

# An Empirical Assessment on Liquidity Management of Indian Public Sector Banks

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## Abstract

Banking sector is accepted as the main motivator in socio-economic upgradation of any country especially developing one like India. Commercial banks, specially their public domain, introduce the assistance programme to society under the portfolio of commercialisation and socialisation. Public sector banks play a pivotal role in framing the socio-economic development of our country by including all financially excluded poor populace at soft terms and conditions under their purview. But in this very effort, the said banks have to face extreme pressure due to lesser amount of deposit than advance, wilful default etc. which may have high impact on their liquidity position and thus would force them to face sustainability crisis in its professional field of activity. Therefore, to carry on a smooth operation in competitive environment, public sector banks would have to maintain a steady flow of liquidity which can be judged through some basic financial ratios.

The present paper aims at (i) assessing the consistent position of the public sector banks (listed in BSE 23.06.2016) in liquidity aspects during the period 1999-2000 to 2015-2016, (ii) making a bank-bank, bank-group (size of bank), and bank-sector comparative analysis on the liquidity position throughout the specific period, and (iii) examining any difference between and within at least two selected banks on liquidity aspects by applying some relevant statistical tools and techniques.

**Keywords:** Public Sector, Commercial Bank, Liquidity

**JEL:** G21

## 1. Introduction

Banking institution is considered to be the most vibrant and significant performer in financial system of any country with socio-economic progression through varied courses of financial and non-financial operations<sup>1</sup>. Amongst the variant dimensions of banks, in India, the commercial banks play the most pivotal role in shaping country's socio-economic progression within the bracket of commercialisation and socialisation. This progressive attitude of commercial banks are found to be more effective in the hands of public sector banks which aim at energising country's socio-economic promotion by channelising surplus funds to the neediest of the society at reasonable terms and conditions. All these movements of public sector banks thus invite inclusive growth<sup>2</sup> in economic structure of our country where irrespective of income-class, standard of living, poorest of the poor of the society can avail of banking facilities. This approach of public sector banks, to make unbanked as banked, offers it high acceptance in general public but simultaneously

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<sup>1</sup> In Indian scenario, 63 per cent of the share of financial market is held by Banks, Dr. D. Subbarao, the Ex-governor of the RBI in FICCI-IBA Conference in Mumbai on August, 2013.

<sup>2</sup> Inclusive growth is a concept that advances equitable opportunities for economic participants during economic growth with benefits incurred by every section of society. It implies direct linkage between the macroeconomic and microeconomic determinants of the economy and economic growth.

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forces the sector to face extreme pressure on their financial stability specially on their liquidity position. Moreover, the excess of advance than deposit amount, wilful default etc. invite sustainability and credibility crisis in their professional field of activities. In this very context, the public sector banks would have to build up a consistent liquidity position in different areas, as tested through some basic financial ratios mainly related to the asset-liability combination with due respect to their size based on asset bases, number of bank branches, customers, employees etc.

The remaining parts of the study are found in eight more sections. Second and third sections deal respectively with the review of the existing literature and research gap. Fourth section states the objectives of the present study and fifth section is concerned with the overview of liquidity in commercial banks in India. In sixth section, the methodology adopted in the study is narrated. Seventh section analyses and interprets the liquidity position in public sector banks. Eighth and ninth sections respectively present conclusion derived from the study and limitations of the study.

## 2. Review of Related Literature

The public sector banks may obtain main focal points in Indian economy for their notable socio-economic contribution towards growth and prosperity of the country. In this background, numerous eminent academicians and researchers have explored their studies to analyse the financial status of the very sector in different dimensions.

In evaluating financial performance of any organisation including financial institutions like banks, ratios would be taken as the main indicators of financial health with proper focus on the assessment of credit growth, credit concentration, liquidity gap etc. (Madhura, 2009; Payne, 2011; James, 2013; Karim & Alam, 2013). Karim & Alam (2013) in this context, categorised the measurement areas of financial health of commercial banks under – internal based, market based, and economic based following ROA, Tobin's Q model, and economic value added.

In this regard, the over the year performance of the ratios in banking sector in varied financial context like productivity, liquidity, managerial efficiency, diversification of business, economic growth, and most significantly market competition/ concentration would be influenced mainly by the size of banks depending on asset size, bank branches etc. along with other factors like type of banks, banking sector penetration, employees, deposit-advances per customer, non-performing assets, age, and ownership pattern of the banking sector (Arora, 2010;

Kundal, 2012; Riaz & Mehar, 2013; Goel & Rekhi, 2013; Najjar, 2013; Hughes & Mester, 2013; Thirunavukkarasu & Nachimuthu, 2015). Besides, the total credit, savings deposit, priority sector advances would also be considered as significant for financial performance measurement (Ibrahim, 2011; Walia & Kaur, 2015; Paul, 2015). Asset quality here might also have high impact on the profitability as well as the liquidity level of a banking institution (Goel & Rekhi, 2013). In this issue, profitability and liquidity could find its measurement criteria from the proportion of current assets to total deposit or total asset used in the sector (Najjar, 2013; Hughes & Mester, 2013).

In all these issues, though public sector banks would get appreciation for their promising performance in motivating country's socio-economic growth more than that of the other banking sectors (private and foreign etc.) (Nandi, 2013), they could find themselves still lagging behind the private and foreign banks mainly for lack or degraded professionalism in utilising assets in dealing with customers and also for huge burden of non-performing assets (Gowri & Ramya, 2013; Das, 2014; Gupta & Kaur, 2014; Gupta & Aggarwal, 2015; Padake & Soni, 2015). All these matters ultimately would disturb the asset-liability balance i.e. balance in deposit and advance. This would ultimately violate the consistent liquidity position of public sector banks and would break the synchronisation of liquidity with profitability aspects at optimum level (Adebayo, David, & Samuel, 2011; Goel & Rekhi, 2013; Das, Chowdhury, Rahman, & Dey, 2015).

## 3. Research Gap

From the literature so far reviewed, it can be detected that no study was conducted on all public sector banks en-bloc (listed in stock exchange) to have an idea on the status of liquidity of overall banking sector. Accordingly, no comparative assessment was generated on the performances of banks in liquidity aspect as per their size. From this perspective, to fill up the gap, the present study has been structured where all the listed public sector banks (Bombay Stock Exchange, 23.06.2016) have been taken to measure the liquidity positions of all concerned banks under the sector.

## 4. Objectives of the Present Study

The present study aims at

- (i) evaluating the liquidity position of all public sector banks in India as listed in Bombay Stock Exchange, (23.06.2016) for 17 consecutive financial years (1999-2000 to 2015-2016) with some selected ratios,

- (ii) assessing the comprehensive scores on average and consistent position of liquidity of all public sector banks on the selected ratios,
- (iii) framing a bank-bank, bank-group (on size), and bank-sector (whole public sector banks) comparative assessment on liquidity position of the selected ratios during the study period,
- (iv) examining whether there is any difference in the liquidity position of the any of two banks under whole group as per the concerned ratios.

## 5. Liquidity in Commercial Banks in India – An Overview

Since the very inception of journey in 18<sup>th</sup> century, Indian banking system is experiencing revolutionary changes in its norms and structure as observed in different phases like nationalisation and consolidation era (1955-1990), Indian financial and banking sector reforms and partial liberalisation (1990-2004), and period of increased liberalisation (2004 onwards). Indian banks in this context have engaged itself in retail banking (individual or small business), wholesale banking (corporate), treasury operations (investment in debt market, equity market, mutual funds, derivative trading), and para banking business (hire purchase, leasing, merchant banking, factories etc.) with an aim at fulfilling its progressive movement towards country's inclusive economic growth prospect. In this very issue, scheduled<sup>3</sup> banks would specially be mentionable among which the commercial banks holding public sector banks, private sector banks<sup>4</sup>,

foreign banks, and regional rural banks are claimed to be the main pathfinders in socio-economic prosperity of our country. The sector is highly appreciated for its high levels of savings deposit, deployment of credit, and investment to all sectors<sup>5</sup>. In this context, though both the public and private sector banks accompany in country's social progression with due respect with commercialisation and socialisation, the former i.e. public sector banks are regarded as the main way to achieve the socio-economic inclusion for all the financially excluded poor of our country (Nandi, 2013). In Indian financial landscape, public sector banks hold 75 per cent of total banking sector (RBI, 2012-2013). The sector aims at preventing the country from the concentration of wealth and economic power, fulfilling different needs of the priority sectors, mobilising savings from all parts of the country, connecting the whole nation into one string and generating employment, rural development, national income, government revenue, capital formation, foreign exchange earnings, infrastructure development, social development etc.

But due to lack of fresh capital injection, non-proactive assessment, ageing workforce etc., public sector banks have to face sustainable challenges in their operations. All these issues are being aggravated with the entry of privatisation in banking sector in response to the reformation in Indian economy with an attempt to curb Government protectionism. The lesser competitiveness of public sector banks can also be reflected in their financial statements where huge amount of non-performing assets (NPA) in comparison with the private sector commercial banks are detected (Economic Times, 2016)<sup>6</sup>. Therefore, all the commercial banks should maintain progressive provisions of the RBI, following maintenance of basic requirement of minimum asset-liabilities standard. RBI,

<sup>3</sup> In India, the banking structure contains a very negligible number of non-scheduled banks also, which sometimes lose their legal status in absence of legislative banking activities. Scheduled banks contain commercial and cooperative banks (rural and urban).

<sup>4</sup> In Public Sector Banks, SBI, its associates (SBI of Bikaner & Jaipur, SBI of Hyderabad, SBI of Mysore, SBI of Patiala, SBI of Travancore); Nationalised Banks (Allahabad, Andhra, Bank of India, Bank of Baroda, PNB, UCO, UBI, United Bank etc.); Other Public Banks (Industrial Development Bank of India and Bharatiya Mahila Bank) are found. In Private Sector Banks, Axis Bank, Development Credit Bank Ltd., HDFC Bank, ICICI Bank, IndusInd Bank, Kotak Mhindra Bank, Yes Bank are considered as new ones (set up in 1993). Apart IDFC, Bandhan Bank of Bandhan Financial Services have also received 'in principle' licenses from the RBI

<sup>5</sup> Commercial banks performance in India – (i) aggregate deposit by Rs.67504.54 billion (demand deposit Rs.6622.9 billion and time deposit Rs.60881.55 billion), (ii) credit deployed Rs.52604.59 Billion, (iv) Investment Rs. 20061.05 Billion, (v) priority sector lending Rs.16411.00 Billion (RBI, 2013)

<sup>6</sup> Net profit in public sector and private sector are respectively found as for Rs.17465 crore and Rs.19787 crore. The NPA in public sector and private sector are respectively for Rs.33634.7 crore and 317312.8 crore (Economic Time, 2016).

in this regard, shapes out the liquidity management in banking sector which aims at achieving two specific objectives – need to supply/withdraw short-term liquidity from the market to cover up the seasonal and frictional liquidity and need to supply durable liquidity in the economy to facilitate growth (Ghosh, 2016). Hence, to ensure a steady liquidity position in banking sector, RBI has considered open mouth operation (a speculative measure to influence interest rate and inflation through sale/purchase of treasury bonds) and has released liquidity. RBI eases the liquidity rule as per the requests of the leading commercial banks in India and releases Rs.2.81 crore for lending (Economic Times, 2016). But in emerging economy, as liquidity is influenced by a combination of autonomous and discretionary factors foreign exchange flows (volatile), liquidity forecasting seems to be a cumbersome process (Ghosh, 2016).

## 6. Methodology of the Present Study

### 6.1. Type of Study

Methodology followed in the present study is predominantly an empirical one.

### 6.2. Method of Data Collection

Data of the present study here have been collected exclusively from secondary sources mainly from ‘Capitaline Database’.

### 6.3. Period of Study

Seventeen consecutive financial years (1999-2000 to 2015-2016) have been taken for the study period.

### 6.4. Variables Studied

The study has taken its focus on all 23 public sector banks listed in BSE (23.06.2016).

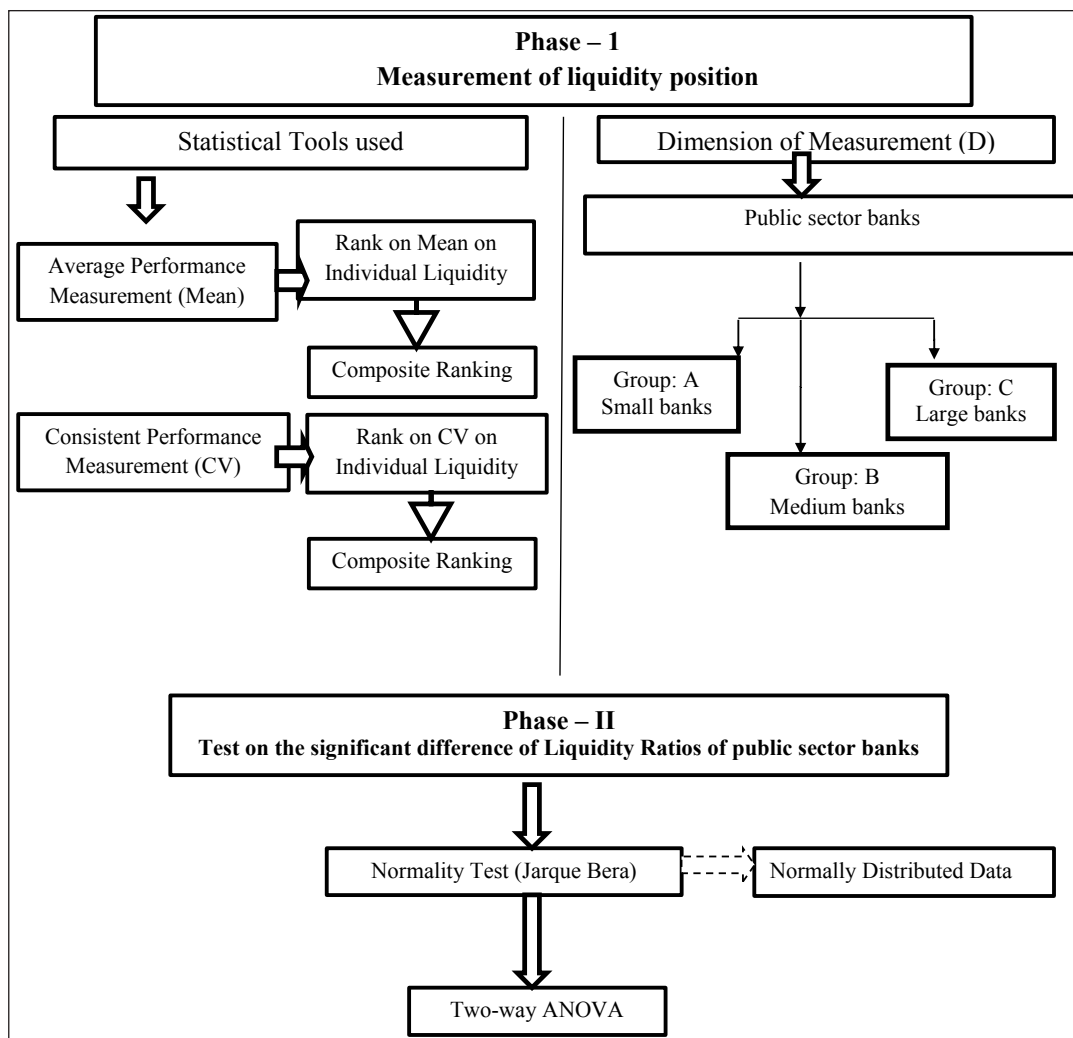
## 6.5. Research Models

To analyse the liquidity position of the concerned banks, data on three basic liquidity related ratios like (a) cash/total deposit (C/TD), (b) cash/ total asset (C/TA), and (c) loan/ total deposit (L/TD)<sup>7</sup> have been collected from published annual reports of the concerned banks for 17 consecutive financial years from 1999-2000 to 2015-16 as disclosed in the said database.

The present study has been framed under two phases (Fig. 1). Phase I has considered the issues of measurement of liquidity position under one dimension (D)-public sector banks wherein three groups have been considered for measurement purpose like group A - small banks, group B - medium banks, and group C - large banks. The categorisation of the banks is done on the basis of asset size of the concerned banks. The maximum asset is possessed by SBI (Rs. 953211.40) and the minimum asset is possessed by SB of Mysore (Rs. 42505.72). The total variation of assets (i.e. range) is calculated as (max-min) Rs. 910705.70. Then the groups are formed by distributing the assets equally maintaining the group limits<sup>8</sup>.

<sup>7</sup> These ratios have been selected as per the research output of several researchers (Najjar, 2013; Hughes & Mester, 2013). Cash/ total deposit (C/TD)\*100: This ratio indicates the percentage of cash (liquid asset) maintained against deposit liability to banks. Higher the ratio, better will be the liquidity position of the bank i.e. adequacy of cash in handling of deposit and higher will be the rank. Cash/ total asset (C/TA) \*100: This ratio indicates the percentage of cash (liquid asset) against the total assets. Higher the ratio, better will be the liquidity position of the bank i.e. more liquid asset out of the total assets in handling operation and higher will be the rank. Loan to total deposit (L/TD)\*100: This ratio indicates the percentage of loan against the total deposit. Higher the ratio, worse will be the liquidity position of the bank i.e. lesser amounts are preserved to customer demand and time deposit and higher amounts are used for loan. Therefore, higher the ratio, lower will the rank of the banks.

<sup>8</sup> Small size banks possess assets from Rs. 42505.72 to Rs. 346074.30; medium size banks have assets ranging from Rs. 346074.31 to Rs. 649642.80; large size banks possess assets from Rs. 649642.81 to Rs. 953211.40.



**Fig. 1: Route Map of the Present Study**

On this basis, under small banks, the study has clubbed 10 banks (SB of Mysore, SB of Bikaner & Jaipur, Andhra Bank, United Bank of India, Bank of Maharashtra, Corporation Bank, Dena Bank, Indian Bank, Punjab and Sind Bank, and Vijaya Bank), under medium banks, it has taken 8 banks (Allahabad Bank, Oriental Bank, UCO Bank, Syndicate Bank, Indian Overseas Bank, Central Bank of India, Union Bank of India, and Industrial Development Bank of India), and under large banks, the study has considered only 5 banks (State Bank of India, Punjab National Bank, Bank of Baroda, Bank of India, and Canara Bank) under its purview.

In Phase II, the present study has taken its attempt to test whether among the listed public sector banks, at least two banks significantly differ on their liquidity positions as measured through liquidity ratios.

### 6.6. Statistical Tools and Hypotheses

To make a comparative assessment on ratio-wise (C/TD, C/TA, and L/TD) performances of the banks under study, individual rank has been assigned to each bank for their over the study period average and consistent performances. After this attempt, a composite rank i.e. the summation of the ranks of the banks for all the ratios has been allotted to determine the comprehensive score of overall liquidity position of each bank (Sur *et al.*, 2013; 2014). This effort has been made for both the average (mean) and consistent (CV) performances of all the banks over the year under study.

In Phase II, the present study has been continued with the application of two-way ANOVA test statistic to each

liquidity ratio. But, before this application, it is highly recommended to test the normality of time series data. Here, the normality test has been conducted by Jarque-Bera (JB) test statistic. ANOVA can only be tested on the normal time series data.

The general model of Jarque-Bera test and two-way ANOVA can be depicted as under.

### 6.6.1. Test for Normality: Jarque-Bera Test

$$JB = n \left[ \frac{S^2}{6} + \frac{(K-3)^2}{24} \right] \quad (1)$$

where n= number of observations, S = skewness, K= kurtosis

For a normal distribution, the values of S and K should be 0 and 3 respectively so that JB becomes equal to 0. A high value of JB is an indicator of non-normality. In other words, if the p value of the corresponding JB statistic is less than or equal to 0.05 then the data would

be considered non-normal at a significant level of 5 per cent or less.

### 6.6.2. ANOVA (Two-Way): The General Model Can be Written as

$$X_{ij} = \mu + \alpha_i + \beta_j + \varepsilon_{ij} \quad (2)$$

where  $\mu$  denotes the general effect,  $\alpha$  is the effect of i th class according to column factor,  $\beta_j$  is the effect to the j th class according to row factor,  $\varepsilon_{ij}$  is the error component with '0' mean and  $\sigma^2$  variance. Hence, the null hypotheses are

$$H_{01} = (\alpha_1 = \alpha_2 = \dots \alpha_i)$$

$$H_{02} = (\beta_1 = \beta_2 = \dots \beta_r)$$

And alternative hypotheses are

**H<sub>11</sub>**: At least two  $\alpha_i$ 's are different

**H<sub>12</sub>**: At least two  $\beta_j$ 's are different

**Decision rule:**

If  $F_{cal} < F_{table}$ , accept  $H_0$ , else reject  $H_0$ .

**Table 1: General ANOVA Table for Two-Way Classification without Replication**

Source of Variation	Sum of Square	Degree of Freedom	Mean sum of square	F ratio
Between columns(Treatments)	SSC	c-1	MSTR=SSC/c-1	MSTR/MSE
Between Rows (Blocks)	SSB	r-1	MSB=SSB/r-1	MSB/MSE
Residual Error	SSE	(c-1)(r-1)	MSE=SSE/(c-1)(r-1)	

## 7. Liquidity Position in Public Sector Banks in India: Analysis and Interpretation

### 7.1 Phase I: Measurement of Liquidity Position – Dimension (D): Public Sector Banks

#### 7.1.1. Bank-Bank and Bank-Group Comparative Analysis

##### 7.1.1.1. Group A (G<sub>A</sub>): Small banks

**C/TD:** As per the average (mean) value of C/TD throughout the study period (from 1999-2000 to 2015-2016), the SB of Bikaner & Jaipur has been found to hold the highest rank with highest mean (8.968 per cent)

out of 10 public sector banks under this group while the Corporation Bank has shown the worst performance with lowest mean value (2.639 per cent). 80 per cent of the banks under the group i.e. the first 8 banks in this context have been found better than that of the specific average group performance (6.188 per cent) throughout the study period. These banks could maintain the proportion of cash to total deposit adequately throughout the study period even more than the group performance.

Corporation Bank in this context has been found as the most consistent bank in the group in maintaining liquidity position as measured through lowest CV of C/TD (12.697 per cent), followed by Bank of Maharashtra, Dena Bank etc., while Vijaya Bank was detected as the worst in this context with highest CV (33.790 per cent). Only the first

two banks i.e. Corporation Bank and Bank of Maharashtra have been considered more consistent in maintaining C/TD than that of the overall group performance (CV 17.116 per cent). These two banks consistently could maintain their liquid asset in cash related to total deposit throughout the study period even more than that of the combined performance of whole group.

Dena Bank has been found to hold most impressive position in liquidity both in terms of average (2<sup>nd</sup> rank) and consistency (3<sup>rd</sup> rank). In some banks (Corporation Bank, Andhra Bank etc.) the average performances in C/TD did not match with consistent performances (Table 1).

**C/TA:** SB of Bikaner & Jaipur, with highest value of mean (7.308 per cent) has held the best position as per the average performance in C/TA throughout the study period (1999-2000 to 2015-2016) and Dena Bank, Andhra Bank have come thereafter. Punjab and Syndicate Bank with lowest average value (mean 2.374 per cent) has been found as the least performing bank. In this regard, the first seven banks, ranked as per the average performance in the ratio throughout the study period, have been considered as better than the specific group with mean value 5.016 per cent. It means these banks held the proportion of cash on total asset to maintain their liquidity status even more adequately than that of the group performance in this regard.

Based on the consistency in C/TA as measured by CV, Corporation Bank has secured the best rank holding the lowest CV (12.506 per cent) in the group whereas Punjab & Syndicate Bank, Bank of Maharashtra etc. have come thereafter. Vijaya Bank has been proved as the worst consistent bank with highest CV (33.072 per cent). Only the first two banks in this regard have held better consistent position in maintaining cash out of the total assets than that of the group performance (CV 17.009 per cent).

Dena Bank has again contained most impressive position in liquidity as per the average performance (2<sup>nd</sup> rank)

and consistent performance (4<sup>th</sup> rank) in C/TA, though in some banks specially in Corporation Bank and Punjab & Syndicate Bank, the position in average performance in C/TD did not match with that of consistent performance (Table 1).

**L/TD:** As per the average performance, United Bank of India has been detected as the best with lowest mean (54.576%)<sup>9</sup>, followed by Indian Bank and Vijaya Bank. SB of Mysore with highest mean (71.835%) has been detected as the worst performer in the matter of liquidity maintenance through this ratio. The first six banks as per average performance in this ratio could maintain their performance more efficiently even than that of the group performance (64.406 per cent).

In the consistency of the performance of L/TD as confirmed by the respective group during the study period, Corporation Bank has been the best with the lowest CV (11.107 per cent), followed by SB of Mysore, Dena Bank etc. But United Bank of India, in this context has been confirmed as the worst consistent bank with highest CV (24.238 per cent) though was best in average performance throughout the period under the group. The first four banks in consistency respect have crossed the group performance (CV 17.040 per cent) and presented that they were consistently maintaining their position in between external loan payment and customer demand satisfaction.

Dena Bank and Vijaya Bank have again been detected in impressive positions as per the average and consistent performances in L/TD, though in some banks, specially in United Bank of India and SB of Mysore, the position in average performance in L/TD did not match with that of consistent performance (Table 1).

<sup>9</sup> As L/TD holds inverse relationship with liquidity position, higher the ratio means higher is the proportion of loan in relation to total deposit i.e. the Bank loses its liquidity in meeting external demand and is not capable to fulfill customer requirement. Therefore, higher the average value of the ratio means lower the rank and vice versa.

**Table 1: Measurement of Liquidity Position of Group A (Small Banks)**

Small Banks	C/TD					C/TA					L/TD				
	Mean	SD	CV	Rank (Mean)	Rank (CV)	Mean	SD	CV	Rank (Mean)	Rank (CV)	Mean	SD	CV	Rank (Mean)	Rank (CV)
SB of Mysore	6.363	1.643	25.823	8	5	5.265	1.338	25.421	7	6	71.835	9.202	12.809	10	2
SB of Bikaner & Jaipur	8.968	2.132	23.771	1	4	7.308	1.756	24.029	1	5	70.833	12.476	17.614	9	6
Andhra Bank	7.166	1.983	27.677	3	8	6.145	1.717	27.949	3	9	68.506	11.715	17.101	8	5
United Bank of India	6.593	1.810	27.461	5	7	5.843	1.586	27.149	5	8	54.576	13.228	24.238	1	10
Bank of Maharashtra	2.736	0.468	17.115	9	2	2.539	0.435	17.132	8	3	63.616	14.910	23.437	6	9
Corporation Bank	2.639	0.335	12.697	10	1	2.409	0.301	12.506	9	1	66.353	7.370	11.107	7	1
Dena Bank	7.591	1.648	21.714	2	3	6.621	1.487	22.464	2	4	63.038	8.683	13.773	5	3
Indian Bank	6.716	1.747	26.009	4	6	5.893	1.535	26.040	4	7	61.301	12.803	20.885	2	7
Punjab & Syndicate Bank	6.555	1.907	29.096	6	9	2.374	0.341	14.374	10	2	62.419	13.485	21.605	4	8
Vijaya Bank	6.549	2.213	33.790	7	10	5.765	1.907	33.072	6	10	61.585	9.548	15.504	3	4
Group (Small Banks)	6.188	1.059	17.116			5.016	0.853	17.009			64.406	10.974	17.040		

Source: Author's calculation

As L/TD holds inverse relationship with liquidity position, higher the ratio, lower the rank and vice versa.

### 7.1.1.2. Group – B (G<sub>B</sub>): Medium Banks

**C/TD:** As per the mean value of C/TD (1999-2000 to 2015-2016), IDBI has been the best bank with highest average value (12.940 per cent) under this group, followed by Oriental Bank of Commerce, Indian Overseas Bank etc., while UCO Bank with lowest average value (5.836 per cent) has shown the worst performance. Under this group, only IDBI has been detected to hold better position in maintaining cash in relation to total deposit than that of the average performance of the whole group (7.586 per cent).

In consistency, Union Bank of India, followed by Indian Overseas Bank, Allahabad Bank etc. has been considered as the most consistent one with lowest CV (26.804 per cent). IDBI, the best in average performance during the year in the group, has been detected as the worst with highest CV (68.180 per cent). In this regard, only the consistent position of Union Bank of India has been found as better than the whole group consistency (28.716 per cent) i.e. this bank could maintain cash in relation to total deposit more steadily than that of the overall group.

Among the eight banks under the group, Oriental Bank of Commerce, Indian Overseas Bank and Central Bank of India have held significant impressive positions in liquidity both in terms of average and consistency ranks (Table 2).

**C/TA:** Oriental Bank of Commerce, with highest value of mean (6.473 per cent) has held the best position as per the average performance in C/TA throughout the study period (1999-2000 to 2015-2016) and Syndicate Bank, Indian Overseas Bank etc. have come thereafter. IDBI with lowest average value (mean 3.538 per cent) here has been found as the least performing bank. In this regard, the first five banks, ranked as per the average performance in the ratio throughout the study period, have been considered as even better than that of the specific group with mean value 5.620 per cent i.e. these banks held the proportion of cash on total asset to maintain their liquidity status even more adequately than that of the group level.

Based on the consistency in C/TA as measured by CV, Union Bank of India has secured the best rank holding the lowest CV (20.742 per cent) in the group where UCO Bank, Indian Overseas Bank etc. have come thereafter.

IDBI has again been proved as the worst consistent bank with highest CV (56.934 per cent). Only Union Bank of India has held better consistent position in maintaining cash out of the total assets than that of the group performance (CV 21.162 per cent).

Some banks like Indian Overseas Bank, Allahabad Bank etc. have contained impressive positions in liquidity both in average performance and consistent performance in C/TA, while UCO Bank and Syndicate Bank could not maintain proper balance between their average performance and consistent performance (Table 2).

**L/TD:** As per the average performance, Central Bank of India has been detected as the best with lowest mean (10.550 per cent), while IDBI with highest mean (68.044 per cent) has been detected as the worst performer in the matter of liquidity maintenance through this ratio. Only Central Bank of India could maintain its performance

more efficiently than that of the group performance (64.406 per cent) with lower mean value.

In the consistency also, Central Bank of India has been the best with the lowest CV (7.856 per cent), followed by Syndicate Bank, IDBI etc. But Union Bank of India, in this context has been confirmed as the worst consistent bank with highest CV (21.886 per cent) though was the best in average performance throughout the period under the group. Only Central Bank of India has been considered as the efficient in maintaining a balance between loan and customer demand even more than that of the group consistency level (CV 12.607 per cent)..

Beside Central Bank of India, UCO Bank has also maintained proper balance in average and consistent performances in L/TD, though in some banks like Syndicate Bank, Union Bank of India, IDBI, the position in average performance in L/TD did not match with that of consistent performance (Table 2).

**Table 2: Measurement of Liquidity Position of Group B (Medium Banks)**

Medium Banks	C/TD					C/TA					L/TD				
	Mean	SD	CV	Rank (Mean)	Rank (CV)	Mean	SD	CV	Rank (Mean)	Rank (CV)	Mean	SD	CV	Rank (Mean)	Rank (CV)
Allahabad Bank	6.587	1.948	29.573	6	3	5.827	1.802	30.934	5	4	62.642	11.470	18.310	3.5	6.5
Oriental Bank of Commerce	7.384	2.312	31.305	2	4	6.473	2.055	31.742	1	5	62.642	11.470	18.310	3.5	6.5
UCO Bank	5.836	1.857	31.818	8	5	4.922	1.406	28.558	7	2	62.991	10.695	16.978	5	4
Syndicate Bank	7.282	2.403	33.000	4	6	6.383	2.182	34.194	2	6	63.583	9.649	15.176	6	2
Indian Overseas Bank	7.371	2.141	29.049	3	2	6.301	1.945	30.866	3	3	66.993	12.021	17.943	7	5
Central Bank of India	6.886	2.419	35.136	5	7	6.018	2.182	36.265	4	7	10.550	0.829	7.856	1	1
Union Bank of India	6.402	1.716	26.804	7	1	5.496	1.525	20.742	6	1	59.872	13.104	21.886	2	8
IDBI Bank	12.940	8.823	68.180	1	8	3.538	2.015	56.934	8	8	68.044	10.796	15.866	8	3
Group (Medium Banks)	7.586	2.178	28.716			5.620	1.189	21.162			51.741	6.523	12.607		

Source: Author's calculation

As L/TD holds inverse relationship with liquidity position, higher the ratio, lower the rank and vice versa.

### 7.1.1.3. Group – C (G<sub>c</sub>): Large Banks

**C/TD:** SBI has been detected as the best bank with highest average value (6.996 per cent) under this group

during the period under study (1999-2000 to 2015-2016), followed by Bank of India, Bank of Baroda etc., while Canara Bank with lowest average value (2.556 per cent) has shown the worst performance. Under this group, the

first three ranks have been more efficient in maintaining liquidity position through C/TA than that of the group average performance (4.664 per cent).

Canara Bank, in this context, has been considered as the most consistent one with lowest CV (14.397 per cent), followed by Bank of India, Punjab National Bank etc. Bank of Baroda has been detected as the worst in consistency with highest CV (29.956 per cent) in the group. In this regard, only Canara Bank could maintain more consistency in preserving cash in relation to total deposit more than the group performance (17.453 per cent).

Among all banks in the group, only Bank of India and Punjab National Bank have made proper balance between average value and consistent value of C/TD (Table 3).

**C/TA:** Under this group, Punjab National Bank has been detected at the top with highest average value (5.375 per cent) throughout the study period (1999-2000 to 2015-2016). Bank of Baroda with lowest average value (mean 2.583 per cent) here has been found at the last in the group. In this regard, the first three banks, ranked as per the average performance in the ratio throughout the study period, have held the proportion of cash in relation to total asset even more adequately than that of the group level (3.916 per cent).

Canara Bank has been found at the top on the basis of consistency in C/TA as measured by CV (16.657 per cent), followed by Bank of Baroda, Punjab National Bank etc. SBI in this regard has been found as worst in consistency under the group with highest CV (56.934 per cent). Under

Bank-Group comparative analysis, it can be detected that Canara Bank only has consistently maintained the liquidity status by C/TD even more than that of the overall consistent group performance (CV 17.103 per cent).

Canara Bank, Punjab National Bank etc. have maintained proper balance between mean value and consistent value of the ratio, while Bank of Baroda could not show the concerned balance properly (Table 3).

**L/TD:** As per the average performance, SBI has held the best position with lowest mean (19.253 per cent), followed by Bank of India, Bank of Baroda etc., while Canara Bank with highest mean (70.223 per cent) has been detected as the worst performer in this group. The first three banks have been found to maintain the average performance in liquidity maintenance with this ratio more efficiently than that of the overall group (66.740 per cent).

Canara Bank has been considered as the best one with the lowest CV (9.409 per cent), followed by Bank of India, Bank of Baroda etc. SBI, best in average, has been found not to maintain the average performance consistently and among the other banks in the group, it has been found as the worst consistent bank (CV 76.965 per cent). Only Canara Bank has been considered as the efficient in maintaining a balance between loan and customer demand even more than that of the group consistency level (CV 15.257 per cent).

Under this group, only Bank of Baroda has maintained proper balance between the average performance and consistent performance (Table 3).

**Table 3: Measurement of liquidity position of Group C (Large banks)**

Large Banks	C/TD					C/TA					L/TD				
	Mean	SD	CV	Rank (Mean)	Rank (CV)	Mean	SD	CV	Rank (Mean)	Rank (CV)	Mean	SD	CV	Rank (Mean)	Rank (CV)
SBI	6.996	1.734	24.793	1	4	3.538	2.015	56.934	4	5	19.253	14.818	76.965	1	5
Punjab National Bank	2.809	0.564	20.075	4	3	5.375	1.265	23.542	1	3	68.997	16.177	23.445	4	4
Bank of Baroda	4.910	1.471	29.956	3	5	2.583	0.525	20.340	5	2	66.453	11.297	17.000	3	3
Bank of India	5.949	1.075	18.076	2	2	4.219	1.265	29.978	3	4	63.585	9.856	15.500	2	2
Canara Bank	2.556	0.368	14.397	5	1	5.021	0.937	16.657	2	1	70.223	6.607	9.409	5	1
Group (Large Banks)	4.644	0.810	17.453			3.916	0.670	17.103			66.740	10.182	15.257		

Source: Author's calculation

As L/TD holds inverse relationship with liquidity position, higher the ratio, lower the rank and vice versa.

### 7.1.2. Bank-Sector Comparative Analysis

Amongst all the public sector banks, IDBI, SB of Bikaner & Jaipur, and Central Bank of India with best average values in C/TD (12.94 per cent), C/TA (7.308 per cent), and L/TD (10.550 per cent) respectively have been considered as the best. None of the bank under Group C i.e. large banks has been considered, while except SB of Bikaner (small bank), rest of the two banks (IDBI, Central Bank of India) have been from Medium banks.

As per consistent performance of the whole sector, Corporation Bank (small bank) has contained the highest possible ranking in C/TD and C/TA with lowest CV (C/TD 12.697 per cent and C/TA 12.506 per cent). Central Bank of India (medium bank) has also been regarded as the most consistent performer in L/TD with lowest possible CV (7.856 per cent) among the whole sector. In this regard also, Group C i.e. large bank has not contained any bank as most consistent in any of the ratios (Table 4).

**Table 4: Measurement of Liquidity Position of Public sector Banks**

Public Sector Commercial Banks	C/TD					C/TA					L/TD				
	Mean	SD	CV	Rank1	Rank2	Mean	SD	CV	Rank1	Rank2	Mean	SD	CV	Rank1	Rank2
SB of Mysore	6.363	1.643	25.823	16	9	5.265	1.338	25.421	14	10	71.835	9.202	12.809	23	4
SB of BJ	8.968	2.132	23.771	2	7	7.308	1.756	24.029	1	9	70.833	12.476	17.614	22	13
Andhra Bank	7.166	1.983	27.677	7	13	6.145	1.717	27.949	6	14	68.506	11.715	17.101	19	12
United Bank of India	6.593	1.810	27.461	11	12	5.843	1.586	27.149	9	12	54.576	13.228	24.238	3	22
BoM	2.736	0.468	17.115	21	3	2.539	0.435	17.132	20	4	63.616	14.910	23.437	14	20
Corporation Bank	2.639	0.335	12.697	22	1	2.409	0.301	12.506	21	1	66.353	7.370	11.107	15	3
Dena Bank	7.591	1.648	21.714	3	6	6.621	1.487	22.464	2	7	63.038	8.683	13.773	11	5
Indian Bank	6.716	1.747	26.009	10	10	5.893	1.535	26.040	8	11	61.301	12.803	20.885	5	17
Punjab & Syndicate Bank	6.555	1.907	29.096	13	15	2.374	0.341	14.374	23	2	62.419	13.485	21.605	7	18
Vijaya Bank	6.549	2.213	33.790	14	21	5.765	1.907	33.072	11	20	61.585	9.548	15.504	6	8
Allahabad Bank	6.587	1.948	29.573	12	16s	5.827	1.802	30.934	10	18	62.642	11.470	18.310	8.5	15.5
OBC	7.384	2.312	31.305	4	18	6.473	2.055	31.742	3	19	62.642	11.470	18.310	8.5	15.5
UCO Bank	5.836	1.857	31.818	18	19	4.922	1.406	28.558	16	15	62.991	10.695	16.978	10	10
Syndicate Bank	7.282	2.403	33.000	6	20	6.383	2.182	34.194	4	21	63.583	9.649	15.176	12	6
IOB	7.371	2.141	29.049	5	14	6.301	1.945	30.866	5	17	66.993	12.021	17.943	17	14
Central Bank of India	6.886	2.419	35.136	9	22	6.018	2.182	36.265	7	22	10.550	0.829	7.856	1	1
Union Bank of India	6.402	1.716	26.804	15	11	5.496	1.525	20.742	12	13	59.872	13.104	21.886	4	19
IDBI Bank	12.94	8.823	68.180	1	23	3.538	2.015	56.934	18	23	68.044	10.796	15.866	18	9
SBI	6.996	1.734	24.793	8	8	3.538	2.015	56.934	13	8	19.253	14.818	76.965	2	23
PNB	2.809	0.564	20.075	20	5	5.375	1.265	23.542	19	6	68.997	16.177	23.445	20	21
Bank of Baroda	4.910	1.471	29.956	19	17	2.583	0.525	20.340	17	16	66.453	11.297	17.000	16	11
Bank of India	5.949	1.075	18.076	17	4	4.219	1.265	29.978	15	5	63.585	9.856	15.500	13	7
Canara Bank	2.556	0.368	14.397	23	2	5.021	0.937	16.657	22	3	70.223	6.607	9.409	21	2
Group (Public sector banks)	6.338	2.264	35.719			5.105	1.501	29.404			60.4300	3.2307	5.3462		

Source: Author's calculation

Rank1: Rank on Mean, Rank 2: Rank on CV, BoM=Bank of Maharashtra, OCB= Oriental Bank of Commerce

As L/TD holds inverse relationship with liquidity position, higher the ratio, lower the rank and vice versa.

As per composite ranking on the mean, Oriental Bank of Commerce of Group B i.e. medium banks has been declared as the best among the public sector banks followed by Dena Bank (small bank), Central Bank of India (medium bank) etc., while Canara Bank (large bank) has been found

as the worst one. As per the comprehensive performance indicator on CVs, Corporation Bank (medium bank) has been at the top and Canara Bank (large bank) and Bank of Baroda (large bank) have come thereafter. In this regard, IDBI (medium bank) has been detected as the least consistent one under this sector (Table 5).

**Table 5: Comprehensive Score (Composite Ranking) on the Liquidity Position of Public Sector Banks in India**

Public sector banks	C/TD		C/TA		L/TD		Composite Ranking	
	Rank (Mean)	Rank (CV)	Rank (Mean)	Rank (CV)	Rank (Mean)	Rank (CV)	Rank (Mean)	Rank (CV)
SB of Mysore	16	9	14	10	23	4	19 (53)	5(23)
SB of Bikaner & Jaipur	2	7	1	9	22	13	8(25)	7(29)
Andhra Bank	7	13	6	14	19	12	13(32)	11.5(39)
United Bank of India	11	12	9	12	3	22	7.5 (23)	18(46)
Bank of Maharashtra	21	3	20	4	14	20	20(55)	6(27)
Corporation Bank	22	1	21	1	15	3	21(58)	1(5)
Dena Bank	3	6	2	7	11	5	2(16)	4(18)
Indian Bank	10	10	8	11	5	17	7.5 (23)	10(38)
Punjab & Syndicate Bank	13	15	23	2	7	18	15 (43)	9(35)
Vijaya Bank	14	21	11	20	6	8	11.5(31)	20(49)
Allahabad Bank	12	16	10	18	8.5	15.5	10(30.5)	21(49.5)
Oriental Bank of Commerce	4	18	3	19	8.5	15.5	1(15.5)	22(52.5)
UCO Bank	18	19	16	15	10	10	16(44)	14.5(44)
Syndicate Bank	6	20	4	21	12	6	4(22)	19(47)
Indian Overseas Bank	5	14	5	17	17	14	9(27)	16.5(45)
Central Bank of India	9	22	7	22	1	1	3(17)	16.5(45)
Union Bank of India	15	11	12	13	4	19	11.5(31)	13(43)
IDBI Bank	1	23	18	23	18	9	14(37)	23(55)
SBI	8	8	13	8	2	23	7(23)	11.5(39)
Punjab National Bank	20	5	19	6	20	21	22(59)	8(32)
Bank of Baroda	19	17	17	16	16	11	18 (52)	14.5(44)
Bank of India	17	4	15	5	13	7	17(45)	3(16)
Canara Bank	23	2	22	3	21	2	23(66)	2(7)

Source: Author's calculation

Figures in parentheses indicate the summation of ranks assigned for each Banks for Mean and CV during the study period.

As L/TD holds inverse relationship with liquidity position, higher the ratio, lower the rank and vice versa.

## 7.2. Phase II: Test on the Significant Difference in Liquidity Ratios of Public Sector Banks

### 7.2.1. Normality Test

As per the normality test following Jarque-Bera test statistic along with probabilities, the following results for each of the liquidity ratios are obtained:

- For C/TD, the data on all banks have been normally distributed with low Jarque-Bera and insignificant probabilities, with exceptions of Bank of Maharashtra, Punjab National Bank, and Corporation Bank (Table 6).
- For C/TA, except Bank of Maharashtra and Corporation Bank, data of all the concerned banks have been found normal with low Jarque-Bera and insignificant probabilities (Table 6).

- For L/TD, data on the concerned banks have been found as normally distributed with low Jarque-Bera and insignificant probabilities with exception in Indian Overseas Bank (Table 6).

**Table 6: Test on the Significant Difference of Liquidity of Public Sector Banks - Normality Test**

Public sector banks	C/TD		C/TA		L/TD	
	Jarque-Bera	Probability	Jarque-Bera	Probability	Jarque-Bera	Probability
SB of Mysore	1.992716	0.369222	2.020354	0.364155	2.816216	0.244606
SB of Bikaner & Jaipur	0.283757	0.867726	0.225769	0.893254	2.168888	0.33809
Andhra Bank	0.923989	0.630026	1.010321	0.603409	2.314123	0.314409
United Bank of India	1.747073	0.417473	1.148197	0.563212	1.999568	0.367959
Bank of Maharashtra	12.85026	0.00162	6.374884	0.041277	1.811943	0.404149
Corporation Bank	6.378929	0.041194	8.069905	0.017687	2.231426	0.327682
Dena Bank	1.926052	0.381736	2.277811	0.320169	2.35157	0.308577
Indian Bank	1.568048	0.456565	1.459368	0.482061	2.089809	0.351725
Punjab & Syndicate Bank	5.733657	0.056879	2.820634	0.244066	2.093023	0.351161
Vijaya Bank	3.075959	0.214815	2.369197	0.305869	2.62569	0.269054
Allahabad Bank	4.192783	0.122899	4.039369	0.132697	2.066566	0.355837
Oriental Bank of Commerce	3.205052	0.201387	3.709754	0.156472	2.459124	0.292421
UCO Bank	0.973234	0.614702	0.414249	0.812918	1.67402	0.433003
Syndicate Bank	1.933996	0.380223	1.918315	0.383216	1.841314	0.398257
Indian Overseas Bank	2.220853	0.329418	2.02534	0.363248	19.57957	5.60E-05
Central Bank of India	1.000458	0.606392	0.548071	0.760305	1.904049	0.385959
Union Bank of India	1.401052	0.496324	1.477738	0.477654	1.791993	0.408201
IDBI Bank	5.676645	0.058524	0.396681	0.820091	4.380175	0.111907
SBI	0.673426	0.714114	0.661842	0.718262	2.17873	0.33643
Punjab National Bank	6.70511	0.034995	3.684412	0.158467	2.067661	0.355642
Bank of Baroda	0.884573	0.642565	0.878365	0.644563	1.946623	0.37783
Bank of India	0.558569	0.756325	0.568769	0.752477	3.503944	0.173432
Canara Bank	2.002895	0.367347	2.267195	0.321873	2.487518	0.288298

Source: Author's calculation

### 7.2.2. ANOVA Test Result: On Liquidity Ratios

Tables 7a through 7c report the results of two-way ANOVA for the liquidity ratios. From these results, one can observe that in all the three cases, the observed F-statistics are higher than the critical F for both  $\alpha_i$ ,  $\beta_j$  i.e.

for column (bank-wise) and row (year-wise). Hence, null hypotheses are rejected. We can safely conclude that at least two banks (from each of the group) are different in terms of liquidity as measured by C/TD, C/TA and L/TD. Moreover, banks' liquidity also varies each year.

**Table 7a: Result on ANOVA Test on C/TD of Public Sector Banks**

Source of Variation	SS	Df	MS	F	P-value	F crit
Rows (Year)	541.5199	16	33.84499	6.671314	2.93E-13	1.672302
Columns (Bank)	1917.069	22	87.13949	17.17639	2.83E-43	1.572535
Error	1785.771	352	5.073212			
Total	4244.359	390				

Source: Author's calculation

**Table 7b: Result on ANOVA Test on C/TA of Public Sector Banks**

Source of Variation	SS	Df	MS	F	P-value	F crit
Rows (Year)	245.0625	16	15.31641	9.048604	1.11E-18	1.672302
Columns (Bank)	924.9178	22	42.04172	24.83735	1.84E-58	1.572535
Error	595.8239	352	1.692682			
Total	1765.804	390				

Source: Author's calculation

**Table 7c: Result on ANOVA Test on L/TD of Public Sector Banks**

Source of Variation	SS	Df	MS	F	P-value	F crit
Rows (Year)	30788.92	16	1924.307	41.59367	4.66E-71	1.672302
Columns (Bank)	83871.91	22	3812.36	82.40368	2.6E-124	1.572535
Error	16285.08	352	46.26443			
Total	130945.9	390				

Source: Author's calculation

## 8. Conclusion

Most of the public sector banks in their liquidity position are supposed to be inconsistent to some extent as judged by the consistency levels of liquidity ratios (C/TD, C/TA, and L/TD) throughout the study period except some banks (Corporation Bank, Canara Bank etc.) which repeatedly are found as better performers than the specific group and even the whole sector. Therefore, the repeated appearance without the involvement of all public sector banks is not proved to be a healthy prospect of the respective banking sector. In this context, Group C banks i.e. banks recognised as large as per their asset size, have not been found in any standard performance level. This issue may also hurt the market return of public sector banks. Small banks and somehow the medium banks could maintain adequate level of liquidity and thus could assure sustainability in competitive market. Among all public sector banks, Bank of Maharashtra, Dena Bank, and Canara Bank have maintained a proper balance between the average performance and consistent performance whereas other banks were not able to maintain a steady performance simultaneously in these two areas.

To curb the hazards faced by public sector banks, the same should adopt monitoring scheme to judge the performance of the banks in varied areas along with maintaining of proper governance practice on them. In this context, to support liquidity in banks, Government of India has announced the formation of Bank Board Bureau in the last

General Budget, to select the top management of banking sector and to identify plans for raising capital for the same. The Ministry of Finance has worked out a Rs.70000 crore capitalisation plan for state-run bank over four years as per the estimation of Rs.1.8 lakh crore of additional capital of that period out of which Rs.1.1 lakh crore will be raised from the market (Economic Times, 2016). Now to assure a steady prosperity in the overall banking sector, banks should be connected with tailor made customisation of their financial performance with a consistent position of liquidity throughout their performing period in view of maintaining a real balance between commercialisation with socialisation with controllable effect of financial inclusion applying advancement in professionalism ("PSBs dividend dole-outs Amid Flood of NPAs Draw Rajan Ire", 2015, pg. 13).

## 9. Limitations of the Study

Data of the present study have been collected only on the then listed public sector commercial banks and for only 17 years as available from the Capitaline Database keeping in mind the time and resource constraints.

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