

# 1 Impact of Non-Performing Loan on Profitability of Banks in 2 Bangladesh: A Study from 1997 to 2017

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## 7 **Abstract**

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

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

## 22 **1 II.**

## 23 **2 Review of Related Literature**

24 Non-performing loan arises from various sources. Banks should identify them and take the necessary steps to  
25 eliminate the NPL from the industry. However empirical studies show that there is an adverse effect of NPL on the  
26 profitability of banks in all over the world. Following are some quotes from the article related to NPL. ??hinkey  
27 (1991) stated that the bank's lending policy has a significant influence on NPL. Before the lending decision banks  
28 need to evaluate the probability of default along with cost and benefit analysis. ??eddy (2004) argues about the  
29 negative consequences of NPL that leads the banks to incur additional costs on non-operative assets that affect  
30 bank's profitability along with capital adequacy which ultimately restrain the bank from increasing their capital  
31 base. ??ohanty (2006) explores the negative impact of NPL resulting from the financial risk which affects the  
32 standard of living and also reduces the profitability of banks thus hinder economic development due to this crisis.  
33 ??dhikary (2007) on his research paper found that the banking sector of our country greatly affected by the large  
34 amount of NPL which continuously influences the economic development. According to him, the main factors  
35 responsible for the massive growth of NPL are-

## 36 **3 1.1) Background of the Study**

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

## 6 METHODOLOGY OF THE STUDY

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

### 4 1.2) Objectives of the Study

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

### 5 1.3) Limitations of the Study

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

60 Podder (2012) found NPL, Advance/Deposit ratio, Total Asset, Equity/Total Asset ratio as some prominent  
61 determinants of profitability of banks during the period 2001-2010 observed on 30 PCBs in Bangladesh. Lata  
62 (2015) has analyzed time series data and concluded that NPL is one of the foremost factors that influence banks  
63 profitability and it has a considerable negative impact on Net Interest Income of State-owned Commercial Banks  
64 in Bangladesh.

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

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

## 6 Methodology of the Study

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

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

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

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

## 101 **7 ii. Tests of Cointegration**

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

## 105 **8 g) Operational Method**

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

## 108 **9 IV.**

## 109 **10 Data Analysis, Results & Findings**

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

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

## 116 **11 4.1) Augmented Dickey-Fuller (ADF) Unit Root Test**

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

## 119 **12 iii. Vector Auto Regression (VAR) Model**

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

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

126 Here is the result using STATA 14.2:

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

## 133 **13 4.2) Phillips-Perron (PP) Unit Root Test**

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

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

142 The following hypothesis needs to be formulated:  $H_0$  : There is no cointegration equation among variables  $H$   
143 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  
144 critical values. So, here we cannot reject  $H_0$ , rather we accept the  $H_0$  that is at their levels the variables are  
145 not stationary. But we see that after first differencing, all the variables become stationary since the t-statistics  
146 of variables is greater than the critical values. So, here we can reject the  $H_0$  and accept the  $H_1$  that is the  
147 variables are stationary at their first differences.

## 148 **14 4.3) Johansen Cointegration Test**

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

### 15 C

150 The previous section confirms that there is no long-run equilibrium relationship exists among the variables. So, 151 here we are unable to conduct the Vector Error Correction Model (VECM) rather the Vector Auto Regression 152 (VAR) model would be appropriate to investigate the short-run causal relationship. The VAR model can be 153 constructed if the variables are integrated at their first difference and not co integrated. Our previous analysis 154 and results confirms that there is no cointegration and variables are integrated at I (1), so we can now run the 155 VAR model in our study.

156 Here, the decision rule is if the Trace Statistics/ Max Statistics  $> 5\%$  critical value then we can reject the 157 null hypothesis and accept the alternative hypothesis. But if the Trace Statistics/ Max Statistics  $< 5\%$  critical 158 value then we fail to reject the null hypothesis. The cointegration test results are furnished in Table-3 and 4. 159 The results tell us both the trace and max statistics is less than 5% critical value. So, we cannot reject the null 160 hypothesis. So there is no cointegration equation exists among the variables meaning that there is no long-run 161 equilibrium relationship exists among the variables.

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

162 Here is the results of the VAR model using STATA 14.2. Optimum lag lengths selection criteria the suggests us 163 to take lag length as 1. From the above results and discussion, we can conclude that from NPLR to ROA there 164 exists independent causality. From CAR to ROA there is also independent causality exist. From PMR to ROA 165 independent causality also exists. In case of NPLR to CAR unidirectional causality found and from PMR to 166 CAR we have seen unidirectional causality as well. While NPLR to PMR shows bidirectional causality at 10% 167 significant level.

### 17 Lagrange-multiplier test:

170 This test confirms that whether there is autocorrelation at lag order exists or not. Here is the hypothesis: H 0 : 171 No autocorrelation at lag order H 1 : Autocorrelation at lag order Here, the probability value is higher than 5%. 172 So, we cannot reject the null hypothesis rather we accept the null hypothesis that is there is no autocorrelation 173 at lag order.

### 175 18 4.6) Diagnostic Checking of VAR Model

### 176 19 4.5) Granger Causality Wald Test

177 Jarque-Bera test: This test measures whether the residuals are normally distributed or not. From the outcome 178 shown in Table -12, we obtained all the individual equation has the probability value more than 5% stated that 179 residuals are normally distributed and as a whole, the p-value is also more than 5% that also confirms the entire 180 model's residuals are normally distributed.

### 181 20 Eigenvalue Stability condition:

182 Table-13 shows that all the eigenvalues lie inside the unit circle meaning that VAR model satisfies the stability 183 condition.

184 So, the VAR model satisfies normality of residuals, the stability of eigenvalue and has no autocorrelation which 185 affirms the model as a whole is a good one. The goodness of fit, R square stated that the explanatory variables 186 together explain about 58.40% variations of the dependent variable. The value of adjusted R square confirms 187 51.06% variation in ROA is explained by variations in independent variables. The pvalue which is 0.16% only 188 affirms the overall significance of the model at 1% confidence level. The coefficient of the NPLR is -0.0218, 189 indicating that a one percent increases in NPLR will decrease the ROA by 0.0218 percent. Likewise, one percent 190 increase in PMR will increase the ROA by 0.0136 percent. Both the variables are significant at 5% level of 191 confidence. On the other hand, the p-value of CAR is more than 5%, so this variable has no significant impact 192 on ROA.

### 193 21 4.7) OLS Regression Analysis

194 The diagnostic tests of OLS, verify the validity of the inference by checking the existence of multicollinearity, 195 serial or auto-correlation, heteroscedasticity and normality of population distribution.

### 196 22 Multicollinearity Test

197 Multicollinearity refers to a condition where two or more independent variables in a multiple regression model 198 are highly related to each other. Here, we test VIF (Variance Inflation Factor) for multicollinearity checking.

### 199 23 Auto Correlation Test

200 Autocorrelation indicates the degree of connection between a given time series and a lagged version of itself over 201 consecutive time intervals. We will go with the following autocorrelation tests: H 0 : There is no autocorrelation

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

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

## 207 **24 Breusch-Pagan/Cook-Weisberg test for heteroskedasticity**

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

## 210 **25 4.8) Diagnostic Tests of OLS Method**

211 Shapiro-Wilk W test for normal data ( )

## 212 **26 C**

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

## 216 **27 V.**

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

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

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

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

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

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

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

## 246 **28 Lack of Proper Action Taken against Defaulters:**

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

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

## 256 29 Normality Test

257 Normality tests are used to decide whether a data set is well-modeled by a normal distribution. We have applied  
258 here Shapiro-Wilk test for checking the normality. H 0 : Residuals (U) are normally distributed H 1 : Residuals  
259 (U) are not normally distributed

## 260 30 5.1) Root Causes of Non-Performing Loan in Bangladesh

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

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

## 270 31 Lack of Applicability of Regulation:

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

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

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

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

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

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

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

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

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

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

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

## 299 32 VI.

## 300 33 Recommendations & Conclusion

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

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

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

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

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## 311 **34 Strictly Follow Rules and Regulation Provided by BB for 312 NPL Management:**

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

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

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

## 319 **35 5.2) Adverse effects of Non-Performing Loan in Bangladesh**

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

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

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

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

327 Punishing Willful Defaulters through Legal Proceedings:

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

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

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<sup>1</sup>

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.

$$Y = ?0 + ?1X1 t + ?2X2 t + ?3X3 t + u t$$

Y= Return on Assets (ROA)

?0= Constant term X1= Non-Performing Loan Ratio (NPLR)

(  
)  
C

X2= Capital Adequacy Ratio (CAR).

X3= Provision Maintenance Ratio (PMR)

u t= 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:

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**1**

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

[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 :

**2**

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

[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 :

**3**

Maximum Rank	Parms	LL	Eigenvalue	Trace Statistics	5% Value	Critical
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 :

4

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 :

5

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 :

---

		Coef.	Std. Err.	z	P> z
roa	L1.	.2536774			
nplr	L1.	.4766956	.0096229	1.88	0.060
car	L1.	-.0133143		-	0.166
		-.0753189		1.38	0.306
				-	
				1.02	
pmr					
L1.	_cons	.0042303	.0067425	Table 7: (Outcome of NPLR Equation)	0.63 0.530 1.67 0.096 S
nplr		.0101505			
equation		Coef.			
roa	L1.	-.1073191			
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 :

	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			
22			
Volume	Eigenvalue .8280433 + .04696056i .8280433 -.04696056i .5158688 .07765175		
XIX			
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Global Journal of Management and Business Research	Source	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	4.22	0.237147
pmr	3.82	0.261829
nplr	2.08	0.480961
Mean VIF	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 :

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

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

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

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

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