STRATEGIC FINANCIAL MODELS FOR LIQUIDITY ANALYSIS OF PUBLIC SECTOR BANKS IN INDIA

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ABSTRACT

Liquidity is a measure of the ability and ease with which assets can be converted to cash. Liquid assets are those that can be converted to cash quickly if needed to meet financial obligations; examples of liquid assets generally include cash, central bank reserves, and government debt. To remain viable, a financial institution must have enough liquid assets to meet its near-term obligations, such as withdrawals by depositors.

KEYWORDS: *Liquidity, Liquid Assets, Government Debt, Current Assets.*
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Introduction

Capital and liquidity are distinct but related concepts. Each plays an essential role in understanding a bank's viability and solvency. Liquidity of a bank implies its ability to meet current liabilities within a year from it's current assets. For a bank, current assets include cash in bank, balances with RBI and other Banks. Current liabilities include deposits in current accounts and overdue term deposit accounts. Banks do have much liquidity with them as they get regular deposit from public. In case of need, they borrow from RBI or call money markets at a higher rate of interests for short term requirements. Banks' liquidity is affected if NPA increases. If NPA rises, they cannot recover their interest income as borrowers don't pay interests and instalments. So to improve liquidity banks should make regular efforts to reduce bad debt and mobilise additional resources.

Classification of Liquidity

Liquidity refers to the availability of cash and the capacity of a firm to convert its current assets into cash easily and immediately without significant loss. No firm keeps its entire available cash in the form of cash. The reason is that idle cash is not productive unless invested in an interest bearing security or deposits. But such deposits should be such that they can be converted into cash easily and immediately so that liquidity is maintained.

Cash Balance in Account

This is the highest form of liquidity but which earns no interest for the simple reason that it is not a deposit kept for a specific period. On an average, companies maintain at least five percent of their total assets as cash balance. But this percentage depends upon the nature of business. If the nature of business is cash oriented, some companies may even maintain up to twenty percent of their total assets as cash balance in account. Examples of such companies are trading and financial enterprises mainly banks, whose business itself are dealing with cash. Manufacturing companies also require more cash especially if their operating cycle is more. Generally, service-oriented companies require fewer amounts of cash.

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The various types of liquidity methods are:

- **Overdraft Arrangement with Banks**

This type of facility is available for businesses with current account. The amounts lying idle in current account do not earn any interest. Upon negotiation with the bank and depending upon the business credentials, 'overdraft limit' is fixed by the banks. At any point of time, the business or company cannot borrow or make payment above the fixed limit. Moreover, the overdraft availed is repayable on demand by the bank. In some cases, depending upon the size of the overdraft facility, banks may require companies to keep a security against it.

- **Marketable Securities**

Marketable securities are short-term investment instruments to obtain a return on temporarily idle funds. The basic characteristics of marketable securities affect the degree of their liquidity or marketability. To be liquid, a security must have two basic characteristics: a ready market and safety of principal. Ready marketability minimizes the amount of time required to convert a security into cash. The second determinant of liquidity is that there should be little or no loss in the value of marketable security over time. Only those securities that can be easily converted into cash without any reduction in the principal amount qualify for short-term investments. So, they earn a lower return as the fear of losing the principal is very less. For selecting a proper marketable security, the financial manager should consider the following factors:

- Financial/default risk
- Interest rate risk
- Taxability
- Liquidity
- Yield

Treasury bills, units, bankers' acceptances etc., are common forms of marketable securities.

- **Factoring**

Factoring is a method of using receivables for financing. In this case, the accounts receivables serve as security for the financing made by the bank/factor. Factoring is the outright sale of accounts receivable to a bank or finance company without recourse. The advantages of factoring in this context are that it offers immediate cash and thus helps in liquidity and it allows for receipt of advances as required on a seasonal basis and it strengthens the company's balance sheet position.

- **Inter-Company Deposits**

They are short-term deposits with other companies and are a fairly attractive form of investment of short-term funds in terms of rate of return. But these kinds of deposits generally require a month's time for conversion into cash and hence have to be planned in advance for meeting any short-term obligation.

- **Money Market Mutual Funds /Liquid funds**

Though these come under marketable securities, they can be considered and dealt with separately, being highly liquid. Money market mutual funds are professionally managed portfolios of marketable securities, which provide instant liquidity. These funds have achieved significant growth due to their competitive yields and high liquidity. After considering all the significant factors for investment, a company may choose an appropriate liquidity mix.

Liquidity Ratios

Following ratios have been analysed to ascertain liquidity of the banks under study.

- **Liquid Assets to Total Assets**

Liquid assets as a percentage of total assets is another measure of liquidity which is widely used in research. This measure of liquidity indicates the percentage of a bank's total assets in liquid form. Higher the percentage better is the liquidity and vice versa.

Formula:

$$\text{Liquid Assets to Total Assets Ratio} = \frac{Liquid\ Assets}{Total\ Assets} \times 100$$

Table 1 shows the percentage of liquid assets of total assets of the selected banks for the period from 2013-14 to 2017-18:

Table 1: Liquid Assets to Total Assets Ratio of the PSBs under Study (2013-14 to 2017-18)

(Ratio in Percent)

Year	SBI	PNB	CBI	OBC
2013-14	7.40	8.24	19.81	9.21
2014-15	8.54	9.29	20.57	8.69
2015-16	7.41	11.08	19.94	10.36
2016-17	8.47	10.31	19.34	11.57
2017-18	9.63	11.68	21.16	12.46
Average	8.29	10.12	20.16	10.46
S.D.	0.93	1.38	0.71	1.58
C.V. (%)	11.21	13.63	3.51	15.07

Source: Computed from Annual Reports and Accounts of the Banks for the period from 2013-14 to 2017-18.

PSB: Public Sector Banks
PNB: Punjab National Bank
OBC: Oriental Bank of Commerce
SBI: State Bank of India
CBI: Central Bank of India
SD: Standard Deviation

As can be seen from Table 1, the liquid assets to total assets ratio for SBI had an increasing trend for the period under study except in the year 2015-16. In 2013-14, the ratio was 7.40 percent (lowest) which reached up to 8.54 percent in 2014-15. Then, it decreased and came down to 7.41 percent in the year 2015-16 but after that, it increased again to 8.47 percent in the year 2016-17 and went up to 9.63 percent (highest) in the final year 2017-18.

For PNB, the liquid assets to total assets ratio had an increasing trend for the period under study except in the year 2016-17. In 2013-14, the ratio was 8.24 percent (lowest) which increased to 9.29 percent in 2014-15 and reached up to 11.08 percent in 2015-16. Then, it decreased and came down to 10.31 percent in the year 2016-17 and reached up to 11.68 percent (highest) in the final year 2017-18.

For CBI, the ratio had a fluctuating trend for the period under study. In 2013-14, the ratio was 19.81 percent which increased to 20.57 percent in 2014-15 but decreased to 19.94 percent in 2015-16 and further came down to 19.34 percent in the year 2016-17. Finally it increased sharply and reached to 21.16 percent (highest) in the year 2017-18.

For OBC, the ratio had an increasing trend for the period under study except in the year 2014-15. In 2013-14, the ratio was 9.21 percent which decreased to 8.69 percent in 2014-15 but after that, it increased to 10.36 percent in 2015-16, 11.57 percent in the year 2016-17 and finally reached up to 12.46 percent (highest) in the year 2017-18.

The average ratio was highest for CBI at 20.16 percent followed by OBC at 10.46 percent, PNB at 10.12 percent and lowest for SBI at 8.29 percent which indicate that CBI had huge quantity of liquid assets and other banks were far behind from it during the period under study. Standard deviation and coefficient of variation were moderate for all the public sector banks under study which indicate low fluctuations and good consistency of the liquidity ratio.

Statistical Analysis: F-test

Following hypothesis has been tested for the ratio:

H_0: There is no significant difference between liquid assets to total assets ratio of the banks under study.

H_1: There is significant difference between liquid assets to total assets ratio of the banks under study.

Table 2 shows one way ANOVA statistics computed for the ratio of banks for the period from 2013-14 to 2017-18.

Table 2: One Way ANOVA for Liquid Assets to Total Assets Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F_c	F_t
Between Sample	429.9524	3	143.3175	99.3570	3.24
Within Sample	23.0792	16	1.4425		
Total	453.0316	19			

Decision: "F" test indicates that the calculated value of F = 99.3570 and tabular value of F = 3.24 at 5% level of significance. As the calculated value of F is more than table value of F the null hypothesis has been rejected and alternative hypothesis has been accepted. It means there is significant difference between liquid assets to total assets ratio of the banks under study.

- **Liquid Assets to Total Deposits**

The liquid assets to total deposits ratio measures the liquidity available in proportion to the total deposits of a bank. This ratio is determined using following formula

Formula:

$$\text{Liquid Assets to Total Deposits Ratio} = \frac{Liquid\ Assets}{Total\ Deposits} \times 100$$

In this formula, liquid assets include:

- Cash in hand, balances with RBI, balances with others banks in India and outside India, money at call on short notice; whereas
- Total deposits include demand deposits, savings deposits, term deposits and other deposits.

Liquid assets as a percentage of total deposits of the selected banks for the period 2013-14 to 2017-18 are shown in the Table 3.

Table 3: Liquid Assets to Total Deposits Ratio of the PSBs under Study (2013-14 to 2017-18)

(Ratio in Percent)

Year	SBI	PNB	CBI	OBC
2013-14	9.51	10.02	13.00	11.65
2014-15	11.09	11.15	14.02	12.26
2015-16	9.67	13.31	15.32	12.82
2016-17	10.31	13.50	16.67	13.61
2017-18	11.55	14.93	18.02	14.75
Average	10.43	12.58	15.41	13.02
S.D.	0.88	1.97	2.01	1.21
C.V. (%)	8.48	15.64	13.04	9.27

Source: Computed from Annual Reports and Accounts of the Banks for the period from 2013-14 to 2017-18.

As can be seen from Table 3, the liquid assets to total deposits ratio for SBI had an increasing trend for the period under study except in the year 2015-16. In 2013-14, the ratio was 9.51 percent (lowest) which reached up to 11.09 percent in 2014-15. Then, it decreased and came down to 9.67 percent in the year 2015-16 but after that, it increased again to 10.31 percent in the year 2016-17 and went up to 11.55 percent (highest) in the final year 2017-18.

For PNB, the liquid assets to total assets ratio had an increasing trend for the period under study. In 2013-14, the ratio was 10.02 percent (lowest) which increased to 11.15 percent in 2014-15, 13.31 percent in 2015-16, 13.50 percent in the year 2016-17 and reached up to 14.93 percent (highest) in the final year 2017-18.

For CBI, the ratio had an increasing trend for the period under study. In 2013-14, the ratio was 13.00 percent (lowest) which increased to 14.02 percent in 2014-15, 15.32 percent in 2015-16, 16.67 percent in the year 2016-17 and reached up to 18.02 percent (highest) in the final year 2017-18.

For OBC, the ratio had an increasing trend for the period under study as well. In 2013-14, the ratio was 11.65 percent (lowest) which increased to 12.26 percent in 2014-15, 12.82 percent in 2015-16, 13.61 percent in the year 2016-17 and reached up to 14.75 percent (highest) in the final year 2017-18.

The average ratio was highest for CBI at 15.41 percent followed by OBC at 13.02 percent, PNB at 12.58 percent and lowest for SBI at 10.43 percent which indicate that CBI had highest percent of liquid assets and other banks having lower liquid assets in comparison to total deposits during the period under study. Standard deviation and coefficient of variation were moderate for all the public sector banks for the period under study which indicate low fluctuations and good consistency of this liquidity ratio.

Statistical Analysis: F-test

Following hypothesis has been tested for the ratio:

H_0:   There is no significant difference between liquid assets to total deposits ratio of the banks under study.

H_1:   There is significant difference between liquid assets to total deposits ratio of the banks under study.

Table 4 shows one way ANOVA statistics computed for the ratio of banks for the period from 2013-14 to 2017-18.

Table 4: One Way ANOVA for Liquid Assets to Total Deposits Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F_c	F_t
Between Sample	62.5570	3	20.8523	8.2100	3.24
Within Sample	40.6380	16	2.5399		
Total	103.1950	19			

Decision: "F" test indicates that the calculated value of F = 8.2100 and tabular value of F = 3.24 at 5% level of significance. As the calculated value of F is more than table value of F, the null hypothesis has been rejected and alternative hypothesis has been accepted. It means there is a significant difference between liquid assets to total deposits ratio of the banks under study.

- **Liquid Assets to Demand Deposits**

Liquid asset as a percentage of demand deposits is one of the most important measures of the liquidity position of a bank. This ratio measures the ability of a bank to meet the demand for withdrawal of cash from demand deposits in a particular year. It is determined by dividing liquid assets from total demand deposits. Liquid assets include cash in hand, balances with RBI, balances with banks in India and outside India, money at call on short notice. Higher this ratio better is the liquidity position of the bank and vice versa.

Table 5 shows the liquid assets as a percentage of demand deposits of the selected banks for the period from 2013-14 to 2017-18.

Table 5: Liquid Assets to Demand Deposits Ratio of the PSBs under Study (2013-14 to 2017-18)

(Ratio in Percent)

Year	SBI	PNB	CBI	OBC
2013-14	117.06	143.55	161.49	152.64
2014-15	140.37	166.56	180.98	145.09
2015-16	119.78	203.62	186.67	186.14
2016-17	128.96	210.03	201.70	190.15
2017-18	141.90	229.38	209.36	213.09
Average	129.61	190.63	188.04	177.42
S.D.	11.42	34.79	18.69	28.15
C.V. (%)	8.80	18.25	9.94	15.86

Source: Computed from Annual Reports and Accounts of the Banks for the period from 2013-14 to 2017-18.

As shown in Table 5, the liquid assets to demand deposits ratio for SBI had an increasing trend during the study period except in the year 2015-16. Initially in 2013-14, it was 117.06 percent in 2013-14 and increased to 140.37 percent in 2014-15. Then, it came down to 119.78 percent in 2015-16 but increased again to 128.96 percent in 2016-17 and further inclined up to 141.90 percent (highest) in the final year 2017-18.

For PNB, the liquid assets to demand deposits ratio had an increasing trend for the period under study. In 2013-14, the ratio was 143.55 percent (lowest) which increased to 166.56 percent in 2014-15, 203.62 percent in 2015-16, 210.03 percent in the year 2016-17 and reached up to 229.38 percent (highest) in the final year 2017-18.

For CBI, the ratio had an increasing trend for the period under study. In 2013-14, the ratio was 161.49 percent (lowest) which increased to 180.98 percent in 2014-15, 186.67 percent in 2015-16, 201.70 percent in the year 2016-17 and reached up to 209.36 percent (highest) in the final year 2017-18.

For OBC, the ratio had an increasing trend for the period under study except in the year 2014-15. In 2013-14, the ratio was 152.64 percent which decreased to 145.09 percent (lowest) in 2014-15 but then in creased to 186.14 percent in 2015-16, 190.15 percent in the year 2016-17 and reached up to 213.09 percent (highest) in the final year 2017-18.

The average ratio was highest for PNB at 190.63 percent followed by CBI at 188.04 percent, OBC at 177.42 percent and lowest for SBI at 129.61 percent which indicate that CBI had highest percent of liquid assets and other banks having somewhat lesser liquid assets during the period under study. Standard deviation and coefficient of variation were moderate for all the public sector banks for the period under study which indicate low fluctuations and good consistency of this liquidity ratio.

Statistical Analysis: F-test

Following hypothesis has been tested for the ratio:

H_0:   There is no significant difference between liquid assets to demand deposits ratio of the banks under study.

H_1:   There is significant difference between liquid assets to demand deposits ratio of the banks under study.

Table 6 shows one way ANOVA statistics computed for the ratio of banks for the period from 2013-14 to 2017-18.

Table 6: One Way ANOVA for Liquid Assets to Demand Deposits Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F_c	F_t
Between Sample	12146.6225	3	4048.8742	6.5239	3.24
Within Sample	9929.9964	16	620.6248		
Total	22076.6189	19			

Decision: "F" test indicates that the calculated value of F = 6.5239 and tabular value of F = 3.24 at 5% level of significance. As the calculated value of F is more than table value of F the null hypothesis has been rejected and alternative hypothesis has been accepted. It means there is significant difference between liquid assets to demand deposits ratio of the banks under study.

- **Composite Liquidity**

Now, according to the average of different ratios calculated to ascertain liquidity of the public sector banks under study, ranks have been given in Table 7. This table shows the average values and ranks of the selected banks relating to different measures of liquidity.

Table 7: Rank of the selected Public Sector Banks under different measures of Liquidity

Particulars	Mean LA to TA (%)	Rank	Mean LA to TD (%)	Rank	Mean LA to DD (%)	Rank
SBI	8.29	4	10.43	4	129.61	4
PNB	10.12	3	12.58	3	190.63	1
CBI	20.16	1	15.41	1	188.04	2
OBC	10.46	2	13.02	2	177.42	3

Source: Tables 1, 3 and 5.
LA = Liquid Assets, TA = Total Assets, TD = Total Deposits, DD = Demand Deposits

Table 7 shows the ranks of the selected banks according to different measures of liquidity. It can be observed from this Table that out of three measures of liquidity, all the selected PSBs performed siginficantly different in different parameters.

Table 7 showed that out of the four public sector banks under study, the mean liquid assets to total assets ratio of CBI is the highest which is computed at 20.16 percent and the bank occupies 1st rank, followed by OBC at 10.46 percent and PNB at 10.12 percent while the average liquid assets to total assets ratio in SBI is lowest (8.29 percent) and is given the fourth rank.

The mean liquid assets to total deposits ratio of CBI is highest which is computed at 15.41 percent and the bank occupies 1st rank, followed by OBC at 13.02 percent and PNB at 12.58 percent while the average in SBI is lowest (10.43 percent) and is occupied the last rank.

From Table 7, it can be seen that amongst the four selected PSBs, the average liquid assets to demand deposits ratio of PNB is the highest which is computed at 190.63 percent and the bank occupies 1st rank position, followed by CBI (188.04 percent) second, OBC (177.42 percent) third rank while the average ratio in SBI is lowest (129.61 percent) and is given the fourth rank.

Out of these public sector banks under study, CBI showed best performance in all three ratio parameters of liquidity analysis followed by OBC in all three parameters as well which clearly indicate that according to this analysis, both these banks showed better liquidity during the period under study. PNB and SBI remained at lower end as far as liquidity is concerned.

Now, to look at the overall rank of the banks in liquidity, for assigning final rank, firstly, all the ranks occupied by individual bank based on mean values of four measures, first rank is given to the bank whose total score is the lowest, then the second lowest one and so on as given in Table 8.

Table 8: Composite Rank and Final Rank of the selected PSBs based on different measures of Liquidity

Bank	Rank in Mean			Composite Rank	Final Rank
	LA to TA (%)	Mean LA to TD (%)	Mean LA to DD (%)		
SBI	4	4	4	12	3
PNB	3	3	1	7	2
CBI	1	1	2	4	1
OBC	2	2	3	7	2

Source: Table 7

From the Table 8, on the basis of the composite score or composite rank, the Central Bank of India (CBI) has been given the 1st rank position for occupying the lowest composite score of 4. PNB and OBC equally gave the 2nd rank position for the second lowest composite rank total of 7 each. In the case of State Bank of India (SBI), the third rank is computed at composite score 12 for liquidity analysis.

Overall Ranking

CAMEL model is used to rating the banks according to their performance. An analysis has been made by computing mean rank and overall rank of the banks under study. Here mean rank has been computed as the average of final ranks obtained by each bank on the basis of ratios under different measures of CAMEL Rating Model and then overall rank has been assigned to the banks based on their mean ranks on the rationale of assigning highest overall rank based on least mean rank. There are 5 alphabets in the word CAMEL which stand for as follows:

C: Capital Adequacy
A: Assets Management
M: Management Quality
E: Earning Quality
L: Liquidity

Overall ranking as shown in table 8 provides necessary data for L i.e. liquidity but for first 4 alphabets separate study is required.

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