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Effects of Non-Performing Loan on Financial Performance: A Hypothetical Evaluation on All Scheduled Banks in Bangladesh

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Abstract

The goal of this study is to determine the impact of non-performing loans (NPLs) on the financial performance of all Bangladeshi listed banks. To accomplish so, the study analyzed data from the previous twenty-three years, from 1997 to 2019 in order to find out the effects of non-performing loan ratio (NPLR), capital adequacy ratio (CAR), inflation (INF) and provision maintenance ratio (PMR) on the return on asset (ROA). Researchers have attempted to investigate the primary cause of NPLs and their implications while taking into account a number of bank-specific characteristics as well as macroeconomic factor. The annual reports from Bangladesh Bank are considered for collecting data that has been examined through OLS and VAT models, along with Test of Heteroscedasticity, Test of Normal Distribution and also Unit Root Test by using STATA 11 (statistical software). By analyzing the OLS regression, it has found that all independent variables i.e. NPLR, CAR, INF and PMR are statistically noteworthy to explain the dependent variable i.e. ROA.

Keywords: Non-performing Loans, Capital Adequacy, Provision, Inflation, Financial Performance

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Introduction

Smooth and furnished banking industry plays a significant role for ensuring the sustainable development of a country like Bangladesh. Effective and productive banking lending certifies the proper development of the economy which is possible through systematic banking system. However, today's banking sectors of our country is terribly facing the problem of non-performing loan (NPL) that is recognized as an indication of inefficient and unproductive lending practices. Although there have some measures taken for reformation of banking industry day by day the problem is increasing. As per definition, non-performing loan means irregular loan wherein both interest and principle amount are not paid regularly for a particular time phase. Overall evaluation especially financial performance of banks badly disturbs due to the increasing amount of NPL in the financial industry. The scenario of NPL of state-owned commercial banks is bagger description whereas NPL of the private commercial banks is also in an alarming position. NPL does not just curtail the banks profit; further it reduces the lending capacity through lessening assets of the banks. Customers as well as investors are losing their trust over banks because they cannot feel secured of getting back of their deposited and invested money with the desired return. The disbursing process of loans by commercial

banks is normally as easy task if we make a comparison with the recovery operation of this amount. Loan recovery is a challenging and difficult work for the banks whereas day by day the amount of NPL is increasing at an alarming rate in Bangladesh. According to Baselga-Pascual et al. (2015), banks want to provide loans just to show that they have quite a good number of customers rather than considering the quality of good borrower which will lead to bankrupt. Banks financial performance and business operation are directly influenced by bad loans.

Many researchers and authors have been defined the meaning of NPL differently; among them the International Monetary Fund (IMF) defines it, as "When the payment of principal and interest of a loan had passed the due date by the period of three months or ninety days or more then the loan would fall under the non-performing loan", (Dimitrios et al., 2016). According to Tracey and Leon (2011), in spite of having a specific direction for the NPLs, banks have been responding in a different way to NPLs ratios above or below a doorstep. If NPLs are of higher than tolerable level; the doorstep has a negative effect on lending. In the economy of a country, commercial banks have been undoubtedly playing a momentous role and having the greatest involvement. According to Wandera and Kwambai (2013), in commercial banks, the main business assets are loans and advances which generate revenue for earning profit that should be managed carefully. At present commercial banks are facing huge credit risk problem because of not to disburse loans and advance in a proper place that eventually leads to shrink their profitability (Ali & Iva, 2013). Effective and efficient strategy against NPL has to be made by banks in order to improve their financial performance. According to Fleisig (1995), the main concern of any lending institution i.e. banks while giving credit is how they will manage to get their money back. This argument statement implies that there is risk involved between the lender and a borrower which is called default risk. The research helps us to determine how the financial performance of commercial banks is influenced by Nonperforming loan (NPL) with different factors i.e. both banks' some selected and microeconomic factors and also measure how the factors are correlated with the banks' financial performance as well as among themselves. The study will also facilitate us how a bank should operate its lending activities properly. The prime purpose of this research is to measure the effects of non-performing loan on financial performance of commercial banks in Bangladesh.

Literature Review & Research Gap

Non-performing loan generates from a variety of sources. Effective and efficient management of NPL is undoubtedly an important task for eliminate the significant amount of bad loan from the economy. Several study and works has been conducted on NPL around the world. Some of quotes derived from research related to the selected topic are as follows:

Berger and DeYoung (1997) used causality techniques of Granger to examine the interrelationship of the problem loan studies with the bank effectiveness literature while they discovered that incompetent management in banks leads to loan payments of poor quality, which in turn contributes to a rise in the number of bad loans or NPLs, lowering the profitability of the institution. In this light, a careful selection of potential clients should be made at the time of loan, because poor selection causes high-quality customers to be replaced with low-quality customers. As a result, the bank's loan portfolio will deteriorate, resulting in the buildup of NPLs, reduced profitability, along with capital erosion (Bofondi & Gobbi, 2003; Makri et al., 2014). Besides, Hu et al. (2004) used statistical data from 40 commercial banks from 1996 to 1999 to measure the association among ownership concentration and non-performing assets based on Taiwanese banks. The study found that when state ownership in a bank rises to 63.51 %, the percentage of non-assets falls, but it rises after that. They also discovered that the size of the bank and the proportion of nonperforming assets (NPA) have a negative association. The relation between defaulting loans and the economic efficiency of commercial banks in Italy was studied by Dongili and Zago (2005). They employed a statistical method to discover problem loans which cause financial difficulties to the commercial banks as well as to identify a substantial association between non-performing assets and the economic performance of the selected banks.

Adhikary (2006) used an econometric model to examine NPL in Guyana, which shows an inverse link between GDP and NPLs volume. The amount of NPL must be reduced in order to increase the country's GDP. According to Khemraj and Pasha (2009), high rates of NPLs are substantially connected with bank performance in growing economy. Besides, Fofack and Fofack (2005) linked banks' high accumulation of nonperforming loans (NPLs) to profitability, noting that NPLs might play a significant role in financial hardship. In addition, the ability to assess credit risk should be available to banks. This assessment must be completed either before or after the loan is granted. This measurement is undoubtedly considered as the critical step for lowering loan defaults as well as loan delinquency. In addition, Casey et al. (2009) said that adequate loan valuation is viewed as the precondition development of economy since it permits effective and convenient stream of saving and investing processes (Rahman & Jahan, 2018). The effects do not stop there; it has a wide range of repercussions. If this trend continues, the bank's ability to contribute to development will be harmed (Abd Karim et al., 2010). Furthermore, the banks are supposed to lead to the enhancement and development of the banking and economic systems. Therefore, a great level of NPLs may endanger overall stability of the banking and the financial sector (Boudriga et al., 2010). Espinoza and Prasad (2010) discovered a substantial and significant inverse link between nonperforming loans and genuine (non-oil) gross domestic output. Efficiency and previous improvement of the financial statements, including the balance sheet, were considered to be prominent among the bank's factors. A higher emphasis on directives, notably over capital adequacy ratios and liquidity buffers, as well as countercyclical provisioning, according to the research report, could assist offset the impact of macroeconomic forces on the banking industry. Economic growth, unemployment, lending rates, public debt, and management quality are the key predictors of non-performing loans throughout the Greek banking sector, according to Louzis et al. (2012).

In Ghana, Boahene et al. (2012) attempted to investigate the link between the profitability of commercial bank and its credit risk. Their research found that it had just a minor influence on profitability. Kolapo et al. (2012) investigated the influence of credit risk on the profitability of Nigerian commercial banks, finding that a growth in NPLs shrinks the bank's profitability. On the other hand, Asantey and Tengey (2014) used secondary information from four publicly traded commercial banks' annual reports of (Ecobank, GCB Bank, CAL Bank, and Agricultural Development Bank) for period of five-year from 2008 to 2013, to investigate the effects of bad loans on banks' lending ability and financial performance. The purpose of this research was to investigate the impact of poor loans on a bank's lending capabilities and net income (return on investment). The data was analyzed using Pearson correlation coefficient and OLS. At the 0.05 alpha level, the study discovered a strong negative relationship between risky debts and lending ability, as well as a strong negative relationship between bad loans and other commercial performance, as assessed by return on the investment or net income.

According to Muluwork (2016), the effects of non-performing resources assisted by non-timely credit recovery produced significant damage to the economic framework, as well as loss of trust in dishonesty, abridged customers' capability to buy, legal matters, a shortage of offensive credit gathering policy, and poor credit valuation. The research outlined a number of particular initiatives taken by bank executives to avoid a catastrophic decline and recovery from the crisis, as well as concrete recommendations for financial stability. According to the survey, bank management should provide adequate loan management education to both its clients and employees. Commercial banks must also assure that sufficient and qualified personnel are trained to carry out their responsibilities. Similarly, NPLs have a major negative effect on bank performance, according to Muluwork (2016), who concluded that bank performance improved from 2011 to 2015 due to a considerable decline in NPLs during the same period. Furthermore, commercial bank management should examine their clients' creditworthiness and implement strict loan advance regulations, according to the report. Furthermore, it was suggested that loans be given to those who are able to repay them and that moral dangers like informant bank loans and information asymmetry be mitigated in order to reduce the incidences of NPLs, which affect the profitability and position of banks by lowering interest income

and, as a result, financial performance.

According to Adebisi and Matthew (2015), the first model of the research found that there exists no substantial relationship between NPL and bank ROA in Nigeria. On the other hand, the another model revealed a link between NPL and Return on Equity (ROE) in Nigeria Banks, which has an impact on shareholder returns. Lata (2015) used time series data to conduct the study and discovered that NPL is one of the most important aspects influencing the profitability of banks, and it has a significant negative impact on Net Interest Income of Bangladesh's state-owned commercial banks. Patwary and Tasneem (2019) found that NPL, OPEX, NII, TIN, SIZE, CAP, and DPST factors are substantial to explain ROA in their study based on data from 2012 to 2016 on the Bangladeshi 15 leading conventional PCBs using fixed - effects panel data regression analysis. According to Alshatti (2015), empirical results show that the proportion of NPLs to gross credits is correlated with commercial performance, and that the percentage of facilities loss to net facilities is inversely related to financial performance, but that CAR and CI/CF have no impact on monetary performance. The report advised that credit management practices be improved by implementing relevant policies. Alexandri and Santoso (2015) investigated the impact of inner and outer banking issues on the amount of non-performing assets in an Indonesian regional development bank, and their findings revealed a positive and substantial relationship between NPA and ROA. Further, Bhattarai (2016) investigated the impact of nonperforming loans on the performance of Nepalese private banks and discovered that the NPLs rate has a inverse impact on the ROA but a positive impact on ROE. But the impact of the NPLR including other drivers on the financial results of Malawian commercial banks has been explained by Chimkono et al. (2016). Besides, it showed that NPLR, cost effectiveness ratios, and interest rate of lending all had a substantial impact on bank performance. In addition, NPLs have a negative correlation with bank performance assessed by ROE, according to Ozurumba (2016), and a rise in NPLs causes a fall in ROE. The study revealed that the impact of nonperforming loans on banks cannot be overstated, as they pose a serious threat to the banks' continued survival as corporate business organizations. Rajha (2016) then looked at the factors that influence non-performing loans in Jordanian banks, finding that economic growth and inflation have an adverse and substantial impact on non-performing loans.

Non-performing loans are a risky asset that can lead to bank insolvency and have a significant impact on the economy. Three commercial banks in Benin failed between 1998 and 1990, with NPLs accounting for 80% of the bank's portfolio. A similar scenario occurred in Cameron, where about 60 percent of the bank's loan portfolio was nonperforming, resulting in the collapse of five banks and the restriction of three others (Ugoani, 2016). NPL has a detrimental influence on profitability, according to Akter and Roy (2017). (Net Interest Margin). Furthermore, when 30 Bangladeshi banks' data from 2008 to 2013 was examined, the NPL was determined to have a negative impact on net profit margin. Besides, the influence of the NPL on bank profitability was explored by Kingu et al. (2018), which included the theory of information asymmetry and the poor hypothesis of management. The study shows the prevalence of NPL in the Tanzanian commercial bank is negatively linked to the level of profitability. Targeted areas such as management and good credit policies, credit analyzes, credit quality, fraudulent practices as well as unsafe competition must be focused and extremely careful (John, 2018).

According to Balango and Rao (2017) found that profitability and the level of NPL have a substantial relationship. The influence of the NPL on bank profitability was explored by Kingu et al. (2018), which included the theory of information asymmetry and the poor hypothesis of management. The study shows the prevalence of NPL in the Tanzanian commercial bank is negatively linked to the level of profitability. Targeted areas such as management and good credit policies, credit analyzes, credit quality, fraudulent practices as well as unsafe competition must be focused and extremely careful (John, 2018). Moreover, NPLs have a negative and large impact on ROA of commercial banks in Ethiopia, whereas CAR has a favorable but little impact. NPL and operational expenses had a considerable effect on ROA, according to Islam and Rana (2017), who used a panel data regression model to look at data from 2005 to 2010. As a result of the provision of classified loans, increased NPL may result in lower profit. The use of NPLs as a performance

indicator is advised; banks that employ NPLs as a performance indicator will see significant improvements in their results (Liu et al., 2017).

From the aforementioned, it has been understood that the majority of analysis conducting around the world in order to measure the relationship between NPL with profitability or performance of the companies which varies on the basis of different variables chosen for the study. Here, after studying all the relevant writing, it has been clarified that most researchers tried to find out the impact of NPL with different selected variables of banks for measuring the profitability. But in the context of Bangladesh, this research has been not only focused on banks selected variables but also considered the macroeconomic parameter to measure effects of NPL on the financial performance of banks as well as it has been taken 23 years' data of all scheduled banks in that was started from 1997 to 2019. Further, this study has been implied alternative ways and procedures for evaluating the financial performance of all scheduled banks in Bangladesh. From the above discussion, the following hypotheses can be assumed as below:

Hypothesis 1: There is a significant relationship between non-performing loan ratio (NPLR) and financial performance.
Hypothesis 2: There is a significant relationship between capital adequacy ratio (CAR) and financial performance.
Hypothesis 3: There is a significant relationship between inflation rate (INF) and financial performance.
Hypothesis 4: There is a significant relationship between provision margin ratio (PMR) and financial performance.

Methodology

Character of the study: Analytical research has been formulated by which researchers have been attempted to discover the significant relationship among the selected variables i.e. between dependent and independent variables.

Types and Sources of Data: The researcher has applied data that is driven from the annual report of Bangladesh Bank. Data has been analyzed based on the objectives of the research in this study and all the data was collected from Bangladesh Bank website considering its different reports, analysis and articles from the period of 1997 to 2019.

Target Population: For analysis, total 23 years' data of all scheduled banks in Bangladesh was collected from the year 1997 to 2019 for the research purpose. Because of not affordable of most recent data, we have to skip year 2020.

Model Specification: In order to realize the effects of non-performing loan on the financial performance of commercial banks in Bangladesh, regression analysis technique has been used. The mentioned model below has been fixed in the light of regression and other test of these variables that may have the relationship with the variables is linear.

$$Y = \beta 0 + \beta 1X1t + \beta 2X2t + \beta 3X3t + \beta 4X4t + ut$$

Y= Return on Assets (ROA)
[Here, Financial Performance of Bank as measured by ROA]
β0= Constant term
X1= Non-Performing Loan Ratio (ROA)
X2= Capital Adequacy Ratio (CAR)
X3= Inflation Rate (INF)
X4= Provision Margin Ratio (PMR)
ut= Disturbance term

Variables: Classification of the variables for the purpose of the research is as following:

Selected Variable	Definition
ROA	It's an extremely frequent as well as extensively implemented indicator of financial performance. Percentage of net margin to total asset of an organization is measured by ROA. It measures the earning competence of an organization.
Explanatory Variables	**Definition**
NPLR	One of the most important independent variables is the Ratio of Non-Performing Loan that is measured by non-performing loan to its total loan outstanding. It is used to measure the assets quality of a bank. A significant relationship is therefore expected between NPL and financial performance.
CAR	Another independent indicator is Capital Adequacy Ratio CAR. It is also determined as percentage of capital to total risk weighted assets. Significant relationship between capital adequacy ratio and financial performance is expected.
INF	Interest Rate (INF) is another independent variable that is denoted as a relative measure for evaluating the financial performance of banks. A significant relationship is therefore expected between interest rate and financial performance.
PMR	Provision Maintained (PM) is another independent variable that is denoted as a relative measure for evaluating the financial performance of banks. A proxy of management efficiency can be established by provision maintenance ratio.

Conceptual Framework: It is a key analytical apparatus in research that helps to show the association among preferred variables. Here, the following framework is highlighting as:

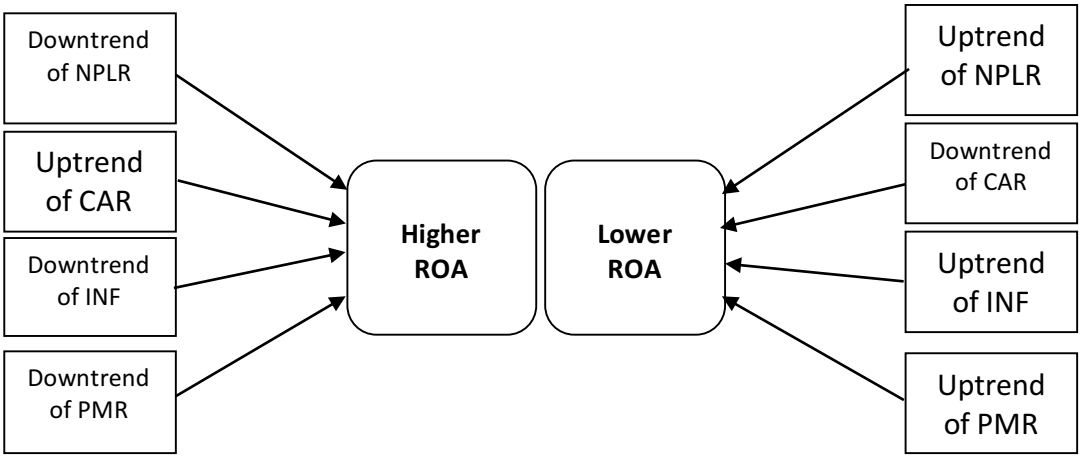


Figure: Conceptual Framework regarding association among the selected variables

Data Analysis & Findings

Descriptive Statistics: The results in table 5.1 indicate the mean and median of financial inclusion are quite equal. Therefore, t can be said that there is an even distribution among the collected data. Including the mean, and median, the other selected criteria are mentioned in the table.

Table-01: Descriptive Statistics

Variables	CAR	INF	NPLR	PM	ROA
Mean	9.300870	6.376957	17.48913	73.74739	0.718261
Median	9.600000	6.194300	10.80000	78.30000	0.700000
Maximum	12.10000	11.39520	41.11000	103.0000	1.800000
Minimum	5.600000	2.007200	6.100000	40.30000	0.010000
Std. Dev.	2.019910	2.141472	11.76484	21.12707	0.426323
Skewness	-0.250325	-0.038856	1.000353	-0.153518	0.884219
Kurtosis	1.625418	3.428652	2.410441	1.531518	3.467324

Source: Worked out by the researchers through E-views 11.

In this above mentioned data set, we take four independent variables from our sample wherein date was taken for last 23 years of 60 commercial banks. For all the variables, the Mean and the Median values are not exactly matched but they are very much similar.

Correlation Analysis: Tin order to avoid multicollinearity, the significance of correlation is to make sure about the interconnection among the independent variables with each other. According to Albright et al. (2011), the strength of linear associations between two or more Variables is easily explained by correlation.

Table-02: Correlation Matrix

Correlation	ROA	CAR	INF	NPLR	PM
ROA	1.000000				
CAR	0.364954	1.000000			
INF	0.557552	0.321690	1.000000		
NPLR	-0.614159	-0.718964	-0.426864	1.000000	
PM	0.574337	0.851565	0.324873	-0.687364	1.000000

Source: Worked out by the researchers through E-views 11.

From table-01, among all the independent variables, CAR INF and PM have the moderate positive correlation with ROA and on the other hand, NPLR is negatively correlated to ROA. Therefore, these all variables do not pose any problem of multicollinearity.

Regression Analysis: Regression analysis is a trustworthy method of measuring relationship between a target and explanatory variables. In detail, regression study assists us to realize how the distinctive value of the dependent variable varies when any one of the explanatory variables is changed, at the same time as the other independent variables are held fixed. In this research, OSL model has been applied for recognizing the influence of expository variables to on our selected variable.

Table-03: Least Squares Model: Dependable Variable (ROA)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	0.882090	0.544620	1.619643	0.1227
NPLR	-0.017004	0.007723	-2.201706	0.0410
CAR	-0.155415	0.059770	-2.600224	0.0181
INF	0.068687	0.030639	2.241814	0.0378
PM	0.015472	0.005473	2.826903	0.0112
R-squared	**0.652205**		**F-statistic**	**8.438658**
Adjusted R-squared	0.574917		Prob (F-statistic)	0.000512

Source: Worked out by the researchers through E-views 11.

From the above mentioned regression table, it is shown that there exists a significant relationship between all the independent variables with dependent variable as it determined by the provability i.e. p-value.

In case of Independent Variable-NPLR, alternative hypothesis has been accepted that means significant relationship is existing between NPLR and financial performance. Again *in case of Independent Variable-CAR,* alternative hypothesis has been accepted which indicates there has a significant relationship between capital adequacy ratio with the banks' financial performance. Further *in case of Independent Variable-INF, alternative* hypothesis has been accepted that explains the significant relationship stuck between inflation rate and financial performance. Furthermore, *in case of Independent Variable-PM,* alternative hypothesis has been accepted signifying that there has a significant relationship between provision margin and financial performance.

Table-04: Hypothesis Summary

Hypothesis	t-value	p-value	Remarks
H-01	-2.201706	0.0410	Significant relationship
H-02	-2.600224	0.0181	Significant relationship
H-03	2.241814	0.0378	Significant relationship
H-04	2.826903	0.0112	Significant relationship

Source: Worked out by the researchers through E-views 11.

From the above table, we can see that the value of r-square is 0.652205, and adjusted r-square is 0.574917 which shows that there is moderate relationship between depended variables and independent variables. If any of the value of independent variables changes, then the value of dependent variables also changes moderately.

The table has also showed the value of F-statistic or F-test which is 8.438658 and Prob. of F-statistic is 0.000512. This p-value shows a significant influence among all independent variables to affects the dependent variable.

Auto-Correlation Test: The Breusch-Godfrey test for serial correlation, often known as the LM (Lagrange Multiplier) test, is used to determine autocorrelation in the residuals.
The hypothesis for this test is:

H_0: Residuals are not auto-correlated.
H_1: Residuals are auto-correlated.

Table-05: Auto-correlation Test

Lagrange Multiplier Test: Null hypothesis: No serial correlation at up to 2 lags Dependent Variable: RESID				
F-statistic	1.075405	Prob. F(2,16)		0.3646
Obs*R-squared	2.725422	Prob. Chi-Square(2)		0.2560
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.051372	0.553218	-0.092860	0.9272
NPLR	0.001265	0.008001	0.158065	0.8764
CAR	0.012742	0.060184	0.211712	0.8350
INF	-0.015774	0.033606	-0.469367	0.6451
PM	8.44E-05	0.005620	0.015023	0.9882
RESID(-1)	0.381660	0.264195	1.444612	0.1679
RESID(-2)	0.015262	0.290236	0.052584	0.9587

Source: Worked out by the researchers through E-views 11.

Here the observed R^2 is 2.725422 and consequently the value of 'p' is 25.60% that is higher than 5% that means null hypothesis has been accepted. Therefore there is no serial correlation or auto-correlation among the residuals. A small p-value indicates there is significant autocorrelation remaining in the residuals and they are not auto-correlated.

Test of Heteroscedasticity: Heteroscedasticity refers to a methodical transformation in the spread of the residuals over the range of precise values.

The hypothesis for the analysis is:

H_0: Variance of the residuals is not heteroscedastic.

H_1: Variance of the residuals is heteroscedastic.

Table-06: Test of Heteroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey Null hypothesis: Homoskedasticity Dependent Variable: RESID^2				
F-statistic Obs* R-squared Scaled explained SS	0.975977 4.099263 1.857563	Prob. F(4,18) Prob. Chi-Square(4) Prob. Chi-Square(4)		0.4451 0.3927 0.7619
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.266630	0.147675	1.805526	0.0877
NPLR	-0.002796	0.002094	-1.335301	0.1984
CAR	-0.020795	0.016207	-1.283112	0.2157
INF	-0.010533	0.008308	-1.267876	0.2210
PM	0.001401	0.001484	0.944037	0.3577

Source: Worked out by the researchers through E-views 11.

Here the observed R^2 is 4.099263 and corresponding p value is 39.27% which is much higher than 5%. Therefore, we do not reject null hypothesis that says the residuals are homoscedastic not heteroscedastic. This is a good sign for a model.

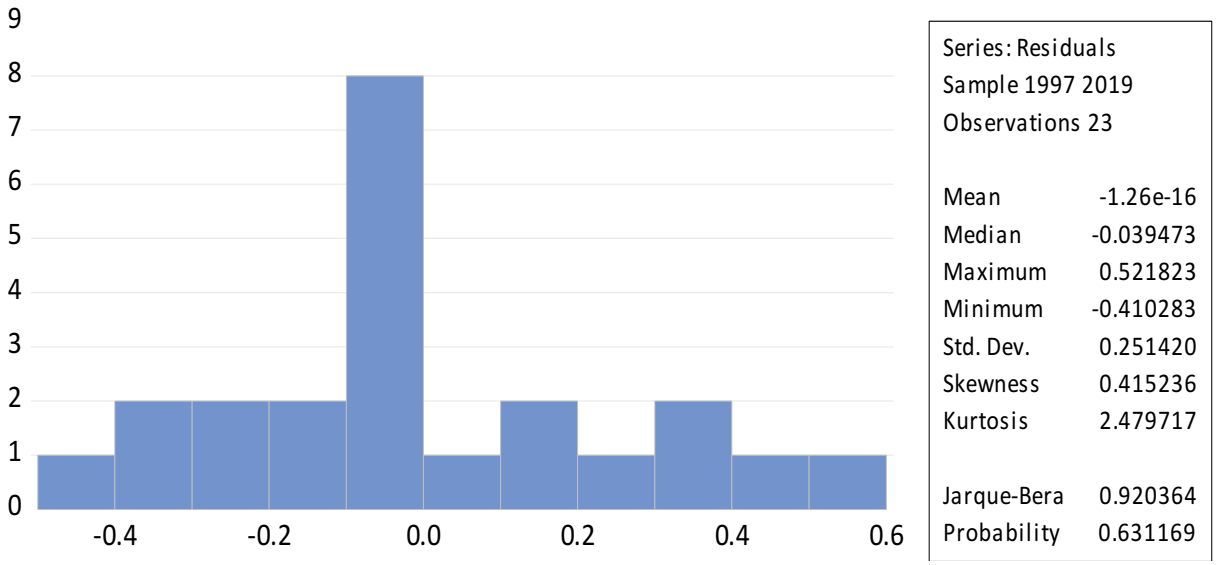
Test of Normal Distribution: A normality test is a test that is used to determine if sample data collected from a population is normally distributed within some tolerance

The hypothesis for this test is:

H_0: Residuals follow normal distribution.

H_1: Residuals don't follow normal distribution.

Graph-01: Normality Test



Source: Worked out by the researchers through E-views 11.

The value of Jarque-Bera Test is 92.04% and consequently the value of 'p' is 63.12% that is not below 5%. So, null hypothesis has been accepted and therefore the residuals are normally distributed.

Vector Auto Regression (VAR): The most affluent, pliable, and simple mechanism used for assessment of inconsistent time series is called VAR mode. In order to explain the dynamic movement of economic and fiscal time series, this VAR model is unanimously accepted and supportive to the researchers.

Table-07: Vector Auto-regression Estimation

Sample (adjusted): 1999 2019 Included observations: 21 after adjustments Standard errors in ( ) & t-statistics in [ ]					
	ROA	**NPLR**	**CAR**	**INF**	**PM**
ROA(-1)	0.793416	-2.869383	-1.297850	3.364867	14.57470
	(0.38248)	(2.21022)	(1.24368)	(1.77035)	(11.4723)
	[2.07439]	[-1.29823]	[-1.04356]	[1.90068]	[1.27043]
ROA(-2)	0.066414	-1.804596	-1.043287	1.497562	-14.33634
	(0.41089)	(2.37437)	(1.33605)	(1.90183)	(12.3243)
	[0.16164]	[-0.76003]	[-0.78088]	[0.78743]	[-1.16326]
NPLR(-1)	-0.023704	0.922028	0.000675	0.257692	1.745104
	(0.04774)	(0.27585)	(0.15522)	(0.22095)	(1.43183)
	[-0.49656]	[3.34246]	[0.00435]	[1.16628]	[1.21880]
NPLR(-2)	0.016835	-0.086808	-0.131076	-0.361589	-2.348841
	(0.04506)	(0.26036)	(0.14650)	(0.20854)	(1.35141)
	[0.37364]	[-0.33342]	[-0.89470]	[-1.73388]	[-1.73806]

CAR(-1)	0.000949	-0.964570	-0.122837	0.015923	-0.183463
	(0.09216)	(0.53254)	(0.29966)	(0.42656)	(2.76420)
	[0.01030]	[-1.81125]	[-0.40992]	[0.03733]	[-0.06637]
CAR(-2)	-0.010072	-0.319533	-0.458656	0.172373	-0.132541
	(0.10040)	(0.58016)	(0.32645)	(0.46470)	(3.01135)
	[-0.10032]	[-0.55077]	[-1.40497]	[0.37094]	[-0.04401]
INF(-1)	-0.090484	0.762452	0.142909	-0.047568	-1.781822
	(0.06229)	(0.35993)	(0.20253)	(0.28830)	(1.86823)
	[-1.45271]	[2.11834]	[0.70562]	[-0.16500]	[-0.95375]
INF(-2)	0.081331	-0.154154	-0.136115	-0.278285	2.993042
	(0.04962)	(0.28675)	(0.16135)	(0.22968)	(1.48837)
	[1.63902]	[-0.53760]	[-0.84360]	[-1.21163]	[2.01096]
PM(-1)	0.002343	0.072036	0.029939	-0.063288	0.594437
	(0.00956)	(0.05522)	(0.03107)	(0.04423)	(0.28664)
	[0.24521]	[1.30444]	[0.96348]	[-1.43077]	[2.07379]
PM(-2)	-0.006535	0.077489	0.072588	-0.033655	-0.122627
	(0.01386)	(0.08010)	(0.04507)	(0.06416)	(0.41578)
	[-0.47141]	[0.96735]	[1.61043]	[-0.52454]	[-0.29493]
C	0.644879	1.917888	11.40972	12.39487	48.67538
	(0.95939)	(5.54399)	(3.11957)	(4.44063)	(28.7763)
	[0.67217]	[0.34594]	[3.65746]	[2.79124]	[1.69151]
R-squared	0.690983	0.981174	0.853301	0.744798	0.887873
Adj. R-squared	0.381966	0.962348	0.706603	0.489595	0.775746

Source: Worked out by the researchers through E-views 11.

Here, all five variables i.e. (ROA, NPLR, CAR, INF and PM) are considered as depended variable and ROA(-1), ROA(-2), NPLR(-1), NPLR(-2), CAR(-1), CAR(-2), INF(-1), INF(-2), PM(-1), and PM(-2) are now independent variable for determining and estimating the dynamic movement of economic and fiscal time series. For determining the significant of each independent variable we need to find out p-value which is as follows:

Estimation of Prob. Estimation Method: Least SquaresSample: 1999 2019 Included observations: 21				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(1)	0.793416	0.382481	2.074391	0.0432
C(2)	-0.023704	0.047737	-0.496558	0.6217
C(3)	0.000949	0.092157	0.010301	0.9918
C(4)	-0.090484	0.062286	-1.452714	0.1526
C(5)	0.002343	0.009557	0.245214	0.8073
C(6)	0.066414	0.410887	0.161636	0.8722
C(7)	0.016835	0.045056	0.373640	0.7103
C(8)	-0.010072	0.100397	-0.100317	0.9205
C(9)	0.081331	0.049622	1.639023	0.1075
C(10)	-0.006535	0.013862	-0.471409	0.6394
C(11)	0.644879	0.959393	0.672174	0.5046

C(12)	-2.869383	2.210224	-1.298232	0.2002
C(13)	0.922028	0.275853	3.342463	0.0016
C(14)	-0.964570	0.532545	-1.811248	0.0761
C(15)	0.762452	0.359930	2.118336	0.0391
C(16)	0.072036	0.055224	1.304440	0.1981
C(17)	-1.804596	2.374371	-0.760031	0.4508
C(18)	-0.086808	0.260360	-0.333416	0.7402
C(19)	-0.319533	0.580161	-0.550767	0.5842
C(20)	-0.154154	0.286746	-0.537600	0.5932
C(21)	0.077489	0.080104	0.967350	0.3380
C(22)	1.917888	5.543994	0.345940	0.7308
C(23)	-1.297850	1.243681	-1.043556	0.3017
C(24)	0.000675	0.155221	0.004351	0.9965
C(25)	-0.122837	0.299660	-0.409922	0.6836
C(26)	0.142909	0.202530	0.705615	0.4837
C(27)	0.029939	0.031074	0.963477	0.3399
C(28)	-1.043287	1.336046	-0.780877	0.4386
C(29)	-0.131076	0.146503	-0.894697	0.3752
C(30)	-0.458656	0.326453	-1.404967	0.1662
C(31)	-0.136115	0.161350	-0.843601	0.4029
C(32)	0.072588	0.045074	1.610427	0.1136
C(33)	11.40972	3.119575	3.657460	0.0006
C(34)	3.364867	1.770346	1.900683	0.0631
C(35)	0.257692	0.220953	1.166279	0.2490
C(36)	0.015923	0.426558	0.037330	0.9704
C(37)	-0.047568	0.288297	-0.164998	0.8696
C(38)	-0.063288	0.044233	-1.430767	0.1587
C(39)	1.497562	1.901825	0.787434	0.4347
C(40)	-0.361589	0.208544	-1.733876	0.0891
C(41)	0.172373	0.464697	0.370936	0.7123
C(42)	-0.278285	0.229678	-1.211631	0.2313
C(43)	-0.033655	0.064162	-0.524538	0.6022
C(44)	12.39487	4.440631	2.791241	0.0074
C(45)	14.57470	11.47227	1.270429	0.2098
C(46)	1.745104	1.431826	1.218796	0.2286
C(47)	-0.183463	2.764196	-0.066371	0.9473
C(48)	-1.781822	1.868231	-0.953748	0.3448
C(49)	0.594437	0.286643	2.073790	0.0433
C(50)	-14.33634	12.32428	-1.163260	0.2502
C(51)	-2.348841	1.351412	-1.738065	0.0884
C(52)	-0.132541	3.011350	-0.044014	0.9651
C(53)	2.993042	1.488365	2.010959	0.0497
C(54)	-0.122627	0.415783	-0.294929	0.7693
C(55)	48.67538	28.77635	1.691507	0.0970

Source: Worked out by the researchers through E-views 11.

There is coefficient estimation shown in the above table. To realize the significant of each coefficient, we need to estimate the value of probability. By taking 2 lags VAR model, we have received 55 coefficients of 5 variables whereas just seven coefficients have been shown the significance value and they have the meaningful impact over dependent variables.

Unit Root Test: A unit root test refers to a technique that is used to determining whether the time series variable is stationary or not. Here, Augmented Dickey-Fuller test statistic is used to determine unit root test.

The hypothesis for the analysis is:

H_0: Variables are not stationary or got unit root

H_1: Variables are stationary or not unit root

Table-8.1: Unit Root Test of

ROA Null Hypothesis: D(ROA) has a unit root Exogenous: None Lag Length: 0 (Automatic - based on SIC, maxlag=4)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.450238	0.0000
Test critical values:	1% level		-2.679735	
	5% level		-1.958088	
	10% level		-1.607830	
*MacKinnon (1996) one-sided p-values. Augmented Dickey-Fuller Test EquationDependent Variable: D(ROA,2) Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ROA(-1))	-1.197465	0.219709	-5.450238	0.0000

Source: Worked out by the researchers through E-views 11.

Here, probability value is 0.00 which is below 5 percent. So alternative hypothesis has been accepted that indicates our variable ROA is stationary and not unit root.

Table-8.2: Unit Root Test of

NPLR Null Hypothesis: D(NPLR) has a unit root Exogenous: None Lag Length: 0 (Automatic - based on SIC, maxlag=4)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.524897	0.0144
Test critical values:	1% level	-2.679735	
	5% level	-1.958088	
	10% level	-1.607830	
*MacKinnon (1996) one-sided p-values. Augmented Dickey-Fuller Test EquationDependent Variable: D(NPLR,2) Method: Least Squares			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NPLR(-1))	-0.456412	0.180764	-2.524897	0.0201

Source: Worked out by the researchers through E-views 11.

Here, probability value is 0.0144 which is below 5 percent. So alternative hypothesis has been accepted that indicates our variable NPLR is stationary and not unit root.

Table-8.3: Unit Root Test of CAR

Null Hypothesis: D(CAR) has a unit root			
Exogenous: None			
Lag Length: 0 (Automatic - based on SIC, maxlag=4)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.839041	0.0000
Test critical values:	1% level	-2.679735	
	5% level	-1.958088	
	10% level	-1.607830	
*MacKinnon (1996) one-sided p-values.			
Augmented Dickey-Fuller Test EquationDependent Variable: D(CAR,2)			
Method: Least Squares			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CAR(-1))	-1.263363	0.216365	-5.839041	0.0000

Source: Worked out by the researchers through E-views 11.

Here, probability value is 0.00 which is below 5 percent. So alternative hypothesis has been accepted that indicates our variable CAR is stationary and not unit root.

Table-8.4: Unit Root Test of INF

Null Hypothesis: D(INF) has a unit root			
Exogenous: None			
Lag Length: 1 (Automatic - based on SIC, maxlag=4)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.336606	0.0000
Test critical values:	1% level	-2.685718	
	5% level	-1.959071	
	10% level	-1.607456	
*MacKinnon (1996) one-sided p-values.			
Augmented Dickey-Fuller Test EquationDependent Variable: D(INF,2)			
Method: Least Squares			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-1.606085	0.300956	-5.336606	0.0000
D(INF(-1),2)	0.447717	0.193552	2.313159	0.0327

Source: Worked out by the researchers through E-views 11.

Here, probability value is 0.00 which is below 5 percent. So alternative hypothesis has been accepted that indicates our variable INF is stationary and not unit root.

Table-8.5: Unit Root Test of PM

Null Hypothesis: D(PM) has a unit root			
Exogenous: None			
Lag Length: 0 (Automatic - based on SIC, maxlag=4)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.669657	0.0001
Test critical values:	1% level	-2.679735	
	5% level	-1.958088	
	10% level	-1.607830	

*MacKinnon (1996) one-sided p-values. Augmented Dickey-Fuller Test EquationDependent Variable: D(PM,2) Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PM(-1))	-1.037617	0.222204	-4.669657	0.0001

Source: Worked out by the researchers through E-views 11.

Here, probability value is 0.0001 which is below 5 percent. So alternative hypothesis has been accepted that indicates our variable PMR is stationary and not unit root.

Findings

At first, in the regression model, there has been found a significant relationship between each independent variable with dependent variable. The p-value of NLPR, CAR, INF and MP is 0.0410, 0.0181, 0.0378 and 0.0112 respectively. Further, the value of R-square is 0.652205 which indicates that these four independent variables are 65.22% fitted to explain ROA in the regression model.

Here the value of F-statistic is 8.438658 and Prob. (F-statistic) is 0.000512. The value shows the significant impact by all independent variables over dependent variable. The result indicates that all ROA is importantly and jointly influenced by all independent variables in this formulated regression model. Then a unit root tests are applied on all variables both dependent and independents to determine whether the variables are unit root or not. After estimation of all variables the p-value of all variables i.e. ROA, NPLR, CAR, INF and PM are 0.0000, 0.0144, 0.0000, 0.0000, and 0.0001 respectively. All the values show that variables are stationary and not unit root.

After that there is another important model called VAR model has been deployed to determine the multivariate time series whereas by taking 2 lags ROA (-1), ROA (-2), NPLR (-1), NPLR (-2), CAR (-1), CAR (-2), INF (-1), INF (-2), PM (-1), and PM (-2) are now independent variable for determining and estimating the dynamic movement of economic and fiscal time series. By taking 2 lags under VAR model, we have received fifty-five coefficients whereas just seven coefficients have been shown the significance value and they have the meaningful impact over dependent variables. The p-value of these seven independent variables are: C (1) 0.0432, C (13) 0.0016, C (15) 0.0391, C (33) 0.0006, C (44) 0.0074, C (49) 0.0433, C (53) 0.0497.

Further Breusch-Godfrey Test, also known as LM Test, is used to determine the auto-correlation among the residuals. Form the estimation; it is found that p-value is 25.60% which is higher than 5%. So, the null hypothesis is not rejected. Therefore, there is no serial correlation or auto-correlation among the residuals. Furthermore, Breusch-Pagan-Godfrey is applied to determine the heteroskedasticity among the residuals. Here the observed R-squared is 4.099263 and consequently the value of 'p' is 39.27% that is not below 5%. Therefore, null hypothesis is not rejected that means the residuals are homoscedastic not heteroscedastic.

Lastly the value of Jarque-Bera Test that is used for determining the normality test of the residuals is 92.04% and corresponding p-value is 63.12% which is higher than 5%. Null hypothesis is not rejected and therefore the residuals are normally distributed.

Recommendations & Scope of Further Research

In Bangladesh, NPLs have turned into a troublesome subject. Because of uncontrollable increase of bad or irregular loans, financial performance of banking sector is drastically reducing. This study helps to realize the effect of NPLs on the financial performance of commercial banks in Bangladesh. Banks will loss the ways for disbursing loans in upcoming days if amount of irregular loans are enhancing. So, the adverse effects of this situation will be multivariate in the economy. So, competent authorities must come forward with a view to taking best initiative in order or control this situation within a very short possible time.

Financial institutions especially banks are facing substantial risk on non-performing loans all over the world. Because of this reason, banks are compelled to modify their lending policies and procedures. For ensuring the development of economy, loans and advances have an inevitable contribution but its non-payment also leads to incidence of great loss on banks in particular as well as country in general. The study will be about to realize the effects of NPLs as well as analyze it with some selected macro and micro economic factors on the banks financial performance wherein commercial banks may consider the impact and influence of these factors and then they will be capable to formulate the efficient management tools which help to control and reduce the none-performing loan from banking financial sector of our country.

Conclusion & Discussion

There is an old saying "prevention is better than cure". This statement is absolutely correct for controlling non-performing loan. Banks must take preventive measures or actions to minimize the ever rising amount NPL in the banking industry. In this regard, suitable and appropriate incentives such as interest exemption, cutting down interest rate, expending the duration of loan payment etc. have to be ensured towards default borrowers to enable them to repay the classified loan. If government and central bank extends their assistance efficiently towards commercial banks and also for borrowers this unstable and adverse situation in the banking industry will be eradicated gradually form the economy of our country and then the stable and consistence environment in this industry will be ensured.

Previous researches have produced varied results when it comes to analyzing a bank's financial performance based on its nonperforming assets (NPL). The reason of these, some of them had analyzed the banks' performance using either bank-specific indicators or macroeconomic data. According to Nyarko-Baasi (2018), profitability, or the dependent variable, has been calculated using ROE. The two main explanatory variables were NPLR and CAR, which found that NPLR has a negative impact on bank profitability whereas CAR had a considerable favorable impact. On the contrary, NPLs, ROA, growth gross domestic product (GGDP), bank liquidity risk (BLQ), and credit risk all showed a modest negative association. It further indicates a positive insignificant weak association between the NPL and CAR bought by Alshebmi et al. (2020). Similarly, Kiran and Jones (2016) have founded a finding indicating that with the exception of SBI (State Bank of India), all other banks' gross non-performing assets and net earnings had a negative relationship. Here, NPLs had a significant negative regression coefficient for Equity Bank as well as a significant link with performance as evidenced by the regression coefficient for the National Bank of Kenya. In the context of Bangladeshi banking financial institutions, some researchers looked at only bank-specific variables, ignoring macroeconomic issues, and discovered a substantial link between NPL and bank financial performance. However, in our study, 23 years of data were collected, from 1997 to 2019, in which banks' some specific factors, as well as microeconomic factor, were occupied for evaluating their weight and influence on bank financial performance, and the analysis revealed that all parameters are extremely important for evaluating bank financial performance. Furthermore, it should be noted that the research might be expanded upon by taking into account the various essential elements affecting banks, as well as other microeconomic characteristics, as well as updated data and information pertaining to banking and financial operations.

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