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A Structural Adjustments on Basel 1& 2, Norms, Capital Adequacy Ratio And Ladder To Shift Basel III Norms

SHANTHANA LAKSHMI. M ASSISTANT PROFESSOR

KEYWORDS

1. Introduction

Capital adequacy ratio is the measure of the amount of a bank's capital expressed as a percentage of its risk weighted credit exposures. Applying least capital adequacy ratios serves to safeguard depositors and promote the stability and efficiency of the financial system. The third installment of the Basel Accords Basel III was developed in response to the deficiencies in financial regulation revealed by the late-2000s financial crisis. Reserve Bank of India has fixed a deadline of March 2018 for Indian banks to complete their conformation to the Basel-III norms. This paper is divided into three phases. The first phase tells about the sample banks taken for analysis. The second phase is testing the significance of Tier 1 and Tier 2 Capital and the last phase has the conclusion of how these banks can achieve the Basel III norms.

1.1 Capital Adequacy Ratio

Capital Adequacy Ratios are a degree of the volume of a bank's capital in relation to the volume of its credit exposures. These ratios are generally expressed as percentage. Capital Adequacy ratio is a measure of a bank's capital. It is expressed as a percentage of a bank's risk weighted credit exposures.

$$CAR = \frac{\text{Tier One Capital} + \text{Tier Two Capital}}{\text{Risk Weighted Assets}}$$

Also known as "Capital to Risk Weighted Assets Ratio (CRAR)."

This ratio is used to safeguard depositors and encourage the steadiness and competence of financial systems worldwide. The reason for having minimum capital adequacy ratios is to make sure that banks can bare a certain level of losses before it becomes insolvent, and before depositors funds are lost.

1.2 Two types of capital are measured:

Tier I capital, that absorbs losses without a bank being required to cease trading, and Tier II capital, that absorbs losses at the time of winding-up and thus provides a lesser amount of protection to depositors.

1.2.1 Tier I capital

Tier I Capital is the core measure of a bank's financial strength from a regulator's point of view. It includes core capital, that mainly consists of disclosed reserves (or retained earnings) and common stock, and it may also include non-redeemable non-cumulative preferred stock. The Basel Committee noticed that banks have used innovative instruments over the years to create Tier I capital; these are subject to tough situations and are limited to a maximum of 15% of total Tier I capital.

There are two different conventions for calculating and quoting the Tier 1 capital ratio:

· Tier I common capital ratio and
· Tier I total capital ratio

1.2.2 Tier II Capital

Tier II Capital, or Supplementary Capital, includes numerous important and legitimate constituents of a bank's capital base. These forms of banking capital were largely standardized in the Basel I accord but left untouched by the Basel II accord. National regulators of most countries have applied these standards in local legislation. While calculating regulatory capital, Tier II is limited to 100% of Tier II capital.

Undisclosed Reserves

Undisclosed reserves are uncommon. However these are recognized by some regulators where a bank has made a profit but this has not appeared in normal retained profits or in general reserves of the bank. They must be accepted by the bank's supervisory authorities. Many countries have not accepted this as an accounting concept or a legitimate form of capital.

Revaluation Reserves

A revaluation reserve is one which is created when a company's has been asset revalued and a rise in value is brought to account. For example, where a bank has the land and building of its head-offices and bought them for $100 a century ago. A current revaluation shows a huge rise in price. This rise would be added to a revaluation reserve

General Provisions

A general provision is made against losses that has not yet discovered. They are qualified for addition in Tier 2 capital as long as they are not made against a known fall in value. They are limited to

- 1.25% of RWA (Risk-weighted assets) for banks using the standardized approach.
- 0.6% of credit risk-weighted assets for banks using the IRB Approach.

Hybrid Instruments

Hybrids are instruments that have certain features of both debt and equity. Provided these are close to equity in nature, in that they are able to take losses on the face value without triggering a liquidation of the bank, they may be counted as capital. Perpetual preferred stocks that carry a cumulative fixed charge are hybrid instruments. Cumulative perpetual preferred stocks are not included in Tier I.

Subordinated Term Debt

Subordinated debt is debt which ranks lower than ordinary depositors of the bank. In calculation of this form of capital only those with a minimum original term to maturity of five years can be included.

2. Basel Norms

The "Basel Committee", established in 1974 (centered in the Bank for International Settlements), represents financial supervisory authorities and central banks of the leading industrialized countries (the G10 countries). The committee ensures effective supervision of banks by setting and promoting international standards on a global basis. Its principal interest is in the area of capital adequacy ratios.

2.1 Basel I

Basel I is the round of deliberations by central bankers from around the world, and in 1988, the Basel Committee on Banking Supervision (BCBS) in Basel, Switzerland, published a set of minimum capital requirements for banks. This is also known as the 1988 Basel Accord, and was enforced by law in the Group of Ten (G-10) countries in 1992. Basel I is now widely viewed as outmoded. Indeed, the world has changed as financial conglomerates, financial innovation and risk management have developed.

2.2 Basel II

Basel II is the second of the Basel Accords, which are recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision.

Basel II, initially published in June 2004, was intended to create an international standard for banking regulators to control how much capital banks need to put aside to guard against the types of financial and operational risks banks (and the whole economy) face. One focus was to maintain sufficient consistency of regulations so that this does not become a source of competitive inequality amongst internationally active banks. Advocates of Basel II believed that such an international standard could help protect the international financial system from the types of problems that might arise should a major bank or a series of banks collapse. In theory, Basel II attempted to accomplish this by setting up risk and capital management requirements designed to ensure that a bank has adequate capital for the risk the bank exposes itself to through its lending and investment practices. Generally speaking, these rules mean that the greater risk to which the bank is exposed, the greater the amount of capital the bank needs to hold to safeguard its solvency and overall economic stability.

2.3 Basel III

Basel III was released in December 2010, which is the third in the chain of Basel Accords that deals with the risk management aspect of the banking sector. It is the global regulatory standard on bank capital adequacy, stress testing and market liquidity risk. Basel III is a complete set of reform methods, developed by the Basel Committee on Banking Supervision, to toughen the regulation, direction and risk management of the banking sector.

2.3.1 Basel III Aims:

- To develop the banking sector's ability to engross shocks that arises from financial and economic stress.
- To develop risk management and governance.
- To toughen banks' transparency and disclosures.

Therefore Basel III guidelines aim at improving the capacity of banks to withstand the periods of economic and financial stress in the banking sector.

Implementation of Basel III by Indian banks as per the RBI guidelines will be a challenging task. It is said that Indian banks are required to raise Rs.6, 00,000 crores in external capital in next nine years.

2.3.2 Three Pillars of Basel II Norms and Comparison with Basel III Norms

The Basel III structure enriches bank-specific measures and includes Macro-prudential regulations to help create a more stable banking sector. The basic structure of Basel III remains unchanged with three mutually reinforcing pillars.

Pillar 1: Minimum Regulatory Capital Requirements based on Risk Weighted Assets (RWAs): Maintaining capital calculated through credit, market and operational risk areas.

Pillar 2: Supervisory Review Process: Regulating tools and frameworks for dealing with peripheral risks that banks face.

Pillar 3: Market Discipline: Increasing the disclosures that banks must provide to increase the transparency of banks

2.3.3 Major Components of Basel III

(a) Better Capital Quality:.
(b) Capital Conservation Buffer:
(c) Countercyclical Buffer:
(d) Minimum Common Equity and Tier 1 Capital Requirements:
(e) Leverage Ratio:
(f) Liquidity Ratios:
(g) Systemically Important Financial Institutions (SIFI):

3. Literature Review

Abstracts:

1. Basel Norms, Indian Banking Sector and Impact on Credit to SMEs and the Poor

The present paper is an attempt to review the impact of Basel I and II norms, dealing with international bank regulation in terms of capital adequacy and supervision, on credit flows to the SMEs and the poor in India. (Ghosh, 2005)

2. Global Administrative Law: The View from Basel

International law-making by sub-national actors and regulatory networks of bureaucrats has come under attack as lacking in accountability and legitimacy. Global administrative law is emerging as an approach to understanding what international organizations and national governments do, or ought to do, to respond to the perceived democracy deficit in international law-making. This article examines the Basel Committee on Banking Supervision, a club of central bankers who meet to develop international banking capital standards and to develop supervisory guidance. The Basel Committee embodies many of the attributes that critics of international law-making lament. A closer examination, however, reveals a structure of global administrative law inherent in the Basel process that could be a model for international law- making with greater accountability and legitimacy. (Miller, 2006)

3. Basel II Norms: Emerging Market Perspective with Indian Focus

Instead of perceiving it as a global initiative, the Indian banking sector needs to look at Basel II as an opportunity to keep its own house in order. It is a necessary framework to improve the stability and resilience of our rapidly evolving banking industry, currently at a critical phase in its expansion. However, it is unfortunate that the current Basel proposals do not explicitly incorporate the mutual benefits of international diversification for advanced as well as developing countries. There is also a fear that too much regulation under Basel II will adversely affect the risk appetite of Indian banks and their lending to credit- starved sectors. It will be a major challenge for the RBI to maintain a healthy credit momentum amid this tighter risk-sensitive framework. (Nitsure, 2005)

4. Understanding Basel Norms

This article explains the Basel I and II frameworks in banking and discusses developing countries' perspectives on these norms. (Sarma, 2007)

5. The Journey from Basel I to Basel III and Implications for Indian Banks

The Bank for International Settlements has devised the Basel norms in an attempt to set international norms for risk management in banks. While Basel I played a major role in creating awareness of the importance of capital in managing banking risk, Basel II emphasized the forms of capital recognized in capital adequacy measures. The Basel III norms have emerged against the background of the global banking crisis of 2007. Basel III primarily aims to boost banks' capital, get banks to move away from short-term funding, improve risk management and governance, and strengthen banks' transparency and disclosures. As Indian banks make the transition to Basel III, they will face the challenge of meeting the credit needs of a growing economy, as also the needs of socially responsible banking, while adjusting to a more stringent regulatory regime in terms of raising more and better quality capital, greater provisioning and upgrading their risk management systems. (Prita, 2013)

6. Will Basel II Norms Slow Financial Inclusion?

The Basel II norms, which will cover all banks by March 2009, will introduce tightly controlled and comprehensive coverage of risks that could militate against financial inclusion. The norms may not per se be against the spread of bank lending to those who are now excluded, but with the inherent biases in the functioning of the banking system, banks will seek cover under the norms to half-heartedly move towards inclusion. With serious inter-regional, inter-class and inter-sectoral disparities in banking services in India, the approach should be based on a calibrated balancing of prudential norms and the provision of genuinely inclusive as well as regionally and functionally well-spread services. (Foundation, 2007)

7. Basel- III-The Panacea for Global Crisis

Capital Adequacy Ratio, ever since its introduction in 1988, has become an important benchmark to assess the financial strength and soundness of banks. The Basel-III framework is aimed at increasing the resilience of the global banking system by enhancing the quality, quantity of bank capital, providing a check on leverage and introducing capital buffers above the minimum requirements to provide a cushion during adverse financial conditions. Basel III Implementation will be a daunting task not only for the banks but also for Govt. as Public Sector Banks are likely to seek a capital injection from the government. In the Indian context, majority of the banks have been able to comply with Basel-II norm of CAR, though Public Sector Banks lag behind. The paper attempts to study the position of Indian banks with respect to capital adequacy and analyze the transition from Basel II to Basel III norms. (Kaur, 2012)

4. Objective

There has been an attempt made:

- To study the concepts of Basel Norms.
- To know the Concept of Capital Adequacy Ratio.
- To find the relationship between Tier I and Tier II Capital.
- To suggest how banks can achieve Basel III Norms.

4.1 Scope of the Study

Scope of the study is to understand the concepts of Basel Norms and how the banks can achieve Basel III within 2018. A sample of 36 banks which includes both public and private sector banks in India is taken and their Tier I capital and Tier II capital is taken for Co-integration tests and Unit Root Test.

S.NO	NAME OF THE BANKS
1.	STATE BANK OF INDIA
2.	STATE BANK OF BIKANER & JAIPUR
3.	STATE BANK OF HYDERABAD
4.	STATE BANK OF MYSORE
5.	STATE BANK OF PATIALA
6.	STATE BANK OF TRAVANCORE
7.	ANDHRA BANK
8.	BANK OF BARODA
9.	BANK OF INDIA
10.	BANK OF MAHARASHTRA
11.	CENTRAL BANK OF INDIA
12.	CORPORATION BANK
13.	INDIAN BANK
14.	INDIAN OVERSEAS BANK
15.	ORIENTAL BANK OF COMMERCE
16.	PUNJAB & SIND BANK
17.	PUNJAB NATIONAL BANK
18.	SYNDICATE BANK
19.	UNITED BANK OF INDIA
20.	UCO BANK
21.	VIJAYA BANK
22.	IDBI BANK LTD.
23.	CITY UNION BANK
24.	DHANLAXMI BANK
25.	FEDERAL BANK
26.	JAMMU & KASHMIR BANK
27.	LAKSHMI VILAS BANK
28.	NAINITAL BANK
29.	RATNAKAR BANK
30.	SBI COMMERCIAL & INTERNATIONAL BANK
31.	SOUTH INDIAN BANK
32.	TAMILNAD MERCANTILE BANK
33.	HDFC BANK
34.	ICICI BANK
35.	INDUSIND BANK
36.	KOTAK MAHINDRA BANK

Secondary data

All the data used in this research is secondary data that is collected from websites, magazines, journals and books.

BANK-WISE CAPITAL ADEQUACY RATIO OF SCHEDULED COMMERCIAL BANKS (2010-2011)

BANK-WISE CAPITAL ADEQUACY RATIO (CRAR) OF SCHEDULED COMMERCIAL BANKS - 2010 AND 2011

(PERCENT)

BANK NAMES	CRAR AS ON (MARCH 31)											
	2010						2011					
	BASEL I			BASEL II			BASEL I			BASEL II		
	Tier-I	Tier-II	Total	Tier-I	Tier-II	Total	Tier-I	Tier-II	Total	Tier-I	Tier-II	Total
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
State Bank of India	8.46	3.54	12	9.45	3.94	13.39	6.93	3.76	10.69	7.77	4.21	11.98
State Bank of Bikaner & Jaipur	7.5	4.44	11.94	8.35	4.95	13.3	7.68	3.64	11.32	7.92	3.76	11.68
State Bank of Hyderabad	7.95	5.76	13.71	8.64	6.26	14.9	8.54	4.81	13.35	9.12	5.13	14.25
State Bank of Mysore	7.4	4.72	12.12	7.59	4.83	12.42	9.08	3.7	12.78	9.78	3.98	13.76
State Bank of Patiala	7.66	4.79	12.45	8.16	5.1	13.26	7.91	4.34	12.25	8.66	4.75	13.41
State Bank of Travancore	8	3.89	11.89	9.24	4.5	13.74	7.77	3.05	10.82	9	3.54	12.54
Andhra Bank	7.81	5.49	13.3	8.18	5.75	13.93	9.07	4.41	13.48	9.68	4.7	14.38
Bank of Baroda	8.22	4.62	12.84	9.2	5.16	14.36	8.96	4.06	13.02	9.99	4.53	14.52
Bank of India	8.29	4.34	12.63	8.48	4.46	12.94	7.8	3.62	11.42	8.33	3.84	12.17
Bank of Maharashtra	5.68	5.65	11.33	6.41	6.37	12.78	7.05	4.7	11.75	8.02	5.33	13.35
Central Bank of India	6.03	4.78	10.81	6.83	5.4	12.23	5.81	4.93	10.74	6.31	5.33	11.64
Corporation Bank	9.03	5.97	15	9.25	6.12	15.37	7.95	4.95	12.9	8.69	5.42	14.11
Indian Bank	10.65	1.51	12.16	11.13	1.58	12.71	10.43	2.4	12.83	11.02	2.54	13.56
Indian Overseas Bank	8.36	5.9	14.26	8.67	6.11	14.78	7.45	5.83	13.28	8.16	6.39	14.55
Oriental Bank of Commerce	8.02	2.81	10.83	9.28	3.26	12.54	9.69	2.61	12.3	11.21	3.02	14.23
Punjab & Sind Bank	6.89	4.85	11.74	7.68	5.42	13.1	7.7	4.24	11.94	8.35	4.59	12.94
Punjab National Bank	8.38	4.59	12.97	9.11	5.05	14.16	7.99	3.77	11.76	8.44	3.98	12.42
Syndicate Bank	7.26	3.94	11.2	8.24	4.46	12.7	7.26	3.94	11.2	9.31	3.73	13.04
United Bank of India	7.02	4	11.02	8.16	4.64	12.8	7.61	3.55	11.16	8.9	4.15	13.05
UCO Bank	6.06	5.29	11.35	7.05	6.16	13.21	7.38	4.49	11.87	8.52	5.19	13.71
Vijaya Bank	7.28	4.51	11.79	7.69	4.81	12.5	8.96	3.63	12.59	9.88	4	13.88
IDBI Bank Ltd.	5.97	4.86	10.83	6.24	5.07	11.31	7.14	5.02	12.16	8.03	5.61	13.64
City Union Bank	11.15	0.94	12.09	12.41	1.05	13.46	10.3	0.79	11.09	11.84	0.91	12.75
Dhanlaxmi Bank	8.45	4.02	12.47	8.8	4.19	12.99	8.62	2.19	10.81	9.41	2.39	11.8

Federal Bank	15.27	2	17.27	16.92	1.44	18.36	13.79	1.6	15.39	15.63	1.16	16.79
Jammu & Kashmir Bank	11.91	2.9	14.81	12.79	3.1	15.89	10.99	2.31	13.3	11.33	2.39	13.72
Lakshmi Vilas Bank	11.52	2.69	14.21	12.01	2.81	14.82	9.88	2.21	12.09	10.78	2.41	13.19
Nainital Bank	14.23	1.3	15.53	14.38	1.3	15.68	16.9	0.59	17.49	15.8	0.55	16.35
Ratnakar Bank	35.43	0.58	36.01	33.53	0.54	34.07	58.91	0.51	59.42	55.93	0.48	56.41
SBI Commercial & International Ban	31.17	0.83	32	26.6	0.71	27.31	29.13	0.76	29.89	27.44	0.72	28.16
South Indian Bank	11.89	2.84	14.73	12.42	2.97	15.39	10.6	2.57	13.17	11.27	2.74	14.01
Tamilnad Mercantile Bank	13.47	0.62	14.09	14.86	0.68	15.54	13.25	0.62	13.87	14.46	0.67	15.13
HDFC Bank	12.5	3.95	16.45	13.26	4.18	17.44	11.56	3.76	15.32	12.23	3.99	16.22
ICICI Bank	13.48	5.66	19.14	13.96	5.45	19.41	11.77	5.86	17.63	13.17	6.37	19.54
Indusind Bank	8.43	4.97	13.4	9.65	5.68	15.33	11.13	3.26	14.39	12.29	3.6	15.89
Kotak Mahindra Bank	15.17	2.88	18.05	15.42	2.93	18.35	16.91	1.82	18.73	17.99	1.93	19.92

5.1 Cointegration Test

Test 1:

```
Date: 02/20/13   Time: 19:56
Sample (adjusted): 3 36
Included observations: 34 after adjustments
Trend assumption: Linear deterministic trend
Series: SERIES04 SERIES07
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized                    Trace          0.05
No. of CE(s)   Eigenvalue      Statistic    Critical Value   Prob.**

None *          0.340721       22.68929      15.49471       0.0035
At most 1 *     0.221763       8.524627      3.841466       0.0035

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized                   Max-Eigen       0.05
No. of CE(s)   Eigenvalue      Statistic    Critical Value   Prob.**

None            0.340721       14.16466      14.26460       0.0518
At most 1 *     0.221763       8.524627      3.841466       0.0035

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

SERIES04      SERIES07
-2.097910     2.494159
-0.686279     1.111220

Unrestricted Adjustment Coefficients (alpha):

D(SERIES04)    1.069356     -2.147341
D(SERIES07)    0.556692     -1.944550

1 Cointegrating Equation(s):      Log likelihood     -129.1221

Normalized cointegrating coefficients (standard error in parentheses)
SERIES04      SERIES07
1.000000      -1.188578
              (0.03271)

Adjustment coefficients (standard error in parentheses)
D(SERIES04)    -2.243417
               (1.83714)
D(SERIES07)    -1.167690
               (1.60919)
```

Test 2:

```
Johansen Cointegration Test

Date: 02/20/13   Time: 20:00
Sample (adjusted): 3 36
Included observations: 34 after adjustments
Trend assumption: Linear deterministic trend
Series: SERIES04 SERIES10
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized                    Trace          0.05
No. of CE(s)   Eigenvalue      Statistic    Critical Value   Prob.**

None *          0.371052       21.46528      15.49471       0.0056
At most 1 *     0.154330       5.699273      3.841466       0.0170

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized                   Max-Eigen       0.05
No. of CE(s)   Eigenvalue      Statistic    Critical Value   Prob.**

None *          0.371052       15.76601      14.26460       0.0287
At most 1 *     0.154330       5.699273      3.841466       0.0170

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

SERIES04      SERIES10
-0.722620     0.573141
0.627112      -0.296658

Unrestricted Adjustment Coefficients (alpha):

D(SERIES04)    -1.201627     -1.482296
D(SERIES10)    -3.979026     -2.303971

1 Cointegrating Equation(s):      Log likelihood     -176.0167

Normalized cointegrating coefficients (standard error in parentheses)
SERIES04      SERIES10
1.000000      -0.793143
              (0.04987)

Adjustment coefficients (standard error in parentheses)
D(SERIES04)    0.868320
               (0.53890)
D(SERIES10)    2.875325
               (1.03238)
```

Test 3:

```
Johansen Cointegration Test

Date: 02/20/13   Time: 20:01
Sample (adjusted): 3 36
Included observations: 34 after adjustments
Trend assumption: Linear deterministic trend
Series: SERIES07 SERIES13
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized                    Trace          0.05
No. of CE(s)   Eigenvalue      Statistic    Critical Value   Prob.**

None *          0.366671       20.44984      15.49471       0.0082
At most 1 *     0.134719       4.919825      3.841466       0.0265

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized                   Max-Eigen       0.05
No. of CE(s)   Eigenvalue      Statistic    Critical Value   Prob.**

None *          0.366671       15.53002      14.26460       0.0314
At most 1 *     0.134719       4.919825      3.841466       0.0265

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

SERIES07      SERIES13
-0.619345     0.493134
0.725867      -0.318399

Unrestricted Adjustment Coefficients (alpha):

D(SERIES07)    -1.465482     -1.145158
D(SERIES13)    -4.240832     -1.661548

1 Cointegrating Equation(s):      Log likelihood     -169.0249

Normalized cointegrating coefficients (standard error in parentheses)
SERIES07      SERIES13
1.000000      -0.796219
              (0.06527)

Adjustment coefficients (standard error in parentheses)
D(SERIES07)    0.907639
               (0.41460)
D(SERIES13)    2.626536
               (0.81192)
```

Test 4:

```
Johansen Cointegration Test

Date: 02/20/13   Time: 19:58
Sample (adjusted): 3 36
Included observations: 34 after adjustments
Trend assumption: Linear deterministic trend
Series: SERIES10 SERIES13
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized                    Trace          0.05
No. of CE(s)   Eigenvalue      Statistic    Critical Value   Prob.**

None *          0.443871       26.13346      15.49471       0.0009
At most 1 *     0.166297       6.183839      3.841466       0.0129

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized                   Max-Eigen       0.05
No. of CE(s)   Eigenvalue      Statistic    Critical Value   Prob.**

None *          0.443871       19.94964      14.26460       0.0057
At most 1 *     0.166297       6.183839      3.841466       0.0129

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

SERIES10      SERIES13
1.183466      -1.475305
2.028183      -2.209533

Unrestricted Adjustment Coefficients (alpha):

D(SERIES10)    5.574506      -0.398323
D(SERIES13)    5.170725      -0.137799

1 Cointegrating Equation(s):      Log likelihood     -139.5147

Normalized cointegrating coefficients (standard error in parentheses)
SERIES10      SERIES13
1.000000      -1.246595
              (0.02774)

Adjustment coefficients (standard error in parentheses)
D(SERIES10)    6.597252
               (1.36464)
D(SERIES13)    6.119388
               (1.25270)
```

5.2 INTERPRETATION OF JOHANSEN TEST:

There are two types of Johansen test, either with trace or with eigenvalue, and the inferences might be a little bit different. The null hypothesis for the trace test is the number of cointegration vectors $r \leq$?, the null hypothesis for the eigenvalue test is $r =$?

- In test 1 with series 04 and series 07, at the assumed level of LOS @ 0.05, we have to reject the hypothesis (H°), because 22.69 >15.50 and 8.52 > 3.84, and thus for this trace test there does exist cointegrating equation amongst the series chosen. For that of the eigenvalue test, we once again reject the hypothesis, because 8.52 > 3.84, but there is an acceptance of the hypothesis at 14.16 < 14.26, which hence leads to the result of no cointegraton at the taken LOS.
- Now in test 2, taking series 04 along with series 10 at LOS @ 5%, we notice an existence of the cointegrating equations, with trace test being proved with by 21.47 > 15.50, and 5.70 > 3.84, and the ultimate rejection of the hypothesis. Here the eigenvalue test too indicate a subsistence of the cointegrating equations, by the rejection of hypothesis, as supported by 15.77 > 14.27, and 5.70 > 3.84.
- Moving on to test 3, analysis of series 07 and series 13, we notice that theses series does have cointegrating equations, with:
  - *trace test* having *rejection of hypothesis @ 5% LOS,* (20.45 > 15.50)
  - *eigenvalues* test *having rejection of hypothesis @ 5% LOS* (4.92 > 3.84)
- The final test 4, analysis is that of *series 10* and *series 13*, whereby we acquire cointegrating equations, at a level of significance as 0.05. The trace test allows a rejection the hypothesis (26.13 > 5.50 and 6.18 > 3.84) and the eigenvalue test too display the similar mannerism with 19.95 > 4.27 and 6.18 > 3.84, proving the clear rejection of hypothesis (H°).

5.3 Unit Root Test

Augmented Dickey-Fuller Unit Root Test on D(SERIES02)

Null Hypothesis: D(SERIES02) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.933023	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES02,2)
Method: Least Squares
Date: 02/19/13 Time: 21:38
Sample (adjusted): 4 36
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES02(-1))	-1.496636	0.252256	-5.933023	0.0000
D(SERIES02(-1),2)	0.387191	0.174735	2.215872	0.0344
C	0.280772	0.949708	0.295641	0.7695

R-squared	0.599077	Mean dependent var	0.190606
Adjusted R-squared	0.572349	S.D. dependent var	8.339174
S.E. of regression	5.453405	Akaike info criterion	6.316865
Sum squared resid	892.1886	Schwarz criterion	6.452911
Log likelihood	-101.2283	F-statistic	22.41369
Durbin-Watson stat	2.133328	Prob(F-statistic)	0.000001

Augmented Dickey-Fuller Unit Root Test on D(SERIES03)

Null Hypothesis: D(SERIES03) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.61301	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES03,2)
Method: Least Squares
Date: 02/19/13 Time: 21:41
Sample (adjusted): 3 36
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES03(-1))	-1.630718	0.140422	-11.61301	0.0000
C	-0.019355	0.267358	-0.072394	0.9427

R-squared	0.808225	Mean dependent var	-0.087941
Adjusted R-squared	0.802232	S.D. dependent var	3.504687
S.E. of regression	1.558574	Akaike info criterion	3.782442
Sum squared resid	77.73289	Schwarz criterion	3.872228
Log likelihood	-62.30151	F-statistic	134.8620
Durbin-Watson stat	2.063906	Prob(F-statistic)	0.000000

Augmented Dickey-Fuller Unit Root Test on D(SERIES04)

Null Hypothesis: D(SERIES04) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.622457	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES04,2)
Method: Least Squares
Date: 02/19/13 Time: 21:42
Sample (adjusted): 4 36
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES04(-1))	-1.566540	0.236550	-6.622457	0.0000
D(SERIES04(-1),2)	0.483092	0.165940	2.911253	0.0067
C	0.239731	0.836055	0.286740	0.7763

R-squared	0.631948	Mean dependent var	0.087273
Adjusted R-squared	0.607412	S.D. dependent var	7.657738
S.E. of regression	4.798100	Akaike info criterion	6.060825
Sum squared resid	690.6528	Schwarz criterion	6.196871
Log likelihood	-97.00361	F-statistic	25.75514
Durbin-Watson stat	2.201823	Prob(F-statistic)	0.000000

Augmented Dickey-Fuller Unit Root Test on D(SERIES05)

Null Hypothesis: D(SERIES05) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.753382	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES05,2)
Method: Least Squares
Date: 02/19/13 Time: 21:43
Sample (adjusted): 3 36
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES05(-1))	-1.193731	0.176761	-6.753382	0.0000
C	0.209081	0.867894	0.240906	0.8112

R-squared	0.587672	Mean dependent var	0.202059
Adjusted R-squared	0.574787	S.D. dependent var	7.760732
S.E. of regression	5.060646	Akaike info criterion	6.137888
Sum squared resid	819.5245	Schwarz criterion	6.227674
Log likelihood	-102.3441	F-statistic	45.60816
Durbin-Watson stat	2.093558	Prob(F-statistic)	0.000000

Augmented Dickey-Fuller Unit Root Test on D(SERIES06)

Null Hypothesis: D(SERIES06) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.60398	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES06,2)
Method: Least Squares
Date: 02/19/13 Time: 21:44
Sample (adjusted): 3 36
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES06(-1))	-1.639760	0.141310	-11.60398	0.0000
C	-0.026671	0.281513	-0.094742	0.9251

R-squared	0.807983	Mean dependent var	-0.110588
Adjusted R-squared	0.801983	S.D. dependent var	3.687602
S.E. of regression	1.640950	Akaike info criterion	3.885450
Sum squared resid	86.16693	Schwarz criterion	3.975236
Log likelihood	-64.05265	F-statistic	134.6523
Durbin-Watson stat	1.984035	Prob(F-statistic)	0.000000

Augmented Dickey-Fuller Unit Root Test on D(SERIES07)

Null Hypothesis: D(SERIES07) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.555678	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES07,2)
Method: Least Squares
Date: 02/19/13 Time: 21:45
Sample (adjusted): 4 36
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES07(-1))	-1.637335	0.249758	-6.555678	0.0000
D(SERIES07(-1),2)	0.438311	0.167523	2.616426	0.0138
C	0.196747	0.719966	0.273273	0.7865

R-squared	0.649558	Mean dependent var	0.043030
Adjusted R-squared	0.626196	S.D. dependent var	6.757383
S.E. of regression	4.131434	Akaike info criterion	5.761634
Sum squared resid	512.0623	Schwarz criterion	5.897680
Log likelihood	-92.06696	F-statistic	27.80312
Durbin-Watson stat	2.256301	Prob(F-statistic)	0.000000

Augmented Dickey-Fuller Unit Root Test on D(SERIES08)

Null Hypothesis: D(SERIES08) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.197876	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES08,2)
Method: Least Squares
Date: 02/19/13 Time: 21:46
Sample (adjusted): 4 36
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES08(-1))	-1.606644	0.259225	-6.197876	0.0000
D(SERIES08(-1),2)	0.379026	0.169901	2.230860	0.0333
C	0.333023	1.636634	0.203481	0.8401

R-squared	0.640008	Mean dependent var	0.149091
Adjusted R-squared	0.616009	S.D. dependent var	15.16911
S.E. of regression	9.399849	Akaike info criterion	7.405772
Sum squared resid	2650.715	Schwarz criterion	7.541818
Log likelihood	-119.1952	F-statistic	26.66761
Durbin-Watson stat	2.132240	Prob(F-statistic)	0.000000

Augmented Dickey-Fuller Unit Root Test on D(SERIES09)

Null Hypothesis: D(SERIES09) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.14718	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES09,2)
Method: Least Squares
Date: 02/19/13 Time: 21:46
Sample (adjusted): 3 36
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES09(-1))	-1.536116	0.151384	-10.14718	0.0000
C	-0.061413	0.252835	-0.242899	0.8096

R-squared	0.762902	Mean dependent var	-0.038824
Adjusted R-squared	0.755493	S.D. dependent var	2.981357
S.E. of regression	1.474212	Akaike info criterion	3.671147
Sum squared resid	69.54562	Schwarz criterion	3.760933
Log likelihood	-60.40949	F-statistic	102.9653
Durbin-Watson stat	2.054911	Prob(F-statistic)	0.000000

Augmented Dickey-Fuller Unit Root Test on D(SERIES10)

Null Hypothesis: D(SERIES10) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.233203	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES10,2)
Method: Least Squares
Date: 02/19/13 Time: 21:47
Sample (adjusted): 4 36
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES10(-1))	-1.630156	0.261528	-6.233203	0.0000
D(SERIES10(-1),2)	0.372648	0.170093	2.190856	0.0364
C	0.265355	1.594284	0.166442	0.8689

R-squared	0.649407	Mean dependent var	0.070000
Adjusted R-squared	0.626035	S.D. dependent var	14.97127
S.E. of regression	9.155335	Akaike info criterion	7.353059
Sum squared resid	2514.605	Schwarz criterion	7.489105
Log likelihood	-118.3255	F-statistic	27.78470
Durbin-Watson stat	2.180120	Prob(F-statistic)	0.000000

Augmented Dickey-Fuller Unit Root Test on D(SERIES11)

Null Hypothesis: D(SERIES11) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.209007	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES11,2)
Method: Least Squares
Date: 02/19/13 Time: 21:48
Sample (adjusted): 4 36
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES11(-1))	-1.661134	0.267536	-6.209007	0.0000
D(SERIES11(-1),2)	0.360328	0.171309	2.103388	0.0439
C	0.367585	1.554844	0.236412	0.8147

R-squared	0.658621	Mean dependent var	0.136364
Adjusted R-squared	0.635862	S.D. dependent var	14.79685
S.E. of regression	8.928983	Akaike info criterion	7.302990
Sum squared resid	2391.802	Schwarz criterion	7.439036
Log likelihood	-117.4993	F-statistic	28.93943
Durbin-Watson stat	2.154685	Prob(F-statistic)	0.000000

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Augmented Dickey-Fuller Unit Root Test on D(SERIES12)

Null Hypothesis: D(SERIES12) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.15883	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES12,2)
Method: Least Squares
Date: 02/19/13 Time: 21:49
Sample (adjusted): 3 36
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES12(-1))	-1.537355	0.151332	-10.15883	0.0000
C	-0.063464	0.279200	-0.227308	0.8216

R-squared	0.763317	Mean dependent var	-0.035882
Adjusted R-squared	0.755920	S.D. dependent var	3.295103
S.E. of regression	1.627926	Akaike info criterion	3.869513
Sum squared resid	84.80458	Schwarz criterion	3.959299
Log likelihood	-63.78172	F-statistic	103.2018
Durbin-Watson stat	2.029205	Prob(F-statistic)	0.000000

Augmented Dickey-Fuller Unit Root Test on D(SERIES13)

Null Hypothesis: D(SERIES13) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.235530	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SERIES13,2)
Method: Least Squares
Date: 02/19/13 Time: 21:49
Sample (adjusted): 4 36
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SERIES13(-1))	-1.686469	0.270461	-6.235530	0.0000
D(SERIES13(-1),2)	0.350959	0.171609	2.045110	0.0497
C	0.295023	1.503571	0.196215	0.8458

R-squared	0.669992	Mean dependent var	0.044242
Adjusted R-squared	0.647991	S.D. dependent var	14.55021
S.E. of regression	8.632689	Akaike info criterion	7.235497
Sum squared resid	2235.700	Schwarz criterion	7.371543
Log likelihood	-116.3857	F-statistic	30.45342
Durbin-Watson stat	2.198655	Prob(F-statistic)	0.000000

5.4 INTERPRETATIONS OF UNIT ROOT TEST:

The unit root test is then carried out under the null hypothesis against the alternative hypothesis of $\gamma < 0$. Once a value for the test statistic

$$DF_\tau = \frac{\hat{\gamma}}{SE(\hat{\gamma})}$$

is computed it can be compared to the relevant critical value for the Dickey–Fuller Test. If the test statistic is less (this test is non symmetrical so we do not consider an absolute value) than (a larger negative) the critical value, then the null hypothesis of $\gamma = 0$ is rejected and no unit root is present.

After the individual analysis of unit root of the series 02 to series 12, we acquire the following data, with LOS @ 0.05

- Series 02 has got a unit root; -5.933023 < -2.954021
- Series 03 has got a unit root; -11.61301 < -2.951125
- Series 04 has got a unit root; -6.622457 < -2.954021
- Series 05 has got a unit root; -6.753382 < -2.951125
- Series 06 has got a unit root; -11.60398 < -2.951125
- Series 07 has got a unit root; -6.555678 < -2.954021
- Series 08 has got a unit root; -6.197876 < -2.954021
- Series 09 has got a unit root; -10.14718 < -2.951125
- Series 10 has got a unit root; -6.233203 < -2.954021
- Series 11 has got a unit root; -6.209007 < -2.954021
- Series 12 has got a unit root; -10.15883 < -2.951125
- Series 13 has got a unit root; -6.235530 < -2.954021

6. FINDINGS

For the Johansen test, we have carried out analysis with both trace and with Eigenvalue test and we have found out a similar pattern for the results.

Though there was a differentiation amongst the tests performed, we can holistically tabulate the existence of cointegrating values for series 04 and 07.

The rest of the series; with 04-10, 07-13, and finally 10-13, we acquire a positive proof of cointegrating values.

Thereby the comment under findings is that the time series are cointegrated, and they share a common stochastic drift at the confidence level of 95%. The Johansen test was used for testing cointegration of several time series. This test permits more than one cointegrating relationship so is more generally applicable than the Engle–Granger test which is based on the Dickey–Fuller (or the augmented) test for unit roots in the residuals from a single (estimated) cointegrating relationship.

7. CONCLUSION

The Basel III Norms thereby aim at strengthening the banking system in the country to resist all kinds of risk and financial shocks. The transformation process has its level of adequacy for the participant banks. There is appropriate level of satisfaction for the present situation within in the banking industry. Basel III would be more an issue of growth than solvency for domestic banks, more so for public sector banks (PSBs) because they are at the mercy of the government with regard to their capital needs. Frequent dilutions will be required to support growth and also simultaneously maintain capital adequacy ratio levels.

There had been a thorough analytical interpretation of the co-relating Tier values of 36 stratified private and public banks. The investigation undertaken has clearly outlined the segmented pattern of the Tier Capital. There is pure exhibition of the merit based upon the system of Tier conversion, and we can understand that this can evaluated into the advanced requirement of Basel III Norms and its adequacy.

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