Impact of Liquidity and Regulatory Capital on the Profitability of Nepalese Commercials Banks

Ravi Rijal and Prof. Dr. R. S. Pradhan*

Abstract

This study examines the impact of liquidity and regulatory capital on the profitability of Nepalese commercial banks. Return on assets and net interest margin are the dependent variables. The selected independent variables are current ratio, investment ratio, liquidity ratio, bank size, capital ratio and capital adequacy ratio. This study is based on secondary data gathered from 20 Nepalese commercial banks with 160 observations for the period from 2011/12 to 2018/19. The data are collected from Banking and Financial Statistics published by Nepal Rastra Bank and annual reports of the Nepalese commercial banks. The regression models are estimated to test the impact of liquidity and regulatory capital on the profitability of Nepalese commercial banks.

The study showed that current ratio has a positive impact on return on assets and net interest margin. It indicates that increase in current ratio leads to increase in return on assets and net interest margin. Similarly, investment ratio has a positive impact on return on assets and net interest margin. It reveals that higher the investment ratio, higher would be the return on assets and net interest margin. However, liquidity ratio has a negative impact on return on assets and net interest margin. It means that higher the liquidity ratio, lower would be the return on assets and net interest margin. Similarly, bank size has a positive impact on return on assets and net interest margin. It reveals that larger the bank size, higher would be the return on assets and net interest margin. Likewise, the study also showed that bank capital ratio has a positive impact on return on assets and net interest margin. It indicates that higher the capital ratio, higher would be the return on assets and net interest margin. Similarly, capital adequacy ratio has a positive impact on return on assets. It reveals that higher the capital adequacy ratio, higher would be the return on assets and net interest margin.

Keywords: Return on assets, net interest margin, liquidity ratio, current ratio, investment ratio, bank size and capital adequacy ratio.

1. Introduction

The measurement of profitability and liquidity is vital for the existence and continuous survival of business. It enables businesses to have a reasonable idea of their past financial performance (profitability) and current financial position (liquidity). This will further enable them to take corrective measures to forestall any future financial quagmire that may arise from future profitability and liquidity crisis (Musso and Schiavo, 2008). Liquidity and

* Mr. Rijal is a freelance researcher, Kathmandu, Nepal and Prof. Pradhan is Academic Director, Uniglobe College (Pokhara University Affiliate), Kathmandu, Nepal. E-mail: rspkamal@gmail.com

profitability are two very important and vital aspects of corporate business life. Liquidity management has become a basic and broad aspect of judging the performance of a corporate entity. It is essential to maintain as adequate degree of liquidity of smooth running of the business operations. Thus, the need for efficient liquidity management in corporate businesses has always been significant for smooth running of the business (Ehiedu, 2014). Strong financial institutions are critical for increased investment, economic growth, employment and poverty alleviation (Kyalo, 2002). Declining ability to rely on core deposits, increased reliance on capital markets and recent turmoil in financial markets have created new challenges for banks in managing liquidity (Roy *et al.,* 2019). Ghosh (2014) revealed that the commercial banks generally increase capital to address the growing risks.

The high level of bank capital boosts the confidence and trust of the public about the soundness of the bank. A sufficient level of capital makes it possible to absorb losses and strengthen solvency (Abba *et al.,* 2013).Capital also offers easy access to financial markets and protects against liquidity problems caused by the outflow of funds (Abbas *et al.,* 2019). Similarly, Berger and Bouwman (2009) showed that bank capital improves the ability of the bank to create liquidity. However, Distinguin *et al.* (2013) observed that banks decrease their capital ratios when there is a decline in liquidity. Capital helps the bank to cope more effectively with risk, but it also reduces the value of the deposit insurance put option (Merton, 1977). The theory suggested that bank capital increases bank return in the start and up to trade-off levels, then it decreases (Berger, 1995). Unregulated banks are believed to maintain too little capital and liquidity to absorb losses. Furthermore, the resilient banking sector facilitates proper financial intermediation and enhances capital allocation in the economy (Dagher *et al.,* 2016). The capital requirements have been considered sufficient to curb bank risk appetite and preserve the liquidity and stability of the banking system. Different studies have provided conflicting results on the impact of liquidity on bank performance (Berger and Bouwman, 2009; Bordeleau and Graham, 2010; Bourke, 1989; Lartey *et al*., 2013). Banks hold short-term assets to manage their liquidity requirements.

Stronger banks can channelize available funds in business activities and make high profits (Pasaribu and Sari, 2011). Likewise, Sangmi and Nazir (2010) stated that the credit to deposit ratio indicates how much of a bank's core funds are being used for lending. In addition, Bunda and Desquilbet (2008) found that there is a significant and positive relationship between bank capital and liquidity. Likewise, Moussa (2015) found that (return on assets, capital to total assets, operating costs to total assets, growth rate of GDP, inflation rate, delayed liquidity) have significant impact on bank liquidity. Similarly, Vodova (2011) showed that bank liquidity is positively linked with

bank capital and bank risk. The results indicated that the liquidity of Czech commercial banks is higher when bank capital is higher and when the interest rates on loans are also higher. Bank profitability is strongly positively related to bank capital. Hence, banks seem to rely strongly on retained earnings in order to increase capital (Ding and Sickles, 2018).

Bunda and Desquilbe (2008) found that there is a negative relationship between bank liquidity and bank size, lending interest rate and financial crisis. However, the study also concluded that bank liquidity is positively correlated to capital adequacy, gross domestic products and inflation rate. Bhati *et al*. (2019) revealed that return on equity has a positive effect on liquidity of Indian banks. Likewise, there is a positive relationship between return on equity and liquidity position of banks (Al-Homaidi *et al*., 2019). Similarly, Bassey and Moses (2015) found that there is a positive and significant relationship between loans to deposit and return on equity ratio. Similarly, Gjorgji and Goran (2019) revealed that return on assets, capital adequacy ratio, non-performing loans and gross domestic products have positive relationship with liquidity whereas size of the banks is inversely associated with liquidity in the context of Macedonian banks. Shaha *et al.* (2018) found that capital adequacy ratio has a positive and significant impact on the liquidity of banks operating in Pakistan. In addition, Singh and Sharma (2016) found capital adequacy ratio positively influence bank liquidity indicating higher capital adequacy ratio leads to greater liquidity. In addition, Melese (2015) revealed that capital adequacy has statistically significant and positive impact on the liquidity of commercial banks.

Similarly, Munteanu (2012) showed that bank stability, Z-score and return on assets have a significant influence on bank liquidity. Likewise, Ayaydin and Karakaya (2014) revealed that there is a positive relationship between capital ratio and profitability. The study also concluded that there is a negative and significant relationship between bank liquidity and net interest margin. However, Fungacova and Poghosyan (2011) found that there is a negative relationship between the ratio of liquid assets to total assets and bank interest margins. In contrary, Lee and Hsieh (2013) revealed that loans to deposit ratio is significantly positive with the profitability (ROA and NIM) for 42 Asian countries banking. Furthermore, Olagunju *et al*. (2011) revealed that there is a negative relationship between the firm's profitability and current ratio. In addition, Morris and Shin (2010) found that there is a positive and significant relationship between liquidity ratio and bank profitability. Margolis and Walsh (2003) revealed a positive and significant relationship between liquidity ratio and bank profitability. Likewise, Hoffmann (2011) found a negative relationship between capital ratio and bank profitability.

Azizi and Sarkani (2014) found a positive and significant relationship

between liquidity, quality of management and earnings with financial performance. However, there was no any relationship between capital adequacy, assets quality and bank financial performance. Nazir (2010) concluded that capital adequacy, liquidity, asset quality and management are crucial in influencing the financial performance of the commercial banks in India. Similarly, Jeevarajasingam (2014) found that liquidity ratio has a strong positive correlation with return on assets. Likewise, non-performing loan has significant but negative effect on ROA, while capital adequacy ratio, operating expenses ratio, net interest margin, and loan-to-deposit ratio have an insignificant effect on ROA. Furthermore, Khrawish (2011) investigated the determinant of commercial banks in Jordan. The study found that Bank size and total liabilities to total asset have negative impact on the profitability, while GDP and inflation have a negative impact on the financial performance of commercial banks. In addition, Pastory and Qin (2012) found that capital adequacy, liquidity and asset quality are crucial for the profitability of commercial banks the absence of which would lead the commercial banks to incur losses.

In the context of Nepal, Pradhan and Shrestha (2016) examined the impact of liquidity on bank profitability in Nepalese commercial banks. The study revealed that there is a positive and significant impact of capital adequacy on bank profitability. Similarly, Pant (2017) assessed the relationship between liquidity risk and credit risk in Nepalese commercial banks. The study found that bank size has a positive and significant impact on bank risk. However, Bhattarai (2016) concluded that credit risk of the bank has a significant impact on the performance of Nepalese commercial banks. Similarly, Magar (2016) found that there is a positive relationship of capital adequacy ratio and firm size with bank profitability measured in terms of return on assets. In addition, Dhakal (2015) found that bank capital has a negative significant relationship with provision for loan loss. Shrestha *et al.* (2014) revealed that bank risk and capital are positively related to ROA and NIM. Similarly, Bhusal (2016) showed that there is a significant positive relationship between liquidity and profitability of commercial banks in Nepal.

The above discussion shows that empirical evidences vary greatly across the studies concerning the impact of capital and liquidity on the profitability of commercial banks. Though there are above mentioned empirical evidences in the context of other countries and in Nepal, no such evidence using more recent data exists in the context of Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The main objective of this study is to examine the impact of capital and liquidity on the profitability of Nepalese commercial banks. More specifically, it examines the relationship of capital ratio, current ratio, investment ratio,

capital adequacy ratio, liquidity ratio and bank size with return on assets and net interest margin of Nepalese commercial banks.

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 section draws the conclusion.

2. Methodological aspects

The study is based on the secondary data which were gathered from 20 Nepalese commercial banks from 2011/12 to 2018/19, leading to a total of 160 observations. The main sources of data includes Banking and Financial Statistics published by Nepal Rastra Bank and annual reports of the selected commercial banks. The study is based on descriptive as well as causal comparative research designs. Table 1 shows the number of commercial banks selected for the study along with the study period and number of observations.

Table 1: List of commercial banks selected for the study along with study period and number of observations

S.N.	Name of the banks	Study period	Observations
1	NABIL Bank Limited	2011/12- 2018/19	8
2	Nepal Investment Bank Limited	2011/12- 2018/19	8
3	Standard Chartered Bank Nepal Limited	2011/12- 2018/19	8
4	Himalayan Bank Limited	2011/12- 2018/19	8
5	Nepal SBI Bank Limited	2011/12- 2018/19	8
6	Nepal Bangladesh Bank Limited	2011/12- 2018/19	8
7	Everest Bank Limited	2011/12- 2018/19	8
8	Nepal Credit and Commerce Bank Limited	2011/12- 2018/19	8
9	NIC Asia Bank Nepal Limited	2011/12- 2018/19	8
10	Machhapuchchhre Bank Limited	2011/12- 2018/19	8
11	Kumari Bank International Limited	2011/12- 2018/19	8
12	Laxmi Bank Limited	2011/12- 2018/19	8
13	Siddhartha Bank Limited	2011/12- 2018/19	8
14	Agricultural Development Bank Limited	2011/12- 2018/19	8
15	Civil International Bank Limited	2011/12- 2018/19	8
16	Prime Commercial Bank Limited	2011/12- 2018/19	8
17	Sunrise Bank Limited	2011/12- 2018/19	8
18	NMB Bank Limited	2011/12- 2018/19	8
19	Mega Bank Nepal Limited	2011/12- 2018/19	8
20	Sanima Bank Limited	2011/12- 2018/19	8
Total number of observations			**160**

Thus, the study is based on the 160 observations.

The model

The models estimated in this study assumes that the firm profitability depends on liquidity and capital requirements. The dependent variables are return on assets and net interest margin. The selected independent variables are current ration, investment ratio, liquidity ratio, bank size, capital ratio and capital adequacy ratio. Therefore, the models take the following form:

$$ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 IR_{it} + \beta_3 LR_{it} + \beta_4 BS_{it} + \beta_5 CAPR_{it} + \beta_6 CAR_{it} + e_{it}$$

$$NIM_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 IR_{it} + \beta_3 LR_{it} + \beta_4 BS_{it} + \beta_5 CAPR_{it} + \beta_6 CAR_{it} + e_{it}$$

Where,

ROA = Return on assets is measured by the ratio of net income to total assets, in percentage.

NIM = Net interest margin is measured by the ratio of net interest income to total assets, in percentage.

CR= Current ratio is measured by the ratio of current assets to current liabilities, in percentage.

IR= Investment ratio is measured by the ratio of total loans to total deposits, in percentage.

LR = Liquidity ratio is measured by the ratio of liquid assets to total assets, in percentage.

BS = Bank size is measured by the total assets, Rs. in Billion.

CAR = Capital adequacy ratio is measured by the ratio of Tier I capital + Tier II capital to total risk weighted assets, in percentage.

CAPR = Capital ratio is measured by the ratio of total capital to total assets, in percentage.

The following section the independent variables used in this study along with the hypothesis formulation:

Current ratio

Current ratio is a measure of a commercial bank's short term solvency. Renato (2010) revealed that current ratio has a significant positive correlation with the bank profitability. Likewise, Khan and Khokhar (2015) revealed that there is a positive relationship between current ratio and return on assets of the companies in Saudi Arabia. Similarly, Ofoegbu and Onodugo (2016) showed that the current ratio and profitability of the company are significantly and positively related. Moreover, Maqsood *et al*. (2016) showed that there is a significant and positive relationship between current ratio and return on

assets. Based on it, this study develops the following hypothesis:

H_1: There is a positive relationship between current ratio and profitability.

Investment ratio

Investment ratio is defined as the ratio of total loan to total deposits. High loan to deposit ratio indicates that a bank has taken more financial stress by making excessive loans (Ahmed, 2011). Alshatti (2015) found that there is a positive and significant relationship between investment ratio and profitability. Lartey *et al*. (2013) revealed that investment ratio has a positive effect on profitability. Bourke (1989) showed that there is a positive and significant relationship between investment and profitability. Based on it, the study develops the following hypothesis:

H_2: There is a positive relationship between investment ratio and profitability.

Liquidity ratio

Liquidity ratio is measured as the ratio of cash plus short term investment to total assets. Alshatti (2015) revealed that there is a negative relationship between bank's liquidity and profitability. Likewise, Drakos (2003) found that there is a negative relationship between liquidity and profitability. Furthermore, Sufian and Chong (2008) showed that bank with higher liquidity levels tend to have less profitability. In addition, Goddard *et al*. (2004) found that high liquidity ratio usually has a lower profitability. Similarly, Rasiah (2010) revealed that the increase in liquidity of the banks tends to increase the profitability of the bank. Moreover, Owolabi *et al.* (2011) showed the negative relationship between liquidity and firm's profitability. Based on it, this study develops the following hypothesis:

H_3: There is a negative relationship between liquidity ratio and profitability.

Bank size

Bank size is measured in terms of total assets. Butt and Hasan (2009) showed that there is a positive and significant relationship between firm size and return on assets. Babalola (2013) examined the effect of firm size on firms' profitability in Nigeria. The study found a positive impact of firm size on profitability. The study also concluded that larger firms reduce costs due to economies of scale. Furthermore, Gul *et al*. (2011) found that there is a direct relationship between assets size and profitability. Likewise, Akhavein *et al*. (1997) revealed a positive relationship between size and bank profitability. Firm size has a strong positive affiliation with profitability (Bagchi, 2013). Based on it, this study develops the following hypothesis:

H_4: There is a positive relationship between bank size and profitability.

Capital ratio

Capital ratio is measured by the ratio of total capital to total assets. Bourke (1989) found that there is a positive relationship between the financial performance and capital ratio. The study also concluded that higher the capital ratio, higher would be the profitability of the bank. Berger (1995) showed capital ratio has a significant and positive relationship with bank profitability. Bank capital is positively related to the financial performance of banks (Gul, 2011). Koasmidou (2008) found that there is a positive impact of capital ratio on the performance of bank. Based on it, this study develops the following hypothesis:

H_5: There is a positive relationship between capital ratio and profitability.

Capital adequacy ratio

Capital adequacy ratio is a measure of the bank's regulatory capital. Gilbert and Wheelock (2007) argued that capital adequacy requirement is effective in the sense that it improves the soundness and safety of the banking sector and consequently its profitability. In addition, Molyneux and Thornton (1992) revealed that there is a positive and significant impact of capital adequacy ratio on bank profitability. Similarly, Bourke (1989) found that there is a positive relationship between the financial performance and capital adequacy ratio. Furthermore, Georgios *et al*. (2012) found that there is a positive relation between capital adequacy ratio and the financial performance of commercial banks. Based on it, this study develops the following hypothesis:

H_6: There is a positive relationship between capital adequacy ratio and profitability.

3. Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics of selected dependent and independent variables during the period 2011/12 to 2018/19.

Table 2: Descriptive statistics

This table shows the descriptive statistics of dependent and independent variables of 20 Nepalese commercial banks for the study period from 2011/12 to 2018/19. The dependent variables are ROA (Return on assets is measured by the ratio of net income to total assets, in percentage) and NIM (Net interest margin is measured by the ratio of net interest income to total assets, in percentage). The independent variables are CR (Current ratio is measured by the ratio of current assets to current liabilities, in percentage), IR (Investment ratio is

measured by the ratio of total loans to total deposits, in percentage), LR (Liquidity ratio is measured by the ratio of liquid assets to total assets, in percentage), BS (Bank size is measured by the total assets, Rs. in Billion), CAR (Capital adequacy ratio is measured by the ratio of Tier I capital + Tier II capital to total risk weighted assets, in percentage) and CAPR (Capital ratio is measured by the ratio of total capital to total assets, in percentage).

Variables	Minimum	Maximum	Mean	Std. Deviation
ROA	0.16	4.01	1.72	0.58
NIM	1.74	5.76	3.24	0.74
CR	85.76	131.51	107.80	6.75
IR	48.32	91.05	75.18	7.99
LIQ	48.32	98.87	80.87	9.92
BS	18.60	179.07	71.23	39.56
CAPR	5.51	32.25	11.87	4.29
CAR	8.77	20.41	12.54	2.04

Correlation analysis

Having indicated the descriptive statistics, Pearson's correlation coefficients are computed and the results are presented in Table 3.

Table 3: Pearson's correlation coefficients matrix

This table shows the bivariate Pearson's correlation coefficients of dependent and independent variables of 20 Nepalese commercial banks for the study period of 2011/12 to 2018/19. The dependent variables are ROA (Return on assets is measured by the ratio of net income to total assets, in percentage) and NIM (Net interest margin is measured by the ratio of net interest income to total assets, in percentage). The independent variables are CR (Current ratio is measured by the ratio of current assets to current liabilities, in percentage), IR (Investment ratio is measured by the ratio of total loans to total deposits, in percentage), LR (Liquidity ratio is measured by the ratio of liquid assets to total assets, in percentage), BS (Bank size is measured by the total assets, Rs. in Billion), CAR (Capital adequacy ratio is measured by the ratio of Tier I capital + Tier II capital to total risk weighted assets, in percentage) and CAPR (Capital ratio is measured by the ratio of total capital to total assets, in percentage).

Variables	ROA	NIM	CR	IR	LIQ	BS	CAPR	CAR
ROA	1							
NIM	0.579**	1						
CR	0.156*	0.056	1					
IR	0.287**	0.179*	-0.001	1				
LIQ	-0.027	-0.099	0.144	0.389**	1			
BS	0.343**	0.215**	0.212**	-0.075	0.331**	1		
CAPR	0.371**	0.250**	0.257**	-0.290**	0.214**	0.228**	1	
CAR	0.281**	0.544**	0.055	-0.280**	0.162*	0.222**	0.516**	1

Note: The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent levels respectively.

Table 3 shows that there is a positive correlation between current ratio and return on assets. It indicates that increase in current ratio leads to increase in return on assets. Similarly, investment ratio has a positive relationship with return on assets. It reveals that higher the investment ratio, higher would be the return on assets. However, liquidity ratio has a negative relationship with return on assets. It means that higher the liquidity ratio, lower would be the return on assets. Similarly, bank size is positively related to return on assets. It reveals that larger the bank size, higher would be the return on assets. Likewise, the study also shows that bank capital ratio has a positive relationship with bank return on assets. It indicates that higher the capital ratio, higher would be the return on assets. Similarly, capital adequacy ratio is positively related to return on assets. It reveals that higher the capital adequacy ratio, higher would be the return on assets.

On the other hand, that there is a positive relationship between current ratio and net interest margin. It indicates that increase in current ratio leads to increase in net interest margin. Similarly, investment ratio is also positively related to net interest margin. It indicates that increase in investment ratio leads to increase in net interest margin. However, liquidity ratio is negatively correlated to net interest margin. It indicates that higher the liquidity ratio, lower would be the net interest margin. The study also shows that bank size is positively correlated to net interest margin. It implies that larger the bank size, higher would be the net interest margin. Likewise, capital ratio has a positive relationship with net interest margin. It indicates that higher the capital ratio, higher would be the net interest margin. The study also shows that capital adequacy ratio has a positive relationship with net interest margin. It means that higher the capital adequacy ratio, higher would be the net interest margin.

Regression analysis

Having indicated the Pearson's correlation coefficients, the regression analysis has been carried out and results are presented in Table 4. More specifically, it shows the regression results of current ratio, capital ratio, capital adequacy ratio, investment ratio, liquidity ratio and bank size on return on assets of Nepalese commercial banks.

Table 4: Estimated regression results of current ratio, capital ratio, capital adequacy ratio, investment ratio, liquidity ratio, and bank size on return on assets

The results are based on panel data of 20 commercial banks with 160 observations for the period of 2011/12-2018/19 by using the linear regression model and the model is $ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 IR_{it} + \beta_3 LR_{it} + \beta_4 BS_{it} + \beta_5 CAPR_{it} + \beta_6 CAR_{it} + e_{it,}$ *where, the dependent variable is ROA (Return on assets is measured by the ratio of net income to total assets, in percentage).*

The independent variables are CR (Current ratio is measured by the ratio of current assets to current liabilities, in percentage), IR (Investment ratio is measured by the ratio of total loans to total deposits, in percentage), LR (Liquidity ratio is measured by the ratio of liquid assets to total assets, in percentage), BS (Bank size is measured by the total assets, Rs. in Billion), CAR (Capital adequacy ratio is measured by the ratio of Tier I capital + Tier II capital to total risk weighted assets, in percentage) and CAPR (Capital ratio is measured by the ratio of total capital to total assets, in percentage).

Model	Intercept	Regression coefficients of						Adj. R_bar^2	SEE	F-value
		CR	IR	LIQ	BS	CAPR	CAR			
1	0.252 (0.341)	0.041 (1.991)*						0.018	0.5829	3.965
2	3.307 (7.797)**		0.021 (3.761)**					0.076	0.565	14.144
3	1.848 (4.813)**			-0.002 (0.334)				0.006	0.591	0.112
4	1.692 (2.273)				0.713 (4.592)**			0.112	0.554	21.091
5	1.118 (8.745)**					0.051 (5.017)**		0.132	0.548	25.173
6	0.706 (2.527)**						0.081 (3.681)**	0.073	0.566	13.541
7	0.953 (1.278)	0.007 (1.006)		-0.007 (1.564)		0.052 (4.856)**		0.138	0.546	9.517
8	0.516 (0.592)		0.016 (2.986)**		0.607 (3.999)		0.044 (2.024)**	0.192	0.528	13.584
9	2.465 (2.735)**	0.009 (1.364)		-0.011 (2.46)	0.691 (4.234)**		0.067 (3.134)**	0.179	0.533	9.695
10	1.056 (1.041)	0.004 (0.624)	0.008 (1.251)	-0.009 (1.814)	0.631 (3.928)**	0.035 (2.871)	0.022 (0.901)	0.233	0.515	9.031

Notes:

i. Figures in parenthesis are t-values.
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
iii. Return on assets is the dependent variable.

Table 4 shows that the beta coefficients for current ratio are positive with return on assets. It indicates that current ratio has a positive impact on return on assets. This finding is consistent with the findings of Maqsood *et al*. (2016). Similarly, the beta coefficients for investment ratio are positive with return on assets. It indicates that the investment ratio has a positive impact on return on assets. This finding is consistent with the findings of Lartey *et al*. (2013). The study also reveals that the beta coefficients for liquidity ratio are negative with return on assets. It indicates that the liquidity ratio has a negative impact on return on assets. This finding is consistent with the findings of Sufian and Chong (2008). Likewise, the beta coefficients for bank size are positive with return on assets. It indicates that the bank size has a positive impact on return on assets. This finding is consistent with the findings of Akhavein *et al*. (1997). The study also reveals that the beta coefficients for bank capital are positive with return on assets. It indicates that the bank capital has a positive impact on return on assets. This finding is

consistent with the findings of (Gul, 2011).

Estimated regression results of current ratio, capital ratio, capital adequacy ratio, investment ratio, liquidity ratio and bank size on net interest margin are presented in Table 5.

Table 5: Estimated regression results of current ratio, capital ratio, capital adequacy ratio, investment ratio, liquidity ratio and bank size on net interest margin of Nepalese commercial banks

The results are based on panel data of 20 commercial banks with 160 observations for the period of 2011/12-2018/19 by using the linear regression model and the model is $NIM_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 IR_{it} + \beta_3 LR_{it} + \beta_4 BS_{it} + \beta_5 CAPR_{it} + \beta_6 CAR_{it} + e_{it,}$ *where, the dependent variable is NIM (Net interest margin is measured by the ratio of net interest income to total assets, in percentage). The independent variables are CR (Current ratio is measured by the ratio of current assets to current liabilities, in percentage), IR (Investment ratio is measured by the ratio of total loans to total deposits, in percentage), LR (Liquidity ratio is measured by the ratio of liquid assets to total assets, in percentage), BS (Bank size is measured by the total assets, Rs. in Billion), CAR (Capital adequacy ratio is measured by the ratio of Tier I capital + Tier II capital to total risk weighted assets, in percentage) and CAPR (Capital ratio is measured by the ratio of total capital to total assets, in percentage).*

Model	Intercept	Regression coefficients of						Adj. R_bar^2	SEE	F-value
		CR	IR	LIQ	BS	CAPR	CAR			
1	3.918 (4.118)**	0.006 (0.709)						-0.003	0.751	0.502
2	4.503 (8.119)**		0.017 (2.281)**					0.026	0.739	5.204
3	2.643 (5.429)**			-0.007 (1.246)				0.003	0.747	1.553
4	0.521 (0.529)				0.569 (2.769)**			0.041	0.734	7.667
5	2.727 (16.074)**					0.044 (3.246)**		0.057	0.727	10.536
6	0.742 (2.385)**						0.201 (8.156)**	0.292	0.631	66.526
7	3.927 (3.965)**	0.015 (1.689)		-0.005 (0.758)		0.047 (3.364)**		0.064	0.725	4.611
8	-0.182 (0.175)		0.003 (0.388)		0.261 (1.442)		0.189 (7.245)**	0.293	0.692	22.958
9	0.629 (0.594)	0.012 (1.615)		-0.001 (0.169)	0.333 (1.733)		0.192 (7.668)**	0.301	0.626	18.026
10	0.763 (0.614)	0.011 (1.458)	0.003 (0.425)	-0.001 (0.107)	0.322 (1.643)	0.007 (0.442)	0.195 (6.584)**	0.292	0.631	11.934

Notes:

i. Figures in parenthesis are t-values.
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
iii. Net interest margin is the dependent variable.

Table 5 shows that that the beta coefficients for current ratio are positive with net interest margin. It indicates that the current ratio has a positive impact on net interest margin. This finding is consistent with the findings of Ofoegbu and Onodugo (2016). Similarly, the beta coefficients for investment ratio are

positive with net interest margin. It indicates that the investment ratio has a positive impact on net interest margin. This finding is consistent with the findings of Alshatti (2015). Likewise, the beta coefficients for liquidity ratio are negative with net interest margin. It indicates that the liquidity ratio has a negative impact on net interest margin. This finding is consistent with the findings of Drakos (2003). Similarly, the beta coefficients for bank size are positive with net interest margin. It indicates that the bank size has a positive impact on net interest margin. This finding is consistent with the findings of Babalola (2013). Likewise, the beta coefficients for capital adequacy ratio are positive with net interest margin. It indicates that the capital adequacy ratio has a positive impact on net interest margin. This finding is consistent with the findings of Bourke (1989).

4. Summary and conclusion

Strong financial institutions are critical for increased investment, economic growth, employment and poverty alleviation. The key component in a financial system is banks which work as intermediate between funds provider and those in need of funds contributing to economic growth. Bank capital adequacy is the key driver of a resilient banking system that is capable of absorbing shocks. Bank capital plays a central role in the safety and soundness of individual banks. It supports future growth and fosters public confidence in the banks. It provides the capacity under the banks legal lending limits to serve customers need and protect the bank from unexpected losses

This study attempts to examine the impact of capital and liquidity on the profitability of Nepalese commercial banks. This study is based on secondary data of 20 commercial banks with 160 observations for the periods from 2011/12 to 2018/19.

The study showed that current ratio, bank size, capital ratio, investment ratio and capital adequacy ratio have positive impact on return on assets. Similarly, the study also showed that current ratio, bank size, capital ratio, investment ratio and capital adequacy ratio have positive impact on net interest margin. However, liquidity ratio has a negative impact on return on assets and net interest margin. The study concluded that bank size followed by capital ratio is the most influencing factor that explains the changes in return on assets. Likewise, the most dominant factor that determines the net interest margin is bank size followed by capital adequacy ratio in the context of Nepalese commercial banks.

References

Abba, G. O., P. Zachariah, and E. E. Inyang (2013). Capital adequacy ratio and banking risks in the Nigeria money deposit banks. *Research Journal of Finance and Accounting*, 4(17), 17-25.

Abbas, F., S. Iqbal, and B. Aziz (2019). The impact of bank capital, bank liquidity and credit risk on profitability in post crisis period: A comparative study of US and Asia. *Cogent Economics and Finance*, 7(1), 1-19.

Akhavein, J. D., A. N. Berger, and D. B. Humphre (1997). The effects of megamergers on efficiency and price: Evidence from a bank profit function. *Review of Industrial Organization, 12*(1), 95-139.

Al-Homaidi, E. A., A. Ahmad, A.S. Khaled, and M.M. Qaid (2019). External factors and banks' performance: An empirical examination of commercial banks listed on Bombay Stock Exchange (BSE). *Journal of Emerging Technologies and Innovative Research, 6(6),* 2349-2362.

Alshatti, A. S. (2015). The effect of the liquidity management on profitability in the Jordanian commercial banks. *International Journal of Business and Management*, 10(1), 62-75.

Ayaydin, H., and A. Karakaya (2014). The effect of bank capital on profitability and risk in Turkish banking. *International Journal of Business and Social Science*, 5(1), 45-65.

Azizi, M., and Y. A. Sarkani (2014). Review of the financial performance of Mellat Bank according to CAMEL Model. *A Journal of Multidisciplinary Research, 3(*1), 32-42.

Babalola, Y. A. (2013). The effect of firm size on firm's profitability in Nigeria. *Journal of Economics and Sustainable Development*, *4*(5), 90-94.

Bagchi, B. (2013). Liquidity-profitability relationship: Empirical evidence from Indian fast moving consumer goods firms. *International Journal of Applied Management Science*, 5(4), 355-376.

Bassey, G. E., and C.E. Moses (2015). Bank profitability and liquidity management: A case study of selected Nigerian deposit money banks. *International Journal of Economics, Commerce and Management*, 3(4), 1-24.

Berger, A. N. (1995). The relationship between capital and earnings in banking. *Journal of Money, Credit and Banking*, 27(2), 432-456.

Berger, A. N., and C. H. Bouwmanm (2009). Bank liquidity creation. *The Review of Financial Studies*, 22(9), 3779-3837.

Bhati, S. S., A. De Zoysa, and W. Jitaree (2019). Factors affecting the liquidity of commercial banks in India: A longitudinal analysis. *Journal of Banking,* 5(1), 249–259.

Bhattarai, Y. R. (2016). Effect of credit risk on the performance of Nepalese commercial banks. *NRB Economic Review*, 28(1), 41-64.

Bhusal, V. (2016). Bank regulatory capital buffer and liquidity: A case of Nepalese commercial banks. *Nepalese Journal of Management,* 3(3), 151-162.

Bordeleau, E., and C. Graham (2010). The impact of liquidity on bank profitability. *Bank of Canada Working Paper No. 012.*

Bourke P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking and Finance*, 13(1), 65-79.

Bunda, I., and J. B. Desquilbet (2008). The bank liquidity smile across exchange rate regimes. *International Economic Journal*, *22*(3), 361-386.

Bunda, I., and J. Desquilbet (2008). The bank liquidity smile across exchange rate regimes. *International Economic Journal*, 22(3), 361-386.

Butt, S. A., and A. Hasan (2009). Impact of ownership structure and corporate governance on capital structure of Pakistani listed companies. *International Journal of Business and Management*, 4(2), 1-12.

Dagher, J., M. G. Ariccia, M. L. Laeven, M. L. Ratnovski, and M. H. Tong (2016). Benefits and costs of bank capital. *International Monetary Fund Working Paper No, 16/10.*

Dhakal, B. (2015). The determinants of loan loss provision in Nepalese commercial banks. *Journal of Banking and Finance,* 30(2), 220-240.

Ding, D., and R. C. Sickles (2018). Frontier efficiency, capital structure, and portfolio risk: An empirical analysis of US banks. *BRQ Business Research Quarterly*, 21(4), 262-277.

Distinguin, I., C. Roulet, and A. Tarazi (2013). Bank regulatory capital and liquidity: Evidence from US and European publicly traded banks. *Journal of Banking and Finance*, 37(9), 3295-3317.

Drakos, K. (2003). Assessing the success of reform in transition banking 10

year later: An interest margin analysis. *Journal of Policy Modelling,* 25(1), 309-317.

Ehiedu, V. C. (2014). The impact of liquidity on profitability of some selected companies: The financial statement analysis (FSA) approach. *Research Journal of Finance and Accounting*, *5*(5), 81-90.

Fungacova, Z., and T. Poghosyan (2011). Determinants of bank interest margins in Russia: Does bank ownership matter? *Economic Systems*, 35(4), 481-495.

Georgios, E., C. Girardone, and A. Ventouri (2012). Bank supervision, regulation, and efficiency: Evidence from the European Union. *Journal of Financial Stability,* 8(1), 292–302.

Ghosh, S. (2014). Risk, capital and financial crisis: Evidence for GCC banks. *Borsa Istanbul Review,* 14(3), 145–157.

Gilbert, R., and W. David (2007). Measuring commercial bank profitability: *Proceed with Caution Review,* 89(2), 515-532.

Gjorgji, G., and H. Goran (2019). Determinants of liquidity and its relationship with profitability: The case of Macedonian banking sector. *Asian Journal of Economics and Empirical Research*, *6*(1), 85-92.

Goddard, J., P. Molyneux, and J. Wilson (2004). The profitability of European bank: A cross sectional and dynamic panel analysis. *International Research Journal of Finance and Economics*, 74(3), 363-381.

Gul, F. (2011). Growth opportunities, capital structure and dividend policies in Japan. *Journal of Corporate Finance, 5*(2), 141-168.

Hoffmann, P. R. (2011). Determinants of the profitability of the US banking industry. *International Journal of Business and Social Science*, 2(22), 255-269.

Jeevarajasingam, N. (2014). A study on liquidity and profitability of private banks in Sri Lanka. *Research Journal of Finance and Accounting, 5*(21), 165-174.

Khan, M. S., and B. Kokhar (2015). Funding liquidity and bank risk taking. *Journal of Banking and Finance*, 82(1), 203-216.

Khrawish H. (2011). Determinant of commercial banks performance in Jordan. *International Journal of Finance and Economics, 6*(81), 148-159.

Koasmidou, K. (2008). The determinants of banks' profits in Greece during the period of EU financial integration. *Managerial Finance*, 34 (3), 146-159.

Kyalo, P. (2002). Allowing for risk choices in financial intermediation. *University of Mannheim Working Paper No. 98/04.*

Lartey, V., A. Samuel, and E. K. Boadi (2013). The relationship between liquidity and profitability of listed banks in Ghana. *International Journal of Business and Social Sciences.* 3(2), 48-56.

Lee, C. C., and M. F. Hsieh (2013). The impact of bank capital on profitability and risk in Asian banking. *Journal of International Money and Finance*, 32(10), 251-281.

Magar, G. T. (2016). Liquidity management and bank profitability: A case of Nepalese commercial banks. *Nepalese Journal of Management*, 3(4), 55-70.

Maqsood, A., I. M. Tahir, and S. Haron (2016). The relationship between inefficiency, risk and capital: Evidence from commercial banks in ASEAN. *Journal of Economics and Management*, 6(1), 58-74.

Margolis, P., and R. Walsh (2003). Foreign banks profit and commercial credit extension in the United States. *Journal of Financial Economics*, 8(5), 533- 539.

Melese, N. (2015). Determinants of banks liquidity: Empirical evidence on Ethiopian commercial banks. *Journal of Economics and Sustainable Development*, *6*(15), 36-47.

Merton, R. C. (1977). An analytic derivation of the cost of the deposit insurance and loan guarantees: An application of modern option pricing theory. *Journal of Banking and Finance*, 1(1), 3-11.

Molyneux, A., and G. Thorton (1992). Determinants of profitability in Turkish banking sector. *International Research Journal of Finance and Economics,* 3(2), 55-86.

Moussa, M. A. B. (2015). The determinants of bank liquidity: Case of Tunisia. *International Journal of Economics and Financial Issues*, 5(1), 249-259.

Munteanu, I. (2012). Bank liquidity and its determinants in Romania. *Procedia Economics and Finance*, 3(1), 993-998.

Musso, P., and S. Schiavo (2008). The impact of financial constraints on firm survival and growth. *Journal of Evolutionary Economics*, *18*(2), 135-

149.

Nazir, T. (2010). Analyzing financial performance of commercial banks in India: Application of CAMEL model. *Pakistan Journal of Commercial Social Sciences, 4*(1), 40-55.

Ofoegbu, G. N., and V. A. Onodugo (2016). Liquidity management and profit performance of pharmaceutical manufacturing firms listed in Nigeria Stock Exchange. *International Journal of Management Sciences and Business Research, 5*(17), 1-13.

Olagunju, A., O. D. Adeyanju, and O. S.Olabode (2011). Liquidity management and commercial banks' profitability in Nigeria. *Research Journal of Finance and Accounting*, 2(7), 2222-2247.

Owolabi, S. A., R. T. Obiakor, and A. T. Okwu (2011). Investigating liquidity profitability relationship in business organizations: A study of selected quoted companies in Nigeria. *British Journal of Economics, Finance and Management Sciences*, 1(2), 11-29.

Pant, U. R. (2017). Relationship between liquidity risk and credit risk: A case of Nepalese commercial banks. *Nepalese Journal of Finance,* 4(2), 139-151.

Pasaribu, H., and R. L. Sari (2011). Alisistingkatkecukupan modal dan loan to deposit ratio terhadap profitabilitas. *Jurnal Telaahdan Riset Akuntansi*, 4(2), 114-125.

Pastory, D., and X. Qin (2012). Commercial banks profitability position: The case of Tanzania. *International Journal of Business and Management, 7*(13), 45-60.

Pradhan, R. S., and D. Shrestha (2016). Impact of liquidity on bank profitability in Nepalese commercial banks. *Nepalese Journal of Business*, 3(4), 1-15.

Rasiah, B. (2010). Capital requirements and bank behavior: Empirical evidence for Switzerland. *Journal of Banking and Finance,* 25(4), 789–805.

Renato, S. V. (2010). The relationship between liquidity and profitability. *International Research Journal of Applied and Basic Sciences,* 4(6), 1624-1631.

Roy, S., A. K. Misra, P. C. Padhan, and M. R. Rahman (2019). Interrelationship among liquidity, regulatory capital and profitability: A study on Indian banks. *Cogent Economics and Finance*, *7*(1), 1-20.

Sangmi, M. U. D., and T. Nazir (2010). Analyzing financial performance of commercial banks in India: Application of CAMEL model. *Pakistan Journal of Commerce and Social Sciences*, 4(1), 40-55.

Shaha, S. Q. A., I. Khan, and M.T. Shaha (2018). Factors affecting liquidity of banks: Empirical evidence from the banking sector of Pakistan. *Colombo Business Journal*, *9*(1), 1-18.

Singh, A., and A. K. Sharma (2016). An empirical analysis of macroeconomic and bank-specific factors affecting liquidity of Indian banks. *Future Business Journal*, *2*(1), 40-53.

Sufian, F., and R. Chong (2008). Determinants of bank profitability in a developing economy: Empirical evidence from the Philippines. *Asian Academy of Management Journal of Accounting and Finance*, 1(4), 91-112.

Vodova, P. (2011). Liquidity of Czech commercial banks and its determinants. *International Journal of Mathematical Models and Methods in Applied Sciences*, 5(6), 1060-1067.