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Empirical Study Of Liquidity Risk Indicators In Indian Private Banks

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ABSTRACT

The Indian private banking ability to maintain a robust liquidity position is vital to the economy's seamless user experience. Liquidity risk is caused if a bank fails to fulfill its liquidity, which increases the likelihood of default (PD) in the financial sector. In truth, the lack of liquidity in the Indian banking industry was the major cause of all negative events during the current recession. As a corollary, it's essential to examine the factors that influence bank liquidity. The present research is an attempt by the researcher to study the generic and specific characteristics affecting bank liquidity, with the target population being the Indian Private Banks, from March 2006 to March 2021. The OLS Panel Data Regression Model is used to examine the impact of various bank specific factors on the banks' liquidity risks.

Keywords: Liquidity Risk, Bank Performance, Profitability, Bank- Specific factors, Banking Crises etc.

1. INTRODUCTION.

As the economy's primary source of financing, the banking industry plays a key role in its survival and prosperity. The Indian banking sector has changed significantly since Dr. Manmohan Singh established the New Economic Policy in 1991. From a regulated to a deregulated market economy, the banking industry has made the transition. In addition, the global financial crisis had a huge influence on India's banking sector. As a result, focusing on risk and distress in the banking sector is critical in order to maintain a bank's financial health in the long run. Despite the fact that banks are vulnerable to a variety of threats. The purpose of this study is to focus on the liquidity risk in the Indian private sector banks.

The ability of a bank to turn its assets into cash and satisfy its obligations on schedule is referred to as bank liquidity. Liquidity risk is created when a bank fails to manage its liquidity, which increases the probability of default (PD) in the banking business. Liquidity risk was seen as a secondary concern

prior to the financial crises. The global recession of 2007-08 has highlighted numerous concerns about banks' liquidity risk management practises. In truth, the shortage of liquidity in the Indian banking industry was the primary cause of all negative events during the banking crisis.

Despite the fact that banks have adequate capital and the RBI has taken numerous efforts, such as the Liquidity Coverage Ratio (LCR), most banks are vulnerable to financial hardship due to inadequate liquidity risk management practices. The lack of risk management studies on liquidity management in the Indian context, as well as unknown/unrecognized parameters influencing liquidity in Indian banks, are the main causes of inadequate liquidity management in Indian banks. Most studies and risk professionals' attention has switched to the liquidity risk since the 2008 financial crisis.

The following sections make up the current research. The review of literature and theoretical framework are included in Section 2. The study's aims are discussed in Section 3. The study's research approach is described in Section 4. Data analysis and interpretation are covered in Section 5. The study's principal findings are discussed in Section 6. The conclusion and scope of future research are discussed in Section 7. The eighth section is devoted to citations.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

For the aim of this study, many research publications and yearly reports relevant to banking institutions are reviewed. The following are some of the various reviews of literature on Liquidity risk assessment and management:

Many authors (Santomero 1997; Fiedler et al., 2002; Ringbom et al., 2004; Gabbi 2004; Basu 2005, Vallabh 2005; Chatterjee 2006; Valla et al., 2008; Ghosh 2011; Ratnovski 2013; Bonner et al., 2015; Chiara Monte & Casu 2017; Abdel 2017) have previously addressed this topic in their papers, emphasising the importance They've also stressed the importance of managing liquidity risk in order to keep the economy's financial stability. The financial crisis of 2008 has refocused the attention of all policyholders, academics, researchers, and bankers on the management of liquidity risk.

Many authors have emphasised the development and design of an effective liquidity risk management policy & its effects on the bank's profitability, taking into account the situation prior to financial crises and after financial crises. They've also focused on the challenges of putting such a policy in place. Gabbi (2004), for example, worked on building a bank management framework for controlling liquidity risk, with the conclusion that cash flow management and stock and bond management should be centralised to reduce liquidity risk. Franck & Krausz (2007) used a sample of 61 institutions over the course of seven years to investigate the various hazards that banks face. Covitz and Downing (2007) used simulation to analyse and design effective liquidity risk management strategies. Cornett et al. (2011) attempted to design a liquidity risk management policy utilising regression Robustness Test over a three-year period. The Basle Committee on Banking Supervision (2010) and Subramanian (2015) both suggested that a sufficient amount of liquidity be maintained. Ismail (2010) investigated the liquidity risk management index in Islam during an eight-year period. Simplice (2010) investigated the steps employed to control liquidity risk following crises, and found that banks should publish the measures they take to ensure stakeholder liquidity. Varotto (2011) used a VAR Model and Sensitivity Analysis to predict liquidity risk over a 5-year period. Teply (2011) investigated the hurdles to the development of liquidity risk management over a three-year period and determined that the key issue is a lack of liquidity measurement, liquidity system, control, and governance. Agbada and Osuji (2013) investigated the effects of effective liquidity management on banking performance in Nigeria, concluding that effective liquidity management boosts bank profitability. Alshatti (2015)

examined the influence of liquidity management on commercial bank profitability in Jordan and proposed that a generalised strategy for controlling liquidity be used.

The literature on the factors of liquidity risk is sparse in relation to the Indian economy; in general, it can be claimed that most study on liquidity risk is concentrated on developed economies. A number of researches on the determinants of liquidity risk have been conducted in industrialised countries. Vodová (2011), for example, conducted research into the drivers of liquidity in Slovakia's commercial banks. The study found that higher profitability, higher capital adequacy, and greater bank size all lead to a decrease in bank liquid assets when using panel data regression analysis on 10-year data. Buch and Neugebauer (2011) used the Regression Analysis Robustness Test to highlight the importance of bank specific characteristics in maintaining optimum liquidity in the economy. David and Samuel (2011) used the OLS Regression Model to study liquidity management in Nigerian banks and found a strong link between liquidity and profitability. Arif and Naman (2012) used a series of Multiple Regressions, Panel Data Approach over a 6-year period to investigate liquidity risk in 22 Pakistani banks and estimate its impact on the institutions' profitability. Liquidity risk can be mitigated by keeping sufficient cash reserve, raising deposits, eliminating liquidity gaps, and reducing non-performing loans, according to the paper's conclusion. Anjum (2012) investigated the bank-specific determinants of liquidity risk across a four-year period using regression and correlation analysis on a sample of 21 banks. The researcher compared the liquidity risks of Islamic and conventional banks and came to the conclusion that Islamic banks have a stronger liquidity position than conventional banks. Munteanu (2012) used regression analysis to assess the determinants of bank liquidity in Romanian commercial banks and advised lowering the inter-bank interest rate to reduce liquidity. Vodova (2013) tried to discover factors of liquidity in Hungarian commercial banks using a Panel Data Regression Approach. According to the findings, bank capital adequacy, loan interest rates, bank profitability, and bank liquidity all have a positive association. Furthermore, a negative association was shown between bank size, interest margin, monetary policy, interest rate, and bank liquidity. By examining a sample of 20 banks, Asongu (2013) investigated the methods taken by banks to control liquidity risk following the financial crisis. Ferrouhi (2014) used Panel Data Regression Analysis on a 12-year sample to determine the factors of liquidity risk and analyse the link between financial performance and liquidity risk of Moroccan commercial banks. The study found a positive correlation between bank size and liquidity risk, as well as a negative correlation between total external funding liabilities, bank capital, and liquidity risk. Sheikh (2015) investigated the drivers of liquidity risk using a Panel Data Approach with fixed and random effects on a sample of 5 Commercial banks in Pakistan over a 7-year period. According to the study, lowering the total capital ratio of deposits raises the liquidity risk, while increasing the capital to financing ratio lowers the liquidity ratio. Boumediene (2015) used a generalised autoregressive conditional heteroskedasticity model to manage Islamic banks' liquidity demands, and discovered that a budget deficit is a good tool for mitigating liquidity risk. Renata (2015) used Panel Data Regression Analysis to identify the drivers of liquidity risk in 42 developed nations over a 12-year period, and the findings suggested that the global determinants of liquidity will be useful in managing liquidity risk. El Khoury (2015) conducted a similar study with a sample of 23 Lebanese banks over a 9-year period, highlighting bank size and loan growth as the key predictors of liquidity risk. Moussa (2015) looked into the factors that affect bank liquidity in Tunisia and found that bank size and deposits have a negative impact on liquidity, whereas return on assets and bank capital have a favourable impact. Over an 8-year span, Roman and Sargu (2015) used OLS Regression Analysis on a sample of CEE countries. The study looked at both internal and external factors that influence liquidity risk, and found that depreciation has a negative impact on loans. Additionally, total capital ratio, return on average equity, and the ratio of impaired loans to total loans are the major factors that affect a bank's overall liquidity. Umar and

Sun (2016) used a Multiple Linear Regression, Econometric Model to investigate the bank-specific determinants of liquidity risk in commercial banks in CEE countries over a 13-year period. There was a positive association between liquidity creation and return on equity, bank size, and a negative relationship between liquidity creation and interest rate, according to the findings. Singh and Sharma (2016) studied the impact of bank specific determinants on bank liquidity using the Pooled OLS Regression Method, Trend Analysis, and Panel Data Approach on 59 BRICS banks over a 12-year period. Deposits, profitability, capital adequacy, and bank liquidity all had a positive association in the study, but bank size and liquidity had a negative link. Over a 14-year period, Sheefeni (2016) used the ordinary least squares (OLS) technique to investigate the bank-specific determinants affecting commercial bank liquidity in Namibia. The findings show a negative correlation between return on equity and commercial bank liquidity, as well as a positive correlation between capital adequacy, non-performing assets, and commercial bank liquidity.

According to the above analysis of literature, there are few studies that validate the impact of various factors on the liquidity of the banks, and liquidity risk is the leading cause of bank failure in the country. As a result, the current research aims to uncover the many elements that influence the liquidity risk of the Indian private banking industry. The study's goal is to look at the elements that influence bank liquidity risk and design a Liquidity Risk Management framework. Despite the fact that there are numerous variables of liquidity risk, the study's focus will be on determining the relationship between liquidity risk and bank-specific parameters. A common liquidity indicator is calculated for the purpose of calculating the bank's liquidity, which is represented by the loan-to-total-asset ratio. Other variables, which can be broadly classed as financial and non-financial performance indicators, are also taken into account. The financial performance obtained from the bank's balance sheet and income statements will take precedence. For the purposes of the study, both general and unique variables are taken into account.

3. THE STUDY'S OBJECTIVES

The purpose of this study is to determine the numerous elements that influence the liquidity risk of Indian private banks. The goal of the research is to learn more about the elements that influence bank liquidity risk and to design a Liquidity Risk Management approach. As a result, the general goal of this research is to look into the elements that influence liquidity risk in Indian private banks.

4. RESEARCH METHODOLOGY

Data and Sample: The data for the previous 14 years, spanning March 2006 to March 2021, is exclusively evaluated to investigate the factors affecting liquidity risk in the commercial banks of the Indian Banking Industry. The information was gathered from bank annual reports and the RBI database.

Descriptive Variable: Numerous reviews of literature focus on various variables relating to liquidity risk; some of them are included below. The variables under investigation are divided into two categories: dependent and independent variables.

Independent Variable	Dependent Variables	Proxy Measurement	References
	Liquidity	Liquidity= liquid assets/total assets.	Sheefeni (2016); Singh & Sharma (2016); Munteanu (2012); El Khoury (2015)
Bank Size		Logs of Total Assets	Vodova (2011); Chiaramonte & Casu (2017); Chouchène & Khiari (2017); Roman & Sargu (2015); León (2016); Singh & Sharma (2016); Choon (2013); Arif (2012); Khoury (2015) (Lebane); Ferrouhi (2014); Vodova (2014); Iqbal (2012).
Profitability		Return on assets (%age)	Vodová (2011); Sheefeni (2016); Chiaramonte & Casu (2017); Chouchène & Khiari (2017); Roman & Sargu (2015); León (2016); Singh & Sharma (2016); Moussa (2015); Choon (2013); Vodov (2013); Arif, & Nauman (2012); Khoury (2015) (Lebane); Ferrouhi (2014); Vodova (2014); Iqbal (2012)
Cost of Funding		Total Interest Expense/Total Liability	Singh & Sharma (2016)
Deposits		Deposits Over Total Assets (Crores)	Singh & Sharma (2016); Arif (2012)
Cost to Income Ratio		Total Expense/Total Generated Revenue	Additional Variables Considered by the Author
Liquidity Management		Total Loans/Total Customer Deposit	Additional Variables Considered by the Author
Bank Resilience Risk		Equity Capital/Total Assets	Alshatti (2015)
Mgt. Efficiency		Operating Expense/Total Deposit	Boadi & Lartey (2016); León (2016)
Quick Ratio (Times)		Quick Assets/Total Liabilities	Alshatti (2015)

Methodology: The current study examines balanced panel data from Indian private commercial banks for the years 2006 to 2021. The Housman test was used to assess whether fixed effect estimates or random effect estimates should be used with the data. Fixed effects estimates are frequently chosen over random effect estimates because fixed effects estimates produce more consistent results. Furthermore, foxed effects estimates are more resilient than random effect estimates since they are not dependent on the individual error term assumption.

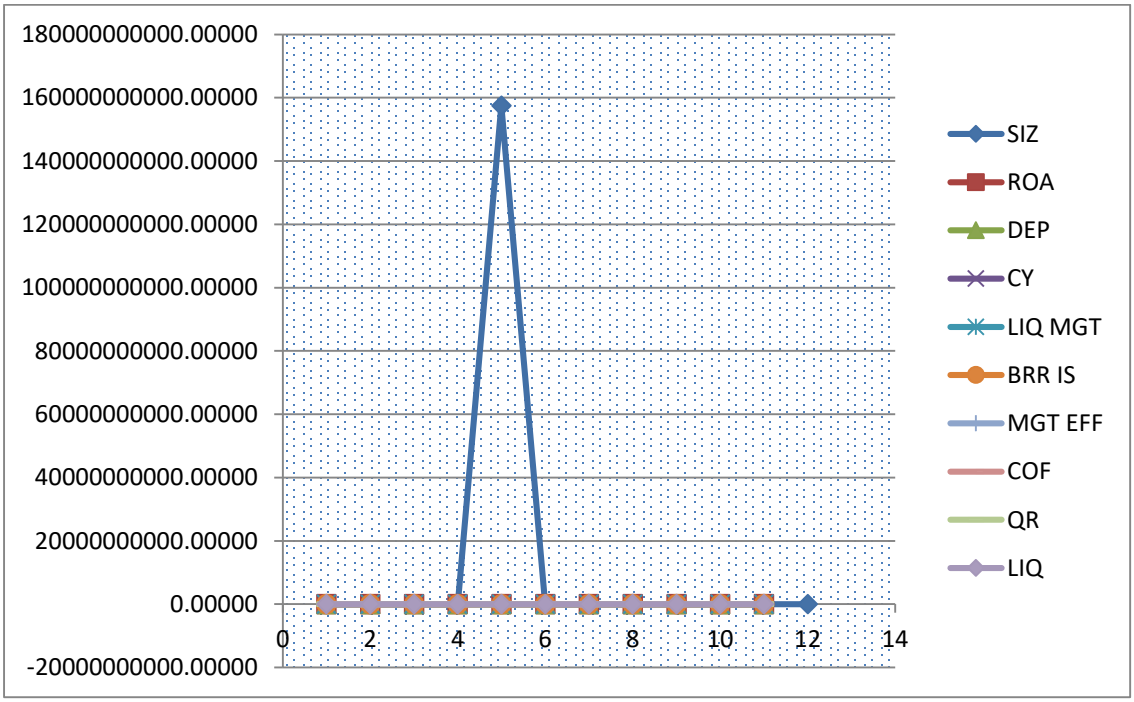
5. DATA INTERPRETATION AND ANALYSIS

The three types of data analysis are descriptive analysis, correlation analysis, and empirical analysis.

I. **Descriptive Analysis:** The normality of the data is examined in this section of the investigation using the descriptive table below.

	SIZ	ROA	DEP	CY	LIQ MGT	BRR IS	MGT EFF	COF	QR	LIQ
Mean	7.89556	0.82389	0.86863	3.55965	1.09648	0.02507	0.05675	0.17287	25.10944	0.10384
Median	7.38500	0.72000	0.92637	0.89464	0.82431	0.00618	0.03051	0.05464	20.16000	0.11357
Standard Deviation	0.2975	0.92970	0.33391	11.52097	1.17022	0.03779	0.08035	0.21346	26.44927	0.04730
Sample Variance	0.574	0.86434	0.11150	132.73273	1.36942	0.00143	0.00646	0.04556	699.56401	0.00224
Kurtosis	-0.85651	3.41958	1.46602	17.88235	15.93900	3.68091	7.24826	1.03104	9.82544	-0.09618
Skewness	1.96220	0.69322	-1.11142	4.22337	3.87159	2.02724	2.76288	1.56012	2.82498	-0.18282
Range	2.92000	4.62000	1.30944	49.65939	5.65244	0.13345	0.31043	0.64936	117.56000	0.18314
Minimum	4.99000	-1.26000	0.09000	0.00061	0.01329	0.00042	0.00836	0.03345	1.30000	0.01012
Maximum	8.91000	3.36000	1.39944	49.66000	5.66574	0.13387	0.31879	0.68281	118.86000	0.19325
Sum	720.1256	114.83000	5.63526	64.07366	19.73659	0.45133	1.02142	3.11170	451.97000	1.86904
Count	**180**									

Note: LIQ is the ratio of liquid assets over total assets. SIZ is bank size, ROA is profitability, COF is cost of funding, DEP is deposits over total assets, CY cost to income ratio, LIQ_MGT is liquidity management, BRR IS bank resilience Risk, MGT_EFF is management efficiency, QR is quick ratio.



(Data Source – Secondary)

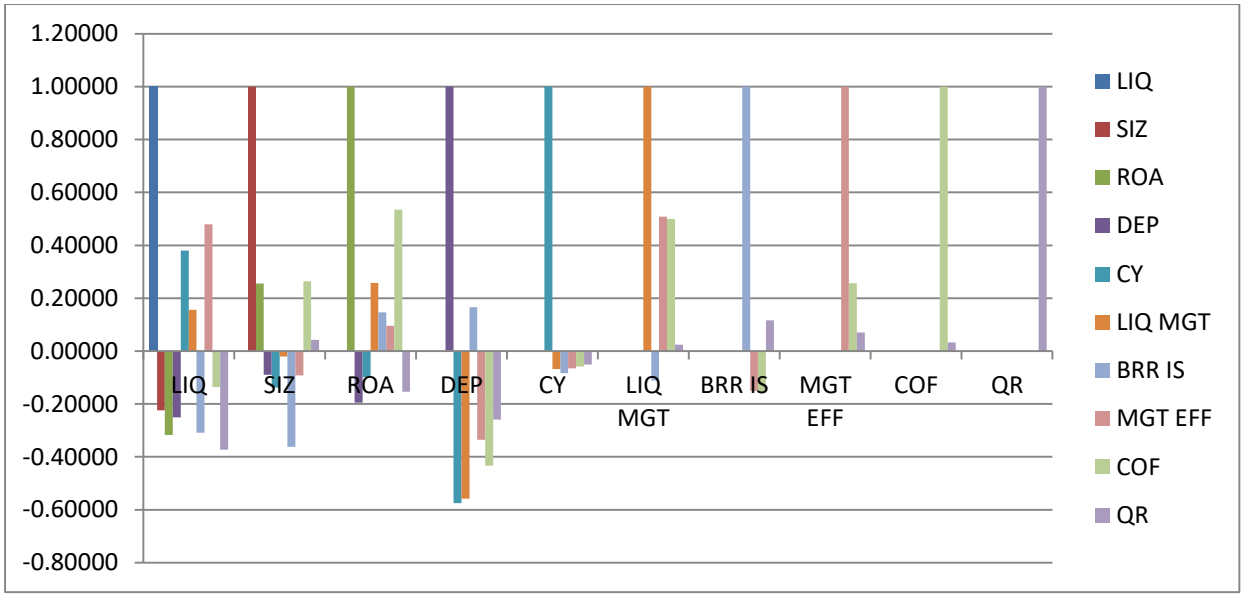
From the above-mentioned table, the following conclusion can be drawn. The total number of observations is 180, and logs of a few variables are used to simplify the data. The given data's mean

median ratio is nearly 1, indicating that the data is normal. In comparison to the mean and standard deviation, the standard error has a lower value, indicating a lower coefficient of variation. As a result, we conclude that the data is normally distributed, and we proceed to apply the correlation and OLS Regression Model (panel data technique) to empirical analysis.

II. **Correlation Analysis:** The correlation matrix is shown in the table below. It shows how the dependent and independent variables are related. The study does not include factors with a high degree of association. There is no evidence of multi-collinearity between the liquidity and other variables in the table. The liquidity and quick ratio collinearity is 0.95, whereas the deposit and quick ratio collinearity is 0.62. As a result, we might conclude that the latter has a stronger association. For all other variables, the coefficient value is less than 0.95, indicating that they are not multi-collinear.

	LIQ	**SIZ**	**ROA**	**DEP**	**CY**	**LIQ MGT**	**BRR IS**	**MGT EFF**	**COF**	**QR**
LIQ	1.00000									
SIZ	-0.22368	1.00000								
ROA	-0.31689	0.25566	1.00000							
DEP	-0.25044	-0.08924	-0.19458	1.00000						
CY	0.38038	-0.13765	-0.09796	-0.57538	1.00000					
LIQ MGT	0.15646	-0.02086	0.25747	-0.55763	-0.06819	1.00000				
BRR IS	-0.30884	-0.36148	0.14703	0.16608	-0.08323	-0.11108	1.00000			
MGT EFF	0.47936	-0.09141	0.09605	-0.33502	-0.06480	0.50833	-0.15022	1.00000		
COF	-0.13552	0.26399	0.53496	-0.43304	-0.05860	0.49941	-0.15451	0.25672	1.00000	
QR	-0.37251	0.04212	-0.15320	-0.25950	-0.05106	0.02424	0.11619	0.06998	0.03241	1.00000

Note: LIQ is the ratio of liquid assets over total assets. SIZ is bank size, ROA is profitability, COF is cost of funding, DEP is deposits over total assets, CY cost to income ratio, LIQ_MGT is liquidity management, BRR IS bank resilience Risk, MGT_EFF is management efficiency, QR is quick ratio.



(Data Source – Secondary)

III. **Empirical Analysis (OLS Panel Data Approach):** On the assumption that all banks are the same, the Pooled Regression Model is used. Profitability, deposits, liquidity management, and management efficiency all have a substantial impact on liquidity, since the P-value is less than 5%. The fixed effect and random effect estimates were calculated, and the Housman Test was used to evaluate whether fixed effect or random effect estimates should be used.

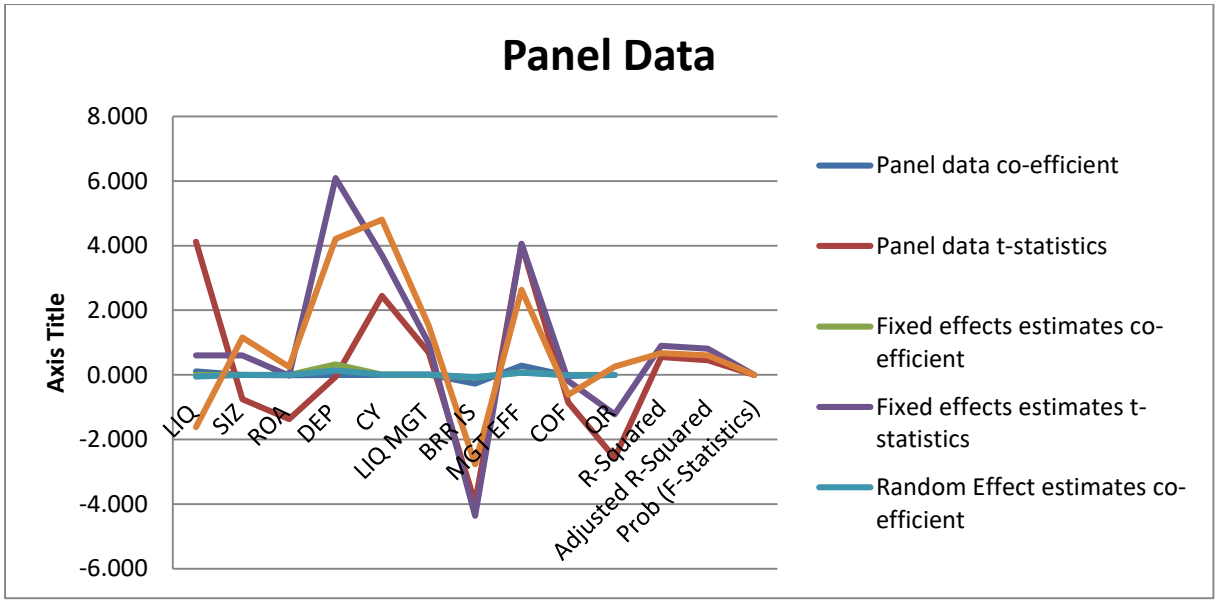
Because the P-value is less than 5%, random effect estimates conclude that bank size, cost of financing, deposits, liquidity management, management efficiency, and quick ratio have a significant effect on liquidity. Profitability, cost-to-income ratio, and resilience risk, on the other hand, have little impact on liquidity. However, bank size, cost of funding, deposits, and liquidity management have a negative impact on liquidity, whereas bank size, cost of funding, deposits, and liquidity management have a positive impact.

A fixed effect estimate model is also used, which allows for data heterogeneity. Because the P-Value is less than 5%, Fixed Effects estimations conclude that managerial efficiency and quick ratio have a major impact on liquidity. Because the P-value is more than 5%, bank size, profitability, cost of funding, deposits, cost to income ratio, liquidity management, and bank resilience risk have no effect on liquidity. However, managerial efficiency has a negative impact on liquidity, whereas the quick ratio has a good impact. The R-square value for fixed effect estimates is 0.90, indicating that the model well fit.

Variables	**Panel data**		**Fixed effects estimates**		**Random Effect estimates**	
	co-efficient	**t-statistics**	**co-efficient**	**t-statistics**	**co-efficient**	**t-statistics**
LIQ	0.104	4.123	0.000	0.603	-0.055	-1.614
SIZ	0.000	-0.754	0.000	0.604	0.000	1.159
ROA	-0.009	-1.366	-0.001	-0.022	0.003	0.244

DEP	-0.001	-0.060	0.324	6.093	0.142	4.209
CY	0.001	2.450	0.007	3.709	0.005	4.801
LIQ MGT	0.004	0.695	0.001	0.975	0.003	1.527
BRR IS	-0.268	-3.970	-0.078	-4.363	-0.071	-2.766
MGT EFF	0.283	4.044	0.073	4.057	0.071	2.634
COF	-0.029	-0.854	-0.002	-0.188	-0.008	-0.612
QR	-0.001	-2.570	0.000	-1.225	0.000	0.254
R-Squared		0.551		0.904		0.672
Adjusted R-Squared		0.457		0.808		0.603
Prob (F-Statistics)		0.001		0.000		0.001

Note: LIQ is the ratio of liquid assets over total assets. SIZ is bank size, ROA is profitability, COF is cost of funding, DEP is deposits over total assets, CY cost to income ratio, LIQ_MGT is liquidity management, BRR IS bank resilience Risk, MGT_EFF is management efficiency, QR is quick ratio.



(Data Source – Secondary)

The Durbin Watson Stat and Hausman Test was used to determine which test between fixed and random effect estimates was the most dependable. Because the P-value is smaller than 0.05, it may be concluded that fixed effect estimates are better than random effect estimates.

Durbin Watson Stat			
Test Summary	**DW**	**Rho**	**Prob**
Cross Section Random	0.158	0.524	<0.0001

Test Interpretation: H0: The residuals are not auto correlated (order=1)

Ha: rho ≠ 0

As the computed p-value is lower than the significance level alpha=0.05, one should reject the null

hypothesis is H0, and accept the alternative hypothesis is Ha.

Hausman Test (Random Effects)

Hausman Test (Random Effect)			
Test Summary	**Chi-Square Statistics**	**Chi Square Degree of freedom**	**Prob**
Cross Section Random	111.65	9	0

6. KEY FINDINGS

The purpose of this study is to investigate the impact of bank-specific factors on bank liquidity risk. The impact of bank-specific factors on bank liquidity has been investigated in a number of studies and are the key findings of the present study are:

I. According to the findings, the 5 per cent level of significance, managerial efficiency, and fast ratio all have a substantial impact on bank liquidity.
II. Management efficiency has a negative impact on liquidity.
III. Quick Ratio has a good impact.
IV. Deposits and liquidity management have a big and beneficial impact on bank liquidity when the probability is zero.

Renuka & Gurpreet (2017), Singh & Sharma (2016), and all found similar results.

7. CONCLUSION

The banking industry's ability to maintain a solid liquidity position is critical to the economy's seamless operation. According to the literature, India has done virtually little study in this area. As a result, we conclude that research into the factors affecting Indian banks' liquidity will assist banking management in developing appropriate strategies to maintain adequate liquidity, which will help them face future uncertainties and, as a result, aid in the economy's long-term growth and development. The findings of this study will be useful to bank executives and policymakers in formulating appropriate methods for ensuring enough liquidity in banks. This will be useful in establishing a liquidity risk management policy to deal with future uncertainties. As a result, the economy will be able to achieve long-term growth and development.

8. LIMITATIONS AND FUTURE RESEARCH SCOPE

Only 18 scheduled commercial banks, all of which are private sector banks, were considered in this study.

In the future, research might focus on all scheduled commercial banks, i.e., all public sector banks, taking into account all bank-specific characteristics to get a holistic perspective of the overall effect of bank-specific factors on the banks' liquidity risk.

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