Optimizing Financial Performance: Deciphering the Interplay of Liquidity and Profitability in Bank Muscat, Sultanate of Oman

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Abstract

This study explores the intricate relationship between liquidity and profitability at Bank Muscat, Oman, examining various financial indicators such as Cash Reserve Ratio (CRR), Total Deposits to Total Assets (TDTA), Capital Adequacy Ratio (CAR), Total Loans to Total Deposits (TLTD), Liquid Assets to Total Assets (LATA), Liquid Assets to Total Deposits (LATD) and Liquidity Risk Exposure (LRE). The findings reveal that Liquid Assets to Total Assets (LATA) significantly correlates with Return on Assets (ROA), while other indicators show varied relationships. Notably, the Capital Adequacy Ratio (CAR) has a substantial negative impact on both ROA and Return on Equity (ROE). Cash Reserve Ratio (CRR), Total Deposits to Total Assets (TDTA), and Total Loans to Total Deposits Ratio (TLTD) have significant impact on ROE. Regression models exhibit exceptional explanatory power, highlighting liquidity and financial indicators' role in explaining profitability variability. Despite some liquidity ratios affecting profitability, others like Liquid Assets to Total Assets (LATA), Liquid Assets to Total Deposit Ratio (LATD), and Liquidity Risk Exposure (LRE) lack conventional significance levels. The recommendations encompass optimizing liquidity management, fortifying capital adequacy, monitoring deposit-to-asset ratios, evaluating liquidity risk exposure, assessing liquid asset allocation, and implementing dynamic risk management frameworks. Future research should consider comparative analyses across banks or regions, advanced statistical methodologies, and exploration of nuanced factors influencing liquidity-profitability dynamics, contributing to comprehensive financial management strategies for banks.

Key words: *Return on Assets, Return on Equity, Cash Reserve Ratio, Total Deposits to Total Assets Ratio, Capital Adequacy Ratio, Total Loans to Total Deposit Ratio, Liquid Assets to Total Assets, Liquid Assets to Total Deposit Ratio, Liquidity Risk Exposure.*

1. INTRODUCTION

The banking sector, a crucial player in economic development, acts as a financial intermediary, facilitating fund flow between savers and borrowers. Banks provide diverse financial services and play a key role in maintaining liquidity, vital for their sound operation. Liquidity, the ability to meet short-term obligations, directly impacts profitability—a pivotal gauge of a bank's financial health. This study explores the intricate relationship between liquidity and profitability, focusing on Oman's largest commercial bank. The research aims to deepen understanding and offer insights into optimizing liquidity management. Valuable for academia, industry, policymakers, and regulators, this study contributes to the discourse on liquidity's role in shaping commercial bank profitability and stability, thereby benefiting the broader economy.

1.1 Significance of the study

The study is expected to provide insights for improving banks 'profitability through better asset and liability management. The findings of the study would be significant in framing prudential guidelines on liquidity that can be used in policy formulation of banks. The findings would assist management in determining the effect of leverage on the value of their firms which can assist in making prudent financial decisions. As for commercial bank, liquidity is the main predictor of its solvency and bankruptcy, the study helps investors to evaluate the financial strength and prospects of the bank. This can assist them to take informed decisions.

1.2 Objectives of the study

1) To analyze the liquidity and profitability position of bank Muscat.

2) To determine the relationship between liquidity and profitability of bank Muscat.

3) To investigate the impact of liquidity on the profitability of bank Muscat.

4) To analyze which among the liquidity factors contribute most to the profitability of the bank.

2. Literature review

Author	Year	Variables tested	Findings
Laila Al-Harthy, Revenio Jalagat, and Karima Sayari	2022	Bank profitability, Macro-economic and bank-specific factors	Investigated the determinants of bank profitability during an oil price decline in Oman. Found no significant correlation between macroeconomic variables and return on equity or net profit ratio. Strong correlation found between return on equity and net profit ratio due to bank-specific characteristics.
Dr. Anitha Ravikumar et al.	2022	Credit risk, Bank performance	Focused on the quantifiable impact of credit risk on listed banks in Oman. Found an inverse association between asset quality and credit risk. No significant correlation was found between bank size and return on assets or return on equity. Emphasized effective credit risk management for enhanced financial performance.
Firdouse Rahman Khan and Iman Sulieman Al Maktoumi	2021	Bank performance, asset management, bank size, operational efficiency.	Evaluated the performance of commercial banks in Oman using ratio analyses. Found the impact of operational efficiency on return on assets and the influence of advances on interest income. Provided insights into the associations among asset management, bank size, operational efficiency, and overall performance.
Racha El Moslemany et al.	2021	Liquidity risk, Bank profitability	Focused on the impact of liquidity risk on bank profitability in the Egyptian banking sector. Found a significant correlation between liquidity risk and bank profitability. The relationship varied based on the measure used to assess profitability and liquidity.
Hacini, I., Boulenfad, A., & Dahou, K. (2021)	2021	Loan to deposit ratio (LTD), Cash to deposit	Examined liquidity risk effects on Saudi Arabian conventional banks' financial results. Found a significant negative association, indicating adverse

		ratio (CTD), Return on Equity (ROE), Equity to total asset ratio (ETA)	impact of liquidity risk on assessed financial performance. Used panel data approach with key variables LTD, CTD, ROE, and ETA.
Alim, W., Ali, A., & Metla, M. R.	2021	Liquidity risk management, Financial Performance	Investigated the effect of liquidity risk management on the financial performance of commercial banks in Pakistan. Panel data analysis revealed that higher liquidity positively impacts banks' performance in Pakistan, aligning with existing studies and literature.
Jayaraman et al.	2021	Key financial variables, Net profit	Analyzed the impact of key financial variables on net profit in Omani commercial banks. Found positive relationships between net profit and assets, deposits, loans, and interest income. However, net loans to total deposits ratio showed a negative relationship. Recommended focusing on lending operations and maintaining a sound credit portfolio for improved profitability.
Dao, B	2020	Return on Asset, Return on Equity, TOBINQ	Examined factors influencing profitability in Asian developing countries' commercial banks. Variables included CAR, NPL, Cost to income, Liquidity ratio, Bank size, concentration HHI, GDP growth, Inflation. Panel data regressions revealed a consistent significantly negative relationship between operational risk and banking profitability across all entities. Bank size negatively impacted profitability in Vietnam and Thailand but not in Malaysia. Negative association found between CAR and profitability indicators, and a positive link between credit risk and banking profitability.

Sathyamoorthi et al.	2020	Return on Assets, Return on Equity	Explored liquidity management impact on Botswana's commercial banks. Proxies included ratios like Loans to total assets and Liquid assets to total assets, showing statistically significant positive relationships with return on assets and return on equity. Conversely, Loans to deposits and Liquid assets to deposits had significant negative relationships. Cash-related ratios showed mixed, statistically insignificant effects. Suggests a need for banks to focus on liquidity for enhanced performance.
Msuku, C. C.	2020	Liquidity level, Capital adequacy, Asset quality, Inflation rate	Explored liquidity risk management impact on Tanzanian commercial banks. All four variables showed positive and statistically significant influence on financial performance. Overall, 72.6% correlation observed between independent and dependent variables, emphasizing the crucial role of liquidity risk management in Tanzanian banks' financial success.
Liu, D.	2020	Liquidity management and Profitability	Investigated the impact of liquidity management on profitability in Chinese Big Four State-Owned commercial banks (SOCBs). Results showed a significant positive impact of liquidity management on SOCBs' profitability, filling a theoretical gap in Chinese commercial bank studies. Suggested that maintaining sufficient liquid assets and prudent investment and savings management lead to continuously favorable profitability for the state-owned commercial banks studied.
Mishra, B., & Swain, R. K.	2020	Loan to deposit ratio (LDR), Deposit to asset ratio (DAR), Cash and cash	Explored the impact of liquidity management on the profitability of Indian commercial banks. Found that only Deposit to asset ratio (DAR) significantly impacted Return on Equity (ROE), while other hypotheses were insignificant. High liquid assets

		equivalents to deposit ratio (CDR), Return on Equity (ROE), Return on Assets (ROA)	holdings post-crisis impacted DAR's effect on Return on Assets (ROA). Loan to deposit ratio (LDR) and CDR did not significantly impact ROE and ROA due to high interest payable, liquid assets holdings, and lending rates. Concluded that liquidity generally does not significantly affect the profitability of the studied banks.
Chintha, S.	2018	Bank profitability, Macro-economic determinants	Studied macro-economic determinants of bank profitability in Oman from 2007 to 2016. Found positive effects of asset size and non-interest income, while deposits had a negative impact. Macro-economic variables such as GDP had a positive relationship, whereas real interest rate and inflation rate negatively affected bank profitability. Recommended focusing on increasing bank size and non-interest income to enhance profitability.
Muhammad Ehsan Javid	2016	Bank-specific (bank size, non-interest revenue and profitability) and macroeconomic determinants	Examined bank-specific and macroeconomic determinants of bank profitability in Pakistan. Found a positive association between bank size and non-interest revenue with profitability. Deposits had a negative relationship due to increased liquidity costs. Macro-economic conditions did not significantly impact bank profitability.
Badreldin F Salim and Zaroug O Bilal	2016	Liquidity management, Financial Performance	Investigated the impact of liquidity management on Omani banks. Found significant relationships between liquidity indicators and financial performance indicators. Indicators such as loans to total assets ratio and illiquid assets to liquid liabilities ratio influenced return on assets and return on equity.
Mwangi, F. M.	2014	Liquidity risk management,	Examined the effect of liquidity risk management on Kenyan commercial banks. Found that liquid assets to total assets ratio, liquid assets to total deposits

		Financial Performance	ratio, and borrowings from banks significantly impacted return on assets negatively. Concluded that liquidity risk management has a significant negative relationship with the financial performance of commercial banks in Kenya.

Source: Author compilation

2.1 Research gap:

This study addresses critical research gaps by examining the relationship between liquidity management and financial performance within Oman's banking sector, focusing on Bank Muscat. While existing literature offers insights into bank profitability determinants, few studies comprehensively analyze liquidity-profitability dynamics within a single bank context. By investigating specific factors influencing Bank Muscat's profitability, such as liquidity risk management and capital adequacy, this research contributes valuable insights tailored to Oman's banking landscape.

3. Research Methodology:

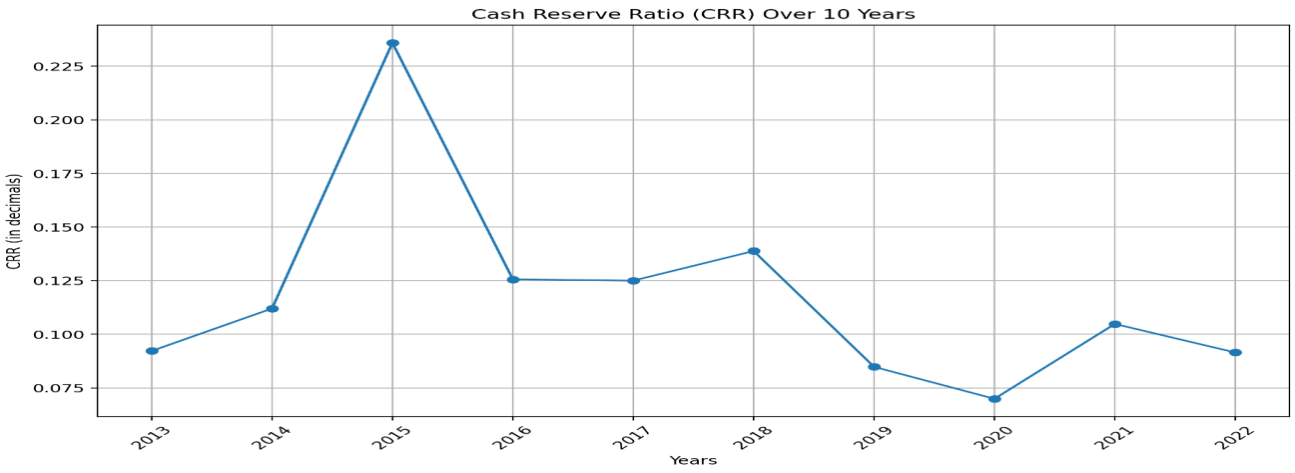
This quantitative study focuses on Oman's banking sector, specifically Bank Muscat, the largest bank in the Sultanate. Utilizing purposive sampling, data spanning a decade (2013-2022) from the bank's annual reports are analyzed. Cash Reserve Ratio (CRR), Liquidity Risk Exposure (LRE), Capital Adequacy Ratio (CAR), Total Loans to Total Deposits Ratio (TLTD), Total Deposits to Total Assets Ratio (TDTA), Liquid Assets to Total Assets Ratio (LATA), Liquid Assets to Total Deposits Ratio (LATD) and Return on Assets (ROA) and Return on Equity (ROE). Inferential analyses, such as correlation and multiple regression, explore relationships and assess the impact of liquidity variables on Return on Assets and Return on Equity, offering a comprehensive understanding of factors influencing bank profitability. SPSS version 21 is used for data analysis with the various tools.

4. Results and discussion:

The descriptive analysis uncovers the patterns, trends, and insights that are inherent in the dataset and provides a comprehensive overview and understanding of the data at hand.

4.1 Cash Reserve Ratio over a period of ten years

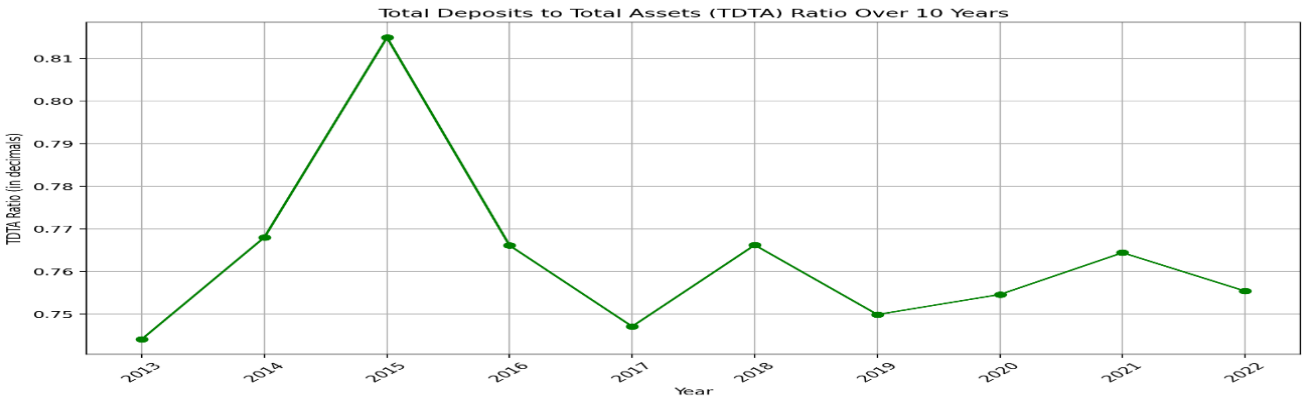
Graph 4.1



The analysis depicts the decade-long trend of Bank Muscat's Cash Reserve Ratio (CRR), a key liquidity metric. Notably, a significant peak in 2015, where CRR reached 23.59%, indicates heightened liquidity reserves. Subsequent sharp declines hint at strategic shifts in liquidity management, followed by stabilized CRR levels in later years, showcasing a more consistent approach. This suggests proactive liquidity reserve management by Bank Muscat, aligning with regulatory changes or internal targets, underscoring the bank's adaptability to evolving factors. The analysis provides valuable insights into the bank's liquidity practices and responsiveness over the observed period.

4.2 Total Deposits to Total Assets (TDTA) Ratio over a period of ten years.

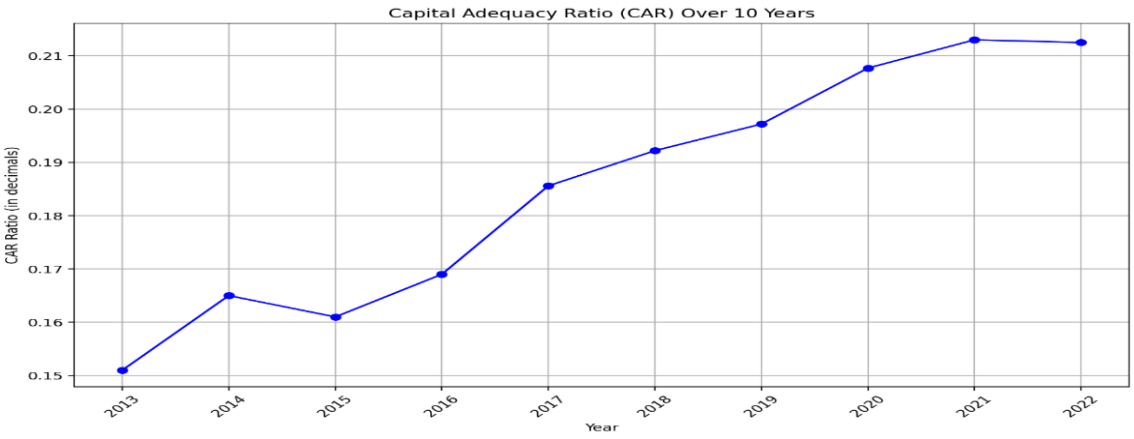
Graph 4.2



The graph portrays Bank Muscat's Total Deposits to Total Assets (TDTA) Ratio trends over a decade, reflecting the bank's funding structure. Despite minor fluctuations, the ratio remains relatively stable. A notable peak in 2015 at 81.49% suggests heightened reliance on deposits for asset funding, followed by a gradual decrease and stabilization around the mid-70% range. This consistent TDTA ratio implies a balanced asset-to-deposit mix and a steady funding strategy, contributing to the bank's overall liquidity and financial stability.

4.3 Capital Adequacy (CAR) Ratio over a period of 10 years

Graph 4.3



The graph illustrates a decade-long trend in Bank Muscat's Capital Adequacy Ratio (CAR), a key financial metric. The steady increase from 15.10% in 2013 to 21.25% in 2022 indicates a proactive strengthening of the bank's capital base. This upward trajectory signifies enhanced financial health and stability, providing a substantial buffer against potential losses.

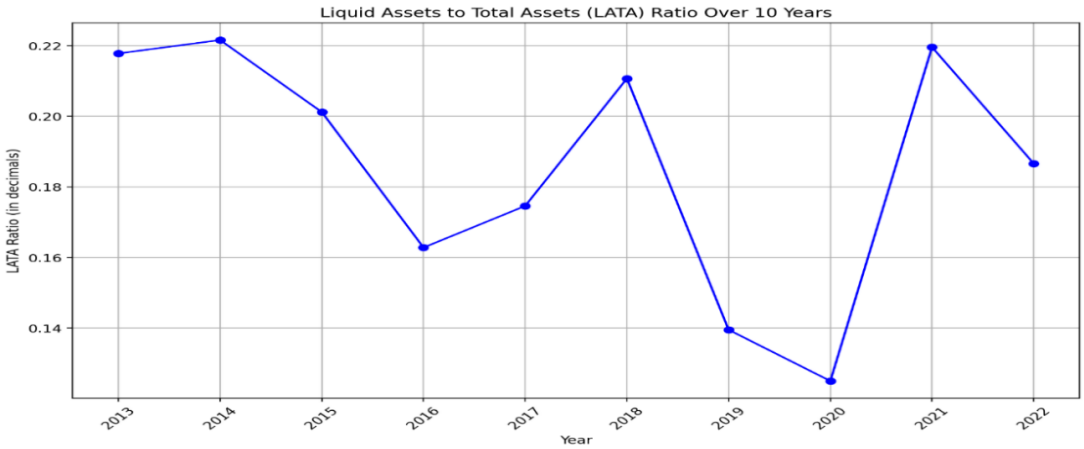
4.4 Total Loan to Total Deposits (TLTD) Ratio over a period of ten years.

Graph 4.4

The line chart presents Bank Muscat's Total Loan to Total Deposits (TLTD) Ratio over a 10-year period. Consistently exceeding 100%, the ratio indicates that, on average, the bank has extended more loans than the total deposits it holds. The peak in 2017 at 112.26% suggests an intense lending period, while the lowest point in 2014 at 96.90% indicates a more conservative lending approach or potential deposit increase. These fluctuations offer insights into the bank's credit risk management and its strategy for leveraging deposits in loan creation.

4.5 Liquid Assets to Total Assets (LATA) Ratio over a period of ten years

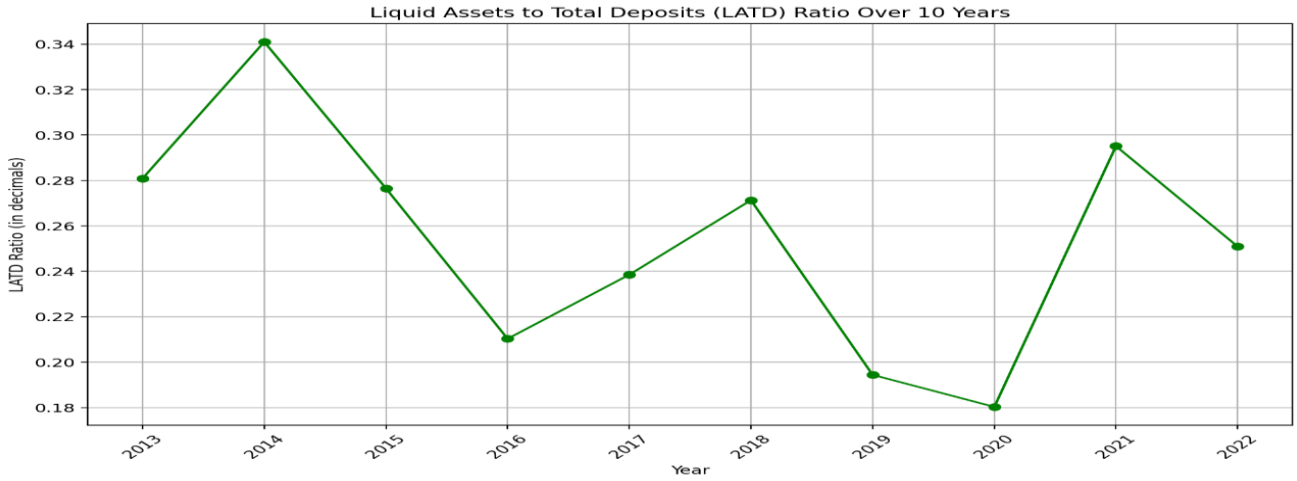
Graph 4.5



The analysis reveals the Liquid Assets to Total Assets (LATA) ratio for Bank Muscat over a decade. The declining trend from 22.16% in 2014 to 18.66% in 2022 indicates a relative decrease in liquid assets compared to total assets. This suggests potential shifts in asset allocation or increased utilization of assets in longer-term investments over the observed period.

4.6 Liquid Assets to Total Deposits (LATD) Ratio over a period of ten years

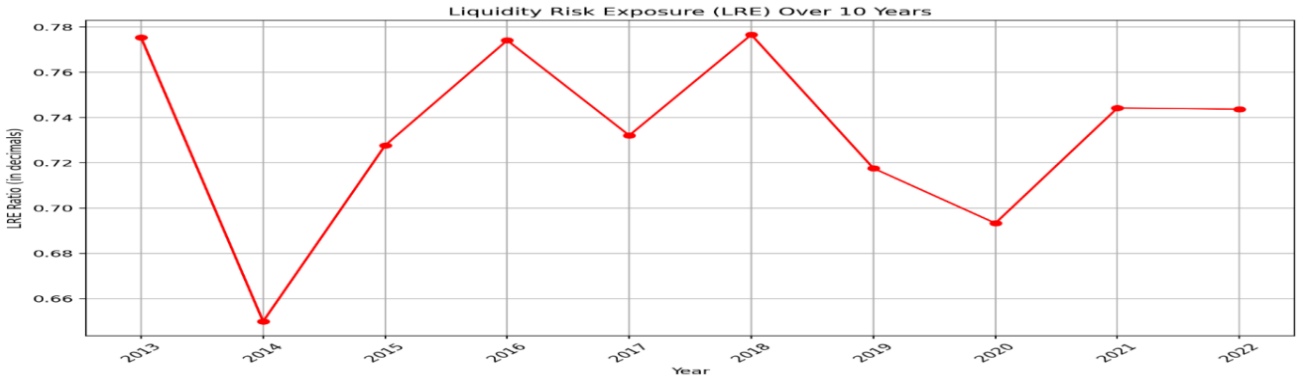
Graph 4.6



The graph illustrates the Liquid Assets to Total Deposits (LATD) Ratio for Bank Muscat over 10 years, reflecting the proportion of deposits held in liquid assets crucial for short-term obligations. The variable trend, peaking at 34.10% in 2014 and dipping to 18.03% in 2020, signifies shifts in the bank's liquidity management.

4.7 Liquidity Risk Exposure (LRE) Ratio over a period of ten years:

Graph 4.7



The analysis reveal Bank Muscat's Liquidity Risk Exposure (LRE) over 10 years, reflecting the potential challenge in meeting obligations due to an imbalance between liquid assets and liabilities. With a consistent trend of high LRE, peaking at 77.66% in 2018 and reaching a low of 64.99% in 2014, the bank tends to have a larger portion of assets tied up in loans than in customer deposits, indicating a heightened liquidity risk.

4.8 Descriptive Statistics

Table 4.1

Variables	Mean	Std. Deviation
Cash Reserve Ratio	.1180	.04647
Total Deposits to Total Assets Ratio	.7631	.02014
Capital Adequacy Ratio	.1854	.0309
Total Loans to Total Deposit Ratio	1.0558	.04686
Liquid Assets to Total Assets	.1859	.03464
Liquid Assets to Total Deposit Ratio	.2539	.04936
Liquidity Risk Exposure	.7335	.03996

Return on Assets	.0159	.00163
Return on Equity	.1161	.01725

The descriptive statistics (Table 4.1) provide insights into key financial metrics for Bank Muscat. The Cash Reserve Ratio (CRR) averages at 11.80%, indicating a moderate liquidity buffer with some variability. The Total Deposits to Total Assets Ratio (TD/TAR) maintains a mean of 76.31%, signaling stability in the asset base. The Capital Adequacy Ratio (CAR) averages at 18.54%, with moderate variability, suggesting diverse financial stability strategies aligned with regulations. The Total Loans to Total Deposit Ratio (TLTD) indicates a slightly aggressive lending strategy at an average of 105.58%. Liquid Assets to Total Assets (LA/TA) and Liquid Assets to Total Deposit Ratio (LA/TDR) reveal moderate liquidity levels. Liquidity Risk Exposure averages at 73.35%, indicating high exposure to liquidity risk with low variability. Return on Assets (ROA) shows a consistent average of 1.59% with low variability, suggesting stability in profitability. Return on Equity (ROE) averages at 11.61% with some variability, highlighting effectiveness in using equity for profit generation.

4.9 Correlation Analysis:

Table 4.2 Correlations

Independent Variable	**ROA Correlation**	**Sig. 2 tailed**	**ROA Significance**	**ROE Correlation**	**Sig. 2 tailed**	**ROE Significance**
Cash Reserve Ratio	0.143	0.694	Not Significant	0.497	0.144	Not Significant
Total Deposits to Total Assets	-0.034	0.925	Not Significant	0.331	0.35	Not Significant
Capital Adequacy Ratio	-0.138	0.703	Not Significant	-0.276	0.441	Not Significant
Total Loans to Total Deposits	-0.429	0.216	Not Significant	-0.531	0.114	Not Significant
Liquid Assets to Total Assets	0.617	.042*	**Significant**	0.514	0.128	Not Significant
Liquid Assets to Total Deposits	0.608	0.062	Not Significant	0.482	0.159	Not Significant

Liquidity Risk Exposure	0.089	0.806	Not Significant	0.148	0.683	Not Significant

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

Hypothesis testing:

H0: There is no significant relationship between liquidity measures and ROA

H1: There is significant relationship between liquidity measures and ROA

H0: There is no significant relationship between liquidity measures on ROE

H2: There is significant relationship between liquidity measures and ROE

The analysis reveal that Total Deposits to Total Assets, (r = -.034), and Capital Adequacy Ratio (CAR) (r = -.138) show a very weak negative correlation with Return on Assets (ROA). The Total Loans to Total Deposits ratio (TLTD) (r= -.429) show a moderate negative relationship with Return on Assets (ROA). The Cash Reserve Ratio (CRR) shows a weak positive relationship (r = .143) with ROA whereas the Liquidity Risk Exposure (LRE) of the bank shows a negligible relationship (.089) on the profitability Metrix ROA of the bank. The other two variables tested with the banks ROA, namely Liquid Assets to Total Assets (LATA; r = .617) and Liquid Assets to Total Deposits (LATD r = .608) show moderate positive relationship with the profitability matrix , ROA of Bank Muscat.

The only liquidity measure that shows statistically significant relationship with ROA is the Liquid Assets to Total Assets (LATA) ratio; (p = 0.042)

The correlations of liquidity variables on the Profitability Matrix Return on Equity (ROE) reveals that there is a weak positive relationship between Capital Adequacy Ratio (CAR) (r = -.276), Total Deposits to Total Assets (TDTA) (r = .331) and Liquidity Risk Exposure (LRE) (r= .148) with ROE. All the other four liquidity variables viz; CRR (r= .497), TLTD (r= -.531), LATA (r= .514) and LATD (r = .482) show moderate positive relationship with Return on Equity (ROE) and none of the variables show significant relationship with ROE.

Hence, H1: There is significant relationship between liquidity variables and ROA is accepted for the liquidity variable, Liquid Assets to Total Assets (LATA), proving significant relationship between LATA and ROA and insignificant relationship for the rest of the ratios in the liquidity matrix. H0 is accepted proving insignificant relationships of all other liquidity variables on the bank's profitability measured in terms of ROA and ROE.

The correlation analysis reveals that Bank Muscat's liquidity metrics, particularly Liquid Assets to Total Assets (LATA), exhibit a significant positive relationship with Return on Assets (ROA).

The observed negative relationship between Cash Reserve Ratio and Return on Assets and Return On Equity (ROE) is consistent with Dao B (2020). In contrast, the study contradicts the results of Mwangi, F. M. (2014), who found a negative relationship between liquidity metrics and return on assets in Kenyan commercial banks.

4.10 Regression analysis:

Regression analysis is used to find out if there exists a significant impact of liquidity financial indicators on the bank's profitability, offering insights into which factors may exert a more substantial impact on ROA and ROE.

Table 4.3 Model Summary and ANOVA

Model Summary					**ANOVA**		
Liquidity measures	**R**	**R square**	**Adjusted R square**	**Durbin Watson**	**df**	**F-Statistic**	**Sig.**
Model 1: Predictors: (Constant), Capital Adequacy Ratio, Liquidity Risk Exposure, Total Deposits to Total Assets Ratio, Liquid Assets to Total Assets, Total Loans to Total Deposits ratio, Cash Reserve Ratio, Liquid Assets to Total Deposits DV : Return on Assets	0.998	0.996	0.980	2.281	7	63.261	.016[b]
Model 2: Predictors: (Constant), Liquidity Risk Exposure, Capital Adequacy Ratio, Total Deposits to Total Assets Ratio, Liquid Assets to Total Assets, Total Loans to Total Deposit Ratio, Cash Reserve Ratio, Liquid Assets to Total Deposit Ratio DV : Return on Equity	0.999	0.999	0.994	2.058	7	204.166	.005[b]

Hypothesis test:

H0: The model does not explain a significant proportion of the variance in ROA

H3: The model explains a significant proportion of the variance in ROA

H0: The model does not explain a significant proportion of the variance in ROE

H4: The model explains a significant proportion of the variance in ROE

Table 4.3 presents the Model Summary of a regression analysis investigating the influence of various liquidity metrics on Return on Assets (ROA) in the banking sector. With an impressive determination coefficient (R) of .998, the model underscores that nearly 99.8% of the ROA variability is explained by the selected liquidity variables. The high Adjusted R Square at .980 reinforces the model's strength in predicting ROA variations. As regards the influence of liquidity metrics on Return on Equity (ROE), the overall correlation is very strong (r = 0.999) with 99.9% of variability in ROE explained by the liquidity variables put to study. The Adjusted R square is 0.994 suggests that a substantial proportion of the variance in the ROE is explained by the liquidity variables.

A high R-squared suggests that a large proportion of the variance in the dependent variable, ie. The profitability of bank measured in terms of ROA and ROE is explained by the independent variables measured in terms of the liquidity ratios.

Hence H3 and H4 are accepted proving that the model explains significant proportion of the variance in ROA and ROE.

Hypothesis test:

H0: The regression model is not a good fit

H5: The regression model is a good fit

The regression model 1 exhibits a significant F-value of 63.261 at p = .016, demonstrating that the combined set of predictors holds substantial influence over the variation in Return on Assets. For Model 2, the F-statistic is 204.166 with a corresponding p-value of 0.005. A higher F-statistic suggests a better fit, and in this case, the obtained F-statistic is large. The low p-value (0.005) leads to the rejection of the null hypothesis, reinforcing the significance of the model. The model effectively explains the observed variance in the dependent variables, ROA and ROE thus supporting the importance of these predictors in evaluating the profitability of the bank. Hence, based on the statistical evidence, H0 (null hypothesis) is rejected, and H5 (alternative hypothesis) is accepted, indicating that the regression models are considered good fits for evaluating the profitability of the bank.

For model 1, the Durbin-Watson statistic of 2.281 indicates the absence of significant autocorrelation in the residuals of regression model 1 for ROA., bolstering the reliability of the results. For model 2, the

Durbin Watson value is 2.058, which is close to 2. This suggests that there is little to no autocorrelation in the residuals of the regression model 2 for "Return on Equity. The ANOVA results indicate a substantial relationship between the predictors—such as Capital Adequacy Ratio, Liquidity Risk Exposure, Total Deposits to Total Assets Ratio, Liquid Assets to Total Assets, Total Loans to Total Deposits ratio, Cash Reserve Ratio, and Liquid Assets to Total Deposits—and the dependent variable, Return on Assets and Return on Equity.

Liquidity measures and ROA

Table 4.4 Coefficients[a]

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	
		B	**Std. Error**	**Beta**			
1	(Constant)	-0.092	0.032		-2.897	0.101	
	Total Loans to Total Deposits ratio	0.042	0.011	1.202	3.977	0.058	
	Liquid Assets to Total Assets	0.002	0.053	0.032	0.029	0.98	
	Liquid Assets to Total Deposits	0.033	0.035	0.991	0.928	0.452	
	Liquidity Risk Exposure	0.000	0.015	0.011	0.028	0.98	
	Cash Reserve Ratio	-0.050	0.013	-1.424	-3.778	0.063	
	Total Deposits to Total Assets Ratio	0.104	0.035	1.28	2.947	0.098	
	Capital Adequacy Ratio	-0.098	0.012	-1.364	-8.113	**0.015**	**Significant**

a. Dependent Variable: Return on Assets

Hypothesis test:

H0: There is no significant impact of the liquidity on ROA

H6: There is significant impact of liquidity on ROA

The regression coefficients for Model 1 indicate the impact of various liquidity measures on Return on Assets (ROA) for the bank. Among the liquidity variables, the Total Loans to Total Deposits ratio shows a positive and marginally significant impact (p = 0.058), suggesting that an increase in this ratio is associated

with a potential positive effect on ROA. On the other hand, the Cash Reserve Ratio exhibits a negative and marginally significant impact (p = 0.063), indicating that a higher cash reserve relative to deposits may have a negative influence on ROA. The other liquidity variables, including Liquid Assets to Total Assets (p= 0.98), Liquid Assets to Total Deposits (p= 0.452), Liquidity Risk Exposure (p = 0.98), Total Deposits to Total Assets Ratio (p = 0.098) do not show statistically significant impacts on ROA. Among the liquidity variables, the analysis indicates that the Capital Adequacy Ratio is the only variable with a statistically significant impact on Return on Assets (ROA), (p = 0.015).

Hence, H0 is reject and *H6: The liquidity measures have significant impact on ROA* is accepted for Capital Adequacy Ratio as the only liquidity measure among the seven variables studied that has significant impact on the bank's profitability measured in terms of ROA.

The negative unstandardized coefficient of -0.098 with a p-value of 0.015 suggests that an increase in the Capital Adequacy Ratio is associated with a decrease in ROA. This relationship is confirmed by the standardized coefficient (Beta) of -1.364, indicating that for every one standard deviation increase in CAR, the Return on Assets (ROA) is expected to decrease by 1.364 standard deviations. In simple words, if the Capital Adequacy Ratio increases by a typical amount (which is one standard deviation), the model predicts that the Return on Assets is likely to decrease by a noticeable amount, around 1.364 times that standard deviation.

The Beta standardized coefficients that determine the contribution of each of the seven liquidity measures to the variation in profitability measured in terms of ROA are shown in Table 4.4. The standardized coefficients allow for the comparison of predictor variables regardless of sign. According to the results of the investigation, Capital Adequacy Ratio has the greatest coefficient and contributes the most to variation in ROA (CAR = -1.364; p= 0.015).

The regression equation is developed as follows:

$$Y=a+b1X1+b2X2+...+bnXn$$

Where; Y represents the dependent variable or the variable being predicted (in this case, Return on Assets - ROA).

a is the intercept (-.092), the constant value when all predictor variables (X) are zero.

b1X1, b2X2…, bnXn are the coefficients of the predictor variables (X).

These coefficients b1, b2….bn represent the impact of each independent variable on the dependent variable (y) when other variables are held constant. The values x1, x2, xn represent the values of the independent variables.

Y (ROA) = -0.092 + - 0.098 x Capital Adequacy Ratio (CAR)

The study's identification of the Capital Adequacy Ratio (CAR) as the sole liquidity variable significantly impacting Return on Assets (ROA) aligns with Dao's (2020) proving consistent negative correlation

between CAR and profitability in Asian commercial banks. However, diverging from Mwangi's (2014) findings in Kenyan banks which concluded a significant negative impact of LATA and LATD ratios on ROA and studies on Pakistani and Chinese banks (Alim et al., 2021; Liu, 2020), the study contradicts the notion of universally positive liquidity-performance associations. The study contributes context-specific insights, highlighting the complex interplay between liquidity management and banking performance.

Liquidity measures and ROE

Table 4.5 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
		B	Std. Error	Beta			
2	(Constant)	-102.35	18.773		-5.452	0.032	
	Cash Reserve Ratio	-0.522	0.078	-1.407	-6.695	**0.022**	**Significant**
	Total Deposits to Total Assets Ratio	1.442	0.207	1.683	6.953	**0.020**	**Significant**
	Capital Adequacy Ratio	-1.156	0.071	-1.522	-16.243	**0.004**	**Significant**
	Total Loans to Total Deposit Ratio	0.447	0.062	1.215	7.211	**0.019**	**Significant**
	Liquid Assets to Total Assets	1.203	0.31	2.415	3.885	0.060	
	Liquid Assets to Total Deposit Ratio	-0.591	0.208	-1.69	-2.837	0.105	
	Liquidity Risk Exposure	-0.315	0.09	-0.729	-3.483	0.073	

a. Dependent Variable: Return on Equity

Hypothesis test:

H0: There is no significant impact of the liquidity on ROE

H7: There is significant impact of liquidity on ROE

The regression coefficients for Model 2 indicate the impact of various liquidity measures on Return on Equity (ROE) for the bank. The analysis revel that Cash Reserve Ratio (CRR) ;p= 0.022 and Capital

Adequacy Ratios (CAR); p = 0.004 have significant negative impact on the banks' profitability measured in terms of Return on Equity (ROE). The Total Deposits to Total Assets Ratio (TDTA) p = 0.020; and the Total Loans to Total Deposits Ratio (TLTD) p = 0.019 have significant positive impact on ROE.

The negative unstandardized coefficient of -0.522 indicates that, holding other variables constant, a one-unit increase in Cash Reserve Ratio is associated with a decrease in ROE by 0.522 units. The negative unstandardized coefficient of -1.156 implies that a one-unit increase in Capital Adequacy Ratio is associated with a decrease in ROE by 1.156 units. This suggests that a stringent capital adequacy requirement negatively influences the bank's return to equity. With a positive unstandardized coefficient of 1.442, for TDTA, a one-unit increase in Total Deposits to Total Assets Ratio is associated with an increase in ROE by 1.442 units. The positive unstandardized coefficient of 0.447 suggests that a one-unit increase in Total Loans to Total Deposit Ratio is associated with an increase in ROE by 0.447 units, indicating that this liquidity measure contributes significantly to the positive variation in ROE. The other liquidity measures such as Liquid Assets to Total Assets (LATA); p = 0.060, Liquid Assets to Total Deposits (LATD) ; p= 0.105 and the Liquidity Risk Exposure (LRE) ; p = 0.073 are proved to have insignificant impact on ROE. Therefore, the impact of a one-unit increase in these variables on ROE is not confirmed by the standardized coefficient.

The Beta standardized coefficients determine the contribution of each of the four significant impact liquidity measures to the variation in profitability measured in terms of ROE. The results reveal that among all the four liquidity measures that have impact on ROE, the Total Deposits to Total Assets Ratio (TDTA) has the greatest coefficient and contributes the most to variation in profitability measured in terms of ROE (TDTA = 1.683; p= 0.020) followed by the Capital Adequacy Ratio (CAR = -1.522; p= 0.004)

The regression equation is developed as under:

ROE= −102.350−0.522 x Cash Reserve Ratio (CRR) + 1.442 × Total Deposits to Total Assets Ratio (TDTA) −1.156 × Capital Adequacy Ratio (CAR) + 0.447 × Total Loans to Total Deposit Ratio (TLTD)

The findings of this study align with several studies, including Dao (2020), Sathyamoorthi et al. (2020), and Liu (2020), which emphasize the significant impact of liquidity-related variables such as Total Deposits to Total Assets Ratio and Capital Adequacy Ratio on bank profitability. The findings also align with the study by Badreldin F Salim and Bilal (2016), emphasizing the crucial impact of effective liquidity management on financial performance. However, divergent results exist, such as those from Mishra and Swain (2020), whose study on Indian banks found no significant impact of liquidity measures on profitability except for Deposits to Assets Ratio (DAR). These nuances underscore the complexity of liquidity-profitability dynamics, emphasizing the need for context-specific analyses in understanding these relationships

Findings:

1. **Cash Reserve Ratio**: The study finds no statistically significant correlations between the Cash Reserve Ratio and both Return on Assets (ROA) and Return on Equity (ROE). This implies that the level of cash reserves in relation to total deposits does not notably affect Bank Muscat's profitability metrics.
2. **Total Deposits to Total Assets**: Similar to the Cash Reserve Ratio, the correlations between Total Deposits to Total Assets and both ROA and ROE are not significant. Thus, the proportion of total deposits relative to total assets does not significantly influence Bank Muscat's profitability.
3. **Capital Adequacy Ratio**: The analysis reveals that the Capital Adequacy Ratio does not have statistically significant correlations with ROA and ROE. This indicates that the bank's capital adequacy, as measured by this ratio, does not notably associate with its profitability.
4. **Total Loans to Total Deposits**: The study finds no significant relationships between the Total Loans to Total Deposits ratio and ROA or ROE. Hence, the ratio of total loans to total deposits does not appear to influence the bank's profitability metrics significantly.
5. **Liquid Assets to Total Assets**: While a statistically significant positive correlation is observed between Liquid Assets to Total Assets and ROA, no significant correlation is found with ROE. This suggests that maintaining a higher proportion of liquid assets relative to total assets may positively impact ROA but not necessarily ROE.
6. **Liquid Assets to Total Deposits**: Both ROA and ROE correlations with the Liquid Assets to Total Deposits ratio are not statistically significant. Hence, the ratio of liquid assets to total deposits does not significantly affect the bank's profitability metrics.
7. **Liquidity Risk Exposure**: Neither ROA nor ROE correlations with Liquidity Risk Exposure are statistically significant. This indicates that the level of liquidity risk exposure does not notably influence Bank Muscat's profitability metrics.
8. **Overall Influence of Liquidity Measures**: The only liquidity measure that exhibits a statistically significant positive correlation with ROA is the Liquid Assets to Total Assets (LATA). However, it does not demonstrate a significant relationship with ROE. Other unaccounted factors may influence both ROA and ROE which are beyond the scope of the analyzed liquidity measures.
9. **Regression Model Performance**: The regression models exhibit exceptional explanatory power, with high R-squared values of .996 for ROA and .999 for ROE. This suggests that a significant portion of the variability in both profitability metrics is explained by the included liquidity and financial indicators.

10. **Key Liquidity Impact on Profitability**: While certain liquidity ratios such as Cash Reserve Ratio, Total Deposits to Total Assets Ratio and Total Loans to Total Deposit Ratio significantly impact ROE, variables like Liquid Assets to Total Assets, Liquid Assets to Total Deposits and Liquidity Risk Exposure do not reach conventional significance levels in explaining profitability variations measured in terms of ROA and ROE. Notably, the Capital Adequacy Ratio emerges as a crucial factor impacting both ROA and ROE significantly, with an increase in CAR leading to a decrease in both profitability metrics.

6. Conclusion:

From the study findings, it is evident that the examined liquidity measures do not exhibit significant associations with Bank Muscat's profitability, as measured by ROA and ROE, except for Liquid Assets to Total Assets (LATA), which shows a significant correlation with ROA. Notably, the Capital Adequacy Ratio (CAR) emerges as the only liquidity measure significantly impacting ROA, with a negative significant impact on both ROA and ROE. Conversely, liquidity measures such as the Cash Reserve Ratio, Total Deposits to Total Assets Ratio, Capital Adequacy Ratio and Total Loans to Total Deposit Ratio significantly impact ROE. However, Liquid Assets to Total Deposit Ratio, Liquid Assets to Total Assets, and Liquidity Risk Exposure do not affect profitability. The negative significant impact of the Capital Adequacy Ratio (CAR) on bank profitability, as measured by both ROA and ROE, suggests that higher levels of capital adequacy relative to risk-weighted assets might constrain profitability.

7. Recommendations:

1. **Enhance Liquidity Management:** Bank may prioritize strategies that optimize liquidity management, focusing on maintaining an appropriate balance between liquid assets and total assets.
2. **Strengthen Capital Adequacy:** Given the negative impact of the Capital Adequacy Ratio (CAR) on bank profitability, it is imperative for banks to ensure compliance with regulatory capital requirements while also seeking avenues to enhance capital efficiency.
3. **Monitor Deposit-to-Asset Ratios**: While Total Deposits to Total Assets Ratio and Total Loans to Total Deposit Ratio significantly impact ROE, banks may closely monitor these ratios to manage deposit and lending activities effectively.

4. **Evaluate Liquidity Risk Exposure:** Despite the lack of significant correlation with profitability metrics, monitoring liquidity risk exposure remains essential for mitigating potential adverse effects on financial stability.
5. **Assess Liquid Asset Allocation:** Although Liquid Assets to Total Assets ratio exhibits a significant positive correlation with ROA, banks may assess their liquid asset allocation strategies to optimize returns while maintaining sufficient liquidity buffers.
6. **Implement Dynamic Risk Management:** Bank may adopt dynamic risk management frameworks that consider both regulatory requirements and profitability objectives, ensuring a balanced approach to liquidity and capital management.

Future Directions of the study:

Future research avenues include comparative studies across banks to validate observed relationships, exploring diverse business models' impacts on liquidity-profitability dynamics, employing advanced analytical techniques like structural equation modeling, and uncovering unseen factors influencing this relationship, such as market dynamics, regulatory changes, and technological advancements, to provide a comprehensive understanding of banking sector dynamics.

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