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Impact of liquidity on bank profitability in Nepalese commercial banks

Prof. Dr. Radhe S. Pradhan¹ and Deepanjal Shrestha

Abstract

This study examines the effect of liquidity on the performance of Nepalese commercial banks. Investment ratio, liquidity ratio, capital ratio and quick ratio are the independent variables used in this study. The dependent variables are return on equity (ROE) and return on assets (ROA), while one year lagged variables for independent variables are also used to determine the more specific result of the previous year's effect on the current years ROE and ROA. The secondary sources of data have been used from annual reports of the banks and supervision report of Nepal Rastra Bank. The regression models are estimated to test the significance and effect of bank liquidity on performance of Nepalese commercial banks.

Correlation between capital ratio and return on equity found to be positive indicating higher the capital ratio higher would be the return on equity. However, the correlation between return on equity and liquidity ratio is found to be negative indicating higher the liquidity in the bank lower would be the return on equity. Further, the correlation is found to be negative for quick ratio with return on equity. Beta coefficients for investment ratio and capital adequacy are positively significant with bank performance, which indicate that increase in investment ratio and capital ratio leads to increase the performance of the banks. However, beta coefficients for liquidity ratio and quick ratio are negative with return on assets and return on equity indicating increased liquidity ratio and quick ratio decreases the return on assets and return on equity of the bank.

Keywords: Capital ratios, investment ratio, liquidity ratio, quick ratio, return on assets, return on equity, lagged variables.

1. Introduction

Bank liquidity refers to the ability of the bank to ensure the availability of funds to meet financial commitments or maturing obligations at a reasonable price at all times. Bank liquidity means a bank having money where they need it particularly to satisfy the withdrawal needs of the customers (Wasiuzzaman and Tarmizi, 2010). Liquidity is a financial term that means the amount of capital that is available for investment. Today, most of this capital is credit fund. That is because the large financial institutions that do most investments prefer using borrowed money (Felix and Claudine, 2008). Profitability and liquidity are effective indicators of the corporate health and performance of not only the commercial banks, but all profit-oriented ventures (Eljelly, 2004). These performance indicators are very important to the shareholders and depositors who are major publics of a bank.

Through the financial inter-mediation role, the commercial banks reactivate the idle funds borrowed from the lenders by investing such funds in different classes of portfolios. The liquidity risk of banks arises from funding of long-term assets by short-term liabilities, thereby making the liabilities subject to rollover or refinancing risk. Liquidity risk is usually of an individual nature, but in certain situations may compromise the liquidity of the financial system. Liquidity risk management in banks is defined as the risk of being unable either to meet their obligations to depositors or to fund increases in assets as they fall due without incurring unacceptable costs or losses. Effective liquidity risk

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management helps ensure a bank's ability to meet its obligations as they fall due and reduces the probability of an adverse situation developing (Ahmad, 2009).

A bank is responsible for the sound management of liquidity risk. A bank should establish a robust liquidity risk management framework that ensures it maintains sufficient liquidity, including a cushion of unencumbered, high quality liquid assets, to withstand a range of stress events, including those involving the loss or impairment of both unsecured and secured funding sources. Supervisors should assess the adequacy of both a bank's liquidity risk management framework and its liquidity position and should take prompt action if a bank is deficient in either area in order to protect depositors and to limit potential damage to the financial system (Kumar and Yadav, 2013).

Banks face two central issues regarding liquidity. Banks are responsible for managing liquidity creation and liquidity risk. Liquidity creation helps depositors and companies stay liquid, for companies especially when other forms of financing become difficult. Managing liquidity risk is to ensure the banks own liquidity so that the bank can continue to serve its function (Vossenand & Ness, 2010). During the early "liquidity phase" of the financial crisis that began in 2007, many banks – despite adequate capital levels – still experienced difficulties because they did not manage their liquidity in a prudent manner. The crisis drove home the importance of liquidity to the proper functioning of financial markets and the banking sector. Prior to the crisis, asset markets were buoyant and funding was readily available at low cost.

The rapid reversal in market conditions illustrated how quickly liquidity can evaporate, and that illiquidity can last for an extended period of time. The banking system came under severe stress, which necessitated central bank action to support both the functioning of money markets and, in some cases, individual institutions. In the aftermath of the crisis, there is a general sense that banks had not fully appreciated the importance of liquidity risk management and the implications of such risk for the bank itself, as well as the wider financial system. As such, policymakers have suggested that banks should hold more liquid assets than in the past, to help self-insure against potential liquidity or funding difficulties. This has led to an international desire for common measures and standards for liquidity risk (Basel Committee on Banking Supervision, 2013).

The performance of commercial banks can be affected by internal and external factors (Kosmidou, 2008). These factors can be classified into bank specific (internal) and macroeconomic variables. The internal factors are individual bank characteristics which affect the bank's performance. These factors are basically influenced by the internal decisions of management and board. The external factors are sector wide or country wide factors which are beyond the control of the company and affect the profitability of banks. But this study is concerned with the relationship between the customer satisfaction and the bank performance To measure the profitability of commercial banks there are variety of ratios used of which Return on Asset, Return on Equity and Net Interest Margin are the major ones (Murthy and Sree, 2003).

Liquidity risk is said to be assassin of banks. This risk can adversely affect both bank's earnings and the capital. Therefore, it becomes the top priority of a bank's management to ensure the availability of sufficient funds to meet future demands of providers and borrowers, at reasonable costs. Episodes of failure of many conventional banks from the past and the present provide the testimony to this claim. For instance, as United States/U.S. subprime mortgage crisis reached its peak in the years 2008/9 unprecedented levels of liquidity support were required from central banks in order to sustain the financial system. Even with such extensive support, a number of banks failed, were forced into

mergers or required resolution. A reduction in funding liquidity then caused significant distress. In response to the freezing up of the interbank market, the European Central Bank and U.S. Federal Reserve injected billions in overnight credit into the interbank market. Some banks needed extra liquidity supports (Longworth 2010; Bernanke 2008).

It is evident that liquidity and liquidity risk is very emerging and important topic. Therefore banks and regulators are keen to keep a control on liquidity position of banks. However, this fragility is also a source of efficiency. Diamond and Rajan (2001) argue that the financial intermediation structure is efficient in that it disciplines banks when carrying out their lending function. The threat of a run is an incentive for the bank to choose projects with high return. More generally, this also suggests that an “even more liquid” bank might not always be desirable for the efficiency of the financial system. Therefore, effective liquidity risk management helps ensure a bank's ability to meet cash flow obligations, which are uncertain as they are affected by external events and other agents' behavior and to keep their optimal profitability.

In Nepalese context, Karki (2004) found that liquidity ratio was relatively fluctuating over the period, return on the equity is found satisfactory and there is positive relationship between deposits and loan advances. The recommendations made that are the existing condition of the liquidity of the banking and financial institutions needs to be reduced through an appropriate investment policy. Further, Joshi (2004) analyzed financial performance through the use of appropriate financial tools and to show the cause of change in cash position of the two banks. In which he stated that bank profitability uses the return on assets, the return on equity and net interest margin. The study found that liquidity and bank loan are positively related to bank profitability

Studies of Nepalese banks' profitability are important as guidance towards enhancing the economy since banks do contribute to economic growth and stability. Stability in the banking sector helps to maintain stability in the economy (Baral, 2005). Few studies have been conducted on determinant of profitability of the commercial banks in Nepal, for example, Karki (2004) also found that the positive relationship between capital adequacy and profitability, Joshi (2004) found that the liquidity and banks loan are positively related to banks profitability and Maharjan (2007) revealed that the capital adequacy and liquidity is positively associated with banks profitability.

The major purpose of the study is to examine effect of bank liquidity on banking performance in Nepalese commercial banks. Specifically, it examines the effect of capital ratio, investment ratio, liquidity ratio and quick ratio to return on assets and return on equity of commercial banks of Nepal.

The remainder of this study is organized as follows. Section two describes the sample, data and methodology. Section three presents the empirical results and the final sections draws conclusion and discusses the implications of the study findings.

2. Methodological aspects

This study has used secondary sources of data to analyze the impact of liquidity on bank performance. The total number of observation for the study consists of 144 from 16 commercial banks for the purpose of analyzing the relationship between the bank liquidity, and bank performance. The secondary data for bank performance and liquidity have been taken from annual report of the commercial bank for the year 2005/06 to 2013/14.

Table 1 shows the number of commercial banks along with the number of the respondents selected for the study.

Table 1
List of banks along with study period and number of observations

S.No	Banks	Years	No of Observations
1.	Nepal Bank Ltd.	2005/06-2013/14	9
2.	Rastriya Baninjya Bank	2005/06-2013/14	9
3.	Agriculture Dev. Bank	2005/06-2013/14	9
4.	Nabil Bank	2005/06-2013/14	9
5.	Nepal Investment Bank	2005/06-2013/14	9
6.	Standard Chartered Bank	2005/06-2013/14	9
7.	Himalayan Bank Ltd.	2005/06-2013/14	9
8.	Nepal Bangladesh Bank	2005/06-2013/14	9
9.	Nepal SBI Bank	2005/06-2013/14	9
10.	Everest Bank Ltd.	2005/06-2013/14	9
11.	Bank of Kathmandu	2005/06-2013/14	9
12.	Lumbini Bank Ltd.	2005/06-2013/14	9
13.	Machhapuchre Bank Ltd	2005/06-2013/14	9
14.	Kumari Bank	2005/06-2013/14	9
15.	Kumbini Bank Ltd.	2005/06-2013/14	9
16.	Sunrise Bank Ltd.	2005/06-2013/14	9
	Total Observation		144

Thus, the study is based on 144 observations.

The Model

Model 1: $ROA_{it} = \alpha_0 + \alpha_1 IR_{it} + \alpha_2 LR_{it} + \alpha_3 CR_{it} + \alpha_4 QR_{it} + \varepsilon_{it}$

Model 2: $ROE_{it} = \alpha_0 + \alpha_1 IR_{it} + \alpha_2 LR_{it} + \alpha_3 CR_{it} + \alpha_4 QR_{it} + \varepsilon_{it}$

Model 3: $ROA_{it} = \alpha_0 + \alpha_1 IR_{it} + \alpha_2 LR_{it} + \alpha_3 CR_{it} + \alpha_4 QR_{it} + \alpha_5 IR_{it-1} + \alpha_6 LR_{it-1} + \alpha_7 CR_{it-1} + \alpha_8 QR_{it-1} + \varepsilon_{it}$

Model 4: $ROE_{it} = \alpha_0 + \alpha_1 IR_{it} + \alpha_2 LR_{it} + \alpha_3 CR_{it} + \alpha_4 QR_{it} + \alpha_5 IR_{it-1} + \alpha_6 LR_{it-1} + \alpha_7 CR_{it-1} + \alpha_8 QR_{it-1} + \varepsilon_{it}$

Where, dependent variables are: ROA_{it} =return on assets for the firm during the period t , ROE_{it} =return on equity for the firm during the period t , & independent variables are: IR_{it} = investment ratio for the firm during the period t , LR_{it} = liquid ratio for the firm during the period t , CR_{it} = capital ratio for the firm during the period t , QR_{it} = quick ratio for the firm during the period t , $It-1$ = variable for one year lag and ε_{it} = Error term

Return on assets

Return on assets (ROA) is a financial ratio that shows the percentage of profit that a company earns in relation to its overall resources (total assets). Return on assets is a key profitability ratio which measures the amount of profit made by a company per dollar of its assets. This ratio is calculated as net profit after tax divided by the total assets. This ratio measure for the operating efficiency for the company based on the firm's generated profits from its total assets. It shows the efficient management at using assets to generate earnings. The ratio of net income to total assets measures the return on total assets (ROA) after interest and taxes (Siraj and Pillai, 2012). Posnikoff (1997) and

Margolis & Walsh (2003) found a positive and significant relationship between liquidity and financial performances. ROA is the ratio of net income to total assets. This ratio measures the profitability achieved by the bank by investing its assets in various activities, and is calculated by dividing net income by total assets.

Return on equity

The amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested (Siraj and Pillai, 2012). Net income is for the full fiscal year (before dividends paid to common stock holders but after dividends to preferred stock). Authors found that liquidity status positively affects the bank performance. ROE is the ratio of net income to shareholder's equity. This ratio measures the management efficiency in utilizing the bank funds in achieving a profit, and is calculated by dividing net income (net profit after tax) by equity.

Capital ratio

It measures the financial strength of a bank and indicates the extent of financial stability at the bank. Capital can be calculated by dividing capital by total assets. The equity-to-asset ratio measures how much of bank's assets are funded with owner's funds and is a proxy for the capital adequacy of a bank by estimating the ability to absorb losses. As the literature review pointed out, there are mixed results regarding the relationship between the equity-to-asset ratio and banks' profitability. Following the risk-return trade off, a higher equity-to-asset ratio leads to a lower expected return. Opposed to the risk-return hypothesis, Berger (1995b) examines the signalling 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. Based on it, this study has developed the following hypothesis;
H1: There is positive relationship between capital ratio and bank profitability.

Investment ratio

Loan to deposit is the most important ratio to measure the liquidity condition of the bank. Loan means the advances for the conventional banks. Bank with Low LDR is considered to have excessive liquidity, potentially lower profits, and hence less risk as compared to the bank with high LDR. However, high LDR indicates that a bank has taken more financial stress by making excessive loans and also shows risk that to meet depositors' claims bank may have to sell some loans at loss (Ahmed, 2009). The investment ratio indicates to the appropriateness of investing the available funds to the bank which derived from deposits, to meet the demands of credited loans and advances. Investment ratio can be calculated by dividing the credit facilities by total deposit.

H2: There is positive relationship between investment ratio and profitability in the Nepalese commercial banks.

Liquidity ratio

This ratio measures the ratio of liquid assets by total assets. Liquid assets includes cash & equivalent and cash reserve at the central bank, short-term deposits in banks and other government and non-government guaranteed securities as a percentage of total bank assets. Liquid ratio can be calculated by dividing the acid liquid ratio by total assets. Liquidity risk is one of the types of risk for banks; when banks hold a lower amount of liquid assets they are more vulnerable to large deposit withdrawals. Therefore, liquidity risk is estimated by the ratio of liquid assets to deposit and liquid asset to total asset. Pasiouras and Kosmidou (2007) found a negative relationship between liquidity ratio and profitability. Molyneux and Thornton (1992) and Guru et al. (2002) found a negative

relationship between liquidity and bank profitability. Based on the above evidences, this study has formulated hypothesis as;

H3: There is negative relationship between the liquidity ratio and profitability in the Nepalese commercial banks.

Quick ratio

This ratio measures the bank's ability to repay short-term obligations during a very limited period (a few days). Quick ratio can be calculated by dividing the difference of current asset and inventory by current liabilities. Nimer et al. (2013) did a study on the impact of Jordanian banks profitability. Bank profitability is the ability of a bank to generate revenue in excess of cost, in relation to the bank's capital base. This study sought to find out whether liquidity through quick ratio has significant impact on Jordanian banks profitability through return on asset (ROA). The study noted that a profitable banking sector is better able to resist negative impact and share in to the stability of the financial system. Based on this, study has developed hypothesis as;

H4: There is positive relationship between quick ratio and bank profitability.

3. Presentation and analysis of data

Descriptive statistics

The descriptive statistics used in this study consists of mean, standard deviation, minimum and maximum values associated with variables under considerations. The descriptive statistics are summarized on table 2.

Table 2
Descriptive statistics

This table summarizes the descriptive statistics- mean values and standard deviation of different variables used in this study during the period 2005/06 through 2013/14 associated with 16 sample banks. ROA and ROE are the variables used to measure the financial performance of commercial bank. The dependent variables used in the study are: ROA is Return on assets, ROE is return on equity, the independent variables are; IR as investment ratio, LR as liquidity ratio, CR as capital ratio, and QR as quick ratio.

Variables	Min.	Max.	Mean	SD
ROA (in %)	-18.92	18.04	1.92	3.32
ROE (in %)	-458.43	194.03	16.30	48.92
IR (in %)	.27	1.04	.71	.16
LR (in %)	.67	31.11	7.27	6.19
CR (in %)	.01	.33	.076	.059
QR (in %)	1.34	37.99	6.94	5.24

The table shows that the average return on assets (ROA) is 1.92 percent with the minimum value of -19.92 percent and maximum value of 3.31 percent. Return on equity (ROE) ranges from minimum value of -458.43 to maximum value of 194.03 percent leading to the average of 16.3015 percent.

Similarly, the descriptive statistics for the independent variable shows that investment ratio has minimum value of 0.27 percent and maximum value of 1.04 percent leading to the mean of 0.71 percent. The average liquidity ratio of the sample banks is noticed to be 7.27 percent with a minimum value of 0.67 percent and maximum value of 31.11 percent. Capital ratio ranges from minimum value of 0.01 percent to maximum value of 0.33 percent with an average of 0.076 percent. Similarly, quick ratio ranges from minimum value of 1.34 percent to maximum value of 37.99 percent with an average of 6.94 percent.

Correlation analysis

Bivariate Pearsons correlation coefficient analysis has been attempted to find the correlations between dependent and independent variables and the results are presented in table 3. Table 3 shows that investment ratio is positively related to return on assets which indicate that higher the investment ratio higher would be the return on assets of the banks. The liquidity ratio is also positive with return on assets indicating that higher the liquidity ratio higher would be the bank performance measured by return on assets. Further, relationship between capital ratio and return on assets is also found to be positive indicating higher the capital ratio of the bank higher would be the return on assets. However, correlation between quick ratio and return on assets shows negative relation indicating there is negative relation of return on assets and quick or acid-test ratio.

Table 3
Bivariate Pearson correlation coefficients for return on assets and determinant's of liquidity

This table reveals the Bivariate Pearson correlation coefficients of ROA. The independent variables are; IR as investment ratio, LR as liquidity ratio, CR as capital ratio, and QR as quick ratio.

Variables	ROA	IR	LR	CR	QR
ROA	1	.082	.160	.190*	-.079
IR		1	-.281**	.471**	.190*
LR			1	.094	-.470**
CR				1	.234**
QR					1

Note: '*' sign indicates that correlation is significant at 5 percentage level and
 '***' indicates that correlation is significant at 1 percentage level.

The correlation coefficient between dependent variable; return on equity (ROE) and independent variables; IR, LR, CR and QR is shown in table 4.

Table 4
Bivariate pearson correlation coefficients for return n equity (ROE) and determinants of liquidity

This table reveals the bivariate Pearson correlation coefficients of ROE. The independent variables are; IR as investment ratio, LR as liquidity ratio, CR as capital ratio, and QR as quick ratio.

Variables	ROE	IR	LR	CR	QR
ROE	1	.071	-.225**	.095	.013
IR		1	-.281**	.471**	.190*

LR			1	.094	-.470**
CR				1	.234**
QR					1

Note: '**' sign indicates that correlation is significant at 5 percentage level and
 '***' indicates that correlation is significant at 1 percentage level.

Correlation result in table 4 shows that return on equity is positively related to investment ratio. This indicates that higher the investment ratio higher would be the return on assets and return on equity. Similarly, correlation between capital ratio and return on equity found to be positive indicating higher the capital ratio higher would be the return on equity. However, the correlation between return on equity and liquidity ratio is found to be negative indicating higher the liquidity in the bank lower would be the return on equity. Further, the correlation is found to be negative for quick ratio with return on equity.

Regression analysis

Regression analysis results are the statistical tools for the data analysis. The regression analysis has been conducted to examine whether or not the return on asset and return on equity are affected by liquidity determinants of Nepalese commercial banks. The regression result of return on assets with liquidity variables are shown in table 5.

Table 5
Regression result of return on assets

This table shows regression analysis results of variables based on panel data of 16 commercial banks from the year 2005/06 to 2013/14. This table shows regression result of model one as: $ROA_{it} = \alpha_0 + \alpha_1 IR_{it} + \alpha_2 LR_{it} + \alpha_3 CR_{it} + \alpha_4 QR_{it} + \varepsilon_{it}$, in the form of simple and multiple regressions. The reported values are intercepts and slope coefficients of respective explanatory variables with t-statistics in parenthesis. Dependent variable is Return on Assets denoted as ROA and independent variables are; IR_{it} as investment ratio, LR_{it} as liquidity ratio, CR_{it} as capital ratio, and QR_{it} as quick ratio.

Specification	Intercept	IRit	LR it	CR it	QR it	Adj. R ²	F value
I	3.004* (4.157)	.905 (.914)				.032	.836
II	1.988* (7.851)		-.051 (-1.930)			.019	3.726
III	1.343* (5.418)			13.392* (5.199)		.154	27.033*
IV	2.668* (9.731)				-.044 (-1.402)	.007	1.965
VIII	4.051* (6.385)	3.795* (3.943)		19.985* (7.267)	-.074* (-2.648)	.271	18.695*
IX	4.757* (5.838)	4.330* (4.182)	-0.039 (-1.374)	21.556* (7.257)	-.097* (-2.986)	.275	14.58*

Note: '**' sign indicates that t-statistics and F-statistics are significant at 1 percentage level and
 '***' indicates that t-statistics and F-statistics are significant at 5 percentage level.

Result in table 5 revealed that beta coefficient is positively significant for investment ratio with return on assets which indicates that increased investment ratio increases the return on assets of the banks. However, beta coefficient for liquidity ratio is negative with return on assets indicating increased liquidity ratio decreases the return on assets of the bank. Further, beta coefficient is positive for capital ratio with return on assets. This result also indicates that increase in capital ratio increases the return on assets. However, the beta coefficient for quick ratio is negatively significant with return on

assets. This indicates that increase in quick ratio leads to decrease the return on assets. These findings are consistent with the findings of Kosmidou (2008); Pasiouras and Kosmidou (2007).

Table 6 reveals regression result in terms of return on equity (ROE). The result reveals that beta coefficient is positive for investment ratio indicating increased investment ratio increases the return on equity (ROE) of the banks. The beta coefficient is positive for capital ratio with return on equity and it is significant at five percent level. This indicates that increase in capital ratio increases the bank performance as measured by return on equity (ROE).

Table 6
Regression results of return on equity (ROE)

This table shows regression analysis results of variables based on panel data of 16 commercial banks from the year 2005/06 to 2013/14. This table shows regression result of model two as: $ROE_{it} = \alpha_0 + \alpha_1 IR_{it} + \alpha_2 LR_{it} + \alpha_3 CR_{it} + \alpha_4 QR_{it} + \varepsilon_{it}$, in the form of simple and multiple regressions. The reported values are intercepts and slope coefficients of respective explanatory variables with t-statistics in parenthesis. Dependent variable is Return on equity denoted as ROE and independent variables are ;IRit as investment ratio, LRit as liquidity ratio, CRit as capital ratio, and QRit as quick ratio.

Specification	Intercept	IRit	LR it	CR it	QR it	Adj. R ²	F value
I	1.505 (.084)	20.832 (.853)				.012	.728
II	29.197* (4.740)		-1.774* (-2.747)			.044	7.544*
III	10.365 (1.562)			78.139 (1.133)		.002	1.285
IV	15.488* (2.277)				-.117 (-.150)	.007	.022
VIII	36.029* (3.406)		-2.560* (-3.441)	137.643 (1.950)	-1.667 (-1.853)	.067	4.411*
IX	55.745* (2.446)	28.292 (.097)	-2.855* (-3.556)	180.433** (2.172)	-1.772** (-1.955)	.066	3.546*

Source: Panel Data in Appendix A

Note: ‘*’ sign indicates that t-statistics and F-statistics are significant at 1 percentage level and ‘**’ indicates that t-statistics and F-statistics are significant at 5 percentage level.

However, beta coefficient for liquidity ratio is negative with return on equity. This result indicates that higher liquidity ratio leads to lower return on equity for commercial banks of Nepal. Further, the beta coefficient for quick ratio is also negative and is significant at five percent. These findings are consistent with findings of Kosmidou (2008).

To obtain the more precise result for the relationship among dependent and independent variables, one year lagged data have been regressed with each dependent variable ROE and ROA. Table 7 shows the regression result of regular data and one year lagged variables for ROA.

Table 7
Regression results of return on assets (ROA) with lagged liquidity variables

This table shows regression analysis results of variables based on panel data of 16 commercial banks from the year 2005/06 to 2013/14. This table shows regression result of model one as: $ROA_{it} = \alpha_0 + \alpha_1 IR_{it} + \alpha_2 LR_{it} + \alpha_3 CR_{it} + \alpha_4 QR_{it} + \alpha_5 IR_{it-1} + \alpha_6 LR_{it-1} + \alpha_7 CR_{it-1} + \alpha_8 QR_{it-1} + \varepsilon_{it}$ in the form of simple and multiple regressions. The reported values are intercepts and slope coefficients of respective explanatory variables with t-statistics in parenthesis. Dependent variable is Return on Assets denoted as ROA and independent variables are ;IRit as investment ratio, LRit as liquidity ratio, CRit as capital ratio, and QRit as quick ratio, further one year lag variable for same are; IRit-1 as investment ratio, LRit-1 as liquidity ratio, CRit-1 as capital ratio, and QRit-1 as quick ratio

Specification	Intercept	IRit	LR it	CR it	QR it	IRit-1	LR it-1	CR it-1	QR it-1	Adj. R ²	F value
I	2.740* (5.524)	.791 (1.163)								.002	1.353
II	1.748* (10.285)		-.059* (-3.329)							.066	11.085*
III	1.451* (8.579)			9.575* (5.447)						.167	29.672*
IV	2.410* (12.802)				-.033 (-1.539)					.009	2.370*
V	3.035* (7.705)					1.494* (2.754)				.048	7.586*
VI	1.875* (11.411)						.016 (.914)			-.001	.835
VII	1.845* (10.804)							1.891 (1.076)		.001	1.157
VIII	2.528* (15.379)								-.077* (-4.145)	.111	17.178*
IX	3.694* (8.120)	2.606* (4.060)		13.441* (6.481)			-.028 (-1.706)		-.081* (-4.428)	.323	16.491*
X	3.873* (8.308)	2.675* (4.182)		13.813* (6.657)	-.034 (-1.581)		-.033* (-1.982)		-.065* (-3.169)	.331	13.855*
XI	3.827* (7.407)	1.915 (2.070)	-.018 (-.697)	11.722* (4.014)	-.028 (-1.179)	.775 (.997)	-.045 (-1.761)	1.889 (.763)	-.070* (-3.152)	.325	8.817*

Note: ‘*’ sign indicates that t-statistics and F-statistics are significant at 1 percentage level and ‘**’ indicates that t-statistics and F-statistics are significant at 5percentage level.

As shown in table 7, the beta coefficient is negative for investment ratio with return on assets. The result indicates that higher the investment ratio higher would be the return on equity. However, the beta coefficient is negative for liquidity ratio with return on assets. Further, beta coefficient for is positive for capital ratio with return on assets. This result indicates that increase in capital ratio increases the return on assets. However, the beta coefficient for quick ratio is negative with return on assets and it is significant at one percent level.

Further, the beta coefficient is positive for one year lagged investment ratio with return on equity and it is significant at five percent level indicating that higher the investment ratio in the previous year higher will be the return on assets in the current year. However, beta coefficient is negative for liquidity ratio with return on equity and is significant at five percent level; this result indicates that higher the liquidity ratio in the previous year may decreases the return on assets in the current year. Further, beta coefficient for capital ratio is positive with return on equity indicating increased capital ratio also increases the bank performance as measured by return on assets. But, beta coefficient is found to be negative for quick ratio with return on assets and it sis significant at one percent level. This result also indicates that higher the quick ratio lower would be the banking performance as measured by return on assets.

Similarly, table 8 also shows the regression result of return on equity (ROE) with lagged liquidity variables as independent variables. The regression result with one year lagged variables shows that beta coefficient for one year lagged investment ratio is positive indicating that higher the investment ratio in the previous year higher would be the return on equity in the current year. Further, the beta coefficient for capital ratio is also found to be positive with return on equity and it is significant at five percent level. This result also reveals that higher the capital ratio in the previous year leads to higher return on equity in the current year. However, the beta coefficient for liquidity ratio is found to be negative with return on equity and found to be significant at five percent level. This result is consistent with the finding of the study by Qasim and Ramiz (2011) and Al-Khoury (2011). Further,

the beta coefficient for one year lagged quick ratio is also found to be negative with return on equity indicating that increased quick ratio in the continuous year would lead to decrease in return on equity in the current year or coming year.

Table 8

Regression results of return on equity with lagged liquidity variables

This table shows stepwise regression analysis results of variables based on panel data of 16 commercial banks from the year 2005/06 to 2013/14. This table shows regression result of model one as: $ROA_{it} = \alpha_0 + \alpha_1 IR_{it} + \alpha_2 LR_{it} + \alpha_3 CR_{it} + \alpha_4 QR_{it} + \alpha_5 IR_{it-1} + \alpha_6 LR_{it-1} + \alpha_7 CR_{it-1} + \alpha_8 QR_{it-1} + \epsilon_{it}$ in the form of simple and multiple regressions. The reported values are intercepts and slope coefficients of respective explanatory variables with t-statistics in parenthesis. Dependent variable is Return on Equity denoted as ROE and independent variables are ;IR_{it} as investment ratio, LR_{it} as liquidity ratio, CR_{it} as capital ratio, and QR_{it} as quick ratio, further one year lag variable for same are; IR_{it-1} as investment ratio, LR_{it-1} as liquidity ratio, CR_{it-1} as capital ratio, and QR_{it-1} as quick ratio

Specification	Intercept	IR _{it}	LR _{it}	CR _{it}	QR _{it}	IR _{it-1}	LR _{it-1}	CR _{it-1}	QR _{it-1}	Adj. R ²	F value
I	1.505 (.084)	20.832 (.853)								-.002	.728
II	29.197 (4.740)		-1.774 (-2.747)							.044	7.544
III	10.365 (1.562)			78.139 (1.133)						.002	1.285
IV	15.488 (2.277)				.117 (.150)					-.007	.022
V	-1.780 (-.105)					24.920 (1.071)				.001	1.146
VI	28.009 (4.147)						-1.758** (-2.401)			.035	5.764
VII	28.009 (4.147)						-1.758** (-2.401)			.035	5.764
VII	17.106 (2.381)							18.813 (.254)		-.007	.065
VIII	11.125 (1.522)								-.652 (-.787)	-.003	.619
IX	44.460 (3.594)		-3.312 (-3.934)	243.690 (2.221)	-1.619 (-1.622)			155.541 (1.680)		.106	4.841
X	64.054 (2.663)	33.7855 (1.060)	-3.545 (-3.953)	310.228 (2.491)	-2.059 (-1.829)			164.846 (1.739)	-.734 (-.738)	.102	3.448
XI	54.451 (2.182)	64.319 (1.439)	4.086 (3.290)	405.334 (-2.874)	-2.116 (-1.870))	38.495 (1.026)	-.985 (-.795)	266.809** (2.229)	-1.134 (-1.053)	.102	2.847

Note: ‘*’ sign indicates that t-statistics and F-statistics are significant at 1 percentage level and ‘**’ indicates that t-statistics and F-statistics are significant at 5percentage level.

4. Summary and conclusion

Liquidity is a financial term that measures the amount of capital that is available for investment. Today, most of this capital is credit fund. That is because the large financial institutions prefer using borrowed money for investment. Low interest rates mean credit is cheaper, thus, businesses and investors are more likely to borrow. The return on investment has to be higher than the interest rate, to make investments attractive. In this way, high liquidity spurs economic growth (Heffernan, 1996). The banking institution had contributed significantly to the effectiveness of the entire financial system as they offer an efficient institutional mechanism through which resources can be mobilized and directed from less essential uses to more productive investments. Liquidity creation itself is seen as the primary source of economic welfare contribution by banks and also as their primary source of risk.

Therefore, virtually every financial transaction or commitment has implications for bank's liquidity. In Nepalese context, authors have found that liquidity ratio was relatively fluctuating over the period, return on the equity is found satisfactory and there is positive relationship between deposits and loan advances. It is also found that the liquidity and banks loan are positively related to banks profitability and some authors revealed that the capital adequacy and liquidity is positively associated with banks profitability.

The major purpose of this study is to determine the impact of bank liquidity on financial performance. This study is based on secondary sources of data of 16 commercial banks for the year 2005/6 to 2013/14 leading to the total observations of 144.

Result revealed that return on equity is positively related to investment ratio. This indicates that higher the investment ratio higher would be the return on assets and return on equity. Similarly, correlation between capital ratio and ROA and ROE is found to be positive indicating higher the capital ratio higher would be ROA and ROE. However, the correlation between return on equity and liquidity ratio is found to be negative indicating higher the liquidity in the bank lower would be the return on equity. Further, the correlation is found to be negative for quick ratio with return on equity. Beta coefficient is positive for investment ratio and capital adequacy with bank performance which indicates that increased investment ratio and capital ratio increases the bank performance. However, beta coefficient for liquidity ratio and quick is negative with return on assets and return on equity indicating increased liquidity ratio and quick ratio decreases the return on assets and return on equity of the bank, but this relation is not significant at five percent level.

This study concludes that liquidity status of the bank plays important role in banking performance in case of Nepalese commercial banks. This study revealed that investment ratio, liquidity ratio and capital ratio has positive impact on bank performance, while quick ratio has positive impact on the same. The result with one year lagged variables also showed similar result that higher liquidity ratio, investment ratio and increased capital ratio result in increase in the bank performance measured by return on assets and return on equity. However, the negative relation with quick ratio showed that increased quick ratio may leads to decrease in bank performance. The study suggests that banks willing to increase bank performance should increase capital ratio and investment ratio while should control liquidity ratio and quick ratio.

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