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Effects of Non-performing Loan on Profitability of Commercial Banks in Nepal

Bishnu Prasad Bhattarai

Excel Business College, Pokhara University Affiliated, New Baneshwor, Kathmandu & Faculty Member, Patan Multiple Campus, Tribhuvan University, Lalitpur, Nepal

Email address:
drbhattarai2019@gmail.com

Abstract: Non-performing loan (NPL) is major problem in banking industry. It has play major role for making profit and bank success or failure. The study has examine the effects of non-performing loan on profitability of commercial banks in Nepal with panel data collected from twelve commercial banks of five years from 2013-2014 to 2017-2018 period with the total observations sixty. The multiple regression model has been used to analysis of the data. The Pooled ordinary least square model, fixed effect model and random effect model has been employed to analyzed profitability. The profitability measure by return on equity (ROE) taken as dependent variable whereas non-performing loan (NPL), capital adequacy ratio (CAR), liquidity (LIQ), size of banks (SIZE) and inflation (INF) were independent variables. The result of three different model revealed that the NPL, CAR, LIQ have significant and negatively associated with ROE. Similarly, the SIZE has significant and positive associate with ROE. The INF has positive but insignificant result with ROE. The study concluded that among study variable NPL, CAR, LIQ and SIZE have major role to determine profitability. The INF has does not significantly effect on Profitability. However, the effect of nonperforming loan on profitability very strong. The bankers have sincerely take for the over 90 day's dues. It has rational effect of national economy also.

Keyword: Return on Equity (ROE), Non-performing Loan (NPL), Capital Adequacy Ratio (CAR), Liquidity (LIQ), Size of Banks (SIZE) and Inflation (INF)

1. Introduction

Commercial Banks play vital role in economic growth of the country. As being a commercial institution, a commercial bank must make profit out of its operation for its survival and fulfillment of its responsibilities. The major activities of the commercial banks include mobilization of resources, which involves cost, and profitable deployment of the resources, generating income. The excess return income over expenses is the main source of profit to the bank. In case the bank fails to generate sufficient returns on the resources deployed, it makes a drain on the company's resources and country's resources as well.

Assets are the most critical factor in determining the strength of any bank. The primary factors that can be considered are the quality of the loan portfolio, mix of risk assets and the credit administration system.

High level of NPL is a matter of great concern for the bank and public alike because bank credit is the catalyst to the economic growth of the nation. Rapid rise in NPL level brings an adverse economic environment to the country. In order to have a permanent presence in the market, bankers must have enough vigilance to control the NPL within a reasonable limit. The lower NPL ratio indicates better risk assessment and robust credit management system are in place and vice-versa. At the same time, higher loan loss provisions indicate poor credit management; it also indicates adequate reserve for possible loan loss, protecting the balance sheets of respective banks.

Nepalese commercial banking industry is still under the developing stage. They have to follow all the rules and regulations or the directives issued by the Rastra Bank of Nepal, the central bank of the country. The core banking business is mobilizing the deposits and utilizing it for lending to industry. Lending business is generally encouraged because it has the effect of funds being transferred from the

system to productive purposes, which results into economic growth. However, lending also carries credit risk, which arises from the failure of borrowers to fulfill its contractual obligation during the course of transaction. It is well known that the bank and financial institutions in Nepal face the problem of swelling non-performing assets and the issue is becoming more and more unmanageable.

This study will investigate the effects of Non-Performing Assets of the bank on its total lending policy and its profitability

Berger and DeYoung [1] has suggesting that poor management in the banking institutions results in poor quality loans, and therefore, contributes to the increase in the level of non-performing loans and decrease in profitability.

Michael et al. [2] has emphasized that NPA in loan portfolio affect operational efficiency which in turn affects profitability, liquidity and solvency position of banks.

Kingu, Macha, and Gwahula [3] have examined the impact of Non-performing loans on banks' profitability using information asymmetry theory and bad management hypothesis. This study adopted causality research design using panel data (2007 to 2015) of 16 commercial banks in Tanzania. The study employed Descriptive statistics and multiple regression analysis estimation methods. Likewise, Ordinary Least-Squares (OLS) regression technique was also used, and then Fixed Effects (FE) and Random Effects (RE) assumptions were considered. The study found that occurrence of non-performing loans is negatively associated with the level of profitability in commercial banks in Tanzania. The results extend further the information asymmetry theory and bad management hypothesis. The findings of the study have both theoretical and managerial implications for practitioners and policy-makers.

The conclusion of the study of Patwary and Tasneem [4] in Bangladesh, have suggested that, "Prevention is better than cure". Similarly, for NPL banks need to take some preventive measures to clean up the ever growing amount of NPL in the industry. The borrower should be motivated to repay the loan by providing them some benefits such as exemption, monetary incentives, etc. The above mention initiatives if practiced accordingly and if government and central bank assists the banks of our country, soon the adverse effect of NPL can be eliminated from the industry. The study shows different causes, effects, analysis and initiatives regarding NPL. Banks should consider all the causes and the consequences of NPL and develop effective NPL management tools to reduce it so that the banks can ensure maximum dedication on the development of the banking industry and hence can contribute to the economic development of the country.

Bhattarai [5] has examined the effect of NPL on the profitability of Nepalese commercial banks and found that the NPL ratio has a negative effect on ROA whereas NPL ratio has a positive effect on ROE.

Similarly, Gnawali [6] has analyzed that the impact of non-performing loan on profitability of Nepalese commercial banks. The result showed that higher the portion non-

performing loan (NPL), Non-performing to total loan (NPLTL) and bank size lower would be the profitability of the Nepalese government banks.

Thus, non-performing loan (NPL) is major problem in banking industry. It has play major role for making profit and bank success or failure. The objective of the study has examine the effects of non-performing loan on profitability of commercial banks in Nepal.

For further study has been organized as follows: Section two research methodology, section three results and analysis and summary and conclusion in final part of the study.

2. Research Methodology

The study based on panel data collected from twelve commercial banks of five years from 2013-2014 to 2017-2018 period with the total observations sixty. The sample banks were: Bank of Kathmandu, Everest Bank, Himalayan Bank, Nepal Investment Bank, Kumari Bank, Laxmi Bank, Machhapuchhre Bank, Nabil Bank, Nepal Bangladesh Bank, Siddhartha Bank, Nepal Credit and Commerce Bank and Prabhu Bank. The multiple regression model has been used to analysis of the data. The Pooled ordinary least square model, fixed effect model and random effect model has been employed to analyzed profitability. The profitability has been measure by return on equity (ROE) taken as dependent variable whereas non-performing loan (NPL), capital adequacy ratio (CAR), liquidity (LIQ), size of banks (SIZE) and inflation (INF) were independent variables.

3. The Model

The model estimated in this study assumes that the impact of non-performing loan on bank's profitability. Therefore, the model taken in the following form:

$$ROE_{it} = \beta_o + \beta_1 NPL_{it} + \beta_2 CAR_{it} + \beta_3 LIQ_{it} + \beta_4 SIZE_{it} + \beta_5 INF_t + \varepsilon_{it}$$

Where,

ROE_{it}=Return on Equity of firm defined as percentage of net income after tax to total shareholders' equity of ith bank in time t.

NPL_{it}=Non-performing loan defined as ratio of non-performing loan to total loan of ith bank in time t.

CAR_{it}=Capital Adequacy Ratio defined as capital fund to risk weighted assets of ith bank in time t.

LIQ_{it}=Percentage of total loan to total deposit of ith bank in time t.

$SIZE_{it}$=Size of the firm defined as natural logarithm of total assets of ith bank in time t.

INF_t=Inflation at Year t

ε_{it}=Error of ith bank in time t

4. Summary of the Variables

The model estimated in this study assumes Return on Equity (ROE) as dependent variable and takes Non Performing Loan, Capital Adequacy Ratio, Liquidity, Banks' Size and Inflation as independent variables. The summary of variables,

measurement, expected sign and source of findings are shown in Table 1.

Table 1. Summary of Variables, Measurement, Expected Sign and Source of Findings.

Variables	Symbol	Measurement	Expected Sign	Source of Findings
Return on Equity	ROE	Net profit after tax to Total shareholders' equity	N/A	Nyarko-Baasi [7], Bhattarai [8], Bhattarai [5], Kingu, Macha, and Gwahula [3] and Bhattarai [9].
Non-Performing Loan	NPL	Total non-performing loan to total loan	Negative	(-) Felix and Claudine [10], Kargi [11], Kodithuwakku [12], Gizaw, Kebede and Selvaraj [13], Godlewski [14], Achou and Tenguh [15], Ara et al. [16], Aduda and Gitonga [17], Poudel [18], Chen [19], Kingu, Macha, and Gwahula [3]. Nyarko-Baasi [7], Patwary and Tasneem [4] (+) Zou and Li [20] and Alshatti [21]
Capital Adequacy Ratio	CAR	Capital adequacy ratio (CAR) is the proportion of a bank's own equity in relation to its risk exposures	Negative	(+) Molyneux and Thornton [22], Berger and Udell [23], Naceur [24], Goddard et al. [25], Brewer and Jackson [26]. Havrylchyk [27], Athanasoglw et al. [38], Ara et al. [16], Oladele et al. [29], Patwary and Tasneem [4] (-) Buyuksalvarci and Abdiogiu [30] and Qin and Dickson [31],
Liquidity	LIQ	Percentage of total loan to total deposit	Negative	(-) Kithinji [32], Kargi [11], Kolapo et al. [33], Kingu, Macha and Gwahula [3].
Banks' Size	SIZE	Natural Logarithm of Total Assets	Positive	(+) Demnirguc-Kunt and Huizinga [34], Staikouras and Wood [35], Kosmidou et al. [36], Smaoui and Ben Salah [37], Anbar & Alper [38], Nyarko-Baasi [7] (-) Naceur [26], Hassan and Bashir [39]
Inflation	INF	Inflation Rate at Year t	Positive	(+) Athanasoglou et al. [40]; and Davydenko [41].

Source: Literature Survey by Researcher (2020).

5. Results and Analysis

5.1. Descriptive Statistics

Table 2. Summary Descriptive Statistics of Study Variables.

Variable	Min	Max	Mean	S. D.
ROE	-26.9	27.9	14.9	7.93
NPL	0.200	24.3	2.24	3.37
CAR	8.68	16.8	12.3	1.45
LIQ	64.4	93.8	79.1	6.88
SIZE	23.8	25.9	25.0	0.504
INF	4.48	9.90	7.32	1.98

Source: Annual Reports of Sample Commercial Banks and Drawn Result from Gretl Statistical Software 1.9.4.

Table 2 shows that summary statistics of study variables. The average ROE is 14.9 percent. The standard deviation is very high which represent 7.93 percent. The result revealed that the return on equity is very and high deviation of individual banks. The average NPLR is 2.24 percent, it indicates that the mean non-performing loan of sample commercial banks 2.24 percent whereas minimum 0.20 percent to maximum 24.3 percent.

The difference of minimum and maximum is very high. NRB should regulated to those banks who have high NPL and maintain the healthy economy in the country. The average capital adequacy ratio is 12.3 percent. The small deviation between minimum and maximum i.e. 1.45 percent.

5.2. Correlation Analysis

The Table 3 reveals that the Bivariate Person correlation coefficient between study variables. Return on equity is dependent variable and non-performing loan, capital adequacy ratio, liquidity, size of bank and inflation rate are

taken as independent variables.

Table 3. Person Correlation Coefficient Matrix of Study Variables.

ROE	NPL	CAR	LIQ	SIZE	INF	Variables
1.0000	-0.6087	-0.0381	-0.2577	0.3305	0.1248	ROE
	1.0000	-0.4444	-0.1881	-0.3578	0.1041	NPL
		1.0000	0.3203	0.4090	-0.4620	CAR
			1.0000	0.0183	-0.1915	LIQ
				1.0000	-0.3828	SIZE
					1.0000	INF

Source: Annual Reports of Sample Commercial Banks and Drawn Result from Gretl Statistical Software 1.9.4.

The mean liquidity ratio is 79.1 percent. It represented that the very high liquidity exit in sample commercial banks. The bank size standard deviation is very low, it reflected that the total assets have very closed to each other at sample commercial banks. The average inflation rate is 7.32 percent which shows that customer prices have been increased in an average 7.32 percent.

There is positive relationship of size of banks and inflation rate with return on equity. It reveals that they are moving in the same direction. The nonperforming loan, capital adequacy rate and liquidity are negative correlated with return on equity. The result shows that their motion is adverse.

5.3. Regression Analysis

The study has been used three panel estimation methods such as: Pooled Regression Model (OLS), Fixed Effects (FE) Model and Random Effects (RE) Model. OLS assumes that all subjects are homogeneous which discounts the heterogeneity (individuality or uniqueness) that might exist among different subjects under study in the regression model {Woodridge [42]}. The Fixed Effects (FE) model takes into account heterogeneity or individuality among

cross-section units by letting each entity have its own intercept value that captures the differences across entities {Gujarati and Porter [43]}. On the other hand, Random effects (RE) Model is used on assumptions that the unobserved individual heterogeneity is uncorrelated with the independent variables included in the model. The RE estimator assumes that the intercept of an individual unit is a random component that is drawn from a larger population with a constant mean value.

In this study, data analysis techniques employed are panel data regression models. Thus, model diagnostic test statistics were used in order to choose the appropriate panel data model for the study.

Testing and determination of appropriate panel data model were done by using the 'Joint significance of differing group means', Breusch-Pagan test statistic, and the Hausman test.

The joint significance of differing group means statistic is F (11, 43)=2.95475 with p-value 0.00534438. The p-value is 0.0053 which is lower than 0.05 indicates that fixed effect model is adequate as compared to pooled OLS model.

Likely, Breusch- Pagan test statistic has been used to compare pooled OLS model with random effect model. Breusch-Pagan test statistic shows that LM=0.62957 with p-value=prob (chi-square (1) > 0.62957)=0.427513. The p-value is 0.427513, which is higher than 0.05, and thus, pooled OLS model is preferred over random effect model.

Table 4. *Regression Results of Effects of Non-performing Loan on Profitability of Commercial Banks in Nepal.*

Model 1: Pooled OLS, Using 60 Observations					
Variables	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*	*VIF*
Const	−32.1645	41.5701	−0.7737	0.4425	
NPL	−1.72065	0.231116	−7.445	<0.0001***	1.370
CAR	−1.82524	0.602784	−3.028	0.0038***	1.730
LIQ	−0.318011	0.103866	−3.062	0.0034***	1.154
SIZE	3.84320	1.56382	2.458	0.0172**	1.403
INF	0.348707	0.399216	0.8735	0.3863	1.414
R-squared		0.620157	Adjusted R-squared=0.584986		
Test for Different Group Intercepts F (11, 43)		2.95475	P-value (F)=0.00534438		
Durbin-Watson		1.138664			

Model 2: Fixed-effects, Using 60 Observations				
Variables	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*
Const	120.564	62.5072	1.929	0.0604*
NPL	−2.43599	0.276676	−8.805	<0.0001***
CAR	−0.837705	0.643868	−1.301	0.2002
TLTD	−0.165279	0.173549	−0.9524	0.3462
LnTA	−3.14571	2.67197	−1.177	0.2456
INF	0.230757	0.375811	0.6140	0.5424
LSDV R-squared		0.783672	Within R-squared=0.665110	
LSDV F (16, 43)		9.735764	P-value (F)=0.00000000137	
Durbin-Watson		1.175030		

Model 3: Random-effects (GLS), Using 60 Observations				
Variables	*Coefficient*	*Std. Error*	*Z*	*p-value*
Const	−11.1906	44.7707	−0.2500	0.8026
NPL	−1.86697	0.241490	−7.731	<0.0001***
CAR	−1.55908	0.610814	−2.552	0.0107**
TLTD	−0.319870	0.114454	−2.795	0.0052***
LnTA	2.88494	1.73108	1.667	0.0956*
INF	0.370150	0.382726	0.9671	0.3335
Breusch-Pagan Test -			Hausman Test -	
Chi-square (1)		0.62957	Chi-square (4)=19.3103	
p-value		0.427513	p-value=0.000682927	
Durbin-Watson		1.175030		

Note: ***. Correlation is significant at the 0.01 level (2-tailed), **. Correlation is significant at the 0.05 level (2-tailed). * Correlation is significant at the 0.10 level (2-tailed).

Source: Annual Report of Sample Commercial Banks and Results are Draw from Statistical Software 1.9.4.

Moreover, Hausman test statistic has been used to compare random effect model and fixed effect model. Hausman test statistic is H=19.3103 with p-value=prob (chi-square (4) > 19.3103)=0.000682927. The p-value is 0.000682927, which is lower than 0.05, thus the fixed effect model is preferred as compared to random effects model.

In view of model diagnostics statistics, fixed effects model stood superior among three models considered for the study. However, the results of these three models have been presented and discussed to ensure precise estimation of the effects of non-performing loan on profitability of commercial banks in Nepal.

In the Pooled OLS Model, the results significant and negative were non-performing loan, capital adequacy ratio and liquidity with return on equity. However, the size have significant and positive with return on equity. The same result has been reveals in the Random Effect Model also.

Similarly, In the Fixed Effects Model, The nonperforming loan has significant and negative result found with return on equity. The value of Adjusted R-Square is 0.6651 i.e. 66.51 percent explanatory power of model. The remaining 33.49 percent have explained by other variable to the return on equity. The power of model is high with compared to Pooled OLS. So that fixed effect model is superior in this study among other two models.Non-performing loan has found significantly negative associated with return on equity in all three models. The result is found significant at less than 1 percent in these all three models. The result indicates that the nonperforming loan do decrease profitability in the context of Nepal. The results is consistent to priori expectation and supports of the finding of the study Godlewski [14], Achou and Tenguh [15], Chen [19], Felix and Claudine [10], Ara et al. [16], Kargi [11], Aduda and Gitonga [17], Poudel [18], Kodithuwakku [12], and Gizaw, Kebede and Selvaraj [13], Kingu, Macha, and Gwahula [3] and Nyarko-Baasi [7], Bhattarai [9] and Patwary and Tasneem [4]. The result contrary with finding of Zou and Li [20] and Alshatti [21].

Capital adequacy ratio is significantly negative with return on equity. The result consistent with the study of Buyuksalvarci and Abdiogiu [30], Qin and Dickson [31] and Patwary and Tasneem [4]. It shows that capital adequacy has negative and significant role play to decreased profitability.

The liquidity ratio has also significant and negative movement with the profitability. The result is similar with the findings of Kithinji [32], Kargi [11], Kolapo et al. [33] and Kingu, Macha and Gwahula [3].

However, the size has significant and positive effect on profitability. It shows that size has positive role play to increase profitability. The result is consistent with the study of Demnirguc-Kunt and Huizinga [34], Staikouras and Wood [35], Kosmidou et al. [36], Anbar and Alper [38], Smaoui and Ben Salah [37] and Nyarko-Baasi [7]. The inflation has positively association but do not significant effect to profitability.

6. Summary and Conclusion

Non-performing loan (NPL) is major problem in banking industry. It has play major role for making profit and bank success or failure. The study has examine the effects of non-performing loan on profitability of commercial banks in Nepal with panel data collected from twelve commercial banks of five years from 2013-2014 to 2017-2018 period with the total observations sixty. The multiple regression model has been used to analysis of the data. The Pooled ordinary least square model, fixed effect model and random effect model has been employed to analyzed profitability. The profitability measure by return on equity (ROE) taken as dependent variable whereas non-performing loan (NPL), capital adequacy ratio (CAR), liquidity (LIQ), size of banks (SIZE) and inflation (INF) were independent variables. The result of three different model revealed that the NPL, CAR, LIQ have significant and negatively associated with ROE. Similarly, the SIZE has significant and positive associate with ROE. The INF has positive but insignificant result with ROE. The study concluded that among study variable NPL, CAR, LIQ and SIZE have major role to determine profitability. The INF has does not significantly effect on Profitability. However, the effect of nonperforming loan on profitability very strong. The bankers have sincerely take for the over 90 day's dues. It rational effect of national economy too.

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