The Impact of Credit Risk and Bank-Specific Variables on Financial Performance of the Listed Commercial Banks in Bangladesh

Dr. Md. Jamil Sharif, FCMA, Mohammed Ashiqur Rahaman, Dr. Mohammad Moniruzzaman, FCA, FCMA

University of Dhaka, Bangladesh

DOI: https://dx.doi.org/10.47772/IJRISS.2024.8080285

Received: 05 July 2024; Revised: 11 August 2024; Accepted: 13 August 2024; Published: 20 September 2024

ABSTRACT

The research aims to empirically investigate the impact of credit risk management and bank-specific variables on the financial performance of the listed commercial banks in Bangladesh.

This examination is based on secondary data from 28 listed commercial banks for six years starting from 2017 to 2021. Therefore, a dataset of 140 firm-year observations was used in this study. The random effect model has been used to examine the impact of two credit risk variables namely, 'non-performing loan (NPL)' and 'capital adequacy ratio (CAR)' including three bank-specific variables namely, 'cost-effective ratio (CER)', 'average lending interest rate (ALR)' and 'liquidity ratio (LR)' on financial performance which is measured using 'return on assets (ROA)' and 'return on equity (ROE)'. The study finds that the credit risk variable NPL is negatively related, and CAR is positively related to both of the dependent variables, i.e. ROA and ROE. Among the bank-specific variables, CER and LR have a negative relationship, while ALR has a positive relationship with both of the profitability measurements. This study extends the existing understanding of credit risk and the bank specific variables and their correlation with financial performance. This study also provides valuable insight for banks and management to set their long-term financial goals. Legislators and the central bank can also benefit from this study in making new lending and credit risk policies. The study only included listed commercial banks in Bangladesh, however, this approach can also be used for non-listed, state-owned, and specialized banks. Future researchers can add these financial institutions and extend their inquiry. Other internal and macroeconomic factors that can affect bank financial performance may also be included in future studies.

Keywords: Credit Risk, Financial Performance, Dhaka Stock Exchange, Bangladesh, Banking Industry

INTRODUCTION

The banking industry's significance extends well beyond the realm of the financial sector. Along with a few others, it is one of Bangladesh's fastest-growing sectors, and its importance to the country's economic progress grows each year. Banks play an important role in the economy because they facilitate monetary transactions and the flow of goods and services (Horvath et al., 2014). The demand deposits customers place with banks are a keyway in which banks facilitate economic growth and development by converting illiquid assets into liquid ones (Diamond & Dybvig, 1983). Commercial banks' loans and advances are their most important business assets since they bring in money that can be turned into profit if the bank is run efficiently (Kwambai & Wandera, 2013). Since banks are at the centre of the credit intermediation process between savers and investors, a robust and resilient banking system is essential for long-term economic development (Basel Committee on Banking Supervision, 2010).

Bank-based financial systems also help to reduce income inequality along with economic growth in developing countries; they play a crucial role in the sustainability of the financial system and become the main resort for funding in countries with bank-based economic systems where capital markets are still developing. Demirguc-Kunt and Levine (1999) used time-series data from a sample of nations to examine and compare the various national financial systems. Their research showed that as national revenues rose, so did the size of financial

intermediaries like banks and stock exchanges. In other words, the nation will experience economic growth. By generating profits from the investments and reinvesting their profits again, banks make a profit and also generate jobs. We view profitable banks' credit management as a catalyst for economic growth. Commercial banks have major challenges in making efficient use of funds due to default culture, industrial disease, commercial failure, a lack of qualified entrepreneurs, an adverse business environment, and so on.

Many studies have focused on commercial banks' profitability, productivity, non-performing loans, and operational efficiencies. Among these issues, non-performing loans of the banks have raised the major concerns for all of the stakeholders. Nonperforming loans have plagued banks for decades. According to the literature, the proportion of classified loans, also known as non-performing loans, have negative impacts on Banks' profitability. Hussain and Al-Ajmi (2012) identified the three most difficult risks that financial institutions confront such as credit, liquidity, and operational risks. Credit risk occurs when borrowers are unable to return borrowed funds within the timeframe indicated in the agreement (Greuning and Bratanovic, 2003). As also stated by the International Monetary Fund (IMF), loans are classified as 'non-performing loans (NPLs)' if they do not generate interest and principal for a minimum of 90 days. The primary causes of high NPLs include poor credit procedures, inexperienced credit experts, huge markup spreads, poor credit principles, and a lack of a monitoring program. According to Ghosh (2015), during the Global Financial Crisis, NPLs have been under the scrutiny of the government and bank management because they are seen to be related to bank failures and crises. This deterioration in bank asset quality is not only financially problematic for the banking system, but it may also lower economic efficiency, damage social welfare, and reduce economic activity. As a result, it is considered that NPLs are a primary indicator of credit risk that impacts the country's banking sector.

Due to their negative economic consequences, many banking analysts have referred to NPLs as 'financial pollution' (Barseghyan, 2010; Zeng, 2012). A low number of NPLs indicates a healthy monetary system in the country, while a high number of NPLs indicates a bad financial situation. NPL reduction is a must to rebuild a sounder banking system and encourage general financial stability. According to Souza and Feijo (2011), the increasing number of NPLs will initially harm commercial banks and subsequently impact the country's financial condition.

Commercial banks are now suffering a large credit risk issue as a result of failing to distribute loans and advances on time, which ultimately leads to a decrease in profitability (Ali, 2013). The resilience of the banking sector is even more important in transitional countries that are constantly changing their legal and macroeconomic environments to conform with international policies issued by the World Bank (WB) and the International Monetary Fund (IMF). In reality, a stable and well-functioning banking system is critical for mitigating negative shocks and financial hardship, especially in commodity-dependent countries. According to Altman (2002), monitoring credit risk and making appropriate allowances for questionable loans may help banks minimize credit risk losses. As a result, banks must monitor and manage credit risk effectively. With effective credit risk management, banks can overcome this credit risk issue which has direct impact on firm performance. Contrarily, bank-specific factors have also impact on bank's performance.

In Bangladesh, very few researches have been conducted to explore the impacts of credit risk managements and other firm specific variables on firm performance. This study intents to explore this research gap and contribute in literature through conducting this research on identifying the credit risk management initiatives of the banks on their performance.

This study has been structured into six sections. After introduction, the second section discusses the previous literatures. Section three mentions the methodology part of the study and section four presents the statistical analysis and findings of the study. Following this section, section five discusses the overall findings of the study and the conclusion part of the study has been put in section six.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The literature review is primarily divided into two parts: the first part covers the literature on credit risk management, while the second part focuses on the literature on other factors specific to banks. Numerous studies have examined the financial performance of banks across various countries. In some studies, researchers have

looked at the effects of credit risk on financial performance, while others have looked at the effects of bank-specific characteristics. Depending on the location, nation, or period of the study, some research uncovers positive associations among factors, while others uncover negative ones.

Credit Risk and Financial Performance

NPL and Financial Performance

Banks create their primary assets, loans and advances, by collecting illiquid assets from clients in the form of demand and deposits, which they then lend to borrowers to generate income and profit. However, the entire process may not result in interest payments on deposits at all or on time. Banks must pay interest on the money placed as well; but, not receiving the interest payment against the loans and advances will undoubtedly diminish their profits. So, here lies the credit risk. Accornero et al., (2018) have defined credit risk as when bank sector borrowers can't pay their debts back on time.

According to the evidence, lending activities are the primary global indicator of credit risk that has an impact on banks' performance and stability. Recent lending activities owing to non-performing loans have resulted in credit risk crises in the UK, USA, Japan, Sweden, and other rising nations, including East Asia and Latin America (Ferreti, 2017). In their investigation of the impact of credit risk on the profitability of 174 Asian commercial banks from 2011 to 2017, Abbas et al., (2019) found that credit risk had a significantly negative impact on profitability. Djalilov and Piesse (2016) used unbalanced data from 275 banks in 16 countries, including Azerbaijan, during the years 2000 to 2013. The study used random-effect type Generalized Method of Moments (GMM) estimators, and the research found that credit risk had a negative influence on the bank's profitability. Using 26 commercial bank data sets from 2005 to 2017, Ekinci and Poyra (2019) researched the impact of credit risk on bank profitability in Turkey. The researchers assessed credit risk using NPL ratios, while profitability was assessed using ‘Return on Assets’ (ROA). The research discovered a negative and substantial correlation between credit risk and ROA. NPL also had a negative impact on Kenyan commercial banks' profitability, according to Kirui (2014), and the banks' profitability declined from 2004 to 2013. The findings of the Boudriga et al., (2010) investigation supported the existence of a bad correlation between ROA and NPLs. They concluded that when the ROA falls, the bank begins to engage in high-risk projects, which raises the number of NPLs. Various banking factors that affected NPLs in Indonesia were examined by Rachman et al., (2018), who concluded that banks with high profitability have fewer NPLs because of better advancing activity and an efficient credit supervision system.

Recent increases in NPLs have also affected the banking sector in various European countries, and effective cost management is needed to lower NPLs and enhance the quality of bank balance sheets (Ghosh, 2015). Ghosh (2015) goes on to say that bank earnings are also crucial in lowering NPLs. While more capitalization may help assure higher earnings, it also increases NPLs. To minimize NPLs while preserving earnings and a safety net, banks must maintain strong credit standards and an appropriate level of capital on their balance sheets. According to Louzis et al., (2012), a bank is likely to face a buildup of NPLs if it has "bad" management with subpar abilities in credit assessment, appraisal of pledged collateral and monitoring debtors. So, there is an inverse link between profitability and NPL, which implies that a bank's likelihood of having NPLs in a given year increases as profitability decreases (Rachman et al., 2018). Based on the above discussions, the first hypothesis of the study has been set as:

H_1: There is a negative impact of Non-Performing Loans (NPLs) on profitability.

Here, NPLs has been measured dividing the total nonperforming loans by the total loans.

Capital Adequacy Ratio and Financial Performance

The capital that a bank must keep to absorb the losses resulting from statutory capital requirements is known as the ‘capital adequacy ratio (CAR)’. CAR helps banks stabilize and regain stability after unexpected shocks. It has been shown that the CAR has a positive impact on bank liquidity and profitability, suggesting that a higher capital adequacy ratio results in increased liquidity and profitability. A higher solvency ratio, or capital adequacy

ratio, may improve performance because it lowers the bank's risks (Athanasoglou et al., 2006). In a study, Singh and Sharma (2016) examine the macroeconomic and bank-specific variables that affect Indian banks' liquidity and profitability. To investigate the association, they conducted OLS, fixed effect, and random effect estimates on a data set of 59 banks from 2000 to 2013, and it was discovered that adequate capital had a favorable impact on bank profitability. In his research, Bashir (2003) looked at how internal factors and the external environment affected the functioning of Islamic banks. The author discovered a statistically significant and favorable association between the capital adequacy and profitability of Islamic banks. Masood and Ashraf (2012) conducted another study on Islamic banks, using panel data from a chosen sample to estimate Islamic banks' profitability. The chosen sample consisted of 25 Islamic banks from 12 different countries. The sample banks were from four different geographical areas, including the Middle East, East Asia, Africa, and South Asia. For the analysis, data spanning five years, from 2006 to 2010, was used, along with ROA and ROE as profitability measurements. ROA and ROE demonstrate a positive and substantial link between profitability and capital adequacy with fixed effects methods. However, Aspal et al.'s (2019) analysis of the link between bank performance and capital adequacy using panel data spanning 7 years and 20 private sector Indian banks revealed a negative but statistically insignificant association. Based on the above discussions, the next hypothesis of this study has been constructed as:

H_2: There is a positive impact of the capital adequacy ratio (CAR) on profitability.

Here, capital adequacy ratio has been measured dividing total equity by total risk weighted assets.

Bank Specific Variables:

Three bank specific variables that have significant impact on performance have also been considered in this study. These three variables are:

Cost Efficiency and Financial Performance:

Effective cost (expense) management is a key factor in determining bank profitability (Athanasoglou et al., 2008). Because only operational expenditures can be evaluated as a result of bank management, they are often quantified by the ratio of total operating costs to total revenue. Poor performance by senior management in managing day-to-day operations is an indication of low efficiency (Ahmad & Bashir, 2013). Banks will be more cost-effective if they make fewer efforts to assure better loan quality (Berger and DeYoung, 1997). This justification shows a negative association, as better operational expenditure management (a lower cost-to-income ratio) ultimately results in greater profitability. Ariff and Can (2009) and Sanchez et al. (2013) have demonstrated the effectiveness of banks with greater ROE in literary works. Koak and Zajc (2006) sought to identify the factors that influence the cost-effectiveness of banks in the new EU member states. They discovered that ROA and ROE were positively correlated with efficiency, indicating that a bank is more profitable the more cost-effective it is. Petria et al., (2015) examine the main determinants affecting EU 27 bank profitability from 2004 to 2011. They classified bank profitability characteristics as bank-specific (internal) and macroeconomic and industry-specific (external). The study estimated bank profitability using ROA and ROE and represented management or cost efficiency with the cost-to-income ratio. For both dependent variables, the cost-to-income ratio (cost-efficiency ratio) was significant but had a negative sign. The theory that operational efficiency (CER), as measured by the cost-to-income ratio, has a negative correlation with bank profitability has been supported by several studies (Ali et al., 2011; Rachdi, 2013; Chimkono et al., 2016). Based on the above theoretical discussion, the study posits the following hypothesis:

H_3: These is a positive association between cost-effectiveness and performance.

Here, cost efficiency ratio is the ratio between total operating cost and total revenue.

Lending Rate and Financial Performance

The average lending interest rate (ALR) is a key component of financial intermediation that is the primary activity of commercial banks. ALR refers to the payment a person or business makes for each dollar they borrow

from a bank or other financial institution (Dornbush and Fisher, 1990). Monetary authorities use the lending rate as a weapon to manage a nation's economy (Chimkono et al., 2016). According to Flannery (1980), a rise in ALR enhances the revenue a commercial bank may make from its loan portfolio, which boosts the return on assets (ROA) and suggests a positive relationship between ROA and ALR. Flannery (1980) discovered that lending rates significantly improved the financial performance of the banks in the USA. Chimkono et al.'s (2016) research sought to determine how non-performing loan ratios and other factors affected commercial banks' financial performance in Malawi's banking industry. Ten commercial banks in Malawi were included in the research, which spanned seven years from 2008 to 2014, and ALR was shown to be positively and significantly associated with ROA. To determine the relationships between bank lending rates and performance, Adebayo et al., (2011) conducted a research study in Nigeria from 2000 to 2010. The analysis of the data reveals a considerable positive association between a bank's performance and its lending rate in both the short and long terms. In their study, Okoye and Onyekachi (2013) looked at how Nigerian deposit money banks performed between 2000 and 2010. The research concluded that the real indicators of bank success are lending rates and the monetary policy rate. Based on the above discussion, the next hypothesis of the study is:

H4: There is a positive impact of the Average Lending Rate (ALR) on financial performance.

Here, average lending rate is the ratio between net interest income and total assets.

Liquidity Ratio and Financial Performance

When a bank is unable to meet its debts when they become due, liquidity risk develops. This risk has the potential to significantly impact the bank's performance; therefore, the bank's management must give top priority to making sure there are enough funds available at a fair price to meet both depositors' and borrowers' future demands. In order to increase client loans when the market presents appealing chances, banks must be aware of their liquidity situation (Falconer, 2001). Banks' liquidity issues result in the loss of numerous business opportunities. As a result, the bank's performance and reputation may be harmed (Jenkinson, 2008). Depositors may lose faith in the bank if funds are not available to reimburse them promptly. These circumstances may jeopardize the bank's reputation also.

According to Chen et al., (2018), liquidity risk has a detrimental impact on banks' performance. Nuriyeva (2014) looked into the profitability of 15 commercial banks in Azerbaijan from 2006 to 2012. Three key metrics—return on assets, return on equity, and net interest margin—were employed by the author to gauge bank profitability. The author used bank liquidity as one of the factors for bank-specific variables and used a panel model with fixed effects. The return on equity and return on assets both benefited significantly from liquidity. Epková (2015) only looked at commercial banks that act independently of one another and utilized unbalanced panel data from 15 commercial banks in the Czech Republic for the years 2001–2012 and found that institutions having a larger liquidity ratio—the ratio of loans to deposits—were more lucrative than other commercial banks. With data spanning ten years, from 2010 to 2019, Yeasin (2022) studied how credit risk affected the banking industry in Bangladesh, focusing on six commercial banks. Using NPL, CAR, and LR as independent variables, as well as ROA as a metric for profitability, the study discovered that LR had a positive and significant relationship with ROA. On the other hand, Masood and Ashraf (2012) conducted the same research on Islamic banks and used panel data from a selected sample to assess their profitability. The chosen sample consisted of 25 Islamic institutions from 12 different countries with data spanning five years, from 2006 to 2010. According to their research, liquidity had little to no effect on bank profitability. So, the next hypothesis of this study has been set as:

H5: There is a positive impact of Liquidity Ratio (LR) on financial performance.

Here, Liquidity ratio has been measured dividing the total loans by the total deposits.

RESEARCH METHODOLOGY

The objective of this study is to identify the impact of credit risk and bank-specific factors on the performance of the banks. The model of the study is consistent with the study of Chimkono et al., (2016) and Siddique et al.,

(2022).

i) Data:

In this study, only the listed banks have been considered for data collection due to the availability of the annual reports in time. Required data have been collected for five years starting from 2017 to 2021. However, out of the 33 listed banks, data was collected from 28 listed banks due to the non-availability of the annual reports or the required data in the annual reports. As a result, the final number of observations used in this study consists of 140 firm-year observations.

ii) Model:

To examine the hypotheses formulated in the preceding section, the study employs two regression models for estimation, characterized by the following specification:

Model 1:

$$ROA_{it} = \alpha_0 + \beta_1 NPL_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CER_{i,t} + \beta_4 ALR_{i,t} + \beta_5 LR_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 INFR_{i,t} + \beta_8 AGE_{i,t} + \varepsilon_{i,t} \quad \text{.............................(i)}$$

Model 2:

$$ROE_{it} = \alpha_0 + \beta_1 NPL_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CER_{i,t} + \beta_4 ALR_{i,t} + \beta_5 LR_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 INFR_{i,t} + \beta_8 AGE_{i,t} + \varepsilon_{i,t} \quad \text{...............................(ii)}$$

Here,

Table-01: Operational definition of the variables

	Dependent and Independent Variables		
Name of Variables	***Label Used***	***Formula***	***Reference***
Dependent Variables			
Return on Assets	ROA	Net Income/ Average Total Assets	Siddique et al., (2022)
Return on Equity	ROE	Net Income/ Total Common Equity	Siddique et al., (2022)
Independent variables			
Non-Performing Loan	NPL	Total Nonperforming Loan/ Total Loans	Noman et al., (2015)
Capital Adequacy Ratio	CAR	Total Equity / Total Risk Weighted Assets	Singh & Sharma (2016)
Cost-efficiency ratio	CER	Total operating cost/Total revenue	Sanchez et al., (2013)
Average lending rate	ALR	Net interest income/Total assets	Sanchez et al., (2013)
Liquidity ratio	LR	Total loans/Total deposits	Marozva (2015)
Control variables			
Bank size	BS	Log value of total assets	Xu and Jin (2022)
Bank Age	AGE	Age of commercial banks	Rababah et al., (2020)

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue VIII August 2024

Bank size and Bank age have been considered as control variables in this study.

iii) Analysis:

The panel data set has been used in this study. As a result, analysis based on Pooled OLS, Panel data fixed effect and panel data random effect models have been used in this study to perform the necessary analysis and make the conclusion.

FINDINGS AND DISCUSSION

i) Descriptive Analysis

The descriptive statistics of the variables presented in Table-02 show that the mean values of both ROA and ROE are .7% and 10.35% respectively. The banks have on an average 5.63% non-performing loans where the highest and lowest NPLs are 33.07% and 2.29% respectively. The mean value of CAR is 9.89% with the maximum and minimum values are 17.70% and 6.31% respectively. The CER ratio shows a high value which is on average 50.90%. On the other hand, the banks failed to earn a standard rate of income from their investments. The result of ALR shows that banks could earn only 2.07% of their total assets. The LR ratio indicates that banks could successfully convert their deposits into loans and as a result, the average LR is 93.43%.

Table-02: Descriptive Statistics

Variable	Observations	Mean	Std. Dev	Min	Max
ROA	140	.0071691	.0033437	-.0007635	.018135
ROE	140	.103596	.0408631	-.0115149	.2359052
NPL	140	.0563335	.0361136	.0229327	.3307245
CAR	140	.0989328	.0204581	.0631347	.1770545
CER	140	.5090506	.081383	.3388101	.7723317
ALR	140	.020708	.0079377	.0013301	.0462162
LR	140	.9343607	.0796452	.7087569	1.127802
BS	140	11.52989	.160722	11.24089	12.21378
AGE	140	27.03571	7.536397	17	46

Source: Calculated by the authors

ii) Multivariate Analysis:

The correlation and VIF results have been presented in the Table-03. The correlation results affirm that CAR and ALR have a positive relationship with firm performance measured by ROA and ROE. On the other hand, NPL, CER, BS and AGE variables have negative relationship with ROA and ROE. A mixed relationship has been found between LR and the profitability of the banks.

Table-03: Results of Pearson's Correlation Coefficient

	ROA	ROE	VIF
ROA	1.0000		
ROE	0.8423*	1.0000	

NPL	-0.3958*	-0.4893*	1.36
CAR	0.5427*	0.1510	1.32
CER	-0.1590	-0.2042*	1.12
ALR	0.5299*	0.5097*	1.18
LR	0.0210	-0.0427	1.06
BS	-0.2825*	-0.2039*	1.32
AGE	-0.2454*	-0.3909*	1.71

Source: Calculated by the authors

*** Indicates statistical significance at 5%.**

Variance Inflation Factor (VIF) checks the severity of multicollinearity in the ordinary least square regression model. Table-03 shows that there is no multicollinearity issue among the variables.

To check whether the Fixed effect model or Random effect model should be used for data analysis, the Hausman Test has been performed. The result shown in Table-04 indicates that the Random effect model is suitable for data analysis.

Table-04: Result of the Hausman Test

ROA	ROE
Test: Ho: difference in coefficients not systematic chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 10.07 Prob>chi2 = 0.1846	Test: Ho: difference in coefficients not systematic chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 12.55 Prob>chi2 = 0.0838
Decision: Random Effect Model	**Decision: Random Effect Model**

Source: Calculated by the authors

To check the existence of the constant variance of the residuals (Homoskedasticity) and auto-correlations issue in the dataset, this study has performed the Breusch-Pagan test for Heteroskedasticity and Breusch-Godfrey serial correlation LM test for auto-correlation. The Breusch-Pagan/Cook-Weisberg test for heteroskedasticity presented in Table-05 shows the existence of heteroskedasticity in the case of ROA but no such issue in the case of ROE.

Table-05: Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance Variables: fitted values of ROA	Ho: Constant variance Variables: fitted values of ROA
chi2(1) = 4.46 Prob > chi2 = 0.0347	chi2(1) = .56 Prob > chi2 = 0.4552
Decision: Existence of Heteroskedasticity Issue	Decision: No existence of Heteroskedasticity Issue

Source: Calculated by the authors

Table-06 shows that the database does not have an auto-correlation issue.

Table-06: Breusch-Godfrey LM test for autocorrelation

Breusch-Godfrey LM test for autocorrelation			
lags(p)	chi2	Df	Prob > chi2
1	0.035	1	0.8520
H_0: No serial correlation			

Source: Calculated by the authors

Table-07 shows the regression results under the Pooled OLS, fixed effect and random effect models for both the dependent variables ROA and ROE. As the Hausman test indicates that the Random effect model would be more appropriate for data analysis, results based on Random Effect Model (REM) have been discussed below. The result indicates that NPL has significant negative relationship with firm performance and CAR has positive relationship with firm performance. CER and LR have a negative relationship with firm performance and on the other hand, ALR has a positive relationship with firm performance.

Table: 07. Results of Pooled OLS Regression, Fixed Effect Model, Random Effect Model and Robust Regression.

	ROA				ROE			
VARIABLES	OSL	FE	RE	Robust	OSL	FE	RE	Robust
NPL	-0.0154***	-0.00793	-0.0124*	-0.0124	-0.355***	-0.104	-0.258***	-0.258**
	(0.00585)	(0.00767)	(0.00649)	(0.00901)	(0.0817)	(0.110)	(0.0907)	(0.118)
CAR	0.0765***	0.0328	0.0713***	0.0713***	0.0179	-0.0235	0.117	0.117
	(0.0102)	(0.0230)	(0.0134)	(0.0142)	(0.142)	(0.331)	(0.182)	(0.229)
CER	-0.00727***	-0.0153***	-0.00948***	-0.00948***	-0.0709**	-0.184***	-0.0947**	-0.0947***
	(0.00236)	(0.00386)	(0.00266)	(0.00251)	(0.0329)	(0.0554)	(0.0368)	(0.0326)
ALR	0.142***	0.0638	0.133***	0.133***	2.198***	1.105	1.940***	1.940***
	(0.0248)	(0.0509)	(0.0290)	(0.0401)	(0.347)	(0.731)	(0.397)	(0.430)
LR	0.00198	-0.00498	-0.00101	-0.00101	-0.0414	-0.0650	-0.0605	-0.0605*

	(0.00234)	(0.00448)	(0.00299)	(0.00287)	(0.0327)	(0.0644)	(0.0408)	(0.0332)
BS	-0.00389***	-0.0121	-0.00335*	-0.00335**	-0.0241	-0.0138	-0.00399	-0.00399
	(0.00130)	(0.00853)	(0.00182)	(0.00136)	(0.0181)	(0.122)	(0.0243)	(0.0223)
AGE	-5.67e-05*	0.000378	-5.60e-05	-5.60e-05	-0.000968**	0.000977	-0.00120*	-0.00120*
	(3.14e-05)	(0.000390)	(4.70e-05)	(4.33e-05)	(0.000439)	(0.00560)	(0.000617)	(0.000660)
Constant	0.0457***	0.144	0.0440**	0.0440***	0.455**	0.376	0.249	0.249
	(0.0149)	(0.0908)	(0.0209)	(0.0153)	(0.208)	(1.303)	(0.280)	(0.252)
Observations	140	140	140	140	140	140	140	140
R-squared	0.612	.362	-	-	0.494	0.271	-	

Here, *, ** and * indicate statistical significance at 1%, 5% and 10% respectively. Standard errors are given in the parenthesis.**

Source: Calculated by the authors

DISCUSSION OF FINDINGS

The result presented in the table indicates that non-performing loan has negative relationship with the profitability of the firm. When the banks have higher amount of non-performing loan, then it has a negative effect on the performance of the company. This finding is consistent with the findings of prior studies (Abbas et al., 2019; Djalilov & Piesse, 2016; Ekinci & Poyra, 2019). On the contrary, when the banks could manage to keep higher CAR, then banks found positive impacts on the performance of the companies. Singh and Sharma (2016); Bashir (2003) and Masood and Ashraf (2012) conveyed the same result in their studies.

Similarly, when the banks managed to charge a higher amount of interest on the investments they made, they found a positive impact on the overall performance of the companies. The findings of ALR matches with the findings of Chimkono et al., (2016); Adebayo et al., (2011) and Okoye and Onyekachi (2013) who pointed out that ALR has significant positive impact on firm performance. As supported by the previous literature (Ariff and Can, 2009; Koak and Zajc, 2006), this study also found a positive relationship between cost efficiency and profitability variables. The banks could generate profit when these banks could operate their business at the lower cost. However, this study found negative relationship between liquidity position of the companies and profitability of the companies but this relationship is not significant. This result aligns with the findings of Siddique et al., (2022).

Table: 08. Summary of the Result

Variable	Expected Result	Hypothesis Accepted/Rejected
Non-Performing Loan	Negative	Accepted
Capital Adequacy Ratio	Positive	Accepted

Cost-efficiency ratio	Negative	Accepted
Average lending rate	Positive	Accepted
Liquidity ratio	Positive	Rejected

Source: Compiled by the authors

CONCLUSION

Banks must deal with a variety of hazards, with credit risk being the most serious. Despite their essential position

in our fast-paced economic world, banks must manage several risks. Business continuity is only possible if credit risk does not negatively impact the bank's operations. Due to Bangladesh's high level of NPLs compared to other industrialized and developing nations, the banking industry is unfortunately forced to deal with significant credit risk. Therefore, managing credit risk is necessary to ensure that the bank's operations go without a hitch.

Empirically examining the relationship between credit risk, bank-specific characteristics, and the financial performance of commercial banks in Bangladesh is the main focus of the present research. The findings revealed the fact that credit risk management is inversely associated with bank performance. To reduce the steadily increasing number of NPLs in the banking sector, banks must implement preventative measures or other activities. To help defaulted borrowers repay the classified loan, it may be necessary to provide them with relevant and appropriate incentives, such as interest exemptions, lower interest rates, longer loan repayment terms, etc.

This unstable and unfavourable situation in the banking industry will be gradually eliminated from the economy of our country if the government and central bank provide efficient assistance to commercial banks and also to borrowers, which will then ensure a stable and consistent environment in this industry. The study's finding suggests that banks in Bangladesh should be focused on implementing modern techniques and strategies for credit risk (NPL) management and another measure of credit risk suggests that banks should look for policy change or new policy implementation for maintaining capital adequacy to enhance monetary gain. One indicator of the bank-specific variable (ALR) has a significant and positive correlation with the FP of commercial banks, suggesting banks should focus on generating more interest income, which may include exploring new markets and offering new products. The CER recommends that banks exercise greater caution in their expenditures and implement measures to enhance the cost efficiency of their operations to create profits. The LR result suggests that banks should maintain adequate liquidity for smooth operations and exercise greater caution when converting deposits into loans, given that the minimum LR is only 70%.

The study has some limitations. The first limitation is its scope. This study is only limited to the listed commercial banks in Bangladesh. However, this model can also be used to include non-listed commercial banks, state-owned banks, and specialized banks. We believe, future researchers will apply this model to a comparative study of listed commercial banks, non-listed commercial banks, and state-owned banks. Second limitation is that, data for this study have been collected only from 28 banks; future research can also increase the number of banks and the number of years to conduct their study. Third limitation of the study is that only three bank-specific variables are used but other internal factors can impact profitability and macroeconomic variables that can also significantly impact the financial performance of the banks that are not included in this study. Continent-to-continent variations in the macroenvironment and bank-specific variables will allow for the potential application of this model in certain other regions.

REFERENCES

1. Abbas, F., Iqbal, S., & Aziz, B. (2019). The impact of bank capital, bank liquidity and credit risk on profitability in postcrisis period: A comparative study of US and Asia. Cogent Economics & Finance, 7(1), 1-8. https://doi.org/10.1080/23322039.2019.1605683

2. Accornero, M., Cascarino, G., Felici, R., Parlapiano, F., & Sorrentino, A. M. (2017). Credit risk in banks' exposures to non-financial firms. European Financial Management, 24(5), 775–791. https://doi.org/10.1111/eufm.12138
3. Adebayo, M., Adeyanju, D., & Olabode, S. (2011). Liquidity management and commercial banks' profitability in Nigeria. Research Journal of Finance and Accounting, 2(8), 24-38.
4. Ahmad, F., & Bashir, T. (2013). Explanatory power of bank-specific variables as determinants of non-performing loans: Evidence from Pakistan banking sector. World Applied Sciences Journal, 22(9), 1220-1231. https:// 10.5829/idosi.wasj.2013.22.09.1908
5. Ali, K., Akhtar, M., & Ahmed, H. (2011). Bank-specific and macroeconomic indicators of profitability - empirical evidence from the commercial banks of Pakistan. International Journal of Business and Social Science, 2(6), 232-242.
6. Ali, S. (2013). Impact of bank-specific variables on the nonperforming loans ratio in Albanian banking system, Research Journal of Finance and Accounting, 4(7), 148-153.
7. Altman, E. I. (2002). Managing credit risk: A challenge for the new millennium. Economic Notes, 31(2). 201-214. https://doi.org/10.1111/1468-0300.00084.
8. Ariff, M., & Can, L. (2009). IMF bank-restructuring efficiency outcomes: Evidence from East Asia. Journal of Financial Services Research, 35(2), 167-187. https://doi.org/10.1007/s10693-008-0047-2.
9. Aspal, K. P., 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), 168–174. https://doi.org/10.32479/ijefi.7727.
10. Athanasoglou, P. P., Brissimis, S. N. & Delis, M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. Journal of International Financial Markets, Institutions and Money, 18(2), 121-136. https://doi.org/10.1016/j.intfin.2006.07.001.
11. Athanasoglou, P. P., Delis, M. D., & Staikouras, C. (2006). Determinants of Bank Profitability in the South Eastern European Region. Journal of Financial Decision Making, 2(2), 1-17. https://mpra.ub.uni-muenchen.de/10274/1/BOG-WP.pdf.
12. Barseghyan, L. (2010). Non-performing loans, prospective bailouts, and Japan's slowdown. Journal of Monetary Economics, 57(7), 873-890. https://doi.org/10.1016/j.jmoneco.2010.08.002.
13. Bashir, A.-H. M. (2003, January). Determinants of Profitability in Islamic Banks: Some Evidence from The Middle East. Islamic Economic Studies, 11(1), 32-57. https://econpapers.repec.org/article/risisecst/0073.htm.
14. Berger, A. N., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. Journal of Banking and Finance, 21(6), 849-870. https://doi.org/10.1016/s0378-4266(97)00003-4.
15. Boudriga, A., Taktak, Neila Boulila, & Jellouli, S. (2010). Bank specific, business and institutional environment determinants of banks nonperforming loans: Evidence from MENA countries. Economic Research Forum working paper No. 547. https://econpapers.repec.org/paper/ergwpaper/547.htm.
16. Chen, Y., Shen, C. H., Kao, L., & Yeh, C. Y. (2017). Bank liquidity risk and performance. Review of Pacific Basin Financial Markets and Policies, 21(1), 1-40. https://doi.org/10.1142/s0219091518500078.
17. 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.
18. Demirguc-Kunt, A., & Levine, R. L. (1999, July). Bank-based and market-based financial systems - cross-country comparisons. Policy Research Working Paper. https://doi/epdf/10.1596/1813-9450-2143.
19. Diamond, D. W., & Dybvig, P. H. (1983). Bank runs, deposit insurance, and liquidity. Journal of Political Economy, 91(3), 401-419. https://doi.org/10.1086/261155.
20. Djalilov, K., & Piesse, J. (2016). Determinants of bank profitability in transition countries: What matters most? Research in International Business and Finance, 38, 69–82. https://doi.org/10.1016/j.ribaf.2016.03.015.
21. Ekinci, R., & Poyraz, G. (2019). The Effect of Credit Risk on Financial Performance of Deposit Banks in Turkey. Procedia Computer Science, 158(1), 979–987, https://doi.org/10.1016/j.procs.2019.09.139.
22. Falconer, B. (2001). Structural liquidity: the worry beneath the surface. Balance Sheet. 9(3), 13-19. https://doi.org/10.1108/09657960110695998.
23. Ferreti, A. (2017). The Effect of Credit Risk Management on Financial Performance of Commercial Banks in Developed World. Journal of Accounting and Finance, 4(2), 101–108.

24. Flannery, M. J. (1980). How do changes in market interest rates affect bank profits? Business Review. Sep Issue. 13-22. https://ideas.repec.org/a/fip/fedpbr/y1980isepp13-22.html.
25. Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. Journal of Financial Stability, 20, 93–104. https://doi.org/10.1016/j.jfs.2015.08.004.
26. Greuning, V., & Brajovic-Bratanovic, S. (2003). Analyzing and Managing Banking Risk: A framework for assessing corporate governance and financial risk management. The World Bank Report. http://documents.worldbank.org/curated/pt/344131468329431946/Analyzing-and-managing-banking-risk-a-framework-for-assessing-corporate-governance-and-financial-risk-management.
27. Horvath, R., Seidler, J., & Weill, L. (2014). Bank capital and liquidity creation: Granger-causality evidence. Journal of Financial Services Research, 45 (3), 341-361. https://doi.org/10.1007/s10693-013-0164-4.
28. Hussain, H. A., & Al-Ajmi, J. (2012). Risk management practices of conventional and Islamic banks in Bahrain. The Journal of Risk Finance, 13(3), 215-239. https://doi.org/10.1108/15265941211229244.
29. Jenkinson, N. (2008). Strengthening regimes for controlling liquidity risk: Some lessons from the recent turmoil. Bank of England Quarterly Bulletin, 2. https://papers.ssrn.com/sol3/Delivery.cfm/SSRN ID1147090 code459244.pdf?abstractid=1147090&mirid=1.
30. Kirui, S. (2014). The effect of non performing loans on profitability of commercial banks in Kenya. A Research project of the University of Nairobi. http://erepository.uonbi.ac.ke/bitstream/handle/ 11295/ 74646/KiruiThe%20effect%20of%20nonperforming%20loans%20on%20profitability.pdf? sequence= 5&isAllowed=y
31. Kwambai, Kipyego Daniel, & Wandera, M. N. (2013). Effects of credit information sharing on non-performing loans: The case of Kenya Commercial Bank Kenya. European Scientific Journal, 9 (13), 168-193. http://eujournal.org/index.php/esj/article/download/1048/1082
32. Louzis, Dimitrios P, Vouldis, Angelos T, & Metaxas, V. L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. Journal of Banking and Finance, 36 (4), 1012-1027. https://doi.org/10.1016/j.jbankfin.2011.10.012.
33. Marozva, G. (2015). Liquidity and bank performance. International Business & Economics Research Journal, 14 (3), 453-462. https://doi.org/10.19030/iber.v14i3.9218.
34. Masood, O., & Ashraf, M. (2012). Bank-specific and macroeconomic profitability determinants of Islamic banks. Qualitative Research in Financial Markets, 4 (2/3), 255-268. https://doi.org/10.1108/17554171211252565.
35. Noman, Pervin, S., Chowdhury, M. M., & Banna, H. (2015). The effect of credit risk on the banking profitability: A case on Bangladesh. Global Journal of Management and Business Research, 15 (3), 41-48. https://globaljournals.org/GJMBR_Volume15/5-The-Effect-of-Credit-Risk.pdf.
36. Nuriyeva, Z. (2014). Factors affecting the profitability of Azerbaijan's banking system. MSc. Thesis paper of the Eastern Mediterranean University. North Syprus.
37. Okoye, V., & Eze, O. R. (2013). Effect of bank lending rate on the performance of Nigerian deposit money banks. International Journal of Business and Management Review, 1(1), 34-43.
38. Petria, N., Capraru, B., & Ihnatov, I. (2015). Determinants of banks' profitability: Evidence from EU 27 banking systems. Procedia. Economics and Finance, 20, 518–524. https://doi.org/10.1016/s2212-5671(15)00104-5
39. Rababah, A., Al-Haddad, L., Sial, M. S., Chunmei, Z., & Cherian, J. (2020). Analyzing the effects of the COVID-19 pandemic on the financial performance of Chinese listed companies. Journal of Public Affairs, 20(4). https://doi.org/10.1002/pa.2440.
40. Rachdi, H. (2013). What determines the profitability of banks during and before the international financial crisis? Evidence from Tunisia. International Journal of Economics, Finance and Management, 2(4), 330-337. https://www.ejournalofbusiness.org/archive/vol2no4/vol2no4_8.pdf.
41. Rachman, R. A., Kadarusman, Y. B., Anggriono, K., & Setiadi, R. (2018). Bank-specific factors affecting non-performing loans in developing countries: Case study of Indonesia. The Journal of Asian Finance, Economics and Business, 5(2), 35-42. https://doi.org/10.13106/jafeb.2018.vol5.no2.35.
42. Sanchez, B., Kabir, H. M., & Bartkus, J. R. (2013). Efficiency determinants and dynamic efficiency changes in Latin American banking industries. Journal of Centrum Cathedra, 5(2), 282-294. https:

10.7835/jcc-berj-2013-0080.

43. Siddique, A., Khan, M. S., & Khan, Z. (2022). The effect of credit risk management and bank-specific factors on the financial performance of the South Asian commercial banks. Asian Journal of Accounting Research, 7(2), 182-194. https://doi.org/10.1108/ajar-08-2020-0071.
44. Singh, A., & Sharma, A. K. (2016). An empirical analysis of macroeconomic and bank-specific factors affecting liquidity of Indian banks. Future Business Journal, 2(1), 40-53. https://doi.org/10.1016/j.fbj.2016.01.001.
45. Souza, G. and Feijó, C. (2011). Credit Risk and Macroeconomic Interactions: Empirical Evidence from the Brazilian Banking System. Modern Economy, 2, 910-929. doi: 10.4236/me.2011.25102.
46. Yeasin, H. M. (2022). Impact of credit risk management on financial performance: A study of commercial banks in Bangladesh. Interdisciplinary Journal of Applied and Basics Subjects, 2(1), 14-22. https://identifier.visnav.in/1.0002/ijabs-21k-15004.
47. Zeng, S. (2012). Bank non-performing loans (NPLS): A dynamic model and analysis in China. Modern Economy, 03(1), 100-110. https://doi.org/10.4236/me.2012.31014.