

Bank Competition and Bank Risk: Evidence from an Emerging Economy

Dr. Probir Kumar Bhowmik*, Karima Khanam and Dr. Mallika Saha*****

Abstract

This paper investigates the relationship between banks' competition and nonperforming loans (NPLs), considering GDP per capita, gross savings, and domestic bank credit to the private sector. The study utilizes comprehensive secondary data from 1994 to 2022, scrutinizing diverse banking environments and revealing significant findings. The analysis reveals a significant positive correlation between the number of banks and the NPL ratio, indicating that increased competition leads to higher NPL. Nonetheless, banks' domestic credit to the private sector has little effect on NPLs. The analysis also reveals a significant positive correlation between gross savings and the NPLs. Furthermore, higher NPLs ratio is linked to reduced commercial bank branches, lower capital adequacy ratios, and diminished bank liquidity reserves, posing potential financial stability risks. Even if large NPLs initially lower inflation rates, their long-term impacts depend on successful policy interventions. Additionally, NPLs significantly impact banks' return on assets and net interest margins, necessitating effective profitability and risk management strategies. The study offers crucial insights for regulators, politicians, and banking professionals to understand the complexities of risk management and competition in the banking industry and create plans to lower NPLs.

Keywords: Non-Performing Loans (NPLs), bank competition, banking sector, Bangladesh

1. Introduction:

In Bangladesh, the banking sector has experienced exponential growth over the years, with an increasing number of banks entering the market to cater to the evolving needs of the economy. This surge in banking institutions reflects the country's economic development aspirations and the growing demand for financial services among a burgeoning population. However, amidst this proliferation of banks, the sector grapples with intensifying competition and the persistent challenge of Non-Performing Loans (NPLs), which pose significant implications for financial stability and economic progress. The banking landscape in

* *Dr. Bhowmik is a Associate Professor, Department of Accounting and Information Systems, University of Barishal, Bangladesh. Email: probir9012@gmail.com*

** *Mr. Khanam is a Graduate Student at the Department of Accounting and Information Systems, University of Barishal, Barishal, Bangladesh. Email: karimakhanom01@gmail.com*

*** *Dr. Saha is a Associate Professor at the Department of Accounting and Information Systems, University of Barishal, Barishal, Bangladesh. Email: msaha@bu.ac.bd. Corresponding Author.*

Bangladesh has undergone a remarkable transformation since its inception, evolving from a small number of state-owned banks following the Liberation War of 1971 to a diverse array of banking institutions, including state-owned, private, and foreign banks. In 1971, Bangladesh came into being, and since then, its banking sector has experienced remarkable growth, particularly following the implementation of liberalization policies in the 1980s. Before these reforms, Bangladesh had only four nationalized domestic banks (Sonali Bank, Pubali Bank, Rupali Bank, and Janata Bank), alongside a mere three foreign banks, with no presence of private banks. This lack of private competition resulted in a highly concentrated banking market dominated solely by these nationalized banks. Various factors, including regulatory reforms, technological advancements, and increasing demand for financial services across different segments of society, have driven this proliferation of banks. With each passing day, new banks are entering the market, attracted by the promising prospects of Bangladesh's growing economy and the untapped potential of its financial sector. However, this influx of banks has led to heightened competition within the industry as institutions vie for market share, customer loyalty, and profitability. The competitive landscape has spurred product, service, and delivery channel innovations, benefiting consumers through increased choice, convenience, and efficiency. In Bangladesh, more and more banks are opening up every day. This means that the country's banking sector is getting bigger fast. This growth is because Bangladesh wants to develop its economy, and people need more banking services. But, with more banks, there's more competition. Banks are fighting to get more customers and make more money. This competition is good because it leads to better services for people. But, it also brings problems. One big problem is that some people don't repay the money they borrow from banks. These are called Non-Performing Loans (NPLs). Non-Performing Loans in Bangladesh Non-Performing Loans (NPLs) refer to loans that are in default or close to being in default, where borrowers are unable to make scheduled payments. Bangladesh has historically struggled with a high level of NPLs in its banking sector, which can strain the financial health of banks and limit their ability to provide fresh credit. High levels of NPLs can hurt banks and even the whole economy. Banks need to be smart about managing risks and making good decisions to survive and do well. They also need to follow the rules set by the government to make sure they're doing things right. Despite the benefits of competition, the banking sector's rapid expansion has also brought challenges, particularly in managing credit risk and addressing the issue of Non-Performing Loans. NPLs, representing loans where borrowers have defaulted on repayment obligations, have become a pressing concern for banks, regulators, and policymakers. High levels of NPLs undermine banks' financial health and profitability and pose systemic risks to the stability of the entire financial system. Surviving and thriving in an environment of increasing competition and NPLs requires banks to adopt robust risk management practices, prudent lending standards, and innovative strategies to differentiate themselves in the market. Banks must balance pursuing growth opportunities and managing risks effectively, recognizing the trade-offs between profitability and asset quality.

Moreover, effective regulatory oversight and supervision are crucial in ensuring that banks maintain sound and resilient operations amidst the challenges posed by competition and NPLs. In this context, understanding the interplay between competition, NPLs, and bank survival is essential for stakeholders in the banking sector. In below, I am showing the aggregate position of NPLs to total loans.



Source: Department of Off-site Supervision, Bangladesh Bank.

From the above chart, from 2013 to 2023, there was an overall upward pattern of Non-Performing Loans and total loans. That means overall the is high. But in 2015, it was a little bit higher than in 2013. The non-performing loans increased from 2015 to 2018, but in 2020, there was little decrease in default loans in Bangladesh's banking sector. Then, Non-Performing Loans continued to increase from 2021 to June 2023.

The issues of Non-Performing Loans and bank competition in Bangladesh are intertwined and pose significant challenges to the country's banking sector and overall economic development. Addressing the high NPL ratio requires a multi-pronged approach that includes improving lending practices, strengthening governance mechanisms, and fostering a loan repayment culture. Simultaneously, promoting healthy competition among banks is crucial for ensuring efficiency, innovation, and customer-centric services within the sector. This can be achieved through regulatory reforms that level the playing field, encourage new entrants, and reduce the dominance of a few large players. By tackling the NPL problem and fostering a competitive banking environment, Bangladesh can unlock the full potential of its financial sector, supporting economic growth, job creation, and overall socio-economic development. By examining the strategies, practices, and outcomes of banks operating in Bangladesh, This paper aims to contribute to this understanding by examining how banks in Bangladesh compete in an environment marked by high levels of loan defaults. By exploring the intricate interplay between bad loans and bank competition, this study sheds light on the underlying factors driving NPLs and the strategies banks employ to navigate this challenging landscape.

Significance of the study

Bangladesh's banking sector is a vital component of the national economy and an integral part of the global financial landscape. Understanding the dynamics between NPLs (Non-Performing Loans) and bank competition in Bangladesh holds immense significance for

stakeholders, including policymakers, regulators, bankers, investors, and the general public. This section outlines the key reasons why this study is essential:

Economic Stability: The prevalence of NPLs poses systemic risks to the stability and soundness of the banking sector in Bangladesh. By exploring the relationship between NPLs and bank competition, this study aims to identify potential vulnerabilities and inform policy measures to enhance the financial system's resilience.

Efficient Resource Allocation: A robust banking sector is crucial for efficient resource allocation and economic development. However, the presence of NPLs distorts the allocation of credit, leading to misallocation of resources and hindering productivity growth. Understanding how banks compete amidst loan defaults can help optimize credit allocation and foster sustainable economic growth.

Regulatory Framework: Regulatory authorities in Bangladesh play a pivotal role in overseeing the banking sector and safeguarding depositor interests. Insights from this study can inform regulators about the effectiveness of existing policies and regulations in addressing NPLs and promoting healthy competition among banks.

Bank Management Strategies: Managing NPLs effectively is paramount for maintaining profitability and long-term viability for banks operating in Bangladesh. This study offers valuable insights into the strategies banks adopt to mitigate credit risk, improve loan recovery mechanisms, and enhance competitiveness in the marketplace.

Investor Confidence: The banking sector's performance significantly impacts investor confidence and overall market sentiment. By examining the relationship between NPLs and bank competition, this study contributes to a better understanding of the factors influencing bank performance, thereby helping investors make informed decisions.

Academic Contribution: This research adds to the existing body of knowledge on banking and finance, particularly in the context of emerging economies like Bangladesh. The study offers new perspectives and contributes to academic debates on NPLs, bank competition, and financial stability by conducting empirical analysis and theoretical exploration.

Research Objectives

To assess the impact of NPLs (Non-Performing Loans).

To analyze the relationship between NPLs and bank competition.

Literature Review

Understanding the impact of Non-Performing Loans on bank competition in Bangladesh is crucial for analyzing how banks compete amidst loan defaults. Several studies have examined this issue in the context of the Bangladeshi banking sector. Hania et al.(2023) found that poor management decisions and inefficiency positively correlate with NPLs, while profitability and bank size show negative relationships. Additionally, macroeconomic factors such as GDP growth rate and unemployment rate have a significant positive relationship with NPLs, while the interest rate has a significant negative relationship. Momtaj Parvin et al. (2023) also

support these findings, highlighting the severe effect of NPLs on banking advancement, including liquidity issues, lower profitability, and capital constraints.

Nazmoon Akhter (2023) identifies the key determinants of Non-Performing Loans (NPLs) as macroeconomic variables like GDP ratio and inflation and firm-specific factors like loan loss provision and capital adequacy ratio. The influence of risk and market competition on the efficiency of commercial banks in Bangladesh, with a focus on ownership, was examined by Gupta et al. (2022). They discovered that the non-linear and quadratic effects of risk, stability, and competition have a homogenous effect on cost and human capital efficiency in the aggregate industry, conventional banks, and private banks. When Dhanonjoy Kumar et al. (2020) examined the rate of Non-Performing Loans (NPL) trend in Bangladesh's banking industry, they discovered that NPL percentages were five to six times higher than the global average, indicating that NPLs represent a severe issue. Md. Nazmul Hasan et al.(2023), In their paper, a deeper look on the origin and effects of NPL based on a sample of 200 survey respondents and endeavored to explore industry insights that might be of special interest to bank owners, management bodies, regulator and finally the shareholders.

In another study, Rahman et al. (2021) discovered that while less competition raises Non-Performing Loans (NPL), greater competition leads to more excellent bank stability. Using the Lerner index and the Boone indicator to represent bank competition and the non-performing loan (NPL) and Z-score to represent financial stability, the authors of this article looked at the relationship between bank efficiency and competition and the financial stability of Bangladesh's banking industry. These results imply that Bangladeshi banks' risk and stability are significantly influenced by competition.

Peter (2023) found that bank competition has a mixed impact on bank credit risk, as indicated by the abstracts. Some studies support the "competition-fragility" theory, suggesting increased competition leads to higher credit risk. However, other studies found by Bayangos (2022) that increased competition can alleviate credit risk, especially when market power increases. Olivia (2022) discovered that other variables, such as the volatility of Non-Performing Loans, may also affect how bank rivalry affects credit risk. Furthermore, different bank types and nations may have distinct relationships between competition and credit risk, according to Shou Hui (2022). Overall, the relationship between bank NPL and bank competition is complex and influenced by various factors, highlighting the need for further research and consideration of specific contexts.

According to research by Xiaofang Tan et al. (2022), banks' organizational cultures can affect the loan loss provisions they make in reaction to heightened industry competition. Furthermore, Ibrahim Yagli (2022) examined bank competition, which has been found to have an inverted-U relationship with firm research and development (R&D) investment, where competition initially promotes R&D investment but reduces it after reaching a turning point. Rahman et al.(2021) found that higher bank competition, measured by the Lerner index, leads to higher bank stability and lower Non-Performing Loans (NPL). Similarly, Junnatun Naym's (2018) study suggests that the banking sector in Bangladesh exhibits monopolistic

competition, indicating a non-concentrated market. Rezina et al.(2020) compared the impact of operational modes between traditional banking and Islamic banking on NPL and found that variables such as governance, bureaucracy, and size of banks have different impacts on NPL. Hasan and Khan (2023) highlight the challenges the banking industry faces in Bangladesh, including corrupt loan practices and connected-party lending, which contribute to the high volume of NPL. Uddin and Suzuki's (2015) research indicates a reduction in concentration and an increase in competition in the banking sector of Bangladesh, particularly in the credit market. Karim et al. (2023) explained that the high volume of NPLs has decreased profitability and eroded banks' capital, posing risks of bank failures. Additionally, Yasmine et al.(2023) found that NPLs negatively impact banks' profitability, as measured by the return on assets (ROA). Furthermore, Mozumder et al.(2022) emphasized the need for stakeholders, including bank management and regulators, to be cautious about NPLs and reduce their levels.

Bhuiya et al. (2023) indicated that credit risk, liquidity risk, and market competition significantly affected the financial performance of commercial banks in Bangladesh. They found that credit risk, measured by non-performing loan ratio (NPLR) and loan loss provision ratio (LLPR), hurt profitability ratios like Return on Equity (ROE) and Return on Assets (ROA). Majumder et al. (2018) revealed that bank capital positively and significantly impacted bank performance while negatively and significantly impacting risk. The performance and risk equations also found an inverse relationship between risk and performance. The study indicated a persistence of performance and risk from one year to the next. According to Moudud (2021), the significant impact of competition confirmed compliance with the structure-conduct-performance hypothesis, the quiet life hypothesis, and the "competition fragility" view. Notably, the key robust results were: (1) in competitive markets, large banks were more efficient than small banks; (2) there was a non-linear relationship between competition, performance, and risk; (3) across bank size, competition heterogeneously affected profitability, efficiency, risk, and stability; (4) during crises, small banks were as efficient as large banks but shared more risk; and (5) small banks were also stable during crises in highly concentrated markets but less stable in competitive environments. Capraru (2021) indicated a non-linear relationship between bank competition and risk, with cooperatives showing better resilience to liquidity risks. They found that well-diversified banks tended to take more risks, while larger institutions exhibited lower risk appetite and higher exposure to liquidity shocks. Recent regulations were noted to have tempered the risk appetite of large financial entities. The study suggested tailoring risk strategies to enhance efficiency and monitoring M&A activities to maintain optimal competition levels.

In their empirical assessment, Uddin et al. (2014) found a negative relationship between competition and bank performance. They emphasized the need for regulatory authorities to incentivize banks, especially private ones, to enhance profitability and efficiency. Ghosh et al. (2020) explored behavioral dimensions contributing to Bangladesh's nonperforming loans (NPLs). They identified factors such as nepotism, moral hazard, inadequate collateral, poor credit assessment, lack of proper monitoring, repayment flexibility, business risk, and lending

interest rates as catalysts for raising NPLs. Rezina (2020) highlighted the significant impact of operational modes on Non-Performing Loans (NPLs) in both traditional and Islamic banking systems. Additionally, variables such as governance, bureaucracy, bank size, reserve ratio, capital adequacy ratio, and interest rates were found to play crucial roles in influencing NPL. The study proposed effective measures aimed at minimizing NPLs within the banking sector.

Hosen et al. (2020) underscored the significance of addressing inefficiency in banks to mitigate Non-Performing Loans (NPLs) and enhance shareholder value. They suggested that policymakers in emerging countries like Bangladesh should focus on reducing inefficiencies within the banking sector to combat the potential worsening of NPLs, especially during the COVID-19 pandemic. Moreover, they noted the negative effect of the loan-to-deposit ratio on NPLs, highlighting the importance of maintaining a balanced lending approach. Chowdhury et al. (2020) uncovered significant determinants of Non-Performing Loans (NPLs) in Bangladesh, including factors such as equity to total assets, interest income, lending capacity, return on equity, unemployment, and consumer price index. They also highlighted the joint influence of both bank-specific and macroeconomic variables on NPLs. Khan et al. (2023) identified various non-performing loan (NPL) determinants in Bangladesh's Islamic and conventional banking sectors. Among bank-specific factors, return on assets, Return on Equity, bank size, and inefficiency helped reduce NPLs, while gross loan growth, leverage, and capital adequacy ratios increased NPLs. Macroeconomic factors such as inflation, GDP growth, unemployment, and exchange rates also impact NPLs. Additionally, the study highlighted differences between Islamic and conventional banks regarding the effect of gross loan growth on NPLs.

While the previous studies provide valuable insights into the dynamics of NPLs and bank competition individually, there is a lack of research examining their interrelationship, particularly in the context of Bangladesh. Therefore, this study seeks to bridge this gap by investigating how banks in Bangladesh compete amidst the challenges posed by bad loans, thereby contributing to a deeper understanding of the complexities within the banking sector and informing policy and managerial interventions.

Structure of the Banking Sector

Bangladesh, founded in 1971, has seen an incredible rise in the banking sector since the liberalization policy was implemented in the 1980s. There were only four domestic banks in Bangladesh before the liberalization program, and they were nationalized: Sonali Bank, Pubali Bank, Rupali Bank, and Janata Bank. Just three foreign banks were present. There was no private bank, though. There was thus no competition in Bangladesh's banking sector. Bangladesh's banking sector comprises diverse institutions, including state-owned, specialized, foreign, and private commercial banks. The Bangladesh Bank, established in 1972 as the country's central bank, plays a crucial role in overseeing and regulating the activities of banks and financial institutions, ensuring stability, transparency, and integrity within the financial system. There are currently 61 scheduled banks, 6 of which are state-owned commercial banks (SOCBs) that the government of Bangladesh wholly or majorly

owns. Three specialized banks are now operating and were established for specific objectives like agricultural or industrial development. These banks are also wholly or majorly owned by the Government of Bangladesh. There is a total of 43 PCBs in operation right now. They are majorly owned by private entities and classified into two types that are Conventional PCBs & Islami Shariah Based PCBs. There are 33 traditional private commercial banks (PCBs), ten based on Islamic Shariah, and nine foreign commercial banks (FCBs) operating in Bangladesh as branches of banks incorporated abroad. Non-scheduled banks are licensed only for specific functions and objectives and do not offer the same range of services as scheduled banks.

Bank Types, Number of Banks and Their Assets and Deposits Shares of 2021 (in billion BDT):

Bank types	Number of banks	Number of branches	Total assets	Share in industry assets (in percent)	Total deposit	Share in deposits (in percent)
SCBs	6	3810	5080.5	24.9	3991.2	26.3
SBs	3	1512	445.9	2.2	412.2	2.7
PCBs	43	5550	13769.0	67.4	10136.0	66.8
FCBs	9	65	1133.9	5.5	642.0	4.2
Total	61	10937	20429.3	100	15181.4	100

Source: Department of Off-site Supervision, Bangladesh Bank.

Bank Types, Number of Banks and Their Assets and Deposits Shares of 2022 (in billion BDT):

Bank types	Number of banks	Number of branches	Total assets	Share in industry assets (in percent)	Total deposit	Share in deposits (in percent)
SCBs	6	3836	5600.7	24.2	4324.8	25.4
SBs	3	1523	539.1	2.3	467.8	2.8
PCBs	43	5666	15688.3	67.8	11385.7	67.1
FCBs	9	63	1314.7	5.7	802.9	4.7
Total	61	11088	23142.8	100	16981.2	100

Source: Department of Off-site Supervision, Bangladesh Bank

In Bangladesh, scheduled banks are categorized into four groups based on ownership: state-owned commercial banks (SCBs), specialized banks (SBs), private commercial banks (PCBs), and foreign commercial banks (FCBs). As of FY23, there were 61 scheduled banks, with 11,088 bank branches by December 2022, up from 10,937 in December 2021. SCBs held 25.4% of total assets in 2022, up from 24.9% in 2021, while PCBs' share increased to 67.8% in 2022 from 67.4% in 2021. FCBs accounted for 5.7% of total assets in 2022, compared to 5.5% in 2021, and SBs' share rose to 2.3% in 2022 from 2.2% in 2021. Total assets of the banking sector were BDT 23,142.8 billion by December 2021, showing a 13.28% increase from the

previous year. Total deposits amounted to BDT 16,981.2 billion in 2022, up 11.9 percent from 2021. SCBs' share of total deposits decreased from 26.3 percent to 25.4 percent from 2021 to 2022, while PCBs' share increased from 66.8 percent to 67.1 percent, FCBs' share rose from 4.2 percent to 4.7 percent, and SBs' share increased from 2.7 percent to 2.8 percent over the same period.

Data, Variables and Methodology

Research Design

This research will adopt a quantitative approach utilizing secondary data analysis. This study investigates the statistics and trends related to Non-Performing Loans (NPLs) and bank competition within Bangladesh's banking sector. The research utilizes data spanning from 2013 to 2023. By solely relying on secondary data, this study aims to analyze existing information from sources such as financial reports, World Bank indicators, and Bangladesh Bank to investigate the relationship between NPL and bank competition in Bangladesh.

Data and Variables

This paper investigates the relationship between Non-Performing Loans (NPLs) and bank competition in Bangladeshi banking. The study employs panel data comprising 61 banks from 1994 to 2022, employing panel data regression methodology. By integrating bank-specific and time-specific variables, panel data regression facilitates the analysis of both cross-sectional and time-series variations in the dataset, thereby allowing for the control variables that may influence NPLs and bank competition. The data is collected from the World Development Indicator (WDI) and Bangladesh Bank's annual report for 1994–2022. The study used Stata 15 statistics.

The regression model is formulated as follows:

$$NPLR = \beta_0 + \beta_1 * NOB + \beta_2 * DCB + \beta_3 * GDPG + \beta_4 * GDPPC + \beta_5 * GDPPG + \beta_6 * GSVG + \varepsilon$$

Where NPLR is the dependent variable, NOB is the independent variable. DCB, GDPG, GDPPC, GDPPG, and GSVG are control variables. β_0 is the intercept term. β_1 , β_2 , β_5 are the coefficients for each variable. ε is the error term.

Definition of variables:

Non-performing loan ratio: Non-performing loans (NPLs) have not generated income for the lender for an extended period, typically due to the borrower's failure to make scheduled payments. In banking, loans are classified as non-performing when the borrower has defaulted on payments or when there are significant doubts about the borrower's ability to repay the loan according to the agreed terms. NPLs can negatively impact a bank's financial health by reducing its profitability, liquidity, and capital adequacy. Banks often have to set aside provisions for potential losses associated with NPLs, affecting their overall performance and stability. Proper management of NPLs is essential for maintaining a healthy loan portfolio and ensuring the soundness of the banking system. In this study, it is the dependent variable.

Bank nonperforming loans to total gross loans are the value of nonperforming loans divided by the total value of the loan portfolio (including nonperforming loans before the deduction of specific loan-loss provisions). The loan amount recorded as nonperforming should be the gross value of the loan as recorded on the balance sheet, not just the overdue amount.

Number of banks: The number of banks in an area can have significant implications for the financial industry, economy, and consumers. A higher number of banks may indicate a more competitive banking sector, offering consumers a more comprehensive range of financial products and service choices. It can also promote innovation and efficiency within the banking industry. Conversely, a lower number of banks may suggest a less competitive market, potentially leading to higher fees, less innovation, and reduced consumer choice. Additionally, the concentration of banking services among a few institutions may increase systemic risks in the financial system.

Domestic credit to the private sector by banks: It refers to financial resources provided to the private sector by other depository corporations (deposit-taking corporations except central banks), such as through loans, purchases of no equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries, these claims include credit to public enterprises.

GDP growth: Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for the depreciation of fabricated assets or for the depletion and degradation of natural resources.

DP per capita: Gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for the depreciation of fabricated assets or for the depletion and degradation of natural resources. Data are in constant local currency.

GDP per capita growth: Annual percentage growth rate of GDP per capita based on constant local currency. GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for the depreciation of fabricated assets or for the depletion and degradation of natural resources.

Gross savings are calculated as gross national income minus total consumption plus net transfers.

Variable descriptions and Data sources

Variables	Description	Source
Dependent variable Non-performing loan	It is measured by the NPL ratio. NPL ratio= Total loans/Total Non-Performing Loans ×100%	World Development indicators
Independent variables Bank competition	A year-by-year increase in the number of banks measures it.	Annual report of Bangladesh Bank
Control variables 1.Domestic credit to the private sector by banks 2.GDP growth 3.GDP per capita 4.GDP per capita growth 5.Gross savings	1. Domestic credit to the private sector by banks (% of GDP) 2. GDP growth (annual %) 3. GDP per capita (constant LCU) 4. GDP per capita growth (annual %) 5. Gross savings (% of GDP)	1. World Development indicators 2. World Development indicators 3. World Development indicators 4. World Development indicators 5. World Development indicators

Results and Discussion**Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
year	29	2008	8.515	1994	2022
NPLR	29	18.107	11.966	6.12	41.112
NOB	29	46.207	11.137	23	61
DCB	29	32.133	9.017	16.27	44.2
GDPG	29	5.757	1.162	3.45	7.88
GDPPC	29	97592.449	37479.486	53888.922	177300.89
GDPPG	29	4.27	1.405	1.92	6.69
GSVG	29	32.999	5.654	22.15	40.6

The dataset consists of 29 observations, each capturing a range of economic and financial variables over a period spanning from 1994 to 2022. The "year" variable indicates the timeframe of the observations, with a mean year of 2008 and a standard deviation of 8.515, showing the dispersion of the data points across nearly three decades. The "NPLR" (non-performing loan ratio) variable, which measures the proportion of loans in default, has an average value of 18.107 and a relatively high standard deviation of 11.966, indicating significant variability among the observations. This variable's minimum and maximum values are 6.12 and 41.112, respectively. The "NOB" (number of bank branches) variable records the number of branches, with an average of 46.207 and a standard deviation of 11.137. The number of branches ranges from 23 to 61, suggesting differences in the banking infrastructure across the observed periods or entities. "DCB" (domestic credit provided by banks) represents the domestic credit extended by banks, averaging 32.133 with a standard deviation of 9.017, ranging between 16.27 and 44.2. Economic growth is captured through the "GDPG" (GDP growth rate) variable, which has a mean of 5.757 and a standard deviation of 1.162, with values spanning from 3.45 to 7.88, reflecting the variations in economic performance. The

"GDPPC" (GDP per capita) variable, which measures the average economic output per person, shows substantial variation with an average of 97592.449 and a significant standard deviation of 37479.486, ranging from 53888.922 to 177300.89. This highlights considerable differences in economic prosperity across the dataset. The "GDPPG" (GDP per capita growth) variable, indicating the GDP per capita growth rate, has an average of 4.27 and a standard deviation of 1.405, ranging from 1.92 to 6.69. This suggests moderate growth variability. Lastly, the "GSVG" (gross savings) variable, which measures the total amount of savings, averages 32.999 with a standard deviation of 5.654, and ranges from 22.15 to 40.6, indicating different levels of savings accumulation over the observed periods or entities. The dataset provides a comprehensive view of various economic and financial metrics, highlighting significant variability and trends across different years and observations.

Linear regression

Variables	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
NPLR	-.036	.023	-1.61	.123	-.083	.011	
NOB	.16	.027	6.00	0	.105	.216	***
DCB	.038	.035	1.10	.286	-.035	.111	
GDPG	.147	.719	0.20	.84	-1.348	1.642	
GDPPC	0	0	17.04	0	0	0	***
GDPPG	-.041	.7	-0.06	.953	-1.497	1.415	
GSVG	.265	.062	4.30	0	.137	.393	***
Constant	1977.711	2.197	900.30	0	1973.142	1982.279	***
Mean dependent var		18.107	SD dependent var			11.966	
R-squared		0.898	Number of obs			29	
F-test		40.492	Prob > F			0.000	
Akaike crit. (AIC)		171.046	Bayesian crit. (BIC)			179.250	

*** p<.01, ** p<.05, * p<.1

This dataset presents the results of a regression analysis with "NPLR" (Non-Performing Loan Ratio) as the dependent variable and several independent variables, including "NOB" (Number of Banks) and control variables such as "DCB" (Domestic Credit by Banks), "GDPG" (GDP Growth Rate), "GDPPC" (GDP per Capita), "GDPPG" (GDP per Capita Growth Rate), and "GSVG" (Gross Savings). The coefficient for "NOB" (Number of Banks) is 0.16, indicating that for every one-unit increase in the number of banks, the non-performing loan ratio increases by 0.16 units. This relationship is statistically significant at the 0.01 level ($p < 0.01$), suggesting a strong positive association between the number of banks and the non-performing loan ratio. For "DCB" (Domestic Credit by Banks), the coefficient is -0.405, but this result is not statistically significant ($p > 0.05$), indicating that domestic credit by banks does not have a significant impact on the non-performing loan ratio. The coefficient for "GDPPC" (GDP per Capita) is 0, and it is statistically significant at the 0.01 level ($p < 0.01$), which may imply that GDP per capita was dropped from the model due to perfect multicollinearity or other issues. The coefficient for "GSVG" (Gross Savings) is -1.1, indicating that the non-performing loan ratio decreases by 1.1 units for every one-unit increase in gross savings. This result is statistically significant at the 0.05 level ($p < 0.05$), suggesting a strong negative relationship between gross savings and the non-performing loan ratio. The constant term is 71.581, representing the intercept of the regression equation. It is statistically

significant at the 0.01 level, indicating that even when all independent variables are zero, there is still a significant non-performing loan ratio.

The R-squared value of 0.898 indicates that the independent variables included in the model explain approximately 89.8 percent of the variation in the non-performing loan ratio. The F-test is highly significant ($p < 0.01$), suggesting that the overall regression model is statistically significant. Additional information includes the mean of the dependent variable (NPLR), which is 18.107 with a standard deviation of 11.966. The Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are model fit and selection measures, with lower values indicating better model fit. In summary, this regression analysis highlights a significant positive relationship between the number of banks and the non-performing loan ratio and a significant negative relationship between gross savings and the non-performing loan ratio. However, domestic credit by banks does not significantly impact the non-performing loan ratio.

NPL (Non-Performing Loans) in Bangladesh:

Non-Performing Loans (NPLs), also known as bad loans, represent a significant challenge for banks worldwide, including those in Bangladesh. NPLs arise when borrowers fail to meet their repayment obligations, adversely affecting banks' financial health, profitability, and stability.

Types of Non-Performing Loans:

1. **Substandard Loans:** Substandard loans are currently non-performing but can be restored to performing with additional measures such as restructuring or collateral recovery.
2. **Doubtful Loans:** Doubtful loans are loans where the likelihood of full repayment is highly uncertain, often due to prolonged delinquency or adverse changes in the borrower's financial condition. These loans require significant provisions and monitoring by the lender.
3. **Loss Loans:** Loss loans are considered uncollectible loans written off as losses by the lender. These loans have no realistic expectation of recovery, either due to the borrower's insolvency or other factors.

The ratio of Gross NPLs to Total Loans by types of Banks (in percent)

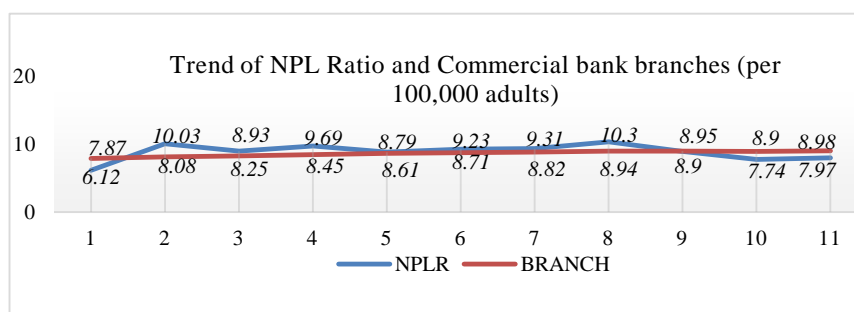
Bank types	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
SCBs	19.8	22.2	21.5	25.0	26.5	30.0	23.9	20.9	19.3	20.3	25.0
SBs	26.8	32.8	23.2	26.0	23.4	19.5	15.1	13.3	12.0	12.8	12.1
PCBs	4.5	4.9	4.9	4.9	4.9	5.5	5.8	4.7	5.3	5.1	6.5
FCBs	5.5	7.3	9.6	7.0	7.0	6.5	5.7	3.5	4.3	4.9	4.8
Total	8.9	9.7	8.8	9.2	9.3	10.3	9.3	7.7	7.9	8.2	10.1

Source: Banking Regulation and Policy Department, Bangladesh Bank.

At the table, the banking sector's gross Non-Performing Loans (NPLs) stood at 10.1 percent by the end of 2023, notably up from 8.2 percent in 2022 and 7.9 in 2021. The data reveals that (FCBs) boasted the lowest gross NPLs at 4.8 percent of total loans. Conversely, scheduled

commercial banks (SCBs) recorded the highest gross NPL rates, reaching 25 percent in 2023, 20.3 percent in 2022, and 19.3 percent in 2021. PCBs maintained a relatively stable NPL ratio from 2014 to 2017, ranging from 4.6 percent to 4.9 percent. However, after 2017, it increased by 5.3 percent in 2021 and 6.5 percent in 2023. Specialized banks (SBs) also faced significant NPL challenges; they had the highest rate at 32.8 percent in 2014, but after 2017, they increased. In 2023, it stood 12 percent, while in 2022, it was 12.8 percent. We can see that the overall gross NPL rate is increased.

Impact of NPLs on the number of commercial bank branches

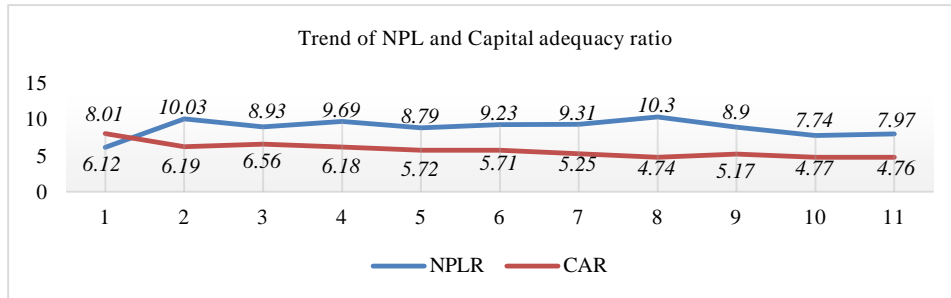


The provided data shows that the non-performing loan ratio (NPLR) influences the number of commercial bank branches (BRANCH) per 100,000 adults. A notable observation is the inverse relationship between NPLR and BRANCH. As NPLR increases, BRANCH decreases slightly, indicating that regions with higher non-performing loan ratios may have fewer commercial bank branches. This correlation suggests that banks may exercise caution in expanding their branch networks in areas with elevated NPLRs due to perceived financial distress and higher credit risk. Conversely, lower NPLRs may attract banks to expand their presence by opening more branches, capitalizing on healthier economic conditions, and lowering credit risk. Strategic decisions regarding branch expansion consider various factors, including NPLR, market demand, and regulatory environment. While high NPLRs may initially deter branch expansion, banks may still invest in these areas for long-term growth potential or under government policies incentivizing financial inclusion. Regulatory factors such as capital adequacy requirements and lending regulations also influence banks' decisions regarding branch expansion in relation to NPLR. While NPLR plays a role in banks' branch expansion decisions, it's just one of several factors considered alongside market demand, economic conditions, regulatory environment, and strategic objectives.

Impact of NPLs on the capital adequacy ratio

The data analysis reveals an inverse relationship between the non-performing loan ratio (NPLR) and the Capital Adequacy Ratio (CAR). As the NPLR increases, the CAR tends to decrease, potentially impacting the bank's capital adequacy and risk management. The CAR serves as a critical measure of a bank's ability to absorb losses and remain solvent, making a decrease in this ratio concerning as it could suggest heightened risk exposure due to higher levels of Non-Performing Loans. Banks with elevated NPLRs may need to allocate more

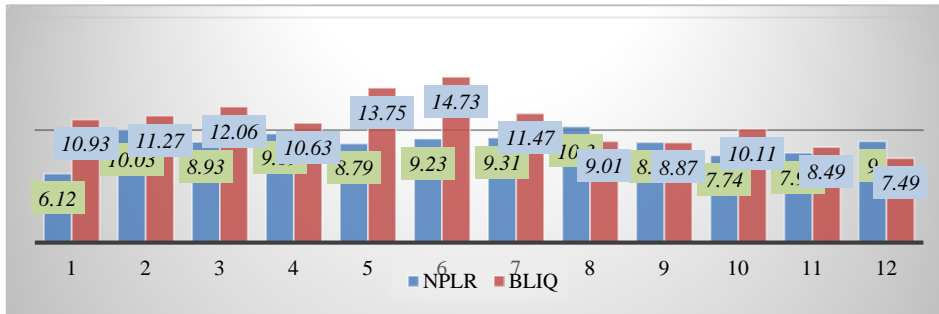
capital to cover potential losses from these loans, thereby reducing their available capital for other purposes and lowering their CAR. Regulatory compliance adds another layer of significance, as banks failing to meet minimum capital adequacy requirements due to high NPLRs may face regulatory intervention or sanctions. Moreover, a decline in CAR resulting from rising NPLRs could erode investor confidence in a bank's financial stability and creditworthiness, potentially leading to higher borrowing costs or difficulty accessing capital markets for funding. This analysis underscores the importance of effective risk management and asset quality for maintaining a healthy banking system, emphasizing that banks must closely monitor and manage their non-performing loan portfolios to preserve capital adequacy and ensure long-term financial stability.



Impact of NPLs on the bank liquid reserve to bank asset ratio:

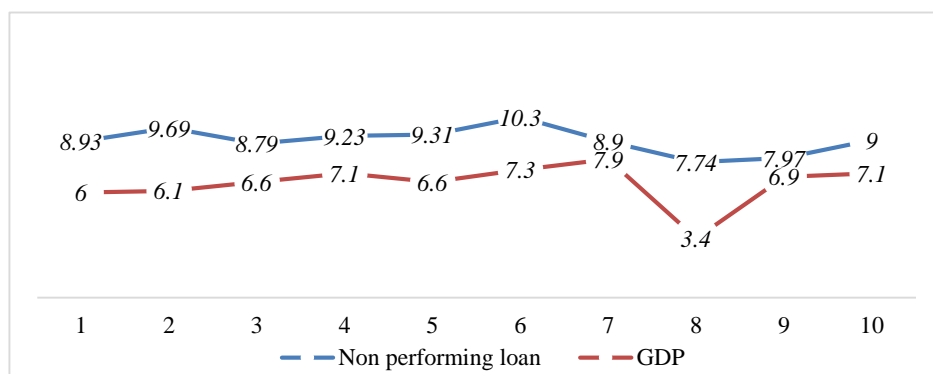
The data analysis indicates an inverse relationship between the non-performing loan ratio (NPLR) and the Bank Liquid Reserve to Bank Asset Ratio (BLIQ). As the NPLR increases, the BLIQ tends to decrease, suggesting that banks may experience a decline in their liquid reserves relative to their total assets. This inverse relationship underscores the potential liquidity risks associated with higher NPLRs, as Non-Performing Loans tie up capital that could otherwise be allocated to maintaining liquid reserves. The decrease in BLIQ could signify that banks have fewer liquid assets available to cover their short-term liabilities, raising concerns about their ability to meet obligations promptly. Furthermore, Non-Performing Loans can impact a bank's asset quality, making it more challenging to maintain adequate levels of liquid reserves. As banks allocate more resources to address Non-Performing Loans, the proportion of liquid assets in their portfolio may decrease, further impacting BLIQ. Regulatory compliance is also a significant consideration, as banks with higher NPLRs may struggle to meet minimum liquidity requirements imposed by regulatory authorities, potentially leading to regulatory scrutiny or penalties. A decline in BLIQ due to rising NPLRs could also affect market perception, causing investors and depositors to question a bank's ability to honor its short-term obligations and potentially eroding confidence in its financial stability and liquidity position. Overall, the impact of NPLR on BLIQ underscores the importance of banks maintaining a balance between asset quality and liquidity management, highlighting the need for effective risk management practices and prudent liquidity planning to ensure financial stability and resilience in uncertain economic conditions.

Impact of NPLs on borrowing

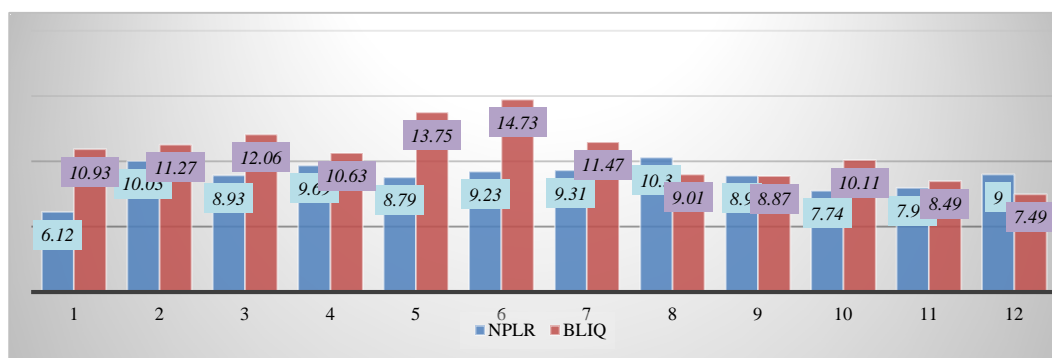


Analyzing the provided data from 2011 to 2021 reveals a potential inverse relationship between the non-performing loan ratio (NPLR) and borrowing activity. As the NPLR increases, the number of borrowers slightly decreases, suggesting that higher non-performing loan ratios may dampen borrowing activity. This inverse relationship can be attributed to several factors. Firstly, higher NPLRs often signal increased credit risk for banks, prompting them to tighten lending standards and reduce credit availability. This, in turn, can lead to more stringent borrowing requirements or higher interest rates, making borrowing less attractive for potential borrowers.

Additionally, rising NPLRs may reflect economic challenges or financial distress, which can deter borrowing activity as businesses and individuals become cautious about taking on debt amidst uncertain economic conditions. Moreover, high NPLRs can erode consumer and investor confidence in the banking sector, further impacting borrowing behavior as individuals may be less willing to borrow in an environment perceived as risky and financially unstable. However, government policies and central bank interventions addressing Non-Performing Loans and supporting credit markets can influence borrowing activity. Stimulus measures or regulatory initiatives may encourage lending or mitigate credit risk, potentially offsetting the impact of NPLRs on borrowing. While NPLR shapes borrowing activity through its impact on credit availability, economic conditions, and consumer confidence, other factors such as interest rates, income levels, and the regulatory environment significantly influence borrowing trends.



Impact of NPLs on domestic credit to banks



The provided data analysis from 2011 to 2022 suggests a slight inverse relationship between the non-performing loan ratio (NPLR) and domestic credit by banks (DCB). As the NPLR increases, there is a modest tendency for domestic credit by banks to decrease, and vice versa. This indicates that higher non-performing loan ratios may dampen the amount of credit extended by banks domestically. This inverse relationship can be attributed to various factors. Firstly, higher NPLRs signal increased credit risk for banks, prompting them to exercise caution in extending credit. Banks may tighten lending standards, reduce credit limits, or increase interest rates to mitigate the risks associated with Non-Performing Loans, thus affecting domestic credit.

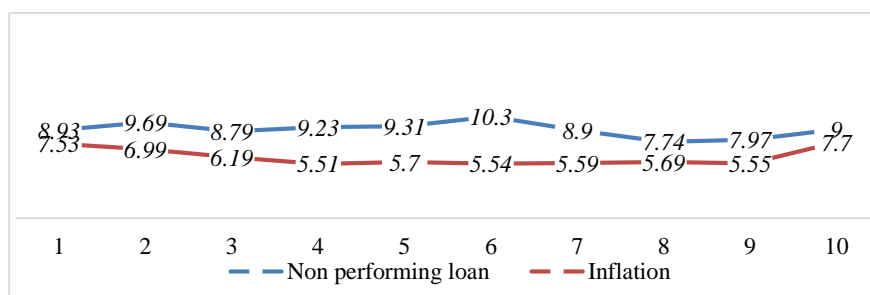
Additionally, rising NPLRs often reflect economic challenges or financial instability, impacting banks' willingness to lend. Economic uncertainty and concerns about loan repayment may lead banks to adopt a more conservative approach to lending, limiting domestic credit growth. Moreover, government policies and regulatory measures addressing Non-Performing Loans can influence domestic credit availability. Stimulus packages, monetary policy adjustments, or regulatory reforms may incentivize or constrain bank lending activities, further impacting the level of domestic credit. High NPLRs can erode business and consumer confidence, impacting borrowing and investment decisions. Reduced confidence may lead to subdued demand for credit, contributing to the observed trends in domestic credit

by banks. Overall, while the NPLR influences domestic credit by banks through its effects on credit risk management, economic conditions, government policies, and confidence levels, other factors also play significant roles in shaping domestic credit availability.

Impact of NPLs on GDP growth

Non-Performing Loans (NPLs) are a critical indicator of financial health within an economy, reflecting the proportion of loans in default or at risk of default. When NPL levels are high, it often signifies underlying weaknesses in the banking sector and broader economic challenges. The impact of NPL on Gross Domestic Product (GDP) is significant and multifaceted. Elevated NPL levels can constrain credit availability as banks become more cautious about lending, dampening investment and consumption, key drivers of economic growth and GDP expansion. Moreover, high NPL ratios can undermine confidence in the financial system, leading to capital outflows, reduced investment, and overall instability, all of which can negatively impact GDP growth. Governments may need to intervene with measures such as bank recapitalization or regulatory reforms to address NPLs, which can have fiscal implications and divert resources away from other productive uses, further impacting GDP growth. Persistently high levels of Non-Performing Loans can have long-term effects on economic growth potential, as resources that could have been allocated to productive investments are tied up in non-performing assets, hindering innovation, productivity, and competitiveness in the economy. Therefore, addressing Non-Performing Loans is crucial for fostering a healthy and resilient economy capable of sustaining long-term growth.

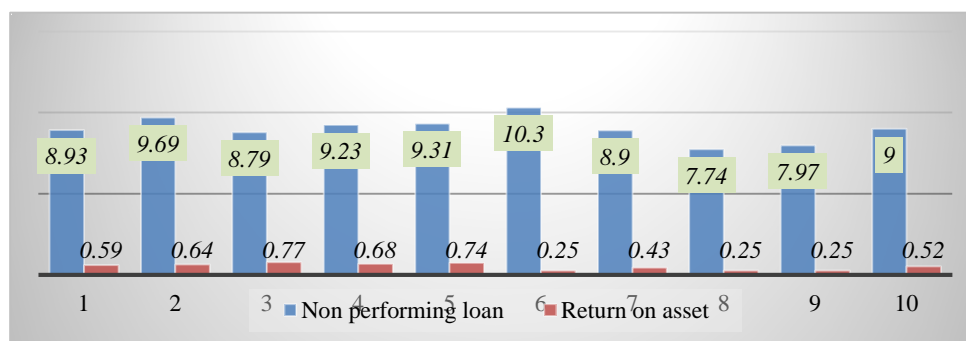
Impact of NPLs on inflation rate



The impact of Non-Performing Loans (NPLs) on the inflation rate is multifaceted and can be analyzed through various economic channels. Elevated NPL levels often coincide with reduced credit availability as banks become more risk-averse in lending. This can lead to lower consumer spending and business investment, decreasing demand for goods and services in the economy. Moreover, high NPL levels may signal underlying economic weaknesses and financial instability, contributing to slower economic growth. Slower economic growth tends to exert downward pressure on inflation rates as demand weakens. Central banks may respond to high NPL levels and low inflation by implementing expansionary monetary policies, such as lowering interest rates or increasing money supply, to stimulate economic activity.

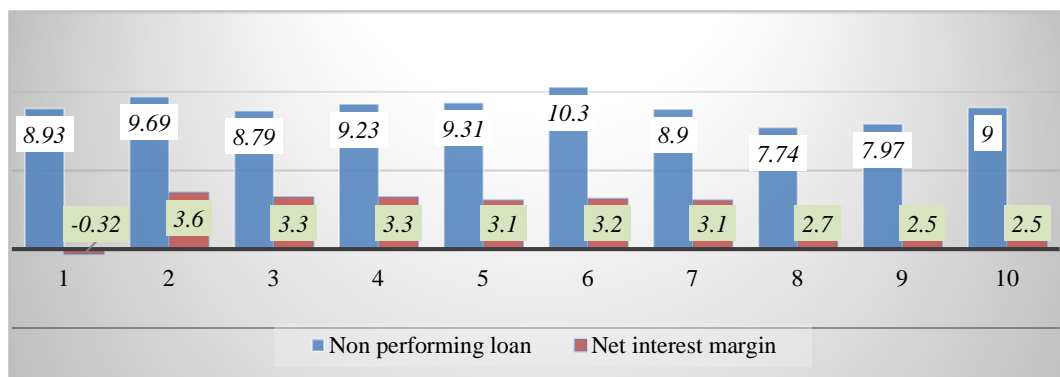
Additionally, elevated NPL levels can erode consumer and investor confidence in the financial system, leading to cautious spending behavior and further dampening inflationary pressures. Government interventions, such as bank recapitalization or regulatory reforms, may influence inflation indirectly through their impact on economic conditions and confidence levels. While high NPL levels may initially contribute to lower inflation rates due to reduced demand and economic activity, the long-term effects will depend on how effectively policymakers address underlying economic challenges and restore confidence in the financial system.

Impact of NPLs on Return on Asse



The impact of Non-Performing Loans (NPL) on return on assets (ROA) is significant and multifaceted, as evidenced by the provided data. Elevated levels of Non-Performing Loans can signal increased credit risk within the banking sector, prompting banks to allocate resources for provisioning and loan loss mitigation activities. These efforts can lead to higher operating expenses, ultimately impacting return on assets. Additionally, Non-Performing Loans erode a bank's asset quality, potentially impairing its ability to generate income from lending activities. The loss of interest income associated with defaulted loans and the need for additional resources for loan recovery efforts can further impact profitability and return on assets.

Moreover, high NPL levels can erode investor confidence in a bank's financial health and management effectiveness, potentially leading to higher funding costs or difficulty accessing capital markets, indirectly affecting return on assets. Regulatory compliance requirements also play a role, as banks with elevated NPL levels may face increased compliance costs or limitations on business opportunities, further impacting return on assets. Overall, the impact of Non-Performing Loans on return on assets is complex and depends on various factors, including credit risk management strategies, asset quality, profitability, investor sentiment, and regulatory environment.

Impact of NPLs on net interest margin:

Non-Performing Loans (NPLs) impact net interest margin (NIM), which is crucial to a bank's financial performance and stability. As Non-Performing Loans rise, several key factors come into play that affect the NIM. Firstly, higher Non-Performing Loans signal increased credit risk within the banking sector. Banks often allocate more resources towards loan loss provisioning to offset this risk, directly impacting net interest income and the NIM. Additionally, Non-Performing Loans erode a bank's asset quality, leading to lower interest income from lending activities. This reduction in interest income directly affects the NIM. Moreover, Non-Performing Loans can directly impact banks' profitability, as they may lose interest income from defaulted loans. This can further reduce the NIM.

Furthermore, banks with higher levels of Non-Performing Loans may adopt more conservative lending practices, offering lower interest rates on loans to mitigate risk. This can also contribute to a decrease in interest income and impact the NIM. Lastly, high levels of Non-Performing Loans can erode investor confidence in a bank's financial health, leading to higher funding costs. The NIM may decline as the cost of funds increases relative to interest income. Overall, the impact of Non-Performing Loans on net interest margin is complex and multifaceted, with implications for risk management, asset quality, profitability, investor confidence, and lending practices within the banking sector.

Conclusion

This study delved into the intricate relationship between bank competition, Non-Performing Loans (NPLs), and key economic indicators, utilizing comprehensive secondary data analysis from 1994 to 2022. Our findings shed light on significant insights regarding the impact of bank competition and NPLs on various aspects of banking and financial stability. Firstly, we observed a statistically significant positive relationship between the number of banks and the NPL ratio, indicating that heightened bank competition tends to correlate with higher NPL ratios. However, domestic credit by banks did not significantly impact the NPL ratio, potentially due to the complex interplay of other factors. Moreover, multicollinearity issues led to excluding GDP per capita from our model. Our analysis revealed that higher NPL ratios are associated with reduced commercial bank branches, lower capital adequacy ratios, and

diminished bank liquidity reserves, posing potential risks to financial stability and liquidity management. Elevated NPL levels may also dampen borrowing activity, domestic credit by banks, and economic growth, impacting inflation rates and banks' return on assets and net interest margins. These findings offer valuable insights for policymakers, regulators, and banking practitioners, emphasizing the importance of understanding the complexities of competition and risk management in the banking sector. Effective strategies to mitigate NPLs require a holistic approach that considers not only bank competition but also the broader economic environment, regulatory framework, and prudent risk management practices. By addressing these challenges, policymakers and banking stakeholders can foster a more resilient and stable banking sector conducive to sustainable economic growth.

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