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Firm-specific Financial Determinants of Non-Performing Loan in the Banking Sector of Developing Countries: Evidence from the Listed Commercial Banks in Bangladesh

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Abstract

This article aims at finding the financial determinants of Non-performing Loans (NPL) in the banking sector of Bangladesh. It employs panel data analysis techniques to find those determinants and the extent of their impact on NPL. It collects data from 2012 to 2016 (total 5 years) of 10 listed commercial banks in Bangladesh from their annual report. It finds that Capital Adequacy Ratio (CAR) and Return on Equity (ROE) are significantly negatively related to NPL where Size (S) is a significant positive determinant of NPL. It also finds that Loan growth (LG) is positive determinants of NPL where Loan to Deposit ratio (LTD) is a negative determinant of NPL, but none of these two is significant. Bank management should focus on higher CAR and efficient utilization of assets that will lessen NPL and consequently enhance the performance. Findings of this article are highly congruous with that of existing literature.

Key Words: Non-performing Loan, Capital Adequacy Ratio, Return on Equity, Loan Growth, Bangladesh.

1. Introduction:

The term non-performing loan (NPL) means the amount of loan for which the debtor has not made any scheduled payment at least for 90 days as per the rule of Bangladesh Bank. It may be a bad loan or close to a bad loan. Loan default in the Banking sectors of Bangladesh has already become a culture that is a big threat to the performance and sustenance of a bank. It is too dangerous a thing that can lead to the substantial financial crisis (Ahmad and Bashir, 2013).

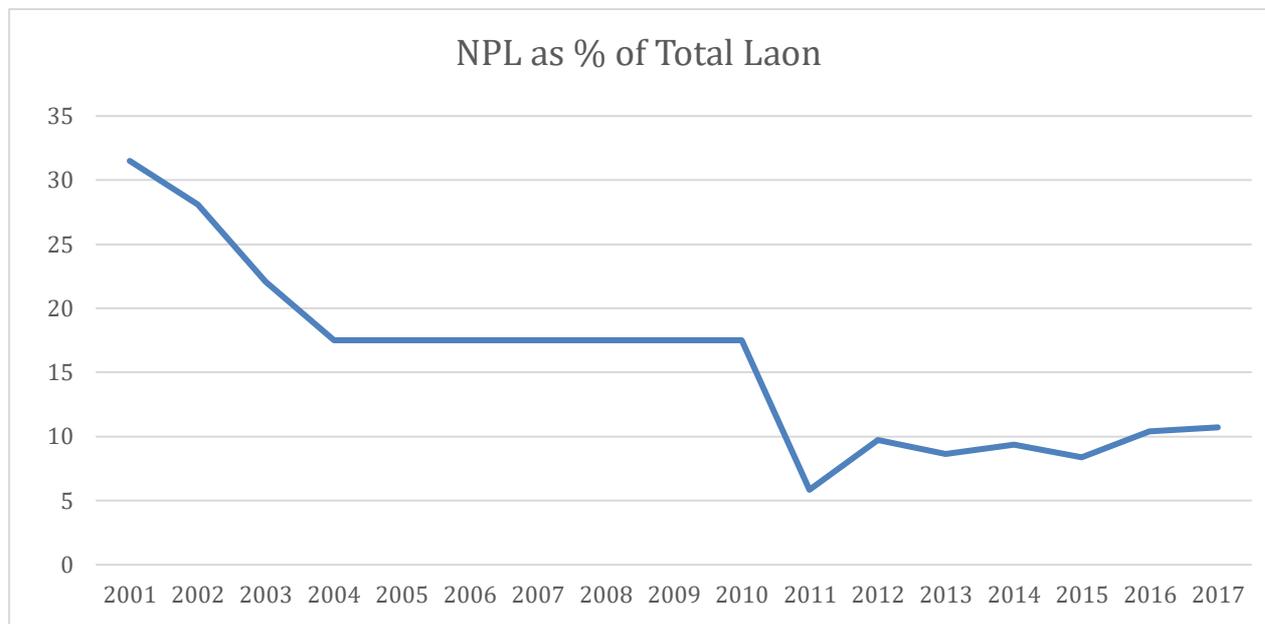
One of the major concern for the banking sector is the minimization of the non-performing loan. NPL is basically dependent on many aspects, both of clients and banks. For example, the inefficiency of management in calculating the credit-worthiness of a client may be a major driver of NPL. On the other hand, an unwillingness of the client or the subsequent failure in business may lead the business borrower to default. Another important reason for the non-performing loan is the use of the fund in the sectors other than those it was collected for (Richard, 2011).

Most of the defaulters of this country are habitual defaulters who take loan and default willingly. Many of them continue taking a fresh loan in addition to the over-due amount after filing a writ petition to the court that gives them a clean slate (The Daily Star, November 2017). Again, they fail to pay back the loans. The central bank of Bangladesh has a lot to do to rein this situation. Another very crucial reason for a loan is the absence of strong

corporate governance. As this popular daily reported, many of the defaulters default due to legitimate reasons. For example, many of them defaulted due to sluggish growth of export earnings and inflow of remittance. On the other hand, many of them default due to an unfriendly business environment.

This article mainly aims at finding the firm specify financial determinants of non-performing loans in the banking sector of Bangladesh, especially in commercial banks listed on the Dhaka Stock Exchange (DSE). It uses panel data analysis techniques and financial data of five years from the annual reports of 10 listed commercial banks of the DSE. That means it considers 50-factor years of data. The independent variables selected are, Capital adequacy ratio (CAR), Loan Growth (LG), Loan to deposit ratio (LDR), Return on equity (ROE) and Size of the bank in term of total assets. Graph 1, given below, presents the historical scenario of NPL in Bangladesh as a percentage of total Loan.

Graph 1: Recent Trends in NPL in Banking Sector of Bangladesh



Source: CEIC

As the graph shows, NPL has fallen down as a percentage of the total loan from 2001 to 2004 significantly. From 2004 to 2010, it remained stable at almost 18%. Again it started falling and continued up to 2011 and reached a 6% mark. After 2011, with some ups and down, it kept increasing and reached a point of 11% in 2017 showing an upward trend.

In the following sections, this article focuses on research methodology, hypothesis building, model development and analysis of the result. It also provides policy guidelines to the interested parties in banking sectors throughout the analysis in the article.

2. Literature Review:

A very few numbers of research has been performed on NPL in the banking sector of Bangladesh. A portfolio of knowledge has been created from the literature of some native and foreign research papers as presented below.

Non-Performing Loans (NPL):

Non-Performing Loans are an acute problem of the banks of Bangladesh and more specifically of banks, located in the urban and corporate periphery, dealt with the industrial and big business loans. Credit Risk occurs when a loan becomes non-performing. A Non-performing loan is a loan that is in default or close to being in default (Bangladesh Bank). It is the most important factor behind the survival of a bank that may also indicate the failure of bank's policy resulting in a broader financial crisis (Saba et al, 2012). Adhikary(2006), finds that NPL is

alarmingly prevalent in the banking sector of Bangladesh, both in nationalized commercial banks and development financial institutions. According to him lack of enforcement of law along with poor capital adequacy ratio are the main determinants of NPL.

According to Saba et al, 2012, a non-performing loan (NPL) is defined as a sum of borrowed money upon which the debtor has not made his or her scheduled payments for at least 90 days. A nonperforming loan is either in default or close to being in default. Once a loan is nonperforming, the odds that it will be repaid in full are considered to be substantially lower. If the debtor starts making payments again on a nonperforming loan, it becomes a re-performing loan, even if the debtor has not caught up on all the missed payments. On the other hand, Mahmood (2016) Defined non-performing loan as the financial assets that generate no interest income or principal repayment to the lending party. According to BRPD Circular 14, 2012 of Bangladesh Bank, the following policies are followed to determine the extent of non-performing loan of a continuous or demand loan.

Overdue or due period	Classification
03 months or more but less than 06 months	substandard
06 months or more but less than 09months	Doubtful
09 months or beyond	Bad loan

Source: BRPD Circular 14, 2012

Capital Adequacy Ratio: As a financial institution a bank may have several sources of fund that can be broadly categorized in two groups i.e. deposit and non-deposit where capital is the non-deposit source of fund for a bank. A simple definition of capital can be the fund coming from long-term debt and equity to the bank. Capital adequacy ratio depict the internal financial strength through giving insight of financial position of a Banka (Shrivastava, 2011). Moreover, falling of this ratio below the minimum requirements results in higher regulatory cost for bank managers(Moyer, 1990). Though this ratio may seem positive for the bank succinctly, a stringent capital adequacy rule may also bring danger or increase risk for a bank as under bindings equity a unit of equity of tomorrow will be more valuable to the banks commensurately rising the risk (Blum, 1990). A higher stock of capital will result in economic fluctuation in turns and reduce bank's ability to disburse fund to lending and industry investment.(Blum and Hellwing,1995). According to Mamun, 2013, in order to calculate CAR, banks are required to calculate their Risk Weighted Assets (RWA) on the basis of credit, market, and operational risks where the total RWA will be determined by multiplying the amount of capital charge for market risk and operational risk by the reciprocal of the minimum CAR and adding the resulting figures to the sum of risk weighted assets for credit risk. The CAR is then calculated by taking eligible regulatory capital as numerator and total RWA as denominator. Minimum capital requirement in Bangladesh is 10% of total risk weighted asset or 4 billion as capital whichever is higher of which 5% should be core capital (BRPD Circular No. 10).

Return on Equity (ROE):

Return on equity is a measure of performance of a business that is derived by dividing net income attributable to the owners of a business by equity of the owners or net assets. The core decision behind any investment decision is whether it will boost up the value of equity holders, and return one equity is one of the most crucial drivers of that value to the equity holders (Arditti,1967). On the other hand, ROIS is affected by the several aspects of company performance like total equity, leverage, performance, return on assets etc. amongst which Risk and Size of the fir are the two most significant determinants(Hagerman and Ratchford,1987). ROE is also an factor of evaluating the efficiency of management (Samad and Kabir,1999).

Size (Total Assets):

Size of a bank (actually any business) is a major aspect of its performance, and this can be measured in terms of total assets, capital or sales volume. Size of bank may have diversified impact on its risk and performance. A bank with higher size enjoys a competitive advantages and lower risk where a smaller banks are bound to take higher risk due to fierce competition (Hakenes and Schnabel, 2011). On the other hand, a bank with larger capacity can serve the customers fasters, solve problems quickly, access the financial flows easily and so on so forth. But, Laeven et al. (2014)come with and opposing finding that the systematic risk of a bank increases with increase in the size of a bank.

Loan Growth (LG):

Loan growth can be defined, in simple language, as percentage increase in the total amount of loan disbursed from the previous year. With the expansion of business and increase in demand from the clients, it is necessary to increase amount of loan but an abnormal loan growth leads to lower capital ratio and increases risk for the banks resulting in lower performance and higher loan loss in turns (Foos et al. (2010), Keeton, (1999)). Loan growth is also a measure of loan quality. Though complex, there exist a relationship between loan growth and loan quality, to be more specified a higher loan leads to higher loan quality of loan, meaning increased loan loss and charge-off [clair,(1992) and Laeven and Majnoni(2003)].

Loan to Deposit Ratio (LDR):

Loan to deposit ratio is ratio between total loans and total deposit of bank. If this ratio is more than one, it implies that the bank is relying on outside borrowing that may increase the risk of performance in case of non-performance of loan where a ratio lower than one may imply the safety of performance. A sector variation regarding the LDR may have varied impact on the performance and risk of a bank. For example, a shift form business sector to personal sector increases the interest margin of banks (Allen, 1988). LDR is also a measure of the flow of the fund. A relatively inflexible RDR may lead to shortage in mortgage and hamper the cyclical flow of funds to and from the banks that in turns may haper the performance of bank (Klein, 1972).

The relationship among Non-performing Loan, Capital Adequacy, Loan Growth, Size, Loan to Deposit Ratio and Return on Equity:

Tsige(2013) in his article on Determinants of Non-performing loans in Ethiopian commercial banks found that Size has a significant positive relationship with NPL where loan growth, financial performance, operational efficiency have a negative impact on NPL of commercial banks in Ethiopia. Rahamand et al (2016) in a research on determinants of non-performing loans in Indonesia covering a sample period of 2013-2014 of 26 commercial banks found that Capital adequacy ratio(CAR)) is significantly negatively related to the amount of NPL and loan to deposit ratio was insignificantly related to NPL. Louzis et al (2012) in a study on non-performing loans of Greece studied the impact of some macroeconomic and firm-specific factors on NPL. They performed a comparative analysis and found that GDP, Unemployment rate, Interest rate, Public debt and Quality of management are the variables that can significantly describe the NPL in the banking sector of Greece. Messai and Jouini (2013) studied the impact of both microeconomic and macroeconomic factors on the NPL of Italy, Greece and Spain for a period of 2004-2008. Using panel data analysis technique in their research they found that NPL is negatively affected by GDP growth and profitability of bank where it is positively affected the real interest rate, unemployment rate and loan loss reserve ratio. Marki et al (2014) studied the determinants of non-performing loans in the Eurozone banking system using a case study approach for a periodof 2000-2008. They used both macroeconomic and microeconomic variables in their study. They found a strong correlation between NPL and firm-specific variables, namely Return on Equity (ROE), Growth of NPL and Capital adequacy ratio (CAR). Ghosh (2015) in his article sought evidence of determinants of non-performing loans from the banking industry of the USA for a study period of 1984-2013. He used both industry-specific and regional factors to find their impact on NPLs. Liquidity risk, poor credit quality, cost efficiency, and size of the bank have a significant positive impact on NL. He also found that higher profitability of bank is significantly negatively related to NPL. Ahmad and Bashir (2013) in their article titled “Explanatory Power of Bank Specific Variables as Determinants of Non-performing Loans: Evidence from Pakistan” performed a study of 6 years panel data of 30 commercial banks in Pakistan. They found that Size of a bank, Management quality, Moral hazards, Return on assets, Return on equity, Loan growth, Loan to deposit ratio are the significant determinants of non-performing loans in commercial banks of Pakistan.

This article is important in that it considers more recent data (2012-2016) and provides the investors and banking organizations with more update guidelines. On the other hand, it uses panel data analysis techniques to do the same that has not been done before in Bangladesh. Thus this article fills up the research gap and contributes to the existing body of literature.

3. Research Objectives:

The core objective of this article is to find out the determinants of Non-performing loans (NPL) and their impact on the same in the banking sector of Bangladesh. It also aims at providing policy guidelines to the bank management and the interested parties.

4. Sample and Data:

This article selects 10 commercial banks listed on the Dhaka Stock Exchange (DSE) randomly. These banks are Islami Bank Ltd, Dhaka Bank Ltd., Mutual Trust Bank Ltd., Dutch Bangla Bank Ltd., Social Islami Bank Ltd., Prime Bank Ltd., Brac Bank Ltd., Standard Bank Ltd., Jamuna Bank Ltd., and South-East bank Ltd. It considers a sample period of total 5 years from 2012 to 2016. These 10 banks comprise 1/3 of the commercial banking companies listed in the DSE. Data has been collected from the published annual report of these banks and some magazines of this Bangladesh.

5. Methodology:

This article employs panel data analysis technique to find out the impact of independent variables on NPL. It uses Hausman test (Hausman, 1978) to select the model (Fixed or Random). It also employs Wald test, Pesaran CD test, and LM test for diagnosing the data set. It collects the required data from the annual reports of the sample banking companies.

6. Independent Variables and Model Development:

In this section, this article develops the theoretical and mathematical model of the expected relationship of independent variables with the dependent variable. At first, it develops the hypotheses, then it presents the expected theoretical relationship in table 1 and then shows the mathematical relationship in an equation.

Capital Adequacy Ratio (CAR): It is a measure of capital and measured in terms of risk-weighted assets of a bank. It is maintained to protect the depositors. The higher the amount of CAR is, the lower is the amount of NPL.

H₀: There exists no relationship between NPL and CAR.

H₁: There exists a relationship between NPL and CAR.

Loan to Deposit Ratio (LDR): Loan to Deposit ratio (LTD) means the portion of deposits from the depositor disbursed as loan to the customers. The higher will be this ratio, the higher will be the chance of NPL.

H₀: There exists no relationship between NPL and LDR.

H₁: There exists a relationship between NPL and LDR.

Loan Growth (LG): It means the amount of loan disbursed in addition to the prior one. As loan grows, a chance for default also grows. The higher is the amount of LG, the higher will be the chance of NPL.

H₀: There exists no relationship between NPL and LG.

H₁: There exists a relationship between NPL and LG.

Return on Equity (ROE): A higher amount of Non-performing loan leaves a lower amount of assets used to earn the profit. As a result, earnings fall and consequently ROE also falls. Therefore, a higher amount of NPL implies a lower amount of ROE.

H₀: There exists no relationship between NPL and ROE.

H₁: There exists a relationship between NPL and ROE.

Size (S): A bigger size of a bank in term of total assets means its higher capacity to disburse loan and adequacy of assets. As a bank gets larger, amount of distributed loans also increases. This higher amount of loans create a commensurate higher risk of NPL.

H₀: There exists no relationship between NPL and Size(S)

H₁: There exists a relationship between NPL and Size(s)

Table 1: Expected Relationship of Independent Variables with Dependent Variables.

Dependent Variable	Independent Variables	Expected Relationship	Sign of Relationship
NPL	CAR		-
NPL	LDR		+
NPL	LG		+
NPL	ROE		-
NPL	S		+

Model Development:

From the theoretical discussion and expected relationship given above, NPL is a function of CAR, LDR, LG, ROE, and S that can be presented as follows:

$$NPL = f(CAR, LDR, ROE, S)$$

The mathematical model can be presented as follows:

$$\ln NPL = \beta_0 + \beta_1 CAR_{it} + \beta_2 LDR_{it} + \beta_3 LG_{it} - \beta_4 ROE_{it} + \beta_5 \ln S_{it} + \varepsilon_{it}$$

Where, NPL_{it} = Non-performing loan of a bank of time t

B_0 = the intercept

CAR_{it} = Capital adequacy ratio of bank i of time t

LDR_{it} = Loan deposit ratio of bank i of time t

LG_{it} = Loan growth of bank i of time t

ROE_{it} = Return on equity of bank i of time t

S_{it} = Size (total assets) of bank i of time t

ε_{it} = error term

7. Analysis of Results and Findings:**7.1 Correlation Analysis:**

Table 1, given below, presents the value of correlation among the variables. It shows the correlation coefficient of the dependent variable (NPL) with independent variables and among the independent variables also. We find that no multicollinearity occurs among the independent variables. Correlations between LG and LDR, CAR and S, LG and ROE, and ROE and S are found to be significant at 1% level of significance. From these data, it can be concluded that the data set is free from multicollinearity.

Table 2: Pearson Test of Correlation:

	Ln NPL	CAR	LG	LDR	ROE	Ln S
Ln NPL	1	-0.159	0.014	-0.186	0.1887	-0.152
CAR		1	0.22	0.1647	0.113	-0.234***
LG			1	0.3879***	0.416***	-0.158
LDR				1	-0.0264	0.224
ROE					1	-0.41***
Ln S						1

*** means the correlation is significant at 1% level.

7.2 Diagnosis Test:

Values of three test statistics are given in table 3. Value of serial correlation test reveals that there exists serial correlation in the data set of this paper. On the other hand, the value of Pearson CD that is used to test the cross-section dependence in the data set reveals that there exists no cross section dependence in the data set. The null hypothesis of no cross-section dependence is accepted. It is also visible from the value of Wald test that there exists heteroscedasticity in the data set of this paper that is evident by the P-value of Wald test less than the 5%.

Tables 3: Diagnosis Tests

Tests	Name of test	Test Value	P Value
Serial Correlation	LM Test	75.35684	0.00031
Homoscedasticity	Wald Test	207.28	0.0000
Cross-section dependence	Pearson Cd	-0.82322	0.4104

7.3 Selection of Appropriate Model:

Appropriateness of panel data analysis is dependent on the choice of the model that gives the best estimate. As we can see that there exist heteroscedasticity and serial correlation in the data set used in this paper, use of general pooled ordinary least square (OLS) may give a biased and inappropriate result. That is why Random and Fixed effect models are estimated. Here, Hausman test is used to decide between Fixed effect and Random effect model. Value of Hausman test supports the selection of Fixed effect model as evident by the P-value less than 5%.

Table 4: Hausman Test

Test	Test Value(Chi-Square)	P value
Hausman Test	14.827825	0.0111

7.4 Analysis of Regression Result:

Table 5, given below, presents the result of Fixed effect regression model using panel data. As it is seen in the table, Capital Adequacy Ratio (CAR) is a significant negative determinant of NPL in banking sectors of Bangladesh as evident by its P value of 2.25%. Each unit increase in CAR reduces NPL by 0.039 unit. Similarly, Return on Equity (ROE) is also a significant negative determinant of NPL as evident by its P value of 0.0001 that is almost 0(zero). Each unit increase in NPL decreases REO by 0.0304unit. On the other hand, size of a bank, that means, total assets is a significant positive determinant of NPL. Each unit increase in the total asset increases NPL by 1.23 unit and vice versa. It is also seen that Loan growth (LG) positively affects the NPL where Loan to deposit ratio (LDR) affects NPL negatively. None of the LG and LDR is significantly related to NPL as evident by their corresponding P-values.

Value of R-squared is 91%. It means our model can explain the 91% of changes in the dependent variable (NPL) by the independent variables. It has a very satisfactory explanatory power. Value of F-statistics is 2831.924 and its p-value is 0.000. It means that the explanatory power of the model is statistically significant.

Table 5: Result of Fixed Effect Model:

Variables	Coefficient	Standard error	t-statistics	P value
C	-7.212181	3.937875	-1.831490	0.0756
CAR	-0.039333	0.016475	-2.387414	0.0225
LDR	-0.010052	0.00747	-1.345470	0.1871
LG	0.004857	0.00443	1.094597	0.2812
ROE	-0.030423	0.006905	-4.405785	0.0001
S	1.238979	0.170643	7.260629	0.0000
R-squared	0.910118	Adj. R-squared	0.908765	
F-value	2831.924	Prob. of F-value	0.0000	

8 Conclusion and Policy Guidelines:

The non-performing loan has become one of the major threat to the banking sector of Bangladesh. Here loan default is almost a culture and very easy to get escape. Political shelter and lack of enforcement of the law, on one side, and lack of a prudent decision by bank management, willing defaults, on the other hand, are major issues behind the scene. The government of Bangladesh has to recapitalize the state-owned banks regularly. On the other hand, opening and operating a bank in this country is becoming easier. A huge competition in this sector makes the management relaxed regarding issuing loans. They issue loans in easy conditions and without proper check-up of credit worthiness. The low-interest rate, problems of corporate governance, family control, dishonest practices, political instability etc. contribute to soaring up this situation from time to time. This kind of rampant loan default is really leading the banking sector of this country to a crisis. This situation should be checked before it becomes too late.

In this article, it is found that Capital adequacy ratio (CAR) significantly reduces the amount of NPL in Bangladesh. Bank management should focus on this aspect strongly. On the other hand, NPL reduces the performance bank significantly that may lead to long-term sustainability threats. It is also found that Size of a bank in terms of total assets significantly contributes to NPL in a positive way. It implies the mismanagement of assets by bank management.

This article considers financial aspects specific to the banking companies. In addition to these, other factors like macroeconomic ones can be used in future research to seek more answers and contribute to the development of the banking sector of Bangladesh.

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