NPL in Banks of Bangladesh: Macro Economic and Bank Specific Perspective

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A part of the ongoing dissemination of BIBM research outputs, the present research monograph contains the findings of the research project titled "NPL in Banks of Bangladesh: Macro Economic and Bank Specific Perspective."

The study was motivated to explore the effects of bad debt sensitivities with respect to both macroeconomic and bank-specific perspectives. Moreover, some recommendations on future actions are provided to reduce the non-performing loans of Bangladeshi banks.

It gives me immense pleasure to publish and distribute this research output to the practitioners of the banks and financial institutions, regulatory agencies, academics and the common readers. I hope this monograph will be a valuable resource for professionals, especially for the banking community for developing effective econometric model to analyze the causes of NPL in the banking industry in Bangladesh.

Md. Akhtaruzzaman, Ph.D.
Director General, BIBM

Acknowledgement

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List of Abbreviations

BB	Bangladesh Bank
BoD	Board of Directors
BRPD	Banking Regulation and Policy Department
CAGR	Compound Annual Growth Rate
CAR	Capital Adequacy Ratio
CRR	Cash Reserve Ratio
CY	Calendar Year
FCB	Foreign Commercial Bank
FEM	Fixed Effect Model
FERA	Foreign Exchange Regulation Act
FI	Financial Institutions
GDP	Gross Domestic Product
GFET	Guidelines for Foreign Exchange Transactions
ICC	Internal Control and Compliance
IIB	Investment Information Bureau
ISBP	International Standard Banking Practice
KYC	Know Your Customer
KYCC	Know Your Customer's Customer
KYE	Know Your Employee
LC	Letter of Credit
MANCOM	Management Committee
NPL	Non-performing Loan
OECD	Organization for Economic Co-operation and Development
PCB	Private Commercial Banks
REM	Random Effect Model
ROA	Return on Assets
ROE	Return on Equity
SCB	State-Owned Commercial Bank
VIF	Variance Inflation Factor

Effective and well-functioning banking industry is absolutely essential for a developing country like Bangladesh. The banking industry contributes to the economic development of Bangladesh by mobilizing the surplus funds ranging from micro unit to macro unit and providing those collected funds to the potential productive units in the forms of loans and advances. If these loans and advances become overdue for a well-defined time (usually for 90 days and above), then it becomes non-performing loans. Non-performing loans are the assets of the banks which fail to generate any revenue for the bank, rather it consumes the earnings of other performing loans in the form of fulfilling the provisioning requirement. It is well acknowledged that the increase of non-performing loans both in quantity and percentage is connected to either financial crises or bank failures or both in every country across the globe whether it is developing or developed.

Sound credit investigation and analysis can definitely reduce NPLs of banks by decreasing the adverse selection and moral hazard problem to a tolerable level. Sometimes, some loans might have all qualities of good loans in the approval, sanction and disbursement stage, still there is every possibility of turning these good loans into bad loans. These NPLs ultimately affect the volume of private investment by inflating the required provision and loss accumulation in the banking system. It also impacts private consumption by decreasing overall loan disbursement and this situation creates the credit crunch in the long run through the erosion of bank's assets and equity. Macroeconomic variables which are not in the control of the individual banks might cause good loans to be converted into NPLs. Simultaneously bank specific factors which are in the control of bank management may also be the determinants of NPLs. Keeping these views about the systemic and non-systemic factors of NPLs of banks, probable dominating determinants of NPLs of banks have been investigated by many researchers in various perspectives. It has been observed from the reviewed literature that both macroeconomic and bank-specific factors have considerable influence on NPLs. In order to capture these effects quantitatively in the context of the banking industry of Bangladesh, we have undertaken this research initiative The principal objectives of the study are : to depict the exact status and admixture of non-performing loans in Bangladesh ; to analyze the sensitivity of non-performing loans with respect to macroeconomic and bank specific perspectives by employing the econometric model on the panel dataset of Bangladesh banking system and to recommend future courses of action for the improvement and better management of NPLs of banks in Bangladesh. Both primary and secondary data have been collected to achieve the objectives of the study. Primary data have been collected through discussions with the industry experts. In order

capture some sort of sensitive information about the classified credit, informal discussion was made with the experts and key practitioners of various banks .Secondary data are gathered from different the annual reports of Bangladesh Bank , annual reports of commercial banks, World Bank reports, Financial Institutions Report published by Ministry of Finance various journals and publications. A panel dataset of total fifty seven banks during the period of 2010 to 2019 have been used for employing the econometric model. By considering the facile availability of data, a total of nine macroeconomic and bank-specific variables have been selected .Econometric models involving the STATA software are used to determine the impact of macroeconomic and bank-specific factors on non-performing loans.

According to the latest Bangladesh Bank (BB) data, at the end of June 2020, the amount of NPLs in the banking sector raised BDT Tk 96,116 crore, which was 9.16% of the total disbursed loans. BB's inspections were also delayed due to the coronavirus pandemic. Compared to NPL ratio of the SAARC countries, the NPL ratio of Bangladesh is not very high. Yet, there is a lot of scope to reduce this current level of NPL ratio to a comfortable level.

The issue of NPLs has always remained an issue of great importance for the banking sector of Bangladesh. The study tried to capture the determinants of NPLs in the banking sector of Bangladesh using the panel dataset. We have used fixed effect model as random effect model is nullified by the dataset by using the Housman test. We have taken the non-performing loan rate as the dependent variable (lnNPL) whereas loan growth rate(LGR), one year lag non-performing loan rate(NPLt-1), inflation rate (INFR), Interest rate (INTR) and gross domestic product growth rate (GDPR) as independent variables and return on asset (ROA), capital adequacy rate (CAR), total assets (SIZE) and age of banks (AGE) as control variables.

The study finds that Loan Growth Rate (LGR) is statistically significant with 1% level of significance ($\beta1$ = -0.0352). It indicates that if LGR declines Non-Performing Loan (NPL) will decline and vice-versa. Further, the study has analyzed NPL as one-year lag. It finds that last year NPL (NPLt-1) is positively significant with 1% level ($\beta2$ = 3.2143). It explains that last year NPL has positive impact on the current year NPL i.e. one point increases of NPLt-1 will effect 3.21 point of the current year NPL of the banks. Again, three macro factors – INFR, INTR and GDPR have been considered to assess how these factors impact NPL of the banks. The study finds that Weighted Average Lending Interest Rate (INTR) of the Bank is statistically significant at 5% level ($\beta4$ = 11.5709). It indicates that lending interest rate increases NPL of the bank i.e. one point increases of INTR, non-performing loans (NPL) of the banks will increase 11.57 point. Interestingly, inflation rate

(INFR) of the country and GDP growth rate (GDPR) are not statistically significant and have no impact on the NPL of the banks. It means that GDP growth rate (GDPR) and inflation rate (INFR) increase or decreases have no impact on the NPL of the banks.

Excellent and reliable borrower with highest integrity are a few in our country. Most of the banks are running after these small number of borrowers for meeting their targeted loans and advances. Automatically there arises the unhealthy competition among the bankers to capture these would-be good borrowers. Bankers should have the constructive competition to target their potential borrowers.

Our econometric analysis demonstrates that though bank-specific factors such as loan growth rate, lagged NPL has positive impact on the NPL of banks but macroeconomic factors like inflation rate (INFR) and GDP growth rate (GDPR) of our country are not statistically significant and have no impact on the NPL of the banks. Literature survey states that these two variables have positive impact on NPL of advanced economies. This indicates that there may be substantial number of willful defaulters that can cause higher NPL in Bangladesh But weighted average lending rate of banks which is treated as macroeconomic factor has immense impact on NPL of banks. Therefore, both regulators and bankers can assist the borrowers in Bangladesh by charging lower rate of interest and thereby increase their loan repayment capacity.

NPL in Banks of Bangladesh: Macro Economic and Bank Specific Perspective

1. Introduction

1.1 Background of the Study

Effective and well-functioning banking industry is absolutely essential for a developing country like Bangladesh. The banking industry contributes to the economic development of Bangladesh by mobilizing the surplus funds ranging from micro unit to macro unit and providing those collected funds to the potential productive units in the forms of loans and advances. If these loans and advances become overdue for a well-defined time (usually for 90 days and above), then it becomes non-performing loans. Non-performing loans are the assets of the banks which fail to generate any revenue for the bank, rather it consumes the earnings of other performing loans in the form of fulfilling the provisioning requirement. Concept of NPL is given by various agencies in more or less similar fashion (Appendix-I). It is well acknowledged that the increase of non-performing loans both in quantity and percentage is connected to either financial crises or bank failures or both in every country across the globe whether it is developing or developed. "The global financial crisis of 2007-2008 was precisely attributed to Non-performing Loans (NPLs) of banks and mortgage firms; the increased debt burden and over-leveraging was too severe that the fourth-largest investment bank of USA, Lehman Brothers Holdings Inc., got bankrupt in 2008 (Swedberg, 2010)".

Sound credit investigation and analysis can definitely reduce NPLs of banks by decreasing the adverse selection and moral hazard problem to a tolerable level. Sometimes, some loans might have all qualities of good loans in the approval, sanction and disbursement stage, still there is every possibility of turning these good loans into bad loans. These NPLs ultimately affect the volume of private investment by inflating the required provision which generates loss in the banking system. It also impacts private consumption by decreasing overall loan disbursement and this situation creates the credit crunch in the long run through the erosion of bank's assets and equity.

Macroeconomic variables which are not in the control of the individual banks might cause good loans to be converted into NPLs. Simultaneously bank specific factors which are in the control of bank management may also be the determinants of NPLs. Keeping these views about the systemic and non-systemic factors of NPLs of banks, probable dominating determinants of NPLs of banks have been investigated by many researchers in various perspectives. It has been observed from the reviewed literature that both macroeconomic and bank-specific factors have considerable influence on NPLs. In order to capture these

effects quantitatively in the context of the banking industry of Bangladesh, we have undertaken this research initiative. We believe that the outcome of this initiative will add some value to the better managements of non-performing loans by the bank management and framing of sound and effective policies by the playmakers and regulators.

1.2 Objectives of the Study

The main objectives of the research are to:
(i)   Detail the bad debt situation and mix in Bangladesh;
(ii) Analyzes of bad debt sensitivities with respect to macroeconomic and bank-specific perspectives; and
(iii) Recommendations on future actions to improve and better manage non-performing loans of Bangladeshi banks;

1.3 Methodology and Data

Both primary and secondary data have been collected to achieve the objectives of the study. Primary data have been collected through discussions with the industry experts. In order capture some sort of sensitive information about the classified credit, informal discussion was made with the experts and key practitioners of various banks. Secondary data are gathered from different the annual reports of Bangladesh Bank, annual reports of commercial banks, World Bank reports, Financial Institutions Report published by Ministry of Finance various journals and publications. A panel dataset of total fifty seven banks during the period of 2010 to 2019 have been used for employing the econometric model. By considering the facile availability of data, a total of nine macroeconomic and bank-specific variables have been selected .Econometric models involving the STATA software are used to determine the impact of macroeconomic and bank-specific factors on non-performing loans. Findings of the study have mainly been presented in tabular form along with some graphic presentations. The paper will be finalized after accommodating the comments, suggestions and remarks of the honorable discussants and participants of the seminar. Both primary and secondary data were collected to meet the study objectives. Primary data was collected through interviews with industry experts. Informal discussions were held with various banking experts and key practitioners to gather sensitive information about confidential loans. Secondary data are collected from various Bangladesh Bank Annual Reports, Commercial Bank Annual Reports and World Bank Reports. Reports on financial institutions published by the Ministry of Finance in various magazines and publications. A panel data set from a total of 57 banks from 2010 to 2019 was used to apply the econometric model. A total of nine macroeconomic variables and bank-specific variables were selected for data availability. Econometric models using STATA software are used to determine the impact of macroeconomic and bank-specific

factors on non-performing loans. The research results were mainly presented in tabular form with some graphs. This paper will be finalized after considering the comments, suggestions and observations of eminent panelists and seminar participants.

1.4 Structure of the Report

The report is organized under six sections. Background, objectives and methodological issues of the study are given in Section-1. Section-2 deals with literature review of non-performing loans. Current status of bank loans of Bangladesh is given in Section-3. Section-4 depicts the main part of study i.e. econometric model and estimation procedure using the panel data. Section-5 gives impact of COVID-19 on NPLs. Finally, Section six presents a set of observations, findings identified in the study and recommendations thereof, which are to be discussed in the seminar. The report is divided into six sections. Research background, objectives, and methodological issues are discussed in Section-1. Section-2 reviews the bad debt literature. The current state of bank credit in Bangladesh is explained in Section-3. Section-4 describes the main parts of the study. H. I will explain the estimation procedure using the econometric model and panel data. Section-5 discusses the impact of COVID-19 on non-performing loans. Finally, Section-6 presents a series of observations, lessons learned from the research, and the resulting recommendations.

2. Literature Review

Non-Performing Loans (NPLs) in Bangladesh is a widely discussed topic for banking sector and bringing unimaginable miseries in every segment of Bangladesh economy. The words 'Rin Khelapi' and 'Ku Rin' are quite popular in our financial system. When a borrower does not pay interest along with principal amount as per terms and conditions, then s/he is called 'Rin Khelapi' (loan defaulter) and the loan is classified as 'Ku Rin' (bad debt). As per Section-5 (cc) of Bank Company Act 1991, 'defaulting debtor' means any person or institution served with advance, loan granted in favour of him or an institution involving interest or any portion thereof, or any interest which has been overdue for six months in accordance with the definition of Bangladesh Bank.

Credit disbursement (term lending, agricultural and micro lending) under directed credit program 70s and 80s by the State-owned Commercial Banks (SCBs) and Development Financial Institutions (DFIs) due to different consideration other than commercial purpose creates high NPL ratio **(Choudhury. A. Toufik and Adhikary, K, Bashu 2002)**.

Muniappan (2002) argues that a bank with high level of NPLs have an adverse impact on carrying costs on non-income yielding assets that strike at portability and at the capital adequacy of a bank.. As a result the bank faces challenges in expanding capital resources.

Instant consequence of large amount of NPLs in the banking system is not only the bank failure but also broadly economy go-slow. The causes of nonperforming loans are usually due to to the lack of active monitoring and supervision of banks, lack of effective lenders' recourse, weakness of legal infrastructure, and lack of proactive debt recovery strategies. **(Adhikary, 2006)**

Dash (2010) found, all the selected independent variables like Real GDP per Capita, Inflation, and Total Loans as independent variables have impact on the dependent variables Non Performing Loan Ratio. But the values of coefficients are not much high.

Moral et al. (2000) argue that the expansion of credit policy during the early stage of liberation,which was directed to disbursement of credit on relatively easier terms, did actually expand credit in the economy on nominal terms. However, it also generated a large number of willful defaulters in the background who, later on, diminished the financial health of banks through the "sick industry syndrome."

Although the liberalizing and privatizing of the banking sectors in the 1980s with the aim to enhance the efficiency, competition but the robustness of the credit situation worsened because of the lack of effective lenders" recourse on borrowers. **(Islam et al., 1999)**

Choudhury et al. (1999) observed that, government direction towards nationalized commercial banks to lend to unprofitable state owned enterprises, limited policy guidelines for banks, banks were allowed to classify their assets at their own judgments regarding "loan classification and provisioning", and the use of accrual policies of accounting for recording interest income of NPLs worsen the credit discipline of the country till the end of 1989.

In the 1990s, however, a broad based financial measure was undertaken in the name of FSRP4, enlisting the help of World Bank to restore financial discipline to the country. Since then, the banking sector has adopted "prudential norms" for loan classification and provisioning. Other laws, regulations and instruments such as loan ledger account, lending risk analysis manual, performance planning system, interest rate deregulation, the Money Loan Court Act 1990 have also been enacted to promote sound, robust and resilient banking practice. Surprisingly, even after so many measures, the banking system of Bangladesh is yet to free itself from the grip of the NPL debacle. There is no definite study to examine the causes of NPL.The concern is , whether NPL arises due to the reasons of flexibility in defining NPLs, lack of operative "recovery strategies" of the banks or poor enforcement status of laws related to nonperforming loans.

3. Current Status of Non-performing Loans in Bangladesh

3.1 Position of NPL of Bangladesh in SAARC Countries

Compared to NPL ratio of the SAARC countries, the NPL ratio of Bangladesh is not very high. Yet, there is a lot of scope to reduce this current level of NPL ratio to a comfortable level.

Figure 3.1: Status of NPL of Bangladesh in SAARC Countries
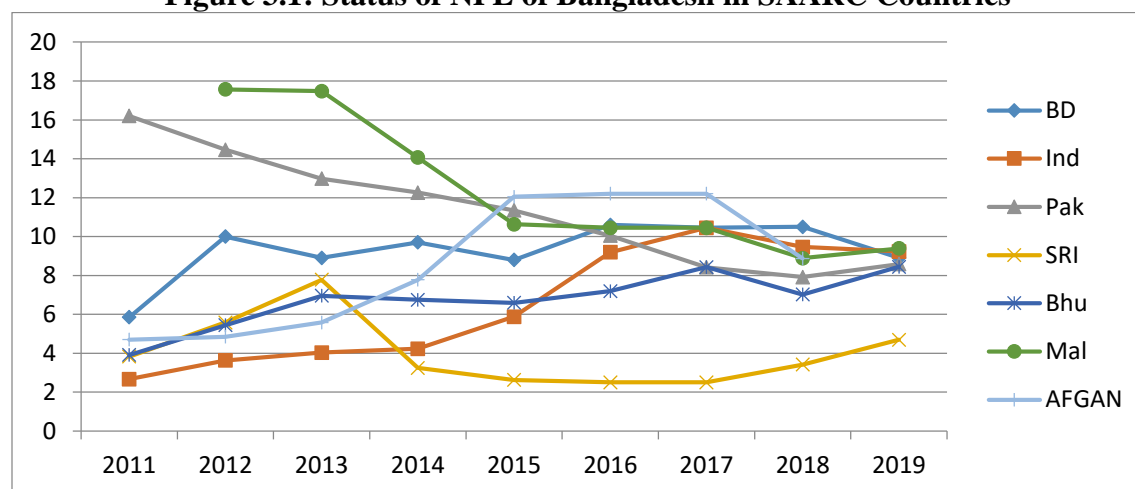
Source: Bangladesh Bank, and World Bank

3.2 Bank Group-wise NPL Trend in Bangladesh

It is observed from the Figure 3.2 that private commercial banks have the lowest NPL level which is around 8.2% to 8.4% during 2018-2019 period. Though NPL of foreign commercial banks is goo, yet, when one foreign bank whose performance is poor is included, FCB's NPL level becomes higher. NPL level of state-owned commercial banks is beyond tolerable limit which is nearly 27.4% in 2019. All the banks are maintaining comfortable loan growth rate, but the foreign banks achieved the loan growth rate of 40.8% in 2019 (Figure-3).

Figure 3.2: Bank Group-wise NPL Trend in Bangladesh
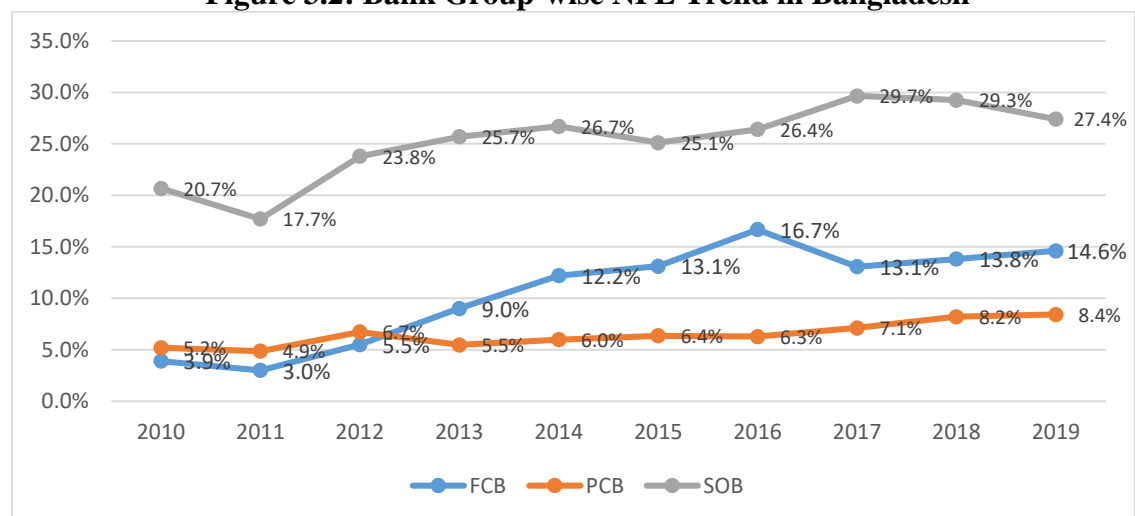
Source: Bangladesh Bank,

Figure 3.3: Bank Group-wise Average Loan Growth Trend in Bangladesh
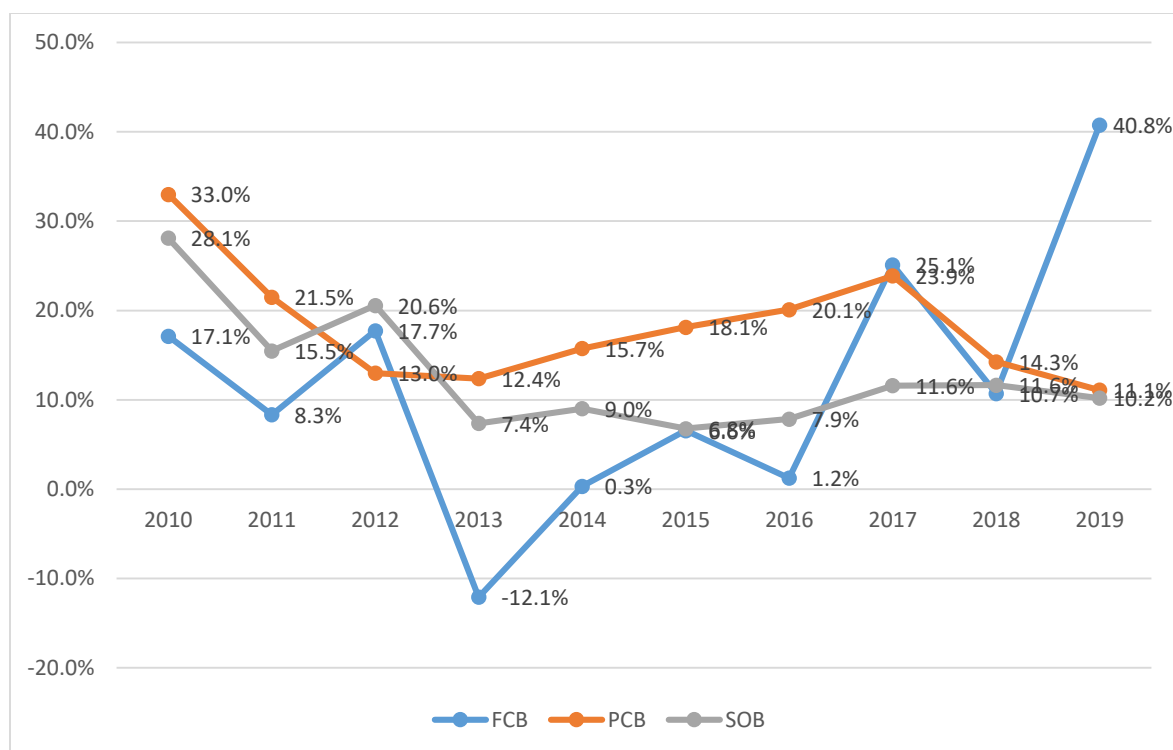
3.3 Gross Non-Performing Loan (GNPL) and Net Non-Performing Loan (NNPL) by Bank Groups

Bank non-performing loans increased from 10.3% in December 2018 to 11.7% in June 2019 (Table 3.1). In 2019, SOCB and PCB had the highest growth rate of total non-performing loans, with an increase of 1.6%. However, SB and FCB's total non-performing loans declined in the first half of 2019. Net non-performing loans increased from 2.2% in December 2018 to 2.5% in June 2019.

Table 3.1: Gross NPL and Net NPL by Bank Groups in Bangladesh

Bank Groups	Gross NPL (%)			Net NPL (%)		
	December 2018	June 2019	Change	December 2018	June 2019	Change
SOCBs	30	31.6	1.6	11.3	8.7	-2.6
SBs	19.5	17.8	-1.7	5.7	4.6	-1.1
PCBs	5.5	7.1	1.6	0.4	1.5	1.1
FCBs	6.5	5.5	-1	0.7	0.1	-0.6
All Banks	10.3	11.7	1.4	2.2	2.5	0.3

Source: Bangladesh Bank, *Annual Report*, 2018-2019

3.4 Composition of NPL of Banks

The composition of bad debts changed adversely between December 31, 2018 and December 31, 2019. During this period from December 2018 to December 2019, the non-performing and deficit-loan categories dominated the pie (Figure 3.1). As of December 2019, the proportion of non-performing loans belonging to the non-performing loan category was approximately 86.3% of all non-performing loans, up 3.3 percentage points from December 2018. This situation shows that most bad loans belong to the worst category.

Figure 3.4: Composition of NPL of Banks in Bangladesh

Composition of NPL as on December 31, 2018	Composition of NPL as on December 31, 2019
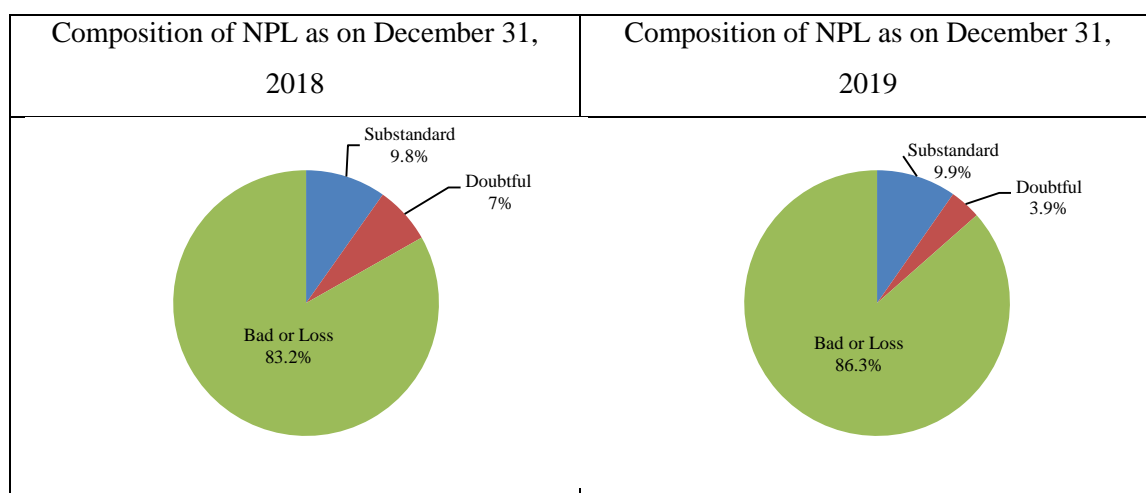
Source: Bangladesh Bank, *Financial Stability Assessment Report*, 2018 and 2019

3.5 Status of Macroeconomic Factors of NPLs in Bangladesh

The macroeconomic factors of GDP growth rate, inflation rate are maintaining a reasonable trend. But the weighted average lending is in gradual decreasing trend (Figure-3.5).

Figure 3.5: Macroeconomic Factors of NPL in Bangladesh
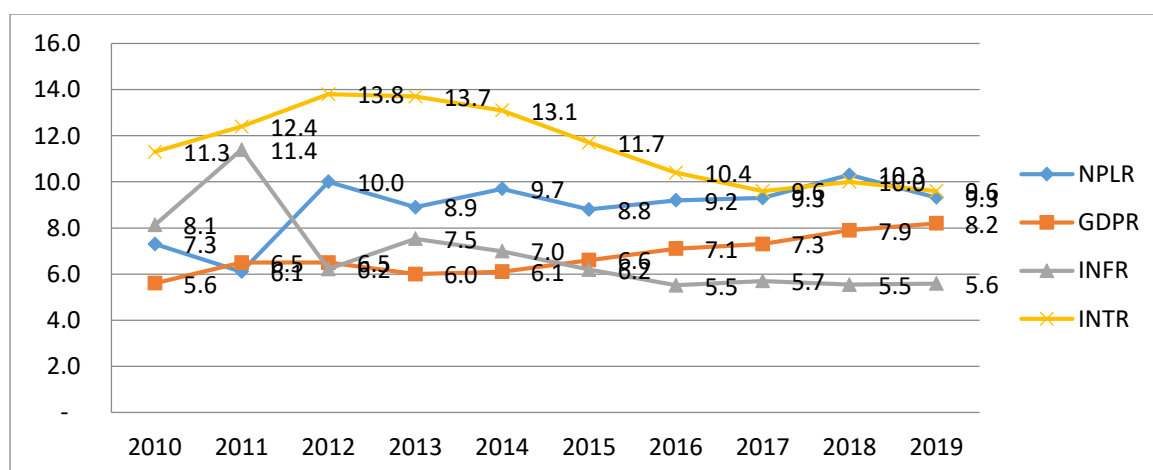
Source: Bangladesh Bank

4. Econometric Model and Estimation Procedure Using the Panel Data

Literature review demonstrates that both macroeconomic and bank specific factors may explain the NPLs in the banking system of Bangladesh. In order to perform our econometric analysis, we have taken the non-performing loan rate as the dependent variable (ln NPL) whereas Loan Growth Rate (LGR), one year lag non-performing loan rate (NPLt-1), Inflation Rate (INFR), Interest Rate (INTR) and Gross Domestic Product Growth Rate (GDPR) as independent variables and Return on Asset (ROA), Capital Adequacy Rate (CAR), Total Assets (SIZE) and Age of banks (AGE) as control variables.

4.1. Macroeconomic and Bank Specific Variables

The study considers Non-performing Loans (NPLs) as dependent variables. NPL is the ratio of classified loan to total loans and advances. LnNPL i.e. NPL as the natural logarithm has been used for the data analysis. Loan Growth Rate (LGR) and NPLt-1 have been considered as micro bank specific factors. LGR is the rate of changes of loans and advances while NPLt-1 is one-year lag of non-performing loan rate. Further, thee macro factors – inflation rate, interest rate and gross domestic product growth rate have been considered as macro factor affecting NPL rate in the banking sector of Bangladesh. Inflation Rate (INFR) is the rate based on consumer price index of Bangladesh while Interest Rate (INTR) is the weighted average lending interest rate of the banks and Gross Domestic Product Growth Rate (GDPR) is the rate of change in the GDP. Again, for better prediction of the model the study controls Return on Assets (ROA) as LnROA, Capital Adequacy Ratio (CAR), SIZE measured by the total assets of the banks and year of commencement of the business (AGE) (Table-4.1).

Table-4.1: Variables Names, Acronyms and Definitions

Variable Name	Acronym	Definition
Dependent Variable; Bank Performance		
Non-Performing Loan Rate	LnNPL	LnNPL is the natural logarithm of the ratio of classified loan to total loans and advances.
Independent Variables		
Loan Growth	LGR	LGR is the percentage changes of Loans and Advances of each Bank
NPL	NPLt-1	NPLt-1 is one-year lag of Non-Performing Loan Rate
Inflation Rate	INFR	INFR is the Inflation Rate based on Consumer Price Index of Bangladesh
Interest Rate	INTR	INTR is the Weighted Average Lending Interest Rate of the Banks
Gross Domestic Product Growth Rate	GDPR	GDPR is the rate of change in the Gross Domestic Product

Variable Name	Acronym	Definition
Control Variables		
Return of Asset	LnROA	LnROA is the natural logarithm of Operating Profit to Total Asset
Capital Adequacy Ratio	CAR	CAR is the Total Eligible Capital to Total Risk Weighted Asset of the Banks
Total Assets	LnSIZE	LnSize is the natural logarithm of total assets of the bank
Age	AGE	Year of the commencement of the business

4.2. Empirical Model

Based on the dependent, independent and control variables the full base line regression models with and without VCE robust for the NPL is as follows:

$$LnNPL_{it} = \alpha + \beta_1 LGR_{it} + \beta_2 NPLt\text{-}1_{it} + \beta_3 INFR_{tit} + \beta_4 INTR_t + \beta_5 GDPR_t + \beta_6 LnROA_{it} + \beta_7 CAR_{it} + \beta_8 LnSIZE_{it} + \beta_9 AGE_{it} + \varepsilon_{it} \quad \text{–(Without VCE Robust)}$$
----------------------------------(1)

$$LnNPL_{it} = \alpha + \beta_1 LGR_{it} + \beta_2 NPLt\text{-}1_{it} + \beta_3 INFR_{it} + \beta_4 INTR_t + \beta_5 GDPR_t + \beta_6 LnROA_{it} + \beta_7 CAR_{it} + \beta_8 LnSIZE_{it} + \beta_9 AGE_{it} + \varepsilon_{it} \quad \text{(With VCE Robust)}$$
------------------------------------(2)

Here,

LnNPL = Natural Logarithm of Non-Performing Loans that explains the performance of ith bank for the year 't'

LGR = Loan growth rate

NPLt-1 = One-year lag of NPL rate

INFR = Inflation Rate based on Consumer Price Index of Bangladesh

INTR = Weighted Average Lending Interest Rate of the Bank

GDPR = The rate of change in the Gross Domestic Product

LnROA = The natural logarithm of Operating Profit to Total Asset

CAR= Total Eligible Capital to Total Risk Weighted Asset of the Banks

LnSIZE = the natural logarithm of total assets of the bank

AGE = Total age from the year of the commencement of the business

The study uses all scheduled banks (total- 57) of Bangladesh Bank (BB). Again, total 10 years with 590 bank-year observation from 2010 to 2019 have been analysis. Annual report of banks provided the data of the respective banks. Again, for macro variables – inflation rate based on consumer price index (INFR) of Bangladesh has been collected from World Bank (WB), weighted average lending interest rate of the banks (INTR) form Bangladesh Bank (BB) and the rate of change in the GDP (GDPR) from the World Bank (WB) have been collected.

4.3 Findings and Analysis

Descriptive Statistics

The study finds that average LnNPL is -2.99 while the minimum is -10.73, maximum is -0.018 and standard deviation is 1.13. Again, the mean loan growth rate is 0.68 followed by minimum LGR is -0.92, maximum is 117.02 and standard deviation is 6.58. Further, among the macro factors, the average inflation rate is 0.068. However, the maximum INFR is 0.114, the minimum INFR is 0.055 and standard deviation is 0.017. The standard deviation for INTR and GDPR are 0.016 and 0.008 respectively. Although the maximum standard deviation for LGR is 6.58, the others micro and macro factors' standard deviation are around 1 and less than 1 (Table-2).

Table-4.2: Descriptive statistics

Variables	Mean	Std.Dev.	Min	Max
LnNPL	-2.98579	1.228838	-10.7275	-0.01816
LGR	0.678933	6.576114	-0.922	117.02
NPLt-1	0.096225	0.151406	0	0.982
INFR	0.067856	0.016615	0.055135	0.113952
INTR	0.115004	0.015657	0.096	0.138
GDPR	0.068155	0.007983	0.056	0.082
LnROA	-3.81128	0.858264	-9.09148	-0.37205
CAR	0.167898	0.275593	-1.3311	2.207
LnSIZE	11.55739	1.219155	5.926926	14.11533
AGE	21.67039	12.04985	1	47
LnSIZE	11.55739	1.219155	5.926926	14.11533
AGE	21.67039	12.04985	1	47

Correlations and VIF

Before the regression results the test of multicollinearity is important because interpretations of the regression results and individual coefficients are contingent on the aptness of the model and are affected by the presence of multicollinearity (Belkaoui and Karpik, 1989). Table-3 explains the correlation matrix among dependent, independent and control variables. Further, for data multicollinearity, we test Variance Inflation Factors (VIF) (Wooldridge, 2013) (Table -4). Wooldridge (2013) explained that if VIF is above 10 then it can conclude that multicollinearity is a problem for estimating the explanatory variables. This study finds that the mean VIF is 2.33. Further, the maximum VIF is 4.99 for GDPR, which is less than 10, hence, the data is free from the multicollinearity problem.

Table-4.3: Correlations

Variable	LnNPL	LGR	NPLt-1	INFR	INTR	GDPR	LnROA	CAR	LnSIZE	AGE
LnNPL	1									
LGR	-0.1305	1								
NPLt-1	0.7165	-0.0472	1							
INFR	-0.0948	0.0145	-0.0645	1						
INTR	0.0166	0.0685	-0.0942	0.4713	1					
GDPR	0.0466	-0.0637	0.0871	-0.5531	-0.7702	1				
LnROA	-0.3458	0.0836	-0.363	0.1608	0.096	-0.1542	1			
CAR	-0.3073	0.0851	-0.3752	0.0102	0.0751	-0.0456	0.0206	1		
LnSIZE	0.0905	-0.2185	-0.1207	-0.1575	-0.1838	0.2336	-0.0237	-0.4067	1	
AGE	0.4093	-0.1308	0.2325	-0.0832	-0.1112	0.14	-0.0148	-0.1863	0.4602	1

Table-4.4: VIF

Variable	VIF	1/VIF
GDPR	4.99	0.200588
INTR	4.90	0.20415
LnSIZE	2.35	0.424883
CAR	1.95	0.513416
AGE	1.68	0.596502
INFR	1.39	0.71861
NPLt1	1.39	0.720069
LnROA	1.28	0.781001
LGR	1.03	0.975574
Mean VIF	2.33	

4.4 Fitness Tests for the Econometric Model

To select an appropriate model for panel data– Fixed Effect model (FE) model or Random Effect (RE) model – the study proceeds as follows. First, the Hausman test is invoked to understand which model would be a preferred model (Gujurati and Porter, 2009). The Hausman test result explains that we cannot accept null hypothesis (H_0) (Prob>chi^2 = 0.0006) (Table-5), hence Fixed Effect Model (FEM) is fit for the data.

Table-4.5: Hausman Test

| Variables | Coefficients | | | |
	(b)	(B)	(b-B)	sqrt(diag (V_b-V_B))
	fe	re	Difference	S.E.
LGR	-0.0351767	-0.0303703	-0.0048064	0.0023978
NPLt1	3.214274	5.422389	-2.208116	0.5207245
INFR	-1.522784	-4.508161	2.985377	2.189806
INTR	11.57092	8.571247	2.999668	2.602715
GDPR	-2.65702	3.921872	-6.578892	3.798931
LnROA	-0.1208911	-0.1310289	0.0101377	0.0356588
CAR	-1.028379	-0.397726	-0.6306532	0.5416461
LnSIZE	-0.060735	0.0898919	-0.1506269	0.1287074
AGE	0.1226658	0.0315445	0.0911213	0.0453374

chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 29.22
Prob>chi2 = 0.0006

Second, According to Drukker (2003), testing for serial correlation in linear panel data models is important and necessary because the presence of serial correlation biases the standard errors and makes the results to be less efficient. This study runs VCE ROBUST (Model-2) to adjust the standard errors in the regression result for better prediction. The full model with and without vce robust are depicted in Table-6.

Table-4.6: Regression Results with without and with VCE ROBUST

Variables	Model-1 (Without VCE ROBUST)	Model-2 (With VCE ROBUST)
	LnNPL	LnNPLs
LGR	-0.0352 *** (0.0077)	-0.0352 *** (0.0054)
NPLt-1	3.2143 *** (0.7773)	3.2143 *** (0.8305)
INFR	-1.5228 (3.0330)	-1.5228 (2.8476)
INTR	11.5709 ** (4.8823)	11.5709 ** (4.8628)
GDPR	-2.6570 (10.035)	-2.6570 (12.3641)
LnROA	-0.1209 * (0.0637)	-0.1209 * (0.0680)
CAR	-1.0284 (0.6653)	-1.0284 (0.6632)
LnSIZE	-0.0607 (0.1467)	-0.0607 (0.1661)
AGE	0.1227 ***	0.1227 ***

	Model-1 (Without VCE ROBUST)	Model-2 (With VCE ROBUST)
Variables	LnNPL	LnNPLs
	(0.0458)	(0.0361)
Constant	-6.6742 *** (1.9779)	-6.6742 *** (2.6823)
Number of Observation	425	425
R^2 (Overall)	0.3442	0.3442
F	12.01	25.17
Prob >F	0.0000	0.0000

Note: Values indicates the Coefficient and Standard Error within the brackets
*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

Model-1 explains the regression result without vce robust while Model-2 explicates the regression result with vce robust. Model-1 and Model-2 explain overall R^2 is 0.3442 and the models are statistically significant with 1% level of significance. The study finds that Loan Growth Rate (LGR) is statistically significant with 1% level of significance (β_1 = -0.0352). It indicates that if LGR declines Non-Performing Loan (NPL) will decline and vice-versa. Further, the study has analyzed NPL as one-year lag. It finds that last year NPL (NPLt-1) is positively significant with 1% level (β_2 = 3.2143). It explains that last year NPL has positive impact on the current year NPL i.e. one point increases of NPLt-1 will effect 3.21 point of the current year NPL of the banks. Again, three macro factors – INFR, INTR and GDPR have been considered to assess how these factors impact NPL of the banks. The study finds that Weighted Average Lending Interest Rate (INTR) of the Bank is statistically significant at 5% level (β_4 = 11.5709). It indicates that lending interest rate increases NPL of the bank i.e. one point increases of INTR, non-performing loans (NPL) of the banks will increase 11.57 point. Interestingly, inflation rate (INFR) of the country and GDP growth rate (GDPR) are not statistically significant and have no impact on the NPL of the banks. It means that GDP growth rate (GDPR) and inflation rate (INFR) increase or decreases have no impact on the NPL of the banks.

4.5 Additional Sensitivity Analysis of the Bank Specific and Macro Factors: Regression Results

The study also conducted additional sensitivity analysis for non-performing loan (NPLs) and the influence of bank specific and macro factors. Total six models have been run for sensitivity analysis. The study tests uni-variate of LnNPL with LGR and NPLt-1; bivariate of LnNPL with LGR and NPLt-1; and multivariate considering other bank specific macro and control variables. Model 3-8 explain the base line model of the study.

$LnNPL_{it} = \alpha + \beta_1 LGR_{it} + \varepsilon_{it}$ --(3)

$LnNPL_{it} = \alpha + \beta_1 LGR_{it} + \beta_2 LnROA_{it} + \beta_3 CAR_{it} + \beta_4 LnSIZE_{it} + \beta_5 AGE_{it} + \varepsilon_{it}$ ----------------(4)

$LnNPL_{it} = \alpha + \beta_2 NPLt-1_{it} + \varepsilon_{it}$ ---(5)

$$LnNPL_{it} = \alpha + \beta_2\ NPLt\text{-}1\ _{it} + \beta_6\ LnROA\ _{it} + \beta_7\ CAR_{it} + \beta_8\ LnSIZE\ _{it} + \beta_8\ AGE\ _{it} + \varepsilon_{it}\ \text{------------(6)}$$

$$LnNPL_{it} = \alpha + \beta_1\ LGR\ _{it} + \beta_2\ NPLt\text{-}1\ _{it} + \varepsilon_{it}\ \text{---(7)}$$

$$LnNPL_{it} = \alpha + \beta_1\ LGR\ _{it} + \beta_2\ NPLt\text{-}1\ _{it} + \beta_3\ LnROA\ _{it} + \beta_4\ CAR_{it} + \beta_5\ LnSIZE\ _{it} + \beta_6\ AGE\ _{it} + \varepsilon_{it}\ (8)$$

Table-4.7: Sensitivity Analysis; Regression Results

	Model-3	Model-4	Model-5	Model-6	Model-7	Model-8
Variables	**LnNPL**	**LnNPL**	**LnNPL**	**LnNPL**	**LnNPL**	**LnNPL**
LGR	-0.0442 *** (0.0081)	-0.0348 *** (0.0079)	----------	----------	-0.0414 *** (0.0073)	-0.0335 *** (0.0077)
NPLt-1	----------	----------	3.1903 *** (0.4402)	3.3208 *** (0.7921)	3.0879 *** (0.4247)	3.2706 *** (0.7735)
INFR	----------	----------	----------	----------	----------	----------
INTR	----------	----------	----------	----------	----------	----------
GDPR	----------	----------	----------	----------	----------	----------
LnROA	----------	-0.1518 ** (0.0613)	----------	-0.1031 (0.0656)	----------	-0.1316 ** (0.0644)
CAR	----------	-0.7787 (0.6181)	----------	-1.5619 ** (0.6782)	----------	-1.0952 (0.6709)
LnSIZE	----------	-0.0552 (0.1427)	----------	0.0574 (0.1503)	----------	-0.0406 (0.1485)
AGE	----------	0.0828 *** (0.0207)	----------	0.0491 ** (0.0223)	----------	0.0556 ** (0.0219)
Constant	-2.9728 *** (0.0301)	-4.7602 *** (1.2812)	-3.2613 *** (0.0523)	-5.2538 *** (1.3792)	-3.23499 *** (0.0506607)	-4.4119 *** (1.3607)
R^2 (Overall)	0.0170	0.2642	0.5134	0.4442	0.5068	0.4569
No of Observations	510	466	464	425	464	425
F	29.60	19.09	52.52	14.17	44.31	15.5
Prob >F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Values indicates the Coefficient and Standard Error in parentheses
*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

Model-3 of the sensitivity analysis explicates that LGR is negatively significant at 1% ($\beta_1 = -0.0442$). When the study adds control variables in Model-4 the regression results remain unchanged i.e. negatively significant. This finding is similar to the full model of Model-1 and Model-2. Again, Model-5 and Model-6 test NPLt-1 with the NPL of the banks with and without control variables. Both cases (Model-5 and Model-6) NPLt-1 is statistically positively significant ($\beta_2 = 3.1903$ for Model-5 and $\beta_2 = 3.3209$ for Model-6). Further, Model-7 and Model-8 consider both LGR and NPLt-1 as bank specific factor without and with control variables respectively. Yet again, LGR and NPLt-1 are statistically significant and supportive to the full model.

5. Factors/ Reasons behind NPLs and Probable Effects of COVID-19 on Banks' NPL of Bangladesh

5.1 There are several causes behind the loans to become non-performing. From the telephonic and informal discussion with the key practitioners and credit managers, we have identified the following reasons behind loans to become non-performing in Bangladesh (Box-5.1).

<table>
<tr><td>Box-5.1: Views/Opinions of Bankers Behind the Loan Defaults</td></tr>
<tr><td>

- There is always an information asymmetry between bankers and borrowers. This information asymmetry creates negative choices and moral hazard issues for borrowers.
- The main cause of non-performing loans (NPL) is due to wrong customer selection subject to loan sanctions.
- Diverted funds to other activities or investments that do not generate sufficient cash flow to repay the customer's loan.
- A customer may obtain a loan to start a new business without having sufficient knowledge of the new business. As a result, business is not run efficiently, payments are not made properly, and not enough cash is generated as a result.
- There is fierce competition among banks for loans. As a result, most banks are looking for the same potentially good customers.
- Delinquency in loan payments to borrowers can result in huge losses for borrowers
- In most cases, political pressure influences the approval of loans to ineligible customers.
- Client bankruptcy due to excessive borrowing and interest.
- When the economy slows down and economic growth slows, borrowers will not be able to pay principal and interest.
- Political turmoil and frequent changes in government policies can cause bad debts.
- Operational inefficiencies or operational vulnerabilities related to sanctions and collection policies and weak corporate governance in Bangladesh's banking sector.
- Unethical activities and corruption by bankers can be at the root of bad debts (NPLs).

</td></tr>
</table>

5.2 COVID-19 and Its Effects on NPL

The global economy has been in deep economic crisis since the beginning of the pandemic due to the high health risks posed by the coronavirus. High levels of non-performing loans in Bangladesh's banking sector were a major concern even before the pandemic. The risk profile of borrowers around the world has deteriorated during the pandemic, and Bangladesh is no exception. Due to the economic recession caused by COVID-19, the income of various organizations has already decreased, the flow of remittances has already been on a downward trend, and the purchasing power and income of individuals may also

decrease, and eventually regular impacts the inflow of funds. Seriously bank. In addition, an increase in non-performing loans will also negatively affect banks' cash flows. Both credit and liquidity risks have a direct impact on profitability, sustainable growth and ultimately the viability of a bank. An increase in non-performing loans due to a lack of regular loan repayments could significantly reduce a bank's real earnings. Bad debt not only reduces revenue, but also increases funding costs. Banks must hold additional reserves from their income or reserves to offset bad debts.

According to the latest data from Bangladesh Bank (BB), the number of non-performing loans in the banking sector stood at Tk 96.116 billion as of the end of June 2020, representing 9.16% of the total disbursed loans. BB's inspections were also delayed due to the coronavirus pandemic. Banks especially tended to hide bad debt figures for the first quarter of the calendar year, which ended up adding to bad debt figures for the second quarter.

To make businessmen's jobs easier and to combat the economic blow from COVID-19, BB urged banks not to downgrade loans for missing installments in Jan-September quarter rice field. The banking sector faces two challenges (1). (2) cut lending rates to single-digit percentages before the coronavirus outbreak; If it took the defaulters 10 years to pay off their debts, even though they weren't facing a crisis as big as the coronavirus, they have a better excuse than 10 years isn't enough. Therefore, the credit default crisis will not go away and will continue to get worse.

Under the BRPD circular dated March 19, 2020, BB asked commercial banks not to treat businessmen who fail to repay their installments by June as defaulters. Bangladesh Bank has extended the relaxed loan repayment regime until September 30, given the impact of the coronavirus on the country's trade and economy. The central bank's memorandum on Monday said the loan's rating would not change between Jan. 1 and Sept. 30 this year, even if someone fails to repay the loan on time. (BRPD Circular No. 15, 15 June 2020) Bangladesh Bank has further extended its relaxed loan repayment terms until 31 December, reflecting the impact of coronavirus on the country's trade and economy. According to the bulletin board. As issued by the Central Bank (BRPD Circular No. 17 of 28 September 2020), the loan classification will not change from 1 January to 31 December this year, even if someone fails to repay the loan on schedule. All the new circulars issued by the Ministry of Banking Regulatory Policy (BRPD) are based on accurate predictions that Bangladesh's businesses, like the rest of the world, will be affected by the pandemic and that employment as a whole may be affected. there is It is expected that many borrowers will not be able to repay their loans on time.

Though the classifications status of these loans remain almost stagnant due to these circulars and banks will not be required to keep provision against these loans. Therefore, the asset quality will be deteriorated and the amount of NPLs will increase after the end of this pandemic. Persistent default culture and taking advantage of relaxed loan rescheduling policy are the major concerns of asset deterioration in the overall banking sector in the upcoming days. In short-term, it might help the banks clean the book but in the long run, the result might be even worse.

It is a great initiative by BB to revive the economy of the country. But banks must remain vigilant so that this facility is not misused. They must check that fund diversion does not occur. Good borrowers might be discouraged. So, banks should ensure with due diligence that the concerned borrowers seeking loan rescheduling are not in the category of willful defaulters.

Because of COVID-19, banking sector experienced sharp fall in the regular loan repayments and recovery from NPL in the second quarter of 2020. If this continues banks' NPL will significantly rise and will lead to provision shortfall in many banks. If this occurs, it will hit the capital base of banks. In the absence of secondary market for real-estate in Bangladesh, banks will face critical situation in selling mortgaged assets which may aggravate this situation. Banks are now waived from maintaining loan loss provision considering the effects of COVID-19 up to December, 2020. But BB may ask banks to maintain provision after September. Thus, banks need to take preparation for recovering loan and maintaining provision considering the situation after 2020.

6. Summary Findings and Suggestions

The issue of NPLs has always remained a great concern for the banking sector of Bangladesh. The study tried to capture the determinants of NPLs in the banking sector of Bangladesh using the panel dataset. We have used fixed effect model as random effect model is nullified by the dataset by using the Housman test. We have taken the non-performing loan rate as the dependent variable (ln NPL) whereas loan growth rate (LGR), one year lag non-performing loan rate (NPLt-1), inflation rate (INFR), Interest rate (INTR) and gross domestic product growth rate (GDPR) as independent variables and return on asset (ROA), capital adequacy rate (CAR), total assets (SIZE) and age of banks (AGE) as control variables. By summarizing the above discussion, we may put forward the following recommendations.

6.1 Stopping the Borrowers to become Borrowers of too Many Banks

It has been observed that the same borrower borrows from multiple banks. As a result, the lending bank loses control over the borrower. Even the loan amount of the borrowers has greatly exceeded their ability to repay, ultimately leading to bad debts. To prevent such a situation, Bangladesh Bank could develop a policy of stopping borrowing from multiple banks, which would reduce the non-performing loans to some extent. In addition, BB can develop an information system integrated with all other bank information systems. This will allow lending banks to access BB's integrated information system to learn about failed debtors. Therefore, the bank confirms the creditworthiness of the borrower before approving the loan. This idea can be developed from cloud computing systems.

6.2 Strengthening the Management Efficiency

Improving return on investment (ROA) can significantly reduce bad debt. Therefore, with appropriate oversight, monitoring and follow-up actions, management can receive early warning signals about potentially classified loans and take corrective/proactive action as well to declassify loans. It is management efficiency that enables these management activities to be carried out reliably.

6.3 Employment of Bank's Agent in the Borrower's Enterprise/ Company/ Project

Especially for large corporate borrowers, the bank may appoint a representative of the borrower's company who will be responsible for monitoring the account area to ensure that the loan amount is properly used for approved projects. In this way, banks can regularly and closely monitor post-payment borrowers, give early warning if transactions are deteriorating, and make proposals to borrowers.

6.4 Reducing the Unethical Activities of Bank Staff in Proposing and Sanctioning Loans

Smart borrowers, in most cases, try to outsmart the proper lending process of the banks and take the loans using undue influence by hook or crook. The bank authority concerned should take concrete steps to prevent the unethical activities of all staffs connected with the credit creation, sanction, documentation and disbursement processes.

6.5 Proper Assessment of Credit Risk of the Borrower

In order to decrease the credit risk at a tolerable level, appropriate investigation and assessment of credit risk of the borrower is must. In this regard, banks should also properly assess the valuation of asset which are provided by borrower as a security. By assessing properly of the borrower, the adverse selection and moral hazard problem can be minimized substantially.

6.6 Abstention of Sanctioning Excess Loan to a New/ Inexperienced Borrower

Sometimes, bankers try to sanction loans and advances to a new, inexperienced and non-tested borrower to meet their credit target. These excess loans will make the borrower default to repay it in due time and in due amount.

6.7 Introduction of Sound and Effective Corporate Governance in Banks of Bangladesh

Sound and effective corporate governance of banks will always help it reduce its non-performing loans. Therefore, bank management should put good governance in place in order to ensure proper management of loans and advances.

6.8 Banks should be Kept Free from Political Influence in Selecting Borrower

It has been opined that most of the big borrowers have used their political connections to get the loans sanctioned and disbursed from the banks. So, the government should take proper steps to avert the political influence to create unnecessary pressures for sanction of loans to a customers who are not eligible for those loans.

6.9 Reduction of Unhealthy Competition among the Banks for a Good Borrower

Excellent and reliable borrower with highest integrity are a few in our country. Most of the banks are running after these small number of borrowers for meeting their targeted loans and advances. Automatically there arises the unhealthy competition among the bankers to capture these would-be good borrowers. Bankers should have the constructive competition to target their potential borrowers.

Our econometric analysis demonstrates that though bank-specific factors such as loan growth rate, lagged NPL has positive impact on the NPL of banks but macroeconomic factors like Inflation Rate (INFR) and GDP Growth Rate (GDPR) of our country are not statistically significant and have no impact on the NPL of the banks. Literature survey states that these two variables have positive impact on NPL of advanced economies. This indicates that there may be substantial number of willful defaulters that can cause higher NPL in Bangladesh But weighted average lending rate of banks which is treated as macroeconomic variable has immense impact on NPL of banks. Therefore, both regulators and bankers can charge lower rate of interest to the borrowers and thereby increase their loan capacity to repay the loan.

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