EFFECT OF CREDIT RISK ON PROFITABILITY OF NEPALESE COMMERCIAL BANKS

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ABSTRACT

This paper has examined the effect of credit risk on profitability of Nepalese commercial banks. The credit risk is measured by the ratio of total loan to total deposit (TL/TD), cash reserve ratio (CRR), the ratio of nonperforming loan to total loan (NPL/TL), and the ratio of loan loss provision to total loan (LLP/TL), and profitability is measured by return on assets (ROA). The annual data of 18 commercial banks from 2013/14 to 2018/19 have been used for the analysis. Using the Fixed Effect model, this paper finds the significant influence of credit risk on profitability of Nepalese commercial banks. Finally, it is observed that TL/TD has significant positive and NPL/TL and LLP/TL has significant negative impact on profitability of Nepalese commercial banks. Therefore, the bank management should increase the ratio of total loan to total deposit and should decrease the ratio of nonperforming loan to total loan and loan loss provision to total loan to increase the profitability of Nepalese commercial banks.

Keywords: Commercial banks, Credit risk, Panel data, Profitability.

INTRODUCTION

The financial performance of commercial banks is affected by so many external factors (Loto, 2018; Anshu & Gakhar, 2019; Prasetya & Thamrin, 2021) and internal factors (Yesmine & Bhuiyah, 2015; Teshome, 2018; Siddique et al., 2021). GDP, interest rate, money supply, trade balance, and gold price, etc. are the external factors which are referred as macroeconomic factors, and capital adequacy, managerial efficiency, operating efficiency, liquidity, bank size, and credit risk are the microeconomic factors which are referred as the bank specific factors. Among these bank specific factors credit risk is the

important one (Aduda & Gitonga, 2011). The possible loss of the bank due to the failure of barrower to pay amount of loan is credit risk. The bank management should identify the factor affecting credit risk to improve their profitability. Credit risk of the bank can be measured by so many ratios such as the ratio of NPL to total loan, cash reserve ratio, total loan to total deposit, assets quality, cost per loan, total operating cost to total loan, and capital adequacy ratio, etc. The empirical studies conducted in different period and context (e. g. Kolapo et al., 2012; Kaaya & Pastory, 2013; Almekhlafi et al., 2016) documented that credit risk has a significant influence on the financial performance of bank.

In this concern, Kolapo (2012) analyzed the influence of credit risk on the performance of Nigerian commercial banks. They used the data of five commercial banks for the period of 2000 to 2011. NPL to total loan ratio, ratio of total loan to total deposit and loan loss provision to classified loans ratio are used to assess credit risk and ROA to assess performance. Using the panel regression model the study found inverse impact of credit risk on performance of bank. The empirical paper of Musyoki and Kadubo (2012) also found the inverse impact of credit risk measured by default risk, bad debts cost and cost per loan on financial performance of commercial bank Keneya. Likewise, the inverse influence of credit risk on profitability was also verified by Kaaya and Pastory (2013).

Kodithuwakku (2015) evaluated the relationship between credit risk and profitability of Sri Lankan banks. The author used panel data of 24 commercial banks from 2009 to 2013. The study found a significant inverse relationship of loan provision to nonperforming loans with performance. Likewise, Almekhlafi (2016) evaluated the impact of credit risk on profitability of commercial bank in Yemen. Using the annual data of six banks from 1998 to 2013, the study observed a significant inverse impact of nonperforming loan on profitability. Furthermore, the study also documented a causal relationship of credit risk with profitability.

Isanzu (2017) also analyzed the influence of credit risk on the profitability of Chinese banks from 2008 to 2014. The study selected 5 largest Chinese commercial banks as the sample and used NPL, CAR, loan impairment charges, and impaired loan reserve as the proxy of credit risk. The study found the significant negative influence of NPL and significant positive impact of CAR on profitability whereas the impact of impaired loan reserve, and loan impairment charges have been observed to be insignificant. In another study of Bangladeshi commercial bank, Noor et al. (2018) revealed a cointegrating

relationship of credit risk with profitability. The study further concluded that credit risk measured by percentage of classified loan (POCL) has significant negative impact of return on investment (ROI) on short-run and long-run whereas the POCL has significant impact on ROA and ROE in long-run only.

The relationship between credit risk and financial performance of commercial bank in Pakistani context was evaluated by Shahid et al. (2019). The study measured credit risk by using ratio of nonperforming loans to gross loan and advance, capital adequacy ratio, credit interest/credit facilities ratio, and leverage ratio, to measure the credit risk and ROA and ROE for profitability. Using the data of 24 banks from 2010 to 2017, the study found a significant negative relation of credit risk on the financial performance.

Similarly, Munangi and Bongani (2020) evaluated the influence of credit risk on profitability of South African commercial banks from 2008 to 2018. The author used ROA and ROE as a proxy of profitability and NPL to measure credit risk. Using the Pooled OLS, Random Effect and Fixed Effect model, the study found a significant negative impact of credit risk on financial performance. Similarly, the positive impact of growth, capital adequacy, and negative impact of leverage on financial performance are also observed. Furthermore, Abu-Alrop and Kokh (2020) analyzed the effect of credit risk on the profitability of Russian banks from 2008 to 2017. The study used ratio of LLP to TL and ratio of TL to TA as the proxy of credit risk and ROA and ROE as the proxy of profitability. Using the multivariate regression analysis, they found the significant negative impact of credit risk on performance.

Likewise, the significant influence of credit risk on profitability of banks in United Arab Emirates was verified by Al Zaidanin and Al Zaidanin (2021). The study was based on panel data of sixteen commercial banks that conducted business in the United Arab Emirates between 2013 and 2019. The study indicated that the loan to deposit ratio had a considerable positive influence on financial performance, whereas the NPL had a large negative impact.

In Nepalese context, Poudel (2012) used default rate (the ratio of NPL to TL), cost per loan assets (the ratio of total operating cost to total loan) and capital adequacy ratio (the ratio of capital funds to risk weighted assets) as the parameters of credit risk and evaluated their impact on profitability of Nepalese commercial banks from 2001 to 2011. Using the multiple regression analysis Poudel (2012) found a significant inverse impact of credit risk on profitability of Nepalese commercial banks. Similarly, the study also found

default rate as the strongest credit risk factor that makes influence on financial performance. The inverse influence of credit risk measured by the ratio of NPL on profitability of Nepalese commercial banks was also verified by empirical paper of Bhattarai, (2016). Furthermore, Bhattarai (2016) found inverse effect of ratio of NPL on profitability and the positive effect of cost per loan. Likewise, the quality of the assets, GDP, and inflation were identified by Shrestha (2016) as the key determinants of profitability. Gautam (2018) came to the further conclusion that the capital adequacy ratio, managerial effectiveness, GDP, liquidity management, and asset quality have a significant impact on the profitability of Nepalese commercial banks. In the same way, Shrestha (2020) also documented the significant inverse effect of credit risk of financial performance of Nepalese commercial banks.

All these studies have documented that credit risk has the strongest impact on profitability of commercial banks. Therefore, it is necessary to investigate how credit risk affects bank profitability in the context of Nepal. The purpose of this paper is to investigate the credit risk effects on the profitability of Nepalese commercial banks. Particularly, this paper seeks to determine which measures of credit risk, if any, plays the most significant role for determining the profitability of commercial banks in Nepal. The study uses the ratios of NPL to total loan, cash reserve ratio, total loan and advance to total deposit, and LLP to total loan as proxies for credit risk even though there are many different metrics that can be utilized.

The remainder of the paper is structured as follows: section two discusses the methodology; section three reports the result and discussion; and section four presents the conclusion and implication.

RESEARCH METHODOLOGY

To achieve the aim of this paper, 18 commercial banks out of 28 commercial banks operating in Nepal from mid-July, 2014 to mid-July, 2019 has been selected as sample based on the availability of the data. The required data are obtained through the annual report published by selected banks. In the first part the descriptive statistics of the variables under the study has been presented. In the second part the impact of credit risk on profitability of Nepalese commercial banks has been analyzed through the multiple regression analysis.

Variables and measures

This paper has used return on assets (ROA) to measure the profitability of the commercial banks. Similarly, credit risk is used as the explanatory variable. The empirical studies (Isanzu, 2017; Shahid et al., 2019; and Abu-Alrop & Kokh, 2020) shows that credit risk of the bank can be measured by using different ratios. The present paper has used the ratio of total loan to total deposit (TL/TD), cash reserve ratio (CRR), the ratio of NPL to total loan (NPL/TL) and the ratio of loan loss provision to total loan (LLP/TL) as proxy of credit risk. Finally, the natural logarithm of total assets is used as proxy of size of the bank which is used as the control variable.

The model

To assess the effect of credit risk on the profitability of Nepalese commercial banks, the following econometric model is used.

$$ROA_{it} = \beta_0 + \beta_1 TL/TD_{it} + \beta_2 CRR_{it} + \beta_3 NPL/TL_{it} + \beta_4 LLP/TL_{it} + \beta_5 Size_{it} + \varepsilon_{it} \qquad …(1)$$

In Equation (1), 'ROA_{it}' is the return on assets of the ith bank for year t; 'β_i' is the estimated bank-specific variable's coefficient; 'TL/TD_{it}' is the ratio of the ith bank's total loans to its total deposits for year t; 'CRR_{it}' is the ith bank's cash reserve ratio for year t; 'NPL/TL_{it}' is the ratio of the ith bank's non-performing loans to its total loans for year t, 'LLP/TL_{it}' is the ratio of the ith bank's total loan to its loan loss provision for the year t, '$Size_{it}$' is the natural logarithm of the ith bank's total assets for the year t; and 'ε_{it}' is the residual error term.

RESULTS AND DISCUSSION

Descriptive statistics

Table 1 displays the results of descriptive statistics for the dependent and independent variables, including mean, standard deviation, minimum and maximum values.

Table 1: Descriptive statistics for the period of 2013/14 to 2018/19

Variables	Mean	Std. Dev.	Minimum	Maximum	N
ROA	1.7772	0.4632	0.6500	3.1200	108
TL/TD	81.3170	9.1907	48.9200	95.6400	108
CRR	15.6983	8.0516	4.1900	37.5200	108
NPL/TL	1.4459	1.3108	0.0100	7.4900	108
LLP/TL	0.4754	0.6878	-2.2200	3.2900	108
Size	25.0629	0.4815	23.9512	26.0276	108

Source: Annual Reports of Sample Banks (2013/14-2018/19).

As shown in Table 1, the profitability (ROA) of the commercial bank has an average value of 1.7772 percent, with a minimum value of 0.65 percent and a maximum value of 3.12 percent. The minimum and maximum value of ROA indicates that there is a very low profitability of Nepalese commercial banks during the study period. Similar to this, the ratio of total loans to total deposits (TL/TD) has a range of 48.92 percent and 95.64 percent, with an average value of 81.3170 percent. The minimum and maximum value of the cash reserve ratio (CRR), which has an average value of 15.6983 percent, is 4.19 to 37.52 percent respectively. The ratio of NPL to total loans, another independent variable, has a minimum and maximum value of 0.01 percent to 7.49 percent respectively, with an average value of 1.4459 percent. Additionally, the loan loss provision to total loan ratio (LLP/TL) averages 0.4754 percent. Finally, the control variable, i.e., the bank size measured by natural logarithm of total assets has average value of 25.0629.

Selection of appropriate model

Using panel data of 18 commercial banks from 2013/14 to 2018/19, the impact of credit risk on the profitability of Nepalese commercial banks has been examined. Panel data can be used with a pooled, random effect, or fixed effect regression model. To choose the best model out of these three regression models, this study used the Breusch and Pagan Lagrangian multiplier (LM) test and the Hausman test. The result of Breusch and Pagan's LM test (Table 2) shows the value of chibar2 23.94 (significant at 1% level of significance) rejects the null hypothesis that a pooled regression model is adequate. Therefore, employing a Random or Fixed Effect model to estimate a multiple regression model would be suitable. Thus, the Hausman test has been used in this study to choose the best model between the Random and Fixed Effect models. The result of Hausman test (Table 3) shows the chi2 value of 80.46 (significant at 1% level of significance), rejects

the null hypothesis that the Random Effect model is suitable. Thus, the Fixed Effect model has been applied to estimate the multiple regression model.

Table 2: Result of Breusch and Pagan LM test for random effects

	Var	sd = sqrt(Var)
ROA	0.2146	0.4632
E	0.0807	0.2841
U	0.0570	0.2387
Test: Var(u) = 0	chibar^2(01) = 23.94	Prob > chibar^2 = 0.0000

Source: Annual Reports of Sample Banks (2013/14-2018/19).

Table 3: Result of Hausman test

	(b)Fixed Effect	(B)Random Effect	(b-B) Difference	sqrt(diag(V_b-V_B))
TL/TD	0.0138	0.0002	0.0136	0.0045
CRR	-0.0014	0.0088	-0.0101	0.0064
NPL/TL	-0.0373	-0.0640	0.0267	0.0250
LLP/TL	-0.1134	-0.0578	-0.0556	0.0051
Size	-0.08340	0.1567	-0.2407	0.0498
χ^2 (7) = 80.46		Prob> χ^2 = 0.0000		

Source: Annual Reports of Sample Banks (2013/14-2018/19).

Estimation of the model

After confirming the Fixed Effect model as the appropriate model, the multiple regression model has been estimated based on it. Table 4 depicts the result of multiple regression model.

Table 4: Fixed effects (within) regression Result

Variable	Coefficient	Std. Error	t-statistics
TL/TD	0.0138	0.0051	2.7100**
CRR	-0.0014	0.0094	-0.1500
NPL/TL	-0.1373	0.0488	-2.8100**
LLP/TL	-0.1234	0.0522	-2.3600**
Size	-0.0840	0.1040	-0.8100
Cons.	2.8871	2.4330	1.1900
R^2: within = 0.6703	F(5,85) = 3.49		Prob > F = 0.0064

Source: Annual Reports of Sample Banks (2013/14-2018/19).

It is observed that there is a positive impact of TL/TD on the profitability. On the other hand, negative impact of cash reserve ratio (CRR), the ratio of nonperforming loan

to total loan (NPL/TL) and loan loss provision to total loan (LLP/TL) is observed. The results clearly show that all the indicators of credit risk have significant impact on profitability of Nepalese commercial banks. The result also shows that TL/TD has a considerable favorable effect on profitability. The ratio of total loans to total deposits (TL/TD) is observed to have a beta coefficient of 0.0138, with a t-value of 2.71 (significant at 5 percent level of significance). This finding suggests that the profitability of Nepalese commercial banks will increase as this ratio increases. Similarly, the beta coefficient for LLP/TL -0.1234 with t-value of -2.36 is observed (significant at 5 percent level of significance) which indicates that it has significant negative impact on profitability. It demonstrates that the profitability of Nepalese commercial banks declines as the ratio of loan loss provision to total loans rises.

Similarly, the nonperforming loan to total loan ratio (NPL/TL) also illustrates the inverse effect on profitability. NPL/TL has a beta coefficient of -0.1373 and a t-value of 2.81, which is significant at 5 percent level of significance. It means that the profitability of Nepalese commercial banks declines when the ratio of nonperforming loans to total loans rises. The negative impact of NPL/TL on profitability is well-matched with the findings of Almekhlafi, (2016), Isanzu (2017), Shahid et al., (2019), Munangi and Bongani (2020) and Al Zaidanin and Al Zaidanin (2021).

Likewise, Table 4 shows the insignificant negative beta coefficient another measures of credit risk, i.e., cash reserve ratio (CRR). It indicates that CRR have insignificant negative influence on profitability of Nepalese commercial bank. Finally, the control variable, i.e., the bank size measure by natural logarithm of total assets has also insignificant negative influence on profitability of Nepalese commercial banks. Thus, this paper finds that credit risk measured by TL/TD, NPL/TL and LLP/TL plays the most significant role for determining the profitability of Nepalese commercial banks.

The figure of R^2 (within) 67.03 percent shows that the credit risk has an effect on the profitability of Nepalese commercial banks by near about to 67 percent. The value of $F_{(5, 85)}$ 3.49 (p-value 0.0064<0.01) reveals that the estimated model is the best fitted model. Based on the above result, the estimated Fixed Effect multiple regression model can be presented as follows:

ROA = 2.8871 + 0.0138 TL/TD – 0.0014 CRR – 0.1373 NPL/TL – 0.1234 LLP/TL – 0.0840 Size

CONCLUSION AND IMPLICATION

This paper has used panel data from 18 commercial banks from 2013/14 to 2018/19 to analyze the effect of credit risk on the profitability of Nepalese commercial banks. The major conclusion of this paper is that the profitability of Nepalese commercial banks is greatly influenced by credit risk. The effect of credit risk on profitability of the Nepalese commercial bank is examined using the Fixed Effect regression model, which reveals a significant positive impact of credit risk as measured by the ratio of total loans to total deposits (TL/TD) and a significant negative impact of the ratios of loan loss provisions to total loans (LLP/TL) and nonperforming loans to total loans (NPL/TL). Thus, this paper concludes that increasing the amount of total loan in respect to total deposit, the Nepalese commercial banks can increase their profitability. On the other hand, decreasing the loan loss provision and nonperforming loans in respect to total loan, The Nepalese commercial banks can increase their profitability. It is, therefore, more focus should be given by the bank management to increase the ratio of total loan to total deposit (TL/TD), decrease the ratio of loan loss provision to total loan (LLP/TL) and the ratio of nonperforming loans to total loan (NPL/TL) to increase their profitability. Further, this study also concludes that the credit risk measured by cash reserve ratio (CRR), has negative but insignificant influence on profitability.

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