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Impact of credit risk management on profitability of Nepalese commercial banks

Ranjita Kafle
MBS-F Finance Student, Lumbini Banijya Campus, Butwal, Nepal

Abstract
The purpose of this study is to examine the impact of Credit risk management on Profitability of Nepalese commercial banks. This study applies the pooled ordinary least square model balanced panel data of ten commercial banks from 2011/12 to 2020/21. Data were obtained by using secondary sources. The study used ROA as profitability measurement tools and capital adequacy ratio, non-performing loan ratio, loan to deposit ratio, cash reserve ratio, and bank size as credit indicators. The result revealed that capital adequacy ratio, loan to deposit ratio, cash reserve ratio, and bank size has been found to have a positive effect on banks' profitability, and non-performing loan ratio negatively affects banks' profitability. Thus, the study concludes that credit risk management is an essential predictor of the profitability of Nepalese commercial banks. Thus, the study concludes that credit risk management predicts banks' profitability significantly. Therefore, the success of the banks in terms of profitability depends on credit risk management.

Keywords: return on assets, capital adequacy ratio, non-performing loan ratio, loan to deposit ratio, cash reserve ratio, and bank size

Introduction

Credit risk is one of the bank's most significant threats when providing financial services to customers (Caruso et al., 2021) [10]. The banking sector's primary source of income is the interest on loans issued by banks (Ramazan & Gulden, 2019) [49]. Securitizing assets, selling loans, and issuing standby credits may reduce interest rate risk and exposure to credit risk. However, it may be more efficient to reduce credit risk with comparatively new financial instruments, Credit derivatives, an over-the-counter agreement possibly protection against loss when default occurs on a loan, bond, or other debt instruments (Rose & Hudgins, 2016) [50]. Credit risk is significant to the bank as it is an integral part of the loan process. It maximizes bank risk and adjusts the risk rate of return by maintaining credit risk exposure to shield the bank from the adverse effects of credit risk. A bank is investing many funds in credit risk management modeling. Credit risk plays a crucial role in the bank's profitability as a large portion of the bank's revenue accrues from loans and advances from which interest is earned (Bhattarai, 2016) [5].

There are many risks that bank face in Nepalese society as Credit risk, interest rate risk, liquidity risk, market risk, operational risk, and foreign exchange risk. Among the various risk faced by the banks, Credit risk plays a vital role in banks' profitability since a large chunk of banks' revenue accrues from loans, from which interest is derived. Interest risk is directly linked to credit risk implying that a high or increment in interest rate increases the chances of a loan default. (Poudel, 2018) [47]. Credit, also known as default risk, performance risk, or counterparty risk, is the possibility that a contractual party will fail to meet its obligations with the agreed terms (Brown & Moles, 2012) [8]. It is a risk of finances whereby money invested by banks to their customer in the form of loans are not repaid (Giesecke, 2004) [14].

Coyle (2000) defines credit risk as losses from the refusal or inability of credit customers to pay what is owed in full on time. It arises mainly from direct lending and certain off-balance sheet products such as guarantees, letters of credit, foreign exchange, forward contracts and derivates, and the bank holding of assets in the form of debt securities. It may take the form of delivery or settlement risk. It is critical to a bank's survival or failure because banks traditionally earn huge profits from interest on their risk exposures. The management of credit risk is a critical approach to risk management and is essential to the long-term success of commercial banks.

Credit is generally defined as a contractual agreement in which a borrower receives something of value now and agrees to repay the lender later, generally with interest. Sometimes, it may even involve crediting a, for instance. Credit also refers to an individual or company's creditworthiness or credit history. It also refers to an accounting entry that either decreases assets or increases liabilities and equity on a company's balance sheet (Kenton, 2020) [18]. As economic condition change, the credit policy may also change. Credit risk management is indeed a challenging and complex task in the financial industry because of the unpredictable nature of the macroeconomic factors coupled with the various microeconomic variables peculiar to the banking industry or specific to a particular bank (Garr, 2013) [13].

Review of literature

This section presents the theoretical and empirical evidences regarding profitability. the first parts focused on the theoretical aspects, second partpresent the review of empirical evidences andin the third section research design and hypothesis formulated in the study were stated.

Theoretical Review

The credit risk theory indicates the risk that the lender will be delayed or default on the instalments or interests owed to him or both to the borrower (Louis, Vouldis & Metaxas, 2012) [42], where the risk is that the lender will be exposed to

financial distress after which he cannot return deposits to their owners or meet his other obligation due to the loss of capital and interest and the lender's exposure to significant losses resulting from borrowers not paying their obligation to lenders, which is now called non-performing loans.

The commercial loan theory, also called the real bills doctrine. The commercial loan theory holds that banks should lend only on short term, self-liquidating, commercial paper. According to Hosna & Manzura, (2009) [16], the commercial loan theory is geared to influence persuasively both the bank lending and the general economic activities. Strict adoption of this theory will reveal that it is expected to serve as a money supply to changes in aggregate economic activity.

Firm characteristicstheories predict that the number of borrowing relationships will decrease for small, high-quality, informational opaque, and constraint firms, all other things being equal (Olukoyo, 2011)

A Credit market theorymodel of the neoclassical credit market postulates that the terms of credits clear the market. The interest rate is the only price mechanism if collateral and other restrictions remain constant. With an increasing demand for credit and a given customer supply, the interest rate rises, and vice versa. It is thus believed that the higher the failure risk of the borrower, the higher the interest premium (Olukoya, 2011).

Empirical Review

Bhattarai (2016) [5] sought to measure credit risk's effect on Nepalese commercial banks' performance. The result revealed the negative effect of the nonperforming loan ratio on bank performance and the positive effect of cost per loan assets on bank performance. In addition to credit risk indicators, bank size positively affects profitability. Capital adequacy ratio and cash reserve are not considered to influence the banks' profitability.

Samuel (2015) [52] sought to measure credit risk on the performance of Nigerian commercial banks. The result showed that the ratio of nonperforming loans to loans and Advances and loans and advances to total deposits negatively affect profitability.

Poudel (2018) [47] sought to measure the impact of credit risk on the profitability of a commercial bank in Nepal. Data were collected from the sample of 15 commercial banks operated in Nepali economy for the period of 2002/2003 to 2014/15. The one-way fixed effect Model of panel data analysis is a powerful tool. The commercial Bank's profitability is measured in terms of Return on equity and is regressed on bank-specific and macroeconomic variables. The result confirmed that credit risk has a significant negative impact on profitability. In contrast, capital adequacy ratio, total assets, significantly positively impact the profitability of commercial banks in Nepal.

Tuladhar (2017) [56] sought to measure the impact of credit risk management on the profitability of Nepalese commercial banks. Data was collected and analyzed using pooled regression analysis and panel data analysis in which 28 commercial banks of Nepal between the periods (2011-2015) were included. The findings indicated that credit risk management have a significant impact on profitability of Nepalese commercial banks. The result showed that coverage, capital adequacy ratio, and bank size have apositive impact on bank performance. On the other hand, leverage ratio, non-performing loan ratio, and female board members were found to have a negative impact on bank performance. However, liquidity ratio assets quality and cash reserve ratio were not significant variables in determining bank performance.

Opoku (2016) [46] assessed the association of the impact of credit risk on the profitability of selected banks in Ghana. The author has used data from seven selected banks covering the nine-year (2005-2013). The independent variables used by the author included nonperforming loan to total loan, loan loss provision ratio and loan advance ratio as credit risk measurement. In contrast, dependent variables included Return on assets and equity as profitability indicators. In addition, some internal and external determinants of profitability were captured in the model. The result showed that nonperforming loan is negatively related to profitability while loan loss provision ratio and loan and advance ratio are positively significant to the profitability bank.

Munangi and Sibindi (2020) [43] investigated the title "The Impact of Credit Risk on The Financial Performance of South African Banks" this article examines the impact of credit risk on the financial performance of African banks from 2008 to 2018. Panel data techniques, such as pooled ordinary least squares (pooled OLS), fixed effects, and, random effects, were tested to find out the relationship between credit risk and financial performance The study's results show that credit risk is negatively related to financial performance. Thus, the higher the incidence of non-performing loans, the lower the Bank's profitability. It was found that capital adequacy was positively related to financial performance.

Nwanna and Ogezue (2017) [44] Studied the title effect between credit management and profitability (ROA) of Deposit Money Banks (DMBs) in Nigeria context for the period of 2006 to 2015. Secondary data were sourced from the Central Bank of Nigeria Statistical Bulletins and the Annual Reports of all the existing DMBs. The study found that loans and advances and loan loss provision have positive and insignificant effects on profitability, while nonperforming loans have a negative and insignificant effect on profitability.

Afriyie and Akotey (2013) [2] examined the impact of credit risk management on the profitability of rural and community banks in Ghana by using a panel regression model from 2006 to 2010. The independent variables that the author has taken are nonperforming loans, and capital adequacy ratio as an indicator of credit risk management whereas the dependent variables that the author has taken are Return on assets and return on equity indicator portability of the Bank. The study's finding showed a significant positive relationship between nonperforming loans and the profitability of the Bank, which means nonperforming loans are increasing proportionately to profitability.

Research methodology

Research Design

The research design adopted in this study is descriptive and causal-comparative relationship research designs. Panel data analysis has been used. The variables included in the study were based on capital adequacy ratio, non-performing loan ratio, loan to deposit ratio, cash reserve ratio, and bank size.

This study is based on a secondary source of data for the period of 2011/12 -2020/21 AD. Out of 26 commercial

banks, 10 banks selected a sample by using a random sampling method. The reason behind choosing of latest year period is to include a fresh data. Data were obtained from secondary sources; the data required for conducting the study were collected from the various reports of Nepal Rastra Bank, journals, different published articles, annual reports of different sample banks, and supervision of Nepal Rastra bank. The data were collected in MS Excel according to the need of the study. The arranged data is later exported to EViews 12 for further analysis of the regression model.

Model specification

The model estimate in this study assumes that the profitability of Nepalese commercial banks depends on several independent and control variables. The credit management variables are capital adequacy ratio. Non-performing loan ratio, loan to deposit ratio, cash reserve ratio, and bank size. Therefore, the model takes the following form:

Profitability =f (credit variables, control variables)

The credit variables focus on capital adequacy ratio, non-performing loan ratio, loan to deposit and the control variables are cash reserve ratio and bank size. Therefore, the model takes the following form:

$$ROA = \beta 0 + \beta 1CAR + \beta 2NPL + \beta 3LDR + e \text{ --- (1)}$$

The model second will be used to test the robustness of impactof credit risk on profitability

$$ROA = \beta 0 + \beta 1CAR + \beta 2NPL + \beta 3LDR + \beta 4CRR + \beta 5BS \text{---(2)}$$

Where,

ROA = Return on assets (ratio of earnings after taxes to total assets)

CAR = Capital adequacy ratio

NPL = nonperforming loan

LDR =Loan to deposit ratio

CRR = Cash Reserve Ratio

BS = Bank size

β0 = Constant parameter

β1.β2, β3 = The slope represents the degree with a bank's profitability changes as the independent variable changes by one unit of a variable.

e = error components

Dependent variables

Return on assets (ROA): Return on assets is a type of return investment metric that measures the profitability of a business about total assets. It measures the efficiency of bank management in generating profits out of its total scarce. A primary measure of bank profitability that corrects the size of the Bank is the Return on Assets (ROA)which divides the net income of the Bank by the number of its assets.

For banks with similar risks, a profile is a valuable statistic for comparing bank profitability as it avoids distortions produced by differences in financial leverage (Bhattarai, 2014) [6].

Independent variables

Capital Adequacy Ratio (CAR): The capital adequacy ratio (CAR) measures a bank's available capital as a percentage of a bank's risk-weighted credit exposures. This is an independent variable for the determination of the profitability of the Bank. The capital adequacy ratio, also known as capital to risk-weighted assets ratio (CRAR), is used to protect depositors and promote the stability of financial systems around the world and to examine the adequacy of the total capital fund and core capital which is yield and NRB directive all commercial banks are required to maintain 11% of their capital as CAR (Pradhan & Parajuli, 2017) [48].

Capital adequacy ratio = Capital / risk-weighted assets

Hypotheses H1: There is a positive relationship between capital adequacy ratio and return on assets.

Non- performing loan ratio: The nonperforming loan is the sum of borrowed money upon which the debtor has not made his scheduled payments for at least 90 days. According to the International monetary fund, "A loan is nonperforming when payments of interest and principal are past due by 90 days or more, or at least 90 days of interest payments have been capitalized, refinanced or delayed by agreement or payments are less than 90 days overdue, but there are good reasons to doubt that payments will be made in full". The nonperforming loan ratio significantly negatively impacts the profitability of commercial banks in Nepal (Poudel, 2018) [47].

Non-performing loan ratio = non-performing loan / Total loan

Hypotheses H2: There is a negative relationship between non-performing loan ratio and return on assets.

Loan to deposit ratio: A loan to deposit ratio shows a bank's ability to cover loan losses and drawls by its customers. Investors monitor the LDR of banks to make sure there's adequate liquidity to cover loans in the event of an economic downturn resulting in loan defaults. Also, the LDR helps to show how well a bank is attracting and retaining customers. The correlation between loan- to deposit- ratio and return on assets has statistically been found to be a positive relationship (Defri 2012) [12].

Loan to deposit ratio = Total loan / Total deposit

Hypotheses H3: there is a positive relationship between loan to deposit ratio and return on assets.

Cash Reserve ratio

Cash reserve ratio is specified as a percentage of the total deposit of customers held with the central bank. It is one of the monetary policy tools used by the reserve bank to control the money supply in the economy (Abid & Lodhi, 2015) [1].

Cash Reserve ratio = reserve requirement with the central banks / Total deposit of customers

Hypotheses H4: there is a negative relationship between cash reserve ratio and return on assets.

Bank Size

Bank size as measured by total assets is one of the control variables used in analyzing the performance of the bank system (Smirlock, 1985) [55]. This is included to control for the possibility that large banks are likely to have greater

product and loan diversification. In the most finance literature, the natural logarithm of the total assets of the banks is used as a proxy for bank size. The effect of bank size on profitability is generally expected to be positive (Smirlock, 1985) [55].

Bank size = Natural logarithm of total assets

Hypotheses H5: There is a positive relationship between bank size and return on assets.

Result and findings

Descriptive Analysis

Descriptive statistical tools are used to analyze the relationship between two or more variables. The profitability of the banks are proxies by capital adequacy ratio, non-performing loan ratio, loan to deposit ratio, cash reserve ratio and bank size are independent variables, and Return on Assets (ROA) which are the dependent variables.

Table 1: Descriptive Analysis

	ROA	CAR	NPLR	LR	CRR	BS
N	100	100	100	100	100	100
Mean	1.67	12.46	2.15	80.50	18.93	11.77
Maximum	3.22	20.74	8.98	104.06	37.52	18.41
Minimum	0.28	(9.77)	0.010	46.08	3.54	9.52
St. Deviation	0.56	4.36	1.85	10.86	9.73	1.45
Prob	0.07	0.00	0.000	0.026	0.045	0.00

The table depicts the descriptive statistics of Nepalese commercial banks. The study period is 2011 to 2021 associated with 10 commercial banks.

The capital adequacy ratio (CAR) ranges from -9.77% to 20.74% with a mean of 12.46 % which is greater than the regulatory requirement of NRB and the standard deviation is 4.36%. The non-performing loan ratio (NPLR) sampled commercial banksranges from 0.01 to 8.98 with a mean of 2.15 with a standard deviation of 1.85. The mean value of the loan-to-deposit ratio (LDR) ranges from 46.08 to 104.06 with a mean of 80.50 with a standard deviation is 10.86. The mean value of the cash reserve ratio (CRR) ranges from 3.54 to 37.54 with the mean value of 18.93 with a standard deviation is 9.73. The mean value of bank size (BS) ranges from 9.52 to 18.41 with a mean of 11.77 with a standard deviation is 1.45. The return on assets (ROA) ranges from 0.28 to3.22 with the mean value of 1.67 with a standard deviation is 0.56 respectively.

Inferential Analysis

Correlation and regression analysis were performed to measure the relationship and effect of explanatory variables on dependent variables. The result of analysis is presented in this section.

Correlation

Table 2: Correlation

Correlation Probability	ROA	NPLR	LN_BS	LDR	CRR	CAR
ROA	1					
	-					
NPLR	0.151914	1				
	0.1313	-				
LN BS	0.248149	-0.073481	1			
	0.0128	0.4675				
LDR	0.267280	-0.328984	-0.085477	1		
	0.0072	0.0008	0.3978			
CRR	0.152341	0.055113	-0.145876	0.196418	1	
	0.1303	0.5860	0.1476	0.0502		
CAR	0.354950	-0.283342	0.034479	0.737820	0.090143	1
	0.0003	0.0043	0.7334	0.0000	0.3724	

Note: Annual reports of Sample banks and results are drawn from EViews 12.

Table 2 reveals the correlation test between both dependent and independent variables using correlation coefficient matrix. The correlation test shows that return on assets has a significant relationship with capital adequacy ratio in 5 level of significance with correlation 0.354950 which means there is weak positive linear relationship between return on assets and capital adequacy ratio. likewise, the value of correlation test shows that return on assets has insignificant relation with non-performing (NPLR) in 5 percent level of significance with correlation coefficients r = 0.151914 which means there is a positive linear correlation between return on assets and non-performing loan ratio. At the same time, the value of correlation test shows return on assets has insignificant relationship with loan to deposit ratio in 5 percent level of significance with correlation coefficients r = 0.267280, which means there is positive relationship between return on assets and loan to deposit ratio. furthermore, the value of correlation test ratio shows return on assets has insignificant relationship with cash reserve ratio in 5 percent level of significance with correlation coefficient r = 0.152341, which means there is a positive relationship between return on assets and cash reserve ratio.

The correlation matrix shows return on assets has significant relationship with bank size in 5 percent level of significance with correlation coefficient r = 0.248149 which means there is a positive relationship between return on assets and bank size.

Regression analysis

Regression analysis with Return on Assets

The regression analysis has been conducted in order to examine the effect of explanatory variables on the profitability in the commercial bank of Nepal. Capital adequacy ratio, non-performing loan ratio, loan to deposit ratio, Cash reserve ratio, bank size is used an independent variable, and return on assets is used as the dependent variable.

$ROA = \beta 0 + \beta 1CAR + \beta 2NPL + \beta 3LDR + e$ --- (1)
$ROA = \beta 0 + \beta 1CAR + \beta 2NPL + \beta 3LDR + \beta 4CRR + \beta 5BS$---(2)

Selection of appropriate model

Using panel data of ten commercial bank out of twenty-six banks from 2068/69 to 2077/2078, the impact of credit risk management on profitability of Nepalese commercial banks. 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 Pagan test and the Hausman test. The result of Breusch-pagan test shows the prob value 0.00 less than 5% level of significance reject null hypothesis that the pooled regression model is adequate. Therefore, employing a random effect and fixed effect model to estimate a multiple regression model would be suitable. Thus, Hausman test has been used in this study to choose the best model between random effect and fixed effect model. Thus, Hausman test shows the probability value of 0.0287 less than 5% rejects null hypothesis. Thus, the fixed effect model has been applied to estimate the multiple regression model.

Apply Breusch-Pagan test

Table 3: Result of Breusch-Pagan test

	Cross-section	Test Hypotheses time	Both
Breusech-Pagan	0.503566	21.46763	21.97119
	(0.4779)	(0.0000)	(0.0000)

Note. Annual reports of sample banks and results are drawn from EViews 12.

If the Breusch-Pagan test is less than 0.05 then reject the null hypothesis of pooled ordinary square and go for the fixed effect model or random effect model.

Random Effect Model

Table 4: Random Effect Model

Variable	Coefficient	Std. error	t-statistic	Prob
NPLR	0.084272	0.030339	2.777660	0.0066
LN BS	0.107214	0.034836	3.077683	0.0027
LDR	0.008370	0.006940	1.206085	0.2308
CRR	0.007425	0.005542	1.339654	0.1836
CAR	0.036946	0.016216	2.278348	0.0250
C	-1.049210	0.660960	-1.587402	0.1158
R-squared	0.241965			
Adjusted R-squared	0.201644			
F-statistic	6.000972			
Prob-(F-statistics)	0,000073			
Durbin-Watson stat	1.439675			

Note. Adapted from Annual reports of sample banks and EViews 12.

To find random effect model is appropriate, further analysis has been performed to test the Hausman test.

Table 5: Result of Hausman test

Test Summary	Chi-square statistics	Chi-square d. f	Cross-section
Cross-section random	12.483478	5	0.0287

The Hausman test is carried out to choose between fixed effect model and random effect model. Since the calculation of probability value of 0.0287 is less than 0.05. Further analysis has been performed to test fixed model.

Fixed Effect Model

After confirming the Fixed Effect model as the appropriate model, the multiple regression model has been estimated based on it. Table 6depicts the result of multiple regression model.

Table 6: Fixed effect model

Variable	Coefficient	Std. error	t-statistics	Prob
NPLR	-0.013192	0.056718	-0.232588	0.8166
LN BS	0.096980	0.043751	2.216632	0.0293
LDR	0.027709	0.010632	2.606105	0.0108
CRR	0.028101	0.013798	2.036617	0.0448
CAR	0.012701	0.018463	0.687910	0.4934
C	-2.364702	1.154254	-2.048683	0.0436
R-squared	0.426196			
Adjusted R-squared	0.331687			
F-statistics	4.509583			
Prob (F-statistics)	0.000005			
Durbin-Watson stat	1.571811			

Note. Adapted from Annual reports and EViews 12.

The establishment multiple linear regression equation becomes:

ROA= -2.364702 + 0.012701CAR - 0.013192NPLR + 0.027709LDR + 0.028101CRR +0.096980BS

In this table, the probability of an independent variable capital adequacy ratio is 0.4934 more than 0.05. so, the capital adequacy ratio is not a significant independent variable for this regression model. The probability of independent variable non-performing loan ratio is 0.8166 more than 0.05. So, NPLR is a not significant independent variable for this regression model. The independent variable loan-to-deposit ratio is 0.0108 less than 0.05. So, LDR is s significant independent variable for this regression model. The probability of independent variable CRR is 0.0448 less than 0.05. So, CRR is a significant independent variable. The probability of an independent variable bank size ratio is 0.0293 less than 0.05. So, the bank size is a significant independent variable for this regression model.

In this table, the coefficient of CAR, NPLR, LDR, CRR, and BS is 0.012701, -0.013192, 0.027709, 0.028101, and 0.096980 respectively. If CAR increase by 1 unit the ROA increase by 0.012701 units keeping other factors remains constant. Capital adequacy has a positive impact on return on assets (ROA). If NPLR increases by 1 unit the ROA decrease 0.013192 by units keeping other factors remain constant. If LDR increases by 1 unit the ROA decreases by 0.027709 units keeping other factors remain constant. If CRR increases by 1 unit the ROA decrease by 0.028101 units keeping other factors remain constant. If BS increases by 1 unit ROA increase by 0.096980 units keeping other factors remain constant.

The Independent variable will forecast the 42.61% true value of the dependent variable. The value of R-squared is 0.426196, which explained the independent variables predicting 42.61% of the dependent Variable indicated that there is a very strong relationship between study variables. The value of the adjusted square is 0.331687, which means the independent variables determine 33.16% of the dependent variable. This means that by knowing these dependent variables return on assets on commercial banks can be predicted.

Standard error of estimate is flawlessly associated with regression analysis. The Durbin Watson statistic is used to test for independent of residuals or auto correlation. The value of the Durbin Watson statistic ranges from 0 to 4. As a general rule, the residuals are independent if the Durbin-Watson statistic is approximately 2, and an acceptable range is between1.50 and 2.50. In this study, Durbin-Watson is 1.57, close to 2 indicates that there is auto correlation in the regression model.

F statistics show the combined effect on all independent variables in the dependent variable. The probability (F-Statistics) is 0.00005 which is less than 0.05 percent which tells this model is significant.

The establishment multiple linear regression equation becomes:

ROA = -2.364702 + 0.012701CAR - 0.013192NPLR + 0.027709LDR + 0.028101CRR + 0.096980BS

Discussion

The primary goal of this research is to examine the impact of Credit risk management indicators on the profitability of Nepalese commercial banks.Using a set of bank-related descriptive variables; we analyzed the profitability variable of twenty-six Nepalese commercial banks.R square has a value of 0.466196 this demonstrates that the independent factors under investigation jointly explain approximately 46.61% change in ROA. It is apparent from finding that the correlation between capital adequacy ratio and ROA is found to be positive indicating higher the capital ratio would be ROA (Biswas, Nath, Biswas, & Rashid, 2021) [7]. The positive relationship between capital adequacy ratio and profitability indicates the high capital, increase in profitability of commercial banks. Further the result indicates the correlation coefficient is 0.012701 and the p-value is 0.4934 which is more than 0.05. This means there is not a significant relationship between capital adequacy ratio and profitability.

The analyses revealed that return on assets and non-performing loan has a statistically negative impact on profitability on Nepalese commercial banks (Bhattarai, 2014) [6]. The result indicates the correlation coefficient is -0.013192 and the p- value is 0.8166 which is greater than 0.05. This means there is no significant relationship.

The correlation between loan- to deposit- ratio and return on assets has statistically been found to be positive relationship. The finding is similar to that of Defri (2012) [12] and Buchory (2015). Furthermore, the result indicates that the correlation coefficient is 0.027709 and the p- value is 0.0108 this means there is a significant relationship.

The correlation between cash reserve ratio and return on assets is found to be positive indicating higher the liquidity in the bank higher would be the return on assets. The finding is similar to (Uremadu, 2012) [57]. The result indicates that the correlation coefficient is 0.028101 and the p- value is 0.0448 less than 0.05. This means there is a significant relationship between them.

The correlation between bank size and return on assets have a positive and strong significant relationship with the profitability of Nepalese commercial banks (Bhattarai, 2014) [6]. Furthermore, the indicates that the correlation coefficient ROA is 0.096980 and p- value is 0. 0293 less than 0.05 which means there is significant relationship between bank size and profitability.

The variable is contributing that 42.61 % of the total variations in average ROA is explained by regression equation and remaining 57.39% is due to the effects of another factor. Value of F is 4.509583 and F(sig) is 0.000005 so the variable are significantly statistics.

Conclusion and implications

The main purpose of this study is to investigate the impact of credit risk on profitability of Nepalese commercial banks. An unbalance panel data of ten commercial banks with 100 observations for the period of 2011 to 2021 have been used for the analysis. The major conclusion 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 relationship between capital adequacy ratio and profitability is found to be positive and insignificant on ROA. A positively related capital adequacy ratio states that the banks need to maintain a sufficient amount of capital funds to soak up adverse situations and remain solvent.The relationship between non-performing loan ratio and profitability is negative but not significant to ROA. The relationship between loan to deposit ratio has positive relationship and significant on ROA Thus, this concludes that increasing the amount of total loan in respect to total deposit, the Nepalese commercial banks can increase their profitability. and cash reserve ratio have positive relationship and significant on ROA. The relationship between bank size and profitability is found moderate positive significant relationship with the profitability. Therefore, it can be concluded that the independent variable of non-performing loan ratio (NPLR), capital adequacy ratio (CAR) could not be regarded as influencing variable on bank profitability as it is found to be insignificant at percent level of significance. Furthermore, the findings of the study indicate that the Nepalese commercial banks have a good credit risk management practice which are evidenced by the significant result for loan to deposit ratio (LDR), cash reserve ratio (CRR) and bank size (BS).

Nepalese commercial banks have poor credit risk management. Thus, these banks need to follow prudent credit risk management and safeguarding the assets of the banks and protect the interests of the stakeholders.

Based on the findings from the empirical analysis, the study offers the following implications are as. Among those risk which have been faced by banks, the credit risk plays the significant role on its profitability.

The banks should maintain adequate capital. This will increase their profitability. Therefore, Nepalese commercial banks should have maintained capital adequacy ratio at least 11% which was set by directives of Nepal Rastra bank. Higher capital adequacy ratio has become successful to minimize its risk. It suggests the need for strong credit risk

and loan services process management must be adopted to keep the level of non-performing loan ratio as low as possible which will enable to maintain the high performance (Profitability) of Nepalese commercial banks. The banks control and monitor NPLR, and keep the level of NPLR, as low as possible by emphasizing more on the ability to pay before credit approvals are given, a practice that will enable banks to achieve higher performance. This is helpful for further analysis of credit risk management and other risk management. The other factor that enhances mitigation of credit risk to improve performance of Nepalese commercial banks.

References

1. Abid SF, Lodhi S. "Impact of Changes in Reserve Requirement on Banks Profitability: A Case of Commercial Banks in Pakistan." European Journal of Business and Management,2015:7(31):1-6.
2. Afriyie HO, Akotey JO. Credit risk management and profitability of rural banks in the brong ahafo region of ghana. European Journal of Business and Management,2013:5(24):24-24.
3. Ahmad SY, Kushwaha BP. Potential of film–induced tourism and its impact on destination development. Prabandhan Guru,2016:7(1&2):9-14.
4. Amiri AM, Kushwaha BP, Singh RK. Visualization of Global Research Trends and Future Research Directions of Digital Marketing in Small and Medium Enterprises using Bibliometric Analysis, Journal of Small Business and Enterprise Development, 2023. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JSBED-04-2022-0206
5. Bhattarai Y. Effect of non-Performing loan on the profitability of commercial bank in Nepal. Prestige international journal of management and research,2016:10(2):1-10.
6. Bhattarai YR. Effect of Credit Risk on the Performance of Nepalese commercial Banks. Journal of Management and Finance,2014:1(1):41-64.
7. Biswas MR, Nath SD, Biswas PK, Rashid MA. Janauary). Effect of Credit risk on Commercial bank's profitability A case of Bangladesh. Indian Journal of Commerce & Management Studies,2021:12(1):44-50.
8. Brown K, Moles P. Credit risk management. Edinburgh Business School, 2012.
9. Buchory HA. Banking profitability: how does the credit risk and operational efficiency effect? Journal of Business and Management Sciences,2015:3(4):118-123.
10. Caruso G, Gattone SA, Fortuna F, Di Battista T.Cluster Analysis for mixed data:An application to credit risk evaluation.Socio-Economic Planning Sciences, 2021.
11. Coyle B. Framework for Credit Risk Management. Chicago and london: Fitzroy Deraborn Publishers, 2000.
12. Defri. The influence of capital adequacy ratio, liquidity and operational efficiency on the profitability of banking companies listed on the IDX. Journal of Management, 2012, 1(1).
13. Garr DK. Determinants of credit risk in the banking Industry of Ghana. Journal of Finance,2013:3(11):64-67.
14. Giesecke K. Credit risk modeling and valuation: An introduction, 2004.
15. Hasan N, Singh A, Agarwal M, Kushwaha BP. Evaluating the Role of Microfinance Institutions in Enhancing the Livelihood of Urban Poor, Journal of Economic and Administrative Sciences, 2022. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JEAS-09-2021-0175
16. Hosna A, Bakaeva M, Sun J. Credit risk management and profitability in commercial banks in sweden. Journal of Banking and finance,2009:21(6):849-872.
17. Kaur G, Kushwaha BP. Essential Aspects for the Development of Women Entrepreneurial Intention in India. Journal of Contemporary Issues in Business and Government,2021:27(1):2381-2388.
18. Kenton W, 2020. https://www.investopedia.com/.
19. Kushwaha BP. Green marketing practices to build brand reputation and increase business performance: an investigation From India. Palarch's Journal of Archaeology of Egypt/Egyptology,2020:17(6):2078-2088.
20. Kushwaha BP. impact of message design on display ads involvement and effectiveness: an evidence from India. PalArch's Journal of Archaeology of Egypt/Egyptology,2020:17(6):2042-2052.
21. Kushwaha BP. Implementing sustainable marketing through integration of employees, customers and technology. PalArch's Journal of Archaeology of Egypt/Egyptology,2020:17(6):2089-2099.
22. Kushwaha BP. investigating privacy paradox: data privacy behavioural intention and disclosure behaviour. pal arch's journal of archaeology of Egypt/Egyptology,2020:17(6):2066-2077.
23. Kushwaha BP. Search engine marketing a new way of marketing in digital age. PalArch's Journal of Archaeology of Egypt/Egyptology,2020:17(6), 2053-2065.
24. Kushwaha BP. Paradigm shift in traditional lifestyle to digital lifestyle in Gen Z: a conception of consumer behaviour in the virtual business world. International Journal of Web Based Communities,2021:17(4):305-320.
25. Kushwaha BP, Tyagi V, Sharma PB, Singh RK. Mediating role of growth needs and job satisfaction on talent sustainability in BPOs and call centres: An evidence from India. Journal of Public Affairs,2022:22(1):e2400.
26. Kushwaha BP, Maru FY. Management students' attitude towards entrepreneur and entrepreneurship, International Journal of Research in Management & Technology,2015:5(4):325-329.
27. Kushwaha BP, Rao NS. Globalization and rural consumers' buying behaviour. Synergy Journal of Management,2014:16(1&2):80-90. ISSN: 0973-922X.
28. Kushwaha BP. An empirical study on youth perceptions and preferences on smartphones. International Journal of Research in IT & Management,2015:5(10):82-90.
29. Kushwaha BP. Consumer behaviour in telecom industry: a study w.s.r.t. value added services. International Journal of Multidisciplinary Empirical Research,2015:2(1):13-23.
30. Kushwaha BP. The impact of influencing factors on purchase decision of consumer durable product. International Journal in Management and Social Science,2015:3(9):375-386.

31. Kushwaha BP. Sustainable offering practices through stakeholder's engagement. Journal of Innovation for Inclusive Development,2018:3(1):3-9. ISSN: 2456 - 4478.
32. Kushwaha BP. Personalised Digital Marketing Perspectives and Practices in Tourism Industry, PalArch's Journal of Archaeology of Egypt/Egyptology,2020:17(6):2029-2041.
33. Kushwaha BP, Singh VN. Incentives and obstacles to take entrepreneurship as a new career opportunity: a case of management students. Apeejay-Journal of Management Sciences and Technology,2018:6(1):36-44.
34. Kushwaha BP, Kaur G, Singh N, Sharma A. Integrating Employees, Customers and Technology to Build an Effective Sustainable Marketing Strategy, International Journal of Sustainable Society,2022:14(4):310-322.
35. Kushwaha BP, Rao NS, Ahmad SY. The factors influencing consumer buying decision of electronic products. Management Dynamics,2015:15(1):5-15.
36. Kushwaha BP, Shiva A, Tyagi V. How Investors' Financial Well-Being Influences Enterprises and Individual's Psychological Fitness? Moderating Role of Experience under Uncertainty, Sustainability,2023:15(2):1699.https://doi.org/10.3390/su15021699
37. Kushwaha BP, Singh RK, Tyagi V. Investigating Privacy Paradox: Consumer Data Privacy Behavioural Intention and Disclosure Behaviour, Academy of Marketing Studies Journal,2021:25(1):1-10.
38. Kushwaha BP, Singh RK, Varghese N, Singh VN. Integrating social media and digital media as new elements of integrated marketing communication for creating brand equity. Journal of Content, Community and Communication,2020:11(6):52-64.DOI: 10.31620/JCCC.06.20/05
39. Kushwaha BP, Tyagi V, Shiva A. Investigating the role of reinforcement and environmental factors in balancing the state of apprehension: evidence from India. World Review of Entrepreneurship, Management and Sustainable Development,2021:17(2/3):142-160.
40. Kushwaha BP, Tyagi V, Singh RK. Impact of Message Design on Display Ads Involvement and Effectiveness: An Evidence from India, Int. J. of Management Practice,2021:15(4):532-547.
41. Kushwaha Dr. BP, Tiwari Dr. DN. Demonetization and digital initiative for inclusive social and financial growth. Kaav International Journal of Economics, Commerce & Business Management,2018:5(1):34-38.
42. Louzis D, Vouldis AT, Metaxas VL. Macro-economic and bank specific determinants of non-performing loans in Greece: A comparative study of mortagage, business and consumer loan portfolios. Journal of banking and finance,2012:36(4):1012-1027.
43. Munangi E, Sibindi AB. An empirical analysis of thr impact of credit risk on the financial performance of South Africian banjs. Academy of Accounting and Financial Studies Journal,2020:24(3):13-22.
44. Nwanna IO, Ogezue FC. Effect of credit management on profitability of deposit money banks in Nigeria. IIARD International Journal of Banking and Finance Reserach,2017:3(2):137-160.
45. Olokoyo FO. Determinants of commercial banks lending behaviour in Nigeria. International Journal of Financial Research,2011:2(2):1-12.
46. Opoku A. The impact of credit risk on profitability of some selected banks in Ghana. Doctoral Dissertation, 2016.
47. Poudel SR. Impact of credit risk on profitability of commercial bank in Nepal. Journal of Applied and Advanced Research,2018:3(6):161-170.
48. Pradhan RS, Parajuli P. Impact of Capital Adequacy and Cost Income Ratio on Performance of Nepalese Commercial Banks. International journal of Management Research,2017:8(1):1-13.
49. Ramazan E, Gulden P. Effect of Credit Risk on Financial Performance of Deposit Banks in Turkey. Procedia computer science2019:158:979-987.
50. Rose S, Hudgins C. Bank Management &Financial Services. New Delhi: McGraw Hill Education(india)Private Limited, 2016.
51. Rubel, Kushwaha. Increasing the Efficiency and Effectiveness of Inventory Management by Optimizing Supply Chain through Enterprise Resource Planning Technology, Efflatounia- Multidisciplinary Journal,2021:5(2):1739-1756.
52. Samuel OL. The effect of credit riskon the perforamance of commercial in Nigreia. Africain Journal Accounting, Auditing and Finance,2015:4(1):29-52.
53. Singh RK, Kushwaha BP. The Influence of Digital Media Marketing and Celebrity Endorsement on Consumer Purchase Intention, Journal of Content, Community & Communication,2021:14(7):145-158. DOI: 10.31620/JCCC.12.21/12.
54. Singh RK, Kushwaha BP, Tyagi V. Essential Aspects for the Development of Women Entrepreneurial Intention in India. Journal of Contemporary Issues in Business and Government,2021:27(1):2326-2339.
55. Smirlock M. "Evidence of non-relationship between concentration and profitability in Banking." Journal of Money, Credit and Banking,1985:17:69-83.
56. Tuladhar R. Impact of Credit Risk Management on profitability. Western Sydney University, Master's Thesis, 2017.
57. Uremadu SO. Bank capital structure, liquidity and profitability evidence from the Nigerian banking system. International Journal of Academic Research in Accounting, Finances and Management Sciences,2012:2(1):98-113.