IMPACT OF LIQUIDITY MANAGEMENT ON THE PROFITABILITY OF DEVELOPMENT BANK IN NEPAL

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Abstract

This research investigates the impact of liquidity management on the profitability of three development banks in Nepal: SDBL, MNBBL, and GBBL. Data was collected from books and financial annual reports, covering Fiscal Years 69/70 to 78/79, resulting in 30 observations. The study employed correlation analysis and regression analysis to examine the relationship between liquidity management indicators, which are, in this case, Cash Reserve Ratio (CRR), Credit Deposit Ratio (CDR), Non-Performing Assets (NPA), Total Liabilities and Total Assets Ratio (TLTA), and Deposit to Total Assets Ratio (DTA) and profitability of development banks, i.e., Return on Equity (ROE). The findings indicate that liquidity management indicators have varying effects on profitability. The correlation analysis reveals strong positive correlations between CRR and ROE and moderate positive correlations between CDR, TLTA, and DTA with ROE. Additionally, NPA exhibits a significant negative correlation with ROE. The regression analysis further confirms the overall significance of the model, with CRR having a statistically significant positive impact on ROE. Based on these findings, the study recommends that development banks focus on optimizing liquidity management by maintaining an appropriate CRR level. Strengthening credit risk management practices and reducing non-performing assets are also suggested to enhance profitability. These findings contribute to understanding liquidity management's impact on profitability in the context of development banks in Nepal and provide valuable insights for bank management and policymakers.

INTRODUCTION

The commercial bank's liquidity refers to its capacity to meet its financial obligations when they come due. This includes responsibilities such as loan and investment agreements, customer withdrawals and deposits, as well as accrued debts (Amengor, 2010).

The recent trends on the global financial scene have significantly impacted the banking industry worldwide, with one major need being for effective liquidity management in banking institutions. Liquidity is generally referred to as the ability to generate adequate cash to pay off financial obligations but in banking, it mainly refers to the ability to honor maturing deposits (Adalsteinsson, 2014). According to Choudhry (2011), liquidity management refers to funding deficits and investment of surpluses, managing and growing the balance sheet, and ensuring that the bank operates within regulatory and stipulated limits. Ideal bank management is an uninterrupted endeavor to assuring that a balance exists between liquidity, profitability and risk (Banks, 2014). Banks indeed require liquidity since such a large proportion of their liabilities are payable on demand (deposits) but typically, the more liquid an asset is, the less it yields. Hence, choosing a particular combination of assets over another, considering a bank's liability size, would have a massive effect on bank liquidity management, profitability and risk (Choudhry, 2012). In managing its assets and liabilities in the wake of uncertainties in cash flows, cost of funds and return on investments, a bank must ascertain its trade-off between risk, return and liquidity (Landskroner & Paroush ,2011). Indeed, studies in other countries across the globe have attributed bank failures to poor liquidity management. This is so because scholars argue that one major contributor to the Global Financial crisis of 2007-2008 was poor liquidity management (Adalsteinsson, 2014). This was largely as a result of the collapse of Lehman Brothers, a leading Investment Bank, which ended up spreading across the globe through the "contagion effect".

Efficient liquidity management is crucial for financial institutions' stability and profitability, including development banks. Liquidity management involves the strategic allocation and utilization of funds to meet the institution's short-term obligations while ensuring the optimal utilization of resources for long-term profitability. In the context of development banks in Nepal, where financial intermediation plays a vital role in supporting economic growth and development, the impact of liquidity management on profitability becomes a topic of significant interest and importance.

The profitability of development banks directly influences their ability to fulfil their developmental objectives and provide sustainable financial services to various sectors of the economy. Liquidity management is essential for ensuring financial soundness and profitability. However, the specific relationship between liquidity management and profitability in the context of development banks in Nepal still needs to be explored.

The findings of this study are expected to contribute to the existing literature on liquidity management and profitability in the banking sector. They will contribute to a deeper understanding of the relationship between liquidity management and profitability in development banks. The insights gained can provide recommendations for enhancing financial performance and ensuring sustainable operations in the banking industry. The results may have practical implications for development bank managers, policymakers, and regulators in Nepal, enabling them to make informed decisions regarding liquidity management practices that can optimize profitability while fulfilling developmental objectives. Furthermore, the research may serve as a basis for future studies exploring additional factors influencing bank profitability and extending the analysis to other financial institutions within the Nepalese context.

By analyzing the relationship between liquidity management variables, including the Cash Reserve Ratio (CRR), Credit Deposit Ratio (CDR), Non-Performing Assets Ratio (NPA), Total Liabilities to Total Assets Ratio (TLTA), and Deposit Total Assets Ratio (DTA), and the profitability measure of Return on Equity (ROE), this research aims to provide insights into the effectiveness of liquidity management strategies in enhancing the profitability of development banks.

The study focuses on five key indicators of liquidity management: Cash Reserve Ratio (CRR), Credit to Deposit Ratio (CDR), Non-Performing Assets Ratio (NPA), Total Liabilities to Total Assets Ratio (TLTA), and Deposit to Total Assets Ratio (DTA). These indicators will be analyzed in relation to the dependent variable, Return on Equity (ROE), which measures profitability.

The study's objectives are to assess the impact of CRR, CDR, NPA, TLTA, and DTA on the profitability of the selected banks. The research hypotheses include alternative hypotheses, aiming to determine whether there is a significant relationship between the liquidity management indicators and profitability in SDBL, MNBBL, and GBBL.

LITERATURE REVIEW

Binay and Chaurasiya (2023) examined the influence of liquidity management on the profitability of joint venture commercial banks in Nepal in 2023. Analyses of data from five banks revealed that the Total Loan to Total Assets Ratio (TLTAR) substantially influenced profitability (ROA), accounting for 61.5% of the variance. However, the effects of the Credit Deposit Ratio (CDR), Capital Adequacy Ratio (CAR), Current Reserve Ratio (CRR), and Total Deposit to Total Assets Ratio (TDTAR) were not statistically significant. The findings highlight the significance of effective liquidity management, especially TLTAR, for increasing the profitability of joint venture commercial banks in Nepal.

Zaharum, et al. (2022) Conducted research on The influence of liquidity management on banks' profitability. The main objective for this study is to examine the relationship between liquidity management and profitability of commercial banks in Malaysia. A sample of top 5 commercial banks listed in Bursa Malaysia has been used to examine the relationship between the liquidity and profitability for the period of 10 years from 2011-2020. The data has been taken from the annual financial statements of the banks. In order to analyze data, the current ratio (CR), cash deposit ratio (CDR), loan to total deposit (LTD), capital to asset ratio (CAR) and non-performing loan (NPL) were used as a proxy for liquidity as an independent variable while the return on assets (ROA) was used as proxies for banks' profitability as dependent variables. The study concluded that current ratio (CR) is positively related to return on asset (ROA). This indicates that higher the current ratio (CR), higher would be the return on assets (ROA). However, the study reveals that non-performing loan (NPL) is negatively related to return on assets (ROA). This indicates that higher the non-performing loan (NPL), lower would be the return on assets (ROA). The study therefore recommended that banks keep liquidity as needed to meet up defined liabilities and not needlessly keeping too much liquidity as it erodes banks' profits.

Paul, Bhowmik, & Famanna, (2021) Conducted research on Impact of Liquidity on Profitability: A Study on the Commercial Banks in Bangladesh. This research aims to investigate the effect of banks' liquidity on its profitability; with the ordinary course of business and in the medium term (10 years). A quantitative analysis is performed on a

statistical sample of forty (40) commercial banks in Bangladesh. Secondary data is used to evaluate the performance of the last ten years (2009-2018) of the annual report of the commercial banks in Bangladesh with 206 bank years of data gathered to consider all Bangladeshi commercial banks. Proposed variables are: LDR, DAR, CDR, LAR and CR as liquidity representation; on the other hand, ROE is the profitability representation. Five hypotheses have been established to assess the effect of liquidity on profitability. Following a correlation and regression analysis, it is observed that LDR, DAR and CDR had a substantial effect on the profitability measured as ROE, but LAR and CR proved insignificant. Therefore, it can be concluded that, in general, the impact of liquidity has a significant effect on the profitability in the commercial banking sector of Bangladesh. By relying on this report; Bangladeshi banks will be best positioned to keep equality between its liquidity and profitability.

Sathyamoorthi, Mapharing, & Dzimiri, (2020) examined the influence of liquidity management on the financial performance of commercial banks in Botswana. Return on Assets and Return on Equity were used as financial performance indicators, while a number of ratios were used as liquidity management proxies. The investigation spanned nine years and analyzed data from Botswana's nine commercial banks. Regression analysis uncovered significant positive correlations between the Loans to total assets ratio and the Liquid assets to total assets ratio and the return on assets and return on equity. In contrast, the relationship between the Loans to deposits ratio and the Liquid assets to deposits ratio was significantly negative. Cash-related ratios were not significantly related. The research indicates that optimizing liquidity variables can improve bank performance and suggests instituting minimum liquidity requirements to support bank profitability.

Yüksel, et al. (2018) identified the factors impacting bank profitability in thirteen post-Soviet nations. Their analysis utilized annual data from 1996 to 2016 and employed panel regression with fixed effects and the Generalized Method of Moments (GMM). The findings reveal that loan size, non-interest income, and economic development substantially impact profitability. The 2008 global mortgage crisis has had a negative impact on the profitability of banks in these nations. Higher non-interest income, fueled by credit card fees and commissions, and economic expansion correlate positively with profitability. However, a greater loan-to-GDP ratio hurts the profitability of banks. Based on these findings, it is suggested that post-Soviet banks priorities non-interest income growth and employ caution in their lending practices.

Alshatti, (2015) demonstrated the effect of liquidity management on the profitability of Jordanian commercial banks from 2005 to 2012. The sample of thirteen banks represents the total Jordanian commercial banking sector in the study. Various liquidity indicators are analyzed, including the investment ratio, the fast ratio, the capital ratio, the ratio of net credit facilities to total assets, and the liquid assets ratio. Profitability is measured using return on equity (ROE) and return on assets (ROA) as surrogates. Hypotheses are examined using regression analysis and the Augmented Dickey Fuller (ADF) stationary test model to ascertain the presence of a unit root in the time series data of the variables. The empirical findings disclose that an increase in the quick and investment ratios positively affects Jordanian commercial banks' profitability. In contrast, the capital ratio and liquid assets ratio negatively affect profitability. To increase bank profitability, the researcher suggests optimizing the utilization of available liquidity across various investment aspects. Moreover, it is suggested that banks adopt a comprehensive framework for liquidity management in order to assure sufficient liquidity for efficient operations. Analyzing the rates of change in liquidity and achieving a balance between sources and uses of funds are also recommended.

Ibe, (2013) randomly select three representative institutions. Cash, bank balances, and treasury bills served as substitutes for liquidity management, whereas profitability was measured by profit after tax. The study revealed that liquidity management is a major concern in the Nigerian banking sector. It is recommended to employ competent personnel in order to make informed decisions regarding optimal liquidity levels and maximize profits.

RESEARCH METHODOLOGY
This study is based on secondary data from 3 development banks of Nepal from 2069/70 to 2078/79 leading to a total of 30 observations of selected development banks which are Shangrila Development Bank, Muktinath Bikas Bank, and Garima Bikas Bank by using convenient Sampling technique. The primary data sources include the Nepal Rastra Bank's Quarterly Economic Bulletin and Bank Supervision Reports, as well as the annual reports of the selected development banks. The number of development banks selected for the study, as well as the number of observations.

Variables define:

Return on Equity (ROE) is a financial ratio that measures a company's profitability by indicating the percentage of net income generated in relation to the shareholders' equity invested.

Cash Reserve Ratio (CRR) is the portion of total deposits that commercial banks must hold with the central bank as a reserve to maintain liquidity and control inflation.

Credit to Deposit Ratio (CDR) is a financial ratio that indicates the proportion of loans and advances a bank grants in relation to its total customer deposits. It measures the bank's lending capacity and liquidity position.

Non-Performing Assets (NPA) Ratio measures the proportion of loans and advances that have stopped generating income for a bank due to non-payment or default by borrowers. It reflects the quality of the bank's loan portfolio.

Total Loan to Total Assets Ratio(TLTA) is a financial metric that indicates the proportion of a bank's total loan portfolio in relation to its total assets. It assesses the extent of the bank's lending activities relative to its overall asset base.

Deposit to Total Assets Ratio(DTA) is a financial indicator measuring the proportion of a bank's total customer deposits concerning its total assets. It reflects the bank's reliance on deposits as a funding source and its liquidity position.

Conceptual framework
The model estimated in the study implies that the bank's profitability depends on capital ratio, deposit, current ratio, liquid asset ratio, quick ratio, and investment ratio. Therefore, the model assumes the following forms:

Bank profitability (Return on equity) = f (Cash Reserve Ratio, Credit to Deposit Ratio, Non-Performing Assets Ratio, Total Loan to Total Assets Ratio, and Total Deposit to Total Assets Ratio).

Figure:1
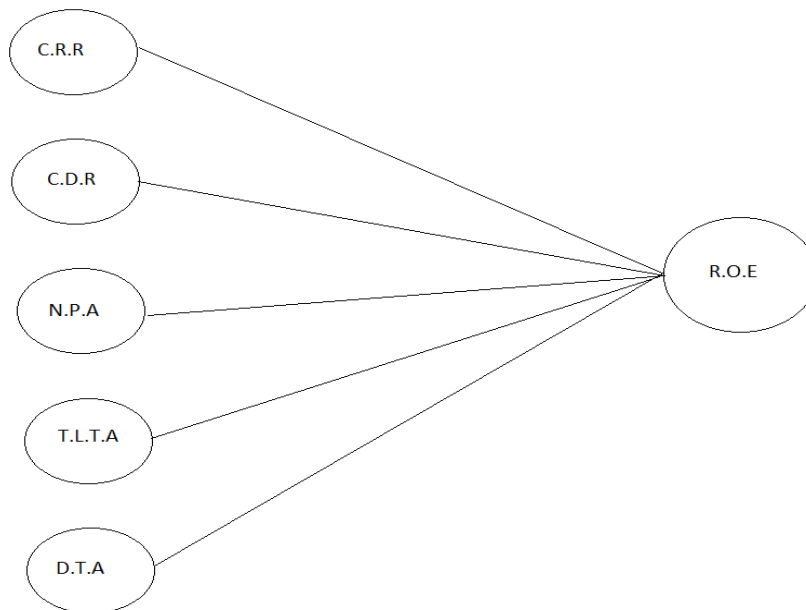
Hypothesis formulation

Hypothesis is formulated on the basis of objective which are as follows;

- **H1**: There is a significant relationship between liquidity management (CRR) and profitability (ROE) of sample development banks in Nepal.
- **H2**: There is a significant relationship between liquidity management (CDR) and profitability (ROE) of sample development banks in Nepal.
- **H3**: There is a significant relationship between liquidity management (NPA) and profitability (ROE) of sample development banks in Nepal.
- **H4**: There is a significant relationship between liquidity management (TLTA) and profitability (ROE) of sample development banks in Nepal.
- **H5**: There is a significant relationship between liquidity management (DTA) and profitability (ROE) of sample development banks in Nepal.

DATA ANALYSIS

Descriptive Statistics:-

Table 1 represents descriptive analysis of 3 development banks including correlation analysis from Fiscal Year 2069/70 to 2078/79.

Table – 1 – Descriptive Statistics and Correlation								
Variables	Mean	S.D	ROE	CRR	CDR	NPA	DTA	TLTA
ROE	17.34	6.79	1					
CRR	5.13	1.74	**.634****	1				
CDR	0.84	0.03	**.406***	.430*	1			
NPA	0.57	0.53	**-.550****	-0.324	-.441*	1		
DTA	0.85	0.08	**0.355***	0.101	0.142	-0.316	1	
TLTA	0.84	0.04	**.364***	0.178	0.120	-0.164	0.297	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The table-1 provides a summary (Descriptive statistics) of mean, and standard deviation for each variable, giving an overview of their range and distribution within the dataset. The Return on Equity (ROE) ranged from 5.78% to 32.17%, with a mean of 17.34% and a standard deviation of 6.79%. The Cash Reserve Ratio (CRR) varied between 3.00% and 10.00%, with a mean of 5.13% and a standard deviation of 1.74%. The Credit to Deposit Ratio (CDR) ranged from 0.78 to 0.91, with a mean of 0.84 and a standard deviation of 0.03. The Non-Performing Assets Ratio (NPA) ranged from 0.00 to 2.17, with a mean of 0.57 and a standard deviation of 0.53. The Deposit to Total Assets Ratio (DTA) ranged from 0.61 to 0.93, with a mean of 0.85 and a standard deviation of 0.08. The Total Liabilities to Total Assets Ratio (TLTA) ranged from 0.74 to 0.88, with a mean of 0.84 and a standard deviation of 0.04.

The table also states about the correlation between variables, which shows the relationships between the dependent variable, Return on Equity (ROE), and the independent variables: Cash Reserve Ratio (CRR), Credit to Deposit Ratio (CDR), Non-Performing Assets Ratio (NPA), Deposit to Total Assets Ratio (DTA), and Total Liabilities to Total Assets Ratio (TLTA).

The analysis reveals the following:

CRR has a strong positive correlation with ROE (0.634**), indicating that as CRR increases, ROE tends to increase as well. CDR also shows a positive correlation with ROE (0.406*), suggesting that a higher CDR may be associated with higher ROE. NPA has a significant negative correlation with ROE (-0.550**), suggesting that higher NPA levels may negatively impact ROE. DTA shows a positive correlation with ROE (0.355*), indicating that as DTA increases; ROE also trend to increase. TLTA exhibits a positive correlation with ROE (0.364*), implying that a higher TLTA may be associated with a higher ROE. These findings highlight the relationships between the independent and dependent variables, providing insights into their impact on the profitability of the entity measured by ROE.

Regression Analysis

Having indicated the correlation coefficients, the regression analysis of return on equity on CRR, CDR, NPA, TLTA, and DTA has been performed, and the results are presented.

Table-2- Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.775a	0.6	0.517	4.721576
a. Predictors: (Constant), TLTA, CDR, DTA, CRR, NPA				

Table 2 is a model summary, and it presents the summary of a statistical model. The model has an R-squared value of 0.6, indicating that the independent variables can explain 60% of the variation in the dependent variable. The adjusted R-squared value is 0.517, which considers the number of predictors and is slightly lower than the R-squared value. The standard error of the estimate is 4.721576, representing the average distance between the actual values and the predicted values of the dependent variable. The predictors included in the model are TLTA, CDR, DTA, CRR, and NPA a constant term. Similarly, the analysis of variance (ANOVA) for the regression model showed that the independent variables (TLTA, CDR, DTA, CRR, NPA) collectively explain a significant amount of variation (803.362) in the dependent variable (Return on equity). The model's overall significance was confirmed by an F-statistic of 7.207 ($p < 0.05$). The residual sum (535.039) accounted for unexplained variation, while the total sum of squares (1338.401) represented the combined effect of the regression and residual sum of squares. The regression model is statistically significant, and the independent variables contribute to its explanatory power.

Table -3- Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	Beta	Std. Error	Beta		
(Constant)	-0.278	0.325		-0.855	0.401
CRR	0.020	0.006	0.515	3.592	0.001
CDR	-0.032	0.319	-0.015	-0.100	0.921
NPA	-3.751	1.914	-0.293	-1.960	0.062
DTA	0.351	0.240	0.195	1.462	0.157
TLTA	0.118	0.108	0.153	1.085	0.289

Table 3 shows the coefficients, standard errors, standardized coefficients (betas), t-values, and p-values for the independent variables (CRR, CDR, NPA, DTA, and TLTA) about to with concerning the dependent variable (ROE). About to with concerning the ANOVA table and model summary, where the overall regression model was found to be statistically significant, we observe that not all independent variables in this table are statistically significant.

The CRR, NPA, DTA, and TLTA coefficients indicate the direction and magnitude of their respective relationships with the dependent variable (ROE). However, to determine the statistical significance of these relationships, we look at the associated t-values and p-values.

In this table, only the coefficient for CRR has a statistically significant impact on ROE, as evidenced by its significant t-value (3.592) and low p-value (0.001). This means that for every one unit increase in CRR, there is a corresponding increase in ROE.

On the other hand, the coefficients for CDR, NPA, DTA, and TLTA are not statistically significant. This is supported by their t-values close to zero and their p-values being above the typical significance level of 0.05. Therefore, we cannot confidently conclude that these variables significantly impact ROE in this model.

Overall, the lack of statistical significance for certain independent variables indicates that their relationships with ROE may not be significant or influenced by other factors not considered in the model.

Independent Variable	Interpretation
Cash Reserve Ratio	The coefficient for CRR is 0.020, indicating that a one-unit increase in CRR is associated with a positive increase in the dependent variable (ROE). This relationship is statistically significant, evidenced by the significant t-value (3.592) and low p-value (0.001). Therefore, higher CRR levels are likely to have a positive impact on ROE.
Credit Deposit Ratio	The coefficient for CDR is -0.032, indicating that a one-unit increase in CDR is associated with a slight negative change in the dependent variable (ROE). However, this relationship is not statistically significant, as reflected by the non-significant t-value (close to zero) and high p-value (0.921). Therefore, CDR does not have a significant impact on ROE in this model.
Non-Performing Assets Ratio	The coefficient for NPA is -3.751, suggesting that higher NPA levels are associated with a negative impact on the dependent variable (ROE). However, this relationship is not statistically significant, with a t-value of -1.960 and a p-value of 0.062. While there is some indication of a negative impact, the lack of statistical significance implies that the relationship may not hold in this model.
Deposit to Total Assets Ratio	The coefficient for DTA is 0.351, indicating that a one-unit increase in DTA is associated with a positive change in the dependent variable (ROE). However, this relationship is not statistically significant, as reflected by the t-value of 1.462 and the p-value of 0.157. Therefore, DTA does not have a significant impact on ROE in this model.
Total Liabilities to Total Assets Ratio	The coefficient for TLTA is 0.118, suggesting that higher TLTA levels may have a positive impact on the dependent variable (ROE). However, this relationship is not statistically significant, with a t-value of 1.085 and a p-value of 0.289. Therefore, TLTA does not have a significant impact on ROE in this model.

The findings of this study provide insights into the impact of liquidity management indicators on the profitability (ROE) of development banks, specifically focusing on the case of SDBL, MNBBL, and GBBL. The results indicate that the Cash Reserve Ratio (CRR) has a significant positive relationship with ROE, suggesting that higher CRR levels are likely to have a favorable impact on profitability. This finding aligns with the study by Agbada and Osuji (2013), who also found a positive relationship between liquidity management and banking performance in Nigeria.
However, the Credit Deposit Ratio (CDR) does not demonstrate a significant relationship with ROE in this model. This result is consistent with the research by Alshatti (2015), who found no significant impact of liquidity management on profitability in Jordanian commercial banks. It suggests that variations in CDR may not have a substantial influence on the profitability of the selected development banks.

Regarding the Non-Performing Assets Ratio (NPA), the results indicate a negative relationship with ROE, although it is not statistically significant in this model. This finding is in line with the study by Ibe (2013), who found that higher levels of non-performing loans have a negative impact on bank profitability in Nigeria. However, further investigation is required to establish the significance of this relationship in the context of the selected banks.
The Deposit to Total Assets Ratio (DTA) shows a positive relationship with ROE, but it is not statistically significant. This finding is consistent with the research by Sathyamoorthi et al. (2020), who found no significant impact of liquidity management on financial performance in Botswana's commercial banks. It suggests that DTA may not be a significant determinant of profitability in the selected development banks.

Similarly, the Total Liabilities to Total Assets Ratio (TLTA) does not demonstrate a significant relationship with ROE. This result aligns with the study by Yüksel et al. (2018), who found no significant impact of TLTA on bank

profitability in post-Soviet countries. It suggests that TLTA may not be a major driver of profitability in the selected development banks.

Overall, the findings of this study contribute to the existing body of literature on liquidity management and profitability in the banking sector. The significant positive relationship between CRR and profitability highlights the importance of effective liquidity management practices in enhancing bank profitability. However, the non-significant relationships of CDR, NPA, DTA, and TLTA with ROE indicate that other factors beyond liquidity management may play a more significant role in determining profitability in the context of SDBL, MNBBL, and GBBL.

CONCLUSION

In this study, we examined the impact of liquidity management on the profitability of development banks, focusing on three banks: SDBL, MNBBL, and GBBL. We utilized regression analysis and correlation data to analyze the relationship between liquidity management indicators (CRR, CDR, NPA, DTA, and TLTA) and the profitability measure (ROE).

The regression analysis indicated that the overall regression model was statistically significant, meaning that the independent variables collectively contributed to explaining the variation in ROE. However, when we examined the individual coefficients, we found that not all independent variables were statistically significant.

Based on the correlation analysis, we observed the following associations between liquidity management and ROE: CRR had a strong positive correlation, CDR and TLTA showed positive correlations, NPA had a significant negative correlation, and DTA exhibited a positive correlation.

Taking these findings into account, we can draw the following conclusions:

Liquidity management, as measured by CRR, has a strong positive impact on profitability (ROE). Banks should aim to maintain an optimal CRR level to maximize their profitability. While CDR and TLTA show positive correlations with ROE, their individual impact on profitability is not statistically significant. However, banks can still consider managing their credit risk (CDR) and maintaining a reasonable level of total liabilities to total assets (TLTA) to support overall financial stability. NPA has a significant negative impact on profitability. Banks should prioritize effective measures to reduce non-performing assets and strengthen their loan portfolio quality to enhance profitability.

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