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Original Article

Determinants of Liquidity in Commercial Banks of Nepal

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Abstract *- This paper aims to identify the determinants of liquidity in Nepalese commercial banks. The descriptive research designs have been adopted for the study. The study is conducted using panel data of 10 commercial banks of Nepal with 100 observations for the period 2007/8 to 2016/17. The dependent variable is LIQ (Loan to deposit ratio) which measures liquidity while the independent variables are bank size, CAR (Total capital adequacy ratio), NPL (Non-performing loan to total loan ratio), ROA(Return on Asset), GDP growth rate and inflation rate. For the purpose of this study, secondary data have been used. The random Effect Model (REM) of panel data analysis is used as a major tool of analysis. The regression results revealed that ROA has a positive significant impact on loan to deposit ratio whereas ROE, Size, and inflation have a negative significant impact on liquidity. Similarly, CAR and GDP have a negative insignificant impact on loan to deposit ratio whereas, NPL has a positive insignificant impact on loan to deposit ratio. This study concludes that ROA, ROE, size, and inflation are major determinants of Bank liquidity.*

Keywords *- Commercial banks, Capital Adequacy Ratio, Non-Performing Loan, Return on assets (ROA), Return on equity (ROE), GDP, Inflation*

I. INTRODUCTION

The bank is the financial intermediary between the surplus unit and the deficit unit. It is the institution that helps to make smooth flow of the money in the financial market. In Nepal, Banks and financial institutions are classified according to their nature and capital according to BAFIA 2073 act. Commercial Banks are graded as 'A' class financial institutions according to this act by Nepal Rastra Bank. The first commercial bank established in Nepal is Nepal Bank Limited which was established on 30th Kartik, 1994 B.S. Then, Nepal Rastra Bank was established on 2013-1-14 B.S as the central bank under Nepal Rastra Bank Act, 2012 B.S. Then, Rastriya Banijya Bank was established as a fully government-owned commercial bank on 2022-10-10 B.S. Agricultural Development Bank was then established on 2024-10-07 B.S to help the agricultural side of the country. After the adoption of the liberalization policy, the first joint venture bank, Nepal Arab Bank was established in 2041-03-29 B.S(Sharma, 2014) Now, there are 28 commercial banks in Nepal. Commercial banks are those banks that are established to make a profit by lending money to individuals and institutions that need money to run their businesses or for other various purposes. Commercial banks manage this fund to lend to deficit units by accepting deposits from those who have surplus money. Commercial banks need to have enough assets with them in the vault to provide money to the depositors when they demand money.

Liquidity is the ability of the assets for quick conversion into cash when needed. Banks need to manage the liquidity to reduce the liquidity and reputational risk. Liquidity refers to the bank's ability to meet its obligations, especially that of depositors. Adequate levels of liquidity are directly proportional to the bank's profitability. The successful management of a commercial bank is very careful in consideration of three objectives liquidity, profitability, and productivity. The findings of(Kamande, 2017) show increase in liquidity causes a significant increase in bank performance the study, therefore, recommends that banks continue to keep the recommended liquidity levels to be able to meet customer demand for their deposits to avoid bank runs and panic in the market. Since banks are less profitable when less liquid, bank managers should be encouraged to invest in more liquid assets. This will not only improve bank profitability but will also enable banks to meet their short-term obligations as they fall due.

There are various factors that affect the liquidity in commercial banks. These factors need to be studied to manage the liquidity in commercial banks. There are macroeconomic and bank-specific factors affecting liquidity in commercial banks. Macroeconomic factors are the broad economic trend or the characteristics of the economy of the country such as GDP, inflation, etc. Bank-specific factors are the factors that the internal factors such as capital adequacy, bank size, non-performing loan, profitability, etc.

The main aim of this article is to identify the factors that have a significant impact on the liquidity of commercial banks in Nepal.

II. REVIEW OF LITERATURE

Various researches have been carried out in the past in various countries about the determinants of liquidity but very few researches have been carried out in commercial banks of Nepal.

Vodova (2011) identifies determinants of liquidity of commercial banks in the Czech Republic. This study considered bank-specific and macroeconomic data over the period from 2001 to 2009 and analyze them with panel data regression analysis. It was found that bank liquidity is positively related to capital adequacy, interest rates on loans, the share of non-performing loans, and interest rate on an interbank transaction and negatively related to the inflation rate, business cycle, and financial crisis. The influence of banks size is ambiguous.

Similarly, another article suggested that only bank capitalization has a positive and statistically significant impact on both liquidity ratios, while loan loss reserve ratio has a positive and statistically significant impact on the first ratio, and bank size has a negative and statistically significant impact on the same ratio. On the other hand, bank profitability has a negative and statistically significant impact on the second liquidity ratio. This study used the financial data of 21 Turkish banks over the period of 2006-2013 and employed two liquidity ratios i.e. the ratio of liquid assets to customer deposits and short-term funding (first ratio), and the ratio of liquid assets to total deposits (second ratio). Bank specific, macroeconomic variables and the realization of the global financial crisis were analyzed by performing panel random effect regression. The results of both regression tests revealed that macroeconomic indicators and the crisis dummy variable have non-significant relations with both liquidity ratios.(Mohammad, 2016)

Sheefeni & Nyambe (2016) revealed that real gross domestic product is the main determinant of commercial banks' liquidity in Namibia. It was also found that monetary policy rate is positively related to banks' liquidity though statistically insignificant. On the contrary, the results revealed a negative relationship between inflation and commercial banks' liquidity. In this paper, the macroeconomic determinants of commercial banks' liquidity in Namibia were considered and analyzed. The unit root, bound test for co-integration, and error correction model were employed using quarterly data covering the period 2001 to 2014.

Alshatti (2015) investigated the impact of liquidity management on profitability in the (13) Jordanian commercial banks during the time period (2005–2012) by applying the data issued by Amman Stock Market about the Jordanian commercial banks as a panel type study. The liquidity indicators were investment ratio, Quick ratio, capital ratio, net credit facilities/ total assets, and liquid assets ratio, while return on equity (ROE) and return on assets (ROA) were the proxies for profitability. Augmented Dickey-Fuller (ADF) stationary test model was used to test for a unit root in a time series of the research variables and then test the hypothesis by using regression analysis. The empirical results showed that an increase in the quick ratio and the investment ratio of the available funds leads to an increase in profitability, while an increase in the capital ratio and the liquid assets ratio leads to a decrease in the profitability of the Jordanian commercial banks.

Gautam (2016) aimed to identify determinants of the liquidity of Nepalese commercial banks. In order to achieve the research objectives, data has been collected from a sample of ten commercial banks in Nepal over the period from 2005 to 2014. Bank-specific and macroeconomic variables were analyzed by using the least square regression model. The loan to deposit ratio was the proxy for the liquidity ratio in this study. Findings of the study revealed that bank size, capital adequacy, and inflation rate have a positive impact on liquidity; while non-performing loans, profitability, and GDP growth rate have a negative impact on the liquidity of Nepalese commercial banks. Capital adequacy, non-performing loan, and profitability have a statistically significant effect on the liquidity of Nepalese commercial banks whereas bank size, GDP growth rate, and inflation rate have statistically insignificant impacts on the liquidity of Nepalese commercial banks.

Umar & Sun (2016) analyzed the impact of non-performing loans (NPLs) on bank liquidity creation to investigate the existence of moral hazard problems in Chinese banks. It used data from 197 listed and unlisted Chinese banks, spanning the period 2005 to 2014. Generalized method of moments (GMM) estimation, fixed and random effect model, and pool data techniques were used for analysis. The study found that liquidity creation by Chinese banks does not depend on the NPLs ratio.

Ojha (2018) examined the form and pattern of liquidity, Non-Performing Loan (NPL), return on assets (ROA), Capital Adequacy Ratio (CAR), Return on equity (ROE), Gross Domestic Product (GDP), inflation, and interbank rate in Nepalese commercial banks. The key findings stated that there is a significant relationship between numbers of variables that impacts the liquidity performance of Nepalese commercial banks. The panel data of commercial banks from 2010/11 to 2016/17 has been taken for the purpose of the research. Mean, standard deviation, correlation, and multiple regression analysis have been used to diagnose data to meet the specific objectives of the research. The major

conclusion of the study is the return on equity, return on assets, non-performing loans, interbank rates have a negative impact on the liquidity of Nepalese commercial banks. The study also concludes that CAR, GDP, and inflation have a positive impact on the liquidity of Nepalese commercial banks.

Shamas, Zainol, & Zainol (2018) aimed to identify the association between liquidity risk proxies by cash to total assets and specific determinants in Bahraini Islamic Banks (IBs) in order to better mitigate and manage this critical financial risk. Panel data analysis was used on a sample of seven Bahraini IBs, which represent the Bahraini Islamic banking sector over the period of 2007 to 2011. The econometric results illustrate that the liquidity risk of Bahraini IBs is dependent on idiosyncratic factors. It was found that liquidity risk is positively related to return on average assets (ROA). On the other hand, non-performing loans (NPLs) and capital adequacy ratio (CAR) affect liquidity risk negatively and significantly. Lastly, bank size and the financial crisis show a negative and insignificant association with liquidity risk.

III. RESEARCH METHODOLOGY

Research Design
The research design used in this study is descriptive and analytical to find out determinants of liquidity in commercial banks of Nepal.

Sources of Information
This study is based on secondary data. Data are collected from annual reports and websites of selected banks for the period 2009-2017, economic surveys, etc.

Population and Sample
The population for this study is the 28 commercial banks of Nepal. Out of these 28 commercial banks, 10 banks are taken as samples for the study. The sample banks are Everest bank,

Data Analysis Methods
The important financial and statistical tools, and methods used for the analysis are ratio analysis, descriptive statistics, correlational analysis, and multiple regression analysis. Secondary data was also collected and analyzed using MS-Excel and E-VIEWS 8.

Specification of the Model
The following model is used to study the determinants of liquidity of Nepalese commercial banks. According to this model, bank liquidity is a function of capital adequacy, non-performing loans, bank size, profitability, the growth rate of GDP, and inflation rate. The model is, therefore, stated below as:

$$LIQ = C(1)+C(2)CAR_t+C(3)NPL_t+C(4)SIZE_t+C(5)ROA_t+C(6)ROE_t+C(7)GDP_t+C(8)INF_t+e_t$$

Where,
LIQ= Liquidity (Total loans/total deposits)
CAR = Capital adequacy Ratio ((tier 1 capital+ tier 2 capital)/total risk-weighted assets))
NPL= Non-performing loans (ratio of Non-performing loans to total loans)
SIZE = Firm's size (The log of the total assets of the company)
ROA = Return on Asset (Net income/total assets)
ROE=Return on Equity (Net income/total equity)
GDP = Growth rate of Gross Domestic Product
INF = Inflation = the rise in the general price level of goods and services, in percentage
e_t= Error term
C(1)= the intercept (constant)
C(2), C(3), C(4), C(5), C(6), C(7), C(8)= The slope which represents the degree with which bank liquidity (loan to deposit) ratio changes as the independent variable changes by one unit variable.

Variable Definition
Liquidity ratio (LIQ): Liquidity ratio is the ability of the bank to meet obligations using the assets. In this study liquidity ratio is the dependent variable. It indicates the percentage of the assets of the bank tied up in illiquid loans. It is calculated as:
Liquidity ratio= Total loans / Total deposits(Gautam, 2016)

Capital Adequacy Ratio: The capital adequacy ratio is defined as the sum of tier I and tiers II capital to risk-weighted assets according to BASEL 2015 accords. The capital adequacy ratio has a positive significant relationship with liquidity. (Ojha, 2018)
Capital Adequacy ratio= (tier 1 capital+ tier 2 capital)/total risk weighted assets

Non-Performing Loan: Non-performing loans are loans that are outstanding in both principal and interest for a long time contrary to the terms and conditions contained in the loan contract. The amount of non-performing loans measures the quality of bank assets. Besides, the large bad loans portfolios will affect the ability of banks to provide credit. Huge non-performing loans could result in loss of confidence on the part of depositors and foreign investors who may start a run on banks, leading to liquidity problems. The proxy for the non-performing loan is the non-performing loan to total loan ratio. It is hypothesized that the non-performing loan has a negative impact on a bank's liquidity. (Gautam, 2016)

Firm's Size: The proxy for bank size used in this study is the natural logarithm of total assets. Bank size measures its general capacity to undertake its intermediary function.

Return on Assets (ROA): Return on Assets is the yield from the total assets invested in the organization. In this study return on assets is the ratio of the net profit to total assets.
ROA=Net profit/total assets

Return on Equity (ROE): Return on equity is the ratio of net profit to shareholder's equity.
ROE= Net profit/total shareholder's equity

The growth rate of GDP: In this study, the proxy for the GDP is the annual percentage change in real Gross Domestic Product (GDP) at the producer's price.

Inflation rate (INF): Inflation is the rise in the general price level of goods and services. In this study, the inflation rate is the annual percentage change in the consumer price index.

III. DATA ANALYSIS AND INTERPRETATION

Various measures such as descriptive statistics, testing of hypothesis, regression analysis, etc. have been used to identify and analyze the determinants of liquidity in commercial banks of Nepal.

Descriptive Statistics
Descriptive measures used in this study are mean median, maximum, minimum, and standard deviation. Liquidity (LIQ) is the dependent variable and the independent variables in this study are cars, NPL, ROA, ROE, SIZE, GDP, and INF.

Table 1. Descriptive Statistics

	LIQ	CAR	NPL	ROA	ROE	SIZE	GDP	INF
Mean	0.771540	0.127259	0.019064	0.017724	0.191579	24.60925	0.045500	0.087400
Median	0.781750	0.119200	0.010050	0.017357	0.178706	24.70943	0.046500	0.093500
Maximum	1.219000	0.210800	0.116900	0.039930	0.335831	25.75290	0.079000	0.126000
Minimum	0.392700	0.103800	0.000000	-0.003529	-0.038900	22.57776	0.006000	0.045000
Std. Dev.	0.148622	0.022425	0.022623	0.006982	0.072240	0.628541	0.018680	0.021059
Observation	100	100	100	100	100	100	100	100

The above table1 shows that the mean value of LIQ is0.771540 and the minimum and maximum values are is0.392700, 1.219000 respectively with the volatility ratio of 0.148622. It means the average liquidity of the 10 commercial banks during ten years period from 2007/2008 to 2011/12 is 77.154 percent. The average level of CAR is 12.7259% which ranges from 10.38% to 21.08% with median value and standard deviation as 11.92% and 14.86% respectively. The average Non-performing loan is 1.9064% of total loans. Similarly, the average ROA, ROE, and the natural log of the size of the sample banks are 1.7724%, 19.1579%, and 24.60925 respectively whereas the average macroeconomic factors growth rate of GDP and inflation are 4.55% and 8.74% respectively.

Hausman test is a statistical test to select whether the most appropriate fixed effect or random effect model is used. A fixed model allows for heterogeneity or individuality among different cross-sections allowing each cross-section to have its own intercept. In short, the intercept may be different for the cross-sections but it is time-invariant that is the intercept remains the same over time. The random effect model also allows for heterogeneity and is also time-invariant but the individual specific effect is uncorrelated with the independent variables. (Adefemi, 2017)

The Hausman test hypothesis is
H_0= Random effect model is appropriate.
H_1= Fixed effect model is appropriate.

Table 2. Hausman Test

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.

Cross-section random	0.000000	7	1.0000

Source: Annual report of sample banks and results are drawn from E-views 8

Table 2 shows the Hausman specification test, the P-value of cross-section random is 1 which is more than 5% level of significant level. This implies that for this research model random effect model is more appropriate than the fixed effect model.

Hypothesis Testing

Following are the hypothesis for this study:

H1: There is a significant relationship between Capital adequacy ratio and liquidity.

H2: There is a significant relationship between non-performing loans and liquidity.

H3: There is a significant relationship between ROA and liquidity.

H4: There is a significant relationship between ROE and liquidity.

H5: There is a significant relationship between firm size and liquidity.

H6: There is a significant relationship between the growth rate of GDP and liquidity.

H7: There is a significant relationship between inflation and liquidity.

Regression analysis

Table 3. Regression output

Dependent Variable: LIQ
Method: Panel EGLS (Cross-section random effects)
Date: 07/18/19 Time: 14:13
Sample: 2008 2017
Periods included: 10
Cross-sections included: 10
Total panel (balanced) observations: 100
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.743596	0.398959	6.876893	0.0000*
CAR	-0.206562	0.496502	-0.416035	0.6784
NPL	0.759817	0.485994	1.563429	0.1214
ROA	13.97322	2.272532	6.148745	0.0000*
ROE	-1.339618	0.232927	-5.751224	0.0000*
SIZE	-0.075410	0.015212	-4.957386	0.0000*
GDP	-0.399716	0.409667	-0.975710	0.3318
INF	-0.884595	0.400505	-2.208700	0.0297*

Effects Specification		
	S.D.	Rho
Cross-section random	0.087714	0.6903
Idiosyncratic random	0.058746	0.3097

Weighted Statistics			
R-squared	0.454176	Mean dependent var	0.159861
Adjusted R-squared	0.412646	S.D. dependent var	0.077156
S.E. of regression	0.059132	Sum squared resid	0.321682
F-statistic	10.93609	Durbin-Watson stat	1.328254
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.505325	Mean dependent var	0.771540
Sum squared resid	1.081733	Durbin-Watson stat	0.531429

**Correlation coefficient significant at 5%*

Source: Annual report of sample banks and results are drawn from E-views 8

Table 3 shows that the Adjusted R-squared is 0.412646, this means a 41.2646% variation of leverage explained by independent variables of the model. The above table shows that the P-value of the F-statistic is 0.0000 which implies all the independent variables in the above model can jointly influence the dependent variable.

The panel random effect estimation regression result in the above table shows coefficient intercept (C) is 2.743596. This means, if all explanatory variables have a value of zero, the average value liquidity would be taken 2.743596 units and statistically significant at 5% of the significance level.

In the above table, CAR, NPL, and GDP are seen as statistically insignificant at a 5% level of significance. But, ROA, ROE, size, and inflation are seen as statistically significant with LIQ at a 5% level of significance as the p-value of these variables is less than 5%. The co-efficient ROA is 13.97322 which means holding other variables constant at their average value, when ROA is increased by 1 time, the liquidity of sampled banks would be increased by 13.97322 times. ROE, Size, and Inflation have negative coefficients which mean they are negatively statistically significant variable at a 5% level of significance. It means as the ROE, Size, and inflation rate increase, the loan to deposit ratio decreases.

IV. CONCLUSION

This study is conducted to identify the significant factors affecting the liquidity in Nepalese commercial banks. The major independent variables used for the study are capital adequacy ratio, non-performing loan to total loan (NPL), return on assets (ROA), return on equity (ROE), firm size, GDP growth rate, inflation rate (INF).

The finding of the study reveals that ROA has a positive significant impact on liquidity. Similarly, ROE has a negative impact on liquidity which matches with the finding of Ojha (2018). Bank size and inflation have a negatively significant impact on liquidity whereas Capital adequacy, non-performing loan, and GDP have no significant impact on liquidity. Bank size has a negative impact on liquidity which matches with the finding of Shamas, Zainol, & Zainol (2018). Inflation has a negative relationship with liquidity which matches with the findings of Sheefeni & Nyambe (2016). The non-performing loan has no significant impact on liquidity which matches with the finding of Umar & Sun (2016). GDP growth rate has a negative insignificant impact on liquidity which matches with the finding of Gautam (2016).

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