NON-PERFORMING LOANS IN BANGLADESH: BANK SPECIFIC AND MACROECONOMIC EFFECTS

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Abstract

This study aims to analyze the bank-specific and macroeconomic determinants of non-performing loans (NPLs) of private commercial banks (PCB) in Bangladesh. It considers panel data from 2014 to 2018 of selected 33 listed PCBs and annual macroeconomic data from 2000 to 2018. This study finds equity to total assets, interest income, lending capacity, and return on equity of bank-specific and unemployment and consumer price index of macroeconomic determinants as significant determinants of NPLs in Bangladesh. The impulse response functions (IRF) indicate that the reactions of NPLs are positive toward the shocks on return on equity, return on assets, lending capacity, asset management and operating efficiency of banks. Wald statistics indicate bankspecific and macroeconomic variables can jointly influence the NPLs. It is expected that, the research-based recommendations will benefit bankers and regulatory authority to formulate appropriate policies to reduce the portion of NPLs in Bangladesh.

Keywords : Bank-specific Determinants, Impulse Response Functions, Macroeconomic Determinants, Private Commercial Banks, PVAR Model.

1. INTRODUCTION

Economic development of a country significantly depends on a stable banking sector (Prochniak & Wasiak, 2017). Banks play intermediary role in transferring small and segregated savings to productive investment sectors. The contribution of banking sector is more important for a developing country like Bangladesh which supplies both short-term and long-term capital due to absence of an efficient capital market. An active banking system utilizes the available resources in a significant manner through appropriate allocation. Banks supply capital to individuals, organizations, and the government to implement development projects, enhance productivity, and create job opportunities. Therefore, existence of a sound banking sector is a prerequisite for a developed nation as it supplies capital (Bannier & Hirsch, 2010). The journey of banking sector in Bangladesh after liberation in 1971 has been quite challenging due to corruptions, mismanagement, influence of top management, lack of monitoring capacity of the central bank and non-compliance of existing legal requirements. To accelerate the free flow of savings to production sectors commercial banks were nationalized as the economy that time was fully controlled by public sector players. Bangladesh Bank, the central bank of Bangladesh used to control most of the activities of banks. To take banking system to the next level, government reformed banking sector by allowing private banks to operate and to make this sector competitive by

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recapitalizing banks, introducing new types of loans, making interest rates more flexible in the early 1980s. As of 2019, there were 57 commercial banks with 10286 branches and Tk. 14572.9 billion total assets (Dey, 2019). This sector is gradually expanding with a greater number of financing instruments and financial institutions. Although the size is expanding, the increasing number of scams, malpractices, heists and corruptions put this promising sector under unprecedented challenges.

1.1 Recent Scams and Image Crisis of Banking Sector

International cyber hackers heisted BDT 6,796 million from the treasury account of Bangladesh Bank, the central bank of Bangladesh, in 2016. An investigation committee was formed headed by the former governor of Bangladesh Bank Dr. Farashuddin ("No BB heist", 2017). Farmers Bank, a PCB, embezzled BDT 5,000 million with the help of 11 different companies during 2013-2017. Bangladesh Bank instructed the Farmers Bank to conduct a functional audit in this regard (Uddin, 2018). Janata Bank, a stateowned commercial bank (SCB), was involved in loan scam of BDT 12,300 million during 2013-16. The corrupt company, Thermax, requested Janata Bank to reschedule the loans and Janata Bank duly sent the request to the Bangladesh Bank ("Another Janata Bank", 2018). NRB Commercial Bank, a PCB, did irregularities in sanctioning loan of BDT 7,010 million during 2013-16. Bangladesh Bank appointed an observer to restore the discipline and corporate governance in that bank (Islam, 2017). BASIC Bank, an SCB, Embezzled BDT 45,000 million through fictitious companies and dubious accounts during 2009-2013. Anti-Corruption Commission (ACC) sued 120 officials of that bank through 56 cases (Rahman, 2013). Bismillah Group took loan of BDT 11,740 million from few banks namely Janata Bank, Prime Bank, Jamuna Bank, Premier Bank and Shahjalal Islami Bank in 2011 in the name of few fake sister concerns and laundered the money to foreign countries. ACC filed 12 cases against 54 people over this notorious scam ("Bismillah Group Chairman", 2018). Apart from these scams, there are many more corruptions that took place throughout the decades and paralyzed the banking sector. Due to these incidents, people have lost their confidence in the banking system of Bangladesh (Islam, 2020). Irregularities, corruptions in credit management result in accumulation of NPLs over the period.

1.2 Overview of NPLs in Bangladesh

According to International Monetary Fund (IMF), NPL refers to that portion of interest and principal which is due by 90 days or more¹. NPLs are of three types in Bangladesh, such as substandard if a loan is due over three months but less than nine months, doubtful if the loan is due for more than nine months but less than twelve months, and bad or loss if the loan is overdue for more than twelve months². The portion of NPLs in Bangladesh is increasing in almost all types of banks as a consequence of sanctioning loans without due appraisal, interference

¹ IMF. 2005. The Treatment of Nonperforming Loans (BOPCOM-05/29) – Eighteenth Meeting of the IMF Committee on Balance of Payment Statistics. Washington D.C. June 27–July 1. https://www.imf.org/external/pubs/ft/bop/2005/05-29.pdf.

² The central bank revised the loan classification rules effective 30 June 2019. Bangladesh Bank. 2019. Banking Regulation and Policy Department Circular No. 03. 21 April.

of top management in processing the loans, inappropriate asset valuation, and irresponsibility of bankers. Banks do not remove the classified loans fearing image crisis and probable legal issues.



Source: International Monetary Fund, November, 2019. Figure 1 : Gross ratio of NPL to Total Loan, by Type of Bank

Although recovery rate was satisfactory up to 1999, the gross ratio of NPLs increased over the last ten years (Dey, 2019). NPLs reduce lending capacity of banks. To supplement NPLs, an additional reserve is required to create. Banks need to bear additional risks as profitability is compromised. Finally, NPLs hamper the overall credit quality of banks.

In line with the above background, this study aims to evaluate the bank-specific determinants following the methodology of De Bock and Demyanets (2012) by using panel data of 33 commercial banks from 2014 to 2018 and macroeconomic determinants from 2000 to 2018 of NPLs. Since, there are 40 private commercial banks in Bangladesh, 33 samples cover 82.5% of total, which is highly representable.

After introduction, section 2 reviews the previous studies on NPLs and relevant determinants, section 3 focuses on the sources and justification of using data and methodology. Section 4 presents empirical results of bank-specific and macroeconomic determinants of NPLs, through panel vector autoregressive (PVAR), ordinary least square (OLS) and impulse response functions (IRF) methods and discuss the outcomes with policy implications. Section 5 concludes the study.

2. LITERATURE REVIEW

Loans do not perform as per expectation for different reasons. As NPLs are not desirable, banks should identify the reasons and take stern actions not to avoid NPLs (Anastasiou, 2016). Bank specific factors play vital role in keeping the NPLs within desired level. There are few previous studies which indicate the impact of internal variables on NPLs. Towhid, Havidz and Alnawah (2019) applied pooled OLS, fixed effect and random models to trace main factors responsible for non-performing loans in Bangladesh considering 16 private commercial banks. Using data from 2011 to 2016, they observed significantly negative relation of net loans to deposit ratio,

average assets and inflation on NPLs. Ali (2012) considered state-owned commercial banks to know the reasons for NPLs. He found inconsistent policies, decreasing GDP growth, political unrest, increase in crimes, ownership concentration, and inefficiency of banks play vital role in increasing NPLs. Zheng, Bhowmik and Sarker (2020) observed both internal and external factors are responsible for NPLs in Bangladesh. Mondal (2016) studied data from 2005 to 2014 of 22 commercial banks and noticed failure to set strict credit policy increases the amount of NPLs in Bangladesh. Jiménez and Saurina (2004) observed significant influence of lending capacity and policy of banks on NPLs. They strongly recommended to evaluate the project on the basis of cost and benefits. Reddy (2004) observed a negative impact of additional costs on NPLs. These costs temper capital base of banks by reducing the profitability and capital adequacy. Mohanty, Das, and Kumar (2018) also found a negative correlation between NPLs and profitability. They also noticed that NPLs increase financial risk as they create bottleneck in the economic development of a nation. Similarly, Adhikary (2006) observed adverse impact of NPLs on banks performance and they also pull back the economic growth. NPLs mainly occur due to ineffective monitoring and supervision, poor credit recovery capacity, insufficient legal supports, and political pressures (Boudriga, Taktak, & Jellouli, 2009). Kiran and Jones (2016) studied relationship between NPLs and bank efficiency in Singapore and Malaysia. They applied Tobit regression model and found that NPLs hamper efficiency and disrupt profit earning capacity of banks. Podder (2012) considered advance to deposit ratio and equity to total asset ratio to measure their impact on NPLs and observed important determinants of profitability. Lata (2015) used time series data to measure the relation of NPLs with profitability and interest income of state-owned banks. She found negative relations with both the determinants. Even in Ghana, Nsobilla (2016) verified the impact of NPLs on the financial performance by using secondary data of six rural banks. He applied OLS method and noticed that NPLs, loan recovery capacity, cost-income ratio and total revenue variables are significantly correlated. Surprisingly, Adebisi and Matthew (2015) found insignificant relation between NPLs and ROE in Nigeria. Hossain and Ahamed (2015) considered 30 private commercial banks to know the capacity of operating expenses, and highest interest rate to explain NPLs by using fixed effect panel regression analysis and observed significant results. NPLs and profitability found to be negatively correlated in Nepal (Bhattarai, 2016), India (Kiran & Jones, 2016), Ethiopia (Balango & Rao, 2017) and Bangladesh (Akter & Roy, 2017). Matin (2017) applied feasible generalized least square model for panel data of commercial banks in Bangladesh and found negative impact of bank size, liquidity, loss on loan, and NPLs on return on assets.

To know the impact of macroeconomic variables on NPLs, Festic and Repina (2009) tested the effect of macroeconomic and bank-specific determinants for NPLs in Baltic States using cross section panel regression for 21 years. They observed that economic recession and growth of NPLs go hand on hand. They further noticed that rapid growth of credit, increases the possibility of NPLs. Kavkler and Festic (2010) considered 12 macroeconomic and financial variables to measure their impact on the NPLs using OLS method taking data from 1997 to 2007 in few selective

European countries. They noticed that strong economy enhances the quality of credit and reduces the amount of NPLs. Fainstein and Novikov (2011) used GDP growth, unemployment rate, and banks' accumulated loan growth to measure their impact on NPLs using vector error correction model in Latvia and Lithuania. Their findings showed that real GDP growth plays significant role as determinant of NPLs' growth. On the other hand, Klein (2013) found significant impact of inflation, GDP growth rate and unemployment in Estonia, Lithuania, Hungary, Bosnia and Herzegovina, Bulgaria, Croatia and Czech Republic. He applied difference generalized method of moments (GMM), system GMM and fixed effect model taking data from 1998 to 2011. Donath, Cerna, and Oprea (2014) used lending interest, GDP, inflation, and unemployment rates in Romania and three Baltic States taking data from 2000 to 2013. They observed significant negative correlation between all the variables and NPLs in four countries. Though inflation was positive in Lithuania and interest rate was positive in Romania.

The above review indicates that there has not been any study on bank-specific and macroeconomic determinants of NPLs in Bangladesh. Banks in Bangladesh are under serious pressure for increasing amount of NPLs. Bangladesh Bank, Center for Policy Dialogue (CPD), Bangladesh Institute of Bank Management (BIBM) and few public and private organizations conducted seminars, round-table discussions on such topic in different occasions but there has not been done any scientific empirical research so far. This study attempts to verify wide range bank-specific determinants namely equity on total assets (ETA), growth of gross loans (GGL), return on assets (ROA), returns on equity (ROE), interest income (II), lending capacity (LC), asset management quality (AM) and operational efficiency (OE) and macroeconomic variables namely unemployment (UN), GDP growth (GDP), inflation (INF) and consumer price index (CPI) rates on NPLs considering 33 commercial banks in Bangladesh. The research outcomes will benefit decision makers of commercial banks, government, and regulatory authority to develop appropriate framework to reinforce the sustainability of banks by reducing the NPLs.

3. DATA AND METHODOLOGY

3.1 Data Sources

In this study, to measure the determinants of NPLs, bank-specific panel data such as equity on total assets, growth of gross loans, return on assets, returns on equity, interest income, lending capacity, asset management quality and operational efficiency have been considered from 2014 to 2018 of 33 private commercial banks in Bangladesh. The samples have been selected based on the availability of data. The data have been collected from the annual reports of selective banks. The macroeconomic data such as unemployment, GDP growth, consumer price index and inflation rates and the annual NPLs of Bangladesh from 2000 to 2018 have been collected from the website of CEIC data (SG) Pte Ltd³.

³ https://www.ceicdata.com

3.2 Sample Characteristics and Justifications

This section defines each bank specific variable and explain reasons for using asset management quality, operational efficiency and four macroeconomic variables.

Variable	Definition				
Equity on total assots	Owners Equity				
Equity on total assets	EIA = Total Assets				
Crowth of groups loops	$\Delta Gross Loan$				
Growth of gross loans	Base Gross Loan				
Determine an except	Net Income				
Return on assets	ROA= Total Assets				
D. to an ite	Return Available for Shareholders				
Returns on equity	ROE = Total Owners Equity				
Interest income	II = Interest Revenue-Interest Expenses				
Lending capacity	LC = Total Deposit				
	Operating Income				
Asset management quality	AM =				
	Operating Expense				
Operational eniciency	OE = Interest Income				

Table 1: Definition of Bank-Specific Variables

Asset Management Quality

Superior asset management quality ensures stability and growth of a bank in the long run. It increases the earnings capacity and reduces the risk level of a bank through optimization. Non-performing assets can be reduced drastically by implementing proper asset management system (Salike & Ao, 2018). In this study, asset management has been determined by comparing the operating income against the total assets of a bank. The measurement parameter is, higher the ratio, better the performance of a bank.

Operational Efficiency

Operational efficiency means the best utilization of man and materials of an organization. It is a strategical trade-off between cost and productivity. Operational efficiency in bank indicates lowering cost and internal wastage and to provide excellent services to customers to survive in the severe competition. Operational efficiency not only benefits a bank, it also enhances the overall productivity of an economy (Allen & Rai, 1996). Now-a-days banks not only focus on basic services like deposit collections, withdrawals, and providing credits, they also concentrate on technology upgradation, environmental issue, infrastructural development, employees' benefits, and service delivery process. All these arrangements require huge capital involvement. A meaningful combination of quality service, profitability

and sound financial capacity ensures excellent operational efficiency. In this study, operational efficiency has been determined by considering the ratio of total operating expenses and interest income.

Nkusu (2011) mentioned that macroeconomic variables influence NPLs. NPLs increase during recession and tend to reduce during fair economic condition. This study considers the following variables:

Unemployment Rate (UR): unemployment is the consequence of low economic activities. During financial crisis and economic meltdown, unemployment increases. Unemployment reduces earnings capacity of borrowers and thus increases the NPLs, therefore, it has positive relation with the NPLs.

Gross Domestic Product (GDP) Growth: Landefeld, Moulton, Platt and Villones (2010) stated that GDP is the most appropriate variable to represent economic condition of a country. GDP has negative relation with the NPLs. He found that when economy improves, the amount of NPLs tend to reduce and vice-versa.

Inflation (INF): Inflation is another economic consequence. When inflation increases, the purchasing power of money decreases. During inflation, real values of commodities increase and people lose their repayment capacity, therefore, it has positive relation with NPLs. Although, Rajha, (2016) observed both positive and negative impact of inflation on the NPLs.

Consumer Price Index (CPI): CPI measures the weighted average price of a basket that includes various goods and services. When CPI increases, people need to pay more and it reduces the real income. An increase in CPI, decreases the repayment capacity of borrowers thus increase the amount of NPLs.

To measure determinants of NPLs, it is important to specify dependent variables. As mentioned above, the variables are divided into two parts, internal or bank-specific and external or macroeconomic variables. The appropriate time period has not been mentioned in any previous studies. Jakubík and Reininger (2013) emphasized on the use of recent data.

3.3 Methodology

Rinaldi and Sanchis-Arellano (2006) recommended to use panel unit root to check cointegration among the variables. For this study, Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) unit root tests have been performed for both panel and time series data. OLS method has been applied to estimate the impact of determinants on NPLs creating six unique models assuming there is no multicollinearity among the independent determinants. To conduct panel vector autoregression (PVAR) for the bank-specific determinants, appropriate lag selection criteria has been applied and based on the result, panel OLS has been applied. Here all the variables have been considered as endogenous. Impulse response functions have been used to verify the dynamic behavior of the model using Cholesky decomposition. An IRF explains the reaction of an endogenous variable against a certain shock. This is a very useful

tool to analyze empirical causal relationship and policy effectiveness. It monitors the impact of a variable on other variables in the system. IRF is a shock to VAR system. It identifies the responsiveness of dependent variable in the VAR when a shock is put to the error term. The shock on error term change the dependent variable during the next period. This error term is also known as innovation, impulse or shock.

4. EMPIRICAL RESULTS

4.1 Descriptive Statistics

Table 2 shows descriptive statistics for bank-specific and macroeconomic determinants used in the regression model. Key items include mean, standard deviation, minimum and maximum values. This table gives a superficial idea about the nature of data used in the model. It indicates, bank-specific variables have 165 observations, that is 5-year data of 33 banks whereas macroeconomic variables have 19 annual data from 2000 to 2018. In the empirical panel VAR models, macroeconomics variables have been excluded. The estimate for macro variables is based on OLS method.

	NPLp	ETA	GGL	ROA	ROE	П	LC	AM	OE	NPLt	UN	GDP	INF	CPI
Mean	3.22	0.06	0.06	0.05	0.17	22.25	22.74	0.05	0.91	15.42	4.13	0.11	0.06	6.25
Max	10.64	0.15	0.69	0.26	2.00	24.28	26.49	0.23	16.94	31	5.00	1.01	7.00	12.50
Min	0.00	0.01	-0.06	0.00	-3.07	12.91	9.76	0.00	-2.01	6	3.00	-1.14	-10.00	2.40
Std. Dev.	2.65	0.03	0.07	0.05	0.50	1.67	5.28	0.03	1.70	8.40	0.52	0.64	3.52	2.86
Obs	165	165	165	165	165	165	165	165	165	19	19	19	19	19

Table 2 : Descriptive Statistics

4.2 Correlation Matrix

Table 3a and 3b exhibit correlation matrix among the variables. The weak pair-wise correlation indicates that there is no multicollinearity between the determinants. Although Gujrati (1995) suggested that in constructing estimation model with dependent and independent variables, multicollinearity does not create any problem.

Table 3a : Correlation Matrix (Bank-specific Variables)

	NPL	ETA	GGL	ROA	ROE	II	LC	AM	OE
NPLp	1.000								
ETA	-0.163	1.000							
GGL	0.110	0.031	1.000						
ROA	0.012	0.150	-0.107	1.000					
ROE	-0.145	0.000	-0.041	0.021	1.000				
II	0.307	-0.163	-0.053	-0.158	-0.051	1.000			
LC	0.232	0.036	0.064	-0.004	-0.273	0.075	1.000		
AM	-0.124	0.084	-0.008	-0.017	0.067	-0.127	-0.265	1.000	
OE	-0.116	-0.050	-0.002	-0.104	-0.070	0.070	-0.334	0.187	1.000

	NPLt	UN	GDP	INF	CPS
NPLt	1.000				
UN	-0.433	1.000			
GDP	-0.208	0.324	1.000		
INF	-0.003	-0.122	-0.062	1.000	
CPS	-0.589	0.030	0.392	0.325	1.000

Table 3b : Correlation Matrix (Macroeconomic Variables)

4.3 Unit Root Tests

Table 4a shows panel unit root fisher-type tests and 4b shows unit root tests results for panel and time series data respectively. In estimating Panel VAR, positive cointegration among the determinants may not give appropriate results. Therefore, testing unit root is essential. the stationarity of variables has been tested by applying ADF and PP unit roots.

	AD)F	PI)
	I(0)	I(1)	I(0)	I(1)
NPL	5.04***		5.08***	
ETA	14.20***		14.14***	
GGL	11.38***		11.39***	
ROA	5.16***		8.47***	
ROE	9.71***		9.95***	
II	5.62***		5.86***	
LC	3.36**		5.35***	
AM	6.56***		10.83***	
OE	7.01***		6.84***	

Table 4a : Panel Unit Root Fisher-Type Tests

The data of GDP growth and inflation have been converted to first difference. The results permit to go for further tests

Table 4b : Unit Root Tests

	Al	DF	PP			
	I(0)	I(1)	I(0)	I(1)		
NPLt	1.90	3.02*	1.89	3.06**		
UN	3.38**		3.60**			
GDP	0.97	3.67**	1.03	4.43***		
INF	2.13	4.99***	1.99	5.02***		
СРІ	3.81**		3.81**			

* Statistical significance at 10%, **Statistical significance at 5%, and ***Statistical significance at 1%.

4.4 Cointegration Test

Table 5 shows cointegration test result. The null hypothesis is that, there is no cointegration among the determinants. After applying Kao residual cointegration test, it is observed that p-value is less than 5%, that means the null hypothesis cannot be rejected. The test result confirms there is no cointegration among the variables, therefore it allows to run the panel VAR model.

	t-Statistic	Prob.
ADF	-3.55452	0.0002

Table 5 : Kao Residual Cointegration Test

4.5 Lag Selection Criteria

Table 6 represents lag length selection criteria. Since, the variables are suitable for panel VAR model, it is important to know the lag length using several popular information criteria such as Akaike (AIC), Schwartz (SC) and Hannan and Quinn (HQ). All the information criteria suggest to apply 2 lags.

Lag	AIC	SC	HQ
0	19.55911	19.80417	19.58347
1	16.07435	17.54473	16.22051
2	10.95533*	13.65102*	11.22329*

Table 6 : Lag Length Selection Criteria

Source: Author calculations.

*Indicates lag order selected by the criterion.

4.6 Bank-Level and Macroeconomic Factors Estimate

To estimate the impact of determinants on NPLs, both random and fixed effect models have been applied. To know the appropriate method, following hypotheses have been established:

Null hypothesis: random model is appropriate

Alternative hypothesis: fixed model is appropriate.

The Hausman test result (p<0.05%) indicates that null hypothesis is rejected, therefore, fixed model is appropriate. Following the methodology of Kjosevski and Petkovski (2017), the OLS models have been designed. Table 7 shows the estimates of six different models. The model 1 includes all the bank-specific determinants. Equity to total assets have significant negative impact whereas interest income and lending capacity have significant positive impact on NPLs. These results are similar to the findings of Berger and DeYoung (1997).

Determinants	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
С	-8.38***	-7.82***	1.86	58.70***		
NPLp(-1)					0.83***	
NPLp(-2)						0.77***
ETA	-13.96***		-17.04***			
ETA(-1)					-18.08	
ETA(-2)						4.21
GGL	5.03		4.07			
GGL(-1)					4.72	
GGL(-2)						1.93
ROA	4.28	3.17				
ROA(-1)					3.95	
ROA(-2)						1.51
ROE	-0.48	-0.68***				
ROE(-1)					-0.80	
ROE(-2)						0.11
II	0.46***	0.49***				
II(-1)					0.15	
II(-2)						0.05
LC	0.07***		0.10***			
LC(-1)					0.042	
LC(-2)						-0.01
AM	-0.83		-3.88			
AM(-1)					-5.80	
AM(-2)						-16.47***
OE	-0.13		-0.08			
OE(-1)					-0.17	
OE(-2)						0.16**
UN				-7.48***		
GDP				2.98		
INF				0.43		
СРІ				-2.06***		
R-squared	0.18	0.12	0.10	0.59	0.16	0.61
Adjusted R-squared	0.15	0.10	0.07	0.46	0.12	0.57
Wald test (p-value)					0.00	0.00

Table 7 : Estimation Results

Source: Author's calculation.

*Statistical significance at 10%, **Statistical significance at 5%, and ***Statistical significance at 1%.

Growth of gross loans and return on assets have positive but insignificant results. Return on equity, asset management and operating efficiency have negative and insignificant impact on NPLs. Model 2 includes only the profitability factors. Return on equity has significant negative impact, return on asset has insignificant positive result and interest income has significant positive impact. The result fairly indicates that when NPLs increases, it reduces the earnings of shareholders. Therefore, negative correlation between the variables is desired. Model 3 includes determinants that represent management efficiency. Asset management and operating efficiency. The result shows negative impacts. This postulates that efficient management of banks reduces the portion of NPLs. Model 4 includes macroeconomic variables. Unemployment and consumer price index have significant negative impact, which is undesirable whereas, GDP growth rate and inflation have positive impact. The positive GDP growth is the indication of good economy. During boom economy, investment increases and banks sanction more loans. Due to excessive loans, the amount of NPLs becomes very high. In an inflationary economy, purchasing power of money is reduced as commodity prices go up. Borrowers need to pay more money to maintain normal life style as a result, they face problems in repaying interests and loans. Model 5 and 6 include bank-specific lag determinants and the Wald statistics (p<5%) indicate that the variables under both situations can jointly influence NPLs. The negative coefficient of ROE indicates that less profitable or losing banks assume more credit risk. This result is consistent with the findings of Swamy (2012). He concluded that bad management is responsible for low profitability and forces managers to take risky decisions to keep the profit level as high as possible and thus emotional growth turns into bad loans.

4.7 Impulse Response Functions

To verify the dynamic behavior of the models, IRFs have been assessed. The IRFs describe the reaction of NPLs in the system to shocks in another variable while keeping the shocks of other variables zero. The IRFs for the model are shown in figure 2.





Figure 2 : Impulse-response Functions

The IRFs reflect responses of NPLs for one standard deviation shock of NPLs to each bank-specific variable. The red lines indicate 90% confidence intervals. The shock on ETA, GGL, AM and OE reduces the NPLs over the time while that of on ROA, ROE, II and LC improve the conditions.

The above empirical results resemble the actual banking scenario in Bangladesh. The Government of Bangladesh has been trying to keep the NPLs in control by framing new policies, reviewing laws, regulations, acts and guidelines for changes which cover Money Loan Court Act, 2003, Bank Company Act, 1991, Bangladesh Bank Order, 1971, and Bankruptcy Act, 1997 so on and so forth. Formation of a special audit for banks is under consideration to inspect anomalies in this sector (Emran, 2019). Despite various measures, banks are still in serious trouble to hold the reins of NPLs. While lending loans, banks should carefully appraise the proposals and follow the code of conducts to ensure security of loans. People who are involved in

loan appraisal and processing activities should be free from any sort of political and administrative pressures. The loan recovery policy should also be made strict and smooth ensuring necessary legal supports from the government and the regulatory authority. In Bangladesh, there is a practice of appointing directors of board and Chairman of banks on political linkage, as a result, the political influence in different banking decisions and activities cannot be avoided. If they are appointed based on appropriate competency, it will not only improve decision making quality but also keep the decisions free from any sort of political interventions. Government should provide simple and hassle-free solutions to resolve insolvency and bankruptcy related problems by amending the Bankruptcy Act, 1997. This will protect the interest of small investors and depositors. In case of mortgaged loan, banks should value the collaterals properly with the help of professionals to minimize or avoid the default risks. At present there is no asset management company (AMC) working in Bangladesh to resolve NPLs related problems. Formation of AMC can reduce NPLs to a significant extent. The loss-making public banks should either be merged or privatized or divested or restructured as the case may be to increase their profitability and sustainability. The NPLs of South Korea and Malaysia are taken over by their AMCs and sell the packages at realistic prices and thus give the banks a relief indeed (Emran, 2019).

5. CONCLUSION

This study has attempted to analyze the bank-specific and macroeconomic determinants of NPLs for a panel of 33 commercial banks in Bangladesh. The existing literature supports the findings of this study. It is observed that among bank-specific determinants, equity to total assets, interest income, lending capacity, and return on equity have significant impact on the NPLs while unemployment and consumer price index of macroeconomic determinants have significant impact. The IRFs indicate that NPLs react to a shock on return on equity, return on assets, lending capacity, asset management and operating efficiency positively. It is also evident that, a smooth and robust banking system can ensure sustainable economic growth of this country. Regulators and commercial banks are highly recommended to follow the research-based implications of this study to frame appropriate policies and to take banking decisions related to NPLs. This paper has been prepared by considering only five years' data of 33 banks. Potential researchers may cover more data and banks.

REFERENCES

Adebisi, J. F., & Matthew, O. B. (2015). The Impact of Non-Performing Loans on Firm Profitability: A Focus on the Nigerian Banking Industry. *American Research Journal of Business and Management*, 1(4), 1-7.

Adhikary, B. K. (2006). Nonperforming loans in the banking sector of Bangladesh: realities and challenges. *Bangladesh Institute of Bank Management*, 4(26), 75-95.

Akter, R., & Roy, J. K. (2017). The impacts of non-performing loan on profitability: An empirical study on banking sector of Dhaka stock exchange. *International Journal of Economics and Finance*, 9(3), 126-132.

Ali, M. (2012). Bank Specific Determinants of Nonperforming Loan: Empirical Study in Case of State-Owned Commercial Banks in Bangladesh. Bank Specific Determinants of Nonperforming Loan: Empirical Study in Case of State-Owned Commercial Banks in Bangladesh. *Available at SSRN: https://ssrn.com/abstract=3116433 or http://dx.doi.org/10.2139/ssrn.3116433*

Allen, L., & Rai, A. (1996). Operational efficiency in banking: An international comparison. *Journal of Banking & Finance*, 20(4), 655-672.

Anastasiou, D. (2016). Management and Resolution methods of Non-performing loans: A Review of the Literature. *Available at SSRN 2825819*.

Another Janata Bank scam of Tk 5130 crore. (2018, July 20). *The New Nation*. Retrieved from < http://thedailynewnation.com/news/182227/another-janata-bank-scam-of-tk-5130-crore.html>

Balango, T. K., & Rao, M. (2017). The effect of NPL on profitability of banks with reference to commercial bank of Ethiopia. *Business and Management Research Journal*, 7(5), 45-50.

Bannier, C. E., & Hirsch, C. W. (2010). The economic function of credit rating agencies–What does the watchlist tell us? *Journal of Banking & Finance, 34*(12), 3037-3049.

Berger, A., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking and Finance*, 21, 849–870.

Bhattarai, Y. R. (2016). Effect of non-performing loan on the profitability of commercial banks in Nepal. *Prestige International Journal of Management and Research*, 10(2), 1-9.

Bismillah Group Chairman, MD among 9 jailed. (2018, September 11). *The Independent*. Retrieved from < https://m.theindependentbd.com/post/165885>

Boudriga, A., Taktak, N. B., & Jellouli, S. (2009). Banking supervision and nonperforming loans: a cross-country analysis. *Journal of financial economic policy*, I(4), pp 286-318.

De Bock, R., & Demyanets, A. (2012). Bank asset quality in emerging markets: Determinants and spillovers. *IMF working paper* 12/71.

Dey, B. K. (2019). Managing Non-performing Loans in Bangladesh, *International Monetary Fund*, Retrieved from < https://www.adb.org/terms-use#openaccess>

Donath, L., Cerna, V., & Oprea, I. (2014). Macroeconomic determinants of bad loans in Baltic countries and Romania. *SEA – Practical Application of Science*, II(4) (6), 71–80

Emran, M. Z. (2019, September 9). The Economic Consequence of Non-performing Loans. *The Daily Star*. Retrieved from < https://www.thedailystar.net/opinion/ economics/news/the-economic-consequence-non-performing-loans-1797394>

Fainstein, G., & Novikov, I. (2011). The comparative analysis of credit risk determinants in the banking sector of the Baltic States. *Review of Economics and Finance*, 1, 20-45

Festic, M., & Repina, S. (2009). Financial stability in the Baltics. *Czech Journal of Economics and Finance*, 59(6), 554–576.

Gujrati, P. D. (1995). Geometrical description of phase transitions in terms of diagrams and their growth function. *Physical Review E*, *51*(2), 957-974.

Hossain, M. S., & Ahamed, F. (2015). Determinants of bank profitability: A study on the banking sector of Bangladesh. *Journal of Finance and Banking*, 13(1), 43-57.

Islam, F. (2020, January 18). Mess in banking sector responsible for share market slump. *Dainik Prothom-alo*. Retrieved from < https://en.prothomalo.com/ opinion/'Banking-sector-responsible-for-share-market>

Islam, S. (2017, December 10). NRBC Bank MD removed on 10 charges. *Dhaka Tribune*. Retrieved from < https://www.dhakatribune.com/business/banks/2017/12/07/nrbc-bank-md-removed-10-charges>

Jakubík, P., & Reininger, T. (2013). Determinants of nonperforming loans in Central, Eastern and Southeastern Europe. *Focus on European Economic Integration*, *3*, 48-66.

Jiménez, G., & Saurina, J. (2004). Collateral, type of lender and relationship banking as determinants of credit risk. *Journal of banking & Finance, 28*(9), 2191-2212.

Kavkler, A., & Festic, M. (2010). The banking sector in the Baltics. *Banks and Bank Systems*, *5*(3), 87-96.

Kiran, K. P., & Jones, T. M. (2016). Effect of Non-Performing Assets on The Profitability of Banks–A Selective study. *International Journal of Business and General Management*, 5(2). 53-60.

Kjosevski, J., & Petkovski, M. (2017). Non-performing loans in Baltic States: determinants and macroeconomic effects. *Baltic Journal of Economics*, *17*(1), 25-44.

Klein, N. (2013). Non-performing loans in CESEE: Determinants and impact on macroeconomic performance. *IMF working papers 13/72*.

Landefeld, J. S., Moulton, B. R., Platt, J. D., & Villones, S. M. (2010). GDP and Beyond: measuring economic progress and sustainability. Survey of current business, 90(4), 12-25.

Lata, R. S. (2015). Non-Performing Loan and Profitability: The Case of State-Owned Commercial Banks in Bangladesh. *World Review of Business Research*, *5*(3), 171-182.

Matin, K. A. (2017, April 27-29). Determinants of bank profitability in Bangladesh. presentation at the 20th Biennial Conference on Economics and Ethics of the Bangladesh Economic Association., 1-20.

Mohanty, A. R., Das, B. R., & Kumar, S. (2018). Determinants of Non-Performing Loans in India: A System GMM Panel Approach. *Prajnan*, 47(1).

Mondal, T. (2016). Sensitivity of non-performing loan to macroeconomic variables: empirical evidence from banking industry of Bangladesh. *Global Journal of Management and Business Research*, 16(4), 20-28.

Nkusu, M. (2011). Nonperforming loans and macro financial vulnerabilities in advanced economies. *IMF working paper 11/161*.

No BB heist probe report until case in Philippines settled: Muhith. (2017, August 5). *The Daily Star*. Retrieved from < https://www.thedailystar.net/country/bangladesh-bank-heist-probe-report-not-before-case-settled-philippines-says-finance-minister-muhith-1443991>

Nsobilla, T. (2016). *The effect of non-performing loans on the financial performance of selected rural banks in the Western and Ashanti regions of Ghana* (Doctoral dissertation).

Podder, B. (2012). Determinants of profitability of private commercial banks in Bangladesh: An empirical study. *A thesis for a Professional Master in Banking Finance. Asian Institute of Technology. Thailand.*

Prochniak, M., & Wasiak, K. (2017). The impact of the financial system on economic growth in the context of the global crisis: empirical evidence for the EU and OECD countries. *Empirica*, 44(2), 295-337.

Rahman, S. (2013, June 28). Scam hits Basic Bank. *The Daily Star*. Retrieved from < https://www.thedailystar.net/news/scam-hits-basic-bank>

Rajha, K. S. (2016). Determinants of non-performing loans: Evidence from the Jordanian banking sector. *Journal of Finance and Bank Management*, 4(1), 125-136.

Reddy, Y.V. (2004, March 1). Credit Policy, Systems, and Culture. *Reserve Bank of India Bulletin*, 303-311

Rinaldi, L., & Sanchis-Arellano, A. (2006). Household debt sustainability: What explains household non-performing loans? An empirical analysis. ECB Working Paper No. 570, *Available at SSRN: https://ssrn.com/abstract=872528*

Salike, N., & Ao, B. (2018). Determinants of bank's profitability: role of poor asset quality in Asia. *China Finance Review International*, 8(2), 216-231.

Swamy, V. (2012). Impact of macroeconomic and endogenous factors on nonperforming banks assets. *International Journal of Banking and Finance*, 9(1), 26–47.

Towhid, A. S. M., Havidz, S. A. H., & Alnawah, M. A. Q. A. (2019). Bank-Specific and Macroeconomic Determinants of Non-Performing Loans of Commercial Banks in Bangladesh. Dinasti International Journal of Management Science, 1(1), 86-101.

Uddin, Z. A. (2018, March 24). New scams hit Farmers Bank. *The Daily Star*. Retrieved from https://www.thedailystar.net/frontpage/new-scams-hit-farmers-bank-1552612

Zheng, C., Bhowmik, P. K., & Sarker, N. (2020). Industry-Specific and Macroeconomic Determinants of Non-Performing Loans: A Comparative Analysis of ARDL and VECM. *Sustainability*, 12(1), 325. DOI:10.3390/su12010325