	-0.293*	1.000							
BSIZE	0.204**	0.017**	-0.004**	0.072*	-0.007**	0.042*	-0.001**	1.000						
OWN(D1)	-0.332	-0.287	0.089	-0.224	0.052	-0.500	0.030	-0.088	1.000					
OWN(D2)	0.174**	0.001*	-0.229**	0.284*	-0.253*	0.088*	-0.409*	0.107*	-0.004	1.000				
OWN(D3)	-0.029*	-0.194**	0.287*	-0.432**	0.211**	-0.107**	0.474*	-0.421*	0.106	-0.090**	1.000			
AGE	0.412**	0.228**	-0.182*	0.048*	-0.510**	0.252**	-0.228*	0.182**	-0.072**	0.389*	-0.274*	1.000		
INF	0.082**	0.060**	-0.021**	0.033**	-0.020**	0.016*	-0.003**	0.009**	-0.012**	0.160**	-0.023**	0.086	1.000	
CRISIS	-0.061**	-0.016**	0.026*	-0.038**	0.103*	-0.110**	0.041*	-0.008**	0.010*	-0.294*	0.304**	-0.093	-0.068**	1.000

Note: ** Correlation is significant at the $p = 0.05$, * Correlation is significant at the $p = 0.01$ level. Data are rounded off to the fourth decimal.

Table 5. Variable regression analysis

Variable	FSUS (ROA) Model			FSUS (ROE) Model		
	Coefficient	Std.Error	Prob.	Coefficient	Std.Error	Prob.
Constant	-0.05172	0.05216	0.000	-0.07693	0.07752	0.000
NPL	-0.03894	0.03932	0.018**	-0.20745	0.21028	0.029**
CAR	0.00591	0.00576	0.015**	0.14253	0.14348	0.018**
CER	-0.04315	0.04367	0.002*	-0.04761	0.04782	0.001*
ALR	0.01603	0.01613	0.031**	0.06976	0.07075	0.006*
LR	-0.04309	0.04366	0.007*	-0.01923	0.01946	0.041**
BSIZE	0.00175	0.00181	0.023**	0.04136	0.04186	0.015**
OWN(D1)	-0.29580	0.29625	0.091	-0.31783	0.31810	0.067
OWN(D2)	0.35759	0.35824	0.013**	0.17120	0.17141	0.009*
OWN(D3)	-0.41938	0.41995	0.000*	-0.16715	0.16805	0.015**
AGE	0.01082	0.01086	0.039**	0.62908	0.63741	0.003*
INF	0.65124	0.65980	0.024**	0.50772	0.51469	0.032**
CRI	-0.28356	0.28733	0.043**	-0.38075	0.38581	0.028**
R- Square		0.362		R- Square		0.283
Adjusted R-Square		0.359		Adjusted R-Square		0.274
Wald Chi-square		89.51		Wald Chi-square		96.23
Prob.		0.000		Prob.		0.000
Observation		145		Observation		145

Note: *, **, mean Note: *, **, mean significant at 1 % and 5 %. The symbols (D1), (D2), (D3) indicate state-owned banks, privately owned banks and foreign banks.

Conclusions and Recommendations

The study Investigating the impact of credit risk loss and bank specific factors on the financial sustainability of commercial banks in Egypt. this study applied on (29) commercial banks in Egypt.

The study showed that non-performing loans have a negative effect on the financial sustainability of the selected commercial banks. Capital adequacy ratio is also revealed to have positive effect on both measures of financial sustainability.

The indicator of the bank-specific variable (ALR) has a significant and negative interrelation with the (FSUS) of commercial banks. In contrast, (CER and LR) have a significant and positive relationship with the (FSUS) of commercial banks in Egypt. Control variables of the study (size of the bank, age and inflation) are also significant in both models of financial sustainability (ROA, ROE). The study suggests that several policy instructions that commercial banks in Egypt should be followed because there are factors contributing to the rise in non-performing loans (NPL): a lack of consumer education regarding loans, market issues, and inadequate supervision and monitoring of clients. When determining if a customer has sufficient means of repayment or not, Bank management should be efficient in judging that their customers have ability of repayment or not. In addition, banks are able to provide professional advice to loan officers about practical ways to effectively fund borrowing in order to ensure that the necessary return on the whole investment made by the company is obtained. Additionally, it's important to retain liquidity so that the organization can endure in a highly competitive environment. The study suggests for policymaker, to eliminate information asymmetry and reduce the likelihood of default, bank management should thoroughly evaluate borrowers' references throughout the credit analysis. As a result, banks must implement powerful credit information systems that help them in covering informational gaps and increasing access to, accurate, complete and reliable data. The regulators should implement an early warning indicator to monitor the accumulation of (NPL) to prevent any financial crisis caused by the existence of (NPL).

Although the study's focus is only on commercial banks, Islamic institutions can also use this methodology. Additionally, this model may be used by future academics to compare and contrast commercial and Islamic banks. The data used in this study were only gathered from (29) banks; other banks and study years may be included in future investigations. Additionally, if the number of banks and the year expanded the population's description is more specific and dependable. The data of this study have been taken only from Egypt, but this study can be extended by adding more countries in Africa. When we add the number of countries, the results are a better and accurate representation of developing and developed countries of Africa.

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References

1. Deloitte's IASPlus. (2020). Effective dates of IFRSs and amendments. (accessed: 10 oct 2023). www.iasplus.com/en/standards/effective-dates/effective-ifrs/
2. Novotny-Farkas, Z. (2016). The interaction of the IFRS 9 expected loss approach with supervisory rules and implications for financial stability. *Accounting in Europe*, 13(2), 197-227. <https://doi.org/10.1080/17449480.2016.1210180>
3. Khan, M. A., Siddique, A., & Sarwar, Z. (2020). Determinants of non-performing loans in the banking sector in developing state. *Asian Journal of Accounting Research*, 5(1), 135145. <https://doi.org/10.1108/AJAR-10-2019-0080>
4. Accornero, M., Cascarino, G., Felici, R., Parlapiano, F., & Sorrentino, A. M. (2018). Credit risk in banks' exposures to non-financial firms. *European Financial Management*, 24(5), 775791. <https://doi.org/10.1111/eufm.12138>

5. Hassan, M. K., Khan, A., & Paltrinieri, A. (2019). Liquidity risk, credit risk and stability in Islamic and conventional banks. *Research in International Business and Finance*, 48, 17-31. <https://doi.org/10.1016/j.ribaf.2018.10.006>
6. Psillaki, M., Tsolas, I. E., & Margaritis, D. (2010). Evaluation of credit risk based on firm performance. *European journal of operational research*, 201(3), 873-881. <https://doi.org/10.1016/j.ejor.2009.03.032>
7. Pandey, A. (2021). The impact of banking regulations and accounting standards on estimating discretionary loan loss provisions. *Finance Research Letters*, Vol. 44, p. 102068. <https://doi.org/10.1016/j.frl.2021.102068>
8. Du, N., Allini, A., & Maffei, M. (2023). How do bank managers forecast the future in the shadow of the past? An examination of expected credit losses under IFRS 9. *Accounting and Business Research*, 53(6), 699-722. <https://doi.org/10.1080/00014788.2022.2063104>
9. Nurunnabi, M., Jermakowicz, E. K., & Donker, H. (2020). Implementing IFRS in Saudi Arabia: evidence from publicly traded companies. *International Journal of Accounting & Information Management*, 28(2), 243-273. <https://doi.org/10.1108/IJAIM-04-2019-0049>
10. Gubareva, M. (2021). How to estimate expected credit losses–ECL–for provisioning under IFRS 9. *The Journal of Risk Finance*, 22(2), 169-190. <https://doi.org/10.1108/JRF-05-20200094>
11. Bilgin, M. H., Danisman, G. O., Demir, E., & Tarazi, A. (2021). Bank credit in uncertain times: Islamic vs. conventional banks. *Finance Research Letters*, 39, 101563. <https://doi.org/10.1016/j.frl.2020.101563>
12. Luu, H. N., Nguyen, L. H., & Wilson, J. O. (2023). Organizational culture, competition and bank loan loss provisioning. *The European Journal of Finance*, 29(4), 393-418. <https://doi.org/10.1080/1351847X.2022.2053732>
13. Bouvatier 1, V., & Lepetit 2, L. (2012). Effects of loan loss provisions on growth in bank lending: some international comparisons. *Economie internationale*, (4), 91-116. <https://doi.org/10.3917/ecoi.132.0091>
14. Bastos, J. A., & Matos, S. M. (2022). Explainable models of credit losses. *European Journal of Operational Research*, 301(1), 386-394. <https://doi.org/10.1016/j.ejor.2021.11.009>
15. Belás, J., Mišanková, M., Schönfeld, J., & Gavurová, B. (2017). Credit risk management: financial safety and sustainability aspects. *Journal of Security and Sustainability Issues*, 7 (1), 79-94 [https://doi.org/10.9770/jssi.2017.6.1\(7\)](https://doi.org/10.9770/jssi.2017.6.1(7))
16. Okimoto, T., & Takaoka, S. (2024). Sustainability and credit spreads in Japan. *International Review of Financial Analysis*, 91, 103052. <https://doi.org/10.1016/j.irfa.2023.103052>
17. Lu, Y., & Nikolaev, V. V. (2022). Expected loan loss provisioning: An empirical model. *The Accounting Review*, 97(7), 319-346. <https://doi.org/10.2308/TAR-2019-0128>
18. Dong, M., & Oberson, R. (2022). Moving toward the expected credit loss model under IFRS 9: capital transitional arrangement and bank systematic risk. *Accounting and Business Research*, 52(6), 641-679. <https://doi.org/10.1080/00014788.2021.1952060>
19. Meher, K., & Getaneh, H. (2019). Impact of determinants of the financial distress on financial sustainability of Ethiopian commercial banks. *Banks and Bank Systems*, 14(3), 187. [https://doi.org/10.21511/bbs.14\(3\).2019.16](https://doi.org/10.21511/bbs.14(3).2019.16)
20. Almaqtari, F. A., Al-Homaidi, E. A., Tabash, M. I., & Farhan, N. H. (2019). The determinants of profitability of Indian commercial banks: A panel data approach. *International Journal of Finance & Economics*, 24(1), 168-185. <https://doi.org/10.1002/ijfe.1655>
21. Kharabsheh, B., & Gharaibeh, O. K. (2022). Determinants of Banks' Stability in Jordan. *Economies*, 10(12), 311. <https://doi.org/10.3390/economies10120311>
22. Kiemo, S. M., Olweny, T. O., Muturi, W. M., & Mwangi, L. W. (2019). Bank-specific determinants of commercial banks financial stability in Kenya. *Journal of Applied finance and banking*, 9(1), 119-145. ISSN: 1792-6580 (print version), 1792-6599 (online)

23. Mohd Isa, M. Y., Voon Choong, Y., Yong Gun Fie, D., & Abdul Rashid, M. Z. H. (2018). Determinants of loan loss provisions of commercial banks in Malaysia. *Journal of Financial Reporting and Accounting*, 16(1), 24-48. <https://doi.org/10.1108/JFRA-03-2015-0044>
24. Bhatt, T. K., Ahmed, N., Iqbal, M. B., & Ullah, M. (2023). Examining the determinants of credit risk management and their relationship with the performance of commercial banks in Nepal. *Journal of risk and financial management*, 16(4), 235. <https://doi.org/10.3390/jrfm16040235>
25. Madi, M. E. S. (2016). Determinants of financial stability in UK banks and building societies Are they different? *Journal of Business Studies Quarterly*, 8(2), 78.
26. Ozili, P. K. (2022). Banking sector earnings management using loan loss provisions in the Fintech era. *International Journal of Managerial Finance*, 18(1), 75-93. <https://doi.org/10.1108/IJMF-07-2020-0369>
27. Khalil, M. (2024). The Role of Value-at-Risk (VaR) Model for Banking Risk Management during the period (2008-2022). *Alexandria Journal of Managerial Research and Information Systems*, 2(2), 11-31. [10.21608/AJMRIS.2024.336831](https://doi.org/10.21608/AJMRIS.2024.336831)
28. [28] Novotny-Farkas, Z. (2016). The interaction of the IFRS 9 expected loss approach with supervisory rules and implications for financial stability. *Accounting in Europe*, 13(2), 197-227. <https://doi.org/10.1080/17449480.2016.1210180>
29. [29] Siddique, A., Masood, O., Javaria, K., & Huy, D. T. N. (2020). A comparative study of performance of commercial banks in ASIAN developing and developed countries. *Insights into Regional Development*, 2(2), 580-591. DOI : [10.9770/IRD.2020.2.2\(6\)](https://doi.org/10.9770/IRD.2020.2.2(6))
30. [30] Ekinici, R., & Poyraz, G. (2019). The effect of credit risk on financial performance of deposit banks in Turkey. *Procedia Computer Science*, 158, 979-987. <https://doi.org/10.1016/j.procs.2019.09.139>
31. [31] Adebayo, M., Adeyanju, D. and Olabode, S. (2011), Liquidity management and commercial banks' profitability in Nigeria. *Research Journal of Finance and Accounting*, Vol. 2 No. 8. [ISSN 2222-1697 \(Paper\) ISSN 2222-2847](https://doi.org/10.22221/ISSN2222-1697)
32. [32] Adeusi, S. O., Akeke, N. I., Adebisi, O. S., & Oladunjoye, O. (2014). Risk management and financial performance of banks in Nigeria. *Risk Management*, 6(31), 123-129. [ISSN 2222-1905 \(Paper\) ISSN 2222-2839](https://doi.org/10.22221/ISSN2222-1905)
33. [33] Chimkono, E. E., Muturi, W., & Njeru, A. (2016). Effect of non-performing loans and other factors on performance of commercial banks in Malawi. *International Journal of Economics, Commerce and Management*, 4(2), 549-563. <http://ijecm.co.uk/>
34. [34] Ariyibi, E. M., Yunusa, L. A., & Williams, T. O. (2020). Bank Specific Factors and Bank Performance: Evidence from Nigeria. *Signifikan: Jurnal Ilmu Ekonomi*, 9(2), 167-176. ISSN: 2087-2046; E-ISSN: 2476-9223. <https://journal.uinjkt.ac.id/index.php/signifikan/article/view/14658>
35. [35] Sah, G., & Pokharel, S. P. (2023). Analysis of Financial Performance of Nepalese Commercial Banks using CAMEL Approach, 5(1), 37-49. <https://dx.doi.org/10.3126/cognition.v5i1.55405>
36. [36] Onyancha, W. N., & Muturi, W. M. (2023). Effect of Macroeconomic Factors on Financial Performance of Commercial Banks in Kenya. *International Journal of Social Science and Humanities Research (IJSSHR)* ISSN 2959-7056 (o); 2959-7048 (p), 1(1), 315331. <https://doi.org/10.61108/ijsshr.v1i1.32>
37. [37] Gautam, K. R. (2020). Financial performance analysis of Nepalese financial institutions in the framework of CAMEL. *Janapriya Journal of Interdisciplinary Studies*, 9(1), 56-74. [ISSN: 2773-8000 \(Online\)](https://doi.org/10.2773-8000)
38. [38] Hamal, J. B. (2020). Impact of firm specific factors on financial performance of life insurance companies in Nepal. *Interdisciplinary Journal of Management and Social Sciences*, 1(1), 39-52. <https://dx.doi.org/10.3126/ijmss.v1i1.34510>
39. [39] Aspal, P. K., Dhawan, S., & Nazneen, A. (2019). Significance of bank specific and macroeconomic determinants on performance of Indian private sector banks. *International*

- Journal of Economics and Financial Issues, 9(2), 168.
<http://creativecommons.org/licenses/by/4.0/>
40. [40] Hasanov, F. J., Bayramli, N., & Al-Musehel, N. (2018). Bank-specific and macroeconomic determinants of bank profitability: Evidence from an oil-dependent economy. *International Journal of Financial Studies*, 6(3), 78. <https://doi.org/10.3390/ijfs6030078>
 41. Lassoued, M. (2018), "Comparative study on credit risk in Islamic banking institutions: the case of Malaysia", *The Quarterly Review of Economics and Finance*, Vol. 70, pp. 267-278. <https://doi.org/10.1016/j.qref.2018.05.009>
 42. Hamza, S.M. (2017), "Impact of credit risk management on banks performance: a case study in Pakistan banks", *European Journal of Business and Management*, Vol. 9 No. 1, pp. 57-64. <https://core.ac.uk/download/pdf/234627678.pdf>
 43. Korzeb, Z. and Niedziółka, P. (2021), "Determinants of differentiation of cost of risk (CoR) among polish banks during COVID-19 pandemic", *Journal of Risk and Financial Management*, Vol. 14 No. 3, p. 110. <https://doi.org/10.3390/jrfm14030110>
 44. Gee, K.H., Neilson, J., Schmidt, B. and Xie, B. (2022), "Are recognized expected credit losses decision- useful and new to investors? Evidence from CECL adoption". <https://dx.doi.org/10.2139/ssrn.4038479>
 45. Kim, S., Kim, S., Kleymenova, A. and Li, R. (2022), "Current expected credit losses (CECL) standard and banks' information production". https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4117869
 46. Chen, J., Dou, Y., Ryan, S.G. and Zou, Y. (2023), "Does the current expected credit loss approach decrease the procyclicality of banks' lending? Evidence from the COVID-19 recession". https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4110109
 47. Chen, Y., Yang, C. and Zhang, C. (2022), "Study on the influence of IFRS 9 on the impairment of commercial bank credit card", *Applied Economics Letters*, Vol. 29 No. 1, pp. 35-40. <https://www.tandfonline.com/doi/abs/10.1080/13504851.2020.1855298>
 48. Pastiranová, O. and Witzany, J. (2021), "Impact of implementation of IFRS 9 on Czech banking sector", *Prague Economic Papers*, Vol. 30 No. 4, pp. 449-469. <https://ssrn.com/abstract=3859402>
 49. Bojar, P., & Olszak, M. A. (2022). The Impact of IFRS 9 on the Link Between Lending and the Capital Ratio in Publicly Traded Banks in Poland. *Journal of Banking and Financial Economics*, 1(17), 60-73. <http://hdl.handle.net/10.1080/00014788.2022.2063104>
 50. Ramzaeva, E. P., & Kravchenko, O. V. (2022). The analysis of the loan portfolio and credit risk in a commercial bank. *Journal Name*, Volume(3), 47-53. <https://doi.org/10.18323/22215689-2022-3-47-53>
 51. Nguyen, H. (2023). Credit Risk and the Financial Performance of Commercial Banks: Evidence from Vietnam. arXiv preprint arXiv:2304.08217. <https://ideas.repec.org/p/arx/papers/2304.08217>
 52. Abdelzaher, M. A. (2022). The The Impact of Macroeconomic and Specific Factors of Commercial and Islamic Banks on Profitability Evidence from Egyptian Market. *International Journal of Economics and Financial Issues*, 12(2), 16. <https://www.econjournals.com/index.php/ijefi/article/view/12776>
 53. Sayed Abd Elghaffar, E. (2019). Determining factors that affect risk disclosure level in Egyptian banks. *Banks and Bank Systems*, 14(1), 159-171. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3524526
 54. Du, N., Allini, A., & Maffei, M. (2022). How do bank managers forecast the future in the shadow of the past? An examination of expected credit losses under IFRS 9. *Accounting and Business Research*, 1-24. <http://dx.doi.org/10.1080/00014788.2022.2063104>
 55. Schutte, W. D., Verster, T., Doody, D., Raubenheimer, H., & Coetzee, P. J. (2020). A proposed benchmark model using a modularised approach to calculate IFRS 9 expected credit loss.

- Cogent Economics & Finance, 8(1), 1735681.
<http://dx.doi.org/10.1080/23322039.2020.1735681>
56. Poudel, R. P. S. (2012). The impact of credit risk management on financial performance of commercial banks in Nepal. *International Journal of arts and commerce*, 1(5), 9-15.
https://www.researchgate.net/publication/273383001_The_impact_of_credit_risk_management_on_financial_performance_of_commercial_banks_in_Nepal
 57. El-faham, K. (2020). Financial risk and financial performance of banks in Egypt. Thesis for Doctor of Philosophy degree, Cardiff School of Management.
<https://doi.org/10.25401/cardiffmet.12720890.v1>
 58. Eldomiaty, T., Youssef, A., & Mahrous, H. (2022). The Robustness of the Determinants of Overall Bank Risks in the MENA Region. *Journal of Risk and Financial Management*, 15(10), 445. Nguyen, H. (2023). Credit Risk and the Financial Performance of Commercial Banks: Evidence from Vietnam. arXiv preprint arXiv:2304.08217.
<https://doi.org/10.3390/jrfm15100445>
 59. Sayed Abd Elghaffar, E. (2019). Determining factors that affect risk disclosure level in Egyptian banks. *Banks and Bank Systems*, 14(1), 159-171. <https://ssrn.com/abstract=3524526>
 60. Kassem, N. M., & Sakr, A. (2018). The impact of bank-specific characteristics on the profitability of commercial banks in Egypt. *Journal of Finance and Bank Management*, 6(2), 76-90. <http://dx.doi.org/10.15640/jfbm.v6n2a8>
 61. Athari, S. A., Saliba, C., Khalife, D., & Salameh-Ayanian, M. (2023). The role of country governance in achieving the banking sector's sustainability in vulnerable environments: New insight from emerging economies. *Sustainability*, 15(13), 10538.
<https://doi.org/10.3390/su151310538>
 62. Ofori-Sasu, D., Mekpor, B., Adu-Darko, E., & Sarpong-Kumankoma, E. (2023). Bank risk exposures and bank stability in Africa: the role of regulations in a non-linear model. *Journal of Financial Regulation and Compliance*, (ahead-of-print).
https://www.emerald.com/insight/content/doi/10.1108/JFRC-08-2022-0099/full/html?utm_source=repec&utm_medium=feed&utm_campaign=repec
 63. Veizi, Z., & Zhuli, B. (2023). The relationship between credit risk management and bank profitability. *Theoretical Literature Review. International Journal of Advanced Natural Sciences and engineering*, 7(5), 140-146. <http://dx.doi.org/10.59287/ijanser.915>
 64. BCP Business & Management. (2023). The global financial crisis and its impact on banking risk management. *Journal of Banking Perspectives*, 46, 191-196.
<https://doi.org/10.1111/irfi.12041>
 65. S. G. (2023). Determinants of credit risk: Empirical evidence from Indian commercial banks. *Banks and Bank Systems*, 18(2), 88-100. [http://dx.doi.org/10.21511/bbs.18\(2\).2023.08](http://dx.doi.org/10.21511/bbs.18(2).2023.08)