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Compliance of Basel III Norms: Comparison of selected Nationalised, Private and Foreign Banks

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Abstract

Paper compares compliance of BASEL III norms as given by RBI by selected nationalized, private and foreign banks. There are three categories of banks in India-Public, Private and Foreign banks. Nine banks, three in each category were selected. Data related to 3 factors of Basel III norms i.e., Capital Adequacy requirements, Supervisory Review and Market Discipline for past 10 years i.e.3 years for Basel I norms, 6 years before and 3 years after the adoption of Basel III norms was collected. It was found out that significant difference was observed in case of Tier 1 capital under Basel II and Basel III norms because the capital of the banks had to be raised in order to meet the requirements of new capital adequacy norms. Significant difference was also observed in case of CRAR of the nationalised and private sector banks. Total capital adequacy ratio of the banks was mainly affected by risk weighted assets of the banks. The more the risk weighted assets of the bank the higher is the capital to risk weighted assets ratio (CRAR). The credit risk capital requirements of private sector banks, market risk capital requirements of nationalised banks and operational risk capital requirements of private sector banks witnessed significant differences under Basel II norms and Basel III norms.

Keywords: Basel I, Basel II, Basel III, Capital Adequacy, Tier 1 Capital, CRAR, Credit, Market and Operational risk.

Introduction

With the evolution of banking reforms in the year 1992, there was a revolution in the banking system in the country. It provided a basis for looking into the future of Indian Banking System. BCBS (Basel Committee on Banking Supervision) is a banking supervisory authorities committee established by Central Bank Governors in 1975. In the year 1988 some recommendations were given by BCBS for minimum capital requirements which came to be known as Basel Capital Accord (Basel I). The main objective of Basel I was adequate capitalisation of banks (minimum level of ratio of capital to assets). As there were many limitations in Basel I accord, Basel II accord was established in December 2001 to overcome the shortcomings of the existing norms. With evolution of time some limitations were witnessed in Basel II norms which necessitated the development of new norms. The limitations included the liquidity risk was improperly addressed by Basel II framework. Another limitation of Basel II norms is the Excessive reliance on external ratings and incorrect internal rating models also allowed for artificial reduction of capital requirements and decrease of banks' capacity to withstand systemic crises. The financial crisis of 2008 led to the introduction of new norms. Basel III guidelines were introduced in December 2010. The norms were introduced to strengthen the Indian banking system.

According to BCBS "Basel III is a comprehensive set of reform measures, developed by the Basel Committee on Banking Supervision, to strengthen the regulation, supervision and risk management of the banking sector". The foremost difference between the Basel II and Basel III norms is the word "enhanced" to the new norms. Basel III requires overall capital to be 10.5 % of the Risk Weighted Assets. Under the new rules, the mandatory reserve (known as Tier 1 capital) will be 6% by 2015. Banks are required to maintain CRAR of 10.5%. The improvements of Basel III over Basel II is that it has led to increase in the level and quality of capital, liquidity standards were introduced, alterations in the existing norms, and better and more comprehensive disclosures. The present study was undertaken with the following objectives:

1. To study the level of compliance of BASEL III norms as given by RBI by selected nationalized, private and foreign banks.

2. To Compare the level of compliance of Basel III norms as given by RBI by selected nationalized, private and foreign banks.

Review of Literature

Nachane (2003) studied the implications of Basel II norms for Indian Banking System and found that Basel I norms were addressed to internationally active banks, and were applied to all banks on a consolidated basis and capital adequacy was the major area to be concentrated and it didn't differentiated between strong and weak banks whereas the new norms were focusing on credit risks, market risks and operational risks. Rao (2003) studied the basis for the revision of the 1988 accord, the overview of the new accord, the standardised approach for assessing capital requirements, and the issues involved in implementation of the standardised approach. It was found that the 1988 framework does not make differentiation of credit risk, the risk weights for a higher rating company is same as that of the lower rating company. Upadhyay (2003) studied the effect of the introduction of capital adequacy norms on the credit flow and asset structure of the public sector commercial banks. It was found out that credit regulatory mechanism has become stricter after the implementation of the Narsimham recommendations.

Munteanu (2012) studied the improvements and changes from Basel II to Basel III. It was found that Basel III strengthens bank capital requirements and introduces new regulatory requirements on bank liquidity and bank leverage. Popli and Vadgama (2012) studied the emerging challenges and potential of the new reforms. It was found that in order to cope with international competition the banks have to gear up for the stringent capital adequacy norms keeping in view the technological innovation and major developments in the banking industry across the world. Popli and Kumari (2012) studied the initiatives taken by commercial banks in compliance of new norms. It was found that Indian commercial banks have taken significant and structural initiatives with regard to risk management to implement the Basel II norms in their organizational structure.

Kishore (2014) studied the transition of Indian Banks from Basel II to Basel III. It was found that the banks had to increase their capital and to strengthen their risk management structure in order to comply with new norms

Bogami et al (2015) studied the extent of compliance of Basel III norms by Saudi Arabia banks. It was found that the banking system in Saudi Arabia, monitored by Saudi Arabian Monetary Agency was actively trying to enforce the reforms as per the agreed timelines. The agency also introduced the leverage, liquidity and capital adequacy ratios.

Mirchandani and Rathore (2013) studied the implementation of Basel III norms for public sector banks. It was found that the implementation of Basel III norms will have significant impact on profitability and lending capabilities of the banks particularly across few industries such as construction, project financing, shipping etc. Yuting (2012) studied the impact of Basel III norms on the European banking industry. It was found that the introduction of new norms will reduce the risk of systematic banking crisis and will act as catalyst for capital market development in the long run.

Research Implications

The research analysis indicates that foreign banks are more efficient in complying with the new norms as compared to the nationalised and private banks. Present research would be useful to understand the capital requirements of nationalised, private sector and foreign banks under new norms. Present research would be useful to understand the different parameters which need to be focused in nationalised and private banks for better performance and it would help in strengthening the banking structure. The research could further be extended to study how the market participants have benefitted from the introduction of enhanced market discipline in the regulatory norms. The research does not cover the internal changes which are brought in the banks structure to comply with new norms because of non-availability of data. The study could also be used to get a detail view of the enhanced norms complied by the banks.

Research Methodology

The research design is exploratory in approach. Population of the study consists of all the banks operating in India. There are three categories of banks in India- Public, Private and Foreign banks. The Indian banking system consists of 26 public sector banks, 25 private sector banks, 43 foreign banks, 56 regional rural banks, 1,589 urban cooperative banks and 93,550 rural cooperative banks, in addition to cooperative credit institutions (India brand equity foundation, 2016). A sample of nine banks, three banks from each category was selected. The banks selected were Bank of India, Punjab National Bank, and State Bank of India, Axis Bank, HDFC Bank, ICICI Bank, HSBC Bank, Citibank and Standard Chartered Bank. Basel norms data related to Tier 1 capital, Total capital Adequacy ratio, credit, market and the operational risk capital requirements for past 12 years i.e. 3 years of Basel I norms, 6 years before and 3 years after the adoption of Basel III norms was collected. The data was collected from the websites of the respective banks as given in references. The percentage change in the tier 1 capital ratio, total capital adequacy ratio, credit, market and the operational risk capital requirements as well as the average of tier 1 capital ratio, total capital adequacy ratio, credit, market and the operational risk capital requirements of the nationalised, private and foreign banks was studied. The statistical techniques used for data analysis includes paired t-test and t Test: Two Sample Assuming Equal Variance.

Results and Discussion

The findings of the study have been divided into three sections. First section deals with comparison of Tier 1 capital ratio, the second section deals with the Total capital adequacy ratio, the third section deals with the Credit Risk, Market Risk and Operational Risk Capital Requirements.

I. Tier 1 Capital Ratio*:* The comparison of individual bank from year 2004-05 to 2015-2016 and inter-category comparison was done. In the end the data was analysed using paired t test.

From Table 1, we find that the average tier 1 capital ratio of nationalised banks increase from 7.08 percent in 2004-2005 to 9.15 percent in 2015-2016. The average tier 1 capital ratio of private banks increased from 8.69 percent in 2004-2005 to 12.99 percent in 2015-2016. It was also observed that the tier 1 capital ratio of foreign banks increased from 8.83 percent in 2004-2005 to14.79 percent in 2015-2016. It was observed that from the year after adoption of Basel III norms, tier 1 capital ratio has increased continuously and was able to meet the statutory requirements of the RBI i.e. 6 percent.

It can be observed from table 2 that average tier 1 capital ratio of Basel III norms was higher in case of foreign banks as compared to private and public sector banks except in case of standard chartered bank where it was 11. 98 percent. The average tier 1 capital ratio under Basel III norms was observed to be lowest of all the three categories of banks as compared to Basel II and Basel III norms.

Table 1: Tier 1 Capital Ratio of Nationalised, Private and Foreign Banks

Banks	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-2011**	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**	**2015-2016**
Bank of India	7.05%	6.75%	6.54%	7.74%	8.99%	8.57%	8.42%	8.69%	8.31%	9.41%	8.63%	7.42%
Percentage change	-	(0.30)%	(0.21)%	1.20%	1.22%	(0.42)%	-0.15%	0.27%	-0.38%	1.10%	-0.78%	-1.21%
Punjab National Bank	7.31%	7.42%	7.83%	8.97%	8.98%	9.11%	8.82%	9.40%	10.00%	9.79%	9.57%	10.16%
Percentage change	-	0.11%	0.41%	1.14%	0.01%	0.13%	-0.29%	0.58%	0.60%	-0.22%	-0.22%	0.59%
State Bank Of India	6.87%	7.65%	7.92%	8.48%	9.38%	9.45%	7.65%	9.65%	9.50%	9.87%	9.49%	9.87%
Percentage change	-	0.78%	0.27%	0.56%	0.90%	0.07%	-1.80%	2.00%	-0.15%	0.37%	-0.38%	0.38%
Average of selected Nationalised Banks	**7.08%**	**7.27%**	**7.43%**	**8.40%**	**9.12%**	**9.04%**	**8.30%**	**9.25%**	**9.27%**	**9.69%**	**9.23%**	**9.15%**
Percentage change	-	0.19%	0.16%	0.97%	0.72%	(0.08)%	-0.75%	0.95%	0.02%	0.42%	-0.46%	-0.08%
Axis Bank	8.87%	7.26%	6.42%	10.39%	9.26%	11.18%	9.41%	9.45%	12.23%	12.75%	12.14%	12.62%
Percentage change	-	(1.61)%	(0.84)%	3.97%	(1.13)%	1.92%	-1.77%	0.04%	2.78%	0.52%	-0.61%	0.48%
HDFC Bank	9.60%	8.60%	8.57%	10.30%	10.58%	13.26%	12.33%	11.67%	11.01%	11.72%	13.67%	13.22%
Percentage change	-	(1.00)%	(0.03)%	1.73%	0.28%	2.68%	-0.93%	-0.66%	-0.66%	0.71%	1.95%	-0.45%
ICICI Bank	7.59%	9.20%	7.42%	10.66%	10.34%	12.92%	12.72%	12.80%	12.91%	13.11%	12.88%	13.13%
Percentage change	-	1.61%	(1.78)%	3.24%	(0.32)%	2.58%	-0.20%	0.08%	0.11%	0.20%	-0.23%	0.25%
Average of selected Private Banks	**8.69%**	**8.35%**	**7.47%**	**10.45%**	**10.06%**	**12.45%**	**11.49%**	**11.31%**	**12.05%**	**12.53%**	**12.90%**	**12.99%**
Percentage change	-	(0.34)%	(0.88)%	2.98%	(0.39)%	2.39%	-0.97%	-0.18%	0.74%	0.48%	0.37%	0.09%
Citibank	9.80%	10.77%	10.12%	11.24%	12.42%	17.27%	17.42%	17.08%	16.70%	17.23%	16.12%	16.27%
Percentage change	-	0.97%	(0.65)%	1.12%	1.18%	4.85%	0.15%	-0.34%	-0.38%	0.53%	-1.11%	0.15%
HSBC Bank	9.00%	9.40%	9.30%	10.52%	14.12%	16.63%	15.75%	15.80%	15.70%	15.89%	13.73%	15.31%
Percentage change	-	0.40%	(0.10)%	1.22%	3.60%	2.51%	-0.88%	0.05%	-0.10%	0.19%	-2.16%	1.58%
Standard Chartered Bank	7.70%	8.40%	8.80%	10.10%	7.99%	8.94%	9.30%	8.59%	10.90%	10.94%	12.21%	12.79%
Percentage change	-	0.70%	0.40%	1.30%	(2.11)%	0.95%	0.36%	-0.71%	2.31%	0.04%	1.27%	0.58%
Average Of selected Foreign Banks	**8.83%**	**9.52%**	**9.41%**	**10.62%**	**11.51%**	**14.28%**	**14.16%**	**13.82%**	**14.43%**	**14.69%**	**14.02%**	**14.79%**
Percentage change	-	0.69%	(0.11)%	1.21%	0.89%	2.77%	-0.12%	-0.33%	0.61%	0.25%	-0.67%	0.77%

(Source: From websites of respective banks)

Comparison of Tier 1 Capital Ratio under Basel I Norms, Basel II Norms and Basel III Norms by Nationalised, Private and Foreign Banks

In this section the average of Tier 1 capital ratio under Basel I, Basel II and Basel III norms by selected Nationalised, Private and Foreign Banks have been discussed. The data was analysed using paired t-test to find whether there was significant difference between Basel I and Basel II norms and Basel II and Basel III norms.

Table 2: Average of the Tier 1 Capital Ratio under Basel I, Basel II and Basel III Norms by selected Nationalised, Private and Foreign Banks

Banks	Basel I	Basel II	Basel III
Bank of India	6.78%	8.45%	8.49%
Punjab National Bank	7.52%	9.21%	9.84%
State Bank of India	7.48%	9.02%	9.74%
Axis Bank	7.52%	10.32%	12.50%
HDFC Bank	8.92%	11.53%	12.87%
ICICI Bank	8.07%	12.06%	13.04%
Citibank	10.23%	15.36%	16.54%
HSBC Bank	9.23%	14.75%	14.98%
Standard Chartered Bank	8.30%	9.30%	11.98%

(Source: From websites of respective banks)

Paired t-test was applied on the above average figures to find out whether the new norms had any effect on the banks' tier 1 capital ratio or not. Paired t-test was applied for comparison between Basel I and Basel II norms and further comparison was done between Basel II and Basel III norms.

Table 3: Comparison of Tier 1 Capital Ratio under Basel I and Basel II Norms and Basel II and Basel III Norms of selected Nationalised, Private and Foreign Banks

Category	Basel I and Basel II		Basel II and Basel III	
	t-value	p-value	t-value	p-value
Public	33.59	<0.0001*	2.14	0.17
Private	7.24	0.02*	4.23	0.05**
Foreign	2.69	0.11	1.90	0.19

(*Significant at 1% level of significance, **Significant at 5% level of significance)
(Source: From websites of respective banks)

From Table 3 it was found that in comparison of Basel I and Basel II norms, significant difference was observed in case of public sector and private sector banks which was significant at 1 percent level of significance while no significant difference was observed in case of foreign banks. While comparing Basel II and Basel III norms significant difference was observed in case of only private sector banks which was significant at 5 percent level of significance while no significant difference was observed in case of public sector and foreign banks.

II Total Capital Adequacy Ratio

The comparison of the individual bank form 2004-05 to 2015-2016 and inter-category comparison was done. The data was analysed using paired t-test.

From Table 4, it was found that the CRAR of nationalised banks decreased in the year 2005-2006 because the risk weighted assets increased and then it increased continuously for three years till 2008-2009 because the reserves, innovative perpetual bonds and capital funds amount under tier 2 capital of the bank increased, further it decreased in year 2009-2010 and 2010-2011 before increasing to a rate of 0.06 percent in 2015-2016. No definite pattern was in the CRAR of nationalised banks.

In case of private sector banks this ratio declined in 2005-2006 because the share premium of HDFC bank decreased to a great extent and there was a credit enhancement on securitisation at 50% and there was a decrease in the investment fluctuation reserve of ICICI Bank and in this year the bank also had a negative balance in the foreign currency translation reserve. It again increased in the year 2006-2007 because the banks raised equity capital during the year through follow-on Global Depositary Receipt (GDR) issue, a Qualified Institutional Placement (QIP) and a preferential allotment of equity shares to the promoters of the banks. In all the years it had been able to meet the statutory requirements of the RBI.

In case of foreign banks this ratio declined in the year 2005-2006 and then continuously increased from 2006-2007 to 2009-2010 and was complying with requirements of those of RBI. Further it decreased in the year 2010-2011 and has gone through ups and downs before reaching to 15.51 percent in the year 2015-2016.

Table 4: Total Capital Adequacy Ratio of selected Nationalised, Private and Foreign Banks

Banks	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-2011**	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**	**2015-2016**
Bank of India	11.50%	10.80%	11.80%	12.07%	13.08%	13%	12.24%	12.03%	11.11%	12.38%	11.21%	10.21%
Percentage change		-0.70%	1.00%	0.27%	1.01%	-0.08%	-0.76%	-0.21%	-0.92%	1.27%	-1.17%	-1.00%
Punjab National Bank	14.80%	12.00%	12.30%	13.46%	14.03%	14.16%	13.01%	12.96%	13.06%	13.16%	12.89%	13.15%
Percentage change		-2.80%	0.30%	1.16%	0.57%	0.13%	-1.15%	-0.05%	0.10%	0.10%	-0.27%	0.26%
State Bank Of India	12.50%	11.90%	12.30%	12.64%	14.25%	13.39%	11.56%	13.68%	12.82%	12.23%	12.00%	12.92%
Percentage change		-0.60%	0.40%	0.34%	1.61%	-0.86%	-1.83%	2.12%	-0.86%	-0.59%	-0.23%	0.92%
Average Of selected Nationalised Banks	12.93%	11.57%	12.13%	12.72%	13.79%	13.52%	12.27%	12.89%	12.33%	12.59%	12.03%	12.09%
Percentage change		-1.37%	0.57%	0.59%	1.06%	-0.27%	-1.25%	0.62%	-0.56%	0.26%	-0.56%	0.06%
Axis Bank	12.70%	11.10%	11.60%	13.99%	13.69%	15.80%	12.65%	13.66%	17.15%	16.30%	15.20%	15.41%
Percentage change		-1.60%	0.50%	2.39%	-0.30%	2.11%	-3.15%	1.01%	3.49%	-0.85%	-1.10%	0.21%
HDFC Bank	12.20%	11.40%	13.10%	13.60%	15.69%	17.44%	16.45%	16.66%	16.90%	16.00%	16.80%	15.33%
Percentage change		-0.80%	1.70%	0.50%	2.09%	1.75%	-0.99%	0.21%	0.24%	-0.90%	0.80%	-1.47%
ICICI Bank	11.80%	13.40%	11.70%	13.46%	14.73%	19.15%	19.92%	19.60%	19.69%	18.34%	17.20%	16.60%
Percentage change		1.60%	-1.70%	1.76%	1.27%	4.42%	0.77%	-0.32%	0.09%	-1.35%	-1.14%	-0.60%
Average of selected Private Banks	12.23%	11.97%	12.13%	13.68%	14.70%	17.46%	16.34%	16.64%	17.91%	16.88%	16.40%	15.78%
Percentage change		-0.27%	0.17%	1.55%	1.02%	2.76%	-1.12%	0.30%	1.27%	-1.03%	-0.48%	-0.62%
Citibank	10.80%	11.30%	11.10%	12.00%	13.23%	18.14%	17.97%	17.79%	17.64%	18.31%	17.18%	17.12%
Percentage change		0.50%	-0.20%	0.90%	1.23%	4.91%	-0.17%	-0.18%	-0.15%	0.67%	-1.13%	-0.06%
HSBC Bank	14.00%	10.60%	11.10%	11.46%	15.31%	18.03%	17.17%	17.23%	17.10%	17.36%	14.84%	15.99%
Percentage change		-3.40%	0.50%	0.36%	3.85%	2.72%	-0.86%	0.06%	-0.13%	0.26%	-2.52%	1.15%
Standard Chartered Bank	10.50%	9.90%	10.40%	10.59%	11.56%	12.41%	12.26%	11.43%	13.43%	12.88%	12.21%	13.41%
Percentage change		-0.60%	0.50%	0.19%	0.97%	0.85%	-0.15%	-0.83%	2.00%	-0.55%	-0.67%	1.20%
Average Of selected Foreign Banks	11.77%	10.60%	10.87%	11.35%	13.37%	16.19%	15.80%	15.48%	16.06%	16.18%	14.74%	15.51%
Percentage change		-1.17%	0.27%	0.48%	2.02%	2.83%	-0.40%	-0.31%	0.57%	0.13%	-1.44%	0.76%

(Source: From websites of respective banks)

Comparison of CRAR under Basel I Norms, Basel II Norms and Basel III Norms by Nationalised, Private and Foreign Banks

In this section the average of CRAR under Basel I, Basel II and Basel III norms by selected Nationalised, Private and Foreign Banks have been discussed. The data was analysed using paired t-test to find whether there was significant difference between Basel I and Basel II norms and Basel II and Basel III norms.

Table 5: Average of CRAR under Basel I, Basel II and Basel III Norms by selected Nationalised, Private and Foreign Banks

Banks	**Basel I**	**Basel II**	**Basel III**
Bank of India	11.37%	12.26%	11.27%
Punjab National Bank	13.03%	13.45%	13.07%
State Bank of India	12.23%	13.06%	12.38%
Axis Bank	11.80%	14.49%	15.64%
HDFC Bank	12.23%	16.12%	16.04%
ICICI Bank	12.30%	17.76%	17.38%
Citibank	11.07%	16.13%	17.54%
HSBC Bank	11.90%	16.05%	16.06%
Standard Chartered Bank	10.27%	11.95%	12.83%

(Source: From websites of respective banks)

Paired t-test was applied on the above average figures to find out whether the new norms had any effect on the banks' tier 1 capital ratio or not. Paired t-test was applied for comparison between Basel I and Basel II norms and further comparison was done between Basel II and Basel III norms.

Table 6: Comparison of CRAR under Basel I and Basel II Norms and Basel II and Basel III Norms of selected Nationalised, Private and Foreign Banks

Category	**Basel I and Basel II**		**Basel II and Basel III**	
	t-value	**p-value**	**t-value**	**p-value**
Nationalised	4.76	0.04*	3.87	0.06
Private	5.01	0.04*	-0.49	0.67
Foreign	3.59	0.07	-1.89	0.19

(*Significant at 5% level of significance)
(Source: From websites of respective banks)

From Table 6 it was found that in comparison of Basel I and Basel II norms, significant difference was observed in case of nationalised and private sector banks which was significant at 5 percent level of significance while significant difference was not observed in case of foreign banks. While comparing Basel II and Basel III norms no significant difference was observed in case of all the three categories of banks.

III. Credit Risk, Market Risk and Operational Risk Capital Requirements

The comparison of credit risk, market risk and operational risk capital requirements before and adoption of Basel III norms was done. The data was analysed using paired t-test to find whether there was any significant difference between the three categories of requirements under two norms.

From Table 7, it was found that the credit risk capital requirements of the nationalised banks had shown the maximum increase and the approach used was Standardised Approach. In case of private banks the average of the credit risk capital requirements had shown a maximum decline in the year 2008-2009 because the Risk Weighted Assets decreased by Rs. 666.36 billion and the private banks used Standardised approach and they also concentrated on the credit risk arising from Swaps. In case of foreign banks the amount of capital for credit risk reduced because the capital for the retail exposures and securitisation exposures had reduced and the approach used was advanced internal ratings based approach.

From table 8 it was found that the market risk capital requirements of nationalised banks have increased from 2008-2009 to 2014-2015 but it showed a decline in the year 2015-2016. For private sector banks there was a decline in the market risk capital requirements and the same results were obtained in case of foreign banks. It was also found that the market risk capital requirements declined for Citibank and Standard Chartered bank but in case of HSBC bank there was an increase in the market risk capital requirements. Overall there was an increase in the market risk capital requirements for foreign banks.

Table 7: Credit Risk Capital Requirements by selected Nationalised, Private and Foreign Banks (Figs. In Crores)

Banks	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Bank of India	95510	109277	146528	185322	213255	227740	271421	292963	280380
Percentage change		14.414197	34.088601	26.47549	15.07268	6.792338	19.18021	7.936748	-4.29508
Punjab National Bank	99130	120250	151802	197470	228052	251022	281345	311668	317548
Percentage change		21.305357	26.238669	30.08393	15.48691	10.07226	12.07982	10.77787	1.886623
State Bank of India	592413	640230	715390	883650	880743	1036077	1162695	1228014	1319505
Percentage change		8.0715649	11.739531	23.52004	-0.32898	17.6367	12.22091	5.617896	7.450322
Axis Bank	6444.37	8398.51	11040.47	15350.25	17815	19785.25	220761	268331	311280
Percentage change		30.323212	31.457485	39.0362	16.05674	11.0595	1015.786	21.54819	16.00598
HDFC Bank	89811.92	107397	122805	152620	197603	246818	285342	348418	433477
Percentage change		19.579895	14.346769	24.27833	29.47386	24.906	15.60826	22.1054	24.41292
ICICI Bank	31385	32814	26281	29656	33919	37718	429691	463971	516599
Percentage change		4.5531305	-19.90919	12.84198	14.37483	11.20021	1039.22	7.977826	11.34295
Citibank	810680	790130	649290	715175	770212	818710	843304	926118	983887
Percentage change		-2.534909	-17.82491	10.14724	7.695599	6.296708	3.003994	9.820183	6.237758
HSBC Bank	5163.61	4394.53	3292.36	51841.75	53232.5	50451	56014	72291	83028
Percentage change		-14.89423	-25.0805	1474.608	2.682683	-5.22519	11.02654	29.05881	14.85247
Standard Chartered Bank	46583	51735	55799	84676	96775	105197	112424	131932	133778
Percentage change		11.059829	7.855417	51.75182	14.28858	8.702661	6.869968	17.35217	1.399206

(Source: From websites of respective banks)

Table 8: Market Risk Capital Requirements by selected Nationalised, Private and Foreign Banks (Figs. In Crores)

Banks	**2007-08**	**2008-09**	**2009-10**	**2010-2011**	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**	**2015-2016**
Bank of India	81585	84367	132598	185322	213255	227740	271421	292963	280380
Percentage change		3.409941	57.16809	39.76229	15.07268	6.792338	19.18021	7.936748	-4.29508
Punjab National Bank	61379	64158	66642	197470	228051	251022	281345	311668	317548
Percentage change		4.527607	3.871692	196.3146	15.4864	10.07275	12.07982	10.77787	1.886623
State Bank of India	42605	37669	50680	41250	43770	63901	71818	111163	112559
Percentage change		-11.5855	34.54034	-18.6069	6.109091	45.99269	12.38948	54.78432	1.255814
Axis Bank	9344	21018	20174	13780	17490	18415	18280	25109	27106
Percentage change		124.9358	-4.01561	-31.6943	26.92308	5.288736	-0.7331	37.35777	7.953324
HDFC Bank	1763	5627	5892	4595	9281	13733	10403	17603	24325
Percentage change		219.1719	4.709437	-22.0129	101.9804	47.96897	-24.2482	69.2108	38.18667
ICICI Bank	4994	4613	3270	3402	3196	3246	29761	39395	37820
Percentage change		-7.62915	-29.1134	4.036697	-6.05526	1.564456	816.8515	32.37122	-3.99797
Citibank	64350	54840	40220	63517	53504	99810	74462	121694	125628
Percentage change		-14.7786	-26.6594	57.92392	-15.7643	86.5468	-25.3963	63.43101	3.232698
HSBC Bank	701.16	822.66	910.72	10688.25	10784.5	10592	10977	13623	18477
Percentage change		17.32843	10.7043	1073.604	0.900522	-1.78497	3.634819	24.10495	35.63092
Standard Chartered Bank	2099.19	3036.94	1755.72	2808	6278	8427	8330	9954	13009
Percentage change		44.67199	-42.1879	59.93439	123.5755	34.23065	-1.15106	19.4958	30.69118

(Source: From websites of respective banks)

Table 9: Operational Risk Capital Requirements by selected Nationalised, Private and Foreign Banks (Figs. In Crores)

Banks	**2007-08**	**2008-09**	**2009-10**	**2010-2011**	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**	**2015-2016**
Bank of India	6990	8840	10791	13187	14965	16840	23801	21157	19053
Percentage change		26.46638	22.07014	22.20369	13.48298	12.52923	41.3361	-11.1088	-9.9447
Punjab National Bank	9746	11656	11656	16993	20642	24219	27157	30095	31579
Percentage change		19.59778	0	45.78758	21.47355	17.32875	12.13097	10.81857	4.931052
State Bank of India	45317	49720	55410	78088	79181	95810	108767	121139	149280
Percentage change		9.716001	11.44409	40.92763	1.399703	21.00125	13.52364	11.37477	23.23034
Axis Bank	2703	4315	6561	9610	12890	16252	20002	24320	32874
Percentage change		59.63744	52.05098	46.47157	34.13111	26.08223	23.07408	21.58784	35.1727
HDFC Bank	9905.5	8061	11750	15142	18926	22564	28100	34144	46580
Percentage change		-18.621	45.76355	28.86809	24.99009	19.22223	24.53466	21.5089	36.42221
ICICI Bank	15220	21140	24590	26250	26190	27490	31238	37003	49265
Percentage change		38.89619	16.31977	6.750712	-0.22857	4.963727	13.63405	18.45509	33.13785
Citibank	7590	12461	12466	12953	12315	10519	10373	126809	160573
Percentage change		64.17655	0.040125	3.906626	-4.9255	-14.5838	-1.38796	1122.491	26.62587
HSBC Bank	3699	5416	7463	8263.25	8309.5	8217	8402	8525	11084
Percentage change		46.41795	37.79542	10.7229	0.559707	-1.11318	2.25143	1.463937	30.0176
Standard Chartered Bank	5705	5740	7496	9263	9894	10342	10955	12001	15546
Percentage change		0.613497	30.59233	23.57257	6.812048	4.527997	5.927287	9.548152	29.53921

(Source: From websites of respective banks)

From table 9 it was found that the operational risk capital requirements of nationalised banks have increased from 2008-2009 to 2013-2014 but it showed a decline in the year 2014-2015 and 2015-2016. For private sector banks there was an increase in the market risk capital requirements and the same results were obtained in case of foreign banks.

Comparison of Credit Risk, Market Risk and Operational Risk Capital Requirements of Banks using Paired t-test

The credit risk requirements were analysed using Paired t-test.

Table 10: Average of the Credit Risk, Market Risk and Operational Risk Capital requirements under Basel II and Basel III Norms by selected Nationalised, Private and Foreign Banks

Banks	**Credit Risk**		**Market Risk**		**Operational Risk**	
	Basel II	**Basel III**	**Basel II**	**Basel III**	**Basel II**	**Basel III**
Bank of India	162938.7	281588	154144.5	281588	11935.5	21337
Punjab National Bank	174621	303520.3	144787	303520.3	15818.67	29610.33
State Bank of India	791417.2	1236738	46645.83	98513.33	67254.33	126395.3
Axis Bank	13138.98	266790.7	16703.5	23498.33	8721.833	25732
HDFC Bank	152842.5	355745.7	6815.167	17443.67	14391.42	36274.67
ICICI Bank	31962.17	470087	3786.833	35658.67	23480	39168.67
Citibank	759032.8	917769.7	62706.83	107261.3	11384	99251.67
HSBC Bank	28062.63	70444.33	5749.882	14359	6894.625	9337
Standard Chartered Bank	73460.83	126044.7	4067.475	10431	8073.333	12834

(Source: From websites of respective banks)

From Table 10 it was found out that the average of the credit risk capital requirements under Basel III norms have increased as compared to Basel II norms for all the three categories of banks. It was also observed that market risk capital requirements of the banks have also increased with the compliance of new norms. Operational risk capital requirements have also witnessed increased when the new norms came into existence.

Table 11: Comparison of Credit Risk, Market Risk and Operational Risk Capital requirements under Basel II and Basel III Norms of selected Nationalised, Private and Foreign Banks

Category	**Credit Risk**		**Market Risk**		**Operational Risk**	
	t-value	**p-value**	**t-value**	**p-value**	**t-value**	**p-value**
Nationalised	2.16	0.16	3.55	0.07*	1.73	0.23
Private	4.17	0.05*	2.10	0.17	9.66	0.01*
Foreign	2.27	0.15	1.60	0.28	1.13	0.38

(*Significant at 5% level of significance)

It was found from table10 that there was significant difference in the credit risk capital requirements under Basel II and Basel III norms for private sector banks which was significant at 5 percent level of significance. No significant difference was observed in case of nationalised and foreign banks. In case of Market risk capital requirements significant difference was observed in case of nationalised banks which was significant at 5 percent level of significance. In case of private sector and foreign banks no significant difference was observed for the market risk capital requirements under Basel II and Basel III norms. In case of operational risk capital requirements significant difference was observed in case of private sector banks which was significant at 5 percent level of significance while no significant difference was observed in case of nationalized and foreign banks.

Discussion

Basel III norms were released in December, 2010 and these are the third series of norms issued by the Basel Committee on Banking Supervision (BCBS). These were introduced with the main objective of improving the banking sector's ability to absorb financial and economic stress, improving the risk management and governance of banks and making the operations of the banks more transparent. The introduction of capital conservation buffer and countercyclical buffer will help in absorbing the unforeseen losses and financial risks. The results of the study indicate that all the banks are ably to comply with the new norms in case of tier 1 capital ratio and CRAR. It was also observed that the market risk, credit risk and operational risk capital requirements of the banks have increased under Basel III norms. Significant difference was observed in case of Tier 1 capital requirements of private banks because the banks had to increase their capital requirements in order to comply with the new norms. The Reserve Bank of India (RBI) has allowed additional reserves to be part of tier-1 or core capital of banks, such as revaluation reserves linked to property holdings, foreign currency translation reserves and deferred tax assets, which is expected to shore up the capital of state-run banks and privately owned banks by up to Rs 35,000 crore (US$ 5.14 billion) and Rs 5,000 crore (US$ 734 million) respectively. In July 2016, the government allocated Rs 22,915 crore (US$ 3.41 billion) as capital infusion in 13 public sector banks, which is expected to improve their liquidity and lending operations, and shore up economic growth in the country (India Brand Equity Foundation, 2016).

While comparing the CRAR of the banks under Basel II and Basel III no significant difference was observed in case of all the three categories of banks. The results of comparison of credit risk, market risk and operational risk indicates that significant difference was observed in case of credit risk and operational risk capital requirements of private banks because private banks have increased their credit risk and market risk capital requirements after the financial crisis of 2008. The market risk capital requirements differ significantly in case of nationalised banks only.

Limitations of the Study

The study is subjected to certain constraints and limitations. These are listed below so that the findings of the study could be understood in their perspective:

1. The study was based on the data available from the websites of the banks.
2. The study does not cover the internal changes brought by the banks in complying with the new norms.
3. In addition to the parameters studied, some other parameters may be there which may not have been included in the study.

Conclusion

Basel III norms were introduced by the Basel Committee on Banking Supervision (BCBS) in December, 2010 and were implemented by banks in April, 2013. The study was conducted to compare the level of compliance of Basel III norms by selected banks in India. It was found that the nationalised, private and foreign banks are able to improve their Tier 1 capital ratio and CRAR according to the guidelines given by RBI. Significant difference was observed in case of private sector banks because the major banking business is conducted by private sector banks. No significant difference was observed in case of nationalised banks because these banks were getting assistance from the Reserve Bank of India in order to comply to meet their capital requirements. Similarly no significant different was observed in case of foreign banks because these banks have already been able to meet their capital requirements not leading to much difference in these banks.

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