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Factors affecting the liquidity of commercial banks in Nepal

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Abstract
The study has investigates the factors that have affecting the liquidity of commercial banks in Nepal. The panel data were collected of the period of 2013/2014 to 2017/2018 from the 10 sample commercial banks. The study has been employed descriptive, correlational, and casual comparative research design. The data have been analysis with helps of Gretl Statistical Software 1.9.4. The Pooled ordinary least square (OLS) Model, Fixed Effects Model and Random Effect Model has been used to investigate the factors that have affecting liquidity. The liquidity - LIQ (total loan to total deposit ratio) taken as dependent variable whereas capital adequacy ratio (CAR), Non-performing loan ratio (NPL), Profitability (ROA, ROE), size of banks (LnTA), Gross domestic products growth rate (GDP) and inflation rate have been selected for independent variables. The result reveals that the profitability and inflation have significant and negative effect on liquidity. The study concludes that the major determinants of commercial banks' liquidity are profitability and inflation rate in the context of Nepal.

Keywords: panel data, liquidity, capital adequacy, non-performing loan, profitability, size of banks, inflation, gross domestic products, commercial banks, Nepal

Introduction

Though banks are contributes the primary source of economic welfare through creating liquidity, they are also primary source of shocks (Bryant, 1980; Calomiris and Kahn, 1991) [5, 6]. Diamond and Rajan (1999) [8] have examined a world of certainty where rigidity was not a problem, and it is first best to structure the bank as a complete pass through, financed fully with deposits. This maximizes liquidity creation. Once we introduce uncertainty that is observable but not verifiable and thus cannot be used in contracting, they were introduce the other side of the trade-off. The rigid capital structure could lead to runs when real asset values fall. The banker now has to trade-off liquidity creation against the cost of bank runs. It may be optimal for the bank to partially finance itself with a softer claim like capital, which has the right to liquidate, but does not have a first-come-first-served right to cash flows. Capital (or its fiduciary representatives), unlike depositors, cannot commit not to renegotiate. While this allows the banker to extract some rents, thus reducing his ability to create liquidity, it also buffers the bank better against shocks to asset values. That bank capital is a buffer against the costs of bank distress is, to some extent, well known. More novel is the cost; the reduced liquidity or credit creation. Similarly, they have added that banks plays a significant role in the financial system by solving liquidity problem of both borrowers and investors, in monitoring and ensuring firms' effective utilization of resources allocated to them, and by creating liquidity.

The very rent article has been published by Maharjan on the topic of liquidity crunch: a headache for banks, in e-paper The Riging Nepal. Maharjan has emphasis on the role of bankers', role of regulator i.e. NRB and liquidity crunch as well solution very seriously. From the study of Maharjan, the banking sector has been suffering a liquidity and credit crunch for months. As a result, the commercial banks have not enough loanable amounts at their disposal. The CCD (credit to core capital-cum-deposit) ratio of most of the commercial banks has exceeded the limit (80 per cent). So they have asked Nepal Rastra Bank (NRB) for an increase in the CCD of up to 82 per cent so that some funds may be utilized for extension of credit. The NRB has flatly refused to consider the request. In fact, it is miffed at the way the commercial banks have been extending credit. The commercial banks have extended credit to the unproductive sector like vehicle, home and margin lending. During the past six months of this fiscal year, the loan portfolio of the commercial banks expanded by 30 per cent vis-à-vis 19 per cent for the last five years. During the period, deposit mobilization lagged behind the expansion of credit. This goes on to show that the commercial banks have adopted aggressive lending to make a profit. It is the obligation of the commercial banks to adhere to the NRB norms. Those commercial banks that violate the norms are subject to action. Viewed thus, the commercial banks that have exceeded the CCD ratio are subject to action by the NRB. But the NRB has not taken any action yet. However, it has warned the commercial banks to remain within the CCD limit. As the NRB is against increasing the CCD ratio, the commercial banks have tried to rationalize the CCD ratio by mobilizing deposits. They have hiked the rate of interest on fixed deposits to as high as 12 or 12.5 per cent per annum. The rate of interest is even higher than that charged to some of their loans.

However, they have not remarkably increased the rate of interest on savings deposits. This is because those customers who prefer higher interest switch over to fixed deposits. On the other hand, the commercial banks are reluctant to increase the rate of interest on savings deposits as the portion of such deposits is huge and even a slight increase may lead to a high cost of fund. It may be kept in mind that offering higher interest on fixed deposits is just a short-term

option. Once the liquidity situation limps back to normalcy, the commercial banks will reduce the rate of interest on fixed deposits. It is anybody's guess when the liquidity crunch will be resolved. But speculation has it that the liquidity crunch will remain for one or two months only.

The liquidity problem is something that cannot be bypassed as it is directly linked to the banking sector as well as the national economy. On the one hand, the commercial banks should take steps such as aggressive deposit mobilization and reduction in unproductive lending, while on the other the NRB and the government should take the initiative in their own way. NRB can help the commercial banks through a refinancing facility and other options while the government can release funds from its coffers by speeding up development works.

Thus, every financial activities and economic welfare mainly depends on the position of banks' liquidity. Currently, the liquidity issue in Nepal is not only the concern of banks and regulatory organ, but also the concern of borrowers in order to enhance their businesses. Such funds that the banks to lend are deposits mobilized from the customers. In the context of Nepal, Bhattarai (2016) [12], Gautam (2016) [10], Ojha (2018) [15], Bhattarai (2019) [13], and Khanal (2019) [11] have been study on determinants of banks' liquidity in Nepal aimed to identify factors affecting liquidity of commercial banks in Nepal. The trend in the liquidity ratio of Nepalese commercial banks also decreased from time to time so far. Therefore, to identify what make banks illiquidity is important to bankers and regulators to protect banks from liquidity shocks.

In this context, this study has examine the factors that affecting the liquidity of commercial banks in Nepal. This study is further organized as follows: section two described the literature review, three research methodology, section four results and discussion and summary and conclusion in final section of the study.

Literature Review

The major studies related to the determinants of liquidity have been reviewed as follows:

According to Yeager and Seitz (1989) [22], liquidity can also be defined as the ability of a financial institution to meet all legitimate demands for fund. However, the fundamental role of banks in the maturity transformation of short-term deposits into long-term loans makes banks inherently vulnerable to liquidity risk, both of an institution-specific nature and that which affects markets as a whole.

Diamond and Rajan (1999) [9] have emphasis on banks can create liquidity because their deposits are fragile and prone to runs. Increased uncertainty can make deposits excessively fragile in which case there is a role for outside bank capital. Greater bank capital reduces liquidity creation by the bank but enables the bank to survive more often and avoid distress. Amore subtle effect is that banks with different amounts of capital extract different amounts of repayment from borrowers. The optimal bank capital structure trades off the effects of bank capital on liquidity creation, the expected costs of bank distress, and the ease of forcing borrower repayment. The model can account for phenomena such as the decline in average bank capital in the United States over the last two centuries. It points to overlooked side-effects of policies such as regulatory capital requirements and deposit insurance.

Banks for international settlement (BIS, 2008), defines liquidity as the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses.

Bhattarai (2016) [13] has revealed that bank liquidity is positively related to capital adequacy ratio, operating expenses assets ratio and profitability. However, bank liquidity is negatively associated to credit deposit ratio and financial expenses credits ratio. The influence of deposits assets ratio on liquidity is ambiguous.

Gautam (2016) [10] has revealed that, bank size, capital adequacy and inflation rate have a positive impact on liquidity; while nonperforming loans, profitability and GDP growth rate have negative impact on liquidity of Nepalese commercial banks. Capital adequacy, non-performing loan and profitability have statistically significant effect on the liquidly of Nepalese commercial banks whereas bank size, GDP growth rate and inflation rate have statistically insignificant impact on the liquidity of Nepalese commercial banks. However, the capital adequacy, non-performing loan, bank size, profitability, growth rate of GDP and inflation rate are the major determinants of liquidity of this industry.

Teshome (2017) [17] has ssessed the factors affecting liquidity of commercial banks in Ethiopia by using the data over the period of 2011 to 2015 on sample size of twelve commercial banks in Ethiopia out of 17 in total with the aim of investigating macroeconomic as well as government policy and bank specific variables which affecting the liquidity of commercial banks in Ethiopia. The study employed sequential mixed research method approach by combining secondary data through balanced random effect regression model and interviews. The results of the study revealed that all macroeconomic and government policy variables were statistically significant in determining the liquidity of commercial banks in Ethiopia. Among those variables foreign direct investment and NBE-bill purchase had negative effect whereas unemployment rate and real GDP growth rate had positive relationship with banks' liquidity. On the other hand, among the bank-specific factors funding cost was statistically insignificant variable in affecting commercial banking liquidity in Ethiopia whereas level of deposit and bank size had statistically significant and negative relationship with banks' liquidity. Thus, the study suggests that macroeconomic factors are more important than firm-specific in determining the Ethiopian commercial banking liquidity. Therefore, banks shall be more concerned about macroeconomic environment in addition to internal environment as a cornerstone while reviewing its policy and developing strategies to enhance their liquidity position.

Ngoc Diep and Nguyen (2017) [14] have identified the major determinants of the liquidity of commercial banks in Vietnam from 2009-2016 of 32 commercial banks by using a regression model with the ordinary least square (OLS) method. The three determinants, including (1) size of bank, (2) ratio of total loans to total deposits and (3) capital to asset proportion, significantly affect the liquidity of a bank. Based on the results of this study, managerial implications for commercial banks in Vietnam are made for their sustainable development and some recommendations are also made for the State Bank of Vietnam to improve their relevant policies in controlling the whole banking system.

Jha (2018) has found that the return on equity, return on assets, non-performing loan, interbank rate have negative

impact on the liquidity of Nepalese commercial banks. The study was concluded that CAR, GDP and inflation have positive impact on liquidity of Nepalese commercial banks.

Bhattarai (2019) [12] has found that among the bank-specific factors non-performing loan ratio is found a significant but negative impact on liquidity. With respect to macroeconomic factors, the results indicated that gross domestic products (GDP) is found a significant positive effect on liquidity (liquid asset to total assets ratio) in the model. Similarly, in the second model there is negative but significant result found between profitability (return on equity) and liquidity (credit to deposit ratio). The study recommended that bankers should consider nonperforming loan and GDP in such a way that improves banks' performance. Finally, the current study provides useful insights for bankers, analysts, regulators, investors, and other interested parties on the liquidity in Nepalese commercial banks context.

Khanal (2019) [11] has revealed that ROA has positive significant impact on loan to deposit ratio whereas ROE, Size and inflation have negative significant impact on liquidity. Similarly, CAR and GDP has negative insignificant impact on loan to deposit ratio whereas, NPL has positive insignificant impact on loan to deposit ratio. This study concludes that ROA, ROE, size and inflation are major determinants of Bank liquidity.

Bhati, De Zoysa and Jitaree (2019) [1] have examines the long-term effect of various regulatory, bank-specific and macroeconomic factors on the determination of liquidity in Indian banks. For this purpose, the study uses a random effect panel data regression model and tests it with data on Indian banks for 21 years, covering the period from 1996 to 2016. The model considers the effect of regulatory factors, cash reserve ratio, and statutory liquidity, and incorporates four different liquidity ratios specific to the Indian banking scenario. The results of the analysis show contrasting relationships between the independent variables and the dependent variables measured by four liquidity ratios. It is interesting to note that Indian banks rely more on asset-based liquidity and less on liability-based liquidity. More specifically, the most important liquidity ratio of L1 (liquid assets to total assets ratio) showed a significant relationship with macroeconomic variables of discount rates, call rates, foreign exchange reserve, exchange rate with US dollar, consumer price index and gross domestic product. L1 also showed a significant relationship with bank-specific variables of capital to total assets and bank size. However, the regulatory factors of cash reserve ratio and profitability determined by return on equity (ROE) and non-performing assets were not found to have any effect on liquidity of Indian banks.

Thus, the rigorous review of literature, the study has been conceptualized the conceptual model, chosen the study variables and formulated the hypothesis to conclude this study.

Research Methodology

Conceptual Framework

The conceptual framework has been developed from the review of rated studies and presented in the Figure 1. In view of the related empirical studies, it is stated that bank liquidity affected by capital adequacy ratio (CAR), Non-performing loan ratio (NPL), Profitability (ROA, ROE), size of banks (LnTA), Gross domestic products growth rate (GDP) and inflation rate (INF). The conceptual framework shows the relationship between dependent variable liquidity (LIQ) and independent variables such as capital adequacy ratio (CAR), Non-performing loan ratio (NPL), Profitability (ROA, ROE), size of banks (LnTA), Gross domestic products growth rate (GDP) and inflation rate (INF).

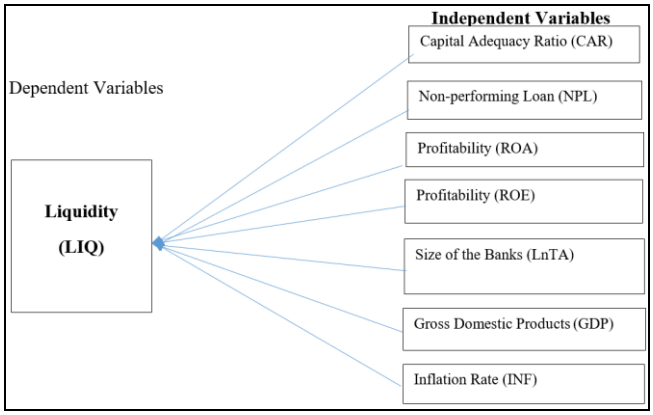

Fig 1: Conceptual Framework Developed by Researcher (2020)

Data Collection

The data were collected from the period of 2013/2014 to 2017/2018 of the 10 sample commercial banks. The annual report of sample commercial banks collected through the respective bank web page. The sample commercial banks, study period and total observation has been presented in Table 1.

Table 1

S. N	Name of Bank	Study Period	Observations
1	LAXMI BANK	2013/2014 -2017/18	5
2	GLOBAL IME	2013/2014 -2017/18	5
3	KUMARI BANK	2013/2014 -2017/18	5
4	NMB BANK	2013/2014 -2017/18	5
5	HBL BANK	2013/2014 -2017/18	5
6	NIBL BANK	2013/2014 -2017/18	5
7	SANIMA BANK	2013/2014 -2017/18	5
8	JANATA BANK	2013/2014 -2017/18	5
9	NABIL BANK	2013/2014 -2017/18	5
10	NCC BANK	2013/2014 -2017/18	5
Total Observations			50

The Model

The study has been employed descriptive, correlational, and casual comparative research design. The panel data have been analysis with helps of Gretl Statistical Software 1.9.4. The Pooled Ordinary Least Square (OLS) Model, Fixed Effects Model and Random Effect Model has been used to investigate the factors that have affecting liquidity. The liquidity - LIQ (total loan to total deposit ratio) taken as dependent variable whereas capital adequacy ratio (CAR), Non-performing loan ratio (NPL), Profitability (ROA, ROE), size of banks (SIZE), Gross domestic products growth rate (GDP) and inflation rate have been selected for independent variables. The model of the study is as follows:

$$\mathbf{LIQ_{it} = \beta_0 + \beta\ 1CAR_{it} + \beta\ 2NPL_{it} + \beta\ 3ROA_{it} + \beta\ 4ROE_{it} + \beta\ 5\ SIZE_{it} + \beta\ 6GDP_{t} + \beta\ 7INF_{it} + e_{it}}$$

Where,

β_0 = Constant Term

$\beta 1$ to $\beta 6$ = Coefficient of Variable

CARit = Capital adequacy ratio of i^{th} bank in year t

$\mathbf{NPL_{it}}$ = Nan-performing loan ratio of i^{th} bank in year t

ROA_{it} = Return on assets of i^{th} bank in year t
ROE_{it} = Return on equity of i^{th} bank in year t
$SIZE_{it}$ = Natural Logarithm of total asset of i^{th} bank in year t
GDP_t = Gross domestic product growth rate in year t
INF_t = Inflation rate in year t
e_{it} = Error term

Variables and Hypothesis
Liquidity (LIQ)
The loan to deposit ratio is a commonly used statistic for assessing a bank's liquidity and it reflects the utilization of funds policy of the bank. An increase in this ratio is indicative of the bank deploying more funds to loans. Such a situation reflects a less liquid position for the bank. In this study, the percentage of total loan to total deposit have used used to calculation of liquidity. The same ratio has been used by Bhattarai (2016) [13], Gautam (2016) [10], Ojha (2018) [15], Bhattarai (2019), and Khanal (2019) [11] to identify factors affecting liquidity of commercial banks in Nepal.

Capital Adequacy Ratio (CAR)
The capital adequacy ratio measures a bank's solvency and ability to absorb risk. It is used to protect depositors, promoters' stability and the efficiency in the financial system. The bank have high level of CAR may pursue opportunities more aggressively, which means increase risk taking leading to more risk credit portfolios. Capital adequacy ratio defined as sum of tier I and tier II capital to risk weighted assets according to BASEL 2015 accords. The study of Ojha (2018) [15] has found that capital adequacy ratio is significant positive related to liquidity. In the same line, this study is expected significant and positive relation with liquidity.
H1: There is significant positive relationship between Capital adequacy ratio and liquidity.

Non-performing Ratio (NPL)
Non-performing loan are those loans which are outstanding both principal and interest for more than 90 days. It is further define that any loan facility that is not up to date in terms of payment of principal and interest contrary to the terms of the loan agreement is NPLs. For the calculation purpose, the relation between non-performing loan to total loan is knows as non-performing ratio. There is significant negative relation between non-performing loan and liquidity (McNulty, Akhigbe, and Verbrugge, 2001, and Bhattarai, 2019) [12]. The study also expect negative relation with liquidity.

H2: There is significant negative relationship between non-performing loan and liquidity.

Return on Assets (ROA)
The return on assets indicates the ability of bank management to generate profit by utilizing the available assets of bank. There is significant and negative result found between the profitability (ROA) and liquidity. The previous study in the same line were: Mehdi and Abderrassoul (2014). Similarly, the study against were: Singh and Sharma (2016) [16]; Roman and Sargu (201); and Melese (2015) [13]. In this study expected that there negative relationship with liquidity.
H3: *There is significant negative relationship between return on assets and liquidity.*

Return on Equity (ROE)
Return on equity expresses the return realized by owners in return on investing their funds in the bank and it is one of most important measurement on profitability. It is a ratio that provides investors insight into how efficiently a bank is managing the equity that shareholders' have contribution to the bank. A business that has a return on eqity is more likely to be one that is capable of generating cash internally. Khanal (2019) [11] and Bhattarai (2019) [13] have found that significant and negative ration of return on equity on liquidity. The study has also same line which is expected negative relation on liquidity.
H4: There is significant negative relationship between profitability (ROE) and Liquidity.

Size of the Bank (SIZE)
The natural logarithm of total asset of bank is taken as size of the bank. The size have positive related with liquidity. The priori study in the same line were: Melese (2015) [13], Mehdi and Abderrassoul (2014), Malik (2013) [12] and Shaha, Khan, Shaha, and Tahir (2018). Even though the contrary study were: Vodov (2011) and Singh and Sharma (2016) [16]. In this case the study ha expected size is positive related with liquidity.

H5: *There is significant positive relationship between size of the bank and liquidity*

Gross Domestic Products Growth Rate (GDP)
Gross domestic products is the monetary value of all the finished goods and services produced within a country's borders in a specific time period. The previous study has found in favor of positive and significant relationship were Sheefeni and Nyambe (2016); Boadi *et al.* (2016); Mazreku, Morina, Misiri, Spiteri, and Grima, (2019) and Bhattarai (2019). Although, the study of Vodova (2013), Vodova (2011), Mehdi and Abderrassoul (2014) and Singh and Sharma (2016) found negative and significant result found between GDP and liquidity. But in this study has has expected positive influence of GDP on liquidity.
H6: There is significant positive relationship between gross domestic products growth rate (GDP) and liquidity.

Inflation Rate (INF)
The inflation has been measured by change in the consumer price index. The study of Singh and Sharm (2016), Vodova (2013); Ahmad (2017) found that inflation rate is positive and significant rated with liquidity of commercial banks. However, the study of Mehdi and Abderrassoul (2014), Malik (2013) [12] and Vodova (2011), Khanal (2019) [11] have found negative relationship with liquidity. Based on the previous study, this study expected positive a negative effect of inflation rate on liquidity.

H7: *There is significant negative relationship between inflation rate and liquidity.*

Results and Discussion
Descriptive Statistics
Table 2 represent the summary descriptive statistics of the study variables. The average liquidity ratio is 83 percent is over than limit 80 percent. In the study period the

commercial banks have enjoyed. They are not suffer the liquidity problems. But it is not suitable for investors perspectives because if will decreased in the net profit. It is main concern for shareholders'.

The maximum rage also is very high. The mean non-performing loan is 1.72 percent with minimum 0.42 percent and 7.30 percent maximum. The banks should makes extra policy to reduce the non-performing loan ratio otherwise banks will face the problem of unsuccessful.

Table 2: Summary Descriptive Statistics of the Study Variables

Variable	Min	Max	Mean	S.D.
LIQ	64.4	134.	83.0	10.0
CAR	9.52	75.3	18.2	18.7
NPL	0.420	7.30	1.72	1.14
ROA	0.400	2.89	1.64	0.511
ROE	8.51	29.8	16.0	5.54
LnTA	9.29	12.4	11.0	0.669
INF	4.48	9.90	7.32	1.98
GDP	0.400	7.40	4.60	2.51

***Source*:** Annual Report of Sample Banks and result are Drawn from Gretl Statistical Software 1.9.4

The average inflation rate is 7.32 percent which is higher as per banks deposited rate perspectives. If the inflation rate is high than bank general deposit at that consumers are not interested to deposit their money at banks at that time bank has suffer the liquidity problem. The minimum gross domestic products growth rate is very poor 0.40 percent. It is the rate of post-earthquake period 2015/16. Even though the rate of GDP is in progressive form these days. Due to the suffering from the COVID-19-2020 problem. The GDP will also decrease in the next economic year 2020/21 in as whole world.

Correlation Analysis

The Table 3 presented the Bivariate Pearson correlation coefficient of study variables. Where, the liquidity (LIQ) has been taken dependent variables and capital adequacy ratio, non-performing loan ratio, return on assets, return on equity, size of bank, inflation rate and gross domestic products growth rate selected as independent variables.

Table 3: Pearson Correlation Matrix of Study Variables

LIQ	CAR	NPL	ROA	ROE	LnTA	INF	GDP	Variables
1.0000	-0.0154	0.1100	-0.0553	-0.4619	-0.0450	-0.3693	0.2555	LIQ
	1.0000	0.0068	-0.0267	-0.0601	0.1874	-0.0253	0.0239	CAR
		1.0000	-0.1739	-0.0609	-0.1512	0.0349	-0.0092	NPL
			1.0000	0.3826	0.5498	-0.1675	0.1462	ROA
				1.0000	0.2420	0.1482	-0.1120	ROE
					1.0000	-0.1941	0.0184	LnTA
						1.0000	-0.7379	INF
							1.0000	GDP

***Source*:** Annual Report of Sample Banks and result are Drawn from Gretl Statistical Software 1.9.4

The non-performing loan and gross domestic products growth rate have negatively associated with liquidity. Similarly, capital adequacy ratio, return on assets, return on equity and inflation rate have negatively correlated with liquidity. The correlation coefficient of all independent variables are less than 0.55, it shows that there is collinearity problem of independent variables. The correlation coefficient results gives the green signal for regression analysis.

Regression Results

Model Diagnostics Test

As per model test diagnostics from Gretl statistical software for Pooled OLS or Fixed Effects Model suitable for this study has been done. Then, the result reveals that Joint significance of differing group means: F(9, 33) = 1.94204 with p-value 0.0799328. The p-vale is 0.079>0.05. The assumption of model selection is: A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the fixed effects alternative. Hence, the as p-vale greater than 0.05, the Pooled OLS model is appropriate for this case.

Again, the model test for the Pooled OLS or Random Effect Model appropriate for this study has been test. Then, the result shows that Breusch-Pagan test statistic: LM = 0.0014846 with p-value = prob(chi-square (1) > 0.0014846) = 0.969265. The p-vale 0.969 is greater than 0.05. The assumption of hypothesis test is: A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the random effects alternative. Hence, the P-vale is greater than 0.05, the Pooled OLS is suitable in this case.

Table 4: Summary of Model Diagnostics Test

S. N	Hypothesis for Model Test	Result of Model Test	Model Selection	Rules of Thump (P-Vale < 0.05)
1	Joint significance of differing group means: The Pooled OLS test hypothesis is H0 = Pooled OLS model is appropriate. H1= Fixed effect model is appropriate.	Joint significance of differing group means: F (9, 33) = 1.94204 with p-value 0.0799328 Assumption: A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the fixed effects alternative.	Pooled OLS Model	P-value =0.079>0.05 Null Hypothesis Accepted
2	Breusch-Pagan test statistic: The Pooled OLS test hypothesis is H0 = Pooled OLS model is appropriate. H1= Random effect model is appropriate. H1= Fixed effect model is appropriate.	Breusch-Pagan test statistic: LM = 0.0014846 with p-value = prob (chi-square (1) > 0.0014846) = 0.969265 Assumption: A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the random effects alternative	Pooled OLS Model	P-value =0.969>0.05 Null Hypothesis Accepted

3	Hausman test statistic: The Hausmen test hypothesis is H0= Random effect model is appropriate. H1= Fixed effect model is appropriate.	Hausman test statistic: H = 11.9134 with p-value = prob (chi-square (5) > 11.9134) = 0.0359945 Assumption: A low p-value counts against the null hypothesis that the random effects model is consistent, in favor of the fixed effects model.	Fixed Effect Model	P-value =0.035<0.05 Alternative Hypothesis Accepted

Similarly, the selection process has been done for model test between Random Effect and Fixed Effect model. The result of Hausman test statistic: H = 11.9134 with p-value = prob (chi-square (5) > 11.9134) = 0.0359945. The assumption of hypothesis test is: A low p-value counts against the null hypothesis that the random effects model is consistent, in favor of the fixed effects model. The p-vale is lower than 0.05 shows that among tested models the Fixed Effects model is appropriate in this case.

Therefore, the Pooled OLS model is appropriate among other model two models fixed effect and random effects model. But, the result of all three models has been presented in Table 5. Only, the result of Pooled OLS Model has been interpreted as support of model diagnostics test.

The VIF less than 3.0, it shows that there is no problem of multicollinirity. The value of adjusted R-square is 0.2121. It shows that the explanatory power of independent variables that has been used in the model is low i.e. 21.21 percent. The selection of the variable is not appropriate for the study because about 79.79 percent explained the liquidity by others variables.

Table 4: Regression Results of Factors Affecting Liquidity

Model 1: Pooled OLS, Using 60 Observations					
Variables	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*	VIF
Const	110.942	29.1269	3.809	0.0004***	
CAR	−0.0219059	0.0706581	−0.3100	0.7581	1.074
NPL	0.943788	1.13753	0.8297	0.4114	1.037
ROA	2.03254	3.25827	0.6238	0.5361	1.708
ROE	−0.806034	0.257033	−3.136	0.0031***	1.251
LnTA	−0.531911	2.46076	−0.2162	0.8299	1.670
INF	−1.72380	1.00451	−1.716	0.0935*	2.450
GDP	−0.232681	0.778619	−0.2988	0.7665	2.350
R-squared =0.324678			Adjusted R-squared = 0.212124		
Test for Different Group Intercepts F (9, 33) = 1.94204			P-value(F) = 0.0799328 > 0.05		
Durbin-Watson = 0.613373					
Model 2: Fixed-effects, Using 60 Observations					
	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	45.2932	39.0045	1.161	0.2539	
CAR	0.415025	1.04598	0.3968	0.6941	
NPL	0.481860	1.31640	0.3660	0.7167	
ROA	9.65285	5.02733	1.920	0.0635*	
ROE	−0.466883	0.425497	−1.097	0.2805	
LnTA	2.67098	2.76223	0.9670	0.3406	
INF	−1.09061	0.944955	−1.154	0.2567	
GDP	−0.101595	0.729498	−0.1393	0.8901	
LSDV R-squared = 0.558511			Within R-squared = 0.361940		
LSDV F(16, 33) = 2.609193			P-value(F) = 0.009702		
Durbin-Watson = 0.519815					
Model 3: Random-effects (GLS), Using 60 Observations					
	Coefficient	*Std. Error*	*Z*	*p-value*	
Const	102.194	29.5381	3.460	0.0005***	
CAR	−0.0219616	0.0866606	−0.2534	0.7999	
NPL	0.724621	1.14677	0.6319	0.5275	
ROA	3.17849	3.55931	0.8930	0.3719	
ROE	−0.809583	0.283896	−2.852	0.0043***	
LnTA	0.0347667	2.48190	0.01401	0.9888	
INF	−1.60033	0.964330	−1.660	0.0970*	
GDP	−0.199306	0.745156	−0.2675	0.7891	
Breusch-Pagan Test:			Hausman Test:		
Chi-square (1) =0.0014846			Chi-square (5) = 11.9134		
p-value = = 0.969265> 0.05			p-value =0.0359945< 0.05		
Durbin-Watson = 0.519815					

Note: ***. Correlation is significant at the 0.01 level (2-tailed), **. Correlation is significant at the 0.05 level (2-tailed). * Correlation is significant at the 0.10 level (2-tailed)

The profitability measure return on equity has been significant negative with liquidity. It shows that profitability

and liquidity moving toward the opposite direction. The banks have made strategy for making profit high it will be liquidity crises and if the liquidity is very high the profitability of the banks is lower. They should balance at a same time by maintained appropriate liquidity. The result of the study is consisted with study of Khanal (2019) [11] and Bhattarai (2019) [13].

The inflation rate is significant negative found with liquidity. The inflation rate is increases the liquidity is decreases and vise-versa. The stable inflation rate is makes suitable liquidity. The result as per priori hypothesis. The result in support of previous study like: Mehdi and Abderrassoul (2014), Malik (2013) [12] and Vodova (2011) and Khanal (2019) [11]. Similarly result contrary with study of of Singh and Sharm (2016), Vodova (2013); Ahmad (2017) found that inflation rate is positive and significant rated with liquidity of commercial banks.

The variables Capital adequacy ratio, size of the bank, gross domestic products growth rate negative and statistically insignificant. The others variables non-performing loan and return on assets have positive but statistically insignificant in this model.

Summary and Conclusion

The study has investigates the factors that have affecting the liquidity of commercial banks in Nepal. The panel data were collected of the period of 2013/2014 to 2017/2018 from the 10 sample commercial banks. The study has been employed descriptive, correlational, and casual comparative research design. The data have been analysis with helps of Gretl Statistical Software 1.9.4. The Pooled ordinary least square (OLS) Model, Fixed Effects Model and Random Effect Model has been used to investigate the factors that have affecting liquidity. The liquidity - LIQ (total loan to total deposit ratio) taken as dependent variable whereas capital adequacy ratio (CAR), Non-performing loan ratio (NPL), Profitability (ROA, ROE), size of banks (LnTA), Gross domestic products growth rate (GDP) and inflation rate have been selected for independent variables. The result reveals that the profitability and inflation have significant and negative effect on liquidity. The study concludes that the major determinants of commercial banks' liquidity are profitability and inflation rate in the context of Nepal.

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