Effect of Non-Performing Loan on Profitability of Commercial Banks in Bangladesh: A Comparative Study on State Owned and Private Commercial Banks

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Abstract

In recent years, the issue of non-performing loans (NPL) has received a great deal of attention in Bangladesh. The main focus of this study is to show the impact of NPL on government owned (SCB) and private bank's (PCB) profitability in a comparative way. Study period was 10 years from 2011 - 2020. Type of data is secondary. ROA and ROE were taken as dependent variables whereas NPLR, CAR and LQDR were taken as independent variables. The data are analyzed through Ordinary Least Square regression method and Pearson correlation coefficient. The findings revealed that there is significant impact of NPL on the ROA of PCBs. One percent increase of NPLR results in decrease of ROA by 0.26% and vice versa in case of private banks. For both PCBs and SCBs, NPLR exerts negative impact on both ROA and ROE. The SCBs have high level of NPLs ratio then PCBs. For both groups, association between NPLR and profitability ratios is negative and in case of PCBs it is significant. The study's conclusions can assist bank investors, regulators, executives, and other stakeholders in making decisions and reviewing policies for improving the performance of banks in the future.

Keywords: Non-Performing Loan, Profitability, Commercial Banks, Bangladesh.

1. Introduction

A country's economic progress depends on the savings-investment mechanism running smoothly and effectively. Bangladesh is a developing country with an underdeveloped capital market, therefore it significantly depends on the intermediary role played by commercial banks to mobilize domestic savings and give cash to the investor. Thus, the effectiveness of our financial system's operation is essential. Upon examining the financial industry's performance in Bangladesh during the last several years, it is evident that a significant part of non-performing loans (NPLs) heavily stress the banking sector. The most recent data shows, Bangladesh's NPL ratio was 11.9%, up from 10.3% in the preceding quarter.

Substandard, Doubtful, and Bad/Loss Loans are added together to form Non-Performing Loans. NPLs always lower bank profitability because banks are incapable to keep interest income from their categorized loans. Because NPLs impede recycling, there are less loanable funds. Banks are required to reserve a portion of their income as a loan loss reserve in order to offset bad debt. A bank's capital is eroded when it has a high rate of non-performing loans. A clear illustration of all the detrimental consequences of non-performing loans (NPLs) on banks' financial health, including low profitability and a tiny capital base, is the banking sector in Bangladesh. Lack of intention to pay combined with fund diversion, willful negligence and the assumption that a waiver might be available in the future, operational issues, an inability to use production capacity, a power outage, an incorrect credit assessment, a natural disaster, and unfair taxation are a few reasons for loan default. The primary causes of Bangladesh's growing loan default problem were reportedly due to the state-owned commercial banks' and private sector banks' inept handling of assets (Alam and Jahan, 1999). If there had been a competent and efficient legal recovery procedure, the issue of non-repayment might have been reduced. The Bangladeshi government has taken steps to help banks collect debts from defaulters, such as tightening regulatory requirements.

Non-performing loans are loans that a financial institution has been instructed to classify as such by a regulatory body because interest or repayments are not being provided when they are supposed to. Since it produces a stream of cash inflows through interest and principle repayments, a loan is an asset for a bank. Profit is the amount over and above the principal that is received in interest payments. If assets are not handled by banks according to schedule, they often consider them to be non-performing. Loans are considered past due when payments are repeatedly late. The loan is categorized as non-performing if a payment is past due (often for 30 days). The term "NPL" refers to a quantity of borrowed money that is either in default or on the verge of going into default because the borrower has failed to make the required installments. A non-performing loan turns into a performing loan when the debtor starts making payments on it.

2. Problem Statement

Bangladesh, a developing nation, significantly relies on the banking sector to provide efficient financial inter-mediation. Hence, facilitate investment through lending. Yet, the serious problem of NPL is presently affecting our banking industry as an indication of poor lending policies. Despite the fact that several reform initiatives have been implemented, the issue worsens every day. Because of the

rising number of NPLs, especially for state-owned commercial banks (SCBs), both public and private commercial banks' (PCBs) financial performance is at risk. The effect of NPLs is alarmingly high in these banks. NPL decrease the bank's ability to lend by lowering its bankable assets, which also lowers the bank's profit. Since people felt uncertain about receiving their invested money back with the projected return, depositors and investors began to lose trust in the bank. The worldwide reputation of our banking sector is also damaged by rising trends in NPL. The study makes an effort to identify the causes of NPLs as well as provide remedies in order to demonstrate how they affect the profitability of both types of banks in Bangladesh.

As Bangladesh's capital market is weak, the banking sector serves as the primary source of funding for the country's commercial organizations. The financial market is made up of combinations of the capital and money markets. The biggest problem facing Bangladesh's banking sector is that a significant number of loans are often going bad. Each NPL in the banking industry is seen as the opposite of a failing, unprofitable business. From this vantage point, eliminating NPL is a requirement for enhancing the economic situation. If NPLs are allowed to persist and are constantly renewed, resources are tied up in inefficient industries, which slows down economic expansion and reduces economic efficiency. NPLs are so disconcerting and cause for worry in both state-owned and private commercial banks.

Banks played immense role in financial and economic system of a country. As a financial intermediary these financial institutions channel funds from suppliers to demanders with a view to undertake real asset-based investment activities. Many manufacturing firms obtain working capital loans from banks for procurement of raw materials and uninterrupted production run. Besides it, banks also extend loans to facilitate post production activities like product storage, sales, distribution etc. By venture capital financing, banks contribute to the establishment of new business enterprises. Moreover, banks also facilitate international trade through import and export financing. NPL adversely affect not only the profitability of banks but also the financial intermediation function which hampers investment in real economic activities to a significant extent. NPL reduces the value of the earning assets, loan turnover ratio, and re-invest capability of a bank as cash inflow ceased to generate and some of the loans under NPL become bad and loss. Due to NPL, every bank is supposed to maintain a provision for loan loss through aside of a certain percentage of their annual profit. These funds can't be utilized either through loan extension or investment. Evidence of NPL erodes public confidence towards a financial

institution. Lack of trust and public confidence among individuals or households result in less volume of new deposit and more withdrawal of existing deposit which would eventually decrease the loan extending capability, investment volume, investment return as well as interest revenue of a commercial bank. In subsequent years these will result in low retention and low re-investment. Banks with adequate liquidity can participate in inter-bank money market or invest in money market instruments to earn a return on short term basis, but NPL also adversely effect on these capabilities of a bank. So, it can be said that long term sustainable operation of a bank could be at a stake due to NPL.

3. Literature review

Empirical research demonstrates that NPLs have a adverse effect on banks' profitability globally. In their 2017 study, Balango and Rao looked at whether there is a connection between profitability and the level of NPL. According to findings, NPL has an adverse and large effect on Ethiopian commercial banks' ROA, whereas CAR has a positive but relatively little effect. Bhattarai (2016) used 77 observations from a pooled dataset of fourteen commercial banks to examine the impact of NPL on the profitability of Nepalese banks from 2010 to 2015. The study concluded that the NPL ratio has an adverse effect on the profitability of Nepalese banks, whereas other factors like bank size, cost per loan asset, and GDP growth rate have a favorable impact. In their study, Chimkono et al. (2016) looked at the impact of the NPL ratio and other factors on the economic performance of commercial banks in Malawi from 2008 to 2014. The author found that the performance of banks was significantly inclined by the NPL ratio, cost efficiency ratios, and average lending interest rate.In their research, Adebisi and Matthew (2015) looked at how NPLs affect bank profitability in Nigeria. The secondary data from the NDIC's annual reports and statement of accounts for the seven-year period (2006-2012) were analyzed using the regression model. The authors discovered a substantial inverse link between return on assets and nonperforming loans (ROA).

In their study, Araka et al. (2018) intended to define the effect of interest rate restrictions and NPLs on the financial performance of commercial banks in Kenya from 2013 to 2017. The study's conclusions showed that meagre credit evaluation, prejudicial bank competition, intentional avoidance by borrowers and their lack of awareness, fund alteration for accidental purposes, over/under financing by banks, bank size, interest rate variations, loan growth, and inflation are some of the factors that contribute to loan default and have an impact on the financial performance of Kenyan banks. The study also showed that there is a connection between

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commercial banks' NPLs and interest rate restrictions. According to the study's findings, interest rate rules cause a rise in NPLs, which has an impact on the ROA and ROE of Kenya's commercial banks. According to the study, commercial banks should have a system in place for recognizing loan shirkers and taking the appropriate action, charge to their customers interest rates in accordance with the law, and improve routine credit risk observing of their loan portfolios in order to lower the level of NPLs.

In their study, Liang et al. (2015) looked at 47 commercial banks in Taiwan between the years 2000 and 2008 in an effort to determine the link between a bank's longevity and its cost effectiveness. Logistic regression is used to recognize the important variables that could have an effect on the survival of the bank based on the CAMELS model. They came to the conclusion that the debt ratio, the NPL ratio, asset growth rate, and bank ownership are the four main variables that determine whether a bank would succeed or fail. The efficiency of banks decreases when debt to NPL ratio and vice versa rise. State-owned banks are more cost-effective than privately held banks. Banks that have failed on average have worse cost efficiency than banks that have survived. Return on Equity (ROE) is the study's stand-in for dependent variable. The two main explanatory variables were capital adequacy ratio (CAR) and non-performing loan ratio (NPLR). The study found that while CAR rate showed a substantial positive association with profitability, NPLR negatively impacted bank profitability. Profitability and bank size both have a favorable association. In his work, Ahamed (2012) used the random effects (RE) estimator to analyze the level of concentration and performance of the Bangladeshi banking sector from 1999 to 2011. According to the study, the size of the bank's assets, capitalization, and liquidity are all positively correlated with the performance of the institution. Government-owned banks appear to perform worse than other commercial banks in the market, according to the ownership variable as well.

In her research, Lata (2015) used several ratios and an econometric approach called a linear regression model to depict the general picture of NPLs, their growth, and the effect of excess NPLs on the profitability of banks. She discovered that the 15 state-owned commercial banks had unusually high NPL ratios relative to their total loans, accounting for more than half of all NPLs in the banking area during the financial years 2006 to 2013. In her conclusion, she noted that it is one of the key variables affecting banks' profitability and has significant adverse effects on SCBs' net interest income throughout the studied years. In their 2014 article, Roy et al. examined the effects of macroeconomic factors on the NPL of Bangladeshi local private commercial banks. The data covered 18 scheduled banks and covered the

years 2004 to 2013. As the variables of the study NPL, GDP growth, inflation, an interest spread were considered. The study resolved that, in the case of local privat commercial banks, GDP growth and inflation have negative and positive effects o NPLR, respectively. Based on the magnitude of the assets, Hossain and Ahame (2015) performed a study utilizing 15 traditional private commercial banks (PCBs) Using a fixed effect model, the study looked at the effects of bank-specific factor on bank profitability in Bangladesh from 2012 to 2016. The research discovere that among the statistically significant predictive factors, NPL had a bad connectio with ROE.

In his article, Adhikary (2006) discovered that Bangladesh's banking industry wa severely impacted by the high level of NPL, which has a long-lasting impact o economic growth. He claims that the absence of efficient monitoring and oversigh political pressure, a porous legal system, and inefficient NPL recovery tactics ar the key causes of the enormous increase of NPL. In his study, Matin (2017) use data from 47 banks in Bangladesh from the years 2010 to 2015 and applied th Feasible Generalized Least Squares (FGLS) model. He discovered that ROA wa significantly impacted negatively by NPL, loan loss provisions, bank size, cos effectiveness, and liquidity. Islam and Rana (2017) in their study consenting for dat period 2005-10 and utilizing panel data regression model revealed NPL an operational expenditures had a substantial influence on ROA. Also, the supply o categorized loans has been demonstrated to result in lower profit when NPA level are significant. Based on secondary data from 2006-2017, Sarker (2019) examine the relative positions of all four banking categories with regard to NPLs i Bangladesh. He also looked at the various causes of NPLs in Bangladesh's bankin industry. The study discovered that there were considerable variances in the NPL performance of the four different types of banks, with SCBs having a higher level o NPLs and a higher NPL to total loan ratio than PCBs and FCBs.

In his study, Rifat (2016) sought to identify the factors that influence NPLs in th Non-Bank Financial Institutions (NBFIs) sector in Bangladesh. He also evaluate the effects of macroeconomic and firm-specific variables on categorized loans. H employed regression analysis and a correlation matrix for this investigation. Th analysis's findings indicated that the firm-specific characteristics were mor important for NBFI non-performing loans. In their 2017 study, Akter and Ro examined how NPLs affect net interest margin (NIM). They discovered that th number of NPLs held by the 30 banks listed on the Dhaka Stock Exchange is ver highand that this is one of the key factors influencing banks' profitability. Thi finding has a significant adverse impact on the listed banks' net profit margins fo

the study periods. An article published by Daily Sun (2018) claimed that NPL has bad influence on the bank's profitability. Banks must maintain an excessive provision for failed loans, which has an immediate impact on their net earnings. According to Bangladesh Bank norms, banks are required to hold 20% provision for substandard (SS) loans, 50% provision for doubtful (DF) loans, and 100% provision for bad and loss loans. Thus, the net profit is lesser and vice versa the larger the NPL.

In a newspaper article, Hasan (2019) stated that, according to data from the Bangladesh Bank, at the end of December 2018, six state-owned banks accounted for 52% of all default loans in the banking industry, totaling Tk. 93,911.40 crore. The managing director of Janata Bank told the Dhaka Tribune that "NPLs have increased sharply due to massive lending to Crescent Leather, while the negative growth in earnings is caused by the provisioning of bad loans". According to Khanom et al. (2013) 's study that assessed the status and management of NPL in Bangladesh's banking industry, the volume of NPL is influenced by a number of factors, including political influence, money misappropriation, inadequate industry analysis, etc. Different executive activities, such as appropriate credit analysis, loan officer training, interest rate disclosure, loan restructuring, etc., will help to lower the volume.In their research, Martiningtiyas and Nitinegeri (2020) examined the impact of non-performing loans on the profitability of 26 conventional banks listed between 2009 and 2017 on the Indonesian Stock Exchange. The study's findings demonstrated that the variable of non-performing loans significantly lowers the earnings of banks.

From 2010 to 2019, Çollaku and Aliu (2021) looked at how non-performing loans affected the profitability of Kosovo banks. The findings demonstrated that, when all other factors are held constant, the impact of non-performing loans on profitability is statistically significant and that, for every 1% rise in NPL, the Return on Assets falls by 0.19%. Based on data spanning the last 21 years, Patwary and Tasneem (2019) determined the effects of the non-performing loan ratio, capital adequacy ratio, and provision maintenance ratio on the return on asset (ROA) of all banks. The study's findings demonstrated the statistical significance of the non-performing loan ratio and the provision maintenance ratio with respect to the ROA. In their research, Karim et al. (2023) sought to determine if NPLs and bank profitability in Bangladesh are related. They have examined data from twenty-five listed banks for the twelve-year period from 2010 to 2021. They discovered that the return on asset (ROA), which measures profitability, is significantly impacted negatively by NPLs. Uddin (2022) studied the impact of NPLs on the state-owned commercial banks'

profitability in Bangladesh, controlling for operational efficiency. According to the study, operating efficiency is positively but not significantly impacted by NPLs.

Several studies that examined the status, causes, effects, and difficulties of NPL in Bangladesh's banking sectors have been discovered. The reasons that cause a loan to become non-performing have also been the subject of much investigation. The key area of research where this study differs from the prior literature reviewed is that it compares the effects of NPLs on the profitability of Bangladesh's state-owned and private banks, an area where very few studies have been done. In addition, the study used three dependent variables as a proxy for profitability (ROA, ROE, and NPM), which was unusual in earlier research. The importance of variations in NPLR between SCBs and PCBs was also examined in the study.

4. Objectives of the Study:

The broad objective of the study is toshow the impact of NPLs on profitability of state-owned and private commercial banks in a comparative way. The specific objectives are:

i. To show the effect of NPLs on the ROA and ROE of SCBs and PCBs.

ii. To identify the types of relationship between NPL and profitability ratios

iii. To explore the significance of differences of NPLR from one year to another.

5. Methodology

5.1 Data and Sample:

Two groups are taken as the sample; SCBs and PCBs. Total number of 61 banks operated in 2020 where 6 were SCBs and 40 PCBs. Among those, 2 SCBs and 8 PCBs, a total of 10 banks have been taken as the sample size. The newly licensed banks have been excluded in selecting the sample size because of the unavailability of data. The study includes only continuously operating commercial banks over the period of 2011-2020. Purposive sampling technique have been used in selecting banks. Secondary data have been used in the study, which were collected from different sources such as the annual reports of the sample banks and Bangladesh Bank (BB), journals, and websites of banks. The period of the study has been covered 10 years from 2011-2020.

5.2 Model Specification and Description of Variables:

The following table shows how variables are determined.

Table 1: Description of variables

Dependent Variables	Definition
ROA	It is defined as a ratio of a bank's net income to its total assets. Hence, highlight a bank's earning capacity.
ROE	Return on equity (ROE) indicates shareholders' return for equity invested in banks. It is the amount of net income distributed in relation to the equity of shareholders.
Independent Variables	
NPLR	The Non-Performing Loan Ratio (NPLR) compares nonperforming loans to the total amount of outstanding loans. It indicates a bank's asset quality.
CAR	It is the ratio of capital to a bank's total risk-weighted assets, which is also expressed as %, indicates the capital adequacy of the institution.
LQDR	A measure of bank liquidity status is the liquidity ratio (LQDR). By dividing net loans by total deposits, it is computed. The ratio of loan balances to deposits increases when liquidity decreases.

The following linear models have been framed in the light of OLS:

$$\text{Model 1:} \quad ROA_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 CAR_{it} + \beta_3 LQDR_{it} + e_{it}$$

$$\text{Model 2:} \quad ROE_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 CAR_{it} + \beta_3 LQDR_{it} + e_{it}$$

Whereas,

ROA= Return on Assets; ROE= Return on Equity

β_0= Constant term; NPLR= Non-Performing Loan Ratio

CAR= Capital Adequacy Ratio; LQDR= Liquidity Ratio; e = Error term

5.3 Data Analysis Techniques:

Ordinary Least Square (OLS) regression approach was used in the investigation. An approach for estimating the unidentified parameters in a linear regression model is called OLS. It uses the least squares technique to determine a linear function's parameters. OLS was used in the study to determine how independent factors affected the dependent variables. For the comparison of two banking groups, t test were performed. The data were evaluated using Correlation, and Regression test by using SPSS software.

1. **Hypotheses of the Study:**

   Ho-1= There is no significant impact of NPLs on profitability of state-owned commercial banks.

   Ho-2= There is no significant impact of NPLs on profitability of private commercial banks.

   Ho-3 = There is no significant difference of Non-Performing Loans (NPLs) ratios from one year to another.

2. **Results and Discussion:**

a. **Relationship between profitability, NPL and firm-specific factors**

Table 2: Correlations between ROA, NPL, and firm-specific factors (state-owned)

		ROA	NPLR	CAR	LQDR
ROA	Pearson Correlation	1	-.534	.837[**]	-.218
	Sig. (2-tailed)		.112	.003	.545
NPLR	Pearson Correlation	-.534	1	-.582	-.370
	Sig. (2-tailed)	.112		.077	.292
CAR	Pearson Correlation	.837[**]	-.582	1	-.242
	Sig. (2-tailed)	.003	.077		.500
LQDR	Pearson Correlation	-.218	-.370	-.242	1
	Sig. (2-tailed)	.545	.292	.500	

Source: Data compiled by researcher and processed in SPSS
**Significant at the 1% level (2-tailed).

The data clearly shows that ROA and CAR have a very strong positive association whereas NPLR and LQDR have a negative correlation. This suggests that a rise in ROA has coincided with an increase in CAR. The findings indicate that an increase in ROA is possible even when the other factors decrease.

Table 3: Correlations between ROE, NPL, and firm-specific factors (state-owned)

		ROE	NPLR	CAR	LQDR
ROE	Pearson Correlation	1	-.481	.828**	-.220
	Sig. (2-tailed)		.159	.003	.542
NPLR	Pearson Correlation	-.481	1	-.582	-.370
	Sig. (2-tailed)	.159		.077	.292
CAR	Pearson Correlation	.828**	-.582	1	-.242
	Sig. (2-tailed)	.003	.077		.500
LQDR	Pearson Correlation	-.220	-.370	-.242	1
	Sig. (2-tailed)	.542	.292	.500	

Source: Data compiled by researcher and processed in SPSS
**.Significant at 1% level (2-tailed).

The data clearly shows that ROE and CAR have a very strong positive link whereas NPLR and LQDR have a negative correlation. This suggests that an increase in ROE has coincided with an increase in CAR. The findings indicate that an increase in ROE is possible even when the other factors decrease.

Table 4: Correlations between ROA, NPL, and firm-specific factors (private banks)

		ROA	NPLR	CAR	LQDR
ROA	Pearson Correlation	1	-.885**	-.918**	.463
	Sig. (2-tailed)		.001	.000	.178
NPLR	Pearson Correlation	-.885**	1	.862**	-.119
	Sig. (2-tailed)	.001		.001	.743
CAR	Pearson Correlation	-.918**	.862**	1	-.342
	Sig. (2-tailed)	.000	.001		.333
LQDR	Pearson Correlation	.463	-.119	-.342	1
	Sig. (2-tailed)	.178	.743	.333	

Source: Data compiled by researcher and processed in SPSS
**Significant at the 1% level (2-tailed).

It is clear from the table that there is a substantial negative link between the NPLR and CAR and a positive correlation between ROA and LQDR. This suggests that a rise in ROA has coincided with an increase in LQDR. The findings indicate that an increase in ROA is possible even when the other factors decrease.

Table 5: Correlations between ROE, NPL, and firm-specific factors (private banks)

		ROE	NPLR	CAR	LQDR
ROE	Pearson Correlation	1	-.820[**]	-.838[**]	.382
	Sig. (2-tailed)		.004	.002	.276
NPLR	Pearson Correlation	-.820[**]	1	.862[**]	-.119
	Sig. (2-tailed)	.004		.001	.743
CAR	Pearson Correlation	-.838[**]	.862[**]	1	-.342
	Sig. (2-tailed)	.002	.001		.333
LQDR	Pearson Correlation	.382	-.119	-.342	1
	Sig. (2-tailed)	.276	.743	.333	
Source: Data compiled by researcher & processed in SPSS **significant at 1% level (2-tailed).					

It is clear from the table that there is a substantial negative association between the NPLR and CAR and a good correlation between ROE and LQDR. This shows that ROE has increased along with a rise in LQDR. The findings indicate that an increase in ROE is possible even when the other factors decrease.

b. Impact of NPL on Bank's Profitability:

I. Impact of NPL on ROA of state-owned commercial banks:

Table 6: Descriptive Statistics of variables (Model 1)

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	10	-3.18	1.27	.2830	1.25178
NPLR	10	11.70	25.24	19.7020	4.15356
CAR	10	1.38	14.21	9.6040	3.33605
LQDR	10	50.04	74.31	60.3870	8.65362

Source: Data compiled by researcher and processed in SPSS

Table 7: Coefficient Table[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Decision about H_0-1
		B	Std. Error	Beta			
1	(Constant)	-.689	5.265		-.131	.900	
	NPLR	-.043	.107	-.143	-.401	.703	Accepted
	CAR	.274	.128	.732	2.147	.075*	
	LQDR	-.014	.043	-.094	-.314	.764	

Source: Data compiled by researcher and processed in SPSS

a. Dependent Variable: ROA   * Significant at 10%

The estimated model is as follows:

$$ROA = -0.689 - 0.043NPLR + 0.274CAR - 0.014LQDR + 0.82712$$

From the above table, it is evident that NPLR and LQDR have negative impact on ROA and CAR has positive impact on ROA. NPLR has insignificant impact on ROA while CAR is significant at 10% level. One percent increase of NPLR results in decrease of ROA by 0.043% and vice versa in case of state-owned banks.

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.842[a]	.709	.563	.82712

Source: SPSS output   a. Predictors: (Constant), LQDR, CAR, NPLR

It is found that that the adjusted R-square value is 56% which is a good fit.

Table 9: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.998	3	3.333	4.871	.048[b]
	Residual	4.105	6	.684		
	Total	14.103	9			

Source: SPSS output   a. Dependent Variable: ROA   b. Predictors: (Constant), LQDR, CAR, NPLR

From the table above it is known that the value of F-stat is 4.871 and is significant as the level of significance is less than 5%. So, the overall model is a good fit.

II. Impact of NPL on ROE of state-owned commercial banks:

Table 10: Descriptive Statistics of variables (Model 2)

	N	Minimum	Maximum	Mean	Std. Deviation
ROE	10	-95.29	22.08	2.3080	34.85286
NPLR	10	11.70	25.24	19.7020	4.15356
CAR	10	1.38	14.21	9.6040	3.33605
LQDR	10	50.04	74.31	60.3870	8.65362

Source: Data compiled by researcher & processed in SPSS

Table 11: Coefficient Table[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Decision about H$_0$-1
		B	Std. Error	Beta			
2	(Constant)	-66.141	152.300		-.434	.679	
	NPLR	-.210	3.103	-.025	-.068	.948	Accepted
	CAR	8.410	3.699	.805	2.274	.063*	
	LQDR	-.135	1.248	-.034	-.109	.917	

Source: Data compiled by researcher & processed in SPSS   a. Dependent Variable: ROE   * Significant at 10%

The estimated model is as follows:

$$ROE = -66.141 - 0.210NPLR + 8.410CAR - 0.135LQDR + 23.92766$$

From the above table, it is evident that NPLR and LQDR have negative impact on ROE and CAR has positive impact on ROE. NPLR has insignificant impact on ROE while CAR is significant at 10% level. One percent increase of NPLR results in decrease of ROE by 0.21% and vice versa in case of state-owned banks.

Table 12: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.828[a]	.686	.529	23.92766

Source: Data compiled by researcher & processed in SPSS a. Predictors: (Constant), LQDR, CAR, NPLR

According to the table above, it is discovered that the adjusted R-square value is 52%. As a result, the analysis predicts the average ROE with approximately 52% explanatory power.

Table 13: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	7497.302	3	2499.101	4.365	.059[b]
	Residual	3435.196	6	572.533		
	Total	10932.499	9			

Source: SPSS output a. Dependent Variable: ROE, b. Predictors: (Constant), LQDR, CAR, NPLR

It can be seen from the table 13 that the F-stat value is 4.365 and that it is significant because the level of significance is 5%. So, in overall the model is a good fit.

III. Impact of NPL on ROA of private commercial banks:

Table 14: Descriptive Statistics of variables (Model 1)

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	10	.87	2.97	1.5520	.67616
NPLR	10	2.14	5.92	3.9710	1.43507
CAR	10	11.05	12.82	12.0380	.49701
LQDR	10	79.53	89.69	84.2020	3.39468

Source: Data compiled by researcher & processed in SPSS

Table 15: Coefficient Table[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Decision about H_0-2
		B	Std. Error	Beta			
1	(Constant)	3.577	4.703		.761	.476	
	NPLR	-.261	.103	-.554	-2.537	.044**	Rejected
	CAR	-.470	.314	-.346	-1.500	.184	
	LQDR	.056	.023	.279	2.367	.056*	

Source: Data compiled by researcher & processed in SPSS   a. Dependent Variable: ROA **Significant at 5%, * Significant at 10%

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The estimated model is as follows:

$$ROA = 3.577 - 0.261NPLR - 0.470CAR + 0.56LQDR + 0.20860$$

From table 15, it is evident that NPLR and CAR have negative impact on ROA and LQDR has positive impact on ROA. It is found that the independent variables NPLR and LQDR are significantly and CAR is insignificantly related to the dependent variable ROA. One percent increase of NPLR results in decrease of ROA by 0.26% and vice versa for private banks.

Table 16: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.968[a]	.937	.905	.20860

Source: SPSS output   a. Predictors: (Constant), LQDR, NPLR, CAR

The adjusted R-square value is 90% which is a good fit.

Table 17: ANOVA[a]

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.854	3	1.285	29.520	.001[b]
	Residual	.261	6	.044		
	Total	4.115	9			

Source: SPSS output   a. Dependent Variable: ROA b. Predictors: (Constant), LQDR, NPLR, CAR

From the table above it is known that the value of F-stat is 29.520 and is significant as the level of significance is less than 5%. Overall, the model is significant.

Table 18: Descriptive Statistics of variables

	N	Minimum	Maximum	Mean	Std. Deviation
ROE	10	9.99	28.07	17.1860	7.29334
NPLR	10	2.14	5.92	3.9710	1.43507
CAR	10	11.05	12.82	12.0380	.49701
LQDR	10	79.53	89.69	84.2020	3.39468

Source: Data compiled by researcher & processed in SPSS

IV. Impact of NPL on ROE of private commercial banks:

Table 19: Coefficient Table[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Decision about H_0-2
		B	Std. Error	Beta			
2	(Constant)	45.245	95.776		.472	.653	
	NPLR	-2.654	2.094	-.522	-1.267	.252	Accepted
	CAR	-4.636	6.389	-.316	-.726	.495	
	LQDR	.455	.478	.212	.952	.378	

Source: Data compiled by researcher & processed in SPSS a. Dependent
Variable: ROE

The model is as follows:

$$ROE = 45.245 - 2.654NPLR - 4.636CAR + 0.455LQDR + 4.24815$$

From the above table, it is evident that NPLR and CAR have negative impact on ROE and LQDR has positive impact on ROE. NPLR has insignificant effect on ROE. One percent increase of NPLR results in decrease of ROE by 2.65% and vice versa in case of private banks.

Table 20: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.880[a]	.774	.661	4.24815

Source: SPSS output   a. Predictors: (Constant), LQDR(%), NPLR(%), CAR(%)

The adjusted R-square value is 66% which is a good fit.

Table 21: ANOVA[a]

	Model	Sum of Squares	df	Mean Square	F	Sig.
2	Regression	370.455	3	123.485	6.843	.023[b]
	Residual	108.281	6	18.047		
	Total	478.736	9			

Source: SPSS output   a. Dependent Variable: ROE(%) b. Predictors: (Constant), LQDR(%), NPLR(%), CAR(%)

It can be seen from the table above that the F-stat value is 6.843, which is significant because the level of significance is less than 5%. The model fits well overall.

c. t-test for identifying differences in NPL between years:

Table 22: ANOVA[a] Test

	Sum of Squares	df	Mean Square	F	Sig.	Decision about H_0-3
Between Groups	138.552	9	15.395	5.682	.000	Rejected
Within Groups	176.107	65	2.709			
Total	314.659	74				

Source: SPSS output a. Bank Type = Private banks

Table 23: ANOVA[a] Test

	Sum of Squares	df	Mean Square	F	Sig.	Decision about H_0-3
Between Groups	310.379	9	34.487	.246	.977	Accepted
Within Groups	1401.283	10	140.128			
Total	1711.661	19				

Source: SPSS output   a. Bank Type = State owned banks

From the table 22 it is seen that the level of significance is 0% which is less than 5%. Hence it can be concluded that there is a significant difference in NPL ratios from one year to another in case of PCBs. But from table 23 it is seen that there is no significant difference in NPL ratios from one year to another in case of state-owned banks.

8. Recommendations

The banks should carefully implement corrective measures to lower non-performing loans, including carefully choosing the right borrowers for loan approval, monitoring and supervising underlying projects, refraining from aggressive lending strategies, putting an end to unethical behavior or employee corruption during loan approval, ensuring good corporate governance practices, determining the value of collateral provided by borrowers, and assuring good corporate governance. In addition to these, the government should take action to stop political pressure from being used to force the approval of loans for customers who are not eligible for them.

9. Conclusion

The performance of the banks as a whole is reflected in NPLs. A high level of NPLs indicates a high likelihood of numerous credit defaults, which could have an impact on bank profitability. Additionally, it undermines consumer trust in banks. As NPLs increase, provisions become necessary, which lowers overall profits and shareholder value. However, according to the most recent data available, it gradually decreased from a very high rate of 28.0% in 2003 to 10.67% in 2017. According to the most recent data, six SCBs account for 29.96% of the total NPLs, and private commercial banks (PCBs) had defaulted on 5.54% of their loans (BB). Even so, it is extremely high by any measure. If it cannot be significantly reduced, we will lose our competitive edge in the global wave of banking service globalization that is currently underway. Although Bangladesh has largely embraced international standards for loan arrangement and provisioning, the structure for managing NPLs is found to be ineffective because it has failed to significantly slow down the rate of new NPLs. Banks must take some preventative measures for NPLs in order to reduce the industry's rising NPL levels. By giving the borrower some benefits, such as exemptions, monetary incentives, etc., the borrower should be encouraged to repay the loan. The aforementioned initiatives, if carried out properly and if government. NPL's detrimental effects on the sector can soon be eliminated if our central bank supports the nation's banks. The study illustrates the effects and provides an analysis of various NPL-related issues. In order to ensure maximum

commitment to the progress of the banking industry and subsequently be able to contribute to the economic expansion of the country, banks should take appropriate measures to reduce NPL.

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Appendices

Table A-1: Profitability ratios, NPL, and firm-specific factors of sample banks

Year	Bank name	ROA(%)	ROE(%)	NPLR(%)	CAR(%)	LQDR(%)
2011	Sonali Bank Ltd.	0.47	9.46	31.44	12.61	63.44
2012		0.28	5.04	27.49	14.60	61.66
2013		0.42	7.62	23.88	10.80	69.84
2014		1.42	17.75	17.80	12.60	64.89
2015		-2.86	-140.84	33.31	-0.94	63.10
2016		0.45	9.89	30.21	7.59	50.07
2017		0.68	11.05	25.61	12.24	43.39
2018		0.06	0.99	25.08	10.08	39.99
2019		0.14	2.18	28.38	10.33	37.28
2020		0.58	10.63	35.28	10.35	39.76
2011	Janata Bank Limited	1.18	34.70	12.34	3.39	65.37
2012		1.00	23.38	8.70	13.81	67.58
2013		0.77	27.80	5.30	9.19	78.77
2014		1.12	16.32	5.60	10.20	71.28
2015		-3.50	-49.74	17.16	3.70	74.52
2016		1.42	30.09	16.54	10.06	59.71
2017		0.61	9.66	14.73	10.69	61.97
2018		0.70	9.70	12.34	10.16	61.50
2019		0.33	5.22	11.69	10.30	62.80
2020		0.33	5.23	11.12	10.27	70.77
2011	National Bank Limited	2.36	28.38	-	13.42	84.18
2012		2.52	27.53	-	8.61	84.77
2013		6.05	48.96	-	12.29	89.78
2014		4.01	29.96	2.83	12.65	89.99
2015		0.80	6.78	4.32	12.80	80.19
2016		0.96	9.14	3.24	11.69	78.03
2017		1.08	10.45	5.26	11.71	85.08
2018		1.43	12.74	7.01	12.05	83.82
2019		1.90	15.96	10.35	13.19	86.99
2020		1.43	12.27	10.64	13.79	91.09
2011	Al-Arafah Islami Bank Limited	1.71	24.70	2.75	11.20	93.44
2012		1.77	24.10	1.68	11.25	94.21
2013		2.65	20.10	1.14	14.49	93.43
2014		2.06	18.34	0.95	13.47	89.07

2015		1.30	13.85	1.63	11.75	90.56
2016		1.31	14.15	2.77	14.66	88.74
2017		1.10	12.80	4.50	14.03	84.58
2018		1.11	14.02	4.66	16.65	88.59
2019		1.08	14.08	4.54	14.91	88.50
2020		1.23	17.08	4.10	13.06	89.95
2011		1.50	29.90	3.30	10.90	80.90
2012		1.60	30.30	2.50	11.60	71.40
2013		2.20	35.30	2.40	9.60	81.30
2014	Dutch-	1.90	27.00	2.70	11.20	79.10
2015	Bangla	1.70	23.40	3.00	12.00	73.10
2016	Bank	1.20	17.00	3.90	13.70	73.30
2017	Limited	1.10	16.20	4.40	13.80	74.61
2018		1.30	19.30	3.70	13.70	81.53
2019		0.70	10.30	5.20	13.10	79.40
2020		0.90	13.20	4.70	14.50	84.10
2011		1.65	25.12	9.73	11.91	77.01
2012		2.3	30.06	2.86	12.83	76.23
2013		1.8	20.52	1.82	9.5	81.97
2014		1.69	19.43	2.2	11.27	80.29
2015	Jamuna	1.06	13.35	2.81	12.21	68.93
2016	Bank	1.01	13.2	7.59	11.1	69.41
2017	Limited	1.06	13.68	5.68	11.25	67.95
2018		1.16	12.39	6.69	12.74	73.41
2019		1.21	11.89	4.05	10.93	82.73
2020		1.11	12.92	4.02	11.86	84.89
2011		3.12	40.96	2.99	12.84	82.71
2012		3.52	39.84	2.75	11.09	85.31
2013		3.09	30.77	2.11	9.91	91.95
2014		0.93	9.25	2.82	11.37	81.48
2015	AB Bank	0.88	9.31	3.32	11.73	75.75
2016	Limited	0.53	6.13	3.37	10.80	86.58
2017		0.54	6.95	3.86	10.32	89.60
2018		0.48	6.03	3.16	11.09	96.80
2019		0.44	5.68	5.19	10.89	83.67
2020		0.01	0.13	7.15	10.80	86.24
2011	Prime	1.30	20.58	1.76	10.88	85.38
2012	Bank	2.37	30.19	1.29	14.71	83.45
2013	Limited	2.22	21.65	1.18	11.43	93.16

Year	Bank					
2014		2.07	20.32	1.37	12.45	86.88
2015		2.22	21.66	3.83	12.73	88.38
2016		2.05	20.19	5.09	12.04	76.07
2017		1.24	13.53	7.61	12.71	71.94
2018		0.76	8.35	7.82	12.74	77.95
2019		0.96	10.08	5.06	12.45	85.99
2020		0.84	8.41	5.45	14.01	99.65
2011	Southeast Bank Limited	1.09	12.06	-	13.00	-
2012		1.66	16.51	-	11.72	-
2013		2.26	19.41	4.37	11.25	87.63
2014		1.32	10.47	3.51	11.46	84.36
2015		0.95	8.42	4.47	10.87	83.04
2016		1.64	16.20	3.94	10.90	76.44
2017		1.67	16.51	3.64	12.41	78.09
2018		1.23	11.86	4.25	11.52	80.25
2019		0.88	9.06	5.89	11.25	83.43
2020		0.37	4.46	5.99	10.84	82.12
2011	EXIM Bank Limited	1.83	21.98	1.88	10.79	93.14
2012		2.19	25.22	2.68	11.18	92.92
2013		3.49	27.86	1.99	9.95	98.26
2014		1.65	13.87	1.63	10.88	92.42
2015		1.45	12.07	4.27	10.94	84.22
2016		1.06	9.28	3.67	13.19	87.67
2017		0.96	9.20	3.23	11.70	89.58
2018		1.07	10.77	4.69	12.04	87.88
2019		0.77	8.31	5.23	11.77	90.00
2020		1.04	11.42	5.32	11.09	89.91

Source: Derived from annual reports

Abbreviations

BB= Bangladesh Bank
BL= Bad and Loss
CAR= Capital Adequacy Ratio
CAMEL=Capital adequacy, Asset quality, Management, Earnings and Liquidity
DSE= Dhaka Stock Exchange
DF= Doubtful
DBBL= Dutch Bangla Bank Limited

FGLS= Feasible Generalized Least Squares
GSE= Ghana Stock Exchange
LQDR= Liquidity Ratio
NPA= Non-Performing Asset
NPL= Non-Performing Loan
NPLR= Non-Performing Loan Ratio
NBFIs= Non-Bank Financial Institutions
NIM= Net Interest Margin
NPM= Net Profit Margin
OLS= Ordinary Least Square
PCBs= Private Commercial Bank
ROA= Return On Asset
ROE= Return on Equity
SCBs= State-Owned Commercial Banks
SS= Sub Standard
SMA= Special Mention Account

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