

# Implementation of Basel Capital Ratios by Indian Banks

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## Abstract

In 2010, central banks, in conjunction with the Basel Committee on Banking Supervision, proposed new capital standards: Basel III, to supplement Basel I and II. Guidelines issued by the Reserve Bank of India required Indian banks to begin following Basel III standards in 2013. Full implementation is expected by 2019. This study examines Basel I, II and III's impact on Indian banks. We find transitioning from Basel I to Basel II had the greatest impact on foreign banks because the new standards required additional capital reserves for market and operational risk.

**Keywords:** Basel capital standards; Reserve Bank of India; Basel implementation in India

## Introduction

In 1988, the Bank for International Settlements (BIS) located in Basel, Switzerland, proposed a set of minimum capital requirements that required banks holding risky assets to increase their capital reserves. Based on borrowers' creditworthiness, assets were divided into four groups with specified risk weights as shown in Table 1.

Holding government bonds or loans was considered risk-free and therefore carried a risk weight of zero. Loans to government agencies were considered slightly risky, resulting in a risk weight of 20%; loans to individuals and corporations were deemed riskiest, and assigned a risk weight of 100%. After applying the above weights to convert all assets into risk-weighted assets, banks were required to set aside a minimum Tier 1 capital equivalent to four percent of the risk-weighted assets (RWA). They also were required to hold a minimum combined Tier 1 and Tier II capital equivalent to eight percent of RWA [1].

In 1992, Basel I was successfully adopted by banks throughout the world [2]. Basel I's adoption accomplished one of the committee's main objectives: creation of a common global standard that permitted cross border comparison of banks' risk profiles. Basel II improved loan classifications and required additional capital to be held against market and operational risk as banks expanded beyond traditional lending into trading and investment banking [3]. The new standards were adopted in Europe and by several Asian countries in 2007. The United States postponed the adoption deadline to 2008, but the financial crisis in 2008 scuttled Basel II before it was fully implemented.

At the height of the crisis in 2009, Basel 2.5 was adopted, significantly increasing the amount of capital held by banks. In 2010, Basel III was introduced with additional requirements that included a new classification for large banks considered too big to fail, SIFIs (systemically important financial institutions). The new standards added a non-risk based leverage ratio, liquidity coverage ratio (LCR) and Net Stable Funding Ratio (NSFR), and introduced additional capital requirements for countercyclical and conservation buffers. Basel III reduced reliance on external ratings agencies because of their poor performance in predicting banks' creditworthiness during the financial crisis. Basel III continues to be modified; in 2016 BIS announced additional rules that include strengthened risk weights, (these had been weakened over the years), and the creation of a lower bound for capital requirements; prior to the crisis, many internal models underestimated capital requirements [4]. The new standards, yet to be formally proposed, are referred to as Basel IV.

In 2004, the Reserve Bank of India (RBI) adopted most of the recommendations outlined in Basel II. In 2008, foreign banks operating in India and Indian banks with large presences overseas began reporting in compliance with Basel II. Other banks scheduled for adoption (except for Local Area and Regional Rural banks) had to implement the adopted recommendations by 2009. In March 2013, the same set of banks began implementing of Basel III, with full adoption expected by 2019.

## Study objectives

- To determine whether capital ratios differ across the four classification of Indian banks: State Bank of India (SBI) banks, nationalized banks, private sector banks and foreign banks.
- To compare changes in capital ratios across banks between Basel I, II and III.

## Research Methodology

The study period extends from 2008 to 2015, when continuous data on capital ratios are available from the RBI. We use a test of means to measure the statistical differences in capital ratios under Basel I, II and III for the four sets of banks.

## Description of variables

Risk-based capital ratios require the estimation of risk-weighted assets and Tier I and Tier II capital.

Tier I capital includes the following:

- Paid-up capital (ordinary shares), statutory reserves, and other disclosed free reserves, if any;
- Perpetual Non-cumulative preference shares (PNCPS) eligible for inclusion as Tier I capital, subject to laws in force from time to time;
- Innovative perpetual debt instruments (IPDI) eligible for inclusion as Tier I capital; and

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d. Capital reserves representing surplus from sale proceeds of assets.

Tier II capital includes undisclosed reserves, revaluation reserves, general provisions and loss reserves, hybrid capital instruments, subordinated debt and investment reserve account. Both Tier I and II have some deductions, such as intangible assets, that reduce the amount of capital requirement.

The formula for determining sufficiency for Basel I standards requires banks to keep a minimum Tier I ratio of 4% and Tier I and Tier II ratio of 8%, as shown below:

$$\text{Tier I ratio} = \frac{\text{Eligible Tier I Capital}}{\text{Risk - Weighted Assets}} > 4\%$$

$$\text{Total ratio} = \frac{\text{Eligible Tier I and II Capital}}{\text{Risk - Weighted Assets}} > 8\%$$

The RBI requested Indian banks to hold a minimum of 8% for total capital ratio but in 1999 they increased it to 9%. They also recommended a minimum of 6% for Tier I capital ratio.

One weakness of Basel I is the lack of differentiation between consumer and commercial loans. A risky loan to a real estate company carried the same risk weight as a loan to a stable and mature company. Consequently, the United States proposed that borrower classifications be based on ratings provided by external ratings agencies such as S&P and Moody's. Other countries, notably Germany objected. German firms rarely borrowed from public markets; therefore, their debt was not rated. Negotiating countries compromised by agreeing that banks could use either external rating agencies or internally generated rating models if the models were approved by their respective regulators. The new standards, termed Basel II, were approved in 2004 and included requirements for holding additional capital for market and operational risk. The RBI implemented Basel II in 2008 and allowed banks to use external ratings to classify loans with risk weights that were slightly different from those proposed by Basel.

Table 2 provides an example of the risk weights that could be applied to public sector enterprises (PSEs) in India.

Tier I and Total capital were to be estimated as follows:

$$\text{Tier I Capital ratio} = \frac{\text{Eligible Tier I Capital}}{\text{Credit Risk RWA} + \text{Market Risk RWA} + \text{Operational Risk RWA}}$$

$$\text{Total Capital (CPAR) ratio} = \frac{\text{Eligible Total Capital}}{\text{Credit Risk RWA} + \text{Market Risk RWA} + \text{Operational Risk RWA}}$$

Basel III has added an additional layer to capital requirements [5]. The new standards include a Tier I common equity capital ratio in

Borrower category	Risk weight
Government bonds and loans	0%
Government agency bonds and loans	20%
Mortgages	50%
Loans to individuals and corporations	100%

Table 1: Borrowers' creditworthiness.

S&P/Fitch ratings	Moody's ratings	Risk weight %
AAA to AA	Aaa to Aa	20
A	A	50
BBB to BB	Baa to Ba	100
Below BB	Below Ba	150
Unrated	Unrated	100

Table 2: Basel II and risk weights for PSEs by external ratings.

addition to the Tier 1 capital and Total capital (CRAR) ratios, as shown below. The Tier I common equity capital ratio is comprised primarily of common shares, stock surplus and statutory reserves and Basel's specified minimum of 4.5%.

$$\text{Common Equity Tier 1 capital ratio} = \frac{\text{Common Equity Tier 1 Capital}}{\text{Credit Risk RWA} + \text{Market Risk RWA} + \text{Operational Risk RWA}}$$

In addition, Basel III required banks to set aside capital for conservation and countercyclical buffers. The conservation buffer limits the size of bonuses that banks can pay their executives, restricts dividend declarations and banks' ability to repurchase shares. Lehman Brothers' repurchase of nearly \$1 billion in shares immediately before its collapse in 2008, is cited as a reason for the last restriction. Similarly, the countercyclical buffer is intended to force banks to hold additional capital during high growth periods because expected falls might be higher than during a moderate increase in the business cycle.

The minimum ratio guidelines issued by RBI are higher than those proposed by Basel, as shown in Table 3.

Table 3 shows the RBI requires a minimum ratio of 5.5% for the common equity Tier 1 ratio, one percent higher than that mandated by Basel. In addition, the conservation buffer increases the total capital ratio by another 2.5%. If the countercyclical buffer is included, the minimum total capital ratio can reach 14%.

## Data

Our study will compare the differences in the total capital ratios (CRARs) estimated by banks under the three different standards. We compare two sets of capital ratios. Our first test compares ratios under Basel I and II for the years 2008 to 2012. By 2008 most banks in India were reporting Basel II ratios [6]. We separate the sample into four categories provided by the RBI:

**SBI and Associates** State Bank of India associates include all majority owned subsidiaries such as State Bank of Hyderabad, State Bank of Bikaner, State Bank of Jaipur, State Bank of Patiala, State Bank of Mysore and State Bank of Travancore.

**Nationalized Banks** There are 20 nationalized banks in 2008 in the sample provided by RBI. These are major banks in India and include Canara Bank, Syndicate Banks and Vijaya Bank. In 2015, the addition of Bharatiya Mahila Bank Limited increased the number to 21.

**Private Sector Banks** In 2008, there were approximately 22 private sector banks including HDFC and ICICI bank. In 2015, the number was reduced to 20 banks.

**Foreign Banks** There were 29 foreign banks in 2008; in 2015, the number increased to 44 banks. These include banks of varying sizes

S.No	Regulatory Capital for Indian Banks under Basel III	As % of RWA
(i)	Minimum Common Equity Tier 1 Ratio	5.5
(ii)	Capital Conservation Buffer (comprised of Common Equity)	2.5
(iii)	Minimum Common Equity Tier 1 Ratio plus Capital Conservation Buffer [(i)+(ii)]	8
(iv)	Additional Tier 1 Capital	1.5
(v)	Minimum Tier 1 Capital Ratio [(i) +(iv)]	7
(vi)	Tier 2 Capital	2
(vii)	Minimum Total Capital Ratio (MTC) [(v)+(vi)]	9
(viii)	Minimum Total Capital Ratio plus Capital Conservation (vii) + (ii)	11.5

Source: Section 4.2 RBI Master Circular DBR.No.BP.BC.1/21.06.201/2015-16

Table 3: Regulatory Capital for Indian Banks under Basel III.

such as the Royal Bank of Scotland, Hong Kong and Shanghai Banks and Sonali Bank Limited from Bangladesh.

Since most banks had implemented Basel III by 2013, the second test compares bank ratios under Basel II and Basel III for the years 2013 and 2016.

We tabulate the capital ratios in two ways. First, for each bank in the sample, the mean CRAR (capital to risk-adjusted assets ratio) is computed regardless of whether banks reported under both Basel I and Basel II. Therefore, we have an unmatched sample. Second, mean CRARs are estimated only for banks that reported Basel I and Basel II ratios, creating a matched sample. Similarly, mean CRARs for matched and unmatched banks reporting ratios under Basel II and Basel III are estimated [7,8]. The results between the two groups are not qualitatively different, so we only report the unmatched sample results. The t-tests determine whether the differences in the two regimes are statistically significant.

## Results

Table 4 shows a comparison of the Basel I and Basel II mean CRARs as reported by the banks.

There appears to be a substantial difference in the capital ratios reported by banks; foreign banks report the largest ratios in every year, and under Basel I and II. With the exception of 2008, capital ratios for the State Bank of India (SBI) and the Nationalized Banks are higher under Basel II than Basel I. In 2009-2012, the increase in both groups' capital ratios exceeds 1%; with the exception of changes in the SBI in 2011, all differences are statistically significant. Under Basel II, capital

Unmatched Sample	2008				
	Basel I	Basel II	Diff	N	P-Value
SBI and Associates	12.6	12.52	-0.08	7	0.889
Nationalized Banks	11.78	11.91	0.13	20	0.793
Private sector banks	15.81	16.22	0.41	22	0.928
Foreign Banks	29.58	27.13	-2.45	26	0.632
Unmatched Sample	2009				
	Basel I	Basel II	Diff	N	P-Value
SBI and Associates	12.07	13.34	1.27	7	0.033**
Nationalized Banks	12.03	13.14	1.11	20	0.000***
Private sector banks	15.8	15.99	0.19	22	0.928
Foreign Banks	27.96	28.52	0.57	25	0.904
Unmatched Sample	2010				
	Basel I	Basel II	Diff	N	P-Value
SBI and Associates	12.31	13.51	1.19	7	0.008***
Nationalized Banks	12.04	13.19	1.15	20	0.002***
Private sector banks	16.03	16.61	0.58	22	0.747
Foreign Banks	33.17	29.97	-3.2	29	0.511
Unmatched Sample	2011				
	Basel I	Basel II	Diff	N	P-Value
SBI and Associates	11.87	12.94	1.07	6	0.112
Nationalized Banks	12.15	13.45	1.3	16	0.000***
Private sector banks	18.76	19.28	0.52	14	0.726
Foreign Banks	42.72	36.9	-5.82	16	0.292
Unmatched Sample	2012				
	Basel I	Basel II	Diff	N	P-Value
SBI and Associates	11.74	13.26	1.52	6	0.005***
Nationalized Banks	11.74	12.89	1.15	20	0.000***
Private sector banks	14.05	14.89	0.84	20	0.476
Foreign Banks	41.5	36.65	-4.85	33	0.509

Table 4: Comparison of Mean Capital-to-Asset Ratios under Basel I and II.

ratios in private sector banks increased slightly, but not significantly. In contrast, the ratios for foreign banks dropped under Basel II. Although the changes are not statistically significant, the average change exceeded negative 3%. One explanation for the differences between foreign and domestic banks is Basel II's requirement that additional capital be held for banks subjected to market and/or operational risks. SBI and nationalized banks do not engage in trading and/or hold as many off-balance sheet instruments as do private and foreign banks in India. Also, banks with direct government ownership have lower operational risk than banks with other ownership structures. Private and foreign banks must set aside additional capital for operational risk. Private banks tend to be more profitable, as shown by Agarwal and Yadav (2015), but they also take on extra risk [1].

Table 5 shows the transition by Indian banks from Basel II to Basel III. The transition began in 2013 and it is expected to be fully implemented by 2019. The table shows the comparison for four years from 2013-2016 with N reported as the larger of the unmatched banks.

The data for some banks are limited between 2013 and 2016. However, the overall results indicate that all banks experienced a decline in capital-to-asset ratios when they transitioned from Basel II to Basel III. In 2013, the 2.23% decline for SBI banks was statistically significant. In 2014, the ratio decline was not significant but equaled 8.18%. Thereafter, ratio changes for SBI banks dropped to less than 1%. Ratios reported by nationalized banks also declined but the reductions were less than one percent. Ratio changes for the ratios reported by private sector banks were small, with two years of increases and two of small declines. Finally, the capital to asset ratios reported by foreign banks dropped substantially, but not significantly, with a large decline of -22.18% in 2015.

Overall, it appears that the transition from Basel I to Basel II had the most significant impact on foreign banks. For foreign banks, ratios dropped because Basel II required additional capital for market and operational risk. The transition to Basel negatively affected most banks

Unmatched Sample	2013				
	Basel II	Basel III	Diff	N	P-Value
SBI and Associates	10.29	8.07	-2.23	6	0.009***
Nationalized Banks	12.19	NA	NA	20	-
Private sector banks	14.72	14.43	-0.29	20	-
Foreign Banks	38.13	31.21	-6.92	38	0.277
Unmatched Sample	2014				
	Basel II	Basel III	Diff	N	P-Value
SBI and Associates	8.85	0.67	-8.18	6	0.129
Nationalized Banks	11.85	11.05	-0.8	20	0.007***
Private sector banks	14.25	14.22	-0.03	20	0.972
Foreign Banks	41.31	37.22	-4.09	39	0.632
Unmatched Sample	2015				
	Basel II	Basel III	Diff	N	P-Value
SBI and Associates	12.13	11.53	-0.59	6	0.035**
Nationalized Banks	11.68	11.22	-0.46	20	0.136
Private sector banks	13.38	14.07	0.69	20	0.439
Foreign Banks	54.81	32.63	-22.18	39	-
Unmatched Sample	2016				
	Basel II	Basel III	Diff	N	P-Value
SBI and Associates	12.59	11.68	-0.91	6	0.362
Nationalized Banks	11.84	11.23	-0.61	20	0.149
Private sector banks	13.54	14.69	1.15	21	0.381
Foreign Banks	NA	33.84	NA	39	-

Table 5: Comparison of Mean Capital-to-Asset Ratios under Basel II and III.

but the greatest impact was felt by foreign banks. Our results suggest that Basel III requirements are more stringent than those under Basel I and II.

## Conclusion

The Basel Committee on Banking Supervision has released three sets of rules for bank capital over the last three decades beginning with Basel I in 1992, Basel II in 2004 and Basel III in 2010. Most central banks have adopted the rules including the Reserve Bank of India. This study compares the Basel ratios reported by banks in India for the period 2008-2012 when Basel II replaced Basel I and 2013-2016 when Basel II replaced Basel I. The results show that the transition from Basel I to Basel II increased the ratios for domestic banks, but decreased them for foreign banks. The most likely explanation is that foreign banks were engaged in additional activities than traditional banking such as trading and investment banking and incurred more risk-weighted assets. The transition from Basel II to Basel III was negative for most banks but foreign banks again showed the largest decline. However, since the full implementation of Basel III will not take place until 2019, we will have to wait to learn if its impact will increase in the future.

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