

# Impact of Non-Performing Loan on Profitability of Banks in Bangladesh: A Study from 1997 to 2017

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## Abstract

Bangladesh being a developing country heavily depends on the banking sector for smooth financial intermediation. Banking industry of Bangladesh has been facing the acute problem of NPL since long. This paper aims to discover the impact of non-performing loan ratio, capital adequacy ratio and provision maintenance ratio on the return on asset (ROA) of all banks based on the last twenty-one years data. This study also investigates the root causes and adverse effects of the non-performing loan. Secondary sources of data are collected from the annual reports of Bangladesh Bank and analyzed by Ordinary Least Square (OLS) method and Vector Auto Regression (VAR) model using STATA 14.2. The results of the study reveal that there are different directional short-run causality exist between variables and the OLS regression analysis confirms that two independent variables; non-performing loan ratio and provision maintenance ratio are statistically significant to the dependent variable; return on asset (ROA).

**Index terms**— non-performing loan, profitability, banks, bangladesh.

## 1 II.

## 2 Review of Related Literature

Non-performing loan arises from various sources. Banks should identify them and take the necessary steps to eliminate the NPL from the industry. However empirical studies show that there is an adverse effect of NPL on the profitability of banks in all over the world. Following are some quotes from the article related to NPL. ??hinkey (1991) stated that the bank's lending policy has a significant influence on NPL. Before the lending decision banks need to evaluate the probability of default along with cost and benefit analysis. ??eddy (2004) argues about the negative consequences of NPL that leads the banks to incur additional costs on non-operative assets that affect bank's profitability along with capital adequacy which ultimately restrain the bank from increasing their capital base. ??ohanty (2006) explores the negative impact of NPL resulting from the financial risk which affects the standard of living and also reduces the profitability of banks thus hinder economic development due to this crisis. ??dhikary (2007) on his research paper found that the banking sector of our country greatly affected by the large amount of NPL which continuously influences the economic development. According to him, the main factors responsible for the massive growth of NPL are-

## 3 1.1) Background of the Study

angladesh being a developing country depends heavily on the banking industry for smooth financial intermediation. Banks thus contribute to the development of the economy through effective and efficient lending. However, our banking sector currently facing the acute problem of NPL as a sign of ineffective lending practices and day by day the problem increases although many reform measures have been carried out. As the name suggests,

non-performing loans are irregular loans from which interest and principal amount becomes due for a specific period. The increasing amount of NPL threatens the financial performance of the banks especially the SCBs. In state-owned commercial banks the impact of NPL is in an alarming situation. NPL not only reduce the bank's profit but also the capacity of lending by reducing bankable assets. Depositors and investors started losing faith over the bank as they feel insecure of getting back their invested money with an expected return. Increasing trends of B NPL also diminishes the international image of our banking industry as well.

### 4 1.2) Objectives of the Study

a. Examining the significance of NPL on the profitability of banks in Bangladesh. b. Explore the relationship among variables of the study. c. Find out the root causes of NPL along with their possible adverse impact on the banking industry. d. Recommend some possible initiatives to control the adverse effects of NPL.

### 5 1.3) Limitations of the Study

This study considers only 21 years data to draw inference due to unavailability of data before the year 1997 and after the year 2017. lack of effective monitoring & supervision, political pressure, weak legal infrastructure, and ineffective NPL recovery strategies. ??hemraj & Pasha (2009) conducted an econometric model based study about NPL in Guyana that reflects an inverse relationship of GDP with the volume of NPL. The study results recommended that a progress in country's GDP contribute to decreasing the NPL. ??arim et al. (2010) in their study shows the relationship between NPL and bank efficiency in Malaysia and Singapore by using the Tobit regression model. The outcome stated that higher NPL reduces cost efficiency and also the lower cost efficiency increases NPL and profitability.

Podder (2012) found NPL, Advance/Deposit ratio, Total Asset, Equity/Total Asset ratio as some prominent determinants of profitability of banks during the period 2001-2010 observed on 30 PCBs in Bangladesh. Lata (2015) has analyzed time series data and concluded that NPL is one of the foremost factors that influence banks profitability and it has a considerable negative impact on Net Interest Income of State-owned Commercial Banks in Bangladesh.

Nsobilla ??2015) has investigated the effect of NPL on financial performance. Secondary data was collected from six selected rural Banks of Ghana for the period of 2004-2013. Applying OLS model, it discovers that the NPL, cost-income ratio, loan recovered and total revenue variables are found statistically significant on ROA. Adebisi & Matthew (2015) confirm that the first model of their study revealed there is no significant association between the NPL and ROA of the Banks in Nigeria. The shareholder's return is affected as the second model showed that there is a connection between the NPL and Return on Equity (ROE) of Banks in Nigeria. ??ussain & Ahamed (2015) in their study based on data for the period of 2012-2016 on top 15 conventional PCBs in Bangladesh and applying fixed effect panel data regression analysis explores that NPL, TIN, NII, OPEX, CAP, SIZE, DPST variables are significant to explain ROA. Bhattarai (2016) has examined the effect of NPL on the profitability of Nepalese commercial banks and found that the NPL ratio has a negative effect on ROA whereas NPL ratio has a positive effect on ROE. Kiran and Jones (2016) have discovered the effect of NPL on the profitability of banks. The study confirms that except for SBI all other banks show a negative connection between their gross NPL and net income.

Mondal (2016) in a study using descriptive statistics, correlation analysis, granger-causality and III. ??016) investigated the effect of NPLR and other determinants on the financial performance of commercial banks in the Malawian. The study concludes that NPLR, cost efficiency ratios, and average lending interest rate had a significant effect on the performance of banks.

## 6 Methodology of the Study

Akter and Roy (2017) found the negative impact of NPL on profitability (Net Interest Margin). Moreover, Net Profit Margin found also negatively influenced by the NPL as well while considering 30 banks data of Bangladesh for the year 2008 to 2013.

Balango & Rao K. (2017) investigated that there is a significant association between profitability and the amount of NPL. The results of the analysis stated that NPL has a negative and significant effect on ROA while CAR has a positive and relatively insignificant effect on ROA of commercial banks in Ethiopia.

Matin ( ??017)in his study applying The Feasible Generalized Least Squares(FGLS) model for panel data on 47 commercial banks of Bangladesh during the period 2010-15 found that NPL, loan loss provisions, bank size, cost efficiency, and liquidity had a significant negative effect on ROA. Islam & Rana ( 2017) in their study considering data period 2005-10 and using panel data regression model found NPL and operating expenses have a significant effect on ROA. Results also have shown that elevated NPL may lead to less profit due to the provision of classified loans. Kingu et al. (2018) in their study examined the impact of NPL on bank's profitability using information asymmetry theory and bad management hypothesis. The study establishes that occurrence of NPL is negatively related to the level of profitability in commercial banks of Tanzania. Non-stationary variables are very much unpredictable since their mean, variance and covariance changes over time. So, to conduct a good forecast, affirmation of the stationarity of variables must be addressed at the outset of the estimation procedure.

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In our study, we will conduct widely used Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) Test of unit root.

## 7 ii. Tests of Cointegration

Tests of cointegration discover the nature of associations between sets of variables. Economic theory repeatedly suggests long-term relationship among various economic variables. Although those variables can be derived from each other on a short term basis. Tests of cointegration guided us how to

## 8 g) Operational Method

Throughout the study, we have used STATA 14.2 software for data analysis and result interpretation. However, MS-Excel of Microsoft Office 2007 software is also used in limited scale for data preparation only.

## 9 IV.

## 10 Data Analysis, Results & Findings

While examining Augmented Dickey-Fuller (ADF) unit root test, we have to formulate the following hypothesis:  $H_0$  : Variable is not stationary/ Variable has unit root  $H_1$ : Variable is stationary/ Variable has no unit root. Here is the result using STATA 14.2: iv. Ordinary Least Square (OLS) Method

Ordinary least square (OLS) is a method for estimating the unknown parameters in a linear regression model. OLS identifies the parameters of a linear function by using the principle of least squares. In this study, we have applied OLS to identify the impact of explanatory variables on our target variable.

## 11 4.1) Augmented Dickey-Fuller (ADF) Unit Root Test

determine the said nature of associations. In this study, we will perform commonly used Johansen Cointegration test.

## 12 iii. Vector Auto Regression (VAR) Model

Empirically we have seen that the Vector auto regression (VAR) model has treated as one of the most flourishing, flexible, and easy to use models used for examination of multivariate time series. The VAR model has to be especially helpful for telling the dynamic behavior of economic and financial time series. Findings: Variables are integrated at order one:  $I(1)$

In the case of Phillips-Perron (PP) unit root test, we also have to design the following hypothesis:  $H_0$  : Variable is not stationary/ Variable has unit root  $H_1$ : Variable is stationary/ Variable has no unit root.

Here is the result using STATA 14.2:

From the table-1, we have found that all the variable's t-statistics is less than the critical values at level. So, here we cannot reject  $H_0$ , rather we accept the  $H_0$  that is the variables are not stationary at their levels. But at their first difference values, all the variables become stationary since t-statics of the variables is greater than the critical values. So, here we can reject the  $H_0$  and accept the  $H_1$  that is the variables are stationary at their first differences. So, both the stationarity test robust our decision that all the variables after first difference become integrated at order one:  $I(1)$  and ready for further analysis.

## 13 4.2) Phillips-Perron (PP) Unit Root Test

After the stationarity test, we are likely to have three outcomes: 1. Variables are integrated at their level that is  $I(0)$ , 2. Variables are integrated at their first difference:  $I(1)$  and 3. Variables are integrated at different orders:  $I(0)$  and  $I(1)$ .

For the first scenario no need to perform any sort of cointegration tests. In case of third scenario bound test is appropriate for checking cointegration. For scenario two, Johansen Cointegration test and some other tests are appropriate and widely applied. In our study, variables are found stationary at their first difference, so Johansen Cointegration test has been adopted for checking whether there is long-run equilibrium relationship or short-run dynamic relationship exist among variables or not.

The following hypothesis needs to be formulated:  $H_0$  : There is no cointegration equation among variables  $H_1$ :  $H_0$  is not true From the table-2, we have seen that at the level all the variable's t-statistics is less than the critical values. So, here we cannot reject  $H_0$ , rather we accept the  $H_0$  that is at their levels the variables are not stationary. But we see that after first differencing, all the variables become stationary since the t-statistics of variables is greater than the critical values. So, here we can reject the  $H_0$  and accept the  $H_1$  that is the variables are stationary at their first differences.

## 14 4.3) Johansen Cointegration Test

We have obtained the results of Johansen Cointegration Test: ( )

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The previous section confirms that there is no long-run equilibrium relationship exists among the variables. So, here we are unable to conduct the Vector Error Correction Model (VECM) rather the Vector Auto Regression (VAR) model would be appropriate to investigate the short-run causal relationship. The VAR model can be constructed if the variables are integrated at their first difference and not co integrated. Our previous analysis and results confirms that there is no cointegration and variables are integrated at I (1), so we can now run the VAR model in our study.

Here, the decision rule is if the Trace Statistics/ Max Statistics  $> 5\%$  critical value then we can reject the null hypothesis and accept the alternative hypothesis. But if the Trace Statistics/ Max Statistics  $< 5\%$  critical value then we fail to reject the null hypothesis. The cointegration test results are furnished in Table-3 and 4. The results tell us both the trace and max statistics is less than  $5\%$  critical value. So, we cannot reject the null hypothesis. So there is no cointegration equation exists among the variables meaning that there is no long-run equilibrium relationship exists among the variables.

## 16 4.4) Vector Auto Regression (VAR) Analysis

Here is the results of the VAR model using STATA 14.2. Optimum lag lengths selection criteria the suggests us to take lag length as 1. From the above results and discussion, we can conclude that from NPLR to ROA there exists independent causality. From CAR to ROA there is also independent causality exist. From PMR to ROA independent causality also exists. In case of NPLR to CAR unidirectional causality found and from PMR to CAR we have seen unidirectional causality as well. While NPLR to PMR shows bidirectional causality at  $10\%$  significant level.

## 17 Lagrange-multiplier test:

This test confirms that whether there is autocorrelation at lag order exists or not. Here is the hypothesis:  $H_0$  : No autocorrelation at lag order  $H_1$  : Autocorrelation at lag order Here, the probability value is higher than  $5\%$ . So, we cannot reject the null hypothesis rather we accept the null hypothesis that is there is no autocorrelation at lag order.

## 18 4.6) Diagnostic Checking of VAR Model

## 19 4.5) Granger Causality Wald Test

Jarque-Bera test: This test measures whether the residuals are normally distributed or not. From the outcome shown in Table -12, we obtained all the individual equation has the probability value more than  $5\%$  stated that residuals are normally distributed and as a whole, the p-value is also more than  $5\%$  that also confirms the entire model's residuals are normally distributed.

## 20 Eigenvalue Stability condition:

Table-13 shows that all the eigenvalues lie inside the unit circle meaning that VAR model satisfies the stability condition.

So, the VAR model satisfies normality of residuals, the stability of eigenvalue and has no autocorrelation which affirms the model as a whole is a good one. The goodness of fit, R square stated that the explanatory variables together explain about  $58.40\%$  variations of the dependent variable. The value of adjusted R square confirms  $51.06\%$  variation in ROA is explained by variations in independent variables. The pvalue which is  $0.16\%$  only affirms the overall significance of the model at  $1\%$  confidence level. The coefficient of the NPLR is  $-0.0218$ , indicating that a one percent increases in NPLR will decrease the ROA by  $0.0218$  percent. Likewise, one percent increase in PMR will increase the ROA by  $0.0136$  percent. Both the variables are significant at  $5\%$  level of confidence. On the other hand, the p-value of CAR is more than  $5\%$ , so this variable has no significant impact on ROA.

## 21 4.7) OLS Regression Analysis

The diagnostic tests of OLS, verify the validity of the inference by checking the existence of multicollinearity, serial or auto-correlation, heteroscedasticity and normality of population distribution.

## 22 Multicollinearity Test

Multicollinearity refers to a condition where two or more independent variables in a multiple regression model are highly related to each other. Here, we test VIF (Variance Inflation Factor) for multicollinearity checking.

## 23 Auto Correlation Test

Autocorrelation indicates the degree of connection between a given time series and a lagged version of itself over consecutive time intervals. We will go with the following autocorrelation tests:  $H_0$  : There is no autocorrelation

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H 1 : There is autocorrelation Both Durbin's alternative and Breusch-Godfrey LM test for autocorrelation reveals the p-value is higher than 5%. So, here we fail to reject the null hypothesis that is there is no autocorrelation exists which is desirable.

Heteroscedasticity Test: For testing heteroscedasticity, here we have applied the Breusch -Pagan/Cook - Weisberg test for heteroskedasticity. H 0 : The residuals are homoscedastic H 1 : The residuals are heteroscedastic

## 24 Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Here from the Table-15, we have the scores of VIF of all the independent variables. The scores all are below 5, implying that there is no presence of multicollinearity among the explanatory variables.

## 25 4.8) Diagnostic Tests of OLS Method

Shapiro-Wilk W test for normal data ( )

## 26 C

Table-18 tells us residuals denoted as variable U has the p-value more than 5% implying the failure of rejection of the null hypothesis. So, here we accept the 0 that is the error terms are normally distributed which is also an indicator of a good model.

## 27 V.

Causes & Effects of NPL Corruption: One of the major reasons behind increasing the NPL in the banking industry is the involvement of the corrupted person in sanctioning and disbursing loans. If we recall the case of the BASIC bank, it turns into a bad bank through the corruption of top management. Lack of Monitoring: Sometimes performing loan becomes defaulted due to lack of monitoring. If the monitoring system was good, and proper action was taken from the beginning period when the bank comes to know about the loan to be defaulted, the NPL amount wouldn't be as large as it is now. Borrower Selection: A loan is considered as a bad loan from the beginning if it is provided to the wrong borrower without correctly evaluating their information. There are many borrowers who take the loan from banks by using false documents. Political Influences: It works in two ways-Firstly, while bank is sanctioning the loans and secondly interfering when the bank takes steps against the bad loan. Lengthy Recovery Procedure: If the recovery procedure through releasing collateral becomes difficult and legal process consume more time then banks have no choice but to keep the NPL forcefully in the loan portfolio. Repetition of Rescheduling: Rescheduling of loans is not the ultimate solution of NPL problem. It rather increases NPL when the bank applies it repeatedly for the nondeserving loan which ultimately encourages the default culture.

Lending above the Exposure Limit: Crossing lending exposure above the prescribed limit by BB to a single borrower create huge NPL as the client become defaulter thus ruin the loan portfolio as well.

Recapitalization Facility: When any state-owned bank faces financial difficulties and capital shortage, government help them through injecting capital from taxpayer's money. These practices de-motivated the govt. banks to earn money on their own as they think govt. will always be there for them supporting at the time of distress all the time.

Unskilled Personnel: In our banking industry many bankers have a little knowledge about the risk assessment factors that they should apply while measuring the risk associated with loans and advances.

Failure of Business of the Borrower: Due to lack of business knowledge, experience in the field of business or other reason borrower's business become fail which makes them unable to repay the loan to the banks.

Willful Default by the Borrower: Most of the people of our country tend repaying the money as late as possible. When this type of borrower borrows money from the bank they have the intension not to repay the loan at all or to pay as late as possible.

Poor Management Quality of Borrowers: If the management quality of the borrower's company found to be weak, the risk of loan default increases.

## 28 Lack of Proper Action Taken against Defaulters:

In our country loans are hardly monitored in due time as a result banks remain unaware of the defaulted loan, even if they come to know it. Delay in taking action or proper legal action against borrower keep the defaulted loan in the bank's portfolio for a long time results from an increase in the aggregate NPL. Adverse Economic Conditions: Some borrowers are not willful defaulters rather they fail to repay loans for some adverse economic factors that affect their business such as recession, political instability, increasing inflation, etc.  $\chi^2(1) = 1.98$  Prob >  $\chi^2 = 0.1593$

The chi-square value is 1.98 and the corresponding p-value is 0.1593 which is more than 5%. So, here we cannot reject the null hypothesis rather we accept the null hypothesis that is the error terms are homoscedastic which is also a good sign for the model.

### 29 Normality Test

Normality tests are used to decide whether a data set is well-modeled by a normal distribution. We have applied here Shapiro-Wilk test for checking the normality.  $H_0$  : Residuals (U) are normally distributed  $H_1$  : Residuals (U) are not normally distributed

### 30 5.1) Root Causes of Non-Performing Loan in Bangladesh

The non-performing loan has become the main concern for the banking industry in recent time. Many economist and analyst found that the main reason behind recent bank failure, continuous loss of SCBs and banking scams all are arises from the adverse impact of NPL. In order to find the solution to the problem the study discover some of the root causes of NPL in the banking industry which are discussed below: Delay in Assessing and Distributing Loans: Due to delay in assessing or disbursing loan banks failed to provide money to business enterprises at the time when they need it most. As a result, the business fails as they suffer from the shortage of funds.

Improper Documentation: When the loan becomes defaulted, the bank fails to track the borrower as they didn't maintain proper documentation at the beginning of loan contact thus make it difficult to take proper action against the defaulters.

### 31 Lack of Applicability of Regulation:

There are several regulation and guidelines for managing nonperforming loan such as The Bankruptcy Act, Money Loan Court Act, etc. but in practice, they are not followed entirely and efficiently.

This study finds some of the major adverse effects of NPL which are given below: Reduce Capacity to Provide New Loans: Honest borrowers are deprived of getting the new and adequate amount of loans as NPL reduces the investable funds of the bank.

Shrinking Profits: NPL reduces interest income with the principal amount of loan. Again banks need to maintain the provision for NPL which ultimately reduces net income.

Rise in Lending Rates: Due to NPL banks lose interest income, but they need to maintain operating costs to run their business smoothly. As an incidence of that bank further increases lending rates for new loans.

Deteriorate Economic Growth: Non-performing loan requires provision and to meet this requirement banks have to cut off their profit with a vast amount of provisioning requirement. Due to huge profit cuts and the rising cost of capital resulting from NPL the investment opportunity of banks decreases, therefore, upsets the economic development.

Decreases Reinvestment of Fund: NPL blocks the money of banks by the defaulters and restrains the bank from reinvesting that fund that they could have invested in the more profitable sector.

Credit Crunch: This situation arises when due to the increase of NPL bank failed to provide sufficient fund at the previous interest rate to new loans.

Hampers Performing Loans: It also negatively affect the performing loans. From the bad experience of NPL, banks forced to follow the restrictive lending policy which ultimately adversely affects the performing loans also.

Disruption in Money Cycle: Due to NPL banks failed to provide the adequate amount of return to its depositors resulting in the withdrawal of funds by the depositor that ultimately cause the shortage of funds. Thus disruption in money cycle emerged due to NPL.

Decreases Employment Opportunity: Due to huge NPL, banks face difficulties to expand their business hence decreases the employment opportunity. Due to this problem prospective businesses also shrink their expansion as they don't get sufficient funds. Increase the Cost of Banks: As banks need to perform several NPL management strategies, more supervision and strong monitoring required which in turns increases the overall costs of the bank.

Reduce the Capital Adequacy Ratio: NPL decreases the capital by reducing profit and also the increasing NPL leads in increasing risk-weighted assets thus eventually ruin the capital adequacy ratio.

### 32 VI.

### 33 Recommendations & Conclusion

Non-performing loan as a major problem of the banking industry should be treated more seriously by all the banks in the industry. This study found some initiatives to control the adverse impact of NPL on the bank's performance. The key initiatives are recommended below to reduce NPL:

Lessen the Interference of Political Parties: BB should apply the quasi-judicial power to prevent corrupted parties from becoming the BoDs of a bank even if the government appoints any.

Ensuring Accountability of Employees: Employees associated with loan sanctioning and disbursement procedure should be accountable for his/her work. Banks should monitor the employees within the office so that any employee cannot fraudulently provide any loan to any false customer.

Reducing Recapitalization: The Govt. should stop recapitalization facilities from the taxpayer's money as it establishes poor professionalism and accountability among the bank's personnel.

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## 34 Strictly Follow Rules and Regulation Provided by BB for NPL Management:

To prevent the risk of default, banks should strictly follow guidelines and regulations provided by BB time to time.

Intensify the Internal Risk Management of Banks: Banks should maintain the database for large credit to identify vulnerabilities associated with a large amount of credit disbursement, default and recovery.

Proper Lending Practices: Significant amount of loans should be disbursed to the productive sector so that the

## 35 5.2) Adverse effects of Non-Performing Loan in Bangladesh

Adopting Improved Loan Recovery Procedure: Collateral collected against loans should regularly be checked whether it has sufficient value or legal ownership so that no delay occurs while selling them for recovery.

Year 2019 ( )C

borrowers can have the ability to repay the loan on time.

To avoid the risk associated with lending large amount, banks should provide loan by syndication.

Judicial Use of Rescheduling and Write-off: Bank should provide rescheduling facility only to those who has proper justification and follows the guidelines for rescheduling appropriately.

Punishing Willful Defaulters through Legal Proceedings:

The prevailing corruption practices in our banking industry should be controlled through applying legal action convicted defaulters and corrupted persons as quickly as possible.

Structured and Regular Monitoring: Bank should periodically monitor its outstanding loans and arrange visits and making reports by the officials regularly to ensure proper utilization of funds.

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Target Variable	Definition	
ROA	A very common and widely used indicator of profitability. Return on Assets (ROA) stated as a percentage of net income to total assets of a bank. Hence indicate the earning efficiency of a bank.	
Explanatory Variables		
NPLR	Non-Performing Loan Ratio (NPLR) is a relative measure of non-performing loan to its total loan outstanding as stated as percentage as well. Measuring the assets quality of a bank.	
CAR PMR	CAR is stands for Capital Adequacy Ratio. It also stated as percentage of capital to total risk weighted assets of a bank therefore measures the adequacy of capital. Provision Maintenance Ratio (PMR) is denoted as a relative measure of Loan Provision Maintained to Loan Provision Required by the banks. Thus this ratio can be used as a proxy of management efficiency as it is a measure of compliance issue directed by central bank.	Year 2019

e) Model Specification: In this study, Ordinary Least Square Regression Analysis has been applied to find out the impact of non-performing loan ratio on the profitability of banks in Bangladesh. The following model has been framed in the light of OLS, which assumed that the association among the variables is linear.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + u$$

Y= Return on Assets (ROA)

$\beta_0$ = Constant term  $X_1$ = Non-Performing Loan Ratio (NPLR)

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$X_2$ = Capital Adequacy Ratio (CAR).

$X_3$ = Provision Maintenance Ratio (PMR)

u = Disturbance term

f) Techniques of Data Analysis

i. Tests of Stationarity

To avoid foul or spurious regression, Test of Stationarity is an obvious issue while working with time series data. Stationarity or Unit root test simply a statistical procedure to confirm whether the time series variables are non-stationary or possess unit root or not.

[Note: d)]

Figure 1:



1

Variables	t-statistics	At Level Critical Values	First Difference t-statistics	Critical Values	Remarks
roa	-1.415	-4.380* -3.600**	-4.931	-4.380* -3.600**	I(1)
nplr	-0.216	-4.380* -3.600**	-4.253	-4.380* -3.600**	I(1)
car	-3.177	-4.380* -3.600**	-5.349	-4.380* -3.600**	I(1)
pmr	-1.881	-4.380* -3.600**	-4.275	-4.380* -3.600**	I(1)

[Note: Note: \* and \*\* denotes Significance at 1% & 5% level, respectively. Decision Rules: When the t-statistics > Critical Values: Reject H<sub>0</sub> t-statistics < Critical Values: Fail to reject H<sub>0</sub> Impact of Non-Performing Loan on Profitability of Banks in Bangladesh: A Study from 1997 to 2017 © 2019 Global Journals 1 16 Global Journal of Management and Business Research Volume XIX Issue I Version I Year 2019 ( ) C]

Figure 2: Table 1 :

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Variables	t-statistics	At Level Critical Values	First Difference t-statistics	Critical Values	Remarks
roa	-1.363	-4.380* -3.600**	-5.009	-4.380* -3.600**	I(1)
nplr	-0.413	-4.380* -3.600**	-4.667	-4.380* -3.600**	I(1)
car	-3.157	-4.380* -3.600**	-5.536	-4.380* -3.600**	I(1)
pmr	-2.051	-4.380* -3.600**	-4.278	-4.380* -3.600**	I(1)

[Note: Note: \* and \*\* denotes Significance at 1% & 5% level, respectively. Decision Rules: When the t-statistics > Critical Values: Reject H<sub>0</sub> t-statistics < Critical Values: Fail to reject H<sub>0</sub>]

Figure 3: Table 2 :

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Maximum Rank	Parms	LL	Eigenvalue	Trace Statistics	5% Critical Value
0	4	208.73043	.	29.2755*	47.21
1	11	216.44679	0.53774	13.8428	29.68
2	16	219.60958	0.27114	7.5172	15.41
3	19	221.79243	0.19610	3.1515	3.76
4	20	223.3682	0.14579		

Figure 4: Table 3 :

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Max imum Rank	Parms	LL	Eigenvalue	Max Statistics	5% Value	Critical
0	4	208.73043	.	15.4327	27.07	
1	11	216.44679	0.53774	6.3256	20.97	
2	16	219.60958	0.27114	4.3657	14.07	
3	19	221.79243	0.19610	3.1515	3.76	
4	20	223.3682	0.14579			

Figure 5: Table 4 :

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Vector Auto Regression					
Sample: 1998 -2017		Number of obs = 20			
Log likelihood = 223.3682		AIC		= -	
				20.33682	
FPE		= 1.81e-14		HQIC = -20.14244	
Det (Sigma_ml) = 2.34e-15				SBIC = -19.34109	
Equation	Parms	RMSE	R-sq	chi2	P>chi2
roa	5	.003371	0.5487	24.3212	0.0001
nplr	5	.026438	0.9582	458.8866	0.0000
car	5	.011392	0.7342	55.24962	0.0000
pmr	5	.11875	0.7692	66.67153	0.0000
roa equation					

Figure 6: Table 5 :

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roa	L1.	Coef.	Std. Err.	.2536774	z	P> z	
nplr	L1.	.4766956	.0096229	.0735225	1.88	0.060	
car	L1.	-.0133143			-	0.166	
		-.0753189			1.38	0.306	
					-		
					1.02		
pmr							
L1.	__cons	.0042303	.0067425	.0060914	Table 7: (Outcome of NPLR Equation)		
nplr		.0101505			0.63	0.530	1.67
equation		Coef.			0.096	S	
roa	L1.	-1.073191					
nplr	L1.	.9414219					
car	L1.	-.4489267					
pmr							
L1.		.0850605	.0528757		1.61	0.108	
__cons		-.0154319	.0477695		-	0.747	
					0.32		

Figure 7: Table 6 :

8

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
roa						
L1.	-.5409454	.8572421	-0.63	0.528	-2.221109	1.139218
nplr						
L1.	-.0705466	.0325181	-2.17	0.030	-.134281	-.0068122
car						
L1.	.0518666	.2484515	0.21	0.835	-.4350895	.5388226
pmr						
L1.	.0492718	.0227846	2.16	0.031	.0046148	.0939288
__cons	.0686555	.0205843	3.34	0.001	.028311	.1089999

Figure 8: Table 8 :

9

pmr equation

roa

L1.	-3.066761	8.935532	-0.34	0.731	-20.58008	14.44656
-----	-----------	----------	-------	-------	-----------	----------

nplr

L1.	-.5884714	.3389555	-1.74	0.083	-1.252812	.0758692
-----	-----------	----------	-------	-------	-----------	----------

car

L1.	-1.342672	2.589755	-0.52	0.604	-6.418498	3.733153
-----	-----------	----------	-------	-------	-----------	----------

pmr

L1.	.7796231	.237497	3.28	0.001	.3141377	1.245109
-----	----------	---------	------	-------	----------	----------

\_\_cons

	.4247128	.2145619	1.98	0.048	.0041792	.8452464
--	----------	----------	------	-------	----------	----------

Figure 9: Table 9 :

10

Equation	Excluded	chi2	df	Prob > chi2
roa	nplr	1.9144	1	0.166
roa	car	1.0495	1	0.306
roa	pmr	.39365	1	0.530
roa	ALL	2.1333	3	0.545
nplr	roa	.29102	1	0.590
nplr	car	.60623	1	0.436
nplr	pmr	2.5879	1	0.108
nplr	ALL	3.1262	3	0.373
car	roa	.3982	1	0.528
car	nplr	4.7065	1	0.030
car	pmr	4.6764	1	0.031
car	ALL	11.877	3	0.008
pmr	roa	.11779	1	0.731
pmr	nplr	3.0142	1	0.083
pmr	car	.2688	1	0.604
pmr	ALL	3.7435	3	0.291

Figure 10: Table 10 :

12

Equation	chi2	df	Prob > chi2
roa	0.176	2	0.91574
nplr	1.761	2	0.41454
car	1.352	2	0.50871
pmr	0.972	2	0.61506
ALL	4.261	8	0.83283

Figure 11: Table 12 :

## Impact of Non-Performing Loan on Profitability of Banks in Bangladesh: A Study from 1997 to

Year

2019

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Volume

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Model

SS .000231947

df 3 17 20 Table 14: (Outcome of OLS Analysis) MS .00007

Residual

Total

.000165223

roa

.00039717

Coef.

nplr

-.0218155

.0083497

car

-.1134578

.0735258

pmr

.013699

.0063004

\_cons

.0116502

.0058046

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Figure 12: Table 13 :

Variable

VIF 1/VIF

car pmr nplr Mean VIF

4.22 0.237147

3.82 0.261829

2.08 0.480961

3.37

Durbin's alternative test for autocorrelation Table 16: (Outcome of Durbin's alternative test for autocorrela

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Figure 13: Table 15 :

**18**

Variable	Obs	W	V	z	Prob>z
U	21	0.92263	1.896	1.293	0.09794

Figure 14: Table 18 :

Client Profile & Documentation: For safeguarding bank's interest bank officials should properly maintain loan documentation and collect sufficient data of borrower time to time and update them in a regular fashion.

### .1 Incentive and Training Programs for Employees:

Employees should get incentive based on their performance for achieving recovery target and should get training facilities.

We know the saying "prevention is better than cure". Similarly, for NPL banks need to take some preventive measures to clean up the ever growing amount of NPL in the industry. The borrower should be motivated to repay the loan by providing them some benefits such as exemption, monetary incentives, etc. The above mentioned initiatives if practiced accordingly and if govt. and central bank assists the banks of our country, soon the adverse effect of NPL can be eliminated from the industry. The study shows different causes, effects, analysis and initiatives regarding NPL. Banks should consider all the causes and the consequences of NPL and develop effective NPL management tools to reduce it so that the banks can ensure maximum dedication on the development of the banking industry and hence can contribute to the economic development of the country.

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