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Research Article

Impact of Macroeconomic Determinants on Non-Performing Loans of Commercial Banks in Bangladesh

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ABSTRACT

The banking system is harmed by rising levels of nonperforming loans (NPL) because they erode capital, decrease liquidity, lessen lending capacity and reduce investors' trust. The banking industry in Bangladesh had a NPL ratio of 12.60% at the end of June 2024, which was a big problem for the sector. Now is the moment to figure out what causes NPLs. Prior research indicates that some bank-specific, macroeconomic, and governance indicators contribute to the rising trend of NPLs. However, the current research seeks to examine the influence of macroeconomic variables only on NPLs in Bangladesh. GDP, interest rate, unemployment rate, currency exchange rate, and inflation rate were employed as independent variables. The World Bank database was used to get macro data. In addition, data on the dependent variable NPLs were gathered from 20 randomly chosen commercial banks in Bangladesh from 2013 to 2025. The GMM model was used to ascertain the extent of correlations between dependent and independent variables. The study's findings indicate that the interest, unemployment, currency exchange, and inflation rate have influence on NPLs. But the effect of GDP on NPLs was negative. The study's results will assist the regulatory authority, policy makers, depositors, borrowers, and investors make better choices in the future.

Keywords: NPLs, Macroeconomics factors, Private commercial banks, GMM, Bangladesh.

1. Introduction

Banks provide both short- and long-term financing to various economic sectors, aiming to recover their funds with interest as profit, which is essential for their financial stability. The primary source of income for commercial banks comes from loans and advances, with interest earnings from loans constituting over 85% of total earnings. However, the presence of (NPLs, defined as loans overdue by more than 90 days (Nkusu, 2011; Zeng, 2012; Ghosh, 2015), poses a significant threat to banks. The European Central Bank (2017) define NPLs as debt .

outstanding which are 90 days in arrears or more, or where the debtor is unable to pay off debts. The IMF (2006) also defines loans as nonperforming if principal

and interest payments are delinquent for 90 days or more.

The negative impact of the rise in NPLs on the banks' profitability comes from the fact that the banks need to set aside a part of their loans as provisions which reduces the net profit and thus reduces confidence of depositors, foreign investment, and shareholder equity and dividend payments. NPLs also disrupt banks' liquidity, leading to increased short-term borrowing costs (Asian Development Bank, 2020).

High NPL levels can erode capital and hurt profitability and liquidity (Salas and Saurina, 2002), and are often indicative of impending financial crises (Reinhart et al., 2011). NPLs not only diminish bank earnings but also reduce lending capacity by eroding bankable assets (Rahman, 2021), resulting in higher operational costs and loan interest rates. If loan default rates continue to rise, banking failures become inevitable (Bardhan et al., 2016). The Bangladeshi banking industry is clearly affected by NPLs' negative impact on banks' financial health, which includes capital erosion, decreased liquidity, and lending capacity (Anik et al., 2020). Therefore, this study seeks to investigate the factors affecting NPLs in the commercial banks of Bangladesh.

1.1 Background of the Study

The Bangladesh Bank classifies NPLs as substandard (SS), questionable (DF), and bad loss (BL). Banking sector NPLs rose from 226.5 billion BDT in 2011 to

1560.4 billion BDT in 2023, demonstrating a considerable decrease in loan performance (Figure-1.a). In 2023, Private Commercial Banks (PCBs) had 736.4 billion BDT in NPLs, up 30.47% from 2022.

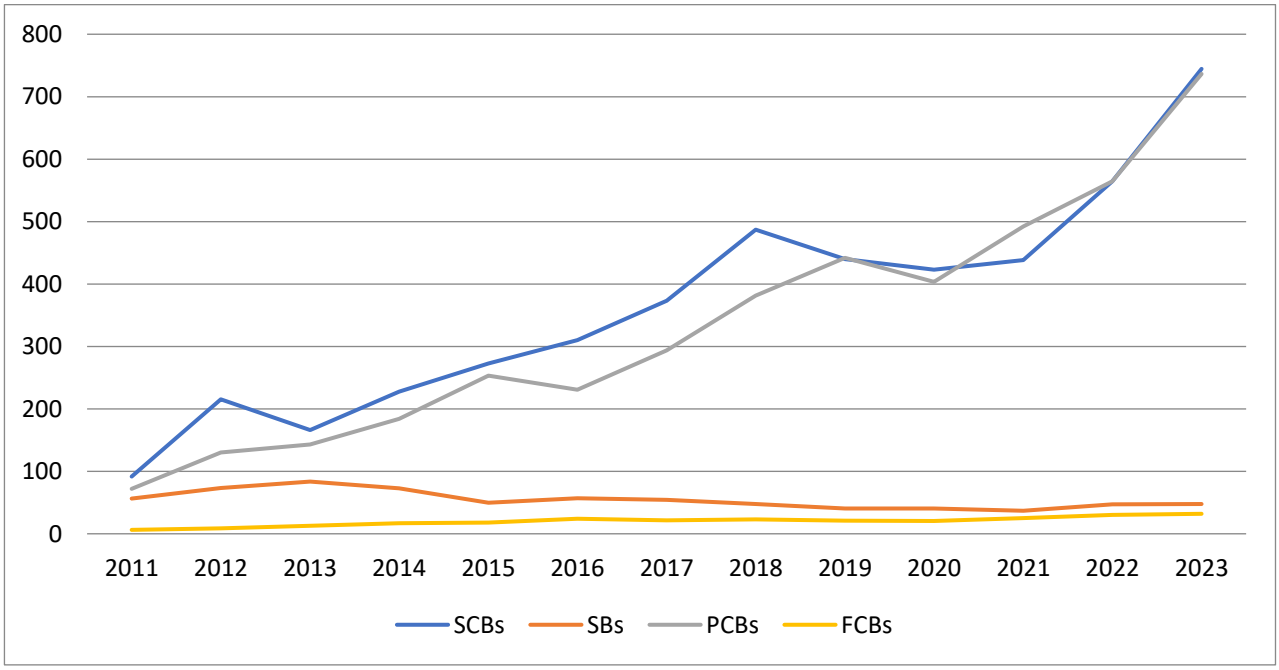

Figure-1.a: Amount of NPL (in Billions)
Source: Bangladesh Bank's Department of Off-Site Supervision, 2024

Bangladesh Bank reported NPLs as 10.1% in 2024 (Figure-1.b) highlighting structural issues in PCBs like poor economic conditions, management practices, political influences, high-profile loan defaulters, and inadequate risk assessments. Due to the necessity for huge NPL reserves, PCBs, which hold a growing percentage of loans and assets, struggle to sustain profitability and capital, threatening the economy and financial system. The growing NPLs hurt bank profitability and investor confidence, restricting fresh loans.

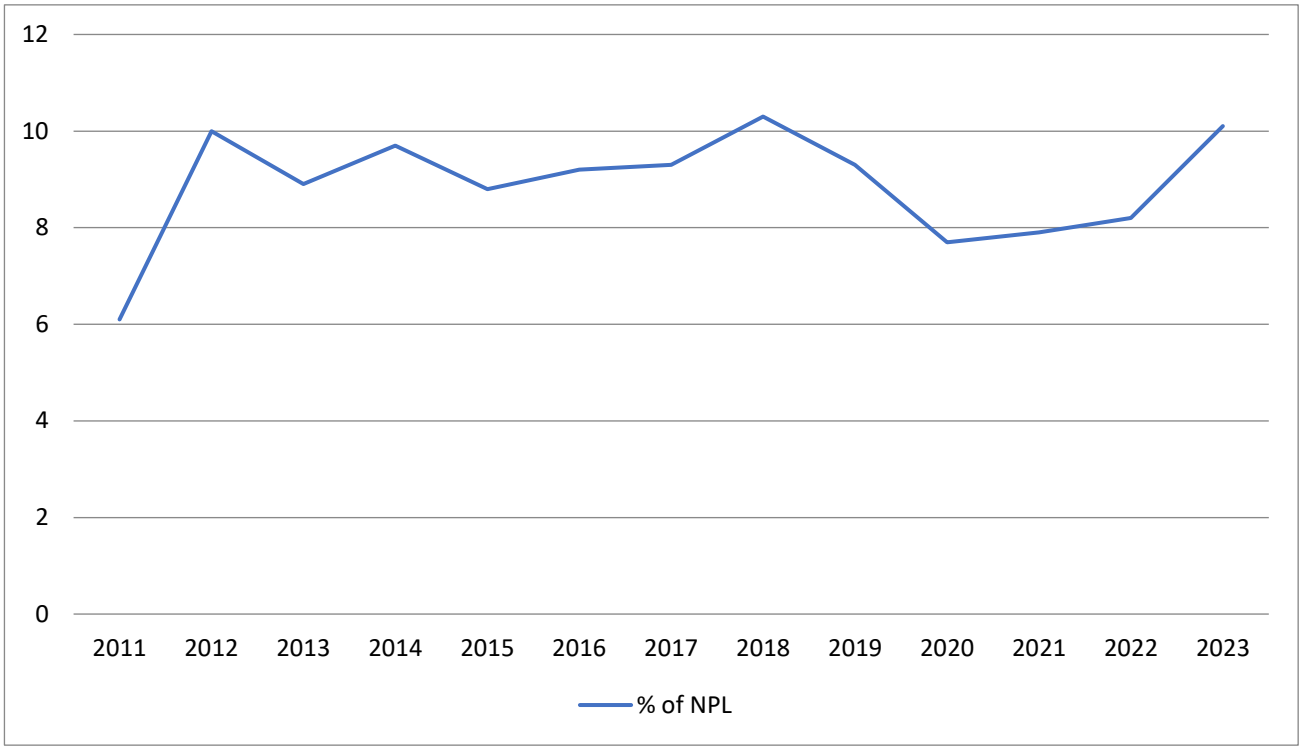

Figure-1.b: Percentage of NPL

Source: Bangladesh Bank's Department of Off-Site Supervision, 2024

At the stage, a thorough investigation and policy changes focused on regulatory frameworks and risk management are needed to solve NPLs. This research, therefore, seeks to uncover macroeconomic variables driving NPLs, which might inform policy reforms and strengthen banking industry of Bangladesh. Existing literature identifies GDP growth, inflation, exchange rate, unemployment, and interest rate as major macroeconomic factors of NPLs. For instance, strong economic growth improves business activities and household income, thereby reducing loan default risk (Hasan, 2019; Rahman, 2022). Inflation affects borrowers' purchasing power and repayment ability and ultimately increases NPLs (Anita et al., 2022). Rahman (2022) found that exchange rate instability increases NPLs by raising import costs and debt burdens. Unemployment also reduces borrowers' income and repayment capacity affecting NPLs (Louzis et al., 2012). Hasan (2019) similarly observed that rising lending rates contribute to increasing NPLs in Bangladesh.

1.3 Research Questions

After reviewing previous literatures the following research questions can be asked for banking sector of Bangladesh: Is GDP growth an important factor of NPLs? Has inflation any impact on NPLs? Does exchange rate fluctuation influence the NPLs? Is unemployment a significant factor of NPLs? Has interest rate any effect on NPLs?

1.4 Objectives of the Study

The main goal of this research is to study the macroeconomic variables of NPLs which are playing significant roles to the commercial banks of Bangladesh. The study has specific objectives as follows:

To observe the impact of GDP growth on NPLs;

To see the impact of inflation on NPLs;

To examine the impact of exchange rate on NPLs;

To study the impact of unemployment on NPLs; and

To notice the impact of interest rate on NPLs.

2. Literature Review

There has been a large amount of research conducted in the past few decades on the determinants of NPLs. Bhattarai (2017), Golitsis et al., (2019) and Obeid (2022) found that the increase in NPLs is caused by both macroeconomic and bank-specific factors. A number of other studies of NPLs only consider macroeconomic factors (Beck et al., 2015; Castro, 2013; Skarica, 2014; Louzis et al., 2012). The present study also attempts to find out the macro-economic factors influencing the NPLs. Macroeconomic factors are economic conditions outside the banking sector that affect the ability of the borrowers to pay back and the stability of the banking sector. The literature shows that there are main macroeconomic factors affecting NPLs, which include GDP growth, inflation, exchange rate, unemployment and interest rate.

The GDP growth is one of the significant macroeconomic factors of NPLs. Favourable economic growth will enhance business activity and household income which will reduce loan default risk. On the other hand, Castro (2013), Beck et al. (2015), and Klein (2013) also determined that there is a negative correlation between GDP growth and NPLs. Furthermore, Hasan (2019) and Rahman (2022) found that the speed of economic growth is negatively related with NPLs in Bangladesh. Hence, the first hypothesis of the study is:

H1: There is a significant relation between GDP growth and NPLs.

Inflation affects borrowers' purchasing power and repayment ability. Accordingly, Fofack (2005), Makri et al. (2014), and Anita et al. (2022) found that inflation significantly increases NPLs. Mondal (2016) also observed that inflationary pressure contributes to rising loan defaults In Bangladesh. Thus, the second hypothesis of the study is:

H2: There is a significant relation between inflation and NPLs.

Exchange rate volatility also has an impact on the quality of loans, particularly in developing economies. Also, both Anastasiou et al. (2016) and Anita et al. (2022) concluded that exchange rate instability leads to an increase in NPLs because of the rise in import prices and debt burden. In a similar study, Rahman (2022) found the same results in Bangladesh. So, the third hypothesis of the study is:

H3: There is a significant relation between exchange rate and NPLs.

Another important factor affecting the NPLs is unemployment as when people lose their job, their income and their power to repay is affected. Fofack (2005) and Louzis et al. (2012) showed that there is a positive relationship between unemployment and NPLs. Higher unemployment affects the financial stability and exposes to default risk. So, the fourth hypothesis of the study is:

H4: There is a significant relation between unemployment and NPLs.

Interest rate is also widely recognized as a significant determinant of NPLs. Nkusu (2011) and Waqas et al. (2017) found that higher interest rates increase borrowing costs and worsen loan repayment conditions. Similarly, Hasan (2019) observed that rising lending rates contribute to increasing NPLs in Bangladesh. Hence, the fifth hypothesis of the study is:

H5: There is a significant relation between interest rate and NPLs.

Overall, the literature suggests that macroeconomic instability significantly affects loan quality and banking sector performance. GDP growth, inflation, exchange rate, unemployment, and interest rate collectively influence the level of NPLS.

2.1 Research Gap

Many researchers in Bangladesh undertook studies to investigate the causes of high levels of NPLS. Sarker (2019) did a comparative research of SCBs, SBs, PCBs, and FCBs using panel data analysis from 2006 to 2017 and discovered no homogeneity of variance for all four types of banks. Towhid (2019) explores another research that use panel data and takes into account both macroeconomic and industry-specific factors. While them only access data from 16 banks over 5 years. Over a 6-year period, Ahammed et al. (2018) and Rahman et al. (2017) performed another study that exclusively looked at bank-specific

attributes. Khanam et al (2021) assessed the causal connection between NPLs and macroeconomic and bank-specific variables using the OLS model using 11-year data. Rahman (2022) completed research on all banks from 1990 to 2020, entirely looking at macroeconomic indicators. Hasan (2019) subdivides the determinants of NPL's by three dimensions.

There are a number of gaps in the current literature on NPLs in Bangladesh that call for further investigation. Although research has examined both macroeconomic and bank-specific variables (Sarker, 2019; Towhid, 2019; Khanam et al., 2021), most studies combine the two or give priority to bank-specific characteristics, leaving little attention to macroeconomic causes alone. Additionally, a lot of studies use limited samples or time periods (such as five to six years), which could not fully capture long-term trends or provide insightful information. There are still methodological issues, such as the use of simplistic models (like OLS), and significant macroeconomic aspects, such as unemployment, exchange rates, and global economic concerns, are not thoroughly examined. By focusing only on macroeconomic factors, using a bigger dataset, including advanced econometric methods, and analyzing recent data, these gaps would be filled and a more thorough understanding of NPL dynamics in Bangladesh would result. This has resulted in a startling increase in the amount of NPLs. This study tries to fill a gap of knowledge regarding the causes of the rise in NPLs in the private commercial banks of Bangladesh and its performance on the way how these factors impact the loan performance and risk management of the private commercial banks of Bangladesh. The work is significantly contributing to the literature because it examines the impact of macroeconomic variables on NPLs of Bangladesh.

3. Methodology of the Study

3.1 Nature of the Research

This study is of empirical nature as only numerical data is considered in this study to find out the actual causes of NPLs.

3.2 Population Size

Out of 62 banks that are under regulation, 43 banks are scheduled PCBs in Bangladesh of which 36 banks are listed in Dhaka Stock Exchange (DSE). Of these a total of 26 are traditional banks and 10 are banks based on Islami Shariah. The research is focused to find the prime factors of NPLs in the commercial banks with focus on 26 commercial banks which are included in DSE (Dhaka Stock Exchange, 2024).

3.3 Sample Design

The sample is for NPLs of conventional commercial banks which contains 21 publicly listed banks representing about 77% of the country's total conventional commercial banks (CCB). The other 5 banks were excluded because the information is not adequate, these banks are relatively new in the banking sector of Bangladesh. The study period from 2013 to 2025 was used and the purposeful sampling method was employed in selecting banks to ensure that there is enough data to analyze.

3.4 Sources of Data Collection:

Quantitative data were collected for the empirical study from the following variety of sources:

Bangladesh banks website;

Sample banks' annual report;

The International Monetary Fund (IMF) and

World Bank Database on macroeconomic factors.

3.5 Data Analysis

Both descriptive and inferential statistical tools were applied by the study. Statistical software E-views-10 was used to analyze the data and test the results. The various statistical tools that were used by the study are discussed below:

3.5.1 Descriptive Statistics

Descriptive statistics were used to summarize the characteristics of the variables through mean, median, maximum, minimum, standard deviation, skewness, kurtosis etc.

3.5.2 Correlation Analysis

Correlation analysis was conducted to examine the degree of association among the variables and identify potential multicollinearity problems.

3.5.3 Variance Inflation Factor (VIF)

The VIF test was applied to detect multicollinearity among explanatory variables.

3.5.4 Panel Unit Root Test

Panel unit root tests including Levin-Lin-Chu (LLC), Im-Pesaran-Shin (IPS), ADF-Fisher, and PP-Fisher tests were conducted to examine the stationarity properties of the variables.

3.5.5 Generalized Method of Moments (GMM)

The study has employed the dynamic panel Generalized Method of Moments (GMM) estimator developed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The GMM approach is appropriate for handling (Ahmed et al., 2021):

endogeneity,

autocorrelation,

heteroskedasticity, and

unobserved bank-specific effects.

3.6 Diagnostic Tests

The validity and reliability of the GMM model were examined using:

Hansen/Sargan test of over-identifying restrictions,

Arellano-Bond AR(1) and AR(2) tests, and Wald test.

The Hansen and Sargan tests are statistical methods used in econometric models to test the validity of over identifying restrictions. The Arellano-Bond test for AR(1) checks for first-order serial correlation in the first differenced error terms of a dynamic panel GMM Model. On the other hand, The Arellano-Bond test for AR(2) is a post estimation diagnostic in dynamic panel models (using difference or system GMM) that checks for second-order serial correlation in the first differenced error terms. The Wald test is used to determine if a specific explanatory variable has a statistically significant relationship with the outcome in a statistical model.

3.7 Model Development

The aforementioned earlier research identified a wide range of macroeconomic, bank-specific, and national governance factors for NPLs. Avetisyan (2019), Jakubik (2022), Masud et al. (2021), Hasan et al. (2021), and Canh et al. (2021) all looked at the significant contributions of macroeconomic indicators to NPLs. A typical panel data regression model looks like this:

$$NPL_{it}=\beta_0+\beta_1 GDP_{it}+ \beta_2 EXG_{it} + \beta_3 INR_{it}+\beta_4 INF_{it}+ \beta_5 UNP_{it} + \epsilon_{it}$$

Where:

NPL_{it}= NPLs ratio of bank i at time t

β_{it} = Vector of explanatory variables

ϵ_{it} = Error term

This study employs a panel data model and evaluates it using the Generalized Method of Moments (GMM), following the methodology of previous studies (Beck et al., 2013; Dimitrios et al., 2016; Makri et al., 2014). The GMM approach was introduced by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). Recent research predominantly utilizes the dynamic panel data estimator, particularly the GMM estimator, which excels in four specific scenarios: limited time periods, dependence of the dependent variable on past realizations, potential correlation between independent variables and past or present error terms, and the presence of heteroskedasticity and autocorrelation among individuals (Ahmed et al., 2021).

The five macroeconomic variables were selected to measure the dependent variable (NPLs).

3.8 Description of the Variables

Table-1: Variables Description

Indicators	Types	Description of Measurement	Sources of Data
NPL	Dependent	Nonperforming loan /Total Loans	Annual report of respective banks
GGDP	Independent	percentage of GDP's yearly growth rate	World Bank
INT		percentage of banks' lending rates to the private sector	
UNP		% of total labor force who are without work	
INF		% change of annual consumer price	
EXG		Domestic currency per U.S. dollar, end of period	IMF

Source: Authors own compilation

4. Data Analysis, Results and Discussion

The descriptive statistics for all the study variables are shown in Table 4.2. It provides a summary of the findings of the dependent variable (NPLs) and independent (macroeconomic) variables. The results also show that some variables have positive skewness, while other variables have negative skewness, which means that the distributions of these variables are skewed. Further, kurtosis values indicate whether the distributions are leptokurtic or platykurtic.

Table-2: Descriptive Statistics

	NPL	GGDP	INT	UNP	EXG	INF
Mean	6.446154	6.446154	10.38308	4.470769	83.42615	6.875385
Median	6.600000	6.600000	9.650000	4.410000	81.86000	6.190000
Maximum	7.900000	7.900000	13.94000	5.440000	106.3100	11.40000
Minimum	3.400000	3.400000	7.120000	3.740000	74.15000	5.430000
Std. Dev.	1.079055	1.079055	2.485298	0.461925	8.229232	1.863458
Skewness	-1.678235	-1.678235	0.148209	0.913001	1.729086	1.430043
Kurtosis	6.108762	6.108762	1.587436	3.485861	5.708013	3.887187
Jarque-Bera	11.33724	11.33724	1.128400	1.933937	10.44999	4.857227
Probability	0.003453	0.003453	0.568815	0.380234	0.005380	0.088159

Source: The author's own evaluation

It shows an important correlation between the macroeconomic variables and the NPLs of the PCBs. The average NPL ratio is 6.45% with moderate variations. The negative skewness indicates that lower NPL values are more prevalent but the Jarque-Bera test indicates non-normality. Note that the statistical properties of the GDP growth rate are comparable to that of the NPL, and hence there might be potential

measurement issues. The average growth rate of GDP is 6.446% with moderate variations. The mean inflation rate was 6.875%, which is moderate inflation, seen in developing economies. The average unemployment rate of 4.470% suggests low unemployment. The distributions of unemployment rates are slightly skewed and inflation rates are moderately variable.

NPL developments may be more significantly impacted by inflation and currency rates than interest rates and unemployment. The non-normal distribution of NPL indicates that exogenous shocks or unpredictable economic conditions may lead to substantial fluctuations. The correlation matrix indicates possible multicollinearity across variables, revealing an adverse relationship between interest rates and unemployment, exchange rates, and GDP. This may lead to an increase in standard errors within a regression model, which may be mitigated by methods such as Variance Inflation Factor analysis (Gujarati & Porter, 2009).

The correlation matrix is presented in Table-3. The results revealed several significant correlations between the dependent variable (NPL) and the independent (macroeconomic) variables. GDP, UNP and EXG exhibit positive relationships with NPLs, implying that macroeconomic conditions significantly influence the loan repayment capacity of borrowers. On the other hand, INT and INF were negatively correlated with the NPLs.

Table-3: Correlation Matrix

	NPL	GDP	INT	UNP	EXG	INF
NPL	1					
GDP	0.0630	1				
INT	-0.2019	0.0291	1			
UNP	0.0795	-0.4245	-0.7098	1		
EXG	0.2630	-0.1146	-0.6931	0.3139	1	
INF	-0.0261	-0.1159	0.1961	-0.4959	0.2134	1

Source: Author's own estimation

To see the multicollenearity between variables the study used the VIF test. The VIF results in Table 4 reveal that all explanatory variables possess centered VIF values below the critical threshold level of 10. This indicates the absence of severe multicollinearity among the variables included in the regression model. Therefore, the explanatory variables are sufficiently independent and appropriate for panel data estimation.

Table-4: VIF Table

Variables	VIF
GDP	2.511074
INT	6.406023
INF	2.289230
EXG	2.793106

UNP	6.859079

Source: Author's own estimation

4.1 Data Stationary and Unit Root Test

In the GMM model, the Augmented Dickey-Fuller (ADF) test is an indispensable tool for checking the stationarity of time series data. The negative test statistic indicates that the series has a unit root, hence demonstrating non-stationarity. The results show that most of the macroeconomic variables such as Non-Performing Loans (NPLs), GDP growth (GDP), Interest Rate (INT), unemployment rate (UNP), Exchange Rate Growth (EXG) and inflation (INF) are stationary after differencing, indicating that a sustained influence exists and requires differencing in order to achieve stationarity. The dynamic panel GMM model is suitable for this investigation because it can handle stationary and non-stationary variables, it can be differenced because of stationarity, and there is no endogeneity problem. EXG should be second differenced if it is necessary, and the need for this should be carefully considered when the model is specified.

The variables used in the regression analysis were stationary or non-stationary and tests were used to determine this. The results of Augmented Dickey-Fuller Fisher (ADF-Fisher) tests are given in Table-5 and show that all variables are stationary at 1% level of significance.

Table-5: Summary of Augmented Dickey-Fuller Unit Root Test

Variables	Order of Integration {I(D)}	ADF test statistic	p-value	Critical Value	Stationary @ 5% level
NPL	l(1)	-3.891089	0.0162	-3.175352	Yes
GDP	l(0)	-4.310234	0.0074	-3.144920	Yes
INT	l(0)	-2.340779	0.0252	-1.982344	Yes
UNP	l(1)	-2.794659	0.0104	-1.982344	Yes
EXG	l(2)	-3.803362	0.0207	-3.212696	Yes
INF	l(1)	-5.315212	0.0019	-3.175352	Yes

Source: Author's own estimation

The dynamic GMM results in Table-6 demonstrate that macroeconomic variables significantly influence NPLs of commercial banks of Bangladesh. The model has a strong fit, accounting for a substantial percentage of the variation in NPLs; however some factors may not considerably enhance the model's explanatory power. GDP exhibits a positive impact on NPLs. Although this finding contradicts traditional economic theory, it may reflect the Bangladesh banking context where periods of economic growth encourage aggressive lending practices and relaxed credit screening procedures, eventually leading to increased loan defaults.

Interest rate has also positive effect on NPLs, indicating that rising borrowing costs increase repayment burdens on borrowers and consequently increase default risk. Furthermore, exchange rate demonstrates a positive relationship with NPLs and remains marginally significant. Exchange rate depreciation may negatively affect import-dependent

firms and increase financial stress on borrowers engaged in international trade activities.

Table-6: Method: Generalized Method of Moments

Dependent Variable: NPL				
Method: Generalized Method of Moments				
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)				
Instrument specification: C GGDP INT UNP(-1) EXG(-2) INF(-1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-15.88000	10.68911	-1.485624	0.1387
GGDP	0.555925	0.219188	2.536300	0.0118
INT	0.398948	0.183668	2.172117	0.0308
EXG	0.098696	0.051442	1.918564	0.0562
UNP	7.305338	19.10140	0.382450	0.7178
INF	-10.18106	5.551377	-1.833971	0.3261
R-squared	0.726639	Adjusted R-squared		0.673680
Durbin-Watson stat	2.326082	J-statistic		0.000000
Instrument rank	6			

Source: Author's own estimation

The other macroeconomic variables, such as the inflation rate and the unemployment rate, are not statistically significant, but the coefficients they have offer valuable information. People might be voting for the UNP because of different developments in different sectors, as the party got the positive coefficient. The inflation rate has negative correlations and could suggest a decline in NPL, but is not statistically significant - this may be due to monetary policy inefficiencies and social safety nets. The findings highlight the complex relationship between macroeconomic indicators and NPL, and suggest that further research is required to gain a better understanding of other factors that may impact the banking sector in Bangladesh.

4.2 Diagnostic Tests

A series of diagnostic tests were performed to check the reliability and suitability of the dynamic GMM model. Table 4.7.1 shows that all of the Wald Test results are statistically significant, suggesting that the explanatory variables as a group have a significant effect on NPLs. The relatively large Wald test statistic is a sign of the explanatory power of the dynamic panel model.

Table-4.7.1: Wald Test

Wald Test:			
Test Statistic	Value	df	Probability

F-statistic	44.00997	(12, 238)	0.0000
Chi-square	528.1196	12	0.0000

Sources: Authors own calculation through e-views 10

The Arellano-Bond serial correlation tests in Table 4.7.2 reveal significant first-order serial correlation AR (1) but insignificant second-order serial correlation AR (2). The insignificant AR (2) result confirms the absence of second-order autocorrelation and validates the specification of the dynamic GMM model.

Table-4.7.2: AR (1) and AR (2)

Arellano-Bond Serial Correlation Test				
Sample: 2013 2025				
Included observations: 230				
Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-4.755639	-660.623650	138.913752	0.0000
AR(2)	1.299745	180.673823	139.007148	0.1937

Sources: Authors own calculation through e-views 10

Furthermore, the Hansen and Sargan tests in Table 4.7.3 indicate that the instruments used in the GMM estimation are valid and appropriate. The insignificant probability values suggest that the over-identifying restrictions are satisfied and the selected instruments are not correlated with the error term.

Table-4.7.3: Hansen and Sargan Test

Diagnostic Test	Statistic	p-value	Decision
Hansen	8.0892	0.9913	Suggests valid instruments
Sargan	10.45	0.63	Suggests valid instruments

Sources: Authors own calculation through e-views 10

Therefore, the diagnostic tests confirm that the dynamic GMM estimation results are statistically reliable, efficient, and appropriate for empirical interpretation

5. Conclusion

Macroeconomic factors such as GDP growth, interest rates and the fluctuations of exchange rates have a significant impact on the behavior of commercial banks in terms of loan default. The results suggest that proper risk management, prudent lending, macroeconomic stability, and efficient recovery system are crucial to manage NPLs and financial stability in Bangladesh. The study, thus, validates the need for concerted action between the bank management, regulators, policy makers and borrowers for the reduction of NPLs. In the boom years the excessive expansion of credit shall be watched by the policy-makers so as to avoid deterioration of the loans in the future. The policy implications should be to have stability in currency rates and efficient interest rate management to reduce the risk of NPLs. Financial stability should be encouraged to prevent financial distress of import dependent industries. The impact of interest rates on borrowers' repaying power should be taken into account by monetary authorities. Improving

risk assessments in the banking system and strengthening monetary policy transmission mechanisms are crucial. Qualitative methods, including interviews with the bankers, borrowers, academics and policymakers, can bring in deep insights into the context of NPLs.

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Author Contributions

Md. Jahidul Islam, chief author, conceptualized and designed the study, developed the research methodology and was responsible for performing the formal analysis, curating and managing the data, and preparing the original manuscript. A.H.M Ziaul Haq being the supervisor of the study, contributed in general guidance and supervision in the process of research and helped to improve the conceptual framework, analytical methodology and critically reviewed the manuscript for important intellectual input. Md. Moniruzzaman provided support in data collection and helped in the investigation and analytical tools of the study. Hasan Md Mahmood Ul Haque did the literature review and he assisted in the data analysis. Each author read and approved the final version of this manuscript for publication.

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