Link between non-performing loans (NPL) and economic growth---evidence from an emerging economy

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Abstract

Managing bad loans or Non-Performing Loans (NPL) is a deep-rooted and persistent issue of many emerging economies. Banks are experiencing NPLs which eventually are affecting the profitability of the banks. The purpose of this paper is to investigate the influence of factors of economic growth on NPLs of an emerging economy. In this study, GDP growth rate, real interest rate, inflation rate, one period lag value of NPL and unemployment rate are used as independent variables and ratio of Non-Performing Loans (NPL) to Total Loans is used as dependent variable. Data was collected from World Bank Open Data for Bangladesh and Bangladesh Bank for the year 1990 to 2018. The study employs multiple regression analysis and Multicollinearity test is also performed to test whether there is any strong correlation among the independent variables. This study reveals that NPLs rate can be significantly influenced by unemployment rate, inflation rate, real interest rate and one period lag value of NPL. However, GDP growth rate is found to be insignificant to NPLs rate in Bangladesh. This study might help policymakers to manage NPLs rate of Bangladesh in a better way to ensure sustainability of banks in future.

Introduction

Non-Performing Loans (NPL) also referred as bad loans or Non-Performing Assets have attracted numerous researchers for the last two decades as the NPLs rate is increasing for many countries. The increasing trend in NPLs is very alarming for every economy as it affects the growth of financial sector of a country and also affect the economic growth of a country. A loan is nonperforming when payments of interest and/or principal are past due by 90 days or more, or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons to doubt that payments will be made in full (International Monetary Fund, 2004). In case of developing countries, the role of banks turns out to be further domineering (Ikram et al. (2016). The sustainability of banks depends on NPLs of banks (Saba et al., 2012). The large level of NPLs can affect the stock price of the bank (Abdelbaki, 2010). In 2014, more than 30 countries experienced economic downturn from NPLs (World Bank, 2014).

Bangladesh as a developing country is also experiencing NPLs and there is an increasing trend in NPLs rate for the last five years. The NPL rate of Bangladesh in 2017 was 9.30 percent, in 2018, NPL rate was 10.40 percent and in 2018, it was 10.40 percent (Bangladesh Bank, 2019). The NPL rate up to June 2019 is 11.60 percent which is very high and alarming for Bangladesh. The development of a country largely depends on the banking sector stability of the country. If the banking sector is not stable, then the country may face economic downturn which is not desirable for the continuous growth of a country. Hence, the reasons for large NPLs in Bangladesh should be investigated. The

findings will help the policy makers to set up proper guideline about NPLs in future. The purpose of this study is to evaluate whether there is any link between Non-Performing Loans (NPLs) and economic growth in Bangladesh.

Literature review

Non-Performing Loans (NPL) are known as loans overdue for at least 90 days, which decrease the value of bank' loan portfolios (Labbé, 2016). Many researchers find that failed banks have substantial amount of NPLs (Berger and De Young, 1997; Jin et al., 2011). Yang (2017) stated that NPLs influence the economic growth by detaining the banks to play their role. NPLs-issues are sometimes referred as financial pollution (Ghosh, 2015; Makri et al., 2014). The declining credit quality in the banking sector poses a danger of systematic risk and create limitation in investment and growth. The previous studies about NPLs shown that the increase in NPLs plays a key role in the emergence of banking crises (Kunt & Detragiache, 1998; Gonzquierz-Hermosillo, 1999).

Bofondi and Ropele (2011) investigated the influence of macroeconomic variables to the credit quality of the loan portfolio of in Italian banking system by using a simple linear regression model and found that the real GDP growth rate and houses prices could inversely affect the NPL rate. They also found the unemployment rate and nominal interest rate could positively affect the NPL rate with different time lag.

Louzis et al. (2010) studied both macroeconomic and bank-specific determinants of NPLs for Greece banking sector and found that GDP growth rate negatively affect NPLs. In their study, they also found unemployment rate and nominal interest rate on loans positively influenced NPLs.

Mpofu and Nikolaidou (2018) examined the macroeconomic determinants of NPLs for 22 Sub-Saharn African economies. They found that GDP growth rate, domestic credit to private sector by banks as a percentage of GDP, trade openness, financial crisis and inflation rate could affect NPL rates significantly.

By using Meta-Regression Analysis, Machacek *et al.* (2018) identified that real economic growth, interest rate, unemployment rate and exchange rate might significantly influence the NPLs. Beck et al. (2015) investigated the macroeconomic determinants by taking 75 countries as sample. By using dynamic panel data analysis, they found that NPLs could be affected by Real GDP, nominal exchange rate and lending interest rate.

Kjosevski et al. (2019) explored the influence of macroeconomic and bank-specific determinants of NPLs in the Republic of Macedonia. They found that among the macroeconomic variables, GDP growth and unemployment rate could affect the NPLs. GDP growth negatively influenced NPLs while unemployment rate positively influenced NPLs in the Republic of Macedonia.

Farhan et al. (2012) studied the macroeconomic determinants of NPLs in Pakistani banking system and found that NPLs could be positively affected by interest rate, inflation, exchange rate and unemployment rate. The study also identified that NPLs could be negatively influenced by GDP growth rate. Anastasiou et al. (2016) examined the macroeconomic variables of NPLs in Greek banking sector. The study revealed that GDP, unemployment arte and interest rates significantly could affect NPLs in Greek banking sector.

Tandra (2016) investigated the macroeconomic determinants of effect on NPLs in Bangladesh banking sector. She identified NPLs to be negatively related to inflation and interest rate. She also identified that GDP and unemployment rate positively affected the NPLs in Bangladesh.

Abdelbaki (2019) examined the macroeconomic determinants of NPLs in GCC economies and found that non-oil GDP growth, domestic credit to private sector to GDP ratio and inflation could negatively affect NPLs while interest rate and financial crisis could positively affect NPLs in GCC economies.

Research methodology

The data for this study are collected from Bangladesh Bank and World Bank Open Data. The sample period covers 29 years, from 1990 to 2018. Yearly data for GDP growth rate, unemployment rate, inflation rate, NPL rate, real interest rate is collected from the above-mentioned sources. After reviewing the literature, the independent variables are selected to include in this study. In this study, NPL rate is dependent variable and growth rate of GDP, inflation rate, unemployment rate, real interest rate and one period lag of NPL are independent variables. The study conducted multiple regression analysis to find out the influence of independent variables over dependent variable. Multicollinearity test is also performed to test whether there is any strong correlation among the independent variables. To do the analysis, Eviews 9 has been used.

3.1 Model Structure

To investigate the link between NPLs and the economic growth in Bangladesh, we formulate our regression equation by considering the following equation model:

Y= c (1) + c (2) *X

For our study, we considered first difference method and converted all our variables into first differenced. In this method, there is no intercept. By using Least Squares Method, we estimate the equation as follow:

D(NPL) = C (1) *D(GDPG) + C (2) *D(UNEMP) + C (3) *D(INF) + C (4) *D(RIR) + C (5) *D(LAG1NPL)

Where,

NPL= Percentage of bank non-performing loans to total gross loans over period t; GDPG= growth rate of GDP; INF=inflation rate; UNEMP= rate of unemployment as percentage of the total labor force; RIR=real interest rate; LAG1NPL= one period lag value of NPL.

Findings/results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPG)	0.566675	0.603822	0.938480	0.3582
D(UNEMP)	-1.895314	0.846242	-2.239682	0.0355
D(INF)	-0.405778	0.171166	-2.370668	0.0269
D(RIR)	0.354883	0.123252	2.879334	0.0087
D(LAG1NPL)	0.569807	0.147668	3.858697	0.0009
R-squared	0.548789	Mean dependent variance		-0.540741
Adjusted R-squared	0.466750	S.D. dependent variance		3.176155
S.E. of regression	2.319354	Akaike info criterion		4.686030
Sum squared residuals	118.3468	Schwarz criterion		4.926000
Log likelihood	-58.26141	Hannan-Quinn criterion.		4.757386
Durbin-Watson stat	1.466405			

Table 1: Dependent variable D(NPL)

After substituting the coefficients, we get the following equation:

D(NPL) = 0.566674543376*D(GDPG) - 1.89531422199*D(UNEMP) - 0.405778162222*D(INF) + 0.354882940363*D(RIR) + 0.569806700956*D(LAG1NPL)

Table 1 shows that the R-squared value is 54.88 percent which means that 54.88 percent variance in the dependent variable, D(NPL) can be explained by the independent variables of the model. Here, we can also see that the P-value for D(GDPG) is 35.82 percent which is not significant at 5 percent significance level. It means that D(GDPG) is not significant to explain D(NPL).

F-statistic	0.922203	Prob. F (2,20)	0.4139
Obs*R-squared	2.277495	Prob. Chi-Square (2)	0.3202

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPG)	0.110617	0.619382	0.178593	0.8601
D(RIR)	-0.047820	0.128610	-0.371819	0.7139
D(UNEMP)	-0.189276	0.863187	-0.219276	0.8287
D(INF)	-0.001372	0.173080	-0.007930	0.9938
D(LAG1NPL)	-0.086704	0.222390	-0.389874	0.7008
RESID (-1)	0.339752	0.302880	1.121738	0.2753
RESID (-2)	-0.151803	0.256219	-0.592473	0.5602

R-squared	0.084352	Mean dependent variance	-0.019829
Adjusted R-squared	-0.190343	S.D. dependent variance	2.133399
S.E. of regression	2.327599	Akaike info criterion	4.745966
Sum squared residuals	108.3544	Schwarz criterion	5.081923
Log likelihood	-57.07054	Hannan-Quinn criterion.	4.845864
Durbin-Watson stat	1.933462		

Table 2: Breusch-Godfrey Serial Correlation LM Test

Again, in Table 1, we can see that the P-value for D(RIR), D(UNEMP), D(INF) and D(LAG1NPL) are 0.87 percent, 3.55 percent, 2.69 percent and 0.09 percent respectively. From this, we can say that the variables D(RIR), D(UNEMP), D(INF) and D(LAG1NPL) are significant at 5 percent significance level and all of these variables can significantly explain the dependent variable D(NPL). To test the serial correlation among the variables, we conducted Breusch-Godfrey Serial Correlation LM Test by considering two lags. Here the null hypothesis is that there is no serial correlation in the model. The hypothesis will be accepted if the P-value is more than 5 percent significance level. Table 2 shows the results of the test. We can see in Table 2 that P-value is 32.02 percent which is more than 5 percent significance level that means we can accept the null hypothesis that there is no serial correlation in this model after the first difference.

In this study we also conducted Variance Inflation Factors (VIF) test to check the multicollinearity among the independent variables. Table 3 shows the result of the test. In Table 3, we can see that there is no centered VIF as there is no intercept in our model. From Table 3, we can also see that the Uncentered VIF value is less than 10 which means there is no multicollinearity among the independent variables.

Variable	Coefficient Variance	Uncentered VIF
D(GDPG)	0.364601	1.139299
D(RIR)	0.015191	1.088370
D(INF)	0.029298	1.177764
D(UNEMP)	0.716126	1.055931
D(LAG1NPL)	0.021806	1.095117

Table 3: Variance Inflation Factors (VIF)

Discussions and conclusions

Our study shows that Non-Performing Loans (NPL) can be significantly influenced by inflation rate, real interest rate, unemployment rate and one period lag value of NPL if first difference method is used for the variables. It also identifies that GDP growth rate cannot significantly affect NPLs in Bangladesh. From our analysis, we can see that inflation rate and unemployment rate are negatively related to NPLs while real interest rate and one period lag value of NPL are positively related to NPLs in Bangladesh. The study also exposes that GDP growth rate does not have significant relationship with NPLs in Bangladesh. From this, we can suggest that the policymakers should closely observe the macroeconomic determinants of NPLs so that proper policy could be developed to control the high NPLs rate in Bangladesh.

Limitations and direction for future research

The limited availability of dependent variable and independent variable data for longer time periods controlled our study. In future, this study can be done with a longer period data and also with other relevant independent variables to explore whether NPLs in Bangladesh can be affected by any of the other variables.

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