



Credit risk, liquidity risk and profitability in Nepalese commercial banks

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Abstract

The main purpose of the study is to measure the effect of credit and liquidity risk on the profitability of commercial banks in Nepal. The panel least squares regression model was used to analyze the balance data of ten commercial banks for the years 2012–2021, with 100 observations. Non-performing loan ratio (NPLR), capital adequacy ratio (CAR), investment ratio (IR), capital ratio (CR), liquid assets to total assets (LTA) and liquid assets to total deposits (LTD) are independent variables, and return on Equity (ROA) is a dependent variable. The necessary data are collected from the annual report of sample banks, banking and financial statistics, and the bank supervision report published by the Central Bank of Nepal. This study has used a descriptive and causal comparative research design. Similarly, Eviews-12 computer software has been employed for diagnosis, model fit, and analysis of data. Likewise, descriptive statistics, Pearson's correlation analysis, and multiple regression models have been used in the study. The random effect model was taken as fitted models after the model diagnosis using Eviews-12 computer software. The regression model revealed that CAR has a positive and statistically significant effect on ROE, whereas IR has a negative and statistically significant effect on ROE. However, CR has a negative and statistically significant effects on ROE, at the same time, capital adequacy ratio, investment ratio, and capital ratio also have significant impact on ROE. So, a strong credit and Liquidity performance and a wide non-performing loan decrease the profitability of the bank.

Keywords: return on equity, non-performing loan ratio, capital adequacy ratio, and investment ratio, capital ratio, liquid assets to total assets and liquid assets to total deposits

Introduction

Credit risk management assists in comprehending the impact of credit risk on bank profitability. Furthermore, the level of loans and advances, non-performing loans, and deposits has an inverse relationship with bank profitability. Because the lender's primary concern is to recover both the principal and the interest, banks manage problem loans through loan workouts, which can be as simple as a renewal or an extension of extra credit. As a result, banks will always choose the option that optimizes recovery while minimizing the risk of troubled loans. Many researchers have discovered a positive relationship between credit risk and commercial bank profitability. Similarly, Afridi and Acutely (2012) confirmed a significant positive impact of non-performing loans on commercial bank profitability in Ghana.

The ability of a bank to pay short-term commitments for daily operations on demand is referred to as its liquidity. Commercial banks are thought to have a large cash balance, which makes them financially sound and low risk (Mustafa, 2019). The term profitability refers to the tool used to assess a bank's economic success. It has been observed that some banks do not have sufficient liquidity levels to operate daily transactions and due obligations, (Kassie, 2009). Credit performance has measured as the quality of assets that a bank puts in its portfolio of loans and advances. Quality of assets means a bank's assets portfolio with the minimum possibility of losses. Largely, the bank provides loans on the behalf of mortgage and its views as security against default. Credit risk may result in an economic downturn for banks due to the default of borrowers. This negatively impacted the overall economy within the country or across the globe as seen in past in the 2008 world economic crisis. In order to minimize non-performing loans or loan loss provisions, and

adverse effects on bank performance and to protect its assets, the bank should manage its credit in the proper way. Mainly, credit risk arises due to both bank-specific and external factors.

Management deficiency as internal weakness affects liquidity which causes an increase in non-performing loans (Chhetri, 2021) [7]. History shows that many BFIs in Nepal have already been liquidated due to large non-performing loans. So, the credit risk management mechanism of the bank should be strong to mitigate possible adverse effects on performance, liquidity crunch, and failure of the bank that might arise from an ineffective credit disbursement process. Besides, some commercial banks are rushing to attract depositors by offering high interest rates on deposit accounts, while others are offering lower interest rates for loans and advances than other competitors in Nepal. As a result, competition between the banks is too high. The competition level in the loan market was found to be higher than deposit market competition. So, banks need to pay special attention to loan management (Gautam, 2021) [8].

Proper liquidity control is also a major influencing factor of controllable elements for profit generation. Both liquidity and profitability decisions, which are important managerial decisions, can influence shareholder return, risk, and customer satisfaction (Jeevar ajasingam, 2014) [14]. Each bank strives to attract more customers in order to increase profits and become a more profitable bank. When a company keeps a large proportion of its current assets, its liquidity position improves, but its overall profitability suffers (Shafana, 2015). Many banks may struggle to determine the optimal level of liquidity.

Theoretical and empirical review

Theoretical review

Credit risk collects immobilized money in the form of deposits from all over the country. This will provide capital for the development of the industry, trade, and business sectors, as well as other resource-depleted sectors. A sound banking system is required for a healthy economy and the formulation of economic policies. As the country moves toward a free market economy, an efficient banking system becomes a top priority, allowing private sector savings to be retained in the country for the promotion of investment needed for growth. As a result, commercial banks have evolved into the financial system's *beati* (Shekher, 2014) [46]. Credit risk is one of the most significant risks that banks face, as credit is one of the primary sources of income for commercial banks. As a result, the management of the risk associated with that credit has an impact on the banks' profitability. The significance of credit risk management in banks stems from its ability to influence financial performance, existence, and growth. Bank credit is observed to be dependent on economic activity in an economy. Bank credit increases as the economy grows, while slowing growth or a decline in economic activity causes a decrease in bank credit (Dash & Kabra, 2010).

According to Berger (1995), the quick ratio, liquid assets to deposits, total loan to deposits, and current ratio all had a positive impact on the ROA and ROE of US banks from 1983 to 1989, but a negative impact from 1989 to 1992. Based on these findings, Berger asserted that the relationship between liquidity and profitability ratios is dependent on the specific conditions present during the time periods studied. According to the study's findings, a high current ratio has a positive impact on profitability when banks' financial conditions are deemed precarious, but a negative impact on profitability when liquidity is available from alternative sources. The most common measures of liquidity, according to Vishnani and Shah (2007), are current ratio and return on investment for profitability. A higher current ratio indicates a greater investment in current assets, implying that the firm's rate of return on investment is low, as excess investment in current assets will not yield a sufficient return. A low current ratio indicates that the firm is investing less in current assets, resulting in a high rate of return on investment because there is no unused investment in current assets. A low current ratio, on the other hand, may indicate production and sales disruption due to frequent stock outs, as well as an inability to pay creditors on time due to the restrictive policy.

Empirical review

Siddique *et al.* (2021) [47] investigated the issue of high non-performing loans in Asian banks which contributed to 60% of world growth. The major goal of the study is to measure the impact of credit risk management and bank-specific factors on the financial performance in scenarios of South Asian commercial banks. NPLs and capital adequacy ratio (CAR) were used to measure credit risk. Similarly, cost-efficiency ratio (CER), average lending rate (ALR) and liquidity ratio (LR) were used as bank-specific factors. On the other hand, return on assets (ROA) and return on equity (ROE) were used as proxy variables to measure the financial performance of the banks. The study was based on secondary data collected from 19 commercial banks (10 commercial banks from Pakistan and 9 commercial banks

from India). The research used a generalized method of moment (GMM) for the estimation to overcome the effects of some endogenous variables. The findings of the study showed that CAR and ALR have significantly positively related to the financial performance, while NPLs, CER and LR have significantly negatively related to the financial performance of the Asian commercial banks.

Bandara *et al.* (2021) [4] employed panel data regression analysis to measure the effect of credit risk on the profitability of the banking sector in Sri Lanka for the observation period from 2010 to 2017 i.e. eight years of thirteen banks. ROA is used to measure the profitability of banks while non-performing loan ratio (NPLR), loan-to-deposit ratio (LDR), net charge-off ratio (NCOR), and capital adequacy ratio (CAR) are used as credit risk indicators to quantify the measure. Descriptive and inferential statistics are employed to analyses the data. This study is based on the quantitative design of research. This study employed panel data analysis the estimate the relationship between the variable by two different specification models, the Fixed Effect Model and the Random Effect Model. The study concludes that credit risk is important determinant of profitability of banks. Furthermore, non-performing loans have a negative and significant ROA while the loan-to-deposit ratio is not an important variable to expand the bank's profit. On the other hand, the capital adequacy ratio positively impacts profitability.

Chhetri (2021) [7] investigated the effect of credit risk on the financial performance of commercial banks in Nepal using panel data of 17 commercial banks for the periods of 2015 to 2020. ROA was used as a dependent variable to measure the profitability of commercial banks. On the other hand, Capital adequacy ratio, asset quality, liquidity, management quality ratio, bank size and non-performing loan ratio were taken as independent variables under the study. Similarly, descriptive statistics, panel regression model and correlation matrix were run for analyzing the data. This investigation has adopted a descriptive and causal-comparative research design. For choosing sample banks, the convenience sampling method was used for the study. The regression model revealed that non – performing loan (NPLR) has a negative and statistically significant impact on ROA. Capital adequacy ratio and bank size have negative and statistically insignificant impacts on ROA. CDR has a positive but no significant relationship with the ROA.

The LAD ratio is a ratio that measures a bank's ability to repay depositors' deposits using the bank's most liquid assets. Banks can avoid liquidity risk, according to Davis (2008) in Hua Shen *et al* (2009), by holding a sufficient proportion of liquid assets that can be used to meet immediate or pre-due needs. There are currently many instruments available that can be used by banking to meet the funding needs of customers who want to withdraw their funds in the form of cash and other immediate needs (Antariksa, 2005) [1], including sharia banking, although financial instruments used to meet the needs of limited liquidity because it must meet sharia requirements. Therefore, liquidity is a problem that many faced by sharia banking (Noraini, 2012). However, the excess of liquid assets indicates that the bank is inefficient in exploiting its funds so that it can affect the profit gain and adversely affect profitability. Thus, the higher the LAD the lower the profitability, meaning that LAD has a negative effect on

profitability. The results of research on banking on the influence of liquidity risk to profitability conducted Hua Shen *et al* (2009) showed that the ratio of LAD has a significant negative effect on profitability.

The LTA ratio is one measure of liquidity risk that is used to determine how much of a bank's total assets are made up of existing liquid assets (Antariksa, 2005) [1]. The high LTA ratio indicates the greater availability of assets ready to be converted into cash and demonstrates fairly good bank liquidity. However, the more cash that is idle in the bank because it is not used for operational purposes, the more profit the bank loses, and the condition will eventually affect the low level of profitability (Machmud and Rukmana, 2010) [39]. As a result, it can be deduced that the higher the LTA ratio, the lower the profitability. Research on sharia banking about the influence of liquidity risk to profitability done by Antariksa (2005) [1] and Machmud and Rukmana (2010) [39] shows that LTA ratio negatively affect profitability.

Hakuduwal (2021) examined the bank-specific factors' effect on the financial performance of Nepalese commercial banks. Total assets, total deposit, total loan and advance and total equity were taken as independent variables and return on assets was taken as a dependent variable. The panel data from 2012 to 2018 was taken for the study and 16 commercial banks were taken as samples. The purposive sampling method was employed to select the sample banks. Regression, F-test and t-test were used for analysis based on pooled least square method. This study revealed that the total assets and total loan and advance have a positive significant impact on profitability. Likewise, total equity has no significant impact and the total deposit has a negative significant impact on the profitability of commercial banks in Nepal. The study suggests to Nepalese commercial banks policy makers to utilize their assets, loans, deposits properly and equity for sound profitability of the bank. Similarly, Bank-specific factors including bank size, assets quality, capital adequacy, liquidity, operating efficiency, deposits, leverage, and assets management significant impacts on profitability (Al-Homaidi *et al.*, 2002). On the other hand, bank size is not significantly affected by bank profitability (Neupane, 2020) [41].

Khan and Ali (2016) investigated the relationship between commercial banks' liquidity and profitability in Pakistan. Correlation and regression are used to determine the nature and extent of the relationship between dependent and independent variables. Secondary data was used for analysis, which was extracted from Habib Bank Limited's annual accounts for the previous five years (2008-2014). Liquidity, profitability, current ratio, quick ratio, gross profit margin, and net profit margin are used to assess the relationship. The study has found that there as significant positive relationship between liquidity with profitability of the banks. None of the variable shows negative relation with all the ratios of liquidity. Hence that research indicated that liquidity has positive relationship with profitability. Shrestha (2011) Found that return on assets has positive and significant relationship with capital adequacy and negative and significant relationship with default rate. Similarly, the study found negative relation with cost per loan assets. Poudel (2012) Return on equity was significantly influenced by capital adequacy ratio, interest expenses to total loan, while capital adequacy ratio had considerable effect on return on equity. Nelson (2020) The study shows that non-

performing loan, capital assets ratio and the loan loss provision ratio have a negative impact on ROE, while the capital adequacy ratio makes a positive contribution to ROE. Thus, credit risk management has a significant impact on profitability. (Bhattarai (2014) the findings of the study showed that negative effect of nonperforming loan ratio on bank performance and the positive effect of cost per loan assets on bank performance. Capital adequacy ratio and cash reserve have no influence on bank performance. Since there is a significant relationship between credit risk and bank performance.

Reported from the bank-specific variables that return on assets (ROA) is significantly positively impacted by bank size and debt-to-assets ratio. Whereas, the deposit-to-assets ratio and loan-to-deposit ratio are a significant and negative impact on bank profitability. This study used panel data from 2010 to 2021 of 40 private south Asian commercial banks i.e. 20 sample banks taken from India and 20 commercial banks taken from Bangladesh using a random sampling method. The fit of the model test and data analysis were done by using E-views econometric software. Breusch–Pagan Lagrange Multiplier (LM) Test is employed to test whether the model is appropriate or not.

Methodology

This study examines the effect credit and liquidity risk on profitability of commercial banks in Nepal over the periods of 2012 to 2021 of 10 commercial banks pooled data regression. The necessary data include time series and cross sectional data were taken from the annual reports of sample banks and NRB website. Similarly, various mathematical and statistical tools were used under the study. Descriptive and causal comparative research designs are employed. This study was used purposive sampling technique to select the sample banks. These selected banks for the study are:

The model

The econometric model used in the study for the purpose of estimate the effect of independent variables on dependent variable is given as:

$$Y = \beta_0 + \beta X_{it} + \epsilon_{it}$$

Where, Y is the dependent variable, β_0 = Constant, β = Coefficient of explanatory variables, X_{it} = Vector of explanatory variables, and ϵ_{it} = Error term

By adopting the above model, the effect of credit and liquidity risk on profitability has been estimated by the following regression equation:

$$ROE = \beta_0 + \beta_1NPL + \beta_2CAR + \beta_3IR + \beta_4CR + \beta_5LAD + \beta_6LTA + \epsilon_{it}$$

Where,

ROE= Return on Equity

β_0 = Constant

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ = Beta Coefficient of independent variables

NPLR=Non-Performing Loan Ratio

CAR=Capital adequacy Ratio

IR=Investment Ratio

CR =Capital Ratio

LAD= Liquid assets to total assets

LAT= Liquid Asset to total deposit

= Estimation of error term

Dependent Variable

Return on equity (ROE)

Return on Equity (ROE) is the ratio of net income to total equity capital which measures the return to shareholders on their equity. It measures how well the management is utilizing the shareholder’s invested money to generate profit (Athanasoglou, Brissimis, & Delis, 2008). ROE is one of the most important measures for evaluating efficiency and profitability of bank’s management based on the equity that shareholders have contributed to the bank.

Independent variables

Non-performing loan ratio (NPLR)

Non-performing loan (NPL) represents the ratio of aggregate non- performing loans and the total gross loan. Non-performing loans ratio (NPLR) reflects the loans and advances quality of bank and is considered as an indicator of credit risk management (Bhattacharai, 2017) [6]. NPLR has negative and statistically significant impact on ROA (Hamza, 2017) [11] which indicates an increase in NPL would be decrease in profitability and vice-versa. It is measured by non-performing loan by total loan.

H1 = non-performing loan ratio (NPLR) has a significant negative effect on bank's profitability.

investment ratio (IR)

The loan-to-deposit ratio is the most important ratio for determining a bank's liquidity. Loans are advances made by traditional banks. A bank with a low LDR is thought to have excessive liquidity, potentially lower profits, and thus less risk than a bank with a high LDR. However, a high LDR indicates that a bank has put itself in more financial jeopardy by making excessive loans, as well as the risk that the bank will have to sell some loans at a loss in order to meet depositors' claims (Ahmed, 2009). The investment ratio indicates the appropriateness of investing the bank's available funds derived from deposits in order to meet the demands of credited loans and advances

H2 = Investment ratio (IR) has a significant positive effect on bank's profitability.

Capital ratio (CR)

It assesses a bank's financial strength and indicates its level of financial stability. Divide capital by total assets to calculate capital. The equity-to-asset ratio calculates how much of a bank's assets are funded with owner funds and serves as a proxy for a bank's capital adequacy by estimating its ability to absorb losses. According to the literature review, there are conflicting findings regarding the relationship between the equity-to-asset ratio and bank profitability. According to the risk-return trade-off, a higher equity-to-asset ratio results in a lower expected return.

Opposed to the risk-return hypothesis, Berger (1995b) examines the signaling hypothesis and bankruptcy cost hypothesis; suggesting that a higher equity-to-asset ratio increase profitability due to signaling issues or lower costs of financial distress

H3 = Capital Ratio (CR) has a significant positive effect on bank's profitability.

Capital adequacy ratio (CAR)

Capital adequacy ratio is the amount of capital that banking and financial institutions must hold to fulfill the regulatory requirement and used to measure financial strength of the bank. A higher capital adequacy ratio means banks have enough capital to absorb possible losses from loans and it can save a bank from being default by the reason of sort of fund. It is a measure of the amount of bank’s capital expressed as a percentage of its risk weighted exposure (Chhetri, 2021) [7]. It is calculated by dividing total capital by total risk weighted assets.

H4 = Capital adequacy ratio (CAR) has a significant positive effect on bank's profitability.

Liquid assets to total assets (LTA)

The LTA ratio is one measure of liquidity risk that is used to determine how much of a bank's total assets are made up of existing liquid assets (Antariksa, 2005) [1]. The high LTA ratio indicates the greater availability of assets ready to be converted into cash and demonstrates fairly good bank liquidity.

H5 = liquid assets to Total assets (LTA) has a significant Negative effect on bank's profitability.

Liquid assets to to total deposits (LTD)

The LAD ratio is a ratio that measures a bank's ability to repay depositors' deposits using the bank's most liquid assets. Banks can avoid liquidity risk, according to Davis (2008) in Hua Shen *et al* (2009), by holding a sufficient proportion of liquid assets that can be used to meet immediate or pre-due needs.

H6 = Liquid Assets to Deposits (LAD) has a significant Negative effect on bank's profitability.

Results and finding

The necessary data are gathered from annual reports and the NRB's key financial indicators report of sample banks. In this section, collected data are presented and analyzed using different mathematical and financial tools and techniques.

Descriptive statistics

Descriptive statistics are used to summarize and describe the characteristics of a set of data under study. It also provides a basis for more advanced inferential statistical analysis.

Table 1: Descriptive statistics of ROE, NPLR, CAR, IR, CR,LTA and LTD

Variables	N	Minimum	Maximum	Mean	SD	CV
Return on equity	100	-6.06	44.96	15.80	0.0682	0.433
Capital adequacy ratio	100	-5.82	19.09	12.66	0.0304	0.240
Non-performing loan	100	0.08	5.83	1.49	0.0115	0.777
investment ratio	100	49.56	95.58	79.35	0.0951	0.119
capital ratio	100	-4.96	17.21	9.75	0.0309	0.317
Liquid to total deposit	100	8.87	25.09	15.14	0.0335	0.221
Liquid assets to assets	100	5.11	25.33	13.22	0.0382	0.289

Note: Annual report of sample banks and NRB, results are drawn from EVIEWS-12.

Table 4.1 shows that the average return on equity is 15.80%, ranging from -6.06% to 44.96%, with a standard deviation of 0.068% and a coefficient of variation of 0.43. As a result, banks have an average return on equity over a study period that demonstrates consistent growth financial performance of return on equity

The average capital adequacy ratio is 12.66%, ranging from -5.82% to 19.09%, with a standard deviation of 0.03% and a coefficient of variation of 0.24. As a result, banks have an average capital adequacy ratio over a study period that demonstrates the minimum requirement of financial performance of capital adequacy ratio.

The average non-performing loan is 1.49%, ranging from 0.08% to 5.83%, with a standard deviation of 0.011% and a coefficient of variation of 0.77. As a result, banks have an average non-performing loan over a study period, demonstrating the minimum requirement of non-performing loan financial performance.

The average investment ratio is 79.35%, ranging from 49.56% to 95.58%, with a standard deviation of 0.095% and a coefficient of variation of 0.1119. As a result, banks have an average investment ratio over a study period that demonstrates a higher growth in financial performance of investment ratio.

The average capital ratio is 9.75%, ranging from -4.96% to 17.21%, with a standard deviation of 0.030% and a coefficient of variation of 0.31. As a result, banks have an

average capital ratio over a study period that demonstrates a consistent growth of financial performance of capital ratio.

The average liquid assets to total deposit ratio is 15.14%, ranging from 8.87% to 25.09%, with a standard deviation of 0.033% and a coefficient of variation of 0.221. As a result, banks have an average liquid asset to total deposit ratio over a study period, indicating a consistent growth in the financial performance of liquid assets to total deposits.

The banks have an average liquid asset to total assets ratio of 13.22%, which ranges from 5.11% to 25.33% with a standard deviation of 0.038% and a coefficient of variation of 0.2. This means that the banks have an average liquid asset to total assets over a study period, indicating a consistent growth of financial performance of liquid assets to total deposit.

Inferential statistics

Correlation analysis

Correlation analysis is a statistical tool to measure the strength of linear association between two or more than two variables. The value of correlation coefficient always lies between -1 to +1. Correlation coefficient +1 means there is strongly positively association between the variables while correlation coefficient -1 means there is strongly negatively association between the variables. Similarly, correlation coefficient 0 means there is no association between the variables.

Table 2: Pearson Correlation Analysis of ROE, NPLR, IR, CR, CAR, LTA, and LTD

	ROE (%)	CAR (%)	NPL (%)	IR (%)	CR (%)	LD (%)	LA (%)
ROE (%)	1						
CAR (%)	0.024**	1					
NPL (%)	-0.164	-0.547**	1				
IR (%)	-0.249*	0.533**	-0.374**	1			
CR (%)	-0.166*	0.860**	-0.330**	0.576**	1		
LD (%)	-0.172	-0.143	0.184	0.014	0.009	1	
LA (%)	-0.066	-0.212	0.031	-0.098*	-0.193	0.509**	1

Note: Results are drawn from EVIEWS-12

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Table 4.2 shows the relationship between the dependent and independent variables. This table clearly shows correlations between liquidity and credit variables (such as non-performing loans, capital adequacy ratios, investment ratios, capital ratios, liquid assets to total deposit ratios, and liquid assets to total assets ratios) and profitability variables (i.e. Return on equity). The coefficient of correlation between capital adequacy and return on equity is 0.024. The relationship between and capital adequacy ratio and return on equity is positive but significant. The coefficient of correlation between capital ratio and return on equity is -0.16. The correlation between capital ratio and return on equity is negative and significant. The coefficient of correlation between investment ratio and return on equity is -0.250. The investment ratio has a negative and significant relationship with return on equity. The coefficient of correlation between liquid assets and total assets and return on equity is -0.066. The relationship between liquid assets and total assets and return on equity is a negative and insignificant one. The coefficient of correlation between liquid assets and total deposits and return on equity is -0.172. The relationship between liquid assets and total deposits and return on equity is negative and significant.

On-performing loans have a -0.163-correlation coefficient with return on equity. Non-performing loans have a negative and significant relationship with return on equity.

Regression analysis

Regression analysis is a mathematical tool that uses to estimate or predict the cause-effect relationship between the two or more variables. In this study, a panel data analysis model is employed for data analysis. There are three estimation models for the panel regression model, i.e., pooled ordinary least square (POLS), random effect model (REM), and fixed effect model (FEM). To determine the appropriate model for data analysis, a model diagnostic test statistic was used. The Hasman Test, Breausch Pagan LM Test, and Chow Test are employed to select an appropriate model.

Table 3: Hausman Test

Test Summary	Chi-Sq. Stat	Chi- Squ. d.f.	Prob
Cross Section Random	5.470	6	0.485

Note: Results are drawn from EVIEWS-12

H0: Random effect model is appropriate than fixed effect model, select RE ($p > 0.05$).

H1: Fixed effect model is appropriate than random effect model, select FE ($p < 0.05$).

The above Table 3 shows the p-value of Hauman Test which is more than 0.05 i.e. 0.7303 which means null hypothesis i.e. random effect model is accepted. After that, Breausch Pagan LM Test is applied to decide whether random effect or pooled ordinary least square model is appropriate. Null hypothesis suggests for POLS model and alternative hypothesis suggests for random effect model.

Table 4: Breusch Pagan LM Test for Model

	Cross-section	Test Hypothesis Time	Both
Breusch- Pagan	13.961	5.066	19.028
	0.000	0.024	0.000

Note: Results are drawn from EVIEWS-12

H0: POLS is better than random effect model, select POLS ($p > 0.05$).

H1: Random effect model is better than POLS, select RE ($p < 0.05$).

The above Table No.4 shows that the p-value of test is less than 0.05 i.e. 0.00 which means null hypothesis is rejected and suggests to go with random effect model.

Table 5: Regression results of NPLR, CDR, IRS, CAR, DGR and TA on ROA

Variables	Coefficient	Std. Error	t-Stat	Prob.
C	29.875	8.527	3.503	0.000
NPL	-0.204	0.808	-0.253	0.802
CAR	1.455	0.477	3.043	0.001
IR	-0.229	0.096	-2.377	0.011
CR	-1.212	0.482	-2.511	0.012
LTD	0.108	0.245	0.441	0.665
LTA	-0.289	0.239	-1.028	0.239
R-Square	0.193			
Adj-R Square	0.141			
F-Stat	3.729			
Prob (F-stat)	0.002			
DW test	1.326			

The regression of ROE and liquidity and credit variables

Note: Results are drawn from EVIEWS-12

(i.e.'Capital adequacy ratio, non-performing loan, investment ratio, capital ratio, liquid assets to total deposit and liquid assets to total assets) impact has been analyzed by defining the ROE changes in terms of liquidity position of selected banks. The regression of ROE on liquidity and credit indicated in the equation for this regression module is as follows:

$$ROE = \beta_0 + \beta_1NPL + \beta_2CAR + \beta_3IR + \beta_4CR + \beta_5LAD + \beta_6LTA + \epsilon$$

How regression is run in eviews and how it is interpret in our model ROE id dependent variable and NPL, CAR, IR, CR, LDT and LTA are independent variables.

$$ROE = \beta_0 + \beta_1NPL + \beta_2CAR + \beta_3IR + \beta_4CR + \beta_5LAD + \beta_6LTA + \epsilon.$$

$$ROE = 29.87 - 0.204NPL + 1.44CAR - 0.227IR - 1.21CR + 0.108LAD - 0.289LTA + \epsilon$$

If non-performing loans fall by one percent, return on equity falls by 0.204 percent while all other factors remain constant. If the capital adequacy ratio rises by one unit, the return on equity rises by 1.44 percent while all other factors remain constant. If the investment ratio falls by one percent, the return on equity falls by 0.227 percent while all other factors remain constant. If the capital ratio falls by one percent, the return on equity falls by 1.21 percent while all other factors remain constant. If the ratio of liquid assets to total deposits increases by one percent, the return on equity increases by 0.108 percent while all other variables remain constant. If liquid assets to total assets decrease by 1 unit than return on equity decrease by 0.289 percent keeping other factors remains constant.

Level of significance mostly 5% is considered. If prob value is greater than 5% or 0.05 it means chance of error is high and we will not consider the regression result of particulars variables. And if chances of error prob value is less than 5% or 0.05 it means regression results are considerable and variables is significant.

The non-performing loan standard error is 0.080, which indicates that the chance of error is high. The capital adequacy ratio standard error is 0.477, and the prob value is less than 5%, indicating that the regression results are significant and the variables are significant. The investment ratio standard error is 0.096 and the prob value is less than 5%, indicating that the regression results are significant and the variables are significant. The capital ratio standard value is 0.482 and the prob value is less than 5%, indicating that the regression results are significant and the variables are significant. The standard deviation of liquid assets to total assets is 0.245, indicating that the chance of error is high. The liquid assets to total assets std error is 0.239 prob value more than 5% it means chance of error is high.

Discussion

The main objective of the study investigates the effect of credit and liquidity risk on profitability of commercial banks in Nepal. Balance panel data of ten commercial banks with 100 observations for the periods of 2012 to 2021 have been employed for analysis and data analysis done by Eviews-12 computer software.

The objectives of the study are to point out the current position and trend which is measured by ROE as profitability indicators, non-performing loan ratio (NPLR), capital adquancy ratio (CAR), investment ratio (IR), capital ratio (CR), Liquid assets to total assets (LTA)and liquid assets to total deposits (LTD), of Nepalese commercial banks. Similarly, it also focuses on identifying the prevailing relationship between the dependent and independent variables and the impact of independent variables on a dependent variable. ROE is employed as dependent variables and NPLR, CAR, IR, LTA and LTD are used as explanatory variables.

The correlation analysis revealed that CAR is positively correlated with ROE and similar findings came in previous research Abdelrahim (2013), Afriyie and Akotey (2012), Bhattarai (2014), Kurawa and Garba (2014), and Ogboi and Unuafe (2013), for example, discovered a significant positive relationship between capital adequacy ratio and bank performance. Alshatti (2015), Zou and Li (2014),

Ndoka and Islami (2016), and Poudel (2012), on the other hand, discovered a negative relationship between capital adequacy ratio and bank performance. Most studies, however, indicate that CAR should be kept in banks to protect them from potential losses. As a result, a positive relationship between capital adequacy and profitability is anticipated. On the other hand NPLR could not find a relationship between ROE and similar finding came in previous research Adeusi *et al.* (2014), Kithinji (2010) ^[19], Nawaz (2012), and Ogboi and Unuafe (2013) could not find a relationship between bank performance and nonperforming loans. likewise investment ratio is negatively correlated with ROE but previous research (Ahemed, 2009) and (Pradha & Gautam 2019) the study show that positively correlated. Furthermore capital ratio is negatively correlated with ROE but (Berger, 2012), (pradha & Gautam 2019) found a positively correlated with bank performance. Another variables liquid to total assets positive and uncorrelated with ROE but previous research (Hua Shen *et al* (2009) showed that the ratio of LAD has a significant negative effect on ROE. likewise Liquid assets to total deposits negatively and uncorrelated with ROE but previous research (Antariksa (2010) and Machmud and Rukman (2012) shows that the ratio of LAD has a significant negative effect on ROE.

Conclusion and implications

The study finds that non-performing loan ratio, liquid assets to total assets, and liquid assets to total deposits had the least effect on the financial performance of sample commercial banks, whereas capital adequacy ratio, investment ratio, and capital ratio have the most effect.

The implications of the study suggests that commercial banks, regulatory authority, investors, debtors, creditors and other stakeholders to depict the current status of credit performance and interest spread of commercial banks in Nepal and developing suitable policies which benefits to concerns parties. Effective management of credit performance and interest spread is crucial for maximizing profitability for commercial banks in Nepal. This may involve taking steps to ensure that loans are of high quality and maintaining a healthy balance between the interest charged on loans and the interest paid on deposits. Similarly, appropriate interest rate should be determined in order to attract more depositors and borrowers. Further, new researcher can use as the reference for conducting research on similar areas as well as compare the findings of the study for validity and reliability.

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