

BASEL III REQUIREMENTS AND COMPLIANCE BY THE INDIAN BANKING SECTOR

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Abstract

The formal framework for banks capital structure evolved in 1988 with an introduction of Basel I followed by Basel II, and the latest guidelines, Basel III. Basel III requirements require banks to enhance their capital structure and hold more reserves to face the credit risk prudently. It was perceived that compliance of Basel III would be a challenge for Indian banking industry and hence the study of compliance of Basel III accord was demanded. The present paper aims to compare the implemented Basel III requirement for Public and Private Banks in India with the stipulated requirements as specified by the RBI and the compliance after the adoption of Basel III. Our result shows that the Indian banks, across both sectors have high compliance of the Basel III than those prescribed by the RBI. The new literature we add on capital and credit risk will help to undertake precautionary steps to manage credit risk and capital prudently, and also aid the bank regulators in revising their policies.

Keywords: *Banking Sector, Basel III requirements, India, Public Sector Banks, Private Banks.*

JEL classification: G21, G32

1 Introduction

The concern regarding the credit risk management at an international level began after the introduction of Basel norms, better known as Basel I, Basel II and Basel III. The Basel III aims at making most banking activities (such as their trading book activities) more capital intensive. This norm also focuses on four vital banking parameters viz. capital, leverage, funding, and liquidity by proposing new requirements with respect to Capital Conservation Buffer (CCB), Counter-Cyclical Capital Buffer (CCCB), Leverage Ratio (LR), Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). As per Basel III, banks are required to hold more reserves by January 2015, with common equity requirements raised to 4.5 percent from 2 percents at present. It introduced an additional reserve of 2.5 percent known as CCB which brings the total Tier-I Capital reserves to 7 percent. The new regime introduced CCCB which varies between 0 to 2.5 percent to meet the demand of the nation's economy in comparison to Gross Domestic Product (GDP). Basel III proposes a leverage ratio of 3 percent of the total assets and requires liquidity ratio to be maintained at 100 percent, also NSFR is to be maintained by banks, and at not lower than 100 percent.

It was always perceived that the implementation of the Basel III accord, in a developing country like India would be a real challenge. The key issues for the bank management are at deciding the best solution that allows them to comply with Basel III with a least cost. Given the pressures risk managers, finance managers, and Basel III program managers face to implement Basel III; it is intended to study the compliance of the Indian banks towards Basel III requirements. Given the above, the present study covers Basel III compliance given the transitional schedule of Basel III, covering a period of 2013-2019. As per the RBI report and the response of bank employees some banks have recently moved towards Basel III guidelines and are still in the process of following standard approaches, though not covering advanced approaches. Thus all banks are at their own pace of meeting the requirements under Basel III. This demands the need to study the compliance of Basel III by the Indian banks.

As per Kant and Jain, (2013) ‘It is necessary to know the compliance of Basel III, the central banks are finding it difficult to implement Basel III during the current environment of a global economic slowdown’. Similarly a study by Parsha (2013) notes that Basel III seem to favour the large banks that have better risk management and expertise who also have better capital adequacy ratio and geographically diversified portfolios.

The aim of the paper is to compare the implemented Basel III requirement ratios of Public and Private Banks with requirements of ratios of the RBI. It also focuses on the comparison of the capital ratios of Public and Private Banks before and after the adoption of Basel III requirements

2 Literature Review

According to Swami (2013) banking is one of the most heavily regulated businesses since it is highly leveraged; hence there is a need to check the compliance of regulations. One of the foremost studies of prudential requirements and the Indian banking sector is by Balsubramaniam (2010) and states readiness of Indian banks to implement Basel III standards. The study also notes the intention of Indian banks have to plan for more capital in years ahead.

In this spirit Kumar (2014) compares the level of compliance of Basel II requirements for selected nationalized foreign and Private Banks in India by using trend analysis, Paired *t-test*, one way ANOVA and Independent sample t-test for analyzing the bank compliance for Tier- I, Tier- II capital and Capital Adequacy ratios. The result indicates that foreign banks are more efficient in compliance with new requirements, compared to the Nationalized (Public) and Private Banks. Basel III accord is expected to generate a positive response to the economy as per Datey and Tiwari (2014). This study analyzed the effect of Basel III on stability of Indian banks. Al-Hares et al. (2013) conducted a study on the compliance of Basel III capital standard in conventional and Islamic banks and conclude that implementation will not take place till the year 2019. Sharma (2017) conducted a study on the compliance of Basel III requirements of select Public, Foreign and Private Banks to find a significant difference in the tier-I capital ratio under Basel II and Basel III and a significant difference in CRAR of Public and Private Banks.

The empirical literature is available on studies such as factors affecting capital adequacy, but very few studies are available on understanding the capital adequacy requirements and compliance, before and after adoption of Basel III. Previous studies examined the plausible *apriori* impact of Basel III whereas literature is limited on compliance of Basel III as per the requirements of RBI in Indian banking sector. Though some studies are available on comparing the CAR, Tier-I and Tier- II Capital ratio before and after the adoption of Basel II, but the same concerning Basel III is left to be examined in the Indian context.

3 Research Methods

The compliance of Basel III in the Indian banking sector is assessed using secondary data, from Indiastat.com and annual reports of individual banks. The sample of the study consists of 21 Public and 18 Private Banks from the Indian banking industry. In order to assess the implementation of Basel III requirements with the stipulated norms, the data period used for the present study is from 2013 to 2018, the phase of the Basel III implementation.

The present paper also tries to assess the capital ratios in the pre and post implementation phase of Basel III. The paired sample t-test is used to make a comparison on a sample of 21 Public sector banks and 18 Private Banks. The data period used for the present paper is from 2009 to 2018. This data period shows two phases, the pre-implementation (2009-2013) and post implementation phase (2014-2015) of Basel III requirements.

4 Results and Discussion

The result and discussion is divided into two parts. Part I covers the compliance of Basel III ratios by Indian banks. Part II covers Comparison of Basel III ratios before and after the adoption of Basel III requirements.

4.1 Compliance of Basel III Ratios by Indian banks

This section explains the compliance of capital ratios of Public and Private Banks with the minimum requirement prescribed by the RBI under Basel III. This study used four capital ratios such as the Minimum Common Equity Tier-1 Capital ratio, Minimum Tier-1 Capital, Tier-II Capital, Capital Adequacy Ratio (CAR) and Leverage Ratio. The comparison of actual ratios with prescribed limit is done using one-sample t-test.

It is hypothesized that, the mean actual Basel III compliance ratios of Public and Private Banks in India are lower or equal to the minimum Basel III ratio prescribed by RBI. The actual Basel III requirement ratios of Public Banks and Private Banks could be lower because, historically banks were maintaining a low provision coverage ratio, as the Indian banks have a high proportion of NPAs that are not provided for the capital.

Table I: Result of One Sample t-test of the Capital Ratios of 21 Public and 18 Private Banks in India

Year	2013	2014	2015	2016	2017	2018
Minimum Common Equity Tier- 1						
Test value – Min Common Equity Tier-1	4.5	5	5.5	5.5	5.5	5.5
Mean of Public Banks	Non-Compliant	7.65	7.82	8.11	8.07	7.89
Mean of Private Banks	Non-Compliant	Non-Compliant	Non-Compliant	Non-Compliant	Non-Compliant	11.92
Result of one sample t-test of Public Banks	t (20) =16.81, p= 0.00 (SD)	t (20) =13.80, p= 0.00 (SD)	t (20) = 13.78, p= 0.00 (SD)	t (20) =12.96, p= 0.00 (SD)	t (20) =16.81, p= 0.00 (SD)	t (20) = 7.95, p= 0.00 (SD)
Result of one sample t-test of Private Banks	Non-Compliant	Non-Compliant	Non-Compliant	Non-Compliant	Non-Compliant	t (10) = 7.51, p= 0.00 (SD)
Minimum Tier- I Capital						
Test Value - Minimum Tier- I Capital	6	6.5	7	7	7	7
Mean of Public banks	8.68	8.11	8.30	8.30	9.07	8.90
Mean of Private Banks	12.12	11.60	12.16	11.49	11.99	12.53
Result of one – sample t-test of Public banks	t (20) = 13.33, p= 0.00 (SD)	t (20) = 8.09, p= 0.00 (SD)	t (20) =7.53, p= 0.00 (SD)	t (20) =7.53, p= 0.00	t (20) = 9.71, p= 0.00 (SD)	t (20) =5.99, p= 0.00

				(SD)		(SD)
Result of one – sample t-test of Private Banks	t (17) =11.57, p= 0.00 (SD)	t (17) =7.63, p= 0.00 (SD)	t (17) =7.85, p= 0.00 (SD)	t (17) =6.75, p= 0.00 (SD)	t (17) =9.58, p= 0.00 (SD)	t (17) =9.12, p= 0.00 (SD)
Tier- II Capital						
Test Value - Minimum Tier- II Capital	3	2.5	2.625	3.25	3.875	4.5
Mean of Public Banks	3.54	3.00	2.8	2.46	2.60	2.30
Mean of Private Banks	1.96	1.9	1.7	1.69	1.52	1.84
Result of one – sample t-test of Public banks	t (20) =2.89, p= 0.00(SD)	t (20) =4.44, p= 0.00 (SD)	t (20) =3.19, p= 0.00(SD)	t (20) = -6.69, p= 0.00 (SD)	t (20) = -9.5, p= 0.00 (SD)	t (20) = -17.48, p= 0.00(SD)
Result of one – sample t-test of private banks	t (17) = -2.9, p= 0.00(SD)	t (17) = -1.51, p= 0.14 (NSD)	t (17) = -3.08, p= 0.00(SD)	t (17) = -4.97 p= 0.00 (SD)	t (17) = -9.91, p= 0.00 (SD)	t (17) = -8.25, p= 0.00 (SD)
Capital Adequacy Ratio (CAR)						
Test value –CAR	9	9	9.625	10.25	10.875	11.50
Mean of Public Banks	12.24	11.11	11.22	11.31	11.72	11.25
Mean of Private Banks	14.7	14.00	14.30	13.58	13.68	14.58
Result of One sample t-test of Public Banks	t (20) =17.54, p= 0.00 (SD)	t (20) =10.96, p= 0.00 (SD)	t (20) =9.19, p= 0.00 (SD)	t (20) =4.63, p= 0.00 (SD)	t (20) =4.05, p= 0.00 (SD)	t (20) = -8.21, p= 0.42 (NSD)
Result of one sample t-test of Private Banks	t (17) =10.76, p= 0.00 (SD)	t (17) =8.58, p= 0.00 (SD)	t (17) =7.39, p= 0.00 (SD)	t (17) = 5.57, p= 0.00 (SD)	t (17) =5.39, p= 0.00 (SD)	t (17) = -5.00, p= 0.00 (SD)
Leverage Ratio						
Test value – Leverage ratio	NA	NA	3	3	3	3
Mean of Public Banks	NA	NA	Non - Compliant	5	5.13	4.68
Mean of Private Banks	NA	NA	Non- Compliant	7.64	8.04	8.09
Result of One sample t-test of Public Banks	NA	NA	NA	t (15) = 14.31, p = 0.00 (SD)	t (15) = 19.21, p = 0.00 (SD)	t (15) = 8.44 p = 0.00 (SD)
Result of one sample t-test of Private Banks	NA	NA	NA	t (13) = 8.09, p = 0.00 (SD)	t (13) =9.46, p = 0.00 (SD)	t (17) = 10.20, p = 0.00 (SD)

Source: Authors Calculation using RBI data. **Notes:** *SD - Significant difference at 95 percent confidence level ** NSD- Non-significant Difference

4.1.1 Minimum Common Equity Tier-1 Ratio

Although the RBI draft guideline states the phase-in arrangement began from 2013 onwards, however, most of the Public and Private Banks from the sample show the implementation to Basel III from 2014 onwards as per a reference to their annual reports. The minimum common equity ratio was 2 percent in Basel II requirements, however, in Basel III requirements it increased to 4.5 percent. An observation to Table I shows, all the Public Banks are compliant towards this ratio from the year 2014 onwards, whereas as per reference to annual reports it shows that Private Banks were not maintaining this ratio separately, but it was included in the Tier-I capital. Most of the Private Banks started maintaining this ratio separately from the year 2018 onwards.

Another observation to Table I shows, this ratio was maintained at a higher level by all the Public Banks compared to what is prescribed by the RBI. To test this difference statistically one sample t-test is used. The result of one sample t-test fails to accept the null hypothesis as the mean difference in implemented Basel III requirement ratios (Sample Mean) of Public and Private Banks is higher than the minimum requirement ratios of RBI (Population Mean).

4.1.2 Tier-I Capital Ratio

There was a difference of 2 percent in the Tier-I capital ratio from Basel II to Basel III requirements. Both Public and Private Banks showed compliance with this ratio from the beginning of Basel III requirements. The Public and the Private Banks from the sample show higher compliance to this ratio. This depicts the difference in the complied ratios and prescribed ratio. To prove this difference statistically one sample t-test was used. The result of one sample t-test fails to accept the null hypothesis as the mean difference in implemented Basel III requirement ratios (Sample Mean) of Public and Private Banks is higher than the minimum requirement ratios of RBI (Population Mean).

4.1.3 Tier-II Capital Ratio

The Public and Private Banks shows a compliance to this ratio from the beginning of Basel III requirements; The result of one sample t-test shows, 83 percent of the observations have a significant difference in the population mean and a sample mean of Private Banks, This results accepts the null hypothesis as the mean difference in implemented Basel III requirement ratios (sample mean) of Private Banks is lower than the minimum requirement ratios of RBI (population mean) as per an observation to Table I. In case of Public Banks there is a significant mean difference in the population mean and the sample mean, this difference is due to higher compliance with this ratio in the first three years and lower compliance in the last three years.

4.1.4 Capital Adequacy Ratio (CAR)

The Basel III requirements stipulate CAR of 8 percent however as per RBI all the scheduled commercial banks are required to maintain a CAR of 9 percent. Till 2019 banks are expected to maintain the (CAR) of 11.5 percent, which will match with the international standard laid down by BCBS. An observation to Table I show that, all the Public and Private Banks have complied with the CAR at a much higher level than prescribed by the RBI from the year 2013-2019 except for Private Banks in the last year of the implementation phase. As in the last year, banks were required to maintain a CAR of 11.5 percent which is beyond the capacity of Private Banks. This shows a difference in the prescribed value and the implemented value of CAR by the Public and Private Banks. To test this difference statistically, one sample t-test was used. The result of one sample t-test fails to accept the null hypothesis as the mean

difference in implemented Basel III requirement ratios (Sample Mean) of Public and Private Banks is higher than the minimum requirement ratios of RBI (Population Mean).

4.1.5 Leverage Ratio

The Basel III requirements levied a 3 percent leverage ratio of Tier-1. An observation of Table 1 show that Public and Private Banks from the sample complied with the leverage ratio at a much higher level than the stipulated rates as laid down by the RBI. This shows a difference in the prescribed value and the implemented value of leverage ratio by the Public and Private Banks. This difference is tested with aid of one sample t-test. The result fails to accept the null hypothesis as there is a significant mean difference in the population mean and the sample means from the year 2016-2018, this difference is due to higher compliance by the Public sector banks towards the minimum ratio laid down by the RBI.

4.2 Comparison of Basel III ratios before and after the adoption of Basel III requirements

A paired t-test was run on a sample of 21 Public sector banks to determine whether there was a statistically significant mean difference in the mean of Tier- I cap ratio, Tier- II cap ratio, and the CAR in the pre-implementation and post-implementation phase of Basel III. A test is run based on the null hypothesis, which states that, there is no statistical difference in the mean Tier-I, Tier--II, CAR before and after the adoption of the Basel III requirements of Public Banks and Private Banks in India. The significant difference in these ratios may not arise for Public Banks, because these banks controls the majority share in the market, thus these banks possess good capital health. Historically Public sector banks are maintaining adequate capital. Therefore there may not be any difference in the capital ratios of Public Banks before and after the adoption of Basel III requirements.

Similarly, the difference in capital ratios may not be there in case of the Private Banks, as these banks are always playing the precautionary role before granting a loan to the business community and therefore the NPA's of these banks were always less compared to NPA's of Public Banks. Further, these banks were maintaining higher capital ratios, even before the adoption of Basel III requirements.

Table 2 Cross-sectional Data showing the Result of the Paired t-test for 21 Public Sector Banks in India

S.n	Banks	Tier-I Capital Ratio	Tier-II Capital Ratio	CAR
1	Allahabad Bank	t (4) =3.06, p= 0.039 (SD)	t (4) =4.29, p= 0.01 (SD)	t (4) =6.90, p= 0.02 (SD)
2	Andhra Bank	t (4) =1.527, p= 0.20 (NSD)	t (4) =2.60, p= 0.06 (NSD)	t (4) =2.62, p= 0.06 (NSD)
3	Bank of Baroda	t (4) =0.099, p= 0.92 (NSD)	t (4) =9.60, p= 0.00 (SD)	t (4) =6.48, p= 0.00 (SD)
4	Bank of India	t (4) =0.38, p= 0.72 (NSD)	t (4) =1.90, p= 0.13 (NSD)	t (4) =0.55, p= 0.60 (NSD)
5	Bank of Maharashtra	t (4) = -3.3, p= 0.03 (SD)	t (4) =11.92, p= 0.00 (SD)	t (4) =2.12, p= 0.1 (NSD)
6	Canara Bank	t (4) =1.32, p= 0.25 (NSD)	t (4) =2.25, p= 0.08 (NSD)	t (4) =2.25, p= 0.08 (NSD)
7	Central Bank of India	t (4) = -1.31, p= 0.26 (NSD)	t (4) =6.71, p= 0.00 (SD)	t (4) =4.96, p= 0.00 (SD)
8	Corporation	t (4) =0.69, p= 0.52 (NSD)	t (4) =6.88, p= 0.02	t (4) =4.30, p= 0.01

	Bank		(SD)	(SD)
9	Dena Bank	t (4) = -0.364, p= 0.73 (NSD)	t (4) =5.23, p= 0.00 (SD)	t (4) = 1.8, p= 0.14 (NSD)
10	IDBI Bank Ltd.	t (4) = -1.52, p= 0.202(NSD)	t (4) =4.91, p= 0.00 (SD)	t (4) =1.9, p= 0.12 (NSD)
11	Indian Bank	t (4) =0.83, p= 0.45 (NSD)	t (4) =0.76, p= 0.48 (NSD)	t (4) =1.30, p= 0.23 (NSD)
12	Indian Overseas Bank	t (4) =2.82, p= 0.04 (NSD)	t (4) =6.21, p= 0.00 (SD)	t (4) =6.52, p= 0.00 (SD)
13	Oriental Bank of Commerce	t (4) =3.37, p= 0.02 (NSD)	t (4) =1.44, p= 0.22 (NSD)	t (4) =6.13, p= 0.00 (SD)
14	Punjab & Sind Bank	t (4) = -1.45, p= 0.22 (SD)	t (4) =24.68, p= 0.00 (SD)	t (4) =9.17, p= 0.00 (SD)
15	Punjab National Bank	t (4) =1.13, p= 0.31 (SD)	t (4) =4.12, p= 0.01 (SD)	t (4) =4.24, p= 0.00 (SD)
16	State Bank of India	t (4) = -1.79, p= 0.14 (SD)	t (4) =7.29, p= 0.00 (SD)	t (4) =1.29, p= 0.26 (NSD)
17	Syndicate Bank	t (4) =0.17, p= 0.81 (SD)	t (4) =3.14, p= 0.03 (SD)	t (4) =2.98, p= 0.04 (SD)
18	UCO Bank	t (4) = -1.11, p= 0.32 (NSD)	t (4) =6.64, p= 0.00 (SD)	t (4) =2.12, p= 0.10 (NSD)
19	Union Bank of India	t (4) =0.031, p= 0.97 (NSD)	t (4) =5.26, p= 0.00 (SD)	t (4) =2.40, p= 0.07 (NSD)
20	United Bank of India	t (4) =0.432, p= 0.68 (NSD)	t (4) =5.13, p= 0.00 (SD)	t (4) =2.39, p= 0.07 (NSD)
21	Vijaya Bank	t (4) = -1.08, p= 0.33 (NSD)	t (4) =1.84, p= 0.00 (SD)	t (4) =0.62, p= 0.56 (NSD)
Overall		t (104) =13.05 p= 0.78 (NSD)	t (104) =16.06, p= 0.00 (SD)	t (104) =11.74 p= 0.00 (SD)

Source: Authors calculation based on the RBI data

The result of the paired t-test fails to accept null hypothesis with respect to four banks such as Allahabad Bank, Punjab and Sind Bank, Punjab National Bank and Syndicate bank. These banks show the maintenance of higher ratios in the pre and post-implementation phase of Basel III. However, for the other four banks (Andhra Bank, Bank of India, Canara Bank, and Indian bank) this test fails to accept the null hypothesis. The result shows, statistical insignificant difference in the compliance of these three ratios in the post and pre-implementation phase of Basel III. This insignificant difference is on account of maintaining the same level of ratio in the post and pre-implementation phase. In other words, these banks followed better ratio in the pre-implementation period of Basel III compared to what was prescribed in Basel III requirements, hence in the post-implementation phase of Basel III requirements, these same banks maintained the same level prescribed in Basel III requirements. Therefore the difference between the two mean is insignificant.

Overall the result of Public sector banks indicates a similarity in the mean of Tier-1 capital ratio in the pre and post-implementation phase of Basel III requirements. These similarities indicate that banks maintained the same level of Tier-I capital in the pre-and post-implementation phase. In the case of the Tier-II capital ratio, the overall paired t-test result shows a significant mean difference in the pre and post-

implementation period of Basel III requirements. This difference indicates that banks did not sustain an appropriate level of Tier-II capital. Similarly, the CAR of Public sector banks shows a significant mean difference in the pre and post-implementation period of Basel III requirements. The difference is significant due to maintaining a higher level of CAR in the pre-implementation phase.

Table 3 Cross-sectional Data Showing the Result of Paired t-test of 18 Private Sector Banks

Private Banks	Result of Paired t-test Tier- I Cap Ratio	Result of Paired t-test Tier- II Cap Ratio	Result of paired t-test CAR
Axis Bank Ltd.	t (4) = -4.01, p= 0.01 (SD)	t (4) =6.65, p= 0.00 (SD)	t (4) = -1.66, p= 0.17 (NSD)
Catholic Syrian Bank Ltd.	t (4) = -1.69, p= 0.16 (NSD)	t (4) =6.58, p= 0.00 (SD)	t (4) =1.037, p= 0.35 (NSD)
City Union Bank Ltd.	t (4) = -14.95, p= 0.00 (SD)	t (4) =7.40, p= 0.00 (SD)	t (4) = -13.64, p= 0.00 (SD)
D C B Bank Ltd.	t (4) = -6.7, p= -5.35 (NSD)	t (4) =0.288, p= 0.00 (SD)	t (4) = -0.546, p= 0.61 (NSD)
Dhanalaxmi Bank Ltd.	t (4) =0.867, p= 0.43 (NSD)	t (4) =1.67, p= 0.16 (SD)	t (4) =1.037, p= 0.35 (NSD)
Federal Bank Ltd.	t (4) =0.69, p= 0.87 (NSD)	t (4) =1.67, p= 0.16 (NSD)	t (4) =-0.438, p= 0.68 (NSD)
H D F C Bank Ltd.	t (4) = -4.16, p= 0.01 (SD)	t (4) =3.38, p= 0.02 (SD)	t (4) =2.19, p= 0.09 (NSD)
I C I C I Bank Ltd.	t (4) = -1.16, p= 0.30 (NSD)	t (4) =2.142, p= 0.09 (NSD)	t (4) =1.255, p= 0.27 (NSD)
Indusind Bank Ltd.	t (4) = -4.5, p= 0.01 (SD)	t (4) =4.46, p= 0.01 (SD)	t (4) =-0.056, p= 0.95 (NSD)
Jammu & Kashmir Bank Ltd.	t (4) =5.30, p= 0.00 (NSD)	t (4) =0.889, p= 0.42 (NSD)	t (4) =6.48, p= 0.00 (SD)
Karnataka Bank Ltd.	t (4) = -1.214, p= 2.91 (NSD)	t (4) =13.061, p= 0.03 (SD)	t (4) =1.318, p= 0.25 (SD)
Karur Vysya Bank Ltd.	t (4) = -1.96, p= 0.12 (NSD)	t (4) =0.439, p= 0.68 (NSD)	t (4) =2.28, p= 0.08 (NSD)
Kotak Mahindra Bank	t (4) = -0.71, p= 0.51 (NSD)	t (4) =3.68, p= 0.02 (SD)	t (4) =0.85 , p= 0.43 (NSD)
Lakshmi Vilas Bank Ltd.	t (4) =3.02, p= 0.039(NSD)	t (4) =1.08, p= 0.339(NSD)	t (4) =2.9, p= 0.04(SD)
Nainital Bank Ltd.	t (4) = -0.17, p= 0.87 (NSD)	t (4) =2.10, p= 0.10 (NSD)	t (4) =0.34, p= 0.75 (NSD)
R B L Bank Ltd.	t (4) =3.01, p= 0.04 (SD)	t (4) = -1.88, p= 0.13 (SD)	t (4) =2.84, p= 0.04 (NSD)
South Indian Bank Ltd.	t (4) =5.30, P= 0.00 (SD)	t (4) =1.5, p= 0.20 (NSD)	T (4) =5.67, P= 0.005 (SD)
Yes Bank Ltd.	t (4) = -3.31, P= 0.03 (SD)	t (4) =5.19, p= 0.00 (SD)	t (4) =1.88, P= 0.13 (NSD)
Overall	t (85) = -1.49, P= 0.14 (NSD)	t (85) =7.55, P= 0.00 (SD)	t (85) =3.01, P= -.003 (SD)

Source: Authors Calculations based on the data from RBI data

The result of the paired t-test fails to accept the null hypothesis as there is statistical difference in the City Union Bank with respect to all three ratios. This shows maintenance of higher ratios in the pre and post implementation phase of Basel III by this bank. With respect to other four banks such as Federal Bank Ltd., ICICI Bank Ltd., Karur Vysya Bank Ltd. and Nainital Bank Ltd. our test helps to accept the null hypothesis. This similarity is on account of maintaining the same level of ratio in the post and pre-implementation phase by them. In other words, these banks followed better ratios in the pre implementation period of Basel III compared to what was prescribed in Basel III requirements, hence in the post implementation phase they could maintain the same prescribed levels.

The overall result for Private Banks indicates a similarity in the mean Tier-1 capital ratio in the pre and post-implementation phase of Basel III requirements. The insignificant difference indicates that banks maintained the same level of Tier-I capital in the pre-and post-implementation phase. In the case of the Tier-II capital ratio, the overall paired t-test result shows a significant mean difference in the pre and post-implementation period of Basel III requirements. This difference indicates that banks were not maintaining a proper level of Tier-II capital. Similarly, the CAR of Public sector banks shows a significant mean difference in the pre and post-implementation period of Basel III requirements. The difference is significant due to maintaining a higher level of CAR in the pre-implementation phase.

5 Conclusions

The study on compliance of Basel III ratios attempts to find whether banks are able to meet the minimum requirements of ratios prescribed by RBI. The result of one sample t-test shows that, private sector banks commenced disclosure towards complying with minimum common Tier- I ratio from 2018 onwards, and Public sector banks from 2014 onwards. In the case of the minimum common equity ratio, Tier- 1 capital ratio and CAR the private as well as the Public Banks show higher compliance compared to a limit prescribed by Basel III requirements, and the mean ratio for Private Banks is higher than the Public sector banks. Both the type of banks started complying to leverage ratio from 2015 onwards and showed higher compliance compared to a limit prescribed by Basel III requirements.

A present study also compared the Tier-I, Tier-II and Capital Adequacy ratio in the pre and post-implementation phase of Basel III. The result of the paired sample t-test showed that banks were maintaining sufficient capital in the pre-implementation phase of Basel III requirements.

The overall conclusion can be drawn that, the Indian banking industry is in a comfortable zone to meet and comply with Basel III requirements. The Public sector banks, as well as Private Banks, have complied with the Tier-I, CAR, and leverage ratio at a much higher level than the minimum requirements prescribed by RBI. On an average basis, both Public and Private Banks have CAR between 14 percent to 16 percent, which signals that the implementation of Basel III have not posed any significant difficulties for Indian banks. However in future, the fulfillment of other requirements of Basel III such as capital buffer using advanced approaches may be a challenge for Indian Banks.

The capital ratios of the Public sector bank are lower than Private Banks. Therefore the Private Banks with enhanced Tier- I capital ratio and higher capital adequacy ratio along with the modern financial skill of personnel are well placed to comply with Basel III requirement. The Public sector banks may face more challenges for the implementation of Basel III also, raising capital from the equity market would be difficult for Public sector units as because of discounted prices of shares and other structural issues (Barua. et al 2016). Thus Public sector banks may have to depend on government support in the near future.

Our added literature on capital and risk may help bankers to undertake precautionary steps to manage their risks and capital prudently. The present study also aids the bank regulators in improving and revising their policies. Monetary policies of the RBI with reference to CRR, and SLR make it difficult to

uniformly implement Basel requirements, as the Indian banks apart from maintaining ratios stipulated by monetary policies will have to adhere to the Basel III requirements. This warrants the RBI to revise its monetary policies to go along with the Basel III requirements. The present study has focused on only one pillar that is capital adequacy and the review of the other two important pillars i.e. supervisory review process and market discipline have not been covered. Further studies could cover the compliance of Basel III requirements concerning the other two pillars.

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