# Impact of Non-Performing Loans on Bank Profitability: A Study of Rupali Bank PLC, Bangladesh

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**Abstract**
In this study, the profitability of Rupali Bank PLC, a state-owned commercial bank in Bangladesh, is examined in relation to non-performing loans (NPLs) during the years 2015–2022. The analysis uses secondary data sourced from the annual reports of Rupali Bank PLC. Linear regression analysis is employed to examine how NPLs impact key profitability indicators, specifically Return on Assets (ROA) and Return on Equity (ROE). The findings reveal a significant negative correlation between NPLs and profitability, with higher NPL ratios leading to a decline in both ROE and ROA. Specifically, NPLs account for 76.1% of the variation in ROE and 62.8% of the variation in ROA. The study confirms the hypotheses: H1 (NPLs have a significant negative relationship with ROE) and H2 (NPLs have a significant negative relationship with ROA), highlighting the detrimental effect of rising NPL levels on the bank's profitability. These results suggest that an increase in NPLs severely hampers the bank's ability to generate profit and affects its overall financial health. The study underscores the importance of effective NPL management for sustaining profitability and ensuring financial stability in the banking sector. The findings have critical implications for policymakers and bank management, suggesting that enhanced credit risk management practices and stronger lending protocols are essential to mitigate the adverse effects of rising NPLs.

**CITATION**

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*Keywords*: Non-performing loans (NPL), Bank profitability, Return on Equity (ROE), Return on Assets (ROA), Rupali Bank PLC.

## 1. Introduction
Rupali Bank PLC, one of the prominent state-owned commercial banks in Bangladesh, was formed on March 26th, 1972, by the amalgamation of Muslim Commercial Bank Ltd., Australasia Bank Ltd., and Standard Bank Ltd. Since its establishment, the bank has grown significantly and transitioned from being a nationalized commercial bank to becoming the largest public PLC bank in the country on December 14th, 1986. Rupali Bank PLC operates a vast network of 626 branches nationwide, providing a comprehensive array of banking services such as deposit accounts, loans, remittance services, and foreign exchange transactions (Rupali Bank Training Academy, 2024). Rupali Bank PLC, one of the top-performing banks in Bangladesh is encountering difficulties owing to a significant amount of non-performing loans that have adversely affected its financial

stability and operational efficacy (Rashaduzzaman, 2024). As of 2022, Rupali Bank PLC has an NPL ratio of over 20%, significantly higher than the industry average of 10%. This high volume of non-performing loans has become a major concern for the bank's management and shareholders as it hinders their ability to generate profits, which is their primary objective (Annual Report 2022, 2023). The bank's inability to mobilize savings and direct them towards productive investments is a worrying trend. Therefore, it is crucial to identify the root causes of this high NPL ratio and find potential solutions to reduce it (Amoako, 2015). This bank has experienced fluctuating levels of NPLs over the years. These fluctuations reflect broader economic conditions as well as internal management decisions (Islam. 2019). According to global financial reports and studies, Non-performing loans are substantially influenced by both macroeconomic circumstances and firm-specific variables (Berger and DeYoung, 1997; Louzis et al., 2012). For instance, economic downturns often lead to higher NPLs due to reduced borrower capacity to meet debt obligations (Salas and Saurina, 2002). The bank's inability to mobilize savings and direct them towards productive investments is a worrying trend. Non-performing loans (NPLs) are a growing issue for Bangladesh's banking sector, especially for state-owned banks like Rupali Bank PLC. Rising NPL levels not only weaken individual banks' financial health but also threaten broader economic stability. Studies consistently show that NPLs reduce bank profitability through decreased interest income, increased provisioning costs, and higher capital requirements. However, the impact varies by country, regulatory framework, and bank characteristics. In Bangladesh, research identifies political interference, governance issues, poor credit assessment, and lax monitoring as key drivers of NPLs (Hossain, 2018). Research conducted by Zeng and Wang (2023) indicates that the larger banks often have a lesser effect on profitability from non-performing loans (NPLs) compared to smaller banks, attributable to economies of scale and more sophisticated risk management practices. More substantial banks can often accommodate NPL-related losses with little adverse effects on ROE and ROA. Research by Rachman, Saleh, and Firdaus (2021) highlights that the influence of non-performing loans (NPLs) on return on equity (ROE) and return on assets (ROA) may vary depending on regional banking practices and regulatory frameworks, with banks in emerging economies exhibiting greater sensitivity to NPLs than their counterparts in developed economies due to variations in credit risk management.

The connection between profitability and non-performing loans (NPLs) in developing nations such as Bangladesh is shaped by a complex interplay of both internal and external factors. According to Hossain (2018), political interference, governance issues, and inadequate credit assessment practices are significant contributors to the rising levels of NPLs in state-owned banks. These issues often hinder proper loan monitoring and enforcement, resulting in a higher accumulation of bad loans, which in turn negatively affects profitability. Additionally, macroeconomic factors such as inflation, interest rates, and overall economic growth play a crucial role in influencing the performance of NPLs. As noted by Louzis et al. (2012), during periods of economic stress, the risk of borrower defaults escalates, amplifying the adverse impact of NPLs on the financial health of banks. This highlights the need for a multi-faceted approach to tackle NPLs, incorporating not only stronger internal risk management practices but also broader economic and policy reforms to mitigate the effects of economic downturns. Furthermore, recent studies emphasize the importance of internal factors like leverage, operating efficiency, and capital adequacy ratio (CAR) in shaping the profitability of commercial banks. One study finds that while NPLs have a negative but insignificant impact on profitability, higher leverage and NPL levels generally reduce return on assets (ROA), underlining the need for careful credit risk management. Similarly, another analysis highlights that both internal factors, such as bank efficiency and management decisions, and external macroeconomic factors, like GDP growth and unemployment rates, influence NPL levels. The study also points to the negative correlation between bank size and NPLs, suggesting that larger banks may be better positioned to manage NPL risks. These findings underscore the importance of a comprehensive approach to managing NPLs, combining efficient credit risk management, strong governance practices, and a keen

awareness of macroeconomic conditions to mitigate the impact of NPLs on profitability. Similarly, Anjom & Karim (2016) examined that a correlation between increasing NPL ratios and decreasing ROA and ROE in the period of stagnation. This study also suggests that non-performing loans (NPLs) deplete resources that may be used for lucrative lending and revenue production. Examining the association between non-performing loans and profitability is required in order to competence the current state and performance of a nation's banking system (Maulani et al., 2024). The main objective of this study is to understand the correlation between NPLs and profitability as well as how non-performing loans affect profitability.

This study is of significant importance as it addresses a notable gap in the existing literature regarding the relationship between non-performing loans (NPLs) and profitability in the context of state-owned commercial banks in Bangladesh, particularly Rupali Bank PLC. While a considerable amount of research has focused on the general determinants and impact of NPLs in the banking sector, there is a lack of studies that specifically examine the performance of state-owned banks specially Rupali Bank PLC in Bangladesh. By utilizing data from 2015 to 2022, this study provides an updated analysis of the NPL situation at Rupali Bank PLC, one of the largest state-owned banks in the country. In addressing this gap, the study contributes to the literature by offering insights into how NPLs affect profitability within the specific context of a state-owned bank. NPLs are critical for bank profitability, as high levels of NPLs reduce the bank's asset quality, increasing the risk of financial instability (Zakaria et al., 2023). Given the unique operational and regulatory environment of state-owned banks in Bangladesh, the findings of this study will be particularly valuable for policymakers, bank managers, and researchers. These insights can help Rupali Bank PLC and other state-owned banks develop more effective strategies for managing NPLs, which in turn can improve their financial performance (Rahadian & Permana, 2021). Furthermore, the study's recommendations could guide policymakers in strengthening the overall stability and resilience of the banking sector in Bangladesh, especially during periods of economic stress or downturns, as NPLs often increase during financial crises (Abu Khalaf & Awad, 2024). By focusing on Rupali Bank PLC, a key player in Bangladesh's banking sector, the study highlights how state-owned banks can adapt their strategies in response to rising NPLs and their impact on profitability. This is crucial for improving the operational efficiency and sustainability of these banks, ensuring they remain viable and effective in supporting the national economy (Tangngisalu et al., 2020). The research also presents an opportunity to inform broader policy discussions on how to enhance the performance of state-owned commercial banks, which are essential to the financial infrastructure of emerging economies like Bangladesh (Kadek et al., 2021).

## 2. Literature Review
Non-performing loans (NPLs) have been a topic of extensive research in the banking literature, particularly in the context of developing economies like Bangladesh. This chapter reviews the existing literature on NPLs, their determinants, and their impact on bank profitability, with a focus on studies conducted in Bangladesh and other similar economies.

### 2.1 Concept and Measurement of NPLs
Loans that are in default or almost in default that are identified by the borrower's inability to make regular payments for a predetermined period of time—typically 90 days or longer—are known as non-performing loans, or NPLs. The percentage of NPLs to total loans is a crucial measure of a bank's asset quality and overall financial health (Bholat et al., 2016; Non-Performing Loan, 2024). Recent research underscores the growing significance of both internal and external factors in determining the level of NPLs in commercial banks. For example, Kryzanowski et al. (2023) find that external shocks, such as the COVID-19 pandemic, have exacerbated NPL ratios by increasing the financial strain on borrowers, leading to higher default rates. The study highlights that state-owned banks, which tend to have higher capital buffers, were better able to manage these increases in NPLs. Similarly, a study by Wang et al. (2023) indicates that the

application of fintech in risk management has a positive impact on mitigating NPL risks, particularly in smaller banks. Their research suggests that enhancing IT infrastructure, such as increasing personnel and software inputs, can reduce NPL ratios by improving credit monitoring and risk assessment processes. Moreover, the work by Benavides-Franco et al. (2023) reveals that in times of crisis, such as the COVID-19 pandemic, non-performing loans can increase significantly due to borrowers' reduced ability to meet repayment obligations, highlighting the vulnerability of banks to external economic shocks. These findings reinforce the idea that managing NPLs requires not only internal strategies such as improved loan monitoring and operational efficiency, but also a broader consideration of macroeconomic conditions and external factors that impact borrowers' financial health. Hossain (2018) notes that NPLs are a major concern for the banking sector in Bangladesh, as they lead to reduced interest income, increased provisioning costs, and lower profitability. The study highlights the importance of understanding the factors contributing to high NPLs in order to develop effective strategies for managing and reducing them.

## 2.2 Determinants of NPLs
The causes of non-performing loans (NPLs) in the banking sector have been the subject of several research, which have identified macroeconomic and bank-specific factors. According to Louzis et al. (2012), macroeconomic variables like GDP growth and unemployment, as well as bank-specific characteristics like management quality, efficiency, and risk preferences, have a major impact on non-performing loans (NPLs). The knowledge of the macroeconomic and bank-specific factors influencing non-performing loans has been expanded by recent research. In their investigation of Barbados' commercial banking industry, Wood and Skinner (2018) noted that macroeconomic variables like GDP growth, unemployment, and interest rates, as well as bank-specific elements like return on equity, return on assets, and capital adequacy ratio, have a major impact on NPL levels. Their study underscores the importance of monitoring financial ratios and macroeconomic trends in predicting NPL behavior, particularly during economic crises. Similarly, Golitsis et al. (2022) found that in North Macedonia, GDP growth, unemployment, and interest rates were key drivers of NPLs, while bank-specific variables such as gross loans and lagged NPLs had a less significant impact. These findings emphasize that a country's economic performance and labor market conditions can significantly affect loan repayment capacity, thus influencing NPL levels. Moreover, Dimitrios et al. (2016) extended this analysis to Euro-area countries, identifying income tax policies and the output gap as new determinants of NPLs. Their study highlights the role of fiscal policies and economic cycles in shaping credit risk in banking systems. Collectively, these studies illustrate the complex interplay between internal bank management and broader macroeconomic forces in determining the NPL levels, underlining the need for comprehensive policies that address both financial management within banks and economic stabilization in the broader economy. In the context of Bangladesh, Rahman et al. (2017) identified poor credit assessment, inadequate monitoring, and lack of effective recovery strategies as major contributors to high NPLs. The study also highlighted the role of political interference and governance issues in exacerbating the problem. Hossain (2018) further emphasized the impact of economic constraints, such as slower economic growth and high inflation, on the rising NPLs in Bangladeshi banks. The study suggests that banks need to consider these macroeconomic factors when developing their credit policies and risk management strategies.

## 2.3 Impact of NPLs on Bank Profitability
The correlation between NPLs and bank profitableness has been a subject of extensive research. Karim et al. (2010) identified a substantial inverse correlation between non-performing loans (NPLs) and bank profitability, as assessed by return on assets (ROA) and return on equity (ROE), in the context of Malaysian banks. Similar findings have been reported in studies conducted in other countries. Chimkono et al. (2016) observed that NPLs have a significant negative impact on the profitability of commercial banks in Malawi. The study emphasized the need for banks to implement effective credit risk management practices to mitigate the adverse effects of NPLs.

Building on these findings, recent studies have further substantiated the negative relationship between non-performing loans (NPLs) and bank profitability across different contexts. Maaji et al. (2023) explored the effects of NPLs on Cambodian banks, revealing that the ratio of NPLs significantly reduces profitability, particularly when compounded by factors such as bank size, inflation, and economic conditions. Similarly, Do et al. (2020) examined Vietnamese commercial banks and found a consistent negative impact of NPLs on profitability, underscoring the role of credit risk management in maintaining profitability. In Bangladesh, Uddin (2022) analyzed the impact of leverage, operating efficiency, and NPLs on bank profitability, concluding that NPLs exert a detrimental effect on return on assets (ROA), further affirming the need for robust risk management strategies to mitigate the financial strain caused by growing NPLs. These studies suggest that as NPLs increase, banks' ability to generate profit diminishes, thereby highlighting the critical importance of effective credit monitoring and risk mitigation strategies to preserve financial stability. In Bangladesh, Rahman et al. (2017) investigated the impact of NPLs on the profitability of commercial banks using panel data analysis. The study found that NPLs have a significant negative effect on bank profitability, highlighting the importance of reducing NPLs to improve the financial performance of banks.

## 2.4 Strategies for Managing NPLs

Given the adverse impact of NPLs on bank profitability, several studies have explored strategies for managing and reducing NPLs. Haneef et al. (2012) emphasized the importance of effective credit risk management practices, including thorough credit assessment, regular monitoring, and timely recovery actions. In the context of Bangladesh, Hossain (2018) suggested that banks should focus on improving their due diligence processes in loan sanctioning, avoiding unhealthy competition, and reducing political interference in lending decisions. The study also highlighted the need for a supportive legal and regulatory environment to facilitate the recovery of NPLs. Rahman et al. (2017) recommended that Bangladeshi banks should adopt a proactive approach to managing NPLs, including early identification of potential problem loans, restructuring of viable loans, and prompt legal action against willful defaulters. The study also emphasized the importance of strengthening the overall governance and risk management frameworks of banks.

## 2.5 Hypothesis development

Beck, Jakubik, and Piloiu (2013) determine that the increasing amount of NPLs may reduce bank profitability (ROE) by eroding equity through credit losses and decreasing overall income. Makri et al. (2014) analyze a negative relationship between NPLs and ROA, where problematic loans hinder the bank's ability to generate income from its assets. Prior studies have consistently found a negative relationship between non-performing loans (NPLs) and return on equity (ROE), a common profitability metric that measures the return generated on shareholders' equity. Karim et al. (2010) found that NPLs negatively affect ROE in Malaysian banks, with high levels of NPLs reducing profitability and shareholders' returns. Similarly, studies in other emerging markets such as Chimkono et al. (2016) in Malawi and Maaji et al. (2023) in Cambodia confirmed the adverse impact of NPLs on ROE, highlighting the role of NPLs in eroding the profitability of banks by increasing credit losses and operational costs associated with managing non-performing assets. Given the findings that NPLs contribute to increased provisioning for loan losses and a reduction in banks' capacity to generate returns from equity investments, it can be hypothesized that the presence of higher levels of NPLs will significantly reduce the profitability of banks, as measured by ROE.

*H1: NPLs have a significant negative relationship with ROE in Rupali Bank PLC.*

In addition, Return on Assets (ROA) is another key profitability indicator that reflects how efficiently a bank utilizes its assets to generate earnings. Studies have widely documented the negative influence of NPLs on ROA. For example, Akter and Roy (2017) in Bangladesh and Do et al. (2020) in Vietnam demonstrated that NPLs negatively impact ROA, as non-performing loans reduce the efficiency with which banks use their assets, ultimately lowering the returns on those

assets. High levels of NPLs require banks to allocate larger provisions for loan losses, reducing the total assets available for productive lending and investment activities. Additionally, Gazi et al. (2022) found that during the COVID-19 pandemic, the rise in NPLs was associated with lower ROA in Bangladesh, as banks faced heightened credit risk and a loss of income from non-performing loans. These findings support the notion that increasing NPLs directly undermine the effective use of bank assets, decreasing overall profitability. Therefore, based on the existing body of literature, it can be hypothesized that higher NPLs will be associated with a decrease in ROA, as the bank's asset utilization efficiency declines.

**H2:** *NPLs have a significant negative relationship with ROA in Rupali Bank PLC.*

## 3. Research Methodology
### 3.1 Research Design
The profitability of Rupali Bank PLC, a state-owned commercial bank in Bangladesh, is examined in this research in connection to non-performing loans (NPLs). Only secondary data from the bank's annual reports served as the basis for the research. The impact of non-performing loans (NPLs) on the bank's profitability is evaluated using key financial indicators, such as NPLs, return on equity (ROE), and return on assets (ROA). These annual reports provide a comprehensive snapshot of the bank's financial performance over the selected period, allowing for a thorough investigation into how NPLs influence profitability. Adopting a quantitative research approach, this study employs statistical methods to explore the relationship between NPLs and profitability. The eight-year period from 2015 to 2022 was selected to capture recent trends and developments within the banking sector, ensuring a sufficient number of data points for analysis. This timeframe also provides a consistent data set, allowing for an in-depth evaluation of the impact of NPLs on bank profitability.

### 3.2 Variables and Notations

**Table1**: Variables and notations

| Determinants | Variables | Notations |
|---|---|---|
| Dependent Variables | Return on Asset | ROA |
| | Return on Equity | ROE |
| Independent Variables | Non-performing Loans | NPLs |

ROI (Return on Investment) and ROA (Return on Assets) are regarded as dependent variables in this study, as their utilization in financial and business analysis constitutes a strategic decision; these metrics generally represent outcomes that indicate a corporation's performance in relation to its investments and asset base.

### 3.3 Model specification
**Econometric Model**
A simple statistical econometric model was used to conduct this study. Based on the theoretical relationship among variables, a simple regression model was developed as per the objective of the study. A regression model is estimated to examine the relationship between nonperforming loans and profitability. The model is expressed as:

Equation 1: for nonperforming loan and return on equity (ROE)
Were,

$$Y^\wedge = \beta_0 + \beta_1 X_1 + \varepsilon$$

Here, Y means return on equity (ROE) is the dependent variable, $X_1$ means non-performing loans (NPLs) is the independent variable, $\beta_0, \beta_1$ are the assessment of regression coefficient that evaluates the relationship between the potential confounder and the result; $\varepsilon$ is the error term.

Equation: 2 for non-performing loan and return on asset (ROA)

Were,

$Y^{\wedge} = \beta 0 + \beta 1X1 + \mathcal{E}$

Here, Y means return on asset (ROA) is the dependent variable, X1 means non-performing loans (NPLs) is the independent variable, β0, β1 are the estimated regression coefficient that quantifies the association between the potential confounder and the outcome; Ɛ is the error term.

### 3.4 Analytical tools and technique

Statistical analysis was conducted using Microsoft Excel for data organization and preliminary analysis, and Statistical tools (SPSS version 25) for regression and correlation analyses for a noteworthy conclusion.

## 4. Data Analysis and Interpretation
### 4.1 Non-Performing Loans at Rupali Bank

The issue of non-performing loans (NPLs) is a pressing concern in Bangladesh's banking sector, significantly impacting the financial performance of many institutions, including Rupali Bank. Despite Rupali Bank PLC (RBL)'s intensified efforts to mitigate the effects of NPLs through rigorous monitoring, review, and the implementation of various measures, the challenge persists. This study aims to analyze the trend of NPLs from 2015 to 2022, highlighting a consistent increase in nonperforming loans each year and month, underscoring the persistent and growing challenge this poses to the banking industry in Bangladesh. The present scenario of a nonperforming loan of Rupali Bank PLC is as follows:

**Table 2**: Current scenario of NPLs of Rupali Bank PLC (Amount: BDT in crore)

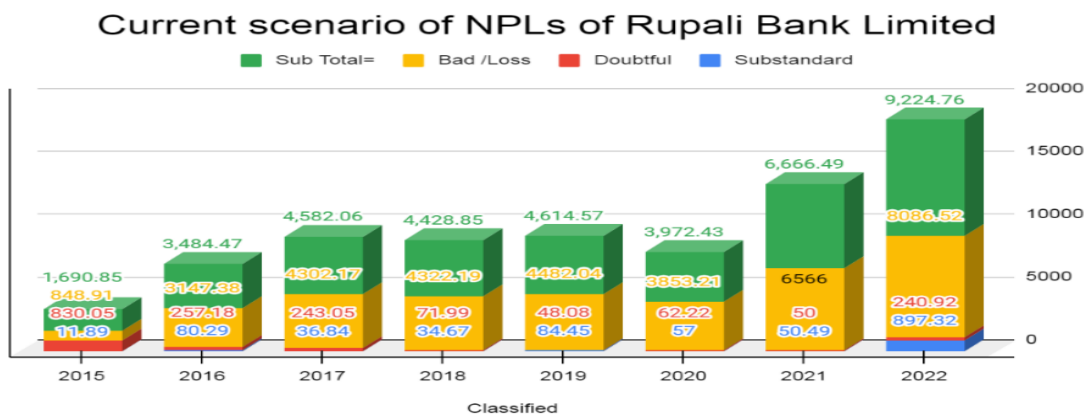| Classified Loans | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|
| **Substandard** | 11.89 | 80.29 | 36.84 | 34.67 | 84.45 | 57.00 | 50.49 | 897.32 |
| **Doubtful** | 830.05 | 257.18 | 243.05 | 71.99 | 48.08 | 62.22 | 50.00 | 240.92 |
| **Bad/Loss** | 848.91 | 3,147.38 | 4302.17 | 4322.19 | 4482.04 | 3853.21 | 6566.00 | 8086.52 |
| Sub Total= | 1,690.85 | 3,484.47 | 4,582.06 | 4,428.85 | 4,614.57 | 3972.43 | 6666.49 | 9224.76 |



**Figure1**: NPLs of Rupali Bank PLC; Source: Annual Report of Rupali Bank PLC

The table 2 and figure 1 indicates that until 2015, the non-performing loan (NPL) amount for Rupali Bank PLC remained below 20 thousand crores. However, in 2016, it surged to 3484.47 crore, signaling a significant concern. From that point onwards, the NPL size of Rupali Bank PLC saw a staggering increase month-over-month and year-over-year. By 2017, the NPL reached 4582.06 crore, slightly reduced to 4428.85 crore in 2018, before climbing again to 4614.57 crore in 2019 and then slightly dropping to 3972.43 crore in 2020. The upward trend continued, with the NPL size escalating to 6666.49 crore in 2021 and further to 9224.76 crore in 2022, marking a record high. Despite efforts by Rupali Bank to mitigate this issue, no significant improvement was

observed. The current state of non-performing loans at Rupali Bank PLC is concerning, with NPLs increasing at an alarming rate since 2015 without adequate measures from the bank's management to address this growing problem. Political interference in lending decisions is a primary factor contributing to the NPL issues facing state-owned commercial banks in Bangladesh, particularly affecting Rupali Bank PLC.

## 4.2 Analyzing Econometric Models

The econometric models used for this study were designed to evaluate the magnitude of non-performing loans in Rupali Bank PLC. The analysis is based on a time series data set spanning from 2015 to 2022, with eight observations (one for each year). A graphically interpretable estimation of the main results, including graphs, tables, and charts, is shown below. The results are further discussed in the following section.

### 4.2.1 Relationship Between Non-Performing Loans (NPLs) and Return on Equity (ROE)

The table below presents Rupali Bank PLC's non-performing loans (NPLs) and the Return on Equity (ROE) ratio, spanning from 2015 to 2022.

**Table3**: NPLs and ROE of Rupali Bank PLC. From 2015 to 2022.

| Year | NPL | ROE ratio |
|------|---------|-----------|
| 2015 | 1690.85 | 2.52 |
| 2016 | 3484.47 | 2.58 |
| 2017 | 4582.06 | 1.00 |
| 2018 | 4428.85 | 0.62 |
| 2019 | 4614.57 | 0.80 |
| 2020 | 3972.43 | 0.92 |
| 2021 | 6666.49 | 2.05 |
| 2022 | 9224.76 | 1.26 |
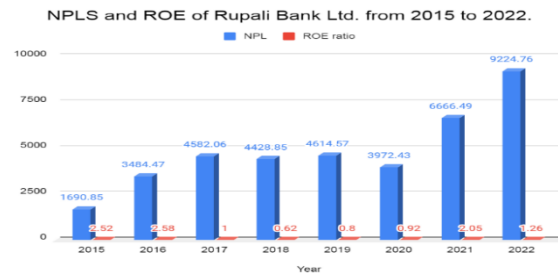


**Source:**(Rupali Bank PLC, December,2022). *Figure 2: NPLS and ROE of Rupali Bank PLC. From 2015 to 2022*

To develop a straightforward econometric model for Rupali Bank Limited, identifying the dependent and independent variables is crucial. This model demonstrates the correlation between NPLs and ROE for Rupali Bank Limited, suggesting how increases or decreases in NPLs impact the bank's ROE. The relationship between non-performing loans and return on equity (ROE) is encapsulated in **Equation 1.**
Were,

**Table 4**: Variables Entered/Removed. (ROE)

| Variables Entered/Removed[a] | | | |
|---|---|---|---|
| Model | Variables Entered | Variables Removed | Method |
| 1 | Non-performing Loan[b] | . | Enter |
| a. | Dependent Variable: Return on Equity | | |
| b. | All requested variables entered. | | |

**Table 5**: Model Summary (ROE)

| Model Summary | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .899[a] | .809 | .761 | .65311 |
| a. | Predictors:(Constant), Non-performing Loan | | | |

In this table (Table 5) summary, "R" stands for the correlation coefficients, whereas "R Square" denotes the coefficient of determination. The coefficient of determination illustrates the extent to which the independent variable can explain variations in the dependent variable. Meanwhile, "Adjusted R-squared" is an enhanced version of R-squared that accounts for predictors which are not significant in a regression model, thereby providing a more accurate measure. Specifically,

non-performing loans (NPLs) account for 76.1% of the variability in Returns on Equity (ROE), indicating that factors other than NPLs also influence ROE to a certain extent.

**Table 6**: ANOVA (ROE)

| ANOVAa | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | **Regression** | 7.207 | 1 | 7.207 | 16.895 | .015b |
| | **Residual** | 1.706 | 4 | .427 | | |
| | **Total** | 8.913 | 5 | | | |
| a. | Dependent Variable: Return on Equity | | | | | |
| b. | Predictors:(Constant), Non-performing Loan | | | | | |

The ANOVA (Analysis of Variance) table (Table 6) indicates a significance level of 1.5%, significantly lower than the standard 5% criterion. The reduced percentage strongly shows the model's statistical validity, implying that the observed outcomes are unlikely to be attributable to chance. In statistical analysis, models with a significance level exceeding 5% are typically considered invalid or unreliable, as the probability of the results arising by chance is substantial. Consequently, due to its significance level of 1.5%, this model is deemed statistically significant and appropriate for advancing the investigation. This corroborates the initial idea and enables the researchers to proceed with increased confidence in their findings.

**Table 7**: Coefficients (ROE)

| Coefficientsa | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 4.754 | .739 | | 6.431 | .003 |
| | Non-performing Loan | -.001 | .000 | -.899 | - 4.110 | .015 |
| a. | Dependent Variable: Return on Equity | | | | | |

The results from Table 7 (Coefficients for ROE) show a statistically significant negative relationship between NPLs and ROE, with a coefficient of -0.001 and a p-value of 0.015, confirming that higher NPLs are associated with lower ROE. A linear regression analysis reveals that for every one-unit increase in NPLs, ROE decreases by 0.001 units, and a two-unit increase in NPLs leads to a twofold reduction in ROE. Therefore, H1 is accepted, indicating a significant negative relationship between NPLs and ROE.

**4.2.2 Relationship Between Non-performing Loans (NPLs) and Return on Assets (ROA)**
The table below presents the data on non-performing loans (NPLs) alongside the Return on Assets (ROA) ratio for Rupali Bank PLC from the year 2015 to 2022.

**Table 8**: Relationship between Non-performing Loans (NPLs) and Return on Assets (ROA).

| Years | NPL | ROA ratio |
|---|---|---|
| 2015 | 1690.85 | 0.10 |
| 2016 | 3484.47 | 0.03 |
| 2017 | 4582.06 | 0.03 |
| 2018 | 4428.85 | 0.02 |
| 2019 | 4614.57 | 0.03 |
| 2020 | 3972.43 | 0.03 |
| 2021 | 6666.49 | 0.06 |
| 2022 | 9224.76 | 0.03 |

**Source:** (Rupali Bank PLC, December,2022).

To develop a straightforward econometric model for Rupali Bank PLC, identifying the dependent and independent variables is essential.
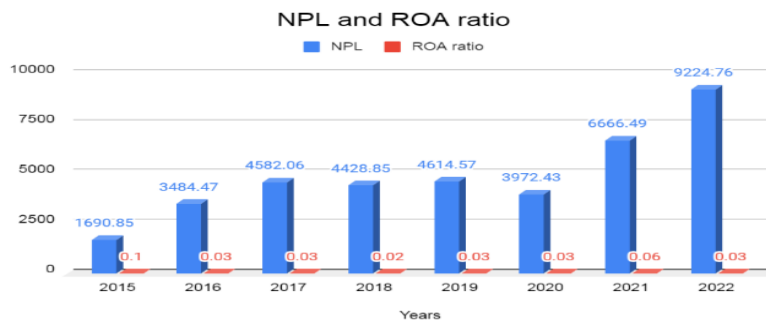


**Figure 3**: Relationship Between Non-Performing Loans (NPLs) and Return on Assets (ROA).

This figure identifies nonperforming loans (NPL) as an independent variable, positing that an increase in NPL amounts indicates poorer credit quality, leading to higher loan loss provisions charged against income. Conversely, Return on Assets (ROA) is designated as the dependent variable for this study. It is calculated by dividing net profits after taxes by the total assets at the end of the financial year. ROA serves as a performance indicator, measuring the profitability of banks in relation to their assets.

**Table 9**: Variables Entered/Removed (ROA)

| Variables Entered/Removed[a] | | | |
|---|---|---|---|
| Model | Variables Entered | Variables Removed | Method |
| 1 | NPL[b] | . | Enter |
| a. Dependent Variable: ROA | | | |
| b. All requested variables entered. | | | |

**Table 10**: Model Summary (ROA)

| Model Summary | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .838[a] | .702 | .628 | .03523 |
| a. Predictors:(Constant), NPL | | | | |

Table 10 summaries, "R" signify the correlation coefficients, while "R Square" denotes the coefficient of determination. The coefficient of determination quantifies the percentage that an independent variable explains a dependent variable. The term "adjusted R-squared" refers to a refined version of R-squared, which accounts for predictors that are not significant in a regression model, adjusting for their presence. Specifically, non-performing loans (NPLs) account for 62.8% of the variation in Return on Assets (ROA), with the remaining percentage influenced by other factors. This suggests that ROA is not solely impacted by NPLs but also by various other elements. Here, an R value of 0.838 indicates a strong correlation between NPLs and Return on Asset (ROA), implying a significant relationship between these two variables.

**Table 11**: ANOVA (ROA)

| ANOVA[a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | .012 | 1 | .012 | 9.440 | .037[b] |
| | Residual | .005 | 4 | .001 | | |
| | Total | .017 | 5 | | | |
| a. Dependent Variable: ROA | | | | | | |
| b. Predictors:(Constant), NPL | | | | | | |

ANOVA table (Table 11) indicates that the level of significance is 3% which is lower than 5% level of significance that means this model is valid if the significance level is above 5% it would be considered as invalid model. So, this model can be preceded for this study.

**Table 12**: Coefficients (ROA)

| Co-efficientsᵃ | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .186 | .040 | | 4.663 | .010 |
| | NPL | -3.371E-5 | .000 | -.838 | -3.072 | .037 |
| a. Dependent Variable: ROA | | | | | | |

The results from Table 12 (Coefficients for ROA) reveal a statistically significant negative correlation between NPLs and ROA, with a coefficient of -3.371E-5 and a p-value of 0.037, which is below the 0.05 threshold, confirming that as NPLs increase, ROA decreases. Specifically, for every one crore increase in NPLs, ROA decreases by 3.371 crore. Therefore, H2 is accepted, indicating a significant negative relationship between NPLs and ROA.

## 5. Discussion
The analysis reveals that a negative and statistically significant correlation exists between the level of non-performing loans (NPLs) and profitability measures such as Return on Assets (ROA) and Return on Equity (ROE). This suggests that an increase in NPLs is associated with reduced profitability. A plausible explanation for this relationship is that defaults on loan repayments by customers adversely impact both the balance sheet and the income statement of banks. This study indicates that credit risk (NPL), capital adequacy (CAR), and liquidity risk (LDR) significantly affect financial performance (ROE). The findings of this study are constrained as they were exclusively conducted at PT BCA Tbk utilizing secondary data from the yearly financial reports of 2014-2018. Assessment of Return on Equity (ROE) variables solely by independent variables NPL, CAR, and LDR (Vellanita et al., 2019; Mandagie, 2021; Suryawan, 2024). It is imperative to address non-performing loans, as the capital supplied to borrowers must be secure and repaid promptly when due. Banks operate with depositor funds; if they are unable to access these funds when needed, it may create a precarious scenario within the industry. The public may lose faith in the bank, potentially leading to a bank run. The bank's profitability may be adversely impacted. The aforementioned solutions may be considered to mitigate non-performing loans. As the central bank of the nation, Bangladesh Bank has a responsibility to foster a stable environment within the banking sector (Akter & Roy, 2017; Singh et al., 2021). These findings lend support to the argument that a rise in NPLs negatively affects banking performance and can degrade the overall health of the banking sector. This is often attributed to managerial shortcomings in controlling operational efficiency, which ultimately leads to diminished profitability. Therefore, the evidence underscores that an escalation in non-performing loans is directly linked to lower profitability levels. These findings and recommendations provide a framework for Rupali Bank PLC to address its NPL challenges and enhance overall financial performance.

## 6. Conclusions, Policy Implications and Future Work
### 6.1 Conclusions
This study examined the relationship between non-performing loans (NPLs) and the profitability of Rupali Bank PLC, Bangladesh, over the period from 2015 to 2022. The analysis revealed a significant negative correlation between NPLs and profitability indicators, specifically Return on Assets (ROA) and Return on Equity (ROE). The results indicated that an increase in NPLs is associated with a decline in the bank's profitability, confirming the hypotheses that NPLs negatively affect both ROE (H1) and ROA (H2). Specifically, NPLs accounted for 76.1% of the variation in ROE and 62.8% of the variation in ROA, highlighting the substantial impact of NPLs on the bank's financial performance.

The study's findings emphasize the importance of managing NPLs to ensure the continued financial health and profitability of the bank. As NPLs rise, the bank's ability to generate profit diminishes, ultimately affecting its long-term stability. Given the significant role that NPLs play in constraining profitability, effective management strategies are crucial for safeguarding the bank's financial health and mitigating the adverse effects of rising NPL levels.

## 6.2 Policy Implications

The presence of elevated levels of non-performing loans (NPLs) signals potential vulnerability within the banking sector, as these loans erode banks' capital reserves and reduce their capacity to lend. This weakening of the financial base can result in a contraction of credit availability, leading to a slowdown in economic activity. To mitigate these risks, policymakers must enforce robust stress-testing measures and capital adequacy requirements to ensure banks are well-equipped to absorb shocks and maintain liquidity during challenging periods. Strengthening the regulatory framework by requiring banks to maintain sufficient capital reserves against potential loan defaults is crucial for preserving financial stability. Non-performing loans often stem from subpar lending practices, inadequate risk assessment, or excessive exposure to volatile industries. Therefore, it is vital for policymakers to emphasize the importance of improving credit risk management strategies within both banking and non-banking financial institutions. A more comprehensive approach to loan origination—through the use of stringent lending standards, thorough due diligence, and advanced credit scoring models—can help mitigate the risks associated with hazardous lending. Properly priced loans, which reflect the actual risk of default, should be encouraged to ensure that higher-risk borrowers are charged accordingly. This not only reduces the probability of loan defaults but also encourages prudent lending practices. Moreover, there is a need to promote financial literacy among both lenders and borrowers. Policymakers should advocate for initiatives aimed at educating stakeholders on effective credit risk management, loan origination protocols, and responsible borrowing practices. By fostering greater understanding of financial risks, both parties can make more informed decisions, reducing the likelihood of defaults and promoting a healthier lending environment. Ultimately, enhancing these regulatory measures will not only help address the challenges posed by NPLs but also strengthen the resilience of the banking sector, ensuring that it can continue to support economic growth.

## 6.3 Future Work

While this study provides valuable insights into the relationship between NPLs and profitability at Rupali Bank PLC, it has some limitations that warrant consideration. First, the study focuses exclusively on one bank, which limits the generalizability of the findings to other banks in Bangladesh or the broader South Asian banking sector. Future studies could extend the analysis to multiple banks, providing a more comprehensive view of how NPLs affect profitability in the banking industry. Second, this study only considered two profitability measures—ROA and ROE—while other financial performance indicators, such as Net Interest Margin (NIM), Earnings Per Share (EPS), or liquidity ratios, could offer additional insights into the relationship between NPLs and financial performance. Future research could explore a broader set of performance measures to better capture the full impact of NPLs on bank profitability. additionally, the study has not accounted for macroeconomic factors such as inflation, interest rates, or economic growth, which could also influence both NPLs and profitability. Future research could include these macroeconomic variables to better understand their role in shaping the relationship between NPLs and bank performance. Finally, the study relies on secondary data from annual reports, which might not fully capture the dynamics of NPL management or the qualitative aspects of loan recovery processes. Future studies could incorporate primary data from interviews or surveys with bank management and industry experts to gain a deeper understanding of the challenges faced by banks in managing NPLs. Moreover, while the study highlights the significant negative impact of NPLs on profitability, further research across a broader set of banks, incorporating additional financial indicators and macroeconomic factors,

will provide a more comprehensive understanding of the issue and inform better policy and management practices in the banking sector.

**REFERENCES**

Abdou, D. M. S., & Alarabi, Y. (2024). The dynamics behind private banking growth in Egypt. *Future Business Journal*, *10*(1). https://doi.org/10.1186/s43093-023-00290-5

Abu Khalaf, B., & Awad, A. B. (2024). Exploring the bearing of liquidity risk in the Middle East and North Africa (MENA) banks. *Cogent Economics and Finance*, *12*(1). https://doi.org/10.1080/23322039.2024.2330840

Akter, R., & Roy, J. K. (2017). The impacts of non-performing loan on profitability: An empirical study on banking sector of Dhaka stock exchange. *International Journal of Economics and Finance*, *9*(3), 126-132.

Akter, R., & Roy, J. K. (2017). The Impacts of Non-Performing Loan on Profitability: An Empirical Study on Banking Sector of Dhaka Stock Exchange. *International Journal of Economics and Finance*, *9*(3), 126. https://doi.org/10.5539/ijef.v9n3p126

Amoako, K. A. (2015). *The effect of bad loans on the profitability and lending potential of rural banks. A case study of some selected rural banks in the Ashanti Region* (Doctoral dissertation).

Anjom, W., & Karim, A. M. (2016). Relationship between non-performing loans and macroeconomic factors with bank specific factors: a case study on loan portfolios–SAARC countries perspective. *ELK Asia Pacific Journal of Finance and Risk Management*, *7*(2), 1-29.

Annual Report 2022. (2023). In Rupali Bank PLC. Retrieved November 7, 2024, from https://rupalibank.com.bd/admin_web/news/RupaliBankAR2022_PrintWorkFile_Remake_forweb.pdf.pdf

Basel Committee on Banking Supervision. (2011). *Basel III: A global regulatory framework for more resilient banks and banking systems*. Bank for International Settlements. Retrieved from https://www.bis.org/

Beck, R., Jakubik, P., & Piloiu, A. (2013). Non-performing loans: What matters in addition to the economic cycle? 1515, 1-34.

Benavides-Franco, J., Carabalí-Mosquera, J., Alonso, J. C., Taype-Huaman, I., Buenaventura, G., & Meneses, L. A. (2023). The evolution of loan volume and non-performing loans under COVID-19 innovations: The Colombian case. *Heliyon*, *9*(4). https://doi.org/10.1016/j.heliyon.2023.e15420

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

Bholat, D., Lastra, R. M., Markose, S. M., Miglionico, A., & Sen, K. (2016). Non-performing loans: regulatory and accounting treatments of assets.

Demirguc-Kunt, A., et al. (2021). *Non-Performing Loans in Bangladesh: A Statistical Analysis*. Retrieved from academic databases or financial reports in Bangladesh.

Dewi, N. K. C., & Badjra, I. B. (2020). The effect Of NPL, LDR and operational cost of operational income on ROA. *American Journal of Humanities and Social Sciences Research (AJHSSR)*, *4*(7), 171-178.

Dimitrios, A., Helen, L., & Mike, T. (2016). Determinants of non-performing loans: Evidence from Euro-area countries. *Finance Research Letters*, *18*, 116–119. https://doi.org/10.1016/j.frl.2016.04.008

Do, H. L., Ngo, T. X., & Phung, Q. A. (2020). The effect of non-performing loans on profitability of commercial banks: Case of Vietnam. *Accounting*, *6*(3), 373–386. https://doi.org/10.5267/j.ac.2020.1.001

Espinosa, M., & Prasad, A. (2010). *Non-performing loans in the Eastern Caribbean Region*. Caribbean Development Bank Working Paper. Retrieved from https://www.caribank.org/

European Central Bank. (2017). *Guidance to banks on non-performing loans*. ECB/Public. Retrieved from https://www.ecb.europa.eu/

Firdaus, A., & Rachman, S. (2022). SISTEM AKUNTANSI PERSEDIAAN BAHAN BAKU PADA PT INDUSTRI KAPAL INDONESIA (PERSERO). Jurnal Riset Rumpun Ilmu Sosial, Politik dan Humaniora, 1(1), 23-29.

Gazi, M. A. I., Nahiduzzaman, M., Harymawan, I., Al Masud, A., & Dhar, B. K. (2022). Impact of COVID-19 on Financial Performance and Profitability of Banking Sector in Special Reference to Private Commercial Banks: Empirical Evidence from Bangladesh. *Sustainability (Switzerland)*, *14*(10). https://doi.org/10.3390/su14106260

Golitsis, P., Khudoykulov, K., & Palanov, S. (2022). Determinants of non-performing loans in North Macedonia. *Cogent Business and Management*, *9*(1). https://doi.org/10.1080/23311975.2022.2140488

Hossain, M. (2018). *Non-performing loans in Bangladesh: Causes and effects.* Available through Bangladesh-focused finance publications.

Ikram, A., Asfaw, S., et al. (2016). Behavioral factors influencing non-performing loans: Evidence from the Bangladeshi banking sector. Available from academic and research databases.

Islam, A. (2019). *Effectiveness of alternative dispute resolution on the recovery of non-performing loans under Artha Rin Adalat: A study on nationalized commercial banks in Bangladesh* (Doctoral dissertation, University of Dhaka).

Kadek, N., Swandewi, M., & Purnawati, N. K. (2021). Capital Adequacy Ratio Mediates the Effect of Non-Performing Loan on Returns on Assets in Public Commercial Banks. *American Journal of Humanities and Social Sciences Research*, (5), 651–656. Retrieved from www.ajhssr.com

Kithinji, A. M. (2010). Non-performing loans and profitability in commercial banks in Kenya: A comparative analysis. Available from Google Scholar or academic databases.

Kryzanowski, L., Liu, J., & Zhang, J. (2023). Effect of COVID-19 on non-performing loans in China. *Finance Research Letters*, *52*. https://doi.org/10.1016/j.frl.2022.103372

Laeven, L., &Majnoni, G. (2003). Loan loss provisioning and economic slowdowns: Too much, too late? *Journal of Financial Intermediation, 12*(2), 178-197. https://doi.org/10.1016/S1042-9573(03)00017-0

Lata, H. (2015). *Non-performing loans and profitability: A comparative study of scheduled commercial banks in Bangladesh*. Available from Bangladesh-specific finance publications.

Louzis, D. P., Vouldis, A. 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 & Finance, 36*(4), 1012-1027. https://doi.org/10.1016/j.jbankfin.2011.10.012

Maaji, M. M., Barnett, C., & Long, C. (2023). Non-Performing Loans and Commercial Bank Profitability: Evidence from Cambodia. *Journal of Entrepreneurship and Business Innovation*, *10*(2), 1. https://doi.org/10.5296/jebi.v10i2.21229

Makri, V., Tsagkanos, A., & Bellas, A. (2014). Determinants of non-performing loans: The case of Eurozone. *Panoeconomicus*, *61*(2), 193-206.

Mandagie, Y. (2021). Analyzing the impact of CAR, NIM and NPL on ROA of banking companies (An empirical study on BEI listed companies). *INQUISITIVE: International Journal of Economic*, *1*(2), 72-87.

Maulani, M. G., Suryaningprang, A., Herlinawati, E., & Sudaryo, Y. (2024). Influence of loan to deposit ratio (LDR), non-performing loan (NPL) and provision for losses of productive assets (PLPA) on return on asset (ROA) in BPR Jujur Arghadana period 2019-2023. *Journal of Management Science (JMAS)*, *7*(1), 393-398.

Minsky, H. P. (1977). The financial instability hypothesis: An interpretation of Keynes and an alternative to "standard" theory. *Nebraska Journal of Economics and Business, 16*(1), 5-16.

Nkusu, M. (2011). *Non-performing loans and macrofinancial vulnerabilities in advanced economies*. IMF Working Papers, 161. Retrieved from https://www.imf.org/external/pubs/ft/wp/2011/wp11161.pdf

Non-Performing Loan (NPL). (2024). Corporate Finance Institute. Retrieved June 7, 2024, from https://corporatefinanceinstitute.com/resources/commercial-lending/non-performing-loan-npl/#:~:text=Summary,the%20loans%20to%20collection%20agencies.

Rahadian, R., & Permana, D. (2021). The Impact of Non-Performing Loans, Return on Assets, Return on Equity, and Loan to Deposit Ratios on Minimum Capital Adequacy Requirement Based on Commercial Banks for Business Activities (BUKU) I 2015-2020. *European Journal of Business and Management Research*, *6*(6), 42–46. https://doi.org/10.24018/ejbmr.2021.6.6.1084

Rahman, M. A., Asaduzzaman, M., & Hossin, M. S. (2017). Impact of financial ratios on non-performing loans of publicly traded commercial banks in Bangladesh. *International Journal of Financial Research*, *8*(1), 181-188.

Rashaduzzaman, M. (2024). *Risk Management in Banks: It's Relationship with the Financial Performance of Commercial Banks in Bangladesh* (Doctoral dissertation, © University of Dhaka).

Rupali Bank PLC. (2020). *Annual Report 2014*. Retrieved from https://rupalibank.com.bd/admin_web/news/Annual%20Report-201410401.pdf

Rupali Bank PLC. (2020, March). *Annual Report 2019*. Retrieved from https://www.scribd.com/document/491876656/Annual-Report-2019

Rupali Bank PLC. (2021). *At a glance*. Retrieved March 10, 2021, from https://rupalibank.com.bd/admin_web/news/RupaliBankAnnualReport2021-43337.pdf

Rupali Bank PLC. (2022). *At a glance*. Retrieved March 11, 2022, from https://rupalibank.com.bd/admin_web/news/RupaliBankAR2022_PrintWorkFile_Remake_forweb.pdf

Rupali Bank Training Academy (RBTA). (2024). Rupali Bank. Retrieved November 7, 2024, from https://rbta.rupalibank.com.bd/about-us/about-rbta#:~:text=No.,slogan%20%E2%80%9CAssures%20Better%20Service%E2%80%9D.

Salas, V., &Saurina, J. (2002). Credit risk in two institutional regimes: Spanish commercial and savings banks. *Journal of Financial Services Research, 22*(3), 203-224. https://doi.org/10.1023/A:1019781109676

Singh, S. K., Basuki, B., & Setiawan, R. (2021). The effect of non-performing loan on profitability: Empirical evidence from Nepalese commercial banks. *The Journal of Asian Finance, Economics and Business*, *8*(4), 709-716.

Smith, R. (2003). Risk management in banking: A framework for understanding risk-taking. *Journal of Financial Risk Management, 2*, 39-49.

Suryawan, T. (2024). The Influence of Return On Assets (ROA), Return On Equity (ROE), and Non-Performing Loans (NPL) on Profit Growth in Banking Companies from 2021 to 2023. *Daengku: Journal of Humanities and Social Sciences Innovation*, *4*(3), 508-515.

Tangngisalu, J., Hasanuddin, R., Hala, Y., Nurlina, N., & Syahrul, S. (2020). Effect of CAR and NPL on ROA: Empirical study in Indonesia Banks. *Journal of Asian Finance, Economics and Business*, *7*(6), 9–18. https://doi.org/10.13106/JAFEB.2020.VOL7.NO6.009

Uddin, Md. K. (2022). Effect of Leverage, Operating Efficiency, Non-Performing Loan, and Capital Adequacy Ratio on Profitability of Commercial Banks in Bangladesh. *European Journal of Business and Management Research*, *7*(3), 289–295. https://doi.org/10.24018/ejbmr.2022.7.3.1463

Vellanita, A., Arimbawa, I. G., & Damayanti, E. (2019, November). Relationship Between Non Performing Loans (Npl), Capital Adequacy Ratio (Car), Loan To Deposit Ratio (Ldr) Towards Return on Equity (Roe) At Pt. Bank Central Asia 2014–2018. In *Journal of world conference (JWC)* (Vol. 1, No. 2, pp. 211-216).

Wang, H., Mao, K., Wu, W., & Luo, H. (2023). Fintech inputs, non-performing loans risk reduction and bank performance improvement. *International Review of Financial Analysis*, *90*. https://doi.org/10.1016/j.irfa.2023.102849

Wood, A., & Skinner, N. (2018). Determinants of non-performing loans: evidence from commercial banks in Barbados. *The Business & Management Review*, *9*(3), 44–64.

Zakaria, Z., Khotimah, K., Saling, S., & Rasyid, A. (2023). Non-Performing Loan and its Impact on Stock Price Index Through Return on Equity in the Banking Industry. *Innovation Business Management and Accounting Journal*, *2*(3), 179–184. https://doi.org/10.56070/ibmaj.v2i3.55

Zeng, M. (2023). Study on the Impact of Digital Finance on Non-Performing Loan Rate of Chinese Commercial Banks. Highlights in Business, Economics and Management, 3, 237-244.

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