Financial Stability Report

(Including Trend and Progress of Banking in India 2013-14)

Issue No.10

Reserve Bank of India
December 2014

Financial Stability Report (Including Trend and Progress of Banking in India 2013-14) December 2014, submitted to the Central Government in terms of Section 36(2) of the Banking Regulation Act, 1949

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LETTER OF TRANSMITTAL

FSU 89 /01.04.003/2014-15

December 29, 2014
Pausha 08, 1936 (Saka)

The Finance Secretary
Government of India
Ministry of Finance
New Delhi – 110001

Dear Shri Mehrishi,

In pursuance of the provisions of Section 36(2) of the Banking Regulation Act, 1949, I have pleasure in transmitting herewith two copies of the Financial Stability Report (Including Trend and Progress of Banking in India 2013-14) December 2014.

Yours sincerely,

Raghuram G. Rajan

(Raghuram G. Rajan)

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List of Select Abbreviations

AE	Advanced Economy
AFA	Additional Factor of Authentication
AFCs	Asset Finance Companies
AFS	Available for Sale
AMCs	Asset Management Companies
AMFI	Association of Mutual Funds of India
AML	Anti Money Laundering
ARCs	Asset Reconstruction Companies
AT1	Additional Tier 1
AuM	Assets under Management
BCBS	Basel Committee on Banking Supervision
BC-ICT	Business Correspondent - Information and Communication Technology
BCP	Basel Core Principles
BCs	Business Correspondents
BE	Budget Estimates
BIS	Bank for International Settlement
BoJ	Bank of Japan
BRICS	Brazil Russia India China South Africa
BSBDAs	Basic Savings Bank Deposit Accounts
BSE	Bombay Stock Exchange
BSI	Banking Stability Indicator
CAD	Current Account Deficit
CAGR	Compounded Annual Growth Rate
CBOE	Chicago Board Options Exchange
CC	Clearing Corporation
CCB	Countercyclical Capital Buffer
CCIL	Clearing Corporation of India Limited
CCP	Central Counter Party
C-D	Credit to deposits
CDR	Corporate Debt Restructuring
CDs	Certificates of Deposits
CET1	Common Equity Tier1
CFT	Combating the Financing of Terrorism
CGA	Controller General of Accounts
CGF	Credit Guarantee Fund
CNP	Card not Present
CPI	Consumer Price Index
CPMI	Committee on Payments and Market Infrastructures
CPSS	Committee on Payment and Settlement Systems
CRAR	Capital to Risk Weighted Assets Ratio
CRILC	Central Repository of Information on Large Credits
CRR	Cash Reserve Ratio
DCCB	District Central Co-operative Bank
DEA	Depositor Education and Awareness
DFIs	Developmental Financial Institutions
DICGC	Deposit Insurance and Credit Guarantee Corporation
DIF	Deposit Insurance Fund
DII	Domestic Institutional Investments
D-SIBs	Domestic Systemically Important Banks
ECB	European Central Bank
ECBs	External Commercial Borrowings
ECR	Export Credit Refinance
EET	Exempt,Exempt,Taxable
EL	Expected Loss
ELSS	Equity Linked Savings Scheme
EMDEs	Emerging Market and Developing Economies
EMEs	Emerging Market Economies
EPFO	Employee Provident Fund Organisation
EPRA	European Public Real Estate Association
ES	Expected Shortfalls

ETFs	Exchange Traded Funds
FATF	Financial Action Task Force
FCCBs	Foreign Currency Convertible Bonds
FI	Financial Institutions
FIPs	Financial Inclusion Plans
FMC	Forward Markets Commission
FMI	Financial Market Infrastructure
FPIs	Foreign Portfolio Investments / Investors
FSAP	Financial Sector Assessment Program
FSB	Financial Stability Board
FSDC	Financial Stability and Development Council
FSR	Financial Stability Report
GCCs	General Credit Cards
GDP	Gross Domestic Product
GF	General Fund
GFSR	Global Financial Stability Report
GLAC	Gone-Concern Loss-Absorbing Capacity
GNPAs	Gross Non-Performing Advances
G-SIBs	Global Systemically Important Banks
HFT	Held for Trading
HNI	High Net Worth Individuals
HQLA	High Quality Liquid Assets
HTM	Held to Maturity
IBA	Indian Banks' Association
IIF	Institute of International Finance
IIP	Index of Industrial Production
IMF	International Monetary Fund
INR	Indian Rupee
IOSCO	International Organisation of Securities Commissions
IPOs	Initial Public Offerings
IRDA	Insurance Regulatory and Development Authority
IT	Information Technology
JLF	Joint Lenders' Forum
KCCs	Kisan Credit Cards
LABs	Local Area Banks
LCR	Liquidity Coverage Ratio
LEI	Legal Entity Identifier
LOU	Local Operating Unit
LTI	Loan to Income
LTV	Loan to Value
MBS	Mortgage Backed Securities
MCA	Ministry of Corporate Affairs
MF	Mutual Fund
MOSPI	Ministry of Statistics and Programme Implementation
MoU	Memorandum of Understanding
MRC	Minimum Required Corpus
mREIT	Mortgage Real Estate Investment Trust
MSCI AE	Morgan Stanley Capital International Advanced Economies
MSCI EM	Morgan Stanley Capital International Emerging Markets
MSF	Marginal Standing Facility
MSME	Micro Small and Medium Enterprises
MTM	Mark-To- Market
NABARD	National Bank for Agriculture and Rural Development
NAFSCOB	National Federation of State Co-operative Banks Ltd.
NAV	Net Asset Value
NBFCs	Non-Banking Financial Companies
NBFCs-D	Non-Banking Financial Companies -Deposit taking
NBFCs-ND	Non-Banking Financial Companies -Non-Deposit taking
NBFCs-ND-SI	Non Banking Financial Companies-Non-Deposit taking- Systemically Important

NDTL	Net demand and Time liability
NHB	National Housing Bank
NIM	Net Interest Margin
NNPAs	Net Non-Performing Advances
NOF	Net Owned Fund
NPAs	Non-Performing Advances
NPS	National Pension Scheme
NSDL	National Securities Depository Limited
NSE	National Stock Exchange
OD	Over Draft
ODIs	Offshore Derivative Instruments
OTC	Over the Counter
PACS	Primary Agricultural Credit Societies
PAT	Profit After Tax
PBC	Principal Business Criteria
PBT	Profit Before Tax
PCARDBs	Primary Co-operative Agriculture and Rural Development banks
PFRDA	Pension Fund Regulatory and Development Authority
PMFI	Principles for Financial Market Infrastructure
PMJDY	Pradhan Mantra Jan Dhan Yojana
PSBs	Public Sector Banks
QCCP	Qualifying Central Counter Party
QE	Quantitative Easing
RBI	Reserve Bank of India
RCAP	Regulatory Consistency Assessment Programme
REER	Real Effective Exchange Rate
REIT	Real Estate Investment Trust
RIDF	Rural Infrastructure Development Fund
RoA	Return on Assets
RoE	Return on Equity
RRBs	Regional Rural Banks
RTGS	Real Time Gross Settlement
RWA	Risk Weighted Assets
SARFAESI	Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (Act)
SCs/RC	Securitisation/Reconstruction Companies
SCARDBs	State Co-operative Agriculture and Rural Development banks
SCBs	Scheduled Commercial Banks
SD	Standard Deviation
SEBI	Securities and Exchange Board of India
SGF	Settlement Guarantee Fund
SIDBI	Small Industries Development Bank of India
SLCC	State Level Coordination Committee
SLR	Statutory Liquidity Ratio
SMA	Special Mention Accounts
SPVs	Special Purpose Vehicles
SRs	Security Receipts
StCBs	State Co-operative Banks
SUCBs	Scheduled Urban Co-operative Banks
SWFs	Sovereign Wealth Funds
TCTF	Too Connected to Fail
TLAC	Total Loss-Absorbing Capacity
UCBs	Urban Cooperative Banks
UL	Unexpected Losses
USD	United States Dollar
y-o-y	Year-on- Year

Overview

Macro-financial risks

The current weak global growth outlook may prolong easy monetary policy stance in most advanced economies (AEs). Consequently, low risk premia may lead to accumulation of vulnerabilities, and sudden and sharp overshooting in markets cannot be ruled out. As of now, financial risk taking has not translated into commensurate economic risk taking. Against the backdrop of low interest rates in AEs, portfolio flows to emerging market and developing economies have been robust, increasing the risk of reversals on possible adverse growth or financial market shocks, thus necessitating greater alertness.

On the domestic front, macroeconomic vulnerabilities have abated significantly in recent months on the back of improvement in growth outlook, fall in inflation, recovery in the external sector and political stability. However, growth in the banking business and activity in primary capital markets remain subdued due to moderate investment intentions. Sustaining the turnaround in business sentiment remains contingent on outcomes on the ground.

Financial institutions: Developments and stability

The growth of the Indian banking sector moderated further during 2013-14. Profitability declined on account of higher provisioning on banks' delinquent loans and lacklustre credit growth. The financial health of urban and rural co-operatives indicated divergent trends in terms of key indicators. While urban co-operative banks exhibited improved performance, the performance of primary agriculture credit societies and long term rural credit co-operatives remained a matter of concern with a further increase in their losses coupled with a deterioration in asset quality. While the asset size of the non-banking financial companies (non-deposit taking-systemically important) showed an expansion, asset quality deteriorated further during the period of review.

The banking stability indicator suggests that overall risks to the banking sector remained unchanged during the first half of 2014-15. In individual dimensions, though the liquidity position improved in the system, concerns remain on account of deterioration in asset quality along with weakened soundness. The profitability dimension of the indicator showed an improvement but it remained sluggish. The stress tests suggest that the asset quality of banks may improve in the near future under expected positive developments in the macroeconomic conditions and banks may also be able to meet expected losses with their existing levels of provisions. However, the asset quality of scheduled commercial banks may worsen from the current level if the macroeconomic conditions deteriorate drastically, and banks are likely to fall short in terms of having sufficient provisions to meet expected losses under adverse macroeconomic risk scenarios.

Analysis of the interconnectedness indicates that the size of the interbank market in relation to total banking sector assets has been on a steady decline. However, contagion analysis with top five most connected banks reveals that the banking system could potentially lose significant portion of its total Tier-I capital under the joint solvency-liquidity condition in the event of a particular bank triggering a contagion.

Financial sector regulation and infrastructure

While the capital to risk weighted assets ratio (CRAR) of the scheduled commercial banks at 12.8 per cent as of September 2014 is satisfactory, going forward, the banking sector, particularly the public sector

banks would require substantial capital to meet regulatory requirements with respect to additional capital buffers.

With the increased regulatory focus on segregating the cases of wilful defaults and ensuring the equity participation of promoter(s) in the losses leading to defaults, there is a need for greater transparency in the process of carrying out a net economic value impact assessment of large Corporate Debt Restructuring (CDR) cases. Another aspect that impinges upon the banks' asset quality is corporate leverage and its impact on banks' balance sheets, particularly 'double leveraging' through holding company structures and the pledging of shares by promoters.

Indian stock markets have seen a rapid growth in recent months. While the retail investor base still remains comparatively low, India's stock markets have been attracting substantial amounts of foreign investments, increasing the risk of reversal. The Securities and Exchange Board of India has introduced an additional safety net in the form of core settlement guarantee fund to mitigate risks from possible default in settlement of trades and to strengthen risk management framework in the domestic capital markets.

With a view to improving participation of actual users / hedgers and the quality of price discovery in the market, the Forward Markets Commission has revised position limits which are linked to estimated production and imports of the underlying commodities.

To deal with issues relating to unauthorised deposit acceptance and financial frauds, the State Level Coordination Committee (SLCC) mechanism has been strengthened under the initiative of the Financial Stability and Development Council (FSDC).

Chapter I

Macro-Financial Risks

The current weak global growth outlook may prolong easy monetary policy stance in most advanced economies (AEs). Consequently, low risk premia may lead to accumulation of vulnerabilities and sudden and sharp overshooting in markets cannot be ruled out. As of now, financial risk taking has not translated into commensurate economic risk taking. Against the backdrop of low interest rates in AEs, portfolio flows to emerging market and developing economies (EMDEs) have been robust, increasing the risk of reversals on possible adverse growth or financial market shocks, thus necessitating greater alertness.

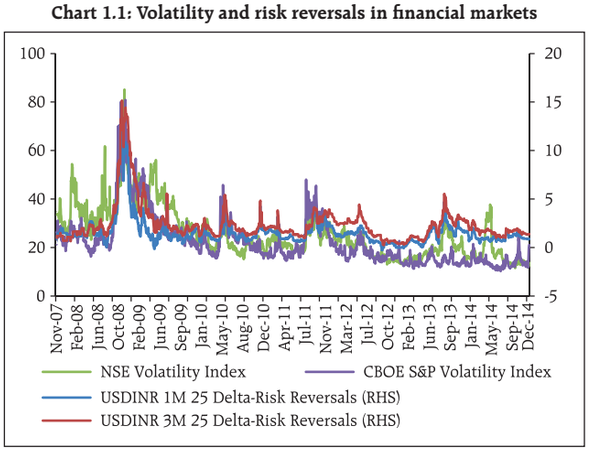
On the domestic front, macroeconomic vulnerabilities have abated significantly in recent months on the back of improvement in growth outlook, fall in inflation, recovery in the external sector and political stability. However, growth in the banking business and activity in primary capital markets remain subdued due to moderate investment intentions. Sustaining the turnaround in business sentiment remains contingent on outcomes on the ground.

Global backdrop

1.1. Global recovery seems to have weakened. While economic growth is finding traction in the US, it appears to be slipping in the Euro area and seems to be reversing in Japan. Any hard landing in China is an additional risk to global growth. Further, geopolitical risks emanating from developments in the Middle East and Ukraine are also impacting the global economy. Without a change in the pattern of growth and stability that still leans heavily on easy money, vulnerabilities remain, especially with inflation ruling below policy targets in many jurisdictions and the threat of deflation continuing in others.

1.2. Against this backdrop, the prospects for global financial stability remain uncertain amidst an ambience wherein weak growth prospects are still considered benign for financial markets in the expectation that ultra-easy monetary policies will continue. Stock markets around the world, particularly in advanced economies (AEs) have been buoyant with lower volatility until recently, a situation earlier experienced in the period of financial excesses leading to the global financial crisis (Chart 1.1). Despite the end of quantitative easing (QE) in the US, carry trades are likely to continue with both the Bank of Japan (BOJ) and the European Central Bank (ECB) adding to global liquidity. Simultaneously, low yields are impacting pension and retirement funds prompting them to shift their investment strategies towards riskier options. Amidst this sense of relative serenity, the October 15 flash crash in US Treasury bond yields may be a harbinger of the risks that may unfold.

Chart 1.1: Volatility and risk reversals in financial markets



Note: Data up to December 12, 2014.
Source: Bloomberg.

Domestic macroeconomic conditions

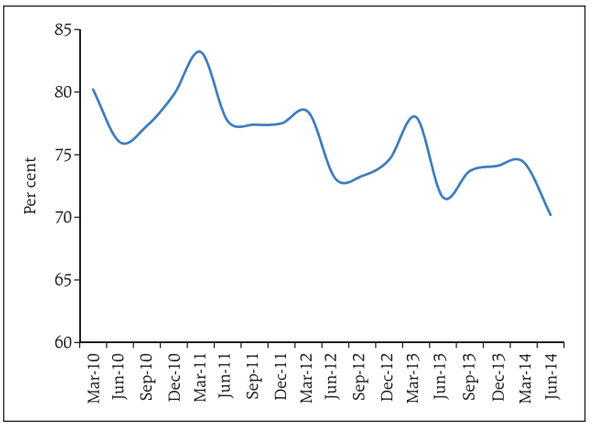
Growth

1.3. Domestic activity weakened in Q2 of 2014-15 with growth at 5.3 per cent. Activity is likely to be muted in Q3 also because of a moderate *kharif* harvest. Choppiness in the index of industrial production (IIP) growth during 2014-15, so far, has raised questions over consolidation of industrial growth. With capacity utilisation[1] during Q1 2014-15 being the lowest in the last four years (Chart 1.2), significant new investments may take time to materialise. In addition, measures of new investment intentions currently show only a modest pickup in investments (Chart 1.3). The Reserve Bank's current central estimate for GDP for 2014-15 is placed at 5.5 per cent with a gradual pickup in momentum through 2015-16.

Inflation

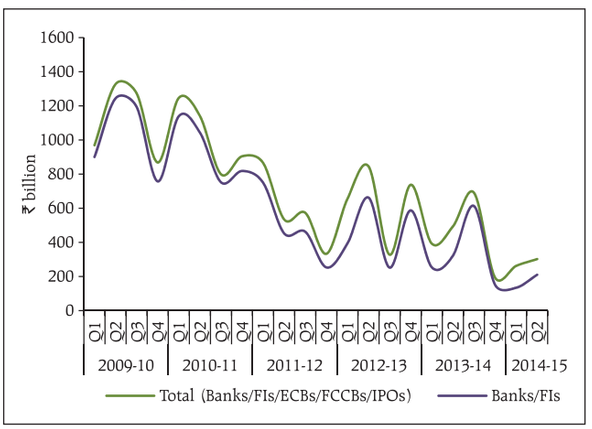
1.4. High and persistent inflation often gets entrenched into inflation expectations and leads to uncertainty over prices. As a result, high inflation can adversely impact investment and consumption decisions. Against this backdrop, the substantial easing in CPI inflation to 4.4 per cent in November 2014 from 11.2 per cent a year earlier (Chart 1.4) marks a significant improvement in the Indian macroeconomic environment. The Reserve Bank's latest projections suggest that CPI inflation over the next 12 months may hover around 6 per cent if the international crude prices remain around the current levels and the monsoon next year turns out to be normal.

Chart 1.2: Capacity utilisation



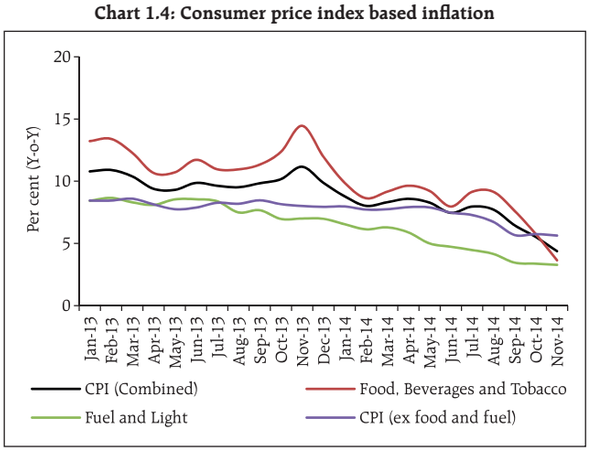
Source: RBI's Quarterly Order Books, Inventories and Capacity Utilisation Survey.

Chart 1.3: Envisaged private corporate investment intentions



Source: RBI.

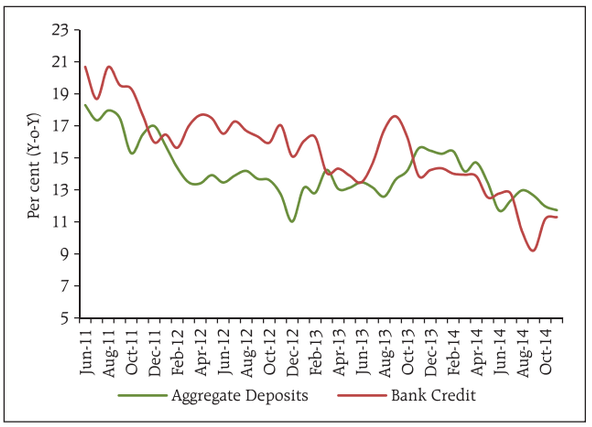
Chart 1.4: Consumer price index based inflation



Note: Data for November 2014 are provisional.
Source: MOSPI, GoI.

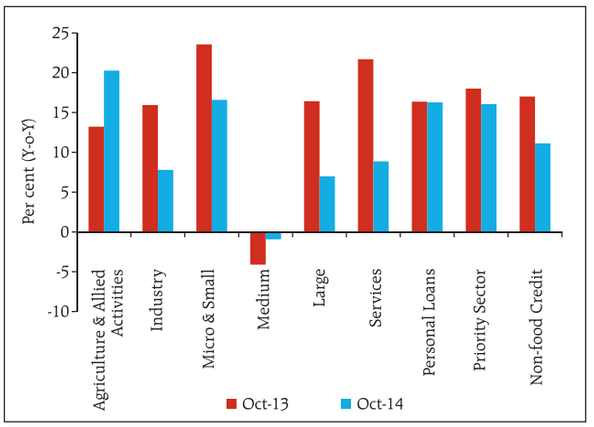
[1] Based on data from the RBI's Quarterly Order Books, Inventories and Capacity Utilisation Survey.

Chart 1.5: Trends in bank credit and deposit mobilisation



Source: RBI.

Chart 1.6: Growth in sectoral credit deployment by major sectors

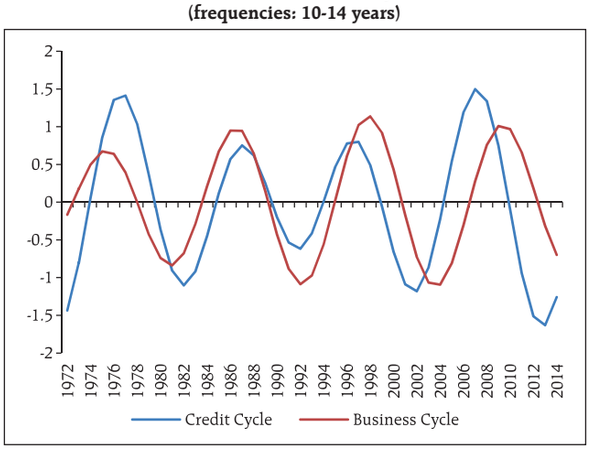


Note: Data are provisional and relate to select banks which cover 95 per cent of total non-food credit extended by all SCBs.
Source: RBI.

Credit

1.5. Growth in bank credit and deposits has been relatively low in the recent past (Chart 1.5). Slowdown in credit growth has been broad-based barring agriculture and allied activities (Chart 1.6). Low credit growth reflects a combination of factors such as reliance on alternative sources of funding, balance sheet repair and slack in demand as also an element of risk aversion. However, pickup in credit assumes importance in the present context given that credit cycles have been leading business cycles in the post-reform period[2] (Chart 1.7). Banks, therefore, need to prepare themselves to meet credit demand as investment picks up.

Chart 1.7: Business *vis-à-vis* credit cycles: BP filter (frequencies: 10-14 years)

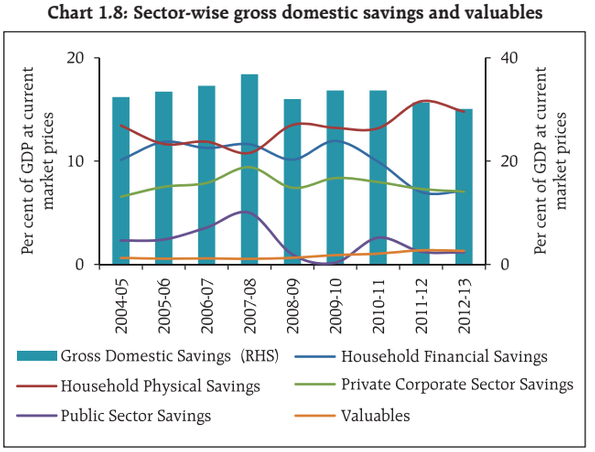


Source: RBI staff calculations.

Household financial savings

1.6. The gross domestic saving rate declined to 30.1 per cent in 2012-13, the lowest in the past nine years. This reduction is explained to a large extent by a fall in households' financial saving rate (Chart 1.8) amid their shifting preferences towards physical assets and valuables. However, preliminary estimates of the household financial saving rate for 2013-14 show a marginal increase, largely with respect to bank deposits and small savings. Revival in investment activity needs to be supported by an increase in financial savings.

Chart 1.8: Sector-wise gross domestic savings and valuables



Source: Database on the Indian Economy - RBI.

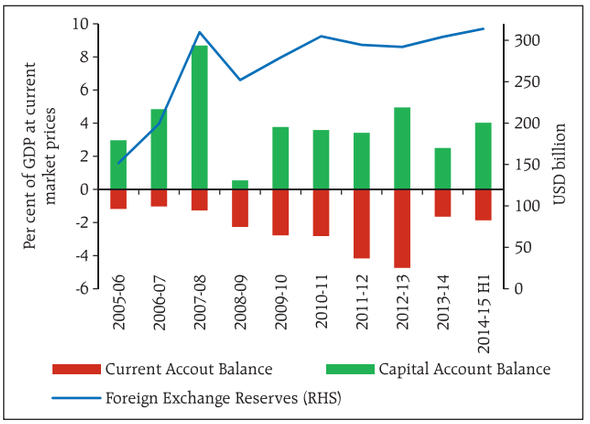
[2] 1992-93 onwards.

External developments

1.7. With the containment of the current account deficit (CAD), improvement in capital inflows, relative stability of the exchange rate and accretion to the foreign exchange reserves, external vulnerability has reduced (Chart 1.9). While fall in global crude oil and commodity prices will help containing CAD, continuous vigil is warranted as capital inflows tend to be volatile.

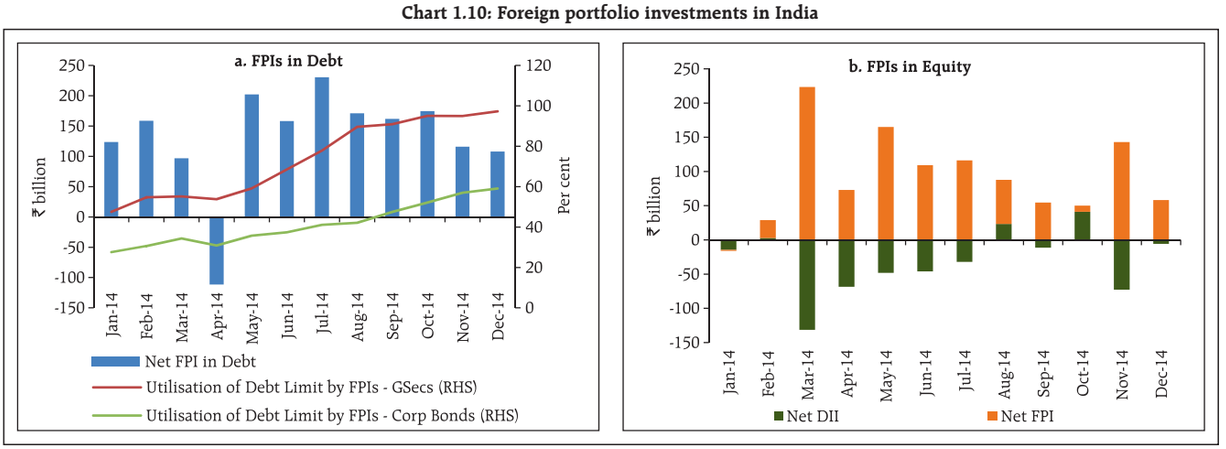
1.8. Foreign portfolio investments (FPIs) into India were robust during 2014 (Charts 1.10a and b).Their heightened interest in debt may create volatility in domestic debt markets despite some evidence that FPIs are taking a longer term view on the Indian debt paper. Given the primacy of US based FPIs in India (Charts 1.11a and b), unexpected changes in the US

Chart 1.9: Improvements in the external sector



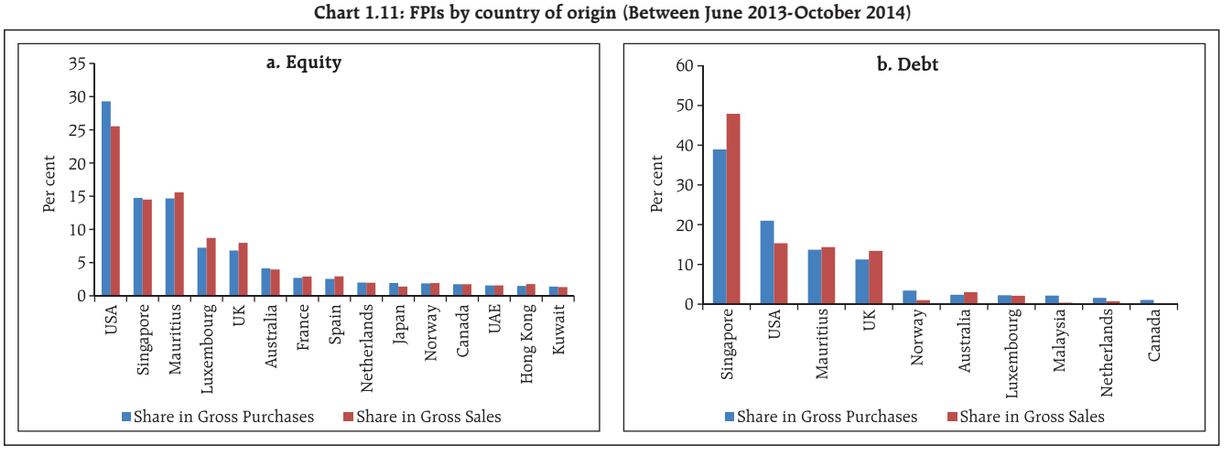
Source: RBI.

Chart 1.10: Foreign portfolio investments in India



Note: Data in Chart 1.10b are provisional. DII refers to Domestic Institutional Investments. Data up to December 11, 2014.
Source: Bloomberg, NSDL, BSE.

Chart 1.11: FPIs by country of origin (Between June 2013-October 2014)



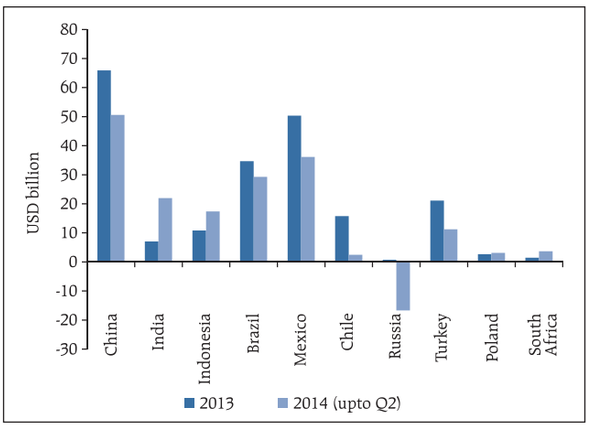
Source: SEBI.

monetary policy could have adverse effects on FPI flows through direct and indirect channels.

Financial markets

1.9. Portfolio inflows into emerging market economies (EMEs) during 2014 were robust (Chart 1.12). Indian stocks and the rupee outperformed their counterparts in other EMEs (Charts 1.13 a and b). Though Indian stocks rose sharply after May 2014, they seem to be only catching up with the likes of MSCI AE and S&P 500 which started their upward movement much earlier. Improvement in overall macroeconomic conditions, a relatively stable exchange rate, return of political stability and expectations of growth enhancing reforms seem to have created a relative advantage in favour of India and unleashed the pent up demand for Indian assets. The challenge ahead is to reinforce expectations through commensurate structural reforms.

Chart 1.12: Portfolio inflows into select EMEs

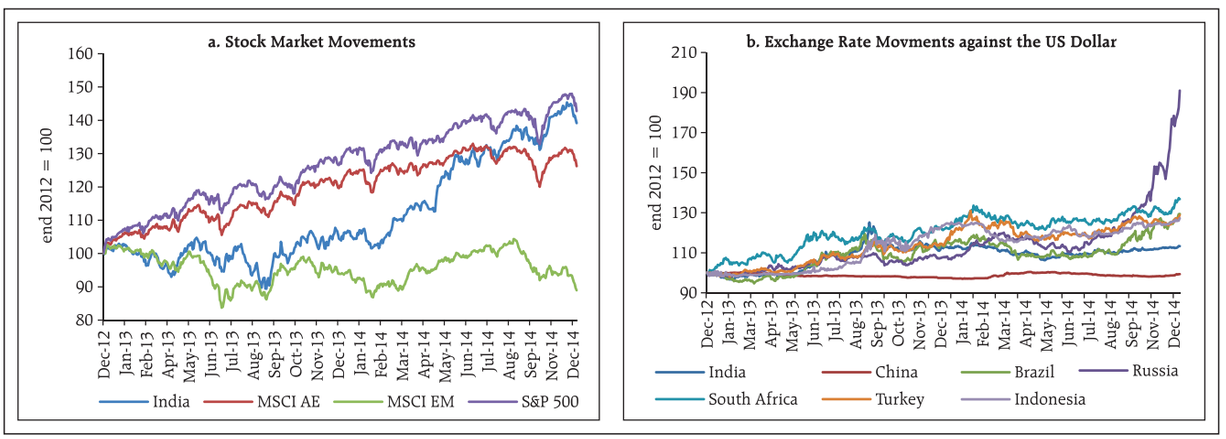


Note: Data for 2014 Q2 are estimates.
Source: IIF.

Government expenditure

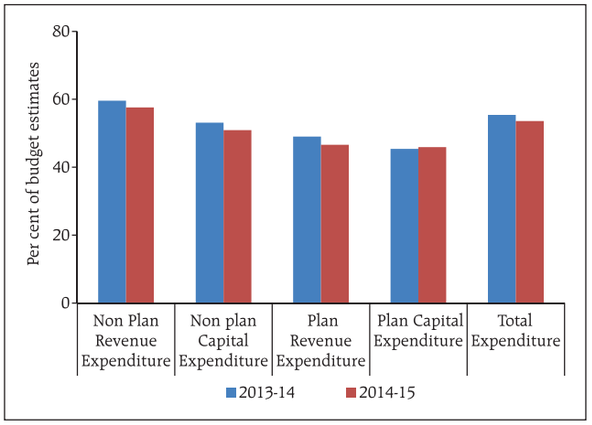
1.10. The Union Budget 2014-15 aimed at achieving higher growth along with macroeconomic stability through lower inflation, reduction in fiscal deficit and a manageable current account deficit. Available information for the first seven months of the current financial year indicates that total expenditure as percentage of budget estimates (BE) was lower compared to the corresponding period in the previous

Chart 1.13: Stock market and currency movements



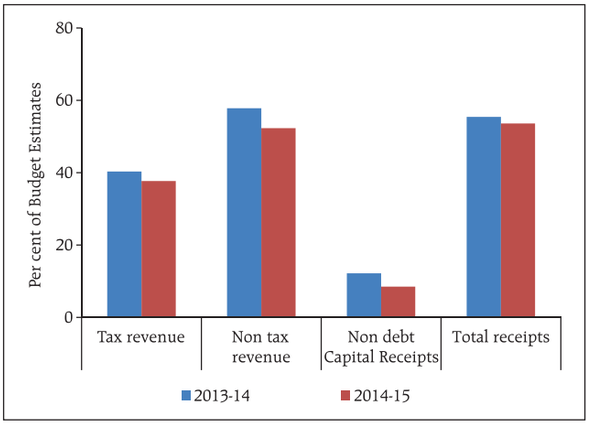
Note: Data up to December 12, 2014.
Source: Bloomberg.

Chart 1.14: Government expenditure
(cumulative position: April-October)



Source: CGA, Government of India.

Chart 1.15: Government receipts
(cumulative position: April-October)



Source: CGA, Government of India.

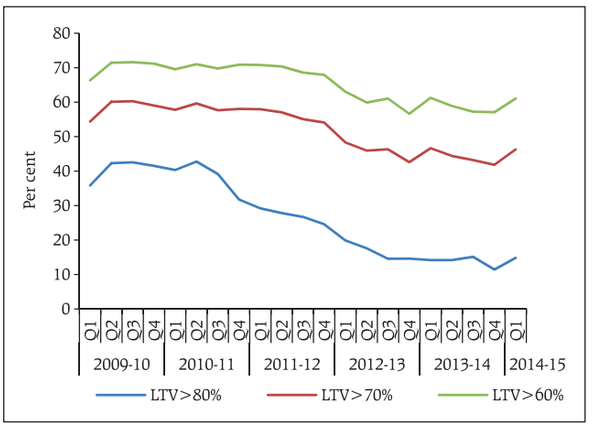
year, primarily on account of lower plan and non-plan revenue expenditure (Chart 1.14). Expenditure on major subsidies was significantly lower at 70.8 per cent of BE during first seven months of the current financial year (78.4 per cent a year ago). Overall capital expenditure was lower by 1.1 percentage points due to lower non-plan capital expenditure.

1.11. However, tax revenue as a percentage of BE was lower during April-October 2014-15 as compared to the previous year reflecting lower collections under all major taxes. Non-tax revenue as per cent of BE was also lower (Chart 1.15). The lower revenue mobilisation which is partly emanating from still subdued economic activity is a major concern.

Mortgage debt: House prices and loan to value/ income ratios

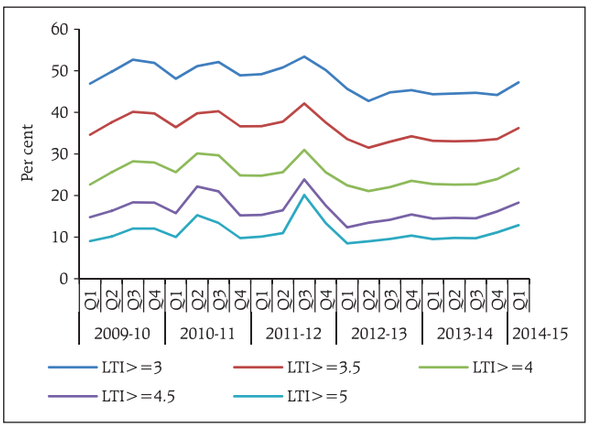
1.12. House prices witnessed correction in many cities during Q1 2014-15.[3] Further, the proportion of loans at high loan to value ratio (LTV) has been falling (Chart 1.16) and lending for housing at high loan to income ratio (LTI) is also relatively low[4] (Chart 1.17). However, a reversal in directional movement in LTV and LTI has been observed in Q1 2014-15.

Chart 1.16: LTV: Share in new housing loans



Source: Asset Price Monitoring System Survey, RBI.

Chart 1.17: LTI: Share in new housing loans



Source: Asset Price Monitoring System Survey, RBI.

[3] Based on National Housing Bank Data (NHB Residex).

[4] Based on Asset Price Monitoring System Survey, RBI.

1.13. Development of housing and mortgage markets has an important role in growth and employment. Given that the government is committed to a policy of housing for all by 2022, the housing sector has immense potential to grow; so do the mortgage markets. In this context, the Securities and Exchange Board of India (SEBI) recently notified the SEBI (Real Estate Investment Trusts) Regulations, 2014 (Box 1.1). These regulations are expected to aid the development of the real estate sector in India with benefits accruing to all stakeholders.

Box 1.1: Real Estate Investment Trusts

Globally, units of Real Estate Investment Trusts (REITs) sell like stocks on major exchanges and they invest in real estate directly, either in properties or mortgages. They enjoy special tax considerations and typically offer investors high yields as well as a framework for wider investor participation in real estate. Most of the REIT earnings are distributed to shareholders regularly as dividends. According to the European Public Real Estate Association's (EPRA) Global REIT Survey 2014, 37 countries worldwide have REITs or 'REIT-like' legislations in place. The structure of REITs varies across countries and it is constantly evolving.[5] Since their introduction in Asia in the early 2000s, REITs have been adopted across the continent, growing into a market worth over USD 140 billion.[6]

REITs are mainly of three types: Equity REITs, Mortgage REITs and Hybrid REITs. Equity REITs invest in and own properties and their revenues come principally from rents. Mortgage REITs invest in real estate and mortgage backed securities and their revenues are generated primarily as interest income that they earn on the mortgage loans. Hybrid REITs combine the investment strategies of Equity REITs and Mortgage REITs by investing in both properties and mortgages. Like any other investment, investments in REITs have their own set of risks. Mortgage REITs (mREITs) are involved in lending money to owners of real estate and buying (mostly agency backed) mortgage backed securities (MBS) and their business model layers on other risks that could amplify market dislocations. Some of these are: a) Funding and liquidity risk, b) Refinancing and rollover risk, c) Maturity mismatch risk, d) Convexity risk, e) Concentration and correlation risk and f) Market risk. These risks, in turn, are inter-related and their presence can lead to a fire sale event. However, in India, the current REIT regulations do not provide for mREITs and are aimed at developing the real estate sector in a robust manner.

[5] European Public Real Estate Association (http://www.epra.com/regulation-and-reporting/taxation/reit-survey/).

[6] Atchison. K and VS Yeung (2014), "The Impact of REITs on Asian Economies", *Asian Pacific Real Estate Association Limited*, April (available at: http://www.aprea.asia/file/The%20Impact%20of%20REITs%20on%20Asian%20Economies.pdf).

Chapter II

Financial Institutions: Developments and Stability

The growth of the Indian banking sector moderated further during 2013-14. Profitability declined on account of higher provisioning on banks' delinquent loans and lacklustre credit growth. The financial health of urban and rural co-operatives indicated divergent trends in terms of key indicators. While urban co-operative banks (UCBs) exhibited improved performance, the performance of primary agriculture credit societies (PACS) and long term rural credit co-operatives remained a matter of concern with a further increase in their losses coupled with a deterioration in asset quality. While the asset size of the non-banking financial companies (non-deposit taking systemically important) showed an expansion, asset quality deteriorated further during the period of review.

The banking stability indicator suggests that overall risks to the banking sector remained unchanged during the first half of 2014-15. In individual dimensions, though the liquidity position improved in the system, concerns remain on account of deterioration in asset quality along with weakened soundness. The profitability dimension of the indicator showed an improvement but it remained sluggish. The stress tests suggest that the asset quality of banks may improve in the near future under expected positive developments in the macroeconomic conditions and banks may also be able to meet expected losses with their existing levels of provisions. However, the asset quality of scheduled commercial banks (SCBs) may worsen from the current level if the macroeconomic conditions deteriorate drastically and banks are likely to fall short in terms of having sufficient provisions to meet expected losses under adverse macroeconomic risk scenarios.

Analysis of the interconnectedness indicates that the size of the interbank market in relation to total banking sector assets has been on a steady decline. However, contagion analysis with top five most connected banks reveals that the banking system could potentially lose significant portion of its total Tier-I capital under the joint solvency-liquidity condition in the event of a particular bank triggering a contagion.

2.1 Given the sluggish demand for credit and concerns about asset quality, the Indian banking sector experienced relatively lower growth and dip in profitability in 2013-14. Scheduled commercial banks (SCBs) showed a moderation in balance sheet growth and a fall in net profits, while the trends were divergent amongst other banking institutions with urban co-operative banks and short-term rural credit co-operative institutions other than primary agriculture credit societies (PACS) showing an improvement in growth as well as health. Long-term credit co-operative institutions, however, continued to be a weak spot within the banking sector.

2.2 Data used in this report are based on audited accounts of banks for the year ended 31 March 2014 as well as supervisory returns till 30 September 2014. The annual accounts include foreign operations of banks, whereas, the supervisory returns covered only their domestic operations. The detailed data on balance sheets as well as income and expenditure of SCBs, regional rural banks, local area banks, urban co-operative banks and rural credit co-operatives are available in the 'Statistical Tables Relating to Banks in India 2013-14' (www.rbi.org.in).

Scheduled commercial banks

2.3 This section discusses the health and performance of SCBs on the basis of their: (i) consolidated operations covering their domestic as well as overseas operations during 2013-2014 (as reported through their audited accounts) and (ii) domestic operations during the first half of 2014-15 (based on supervisory returns).

Performance

Consolidated operations

2.4 The consolidated balance sheet of SCBs in 2013-14 registered a decline in growth in total assets

and credit for the fourth consecutive year (Chart 2.1). This decline could be attributed to a variety of factors ranging from slower economic growth, de-leveraging, persistent pressure on asset quality leading to increased risk aversion among banks and also increasing recourse by corporates to non-bank financing including commercial papers and external commercial borrowings.

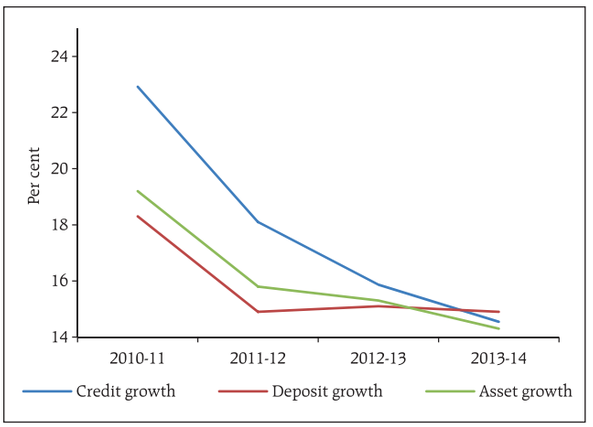
2.5 With both credit and deposit growth more or less same, the outstanding credit to deposit (C-D) ratio at the aggregate level remained unchanged at around 79 per cent (Chart 2.2).

Domestic operations

Credit and deposit growth

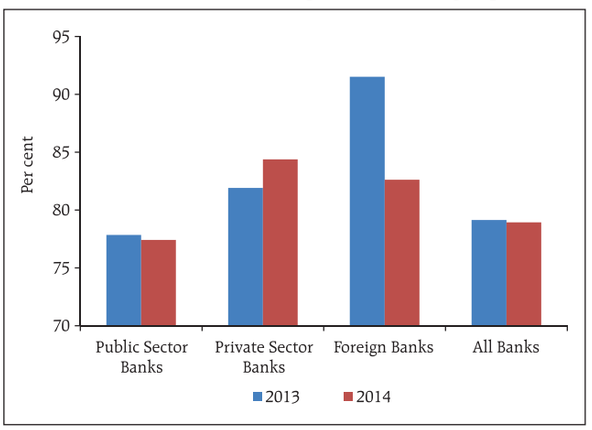
2.6 Credit growth on a y-o-y basis continues to decline and recorded low growth at 10.0 per cent as of September 2014, with public sector banks (PSBs) underperforming the rest with a growth of 7.9 per cent. Growth in deposits also declined to 12.9 per cent as of September 2014 from 13.7 per cent as of March 2014 (Chart 2.3).

Chart 2.1: Asset, credit and deposit growth



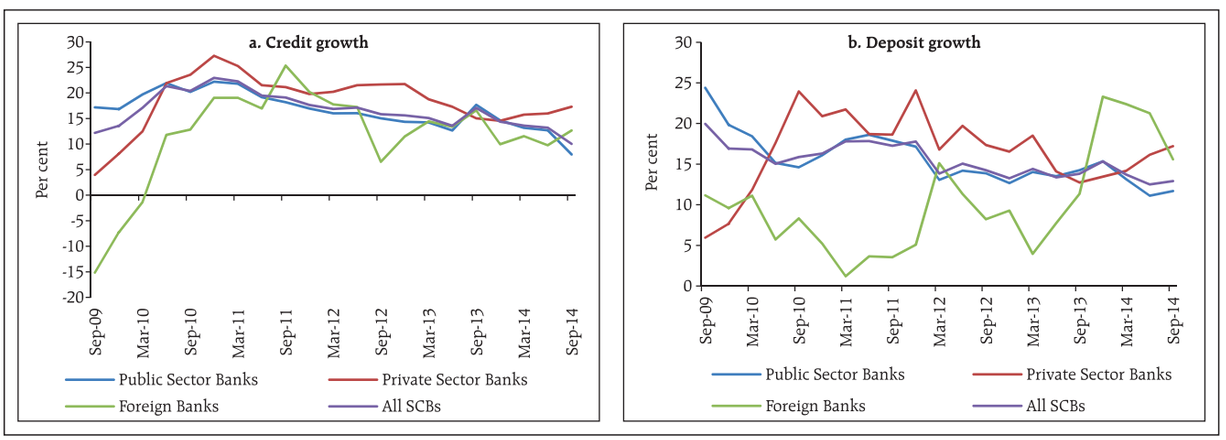
Source: Banks' annual accounts.

Chart 2.2: Trends in outstanding C-D ratio: Bank-group wise



Source: Banks' annual accounts.

Chart 2.3: Credit and deposit growth: y-o-y basis



Source: RBI supervisory returns.

Soundness

Capital adequacy

2.7 Between March and September 2014 the total capital and risk weighted assets (RWA) of SCBs increased by 1.9 per cent and 4.1 per cent respectively. This has resulted in decline in the capital to risk weighted assets ratio (CRAR) from 13.0 per cent to 12.8 per cent (Chart 2.4).

Leverage

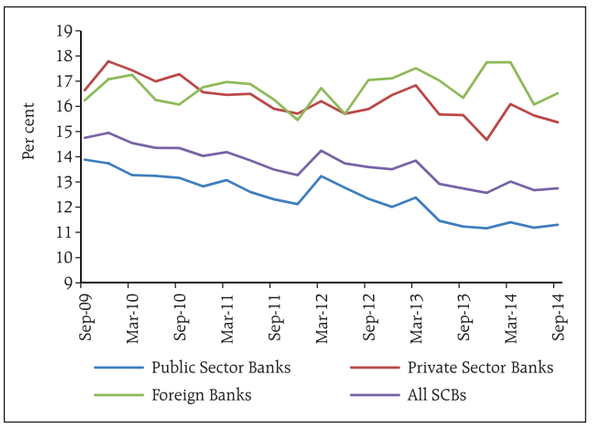
2.8 The Tier I leverage ratio[1] was 6.2 per cent in September 2014. In the case of PSBs, it marginally improved to 5.2 per cent in September 2014 from 5.1 per cent in March 2014 (Chart 2.5).

Asset quality

2.9 The gross non-performing advances (GNPAs) of SCBs as a percentage of the total gross advances increased to 4.5 per cent in September 2014 from 4.1 per cent in March 2014. The net non-performing advances (NNPAs) as a percentage of total net advances also increased to 2.5 per cent in September 2014 from 2.2 per cent in March 2014. Stressed advances[2] increased to 10.7 per cent of the total advances from 10.0 per cent between March and September 2014. PSBs continued to record the highest level of stressed advances at 12.9 per cent of their total advances in September 2014 followed by private sector banks at 4.4 per cent (Chart 2.6).

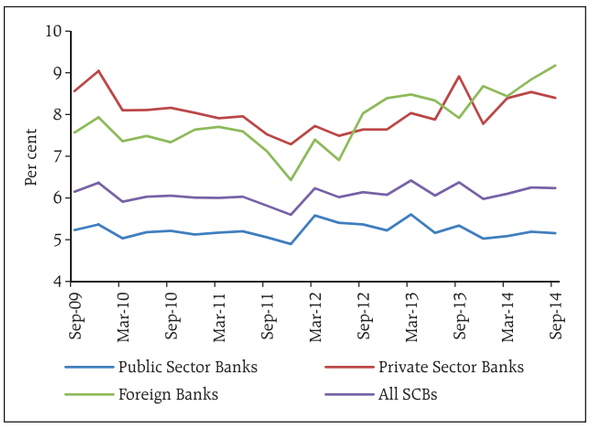
2.10 At a more granular level, share of stressed advances in total advances increased in the case of 46 SCBs (accounting for around 88 per cent of total loan portfolios of SCBs) between March and September

Chart 2.4: Capital adequacy: CRAR



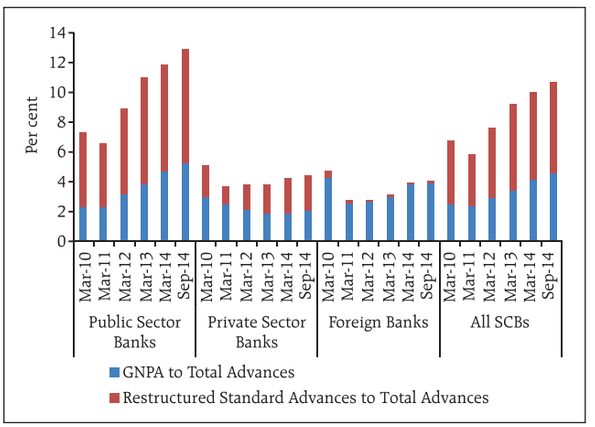
Source: RBI supervisory returns.

Chart 2.5: Leverage ratio of SCBs



Source: RBI supervisory returns.

Chart 2.6: Asset Quality of SCBs



Source: RBI supervisory returns.

[1] Tier-I leverage ratio is defined as the ratio of Tier-I capital to total assets. Total assets include the credit equivalent of off balance sheet items.

[2] For the purpose of analysing the asset quality, stressed advances are defined as GNPAs plus restructured standard advances.

2014 (Table 2.1). There are 20 banks which have higher share in the total stressed advances of all SCBs than their share in the total advances of SCBs. These 20 banks together have 43 per cent of the total SCB loans and contribute around 60 per cent of the total stressed advances of the banking system.

2.11 Five sub-sectors: infrastructure, iron and steel, textiles, mining (including coal) and aviation, had significantly higher levels of stressed assets and thus these sub-sectors were identified as 'stressed' sectors in previous FSRs. These five sub-sectors had 52 per cent of total stressed advances of all SCBs as of June 2014, whereas in the case of PSBs it was at 54 per cent (Table 2.2).

2.12 The data on exposure to infrastructure as of September 2014 shows that SCBs' exposure to the sector rose further to 15.6 per cent of their total loans. Exposure to the energy segment largely comprising of electricity, oil and gas constituted the major portion (around 58 per cent) of banks' aggregate exposure to infrastructure sectors, followed by transport (around 21 per cent) and telecommunications (around 10 per cent). Among bank groups, exposure of PSBs to infrastructure stood at 17.5 per cent of their gross

Table 2.1: Changes in the stressed advances ratio : March - September 2014

	No. of Banks	Share in Total Advances of all SCBs (in per cent)
Increase in Stressed Advances Ratio	46	88.2
Decline in Stressed Advances Ratio	25	5.9
No Change in Stressed Advances Ratio	18	5.9
Total	**89**	**100.0**

Source: RBI supervisory returns.

Table 2.2: Share of stressed advances in total loan portfolio

(Per cent)

Sub-sector		All SCBs			PSBs		
		Mar-13	Mar-14	Jun-14	Mar-13	Mar-14	Jun-14
Mining	Share in Total Advances of SCBs	0.7	0.6	0.6	0.8	0.7	0.7
	Share in Total Stressed Advances of SCBs	0.6	0.9	0.9	0.6	0.8	0.8
Iron and Steel	Share in Total Advances of SCBs	4.9	4.8	4.8	5.7	5.5	5.6
	Share in Total Stressed Advances of SCBs	8.2	10.8	10.2	8.7	11.2	10.6
Textiles	Share in Total Advances of SCBs	3.7	3.5	3.5	4.1	4.0	4.0
	Share in Total Stressed Advances of SCBs	7.5	7.7	7.2	7.5	7.8	7.4
Infrastructure	Share in Total Advances of SCBs	14.6	14.4	14.8	16.8	16.5	17.1
	Share in Total Stressed Advances of SCBs	28.8	29.4	30.7	29.5	30.2	31.9
Aviation	Share in Total Advances of SCBs	0.5	0.5	0.5	0.6	0.6	0.7
	Share in Total Stressed Advances of SCBs	3.9	3.3	3.1	4.3	3.6	3.4
Total	**Share in Total Advances of SCBs**	**24.4**	**23.9**	**24.2**	**28.0**	**27.2**	**28.0**
	Share in Total Stressed Advances of SCBs	**48.9**	**52.0**	**52.0**	**50.5**	**53.7**	**54.0**

Source: RBI supervisory returns.

advances as of September 2014. This was significantly higher than that of private sector banks (at 9.6 per cent) and foreign banks (at 12.1 per cent).

Profitability

Consolidated operations

2.13 During 2013-14, the growth in net profits of SCBs, which had been on a declining trend since 2011-12, turned negative. SCBs as a whole reported net profits of about ₹809 billion, indicating decline by 11.3 per cent compared to previous year. This decline in net profits was primarily the result of higher provisioning on banks' delinquent loans which registered an increase of nearly 34 per cent coupled with growth in the interest expenses of around 12 per cent during the year. This in turn impacted their return on assets (RoA) and return on equity (RoE) (Table 2.3). Their spread and net interest margin (NIM) also witnessed a decline (Chart 2.7).

Domestic operations

2.14 After contraction in the profit after tax (PAT) during the financial year 2013-14, SCBs recorded positive growth in PAT at 10.0 per cent in September 2014 due to the significantly lower growth in provisioning and write-offs. The RoA of all SCBs remained at 0.8 per cent as of September 2014, whereas, RoE of SCBs improved to 9.9 per cent as of September 2014 from 9.5 per cent as of March 2014 (Table 2.4).

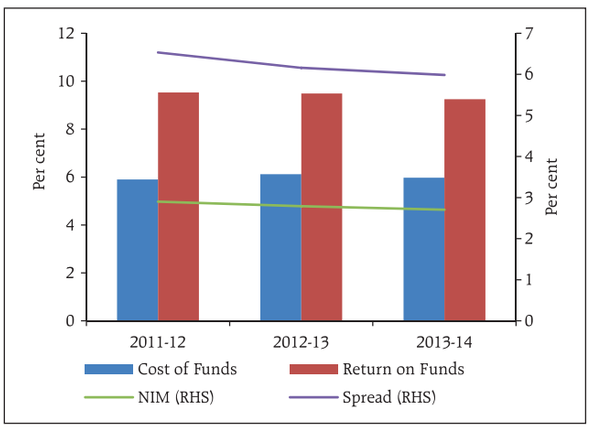
Table 2.3: Return on assets and return on equity of SCBs: Bank group-wise

(Per cent)

Sr. No.	Bank Group/Year	Return on Assets		Return on Equity	
	1	2	3	4	5
		2012-13	2013-14	2012-13	2013-14
1	Public sector banks	0.80	0.50	13.24	8.47
2	Private sector banks	1.63	1.65	16.46	16.22
3	Foreign banks	1.92	1.57	11.53	9.02
	All SCBs	1.04	0.81	13.84	10.68

Notes: Return on Assets = Net profit/Average total assets.
Return on Equity = Net profit/Average total equity.
Source: Annual accounts of respective banks.

Chart 2.7: Trends in spread/NIM



Note: Cost of Funds = (IPD + IPB) / (Deposits + Borrowings)
Return on Funds = (IEA + IEI) / (Advances + Investments)
Net interest margin = Net Interest Income / Total Assets
Spread = difference between return on and cost of funds, where:
IPD = Interest paid on deposits.
IPB = Interest paid on borrowings from RBI and other agencies.
IEA = Interest earned on advances and bills.
IEI = Interest earned on investments.
Source: Banks' annual accounts.

Table 2.4: Profitability of SCBs

(Per cent)

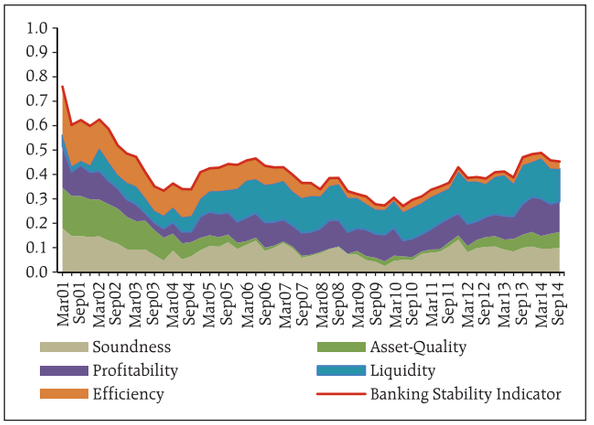
	Return on Assets	Return on Equity	PAT Growth	Earnings Before Provisions & Taxes-Growth	Net Interest Income-Growth	Other Operating Income-Growth
Sep-11	1.0	12.4	6.3	11.2	16.8	4.1
Mar-12	1.1	13.4	14.6	15.3	15.8	7.4
Sep-12	1.1	13.2	24.5	13.2	12.9	12.4
Mar-13	1.0	12.9	12.9	9.9	10.8	14.4
Sep-13	0.8	10.2	-9.7	12.8	11.6	30.5
Mar-14	0.8	9.5	-14.1	9.5	11.7	16.6
Sep-14	0.8	9.9	10.0	7.0	9.7	4.3

Note: RoA and RoE are annualised figures, whereas growth on a y-o-y basis.
Source: RBI supervisory returns.

Risks

2.15 As per the Banking Stability Indicator (BSI),[3] risks to the banking sector have not changed much since the publication of the previous FSR.[4] The BSI showed a continuous increase in vulnerability in the banking sector over the past few years. The factors contributing towards increase in risks, in the order of their share, are liquidity, profitability, soundness and asset quality. Though the liquidity position improved in the system during March and September 2014, concerns remain over deterioration in asset quality and soundness.[5] Profitability improved but remained sluggish (Charts 2.8 and 2.9).

Chart 2.8: Banking stability indicator



Note: Increase in indicator value shows lower stability. The width for each dimension signifies its contribution towards risk.
Source: RBI supervisory returns[6] and staff calculations.

Stress tests

Macro stress test: Credit risk

2.16 The resilience of the Indian banking system against macroeconomic shocks was tested through a series of macro stress tests for credit risk at the system, bank group and sectoral levels. These tests encompass assumed risk scenarios incorporating a baseline and two adverse macroeconomic scenarios representing medium and severe risks (Table 2.5). The adverse scenarios were derived based on up to 1

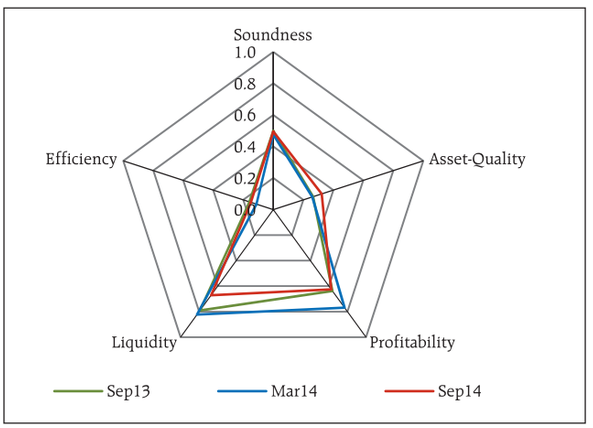
Table 2.5: Macroeconomic scenario assumptions[7]

(per cent)

FY		Baseline	Medium Stress	Severe Stress
2014-15*	Real GDP Growth	5.5	4.0	2.6
	Gross Fiscal Deficit	4.1	4.9	5.7
	CPI (Combined) Inflation	7.4	8.9	10.4
	Weighted Average Lending Rate	12.1	12.6	13.0
	Merchandise Exports to GDP Ratio[8]	15.5	14.3	13.1
2015-16	Real GDP Growth	6.3	4.1	2.1
	Gross Fiscal Deficit	3.6	4.8	6.0
	CPI (Combined) Inflation	7.2	9.5	11.6
	Weighted Average Lending Rate	12.1	12.8	13.5
	Merchandise Exports to GDP Ratio	16.5	14.7	13.0

* Average number for the last two quarters of FY 2014-15.

Chart 2.9: Banking stability map



Note: Away from the centre signifies increase in risk.
Source: RBI supervisory returns and staff calculations.

[3] The detailed methodology and basic indicators used under different BSI dimensions are given in Annex 2.

[4] FSR, June 2014 (with reference to data as of March 2014).

[5] Soundness was measured based on CRAR, Tier-I capital to Tier-II capital ratio and leverage ratio.

[6] Based on SCBs' supervisory data covering domestic operations.

[7] These stress scenarios are stringent and conservative assessments under hypothetical severely adverse economic conditions and should not be interpreted as forecasts or expected outcomes.

[8] The impact of exchange rate, through REER, has also been captured on the asset quality of SCBs. The impact turned out to be very small (for details see Annex 2).

standard deviation (SD) for medium risk and 1.25 to 2 SD for severe risk (ten years historical data).

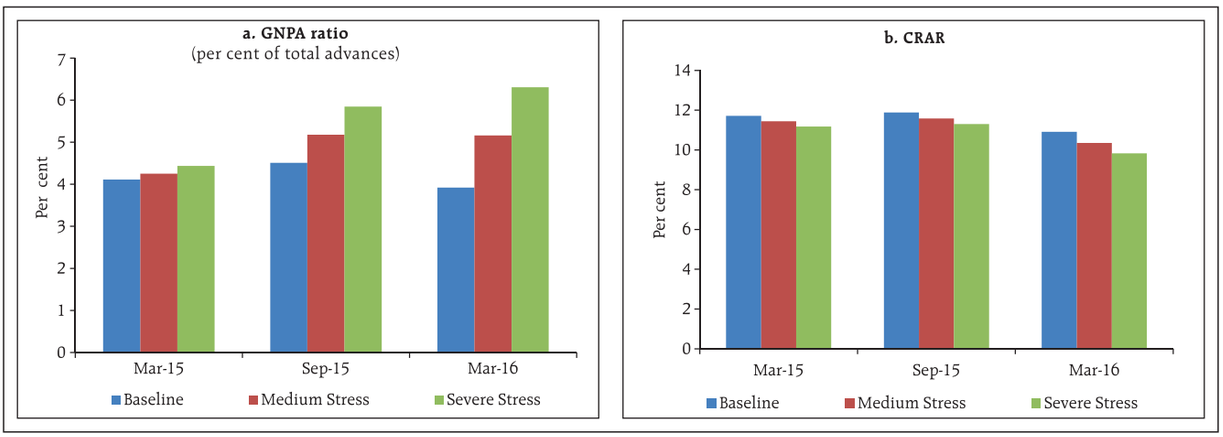
System level credit risk

2.17 The macro stress tests for credit risk suggest that under the baseline scenario, which assumes improvement in the overall macroeconomic scenario during the next financial year, the GNPA ratio of all SCBs may decline to 4.0 per cent by March 2016 from 4.5 per cent as at end September 2014. However, if macroeconomic conditions deteriorate, the GNPA ratio may increase further and under a severe stress scenario could rise to around 6.3 per cent by March 2016. Under such a severe stress scenario, the system level CRAR of SCBs could decline to 9.8 per cent by March 2016 from 12.8 per cent in September 2014 (Chart 2.10).

Bank group level credit risk

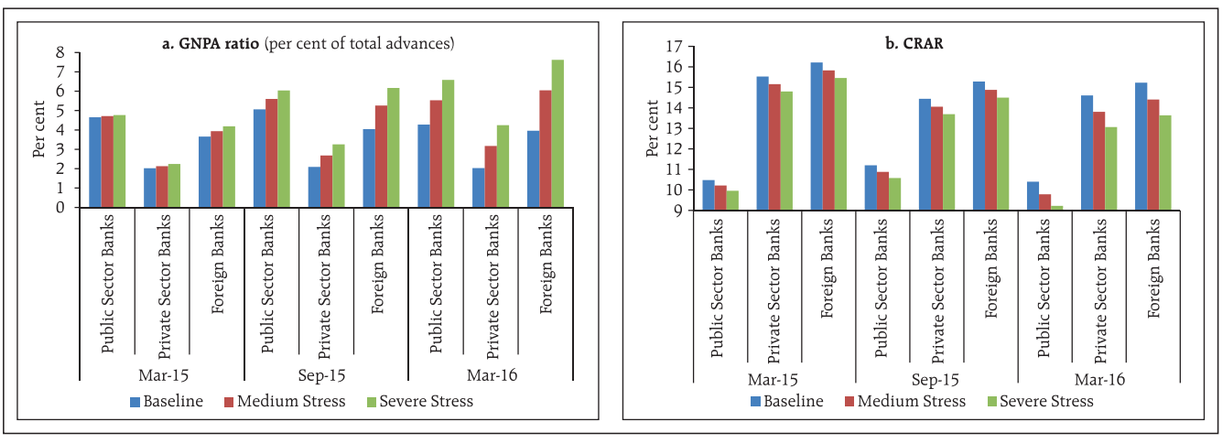
2.18 Under the assumed baseline scenario of improved macroeconomic conditions, the asset quality of public sector banks is expected to improve, but they will continue to carry the highest GNPA ratio among the bank groups (Chart 2.11).

Chart 2.10: Projection of system level GNPAs and CRAR of SCBs (under various scenarios)



Note: The projection of system level GNPAs has been done using three different but complementary econometric models: multivariate regression, vector autoregressive (which takes into account the feedback impact of credit quality to macro variables and interaction effects) and quantile regression (which can deal with tail risks and takes into account the non-linear impact of macroeconomic shocks). The average GNPA of the three models is given here.
Source: RBI supervisory returns and staff calculations.

Chart 2.11: Projection of bank group-wise GNPAs and CRAR (under various scenarios)



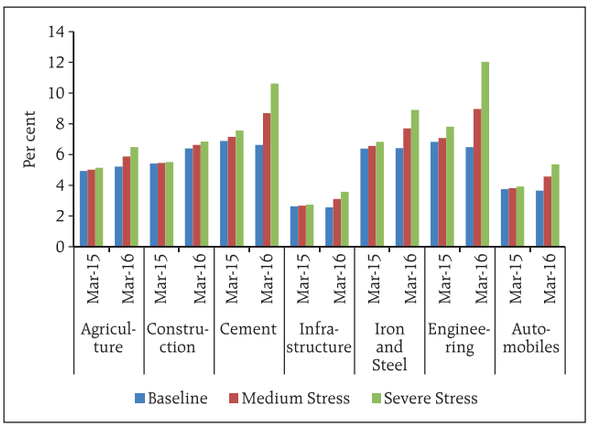
Note: The projection of bank groups-wise GNPA has been done using two different but complementary econometric models: multivariate regression and vector autoregressive. The average GNPA of the two models is given here.
Source: RBI supervisory returns and staff calculations.

2.19 Under a severe stress scenario, PSBs may record the lowest CRAR of around 9.2 per cent by March 2016 (as against 11.3 per cent in September 2014), close to the minimum regulatory capital requirement of 9 per cent (Chart 2.11).

Sectoral credit risk

2.20 A macro stress test of sectoral credit risk revealed that under a severe stress scenario, among seven select sectors the engineering sector is expected to register the highest GNPA ratio at 12.0 per cent by March 2016 followed by the cement sector (10.6 per cent) (Chart 2.12).

Chart 2.12: Projected sectoral GNPAs (under various scenarios)
(per cent to total advances)

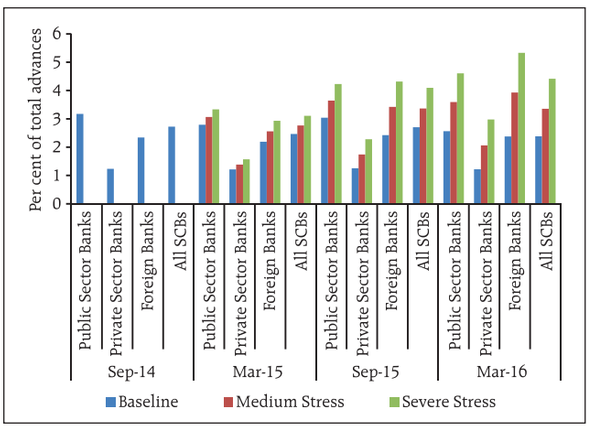


Source: RBI supervisory returns and staff calculations.

Estimation of losses[9] for credit risk: Provisioning and capital adequacy

2.21 Due to secular deterioration in their asset quality, SCBs' expected loss (EL) continues to rise but might decline in the second half of 2015-16 if the assumed improvements in macroeconomic conditions materialise. The current level of provisions[10] of various bank groups – public sector banks, private sector banks and foreign banks as a proportion of their respective total advances as of September 2014 were at 3.2 per cent, 1.9 per cent and 3.9 per cent respectively. Among the bank groups, PSBs had the highest expected loss at 3.2 per cent of their total advances as of September 2014. Though they may meet the expected losses under baseline scenarios they are likely to fall short in terms of having sufficient provisions to meet expected losses (EL) under adverse macroeconomic risk scenarios[11] (Chart 2.13).

Chart 2.13: Expected losses: Bank group-wise



Source: RBI supervisory returns and staff calculations.

[9] The procedure adopted for estimating losses is given in Annex 2. Internationally, it is recommended to use the estimated losses (EL & UL) approach for the purpose of making provisions and capital for the next one year. For this purpose, PD is derived based on annual slippage. As the purpose of this study is to judge the adequacy of provisioning and capital levels being maintained by SCBs and not to estimate the required level of provisions and capital to be maintained for next one year, the PD used here is based on GNPAs.

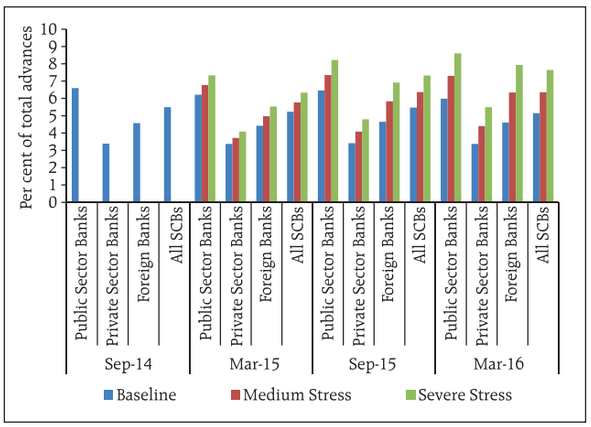
[10] Provisions include those for credit losses, risk provision for standard advances and provisions for restructured standard advances.

[11] The stress scenarios are defined in Table 2.5 under macro stress tests.

2.22 The estimated unexpected losses (UL) and expected shortfalls (ES) arising from the credit risk of various bank groups even under severe macroeconomic stress conditions are expected to be much lower than the present level of total capital (Tier-I plus Tier-II) maintained by them. Public sector banks, private sector banks and foreign banks maintained total capital at the level of 12.5 per cent, 21.4 per cent and 36.0 per cent of total advances respectively as of September 2014 (Charts 2.14 and 2.15).

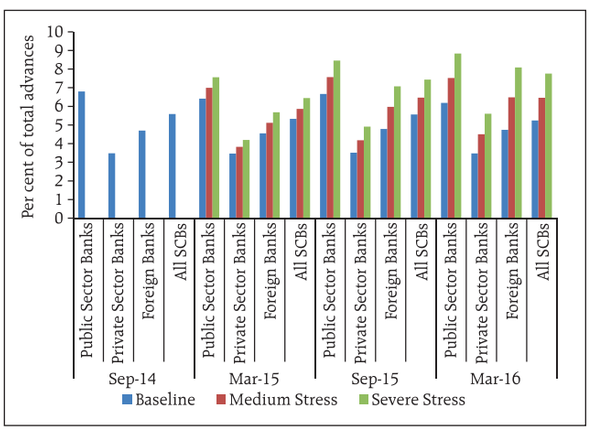
2.23 The bank-wise[12] estimation of EL and UL arising from credit risk shows that 20 banks (mostly PSBs) were unable to meet their expected losses with their existing provisions. These banks had a 29.8 per cent share in the total advances of the select 60 banks. On the other hand, there were only two banks (with 2.0 per cent share in total advances of the select banks) which were expected to have higher unexpected losses than the total capital (Chart 2.16).

Chart 2.14: Unexpected losses: Bank group-wise



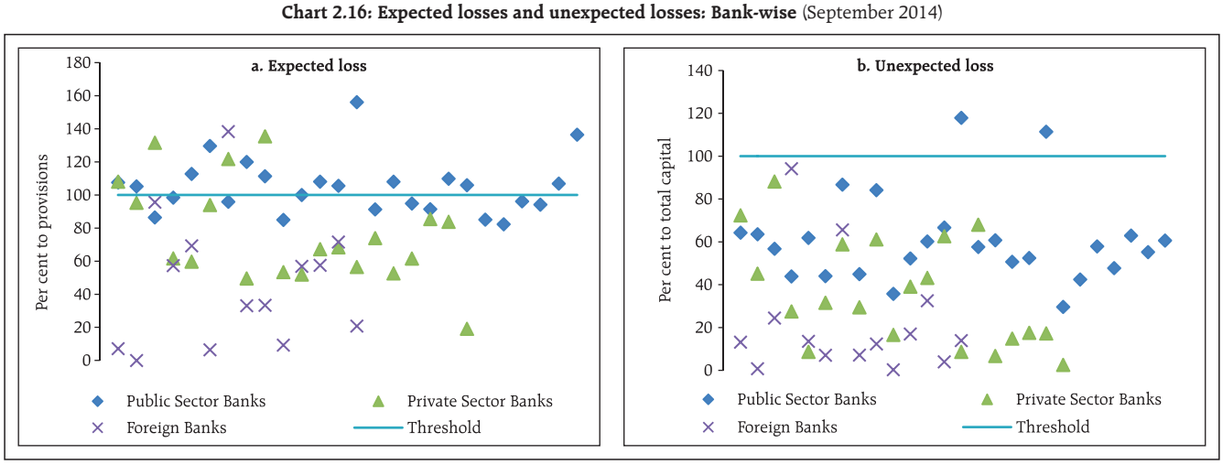
Source: RBI supervisory returns and staff calculations.

Chart 2.15: Expected shortfalls: Bank group-wise



Source: RBI supervisory returns and staff calculations.

Chart 2.16: Expected losses and unexpected losses: Bank-wise (September 2014)



Source: RBI supervisory returns and staff calculations.

[12] Bank-wise estimation of EL and UL were done for 60 SCBs which account for 99 per cent of SCBs' total assets.

Sensitivity Analysis: Bank Level[13]

2.24 A number of single factor sensitivity stress tests (top-down) were carried out on select SCBs (60 banks accounting for 99 per cent of the total banking sector assets) to assess their vulnerabilities and resilience under various scenarios. The resilience of commercial banks with respect to credit, interest rate and liquidity risks was studied through the top-down sensitivity analysis by imparting extreme but plausible shocks. The results are based on September 2014 data.[14]

Top-down stress tests

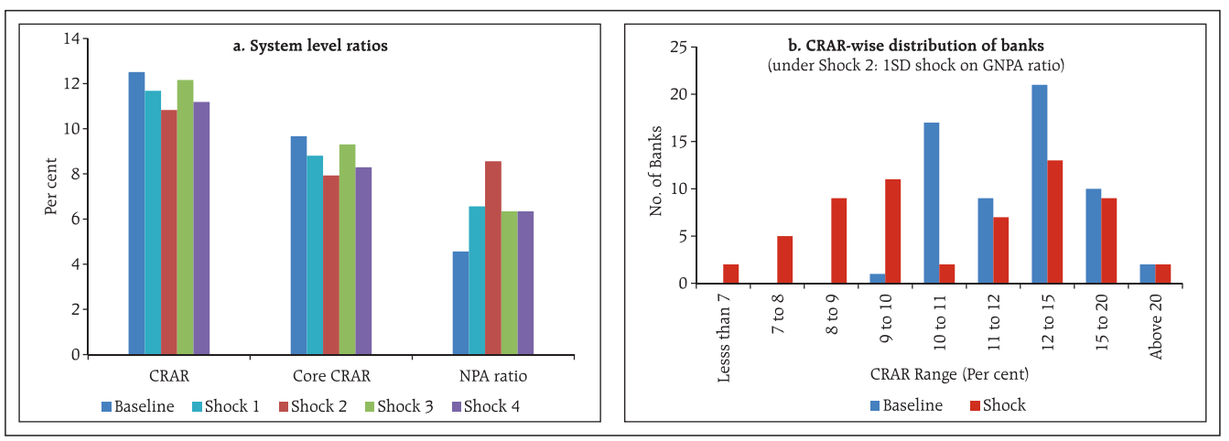
Credit risk

2.25 The impact of different static credit shocks for banks as on September 2014 shows that the system level stressed CRAR remained above the required minimum of 9 per cent (Chart 2.17). Capital losses at the system level could be about 15 per cent in the case of a severe shock of 1 SD[15] (shock 2), while the impact on banks' profits would be more severe wiping out their annual profits. The stress test results further show that 16 banks, mostly PSBs, sharing about 28 per cent of SCBs' total assets, would fail to maintain required CRAR if GNPA increases under shock 2 assumptions. For 7 banks, the CRAR may even go below the level of 8 per cent.

Credit concentration risk

2.26 Stress tests on the credit concentration risk of banks show that the impact under various stress scenarios was significant for six banks, which account for 8 per cent of the assets, with their CRAR falling below 9 per cent. Capital losses could be around 5 per cent, 9 per cent and 14 per cent at the system level under the assumed scenarios of default of the top one, two and three individual borrowers

Chart 2.17: Credit risk: Shocks and impacts



Note: Shock 1: 0.5 SD shock on GNPA ratio. Shock 2: 1 SD shock on GNPA ratio.
Shock 3: 30 per cent of restructured advances turn into GNPAs (sub-standard category).[16]
Shock 4: 30 per cent of restructured advances are written-off (loss category).

Source: RBI supervisory returns and staff calculations.

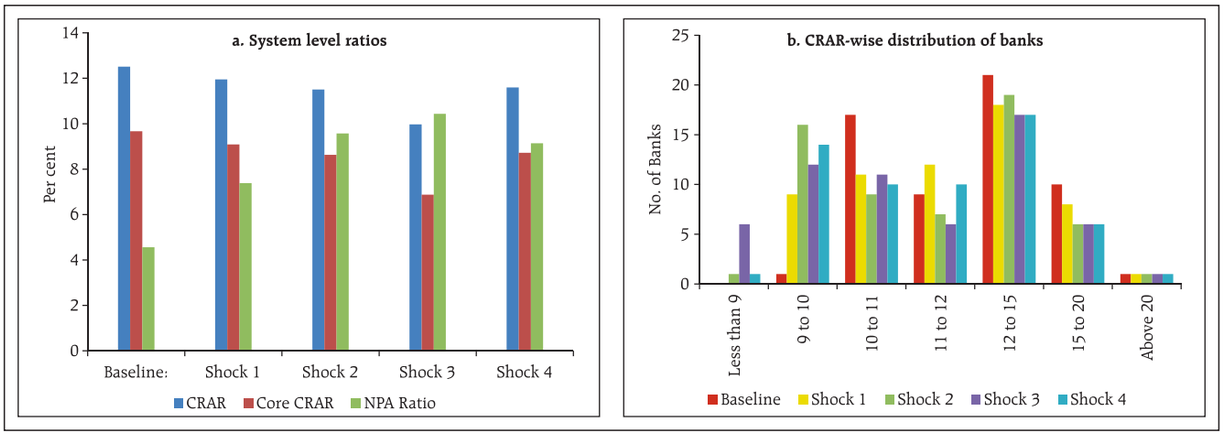
[13] The sensitivity analysis was done in addition to the macro stress tests for credit risk. While in the former shocks were given directly to asset quality (GNPAs), in the latter the shocks were in terms of adverse macroeconomic conditions. Also, macro stress tests were done at the system, major bank group and sectoral levels, whereas the sensitivity analysis was done at aggregated system and bank levels. While the focus of macro stress tests was credit risk, the sensitivity analysis covered credit, interest rate and liquidity risks.

[14] For details on the stress tests, see Annex 2.

[15] The standard deviation of GNPA ratio is estimated from ten years quarterly data.

[16] Relaxation in asset classification for restructured advances granted by the Reserve Bank will be withdrawn from April 1, 2015. For further discussion refer to Chapter III (paras 3.26 and 3.27).

Chart 2.18: Credit risk: Concentration



Note: Shock 1: The top individual borrower defaults. Shock 2 : The top two individual borrowers default.
Shock 3 : The top three individual borrowers default. Shock 4 : The top group borrower default.
Source: RBI supervisory returns and staff calculations.

respectively. Capital losses[17] could be around 9 per cent at the system level under the assumed scenarios of default of the top group borrower. The impact on profit before tax (PBT) could be as high as 202 per cent with a minimum of 73 per cent under the same scenarios. The direct impact on CRAR at the system level under the assumed scenarios of default of the top individual borrower, the top two individual borrowers, the top three individual borrowers and default by the top group borrowers would be 56, 100, 254 and 94 basis points respectively. However, system level CRAR will remain above 9 per cent under these shocks (Chart 2.18).

Sectoral credit risk

2.27 Credit risk of exposure to a few important sectors/industries was examined through sectoral credit stress tests. The assumed shock was an increase in GNPAs ratio by 5 percentage points in each sector. The results of a sensitivity analysis revealed that the shocks would significantly increase system level GNPAs, with the most significant effect of the single sector shock being in the real estate (Table 2.6). The impact of the shock on capital ratios was limited given that only a portion of the credit portfolio was shocked. However, there could be a

Table 2.6: Credit risk: Sectors

(Per cent)

Sector level			System level				
			CRAR	Tier-1 CRAR	GNPA Ratio	Losses as per cent of capital	Losses as per cent of profit
Baseline:			12.5	9.7	4.6	-	-
	Share in Total Advances	GNPA Ratio of the Sector	Shock: 5 percentage points increase in GNPAs in each sector				
Agriculture	12.6	5.4	12.3	9.4	5.2	2.4	17.6
Power	9.0	1.4	12.3	9.5	5.0	1.6	11.7
Real Estate	17.4	4.6	12.2	9.3	5.4	3.3	24.5
Telecom	1.6	4.8	12.5	9.6	4.6	0.3	2.3
All 4 Sectors (Agriculture + Power + Real Estate + Telecom)	41.0	4.0	11.7	8.8	6.6	7.7	57.9
Priority Sector	34.1	5.2	11.8	9.0	6.3	6.4	47.7

Source: RBI supervisory returns and staff calculations.

[17] Capital losses have been calculated on total capital (Tier I + Tier II).

significant impact on banks' profitability (profit before tax).

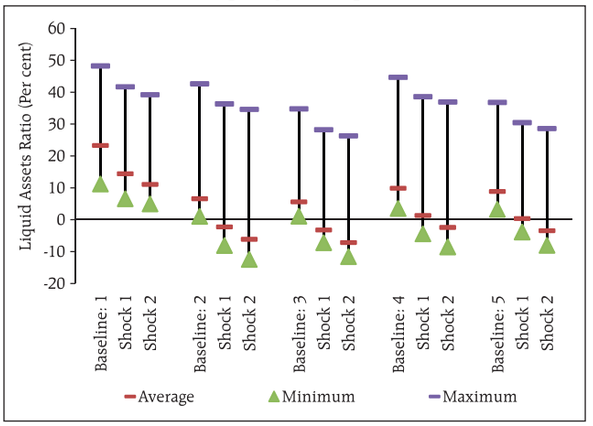
Interest rate risk

2.28 The interest rate risk in the trading book (direct impact on AFS and HFT portfolios of banks) under various stress scenarios is manageable with reduction in CRAR by 74 basis points at the system level. This impact is due to parallel upward shift (2.5 percentage points) in the yield curve. Reduction in CRAR was 82 basis points reported in the previous FSR (June 2014) for the same shock. At the disaggregated level, three banks that accounted for 5.1 per cent assets are getting impacted adversely. The total capital loss at the system level would be about 6.6 per cent. The assumed shock of 2.5 percentage points parallel upward shift in the yield curve on the HTM portfolio of banks, if marked-to-market, would significantly reduce the CRAR by about 261 basis points (the previous FSR reported an impact of 280 basis points), impacting 25 banks. The income impact on the banking book[18] of SCBs could be about 50 per cent of their profit (before tax) under the assumed shock of a parallel downward shift (2.5 percentage points) in the yield curve.

Liquidity risk

2.29 The liquidity risk analysis captures the impact of assumed deposit run-off scenarios on banks. The analysis used five definitions of liquid asset.[19] As per these definitions, liquid assets comprise of cash, CRR, interbank deposits and investments in different forms. Different liquid asset ratios[20] were arrived at using various definitions under the baseline scenario. The stress scenarios were constructed to test the banks' ability to meet a run on their deposits using only their liquid assets. The analysis shows that though there was liquidity pressure under the stress scenarios, banks could withstand sudden and unexpected withdrawals by depositors under assumed shocks with the help of their statutory liquidity ratio (SLR) investments (Chart 2.19).

Chart 2.19: Liquidity risk (deposit run-offs)



Liquid assets-definitions	
1	Cash + Excess CRR + Inter Bank Deposits maturing within1-month + SLR Investments + Eligible Export Credit Refinance (ECR)
2	Cash + Excess CRR + Inter Bank Deposits maturing within1-month + Investments maturing within1-month + Eligible ECR
3	Cash + Excess CRR + Inter Bank Deposits maturing within1-month + Excess SLR Investments+ Eligible ECR
4	Cash + CRR + Inter Bank Deposits maturingwithin1-month + Investments maturing within 1-month + Eligible ECR
5	Cash + CRR + Inter Bank Deposits maturing within 1-month + Excess SLR Investments + Eligible ECR
A baseline and two shock scenarios were constructed for each of these definitions.	
Liquidity Shocks	
Shock 1	10 per cent deposits withdrawal (cumulative) in a short period (say 1 or 2 days).
Shock 2	3 per cent deposits withdrawal (each day) for consecutive 5 days.

Source: RBI supervisory returns and staff calculations.

[18] The income impact on the banking book considering the exposure gap of rate sensitive assets and liabilities, excluding AFS and HFT portfolios, are calculated for one year only.

[19] The guidelines on Liquidity Coverage Ratio (LCR), Liquidity Risk Monitoring Tools and LCR Disclosure Standards were issued vide circular DBOD. BP.BC 120/21.04.098/2013-14 dated 9 June 2014. LCR will be introduced in a phased manner starting with a minimum requirement of 60 per cent from 1 January 2015 and reaching minimum 100 per cent on 1 January 2019.

[20] Liquid Assets Ratio $= \frac{\text{Liquid Assets}}{\text{Total Assets}} \times 100$. Under shock scenarios, the negative liquid assets ratio reflects the percentage deficit in meeting the required deposit withdrawal.

2.30 Another liquidity risk analysis based on the unutilised portion of credit lines which are sanctioned/ committed/guaranteed (taking into account the undrawn working capital sanctioned limit, undrawn committed lines of credit and letters of credit and guarantees) was carried out to focus on banks' ability to fulfil the additional demand for credit. Banks were required to meet the demand using their cash balances, excess CRR, short term interbank deposits (one month maturity), excess SLR and eligible export credit refinance (ECR). The major impact was due to the utilisation of undrawn working capital limits and around 12 small banks were unable to meet the credit requirements of their customers using existing liquid assets (shock1). However, the number of impacted banks was much lower at six, if only a portion (50 per cent) of undrawn sanctioned working capital was assumed to be used by the customers (Table 2.7).

Table 2.7: Liquidity risk: Utilisation of undrawn limits/ devolvement of contingencies

	System Level		Impacted Banks		
	Size of Unutilised Credit (% to O/s Advances)	Liquid Assets Ratio (%)	Number of Banks with Deficit Liquidity after shock	Deposit Share (%)	Asset Share (%)
Liquid assets: Cash, excess CRR, interbank deposits maturing 1-month, excess SLR, ECR					
Baseline	-	5.6	-	-	-
Shock 1	3.2	3.5	12	8.5	9.5
Shock 2	1.4	4.4	6	4.2	5.0
Shock 3	0.4	5.0	2	1.6	2.0
Shock 4	0.2	5.1	1	0.8	1.2
Shock 5	0.4	5.0	0	0.0	0.0

Note: Liquidity Shocks

Shock 1: Undrawn Sanctioned Limit - Working Capital - Fully Used

Shock 2: Undrawn Sanctioned Limit - Working Capital - Partially Used (50 per cent)

Shock 3: Undrawn Committed Credit Lines to Customers - Fully Demanded

Shock 4: Undrawn Committed Credit Lines to Customers - Partially Demanded (50 per cent)

Shock 5: Letters of Credit/Guarantees given to Customers - Devolvement

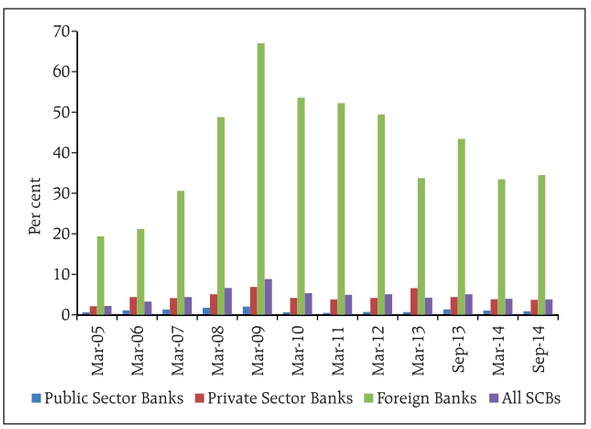
Source: RBI supervisory returns and staff calculations.

Bottom-up stress tests: Derivatives portfolios of banks

2.31 The derivatives portfolios of banks have relatively shrunk in the recent period. The credit equivalent of the derivatives portfolio is about 4 per cent of balance sheet assets. However, the size of the derivatives portfolio was quite significant for foreign banks at 34 per cent of their balance sheet assets in September 2014 (Chart 2.20).

Chart 2.20: Trends in derivatives portfolio (credit equivalent) of SCBs

(per cent to balance sheet assets)



Source: RBI supervisory returns.

2.32 A series of bottom-up stress tests (sensitivity analyses) on derivative portfolios were conducted for select sample banks,[21] with the reference date as on 30 September 2014. The banks in the sample reported the results of four separate shocks on interest and foreign exchange rates. The shocks on interest rates ranged from 100 to 250 basis points,

[21] Stress tests on derivatives portfolios were conducted for a sample of 20 select banks comprising about 55 per cent of the total assets of SCBs (for details on methodology see Annex 2).

while 20 per cent appreciation/depreciation shocks were assumed for foreign exchange rates. The stress tests were carried out for individual shocks on a stand-alone basis.

2.33 In the sample, the impact of mark-to-market (MTM) of the derivatives portfolios for banks as a proportion to their balance sheet assets as of September 2014 varied with PSBs and PBs registering small values, while foreign banks had relatively large ratios. The banks had positive net MTM in September 2014 (Chart 2.21).

2.34 The stress test results showed that the average net impact of interest rate shocks on sample banks was not very high. However, foreign exchange shock scenarios showed relatively higher impacts on banks (Chart 2.22).

Regional rural banks

Balance sheet operations

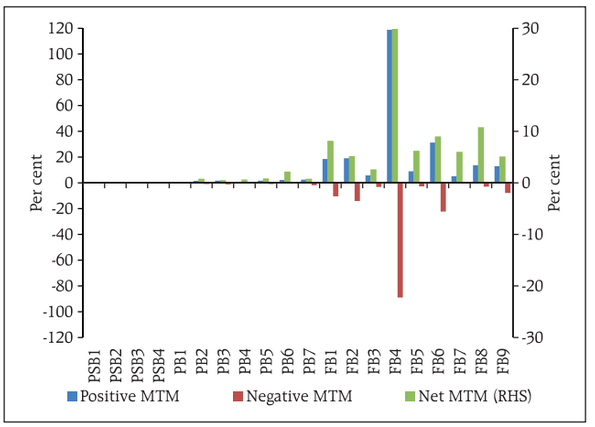
2.35 Regional rural banks (RRBs) maintained stable growth in assets around 16 per cent during 2013-14. Major sources of growth were borrowings and capital infusion by NABARD and sponsor banks on the liabilities side and loans and advances on the assets side.

Profitability

2.36 As per the provisional results, all the 57 RRBs reported profits in 2013-14 with their net profits going up by 18.5 per cent during the year. Net margin (net interest income as per cent of average total assets) also recovered from previous year (Chart 2.23).

Chart 2.21: MTM of total derivatives-baseline

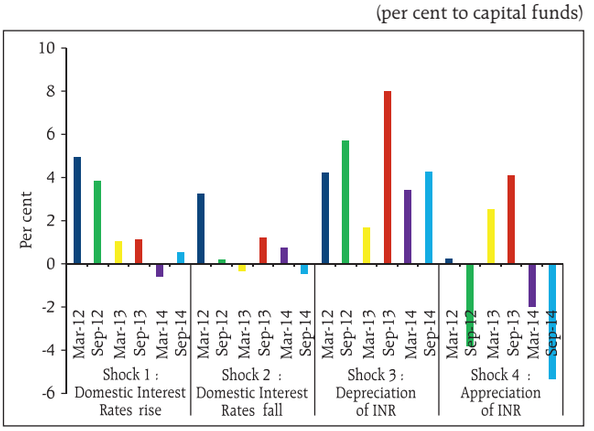
(Per cent to balance sheet assets)



Note: PSB: Public Sector Bank, PB: Private Sector Bank, FB: Foreign Bank.
Source: Sample banks (bottom-up stress tests on derivatives portfolios).

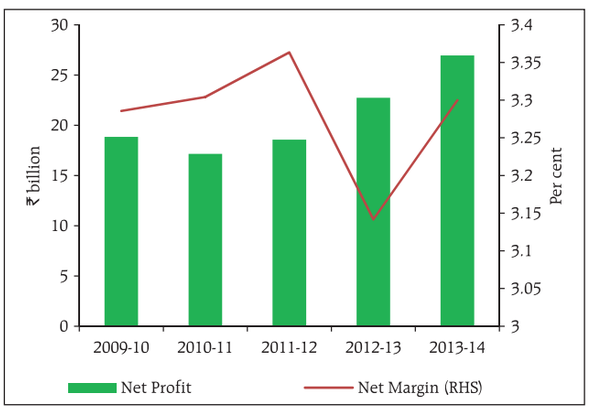
Chart 2.22: Stress tests: Impact of shocks on derivatives portfolios of select banks (change in net MTM on application of a shock)

(per cent to capital funds)



Source: Sample banks (bottom-up stress tests on derivatives portfolios).

Chart 2.23: Trend in profitability of RRBs



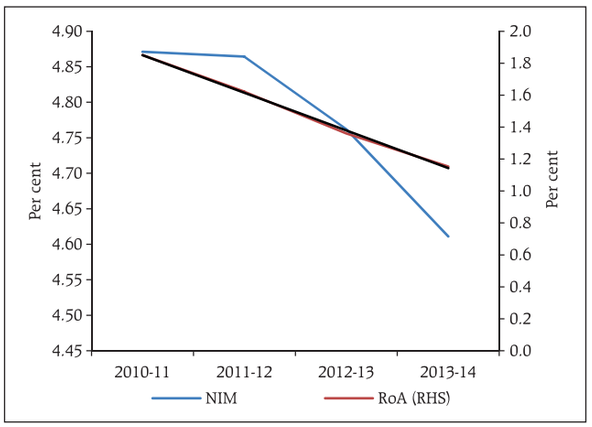
Source: NABARD.

Local area banks

Balance sheet operations and profitability

2.37 Four local area banks (LABs) are currently operational. During 2013-14, they witnessed an asset growth of 20 per cent. The decline in net profits by over 21 per cent, can be attributed to growth in interest expenses outpacing the increase in their incomes (Chart 2.24).

Chart 2.24: Return on assets and net interest margin of LABs



Source: RBI supervisory returns.

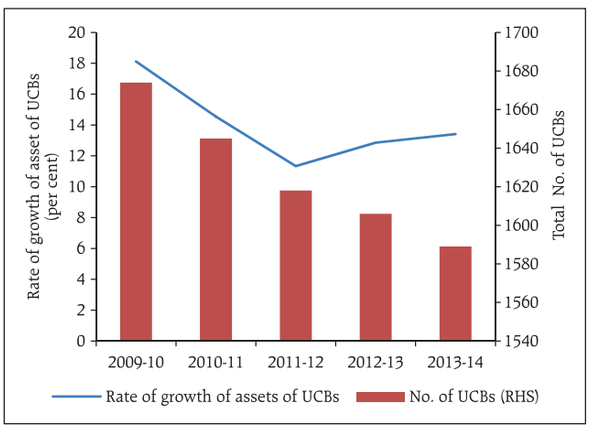
Urban co-operative banks

Balance sheet operations

2.38 The balance sheets of urban co-operative banks (UCBs) showed stable growth in 2013-14 (Chart 2.25). Growth in liabilities was driven by an increase in their other liabilities and deposits. Following consolidation, the number of UCBs came down marginally to 1,589 in 2013-14 from over 1,600 a year ago.

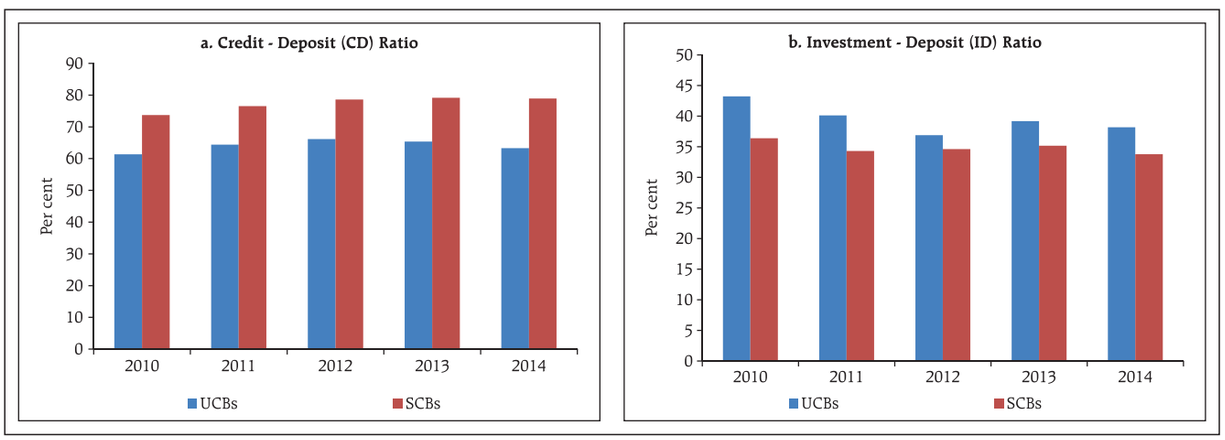
2.39 In 2013-14 UCBs' C-D ratio declined by about 2 percentage points and the investment-deposit ratio also showed a small contraction (Chart 2.26).

Chart 2.25: Number of UCBs and their asset growth



Source: RBI supervisory returns.

Chart 2.26: Credit-deposit and investment-deposit ratios for UCBs as compared to SCBs



Source: RBI supervisory returns and banks' annual accounts.

Profitability

2.40 Net profits of UCBs increased by 31 per cent during 2013-14 as compared to a decline of 25 per cent in the previous year. Although the growth in both income and expenditure decelerated during the year, the sharp contraction in provisions, contingencies and taxes resulted in an increase in their net profits. Consequently, RoA and RoE of UCBs improved to 0.9 per cent and 9.0 per cent, respectively, during the year from 0.8 per cent and 7.2 per cent during 2012-13.

Scheduled urban co-operative banks

Performance

2.41 At the system level,[22] CRAR of scheduled urban co-operative banks (SUCBs) improved to 12.7 per cent as of September 2014 from 12.4 per cent as of March 2014. However, at a disaggregated level, seven banks failed to maintain the minimum required CRAR of 9 per cent. The asset quality of SUCBs, measured in terms of GNPAs, deteriorated and their provision coverage ratio declined significantly (Table 2.8).

Table 2.8: Select financial soundness indicators of SUCBs

(per cent)

Financial Soundness Indicators	Mar-14	Sep-14
CRAR	12.4	12.7
Gross NPAs to Gross Advances	5.5	7.4
Return on Assets (annualised)	0.7	0.9
Liquidity Ratio	35.1	35.5
Provision Coverage Ratio (PCR)	71.4	53.7

Note: 1. Data are provisional.
2. Liquidity Ratio = (Cash + due from banks + SLR investment) / Total Assets * 100.
3. PCR is compiled as 'NPA provisions held as per cent of Gross NPAs'.

Source: RBI supervisory returns.

Stress tests

Credit risk

2.42 A stress test for assessing credit risk was carried out for SUCBs using the provisional data as of September 30, 2014. The impact of credit risk shocks on CRAR of SUCBs was observed under four different scenarios.[23] The results showed that except under the extreme scenario (1SD increase in GNPAs which are classified as loss advances), the system level CRAR of SUCBs remained above the minimum regulatory required level, though individually a large number of banks (28 of the 50 banks under the fourth scenario) would not be able to meet the required CRAR levels.

Liquidity risk

2.43 A stress test on liquidity risk was carried out using two different scenarios assuming 50 per cent and 100 per cent increase in cash outflows in the one to 28 days time bucket. It was further assumed that there was no change in cash inflows under both the scenarios. The stress test results indicate that the SUCBs will be significantly impacted under stress scenarios (out of 50 banks, 24 banks under scenario I and 38 banks under scenario II).

Rural co-operatives[24]

Short-term rural credit co-operatives

State co-operative banks

Balance sheet operations

2.44 There was some moderation in the growth of the overall balance sheet size of state co-operative banks (StCBs) during 2012-13 to 10.2 per cent from 14.4 per cent in the previous year. This decline was primarily on account of deceleration in their

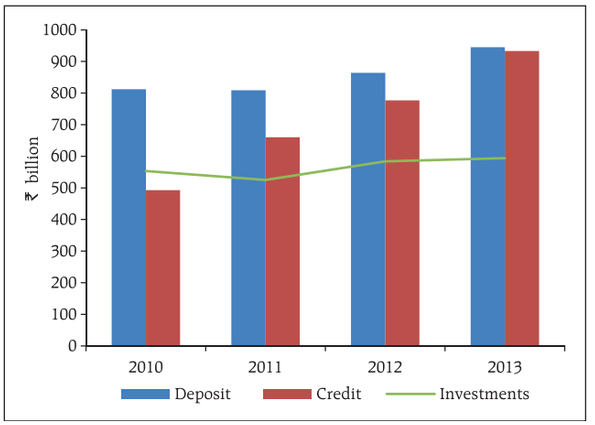
[22] System of 50 SUCBs.

[23] The four scenarios are: i) 0.5 SD shock in GNPA (classified as sub-standard advances), ii) 0.5 per cent shock in GNPA (classified as loss advances), iii) 1SD shock in GNPA (classified as sub-standard advances, and iv) 1SD shock in GNPA (classified as loss advances)-based on ten years data.

[24] Given the lagged availability of data for rural co-operatives, this section is based on 2012-13.

borrowings, which accounted for about 30 per cent of their total liabilities, even as deposits registered a moderate growth (Chart 2.27).

Chart 2.27: Select balance sheet indicators of StCBs



Source: NABARD.

Profitability

2.45 Continuing the trend of the previous year, net profits of StCBs increased to ₹11.0 billion during 2012-13 from ₹6.2 billion in the previous year on the back of a rise in total income (both interest and non-interest income) which exceeded the growth in their total expenditure. The decline in provisions and contingencies also contributed to the rise in net profits.

Asset quality

2.46 Although there was a marginal improvement in the asset quality of StCBs during 2012-13, the GNPAs ratio still remained high at 6.1 per cent (Table 2.9).

District central co-operative banks

Balance sheet operations

2.47 There was a deceleration in growth of the overall balance sheet of district central co-operative banks (DCCBs) in 2012-13 which was evidenced by decline in asset growth to 13.3 per cent during the year from 14.5 per cent during 2011-12.

Table 2.9: Soundness indicators of rural co-operative banks (short-term)

(amount in ₹ billion)

Item	StCBs				DCCBs			
	As at end-March		Percentage Variation		As at end-March		Percentage Variation	
	2012	2013P	2011-12	2012-13P	2012	2013P	2011-12	2012-13P
1	2	3	4	5	6	7	8	9
A. Total NPAs (i+ii+iii)	54	56	-3.7	3.9	161	181	8.8	12.0
i. Sub-standard	16 (29.2)	21 (36.6)	-8.6	30.1	63 (38.9)	79 (43.6)	6.4	25.7
ii. Doubtful	24 (43.4)	20 (35.4)	-7.8	-15.3	71 (44.2)	76 (42.2)	13.9	7.1
iii. Loss	15 (27.4)	16 (28.0)	10.4	6.3	27 (17.0)	26 (14.2)	2.1	-6.5
B. NPA-to-Loans Ratio (%)	7.0	6.1	-	-	10.2	9.9	-	-
C. Recovery-to-Demand Ratio (%) (as on 30 June of previous year)	95.6	94.8	-	-	79.2	80.0	-	-

P : Provisional

Notes: 1. Figures in parentheses are percentages to total NPAs.
2. Percentage variation could be slightly different because absolute numbers have been rounded off to ₹billion.

Source: NABARD

Profitability

2.48 DCCBs reported decline in growth in net profits in 2012-13 mainly on account of moderate increase in both interest as well as non-interest income (Chart 2.28). This is despite that provisions and contingencies witnessed a sharp decline during the year.

Asset quality

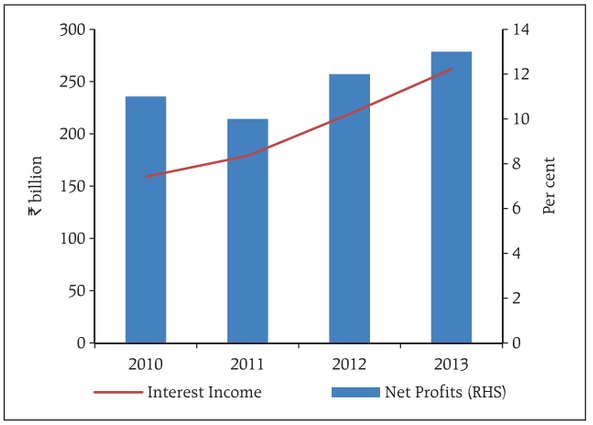
2.49 The reduction in provisions of DCCBs was primarily on account of an improvement in asset quality with a decline in the overall GNPA ratio from 10.2 per cent to 9.9 per cent between 2011-12 and 2012-13 (Chart 2.29). Notwithstanding this improvement, the high GNPA ratio for DCCBs remained a matter of concern.

Primary agricultural credit societies

Balance sheet operations

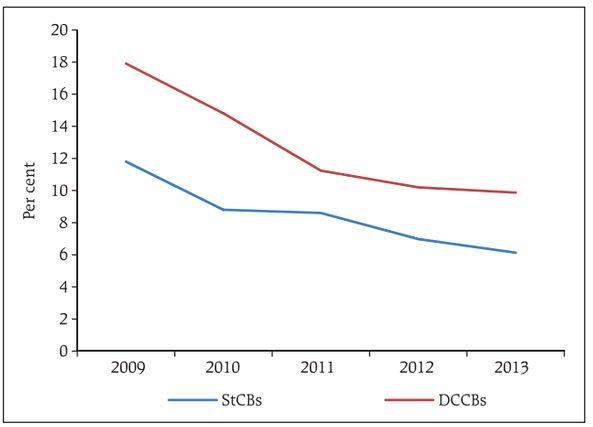
2.50 During 2012-13 an analysis of select indicators on the balance sheets of primary agricultural credit societies (PACS) suggests certain positive changes. Their owned funds increased with lower growth in borrowings. Loans outstanding during the year also witnessed higher growth (Chart 2.30).

Chart 2.28: Trend in profitability of DCCBs



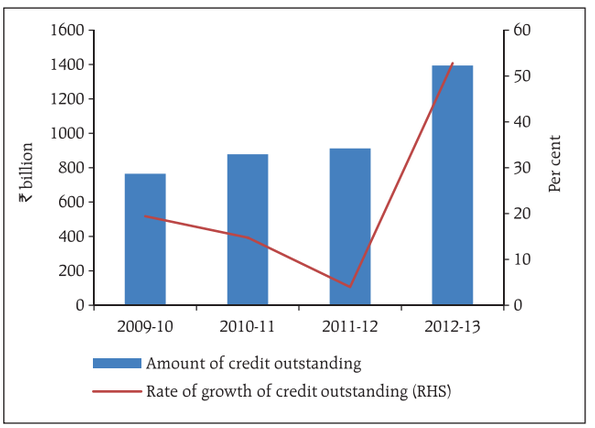
Source: NABARD.

Chart 2.29: GNPA ratio of short-term rural co-operatives



Source: NABARD.

Chart 2.30: Growth in credit outstanding from PACS



Source: NAFSCOB

Profitability

2.51 As of March 2013, about 41 per cent of all the PACS in the country reported losses, while about 46 per cent were making profits. There was a concentration of loss making PACS in the eastern region (Chart 2.31).

Long-term rural credit co-operatives

State co-operative agriculture and rural development banks

Balance sheet operations

2.52 There was continued deceleration in balance sheet growth of state co-operative agriculture and rural development banks (SCARDBs) in 2012-13; this was contributed to by all major components on the liabilities and assets sides (Chart 2.32).

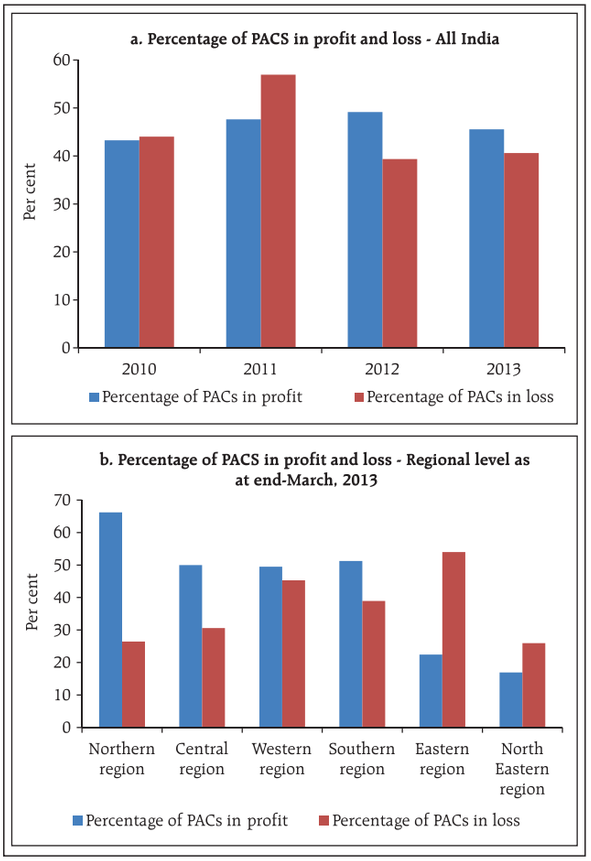
Profitability

2.53 Apart from the continued decline in their asset sizes, SCARDBs also incurred losses to the tune of ₹1.0 billion in 2012-13. These losses were primarily on account of large provisioning towards loan losses.

Asset quality

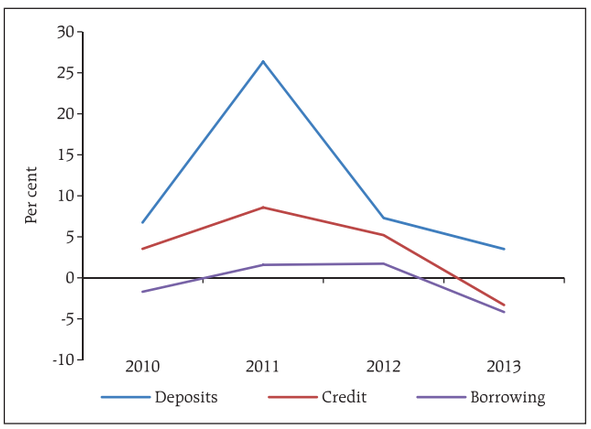
2.54 There was a decline in the asset quality of SCARDBs in 2012-13 taking their GNPA ratio to a high of 36 per cent (Table 2.10).

Chart 2.31: Profit/Loss making PACS



Source: NAFSCOB.

Chart 2.32: Trends in balance sheet indicators of SCARDBs



Source: NABARD.

Table 2.10: Soundness indicators of rural co-operative banks (long-term)

(in ₹ billion)

Item	SCARDBs				PCARDBs			
	As at end- March		Percentage Variation		As at end-March		Percentage Variation	
	2012	2013P	2011-12	2012-13P	2012	2013P	2011-12	2012-13P
1	2	3	4	5	6	7	8	9
A. Total GNPAs (i+ii+iii)	64	68	7.7	5.1	46	46	-5.0	-0.1
i. Sub-standard	30 (46.1)	28 (41.9)	1.4	-4.4	21 (45.3)	20 (43.5)	-14.5	-4.3
ii. Doubtful	34 (53.6)	38 (56.2)	13.8	10.2	25 (53.9)	26 (56.1)	4.2	3.8
iii. Loss	0.2 (0.3)	1.2 (1.8)	8.3	603.0	0.3 (0.7)	0.2 (0.5)	58.1	-35.0
B. GNPA-to-Loans Ratio (%)	33.1	36.0	-	-	36.7	37.1	-	-
C. Recovery-to-Demand Ratio (%) (as on 30 June of previous year)	40.2	32.3	-	-	47.3	42.7	-	-

P: Provisional

Note: 1. Figures in parentheses are percentages to total GNPAs.
2. Percentage variation could be slightly different because absolute numbers have been rounded off to ₹billion.

Source: NABARD.

Primary co-operative agriculture and rural development banks

Balance sheet operations

2.55 The asset growth of primary co-operative agriculture and rural development banks (PCARDBs) further declined to 1.7 per cent in 2012-13 from 5.5 per cent during the previous year. These institutions also showed weak growth in owned funds (including capital and reserves) as well as negative growth in credit outstanding during the year.

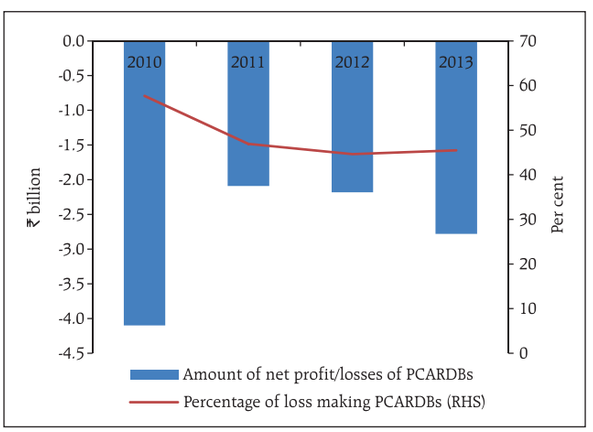
Profitability

2.56 The number of loss making PCARDBs marginally increased to 318 during 2012-13 (Chart 2.33). On aggregate basis, PCARDBs reported losses in 2012-13.

Asset quality

2.57 The asset quality of PCARDBs continued to be fragile with their GNPA ratio increased to 37 per cent in 2012-13 (Table 2.10).

Chart 2.33: Profitability indicators of PCARDBs



Source: NABARD.

Non-banking financial companies

2.58 As of March 2014, there were 12,029 NBFCs registered with the Reserve Bank, of which 241 were deposit-accepting (NBFCs-D) and 11,788 were non-deposit accepting (NBFCs-ND). NBFCs-ND with assets of ₹1 billion and above had been classified as Systemically Important Non-Deposit accepting NBFCs (NBFCs-ND-SI)[25] since April 1, 2007 and prudential regulations such as capital adequacy requirements and exposure norms along with reporting requirements were made applicable to them. From the standpoint of financial stability, this segment of NBFCs assumes importance given that it holds linkages with the rest of the financial system (further discussed in Chapter III, paras 3.21 to 3.23).

Performance

2.59 During 2013-14, the overall balance sheet of NBFCs-ND-SI expanded by 9.5 per cent (Table.2.11). Loans and advances (a major component on the assets side) increased by 11.2 per cent. Total borrowings, which constituted more than two-third of their liabilities, increased by 9.8 per cent.

2.60 The financial performance of NBFCs-ND-SI improved during 2013-14 as their net profit to total income increased from 18.3 per cent to 20.2 per cent. As a result, return on assets rose to 2.3 per cent as of March 2014 from 2.0 per cent a year ago (Table 2.12).

Table 2.11: Consolidated balance sheet of NBFCs-ND-SI
(As of March)

(in ₹ billion)

Item	2013	2014P	Percentage Variation
1. Share Capital	647	695	7.4
2. Reserves & Surplus	2,276	2,457	8.0
3. Total Borrowings	8,104	8,902	9.8
4. Current Liabilities & Provisions	574	647	12.8
Total Liabilities/ Assets	**11,601**	**12,701**	**9.5**
1. Loans & Advances	7,600	8,455	11.2
2. Hire Purchase Assets	805	896	11.3
3. Investments	1,945	2,075	6.6
4. Other Assets	1,250	1,276	2.1
Memo Items			
1. Capital Market Exposure (CME)	885	1,029	16.4
2. CME to Total Assets (per cent)	7.6	8.1	
3. Leverage Ratio	3.0	3.0	

P: Provisional
Note: 1. Data presented here pertain to 420 entities which account for more than 95 per cent of the total assets of the NBFCs-ND-SI sector.
2. Percentage figures are rounded-off.
Source: RBI supervisory returns.

Table 2.12: Financial performance of NBFCs-ND-SI sector
(As of March)

(in ₹ billion)

Items	2013	2014 P
1. Total Income	1,272	1,436
2. Total Expenditure	1,039	1,147
3. Net Profit	233	290
4.Total Assets	11,601	12,701
Financial Ratios (per cent)		
(i) Net Profit to Total Income	18.3	20.2
(ii) Net Profit to Total Assets	2.0	2.3

P: Provisional.
Source: RBI supervisory returns.

[25] As of March 2014 there were 465 NBFCs-ND-SI.

Asset quality

2.61 The asset quality of the NBFCs-ND-SI sector has been deteriorating since the quarter ended March 2013 (Chart 2.34). The Reserve Bank issued separate guidelines for both banks and NBFCs with an objective of mitigating the stress due to their NPAs. NBFCs were advised to identify incipient stress in their accounts by creating a sub-asset category *viz.* 'Special Mention Accounts' (SMA), which was further divided into three sub-categories (*viz.*, SMA-0, SMA-1 and SMA-2) based on the extent of principal or interest payment overdue as also the weakness of their accounts. They were also directed to report relevant credit information to the Central Repository of Information on Large Credits (CRILC).

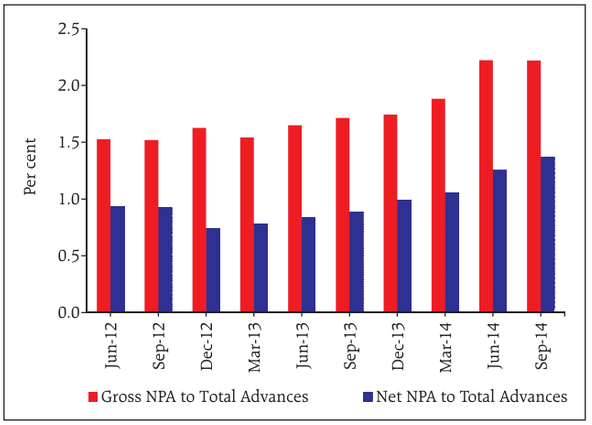
Capital adequacy

2.62 As per the guidelines, NBFCs-ND-SI are required to maintain a minimum capital consisting of Tier-I[26] and Tier-II capital, of not less than 15 per cent of their aggregate risk-weighted assets. As of March 2014, by and large, the capital adequacy position of the NBFCs-ND-SI remained comfortable and was well above prudential norms. Nevertheless, CRAR of the NBFCs-ND-SI slipped from the peak of 29.0 per cent as of September 2013 to 27.2 per cent as of March 2014. It subsequently recovered to 27.8 per cent by the quarter ended September 2014 (Chart 2.35).

Profitability

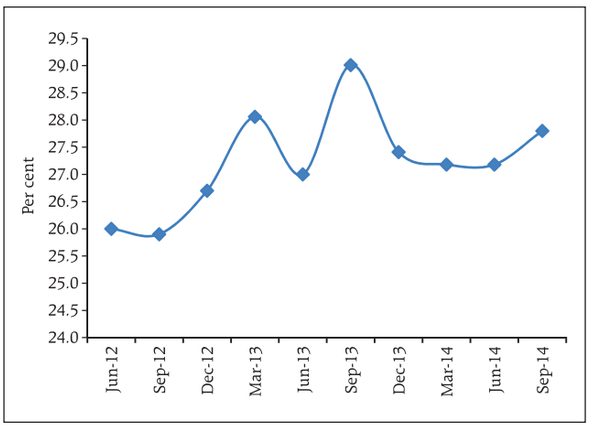
2.63 RoA of NBFCs-ND-SI increased to 2.5 per cent in September 2014 after remaining at around 2.3 per cent in previous three quarters (Chart 2.36).

Chart 2.34: Asset quality of NBFCs-ND-SI



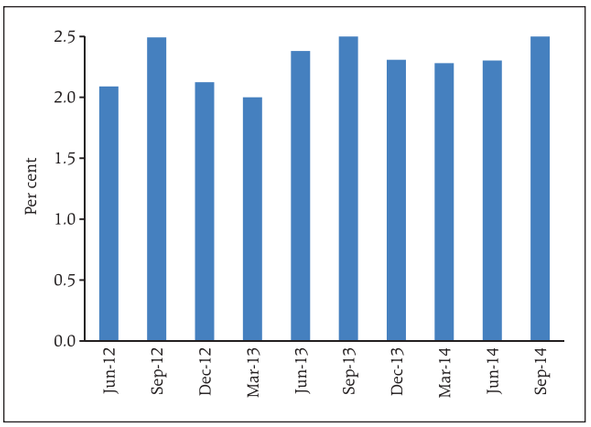
Source: RBI supervisory returns.

Chart 2.35: CRAR of NBFCs-ND-SI



Source: RBI supervisory returns.

Chart 2.36: Trends in return on assets of NBFCs-ND-SI



Source: RBI supervisory returns.

[26] As per revised guidelines issued on November 10, 2014, minimum tier-I capital for the NBFCs-ND-SI (having asset size of ₹5 billion - new definition) has been revised up to 10 per cent (earlier tier-I capital could not be less than 7.5 per cent) and these entities have to meet compliance in a phased manner: 8.5 per cent by end-March 2016 and 10 per cent by end-March 2017).

Stress tests: Credit risk

System level

2.64 A stress test on credit risk for NBFC sector[27] as a whole for the period ended September 2014 is carried out under three scenarios: (i) GNPA increased by 0.5 SD (ii) GNPA increased by 1 SD and (iii) GNPA is increased by 3 SD. The results suggest that under first two scenarios, CRAR of the NBFC sector is unaffected while in the third scenario, it declines to 23.0 per cent from its level of 23.6 per cent.

Individual NBFCs

2.65 A stress test on credit risk for individual NBFCs is also conducted for the same period under the same three scenarios. The results indicate that under scenarios (i) and (ii) around 1.6 per cent of the companies will not be able to comply with the minimum regulatory capital requirements of 15 per cent, while 4.1 per cent of companies will not be able to comply with the minimum regulatory CRAR norm under third scenario.

Interconnectedness

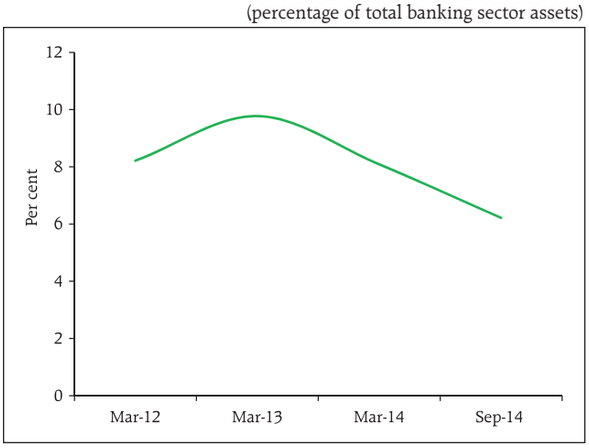
Trends in the interbank market

2.66 Banks' dependence on the interbank market for liquidity as well as long term uses reveals certain noteworthy trends. While the size of the market in absolute terms has hovered around a range of ₹6 to 8 trillion over the last ten quarters, the market as a percentage of total banking sector assets has witnessed a steady decline (Chart 2.37).

2.67 PSBs continue to be the biggest players in the market with a share of over 70 per cent as of September 2014. The share of foreign banks in the interbank market, however, has declined considerably since March 2012 (Chart 2.38).

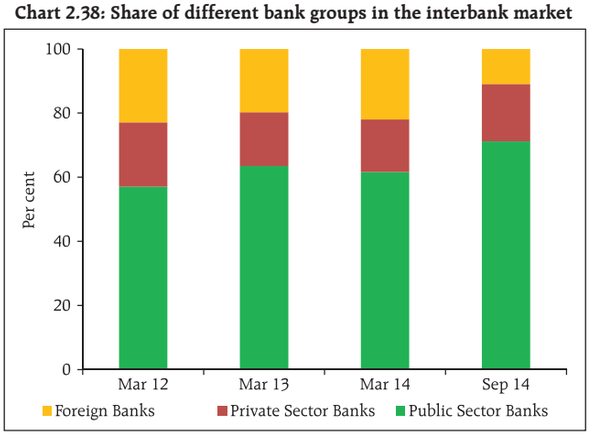
Chart 2.37: Size of interbank market

(percentage of total banking sector assets)



Source: RBI supervisory returns.

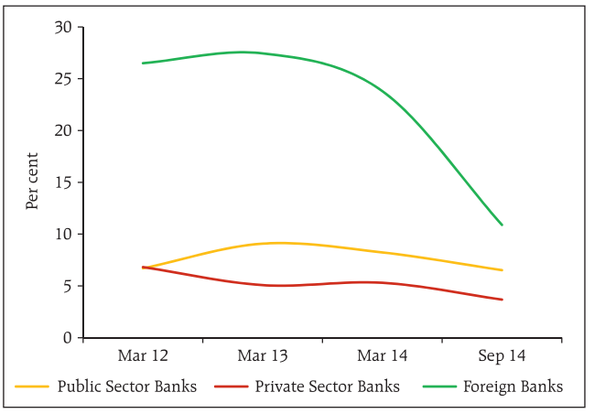
Chart 2.38: Share of different bank groups in the interbank market



Note: The composition of interbank market is based on both lending as well as borrowing.
Source: RBI supervisory returns.

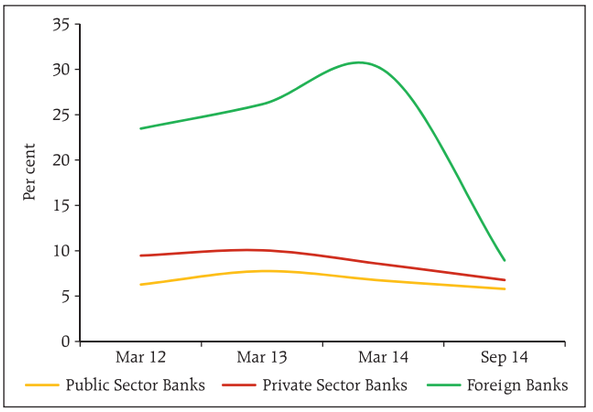
[27] This includes NBFCs-D and NBFCs-ND-SI.

Chart 2.39: Interbank lending
(percentage of total overall assets)



Source: RBI supervisory returns.

Chart 2.40: Interbank borrowing
(percentage of total overall assets)



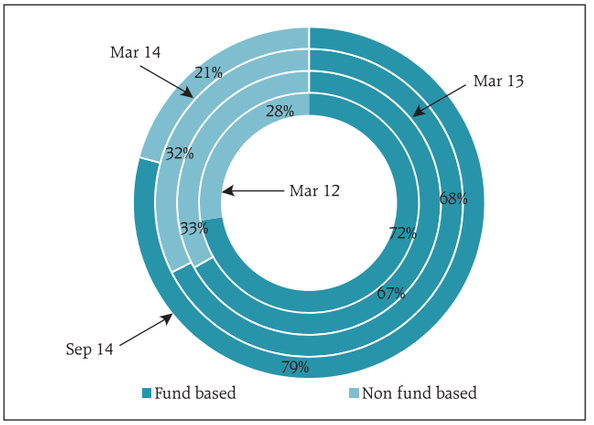
Source: RBI supervisory returns.

2.68 The ratio of lending and borrowing[28] in the interbank market by each bank group to its respective total assets is an important indicator of business models employed by a particular group. Foreign banks, which had the highest ratios in this respect, have shown a sharp fall in the recent past (Charts 2.39 and 2.40).

2.69 The interbank market continued to be predominantly fund based (close to 80 per cent of the exposures) as of September 2014 (Chart 2.41). The banking sector as a whole had raised nearly 6 per cent of its total outside liabilities from this market (Chart 2.42).

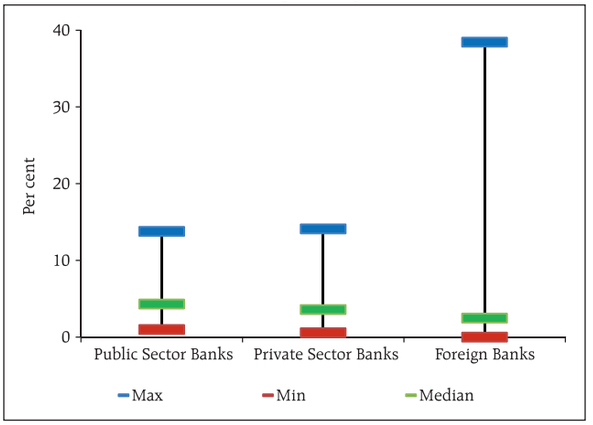
2.70 A substantial portion of fund-based exposures in the interbank market are short term in nature. Certificates of deposit (CDs) issued by banks are a major contributor in this area. The size of the short term interbank market as a percentage of the total

Chart 2.41: Fund based and non-fund based exposures in the interbank market



Source: RBI supervisory returns.

Chart 2.42: Fund based interbank borrowing
(percentage of total outside liabilities)



Source: RBI supervisory returns.

[28] Borrowing and lending refers to the payables and receivables on account of both fund based and non-fund based transactions in the interbank market. Non-fund based exposures also include derivatives positions that banks have taken against each other. For derivatives, positive MTM and negative MTM figures (on a gross basis) have been reckoned as receivables and payables respectively.

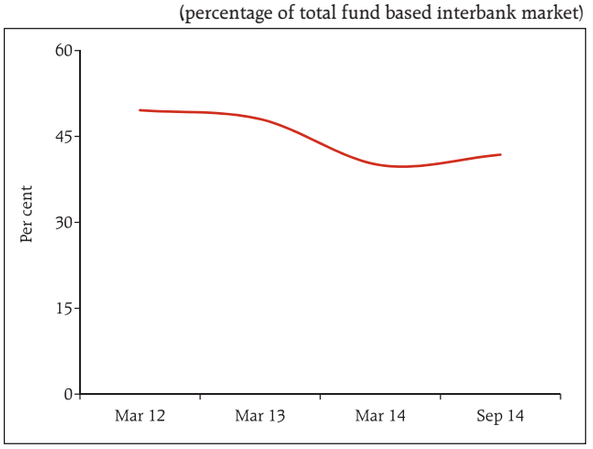
fund-based interbank market stood at over 41 per cent as of September 2014 (Chart 2.43).

Network structure of the banking system

2.71 The banking system continues to be reasonably connected with the connectivity ratio,[29] which is a simple estimate of interconnectedness, consistently remaining over 20 per cent in the last three years. The network structure[30] of the banking system, which is tiered[31] in nature, reveals that the most connected banks have been the same for the last two years. Further, the bank which is systemically the most important[32] continues to be the same. PSBs are the biggest net lenders while private banks are the biggest net borrowers in the interbank market (Chart 2.44).

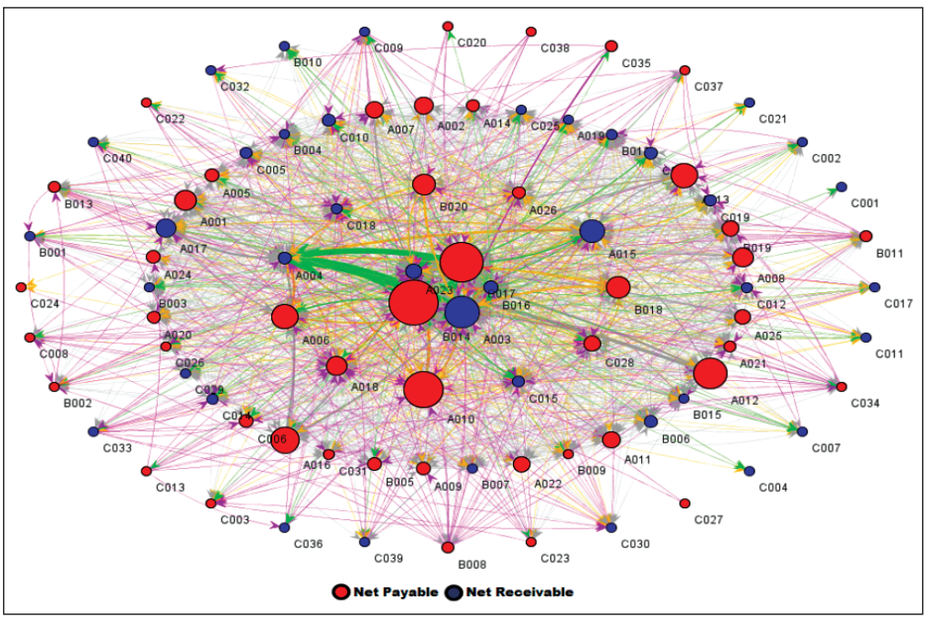
Chart 2.43: Short-term interbank market

(percentage of total fund based interbank market)



Source: RBI supervisory returns.

Chart 2.44: Network structure[33] of the Indian banking system (September 2014)



Source: RBI supervisory returns and staff calculations.

[29] Connectivity ratio is a measure of actual connections in the network relative to all possible connections in it.

[30] The network model used in the analysis has been developed by Professor Sheri Markose (University of Essex) and Dr Simone Giansante (Bath University) in collaboration with the Financial Stability Unit, Reserve Bank of India.

[31] A tiered structure is one where different institutions have different degrees or levels of connectivity with others in the network. In the present analysis, the most connected are in the innermost core (at the centre of the network diagram in Chart 2.44). Banks are then placed in the mid core, outer core and the periphery (the respective concentric circles around the centre in the diagrams), based on their level of relative connectivity.

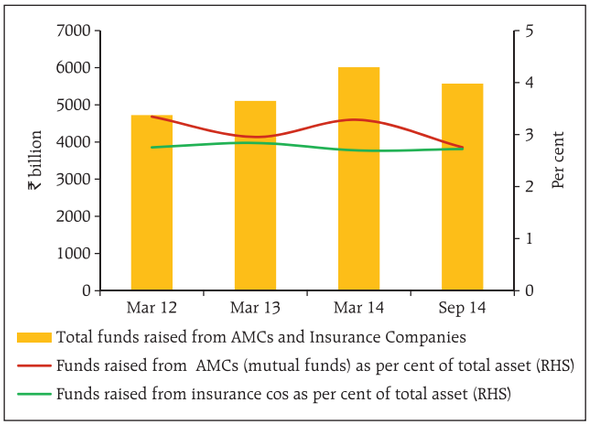
[32] Maximum eigen value measure, which uses both connectivity and net borrowing positions as parameters is used to determine the systemically important bank.

[33] Red and blue circles represent net borrower and net lender banks respectively. The sizes of the balls are weighted by net positions of respective banks. The links between banks are represented by arrows which indicate the direction of the transaction outstanding. Incoming arrows (in-degrees) mean net receivables while out going arrows (out-degrees) mean net payables. The thickness of the arrows is weighted by the size of the exposures.

Interconnectedness in the financial system

2.72 A better perspective of the network structure of the Indian financial system emerges when an analysis of the interbank market is extended to include the other two most important sectors: asset management companies (AMCs) managing mutual funds and insurance companies.[34] The size of this enlarged market as of September 2014 stood at over ₹12 trillion which is roughly double the size of the interbank market. Both mutual funds and insurance companies are the biggest providers of funds in this system, while the PSBs emerge as the largest receiver of funds. Total funds raised by the banking sector from mutual funds and insurance companies was to the tune of ₹5.5 trillion (Chart 2.45).

Chart 2.45: Funds raised by the banking sector from AMCs and insurance companies



Note: Total assets are based on only on-balance sheet item.
Source: RBI supervisory returns.

2.73 When viewed from a different angle, AMCs' and insurance companies' investments in the banking sector as a percentage of their respective assets under management (AuM) were also sizeable.[35] The interconnectedness that exists between different sectors in the financial system does expose the system to contagion risks in the event of stress scenarios. Irrespective of this, good interconnectedness amongst financial institutions is a necessary evil (Box 2.1).

Box 2.1: Interconnectedness in the Financial System: How Vital and How Critical

The post-crisis experience of many features in the financial system which were not given due attention earlier, led to the calibration of many new regulatory standards. More notably, in addition to keeping a tab on individual institutions, the importance of a macro view of the financial system was acknowledged. Among the many structures that emerged was 'Too Connected to Fail (TCTF)'. The US experience of one institution going bust leading to the failure of a dozen others due to common exposures, led the world to come alive to the phenomenon of '*interconnectedness*' that exists between financial institutions. Subsequently, interconnectedness has been accepted by standard setting bodies as one of the parameters for identifying systemically important financial institutions.

Why then are network models being increasingly used across the world to assess interconnectedness among financial institutions? The answer lies in the fact that financial networks are complex and adaptive systems. They are complex because the interconnections involved among financial institutions are massive and they are adaptive because while individual institutions in the system always want to be in an optimal position, they are not fully informed. Such complex adaptive systems have the potential to amplify losses manifold during crisis events. This is exactly what happened during the Lehman fallout when many institutions shut their doors and refused liquidity to institutions just because they were suspected of being 'infected'.

To begin with, network models assist in understanding the structure and pattern of connections in a particular system. If the institutions with high centrality scores are also heavy net borrowers in the system, then there might be potential stability issues in the event of any such institution facing distress. These sort of indications can provide valuable inputs to a regulator in reassessing the available redundancies in the system and initiate counteractive measures.

[34] For the analysis, 21 insurance companies and 19 AMCs managing mutual funds were included in the sample.

[35] Financial Stability Report, June 2014.

Contagion analysis

2.74 A contagion analysis[36] is conducted to estimate potential loss to the banking system triggered by either one or several banks. Though such an analysis may appear hypothetical, it is a good indicator about the toxicity of banks. The results further provide an additional input in identifying systemically important banks. Three types of contagion analysis are generally carried out: solvency contagion, liquidity contagion and joint liquidity-solvency contagion. Solvency contagion is typical to distress generated by the failure of a bank which is a net borrower in the financial system. On the other hand, liquidity contagion is generated by a net lender bank. In the actual world, both solvency and liquidity contagion are likely to emanate simultaneously due to the obvious dynamics present in a financial system.

2.75 An analysis of the top five connected banks as trigger banks reveals that the banking system could potentially lose close to 50 per cent of its total Tier-I capital under the joint solvency-liquidity condition in the event of a particular bank triggering a contagion (Table 2.13). It may be noted that Bank E, which does not cause substantial solvency or liquidity contagion on a standalone basis, does have a massive impact under the joint scenario. This is because Bank E is causing distress to one particular bank that in turn is magnifying the contagion. This underscores the importance of monitoring not just the interconnectedness, but also the counterparties and magnitude of exposure involved in the connection.

Table 2.13: Contagion triggered by the top-5 connected banks in the system

Trigger Banks	Percentage loss of total Tier-I capital of the banking system		
	Solvency Contagion	Liquidity Contagion	Joint Solvency-Liquidity Contagion
Bank A	3.4	13.7	37.1
Bank B	0.7	11.2	49.5
Bank C	5.5	0.9	42.5
Bank D	0.5	2.1	2.7
Bank E	4.4	3.3	47.5

Source: RBI supervisory returns and staff calculations.

[36] Details on methodologies and assumptions are given in the Annex 2.

Chapter III

Financial Sector Regulation and Infrastructure

While the capital to risk weighted assets ratio (CRAR) of the scheduled commercial banks at 12.8 per cent as of September 2014 is satisfactory, going forward, the banking sector, particularly the public sector banks (PSBs) would require substantial capital to meet regulatory requirements with respect to additional capital buffers.

With the increased regulatory focus on segregating the cases of wilful defaults and ensuring the equity participation of promoter(s) in the losses leading to defaults, there is a need for greater transparency in the process of carrying out a net economic value impact assessment of large Corporate Debt Restructuring (CDR) cases. Another aspect that impinges upon the banks' asset quality is corporate leverage and its impact on banks' balance sheets, particularly 'double leveraging' through holding company structures and the pledging of shares by promoters.

Indian stock markets have seen a rapid growth in recent months. While the retail investor base still remains comparatively low, India's stock markets have been attracting substantial amounts of foreign investments, increasing the risks of reversal. The Securities and Exchange Board of India (SEBI) has introduced an additional safety net in the form of core settlement guarantee fund to mitigate risks from possible default in settlement of trades and to strengthen risk management framework in the domestic capital markets.

With a view to improving participation of actual users / hedgers and the quality of price discovery in the market, the Forward Markets Commission (FMC) has revised position limits which are linked to estimated production and imports of the underlying commodities.

To deal with issues relating to unauthorised deposit acceptance and financial frauds, the State Level Coordination Committee (SLCC) mechanism has been strengthened under the initiative of the Financial Stability and Development Council (FSDC).

Progress on the global regulatory reforms programme

3.1 The financial sector reform programme, initiated under the aegis of G20 as a response to the global financial crisis was primarily aimed at correcting the weaknesses in financial regulation and supervision mainly in some advanced jurisdictions that caused or aggravated the global crisis. A broad agreement has been arrived at with regard to the contours and design of most of the proposed regulatory reform measures (for example, banking capital and liquidity regulations, 'too-big-to-fail', shadow banking and OTC derivatives, among others) and the implementation of these measures is being taken forward based on clear principles and timelines.[1] The implementation is being coordinated by the Financial Stability Board (FSB) with active involvement of national regulatory, supervisory and policymaking authorities and international standard-setting bodies seeking to make the global financial system safer, more resilient to shocks and more efficient in catering to the needs of the real sector for promoting strong and sustainable economic growth.

Basel III: Banking capital and liquidity standards

Improvement in capital ratios of international banks

3.2 Regulatory initiatives on banking capital and liquidity have contributed to the strengthening of the global banking system. The capital ratios of large internationally active banks have shown improvement

[1] FSB (2014b), "Overview of Progress in the Implementation of the G20 Recommendations for Strengthening Financial Stability: Report of the Financial Stability Board to G20 Leaders", November [available at: http://www.financialstabilityboard.org/wp-content/uploads/Overview-of-Progress-in-the-Implementation-of-the-G20-Recommendations-for-Strengthening-Financial-Stability.pdf].

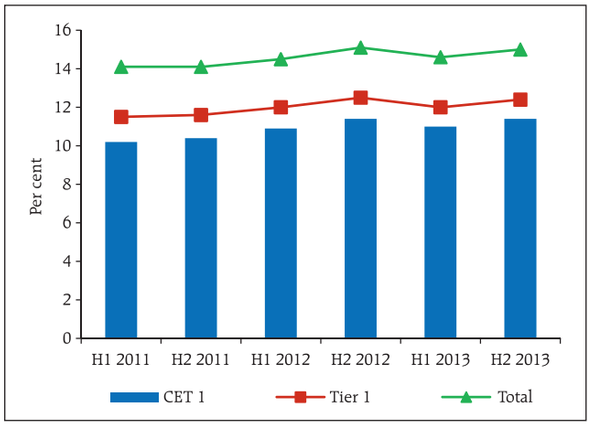
over the last three years.[2] The average common equity Tier I (CET1) capital ratio of these banks rose from 10.2 per cent to about 11.4 per cent of their risk-weighted assets (RWAs) during the second half of 2013 under the currently applicable regulatory framework (Chart 3.1). If all the provisions of the Basel III framework were to be applied on the December 2013 position, the average CET1 capital ratio of these banks would fall from 11.4 per cent to 10.2 per cent due to the new definition of eligible capital under Basel III, deductions that were not previously applied at the common equity level of Tier I capital in most countries and increases in RWAs. The transition, however, is specifically provided for by Basel III to moderate the immediate impact on balance sheets.

3.3 As banks adapt themselves to new regulatory and business realities, the impact on profitability may raise concerns about their ability to build capital buffers and meet credit demand. These banks may require a fundamental overhaul of their business models, including a combination of re-pricing in existing business lines, reallocation of capital across activities or retrenching altogether.

Augmentation of capital: The 'efficiency-redundancy' paradigm

3.4 Although the Basel Committee's global regulatory standards on bank capital adequacy will strengthen capital ratios in the long run, they may also lead to increase in the cost of capital, which in turn will affect the cost of lending and economic growth and may force banks into aggressive and riskier innovations to maintain their return on equity (RoE). The issue has also created debates over the

Chart 3.1: Average CET1, Tier I and total capital ratios under the current framework



Source: Basel Committee on Banking Supervision.

efficiency-redundancy trade-off involved in extra capital that banks are mandated to raise. Furthermore, an improvement in capital ratios *per se* may not necessarily lead to improvements in the capacity of banking institutions and their contribution to economic development as capital ratios may increase on account of many factors.

3.5 Previous Financial Stability Reports (FSRs) have discussed issues relating to the possibility of manoeuvring of risk-weights, especially under internal models-based approaches for different types of risks under the Basel framework. In order to strengthen the comparability of implementation across jurisdictions, the Basel Committee has started an analysis of the discretions in risk-weight prescriptions to understand how much they contribute to unwarranted variations in capital standards. This has been highlighted by some recent studies[3] on the variation of risk-weighted assets in the banking book and the trading book. Going forward, some of these

[2] BCBS (2014a), " Basel III Monitoring Report", *Bank for International Settlements*, September [available at: http://www.bis.org/publ/bcbs289.pdf].

[3] BCBS (2013a), "Regulatory Consistency Assessment Programme (RCAP) – Analysis of risk-weighted assets for market risk", *Bank for International Settlements*, February [available at: http://www.bis.org/publ/bcbs240.pdf].

BCBS (2013b), "Regulatory Consistency Assessment Programme (RCAP) - Analysis of risk-weighted assets for credit risk in the banking book", *Bank for International Settlements*, July [available at: http://www.bis.org/publ/bcbs256.pdf].

BCBS (2013c), "Regulatory Consistency Assessment Programme (RCAP) - The second report on risk-weighted assets for market risk in the trading book", *Bank for International Settlements*, December [available: http://www.bis.org/publ/bcbs267.pdf].

discretions may be removed in 2015.[4] Further, Basel Committee is examining prescription of other policy measures and benchmarks to ensure more consistency as part of Regulatory Consistency Assessment Process.

3.6 The introduction of a minimum Tier I leverage ratio of 3 per cent by Basel Committee on Banking Supervision (BCBS), was aimed at constraining the build-up of leverage in the banking sector and reinforcing risk-based capital requirement measures with a simple and non-risk based 'backstop' measure. The Reserve Bank has prescribed that banks should strive to achieve a minimum Tier 1 leverage ratio of 4.5 per cent during the parallel run period.

Proposals for tougher capital measures for addressing 'too-big-to-fail'

3.7 Policy proposals on the adequacy of loss-absorbing and recapitalisation capacity of Global Systemically Important Banks (G-SIBs)[5] has been under consideration in the form of a common minimum requirement for their 'gone-concern loss-absorbing capacity' (GLAC). In the recently released set of principles[6] for public consultation on the loss-absorbing capacity of G-SIBs in resolution, FSB has proposed a single specific minimum Pillar 1 'total loss-absorbing capacity (TLAC)' requirement to be set within the range of 16–20 per cent of RWAs under the condition that the minimum level should be at least twice the Basel III Tier I leverage ratio requirement.

3.8 The objective of the TLAC requirements is to ensure that G-SIBs have adequate loss absorbing and recapitalisation capacity necessary to ensure that in and immediately following a resolution, critical functions can be continued without tax payers' funds or financial stability being put at risk. Implementation of TLAC and the final calibration of the common Pillar 1 minimum TLAC requirement will take into account the results of this consultation and the Quantitative Impact Study and market survey which will be carried out in early 2015.

3.9 TLAC requirements are not applicable to any Indian bank as none of them is a G-SIB. However, it may not be possible to rule out the risk of spill over impact on emerging market and developing economies (EMDEs) due to the adverse impact of the TLAC proposal on G-SIBs.

Assessment of impact of higher capital requirements

3.10 Some studies[7] show that, *ceteris paribus*, if the ratio of common equity for a given loan is increased by 2 per cent, banks will require to raise the lending rate by 40 basis points (bps) in US and 19 bps in Europe, to maintain a level of 12 per cent RoE. It has been observed that the banks tend to pass on the increased cost to the lending spread without any adjustments to other heads of income. Increased cost of lending might impact the credit off-take from banking sector.

3.11 Various studies to assess the impact of implementation of Basel III on growth point towards the negative impact of higher capital requirements on GDP.[8] Analytical work also shows that Basel III

[4] BCBS (2014b), "Basel capital framework national discretions", *Bank for International Settlements*, November [available at: http://www.bis.org/bcbs/publ/d297.pdf].

[5] FSB and the BCBS identified 30 G-SIBs in November 2014. There is no Indian bank in this list of G-SIBs.

[6] FSB (2014a), "Adequacy of Loss-Absorbing Capacity of Global Systemically Important Banks in resolution", November [available at: http://www.financialstabilityboard.org/wp-content/uploads/TLAC-Condoc-6-Nov-2014-FINAL.pdf].

[7] Elliott. D, S. Salloy and A. O. Santos (2012), "Assessing the Cost of Financial Regulation", *IMF Working Paper*, WP/12/233, September. [available at: http://www.imf.org/external/pubs/ft/wp/2012/wp12233.pdf]

[8] Slovik, P., and B. Cournède (2011), "Macroeconomic Impact of Basel III," *OECD Economics Department Working Papers*, No. 844 suggests that a 1 per cent increase in capital would lead to marginal annual decline of 0.04 per cent while IIF(2011),"The cumulative impact on the global economy of the changes in the financial regulatory framework", September observed that capital requirements would reduce GDP by 2.7 per cent in the US, 3 per cent in the European Union and 4 per cent in Japan.

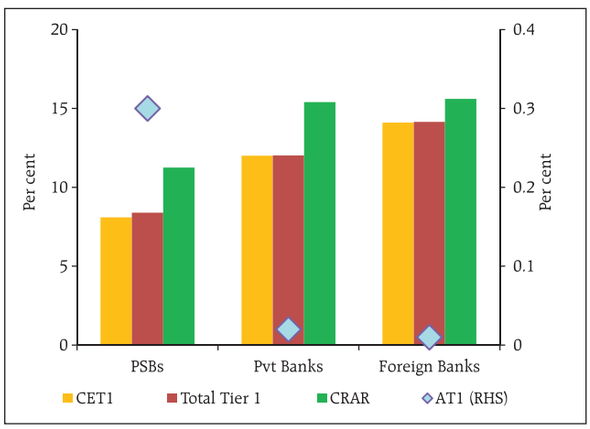
MAG (2010), "Final Report - Assessing Macroeconomic Impact of the transition to stronger capital and liquidity", *Bank for International Settlements*, December observes that the annual growth would be 0.03 percentage points (or 3 basis points) below its baseline level during the period of implementation, showing modest impact on growth.

requirements will have spill over effects in the non-bank financial sector due to shifting of credit to the non-bank financial sector. A few other studies on the assessment of the impact of implementation of Basel III specifically focus on EMDEs.[9]

Capital levels of Indian banks

3.12 India has implemented Basel III capital framework from April 1, 2013. The CRAR for Indian banks under Basel III as of September 2014 stood at a satisfactory level of 12.8 per cent (as against 13 per cent as of March 2014). Banks are expected to remain under pressure on account of additional requirements towards the capital conservation buffer, the countercyclical capital buffer and supervisory capital under pillar 2 (Chart 3.2). While all bank groups met the segregated requirements of minimum CET1 and Tier I capital ratios as at the end of September 2014, if the additional requirement of 2.5 per cent in the form of CET1 for meeting the capital conservation buffer is considered in future, then the capital requirements, especially of public sector banks (PSBs), would go up further.

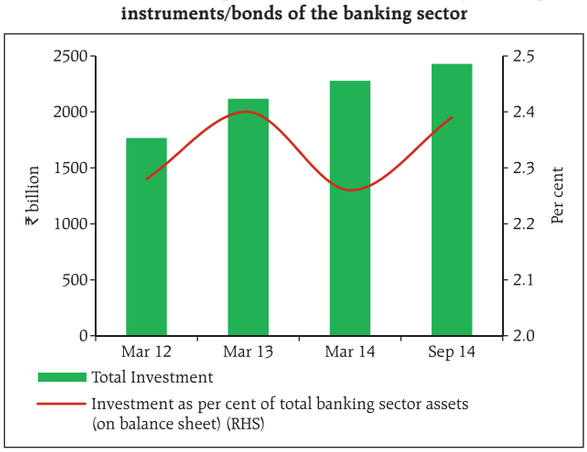
Chart 3.2: Capital ratios of the banking sector (September 2014)



Source: RBI supervisory returns and staff calculations.

3.13 Apart from the cost implications of raising additional capital, banks will face challenges in terms of depth, liquidity and sufficient appetite in India's capital markets for such risk bearing Additional Tier I (AT1) capital instruments. In the absence of a wider retail market, few select investor categories and institutional investors, mainly insurance companies might end up holding much of the AT1 instruments issued by banks (Chart 3.3). Since such institutional investors mostly hold such securities till maturity, feedback for pricing of such instruments through secondary market trades are conspicuously absent. In the absence of effective market making, the banks may have to bear higher costs for issue of such instruments relative to their international peers.

Chart 3.3: Insurance companies'[10] investments in long-term capital instruments/bonds of the banking sector



Source: RBI supervisory returns and staff calculations.

[9] A., Abdel-Baki Monal, (2012), "The Impact of Basel III on Emerging Economies", *Global Economy Journal*, 12, issue 2, p. 1-33 found that the implementation of Basel III would hamper growth by more than 3 percentage points in the 47 emerging market economies studied in the paper.

[10] Sample includes 21 top insurance companies in the country.

This issue further underlines the need for development of a robust non-government debt market.

3.14 On its part, as owner of the dominant part of the banking industry, the Government of India has made capital infusion of ₹586 billion in PSBs in the last four years (2011-14) and plans to further infuse an amount of ₹112 billion in 2014-15. Capital infusion has broadly been carried out by way of preferential allotment of equity by the banks. The government is planning to bridge this gap by diluting its stake in some PSBs to 52 per cent to enable banks to raise capital from the market. Tentative calculations show that PSBs require significant capital injection in order to sustain even a moderate 15 per cent compounded annual growth rate (CAGR) in RWAs.

Market valuations of PSBs and implicit sovereign guarantee

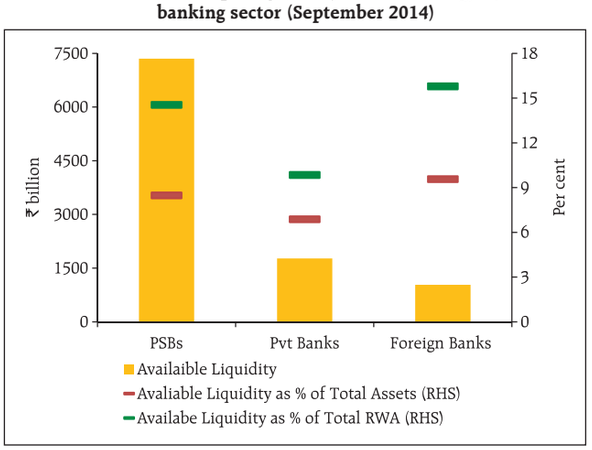
3.15 Capital raising efforts by PSBs other than the capital infusion by the government, face challenges because of their relatively low equity valuations compared to their private sector peers. The previous FSR had raised issues about the low valuation of PSBs. Despite implicit backing from the government, the low equity valuations are justified by the options pricing model for valuation of equity. The implicit sovereign guarantee cannot be treated directly in this model because if the value of a firm falls below the face value of debt, then compensation to debtors is assumed to be made up by the sovereign, but no compensation will be forthcoming to equity investors. Hence, the fortunes of equity investors are unaffected by an implicit sovereign guarantee of debt. The ultimate improvement in valuations can only come from commensurate improvements in asset quality, governance structures and operational efficiency.

Liquidity coverage ratio (LCR) norms

3.16 According to the guidelines issued by the Reserve Bank on the liquidity coverage ratio (LCR) in June 2014, banks were permitted to reckon government securities to the extent allowed by the Reserve Bank under its Marginal Standing Facility (MSF) as Level 1 High Quality Liquid Assets (HQLA) under LCR. Subsequently, banks have been allowed (with effect from January 1, 2015) to include government securities held by them up to another 5 per cent of their net demand and time liabilities (NDTL) within their mandatory Statutory Liquidity Ratio (SLR) requirement (see Box 3.2 for details). Such government securities reckoned as HQLAs for the LCR are to be valued at an amount not greater than their current market value.[11]

3.17 As of September 2014, the banking sector had a liquidity buffer, represented by unadjusted level 1 HQLA[12], of over ₹10 trillion which was around 8.2 and 13.5 per cent of total banking sector assets and RWAs respectively (Chart 3.4). However, since LCR has to be adopted in each significant currency separately, the implementation of Basel III LCR norms for the foreign

Chart 3.4: Available liquidity (unadjusted level 1HQLA) of the banking sector (September 2014)



Source: RBI supervisory returns and staff calculations.

[11] RBI (2014a), "Basel III framework on liquidity standards - liquidity coverage ratio (LCR), liquidity risk monitoring tools and LCR disclosure standards" November 28. [available at: http://rbi.org.in/scripts/NotificationUser.aspx?Id=9369&Mode=0].

[12] Unadjusted Level 1 HQLA has been calculated as total of excess CRR, excess SLR, available MSF and additional 5 per cent of NDTL.

exchange portfolio of Indian banks may have profound implications for the way the business is being conducted hitherto. Currently, the foreign exchange business model for Indian banks involves running negative gaps (the duration of assets longer than that of liabilities), with negligible foreign currency HQLA backing. Moreover, overseas branches being the major source of foreign exchange liabilities may themselves be subject to host country liquidity regulations, including implementation of Basel III norms on a location by location basis (*i.e.* gross) and not aggregate (*i.e.* net) basis, which may be further adding to cost. After negative carry in prospective HQLA in major currencies are taken into account, the profitability of overseas operations as well as foreign exchange book of major banks is likely to be materially affected. The issue requires careful cost benefit analysis of maintaining overseas operations of Indian banks as well as an appropriate strategy to deal with emerging liquidity regulations.

Shadow banking

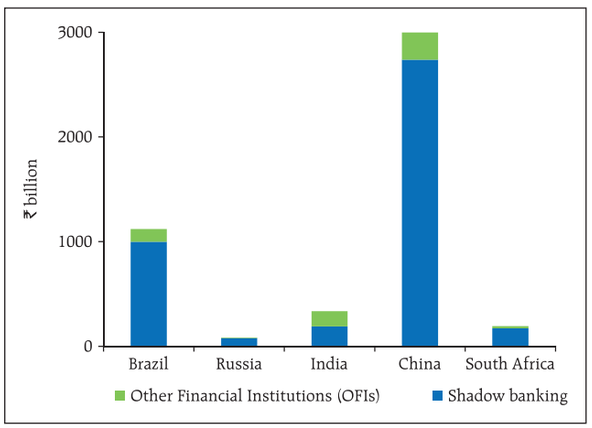
3.18 The role of the 'shadow banking system', defined as 'credit intermediation involving entities and activities outside the regular banking system', as a source of systemic risk was an important learning outcome of the global financial crisis. Its importance stemmed not only from its direct role in supplying credit or liquidity to the economy but also due to its interconnectedness with the more closely regulated banking system.

3.19 According to the FSB methodology and classification, the size of the shadow banking sector in India is estimated to be around USD 190 billion, which is the 15th largest in the world. Among the BRICS, India has the third largest shadow banking sector (Chart 3.5).

Regulation of non-banking finance companies

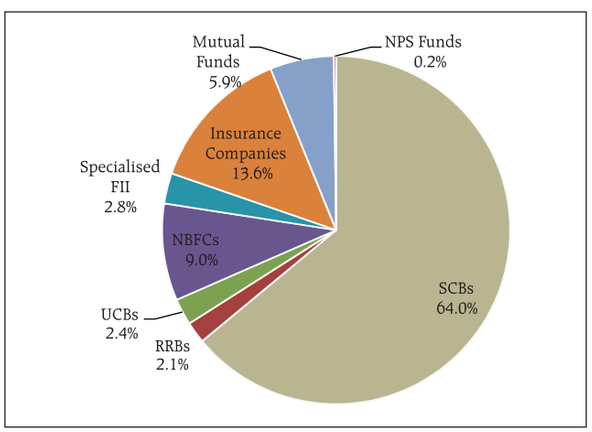
3.20 The G20/FSB led reform proposals initiated in this regard were aimed at developing appropriate monitoring and regulatory frameworks to mitigate the potential build-up of risks in and through the shadow banking system. The FSB approach was based on first capturing the data and information with respect to all kinds of non-bank credit intermediation and then concentrating on the areas of non-bank credit intermediation where maturity/liquidity transformation and/or flawed credit risk transfer and/or leverage could potentially create important systemic risks. In the Indian financial system what has been reckoned as shadow banking by the FSB are predominantly non-banking financial companies (NBFCs), which have been under prudential regulation for a long time and account for a relatively small share of the total assets of the Indian financial system (Chart 3.6).

Chart 3.5: Size of the shadow banking system in BRICS countries



Source: FSB.

Chart 3.6: Share of different sectors in total assets of the Indian financial system



Source: RBI, SEBI, IRDA and PFRDA.

3.21 However, given the significant interconnectedness of NBFCs with the rest of the financial system, especially banks (Table 3.1) they could impact banks under conditions of stress and may face difficulties if banks show reluctance to lend to them in case of a liquidity crunch.

3.22 Considering these aspects, regulations for NBFCs have been tightened (Box 3.1). Furthermore, efforts were also made to assess the size and profile of actual shadow banking entities. From a preliminary reconciliation of the database of the Ministry of

Table 3.1: Exposure of banks, AMCs and insurance companies to top NBFCs[13]

(₹ billion)	Mar 2012	Mar 2013	Mar 2014	Sep 2014
Banks	1513	1453	2919	1495
AMCs	83	624	756	912
Insurance Companies	780	880	965	1023

Source: RBI supervisory returns and staff calculations.

Box 3.1: Salient Features of Revised Regulatory Framework for NBFCs

i) The minimum Net Owned Fund (NOF) criterion for existing NBFCs (those registered prior to April 1999) has been increased to ₹20 million. NBFCs have been allowed till March 2017 to achieve the required minimum levels.

ii) In order to harmonise and strengthen deposit acceptance regulations across all deposit taking NBFCs (NBFCs-D) credit rating has been made compulsory for existing unrated asset finance companies (AFCs) by March 31, 2016. Maximum limit for acceptance of deposits has been harmonised across the sector to 1.5 times of NOF.

iii) In view of the overall increase in the growth of the NBFC sector, the threshold for defining systemic significance for non-deposit taking NBFCs has been revised to ₹5 billion from the existing limit of ₹1 billion. Non-deposit taking NBFCs shall henceforth be categorised into two broad categories: NBFCs-ND (those with assets less than ₹5 billion) and NBFCs-ND-SI (those with assets of ₹5 billion and above – deemed as systemically important) and regulations will be applied accordingly. NBFCs-ND will be exempt from capital adequacy and credit concentration norms while a leverage ratio of 7 has been introduced for them.

iv) For NBFCs-ND-SI and all NBFCs-D categories, tighter prudential norms have been prescribed - minimum Tier I capital requirement raised to 10 per cent (from earlier 7 per cent in a phased manner by end of March 2017), asset classification norms (from 180 days to 90 days in a phased manner by the end of March 2018) in line with that of banks and increase in provisioning requirement for standard assets to 0.40 per cent in a phased manner by March 2018. Exemption provided to AFCs from the prescribed credit concentration norms of 5 per cent has been withdrawn with immediate effect. Additional corporate governance standards and disclosure norms for NBFCs have been issued for NBFCs-D and NBFCs-ND.

v) NBFCs with assets of less than ₹5 billion shall not be subjected to prudential norms if they are not accessing public funds and those not having customer interface will not be subjected to conduct of business regulations.

vi) Assets of multiple NBFCs in a group shall be aggregated to determine if such consolidation falls within the asset sizes of the two categories. Regulations as applicable to the two categories will be applicable to each of the NBFC-ND within the group. Reporting regime has been rationalised with only an annual return prescribed for NBFCs of assets size less than ₹5 billion.

[13] The sample includes the 36 biggest NBFCs in the country (both deposit taking and non-deposit taking).

Corporate Affairs (MCA), Government of India, on companies registered under the Companies Act, 1956 and classified under 'Financial Intermediation, except Insurance and Pension Funding' and 'Activities auxiliary to Financial intermediation', it is observed that many of these companies though not registered with the Reserve Bank might be carrying on (non-banking) financial activities. Financial statements of many such companies reveal that a significant number of them could be termed as NBFCs as per the Principal Business Criteria (PBC) specified by the Reserve Bank. Such companies include a small number of deposit taking companies and also companies whose applications for registration were cancelled by the Reserve Bank on various grounds.

3.23 A preliminary exercise to map the universe of 'finance' companies currently not registered with the Reserve Bank shows that the relative proportion of the segment of un-registered companies in terms of asset size may be much lower than companies under Reserve Bank's regulation. Thus, a large number of small companies populating the NBFC sector do not appear to be posing a major risk to systemic stability (Table 3.2). Nonetheless, they give rise to issues with regard to consumer protection as well as reputational risks for the regulator. In this regard the State Level Coordination Committee (SLCC)[14] mechanism has been strengthened under the initiative of the Financial Stability and Development Council (FSDC) to improve surveillance and deal with issues such as unauthorised deposit acceptance and financial frauds.

Need to bring government owned NBFCs under prudential regulations

3.24 In addition to NBFCs in the private sector, there are some (central and state) government owned finance companies (not being banks) registered with the Reserve Bank as NBFCs, which account for significant proportion of the total assets and business of the NBFC sector. Government owned NBFCs hold 37 per cent of the assets of the entire NBFC sector but are exempt, at present, from certain regulatory prudential norms of the Reserve Bank. These NBFCs are highly leveraged with a leverage ratio of 6.4 (leverage of state government owned NBFCs at 8.8 and central government owned NBFCs at 6.2) as compared to 3.3 for the entire sector. Their aggregate outside liabilities are around ₹3.8 trillion of which ₹385 billion are in the form of bank borrowings.

3.25 While these NBFCs have been playing a useful role in financing certain critical infrastructure sectors, and certain degree of forbearance might have been warranted in the initial stages, there is a need to bring all deposit taking and systemically important government owned companies under the prudential regulatory framework as applicable to other NBFCs, especially in view of the rationalisation of regulations (and where necessary, alignment with banking sector regulations).

Table 3.2: Size-wise distribution of NBFCs registered with the Reserve Bank

Assets size category (in ₹)	Number of companies	Total Assets size (in ₹ billion)	Proportion of Number of Companies (%)	Proportion of Total Asset Size (%)
Above 1 billion	454	11621	3.8	89.6
500 Million to 1 billion*	686	490	5.7	3.8
Up to 500 million	9555	854	79.4	6.6
Data not available	1334	NA	11.1	

* Data pertains to 384 reporting companies

[14] State Level Coordination Committee is a state level committee convened by the Regional Offices of Reserve Bank, comprising of top government officials, representatives from other regulators and major banks.

Indian banking sector's health and asset quality: Focus on PSBs

Regulatory forbearance

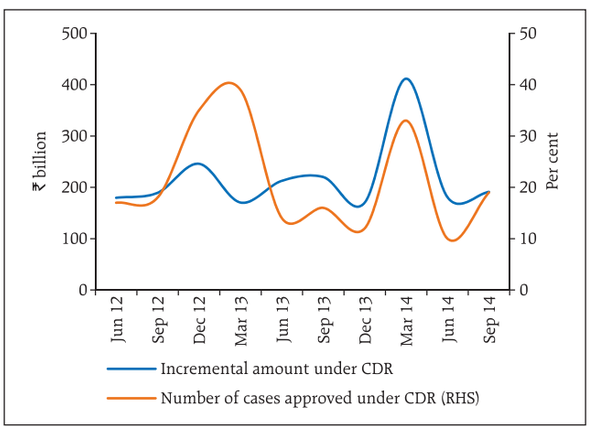
3.26 The extent of restructured assets in the banking sector, especially PSBs, is a cause of serious concern (see Chapter II for details). The relatively higher possibility of slippages in restructured standard advances is required to be factored in by banks from the capital adequacy perspective. Even in 'business as usual' conditions (as against 'stressed conditions'), any restructured advance which would be generally categorised by a rating agency as a sub-investment grade, carries much higher probability of turning into non-performing asset (NPA) than a standard asset. Since banks, traditionally have been short term working capital providers, their appreciation of idiosyncratic risks in infrastructure projects seems to have been inadequate. Hence, the appraisals of most of the project loans have been the prerogative of a handful of merchant banks. However, since the compensation of merchant banks is linked to closure of funding and the decision to fund the respective projects still rests with the banks, it is necessary that the banks strive for a more detailed understanding of the risk-return profile of the underlying projects before committing funds, whenever project appraisal is outsourced.

3.27 While it may be somewhat legitimate to justify regulatory forbearance in times of major crises, forbearance for extended periods and as a cover to compensate for lenders/borrowers' inadequacies engenders moral hazard. Furthermore, going forward, with the initiation of risk based supervision as well as implementation of Basel II advanced norms for credit, accounting discretions such as restructuring will have no impact on capital requirements since such processes incorporate capital provisioning based on expected losses (*i.e.* internal rating based approach for credit risk under Basel II or the Risk Based Supervision model initiated by the Reserve Bank) and would largely align regulatory capital with economic capital rendering discretionary accounting forbearance of little consequence. Hence, an early end to regulatory forbearance may be the right step. In addition, governance reforms along the lines suggested by the P.J. Nayak Committee will build in inherent checks and balances on the risks and returns of the credit portfolio thereby leading to more informed risk taking.

Reduction in cases referred under CDR in the last six months

3.28 Out of the total number of cases referred to/approved under CDR, 49 per cent have been successfully implemented till date. Further, it is observed that the number of cases referred to the CDR cell has come down in the recent past (Chart 3.7). One of the reasons for this reduction could be the Reserve Bank's move to allow banks to restructure their large credits with aggregate exposure (AE) of ₹1 billion and above outside CDR under the Joint Lenders' Forum (JLF) constituted under the provisions of the 'Framework to Revitalise the Distressed Assets in the Economy' which became effective from April 1, 2014. (Box 3.2).

Chart 3.7: Quarterly trends in the number of cases and amounts under the CDR Cell



Source: CDR Cell.

3.29 There is also a need to review and strengthen the accountability mechanism in the entire process of reference, approval and implementation or exit under CDR. Adequate disclosures on the eventual cost-benefit profile of approved CDR cases (for successful as well as failed cases) will help in forming policy and aid proper use of scarce resources. With increased regulatory focus on segregating cases of wilful defaults and ensuring adequate equity participation of promoter(s) in the losses leading to defaults, there is a need for greater transparency in carrying out a net economic value impact assessment and audit of big ticket CDR cases.

Corporate leverage

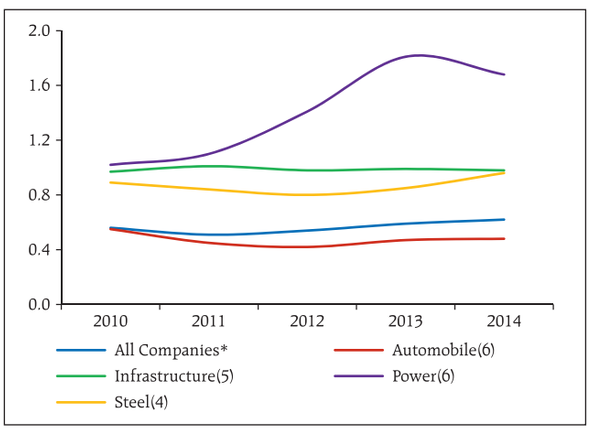
3.30 A related issue that impinges on the banks' asset quality is the understanding of corporate leverage and assessment of the impact on banks' balance sheets. A report of the International Monetary Fund (IMF) has flagged that trends in corporate leverage ratios in emerging Asia (including India) represented a 'fault line', with the potential to amplify shocks as global liquidity conditions tighten, interest rates rise and growth slows.[15] In the Indian context, various reports on indebtedness among Indian companies (and business groups at the aggregate level) have pointed towards increasing corporate leverage (debt-to-equity) ratios, though the Indian scenario is somewhat different with many cash rich companies coexisting with debt ridden companies (Chart 3.8). The euphoria during the boom period might have driven many Indian companies towards huge expansion/acquisition programmes. For many such companies the slowdown in the post-global financial crisis has been a shock and there is some evidence that several of them are on the path of deleveraging and the debt equity ratios of many corporates seem to be stabilising, if not tapering.

3.31 With renewed focus on speedy regulatory clearances for projects and their implementation, the profitability of corporate entities is expected to improve once the stalled projects reach the stage of commercial operations, thus also helping the cause of the asset quality of the banking system. Simultaneously, it may be pertinent to examine the implications of certain corporate practices in India relating to multi-layered structures and pledging of shares by promoters which will improve an assessment of vulnerabilities and the remedies thereof while helping redefine regulatory and supervisory responses.

Effective leverage under holding company/SPV structures

3.32 While the holding company structure has evolved primarily to consolidate a group's holdings in various companies/projects, concerns emanate when such holding companies start acting as operating entities. The evolution of special purpose vehicles (SPVs) may also be associated with the need to reduce bankruptcy costs (and hence risks to lenders). A practice popularly known as 'double leveraging' has been prevalent, especially in the infrastructure space since companies that undertake

Chart 3.8: Average debt-equity ratio of BSE 100 companies[16]



Source: Capitaline (figures in parenthesis indicate number of companies).

[15] IMF (2014), "Regional Economic Outlook: Asia and Pacific", *World Economic and Financial Surveys*, April [available at: https://www.imf.org/external/pubs/ft/reo/2014/apd/eng/c2_0414.pdf].

[16] Data pertaining to 80 companies under the BSE 100 Index have been used excluding banks and non-banking finance companies.

mega projects need not raise a lot of resources while satisfying their equity contributions. In a typical double leveraging, a holding company raises debt on its balance sheet and infuses it as equity in SPVs. From the lenders' perspective, a debt-to-equity ratio of 2:1 at the holding company level could transform into a leverage of 8:1 at the SPV level. While there could be some merit in such practices, risk assessments by banks need to capture this effectively.

Implications of pledging of shares by promoters

3.33 The December 2013 FSR raised certain concerns over pledging of shares by promoters. This report examines the issue further from the lenders' perspective. A majority of Indian companies are family owned/controlled, as substantial levels of promoter shareholding are concentrated within the family hold (Table 3.3). The promoter shares can be significant collateral for a typical company if it wants to expand leverage. Pledging of shares is practiced in other advanced economies too, but it has taken a significantly different form in India.[17] In the case of a typical Indian company, the promoters pledge shares not for funding 'outside' business ventures but for the company itself. By pledging shares, the promoters have no personal liability other than to the extent of their pledged shares. In some instances the shares pledged by unscrupulous promoters could go down in value and the promoters may not mind losing control of the company as there is a possibility of diversion of funds before the share prices collapse.[18] While a lender has the option of selling the shares when prices fall and hit a point that can be called a default event, this can still have impact on minority shareholders through market impact costs, as with the invoking of the pledge, the pledged shares will have to be sold immediately.

Table: 3.3: Industry-wise position on proportion of promoters' pledged shares (as of March 2014)

(in per cent)

Sector	Indian Promoters	Foreign Promoters	Total Promoters' Holding	Promoters' Ownership Pledged
Banks	49.0	0.7	49.7	0.1
Engineering	35.8	0.5	36.3	11.2
Financial Services	47.4	1.1	48.4	7.6
FMCG	27.9	3.2	31.1	11.7
Infrastructure	69.8	1.1	70.9	14.7
Information Technology	43.0	4.9	47.9	11.2
Manufacturing	50.5	7.0	57.5	18.1
Media and Entertainment	44.3	5.2	49.4	24.9
Petrochemicals	54.8	5.3	60.1	8.7
Pharmaceuticals	47.1	6.0	53.1	5.4
Services	46.3	9.7	56.1	25.5
Telecommunication	51.4	5.8	57.3	12.8
Miscellaneous	53.1	2.8	55.9	12.6
Total	**51.6**	**4.7**	**56.3**	**14.2**

Source: National Stock Exchange.

3.34 In view of the prevalence of promoters pledging a substantial portion of their shares, the resultant leverage could be a concern not only for shareholders but also for the health of the financial system. This issue calls for a closer examination, especially in the current scenario of buoyancy in stock prices wherein the collateral in the form of pledged shares may appear to justify higher leverage. In this regard, the fundamental question is one related to implications from a company's perspective of the practice wherein a company's own shares can be pledged to raise debt on its balance sheet.

Move towards a diversified banking system in India

3.35 The final guidelines for setting up 'Payments Banks'[19] and 'Small Finance Banks'[20] have been issued

[17] For example, company executives in the US do pledge shares to collateralise loans to fund 'outside' business ventures and prior purchase of shares of the company (although many large companies prohibit their executives or directors from such practices). The Institutional Shareholder Services Inc. (ISS), supposedly the world's leading corporate governance solution provider, has its policy that states 'pledging of company stock in any amount as collateral for a loan is not a responsible use of equity'.

[18] This might be viewed as promoters having more skin in the company, but many corporate accounting scams have revealed the vulnerabilities in this view.

[19] RBI (2014b), "Guidelines for Licensing of Payments Banks", November 27 [available at: http://rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=32615].

[20] RBI (2014c), "Guidelines for Licensing of Small Finance Banks in the Private Sector, November 27 [available at: http://rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=32614].

on November 27, 2014. The primary objective of setting up these differentiated banks will be to further increase financial inclusion. The payments banks target at providing small savings accounts and payments/ remittance services to the migrant labour workforce, low income households and small businesses by enabling high volume-low value transactions in deposits and payments/remittance services in a secured technology-driven environment. On the other hand, the small finance banks shall help in provision of savings vehicles primarily to unserved and underserved sections of the population and supply of credit to small business units, small and marginal farmers, micro and small industries, and other unorganised sector entities, through 'high technology-low cost' operations.

3.36 While a small finance bank will engage in basic lending activities, a payments bank will be limited to only accepting deposits up to a maximum of ₹100,000 per individual customer. Further, the small finance banks could also undertake other non-risk sharing simple financial services such as distribution of mutual fund units and insurance and pension products. They can also become category II authorised dealers in the foreign exchange business for clients' requirements. The scope of activities for payment banks on the other hand will require them to maintain a minimum 75 per cent of demand deposit balances in SLR securities with a maturity up to one year, besides maintaining Cash Reserve Ratio (CRR) requirements. They will be allowed to deposit a maximum of 25 per cent in other SCBs for operational purposes and liquidity management.

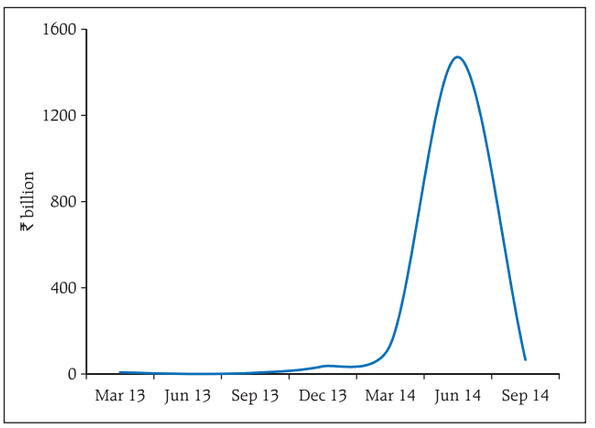
Asset reconstruction companies (ARCs)

3.37 In view of sudden spurt in sale of NPAs by banks (mainly the PSBs facing asset quality pressures) to ARCs during recent quarters, the previous FSR had highlighted certain aspects related to the functioning of ARCs and the need for a review of the regulatory framework for the sector. A well capitalised and efficient ARC sector may play an important role in the coming years in reconstruction and resolution of stressed assets. There are 14 ARCs currently functioning in India, out of which two have majority ownership by public sector institutions, six have shareholding which is a mix of the public and private sectors (including foreign institutions), while the remaining six are fully owned by the private sector. Indian banks, both public sector and privately owned, have a significant level of ownership stake in ARCs. With further opening up of the economy, it is expected that the ARC sector will attract substantial fresh foreign investments.[21]

Impact of changes in regulatory norms

3.38 ARCs have witnessed very high growth in recent times riding on the business opportunities arising out of a high level of NPAs in the banking sector. The fourth quarter of the previous financial year (2013-14) and the first quarter of 2014-15 saw a surge in their asset acquisition, with a number of transactions being closed at aggressive prices. The quarter ended September 30, 2014 however, witnessed a sharp decline in acquisition (Chart 3.9).

Chart 3.9: Amount of assets sold by banks to ARCs



Source: RBI supervisory returns.

[21] As on date, only one of the 14 ARCs has received foreign direct investment (FDI) to the level of 49 per cent.

3.39 The fall in asset acquisition by ARCs during the last quarter may have been partly due to the revised regulations introduced by the Reserve Bank in August 2014. The revision of regulations enhanced 'skin in the game' for ARCs by mandating increased investment in security receipts (SRs) from 5 per cent to 15 per cent, linking the calculation of management fee with the net asset value (NAV) of SRs rather than the outstanding SRs issued as hitherto. The rationale behind these regulatory changes was to incentivise realisation and thereby expediting the process of recoveries/restructuring as NAV of SRs is calculated on the basis of the likely rate of recovery of stressed assets. With the regulatory changes effected in August 2014, ARCs will need to focus on actual redeeming of security receipts as it is no longer possible for them to base their profit model on the basis of management fees (details in Box 3.2). In the near term, ARCs may find it difficult to align their pricing to the expectations of the selling banks and the selling banks also may not have yet reconciled to a realistic sale price expectation for the assets that they want to offload, resulting in the reduction in sales during the second quarter ended September 2014.

3.40 Some other regulatory measures introduced in the guidelines for ARCs, *inter alia*, are greater disclosures on the part of ARCs, membership in the Joint Lenders' Forum (JLF) in order to participate in a corrective action plan for restructuring stressed assets, lowering the threshold level to enforce the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, providing more time to ARCs to conduct due diligence on stressed assets on the auction block, a shorter period for valuation of SRs and a shorter planning period for reconstruction. It is expected that a greater degree of transparency in the sector will support its long term sustainability as an effective institutional response to controlling NPAs.

Box 3.2: Important Regulatory and Supervisory Measures

Dealing with domestic systemically important banks (D-SIBs): Based on the internationally agreed reform measures, the framework for dealing with D-SIBs in India was issued in July 2014. The assessment methodology incorporates major indicator categories: size, interconnectedness, substitutability and complexity. Based on their systemic importance scores in ascending order, banks are slotted into four different buckets and will be required to have additional CET1 capital ranging from 0.20 per cent to 0.80 per cent of risk-weighted assets depending on the bucket that they are slotted into. The computation of systemic importance scores will be carried out at yearly intervals and the banks classified as D-SIBs will be disclosed in August every year starting from 2015.

Capital and provisioning requirements for bank exposures to entities with unhedged foreign currency exposure: Corporates' unhedged foreign currency exposures have been an area of concern not only for individual corporates but also for the financial system as a whole. The final guidelines, issued in January 2014, provide a methodology to be adopted by banks to compute incremental provisioning and capital requirements. More specifically, the incremental provisioning requirements are to be calculated as per the ratio of likely loss due to foreign exchange movement to a company's earnings and depreciation and incremental capital will need to be provided accordingly. It is expected that these measures will incentivise corporates to hedge their foreign currency exposure and also enable banks to develop capabilities to measure and manage currency-induced risks.

Capital requirements for bank exposures to Central Counterparties (CCPs): In order to promote central clearing through well managed CCPs, in January 2014 banks were advised that their clearing exposure to a Qualifying CCP (QCCP) would be kept outside of the exposure ceiling of 15 per cent of its capital funds applicable to a single counterparty. Other exposures to QCCPs such as loans, credit lines, investments in the capital of CCP, liquidity facilities, *etc.* will continue to be

(Contd...)

within the existing exposure ceiling of 15 per cent of capital funds to a single counterparty. However, all exposures of a bank to a non-QCCP should be within this exposure ceiling of 15 per cent.

Countercyclical capital buffer: Taking into consideration the evolution of the Indian economy and other relevant factors including the BCBS document on this aspect, a countercyclical capital buffer (CCB) was prescribed for banks that in addition to their private sector lending, takes into account other relevant factors such as the incremental C-D ratio for a moving period of three years (along with its correlation with the credit-to-GDP gap and GNPA growth), the industry outlook assessment index (along with its correlation with GNPA growth) and interest coverage ratio (along with its correlation with the credit-to-GDP gap). Decisions on CCB may be pre-announced with a lead time of four quarters. The lower threshold (L) where the CCB is activated was recommended at 3 percentage points of the credit-to-GDP gap, provided its relationship with GNPA remains significant and the upper threshold (H) where the CCB is at its maximum was stipulated at 15 percentage points of the credit-to-GDP gap.

Revitalising distressed assets: A framework for revitalising distressed assets in the economy was operationalised by the Reserve Bank with effect from January 2014. In essence, the framework outlines a corrective action plan that will incentivise an early identification of problem accounts which are considered viable and their timely restructuring and taking prompt steps for recovery or sale of unviable accounts. The salient features of the framework include: a) A Central Repository of Information on Large Credits (CRILC) has been set up to collect, store and disseminate credit data with respect to borrowers having aggregate fund-based and non-fund based exposure of ₹50 million and above, b) All commercial banks are required to mandatorily report their credit information on their borrowers/ customers, c) NBFC-ND-SI, NBFCs-D and all NBFC-factors (notified NBFCs, for short) are also required to furnish such information, d) Banks were advised to furnish details of all current accounts with outstanding balance (debit or credit) of ₹10 million and above, and e) Banks are required to monitor stress in borrowal accounts through three categories of special mention accounts (SMAs).

Liquidity Coverage Ratio (LCR): Taking into account the final guidelines issued by BCBS, the Reserve Bank issued its final guidelines on LCR, Liquidity Risk Monitoring Tools and LCR Disclosure Standards' in June 2014, keeping in view country-specific considerations as well. Therefore, besides the usual phase-in arrangements and definitional aspects, the guidelines by the Reserve Bank also consider the range of high quality liquid assets (HQLAs) available in Indian financial markets and their liquidity features. As a result, investment in government securities to the extent of 2 per cent of NDTL was allowed to be included as level 1 HQLAs. Subsequently, banks have now (with effect from January 1, 2015) been permitted to reckon government securities held by them up to another 5 per cent of their NDTL within the mandatory SLR requirement as level 1 HQLAs. Further, eligible common equity shares with 50 per cent haircut have been allowed to be included as level 2B HQLAs. Liquidity risk monitoring tools have also been suitably prescribed in RBI's standards. Accordingly, four additional returns have been prescribed for banks: the LCR, LCR by significant currencies, available unencumbered assets, funding concentration and other information on liquidity by banks.

Sale of NPAs to Asset Reconstruction Companies (ARCs): In February 2014, as part of the Framework for Revitalising Distressed Assets in the Economy, banks have been allowed to: a) Reverse excess provision on sale of NPAs to profit and loss account to the extent of cash received on account of sale of NPAs is more than the net book value of the NPAs, b) Amortise the loss on sale of NPAs to ARCs where the sale consideration is less than net book value (with regard to NPAs sold up to March 31, 2015) over a period of two years, c) Sell financial assets to Securitisation/Reconstruction Companies (SCs/RCs) which are reported as SMA-2 by the bank/FI to CRILC, and d) Use countercyclical/ floating provisions for meeting any shortfall on sale of NPAs (*i.e.*, when the sale is at a price below the net book value). These measures are aimed at incentivising banks to sell their NPAs to SCs/RCs, who in turn are expected to act as a supportive system for stressed asset management with greater emphasis on asset reconstruction.

(Contd...)

Depositor Education and Awareness (DEA) Fund Scheme, 2014: Pursuant to the enactment of the Banking Laws (Amendment) Act, 2012, a separate section has been inserted in the Banking Regulation Act, 1949 relating to the Depositor Education and Awareness (DEA) Fund. As per the scheme, which is applicable to all commercial and co-operative banks in the country, the amounts to be credited to the DEA Fund shall be the credit balance in any deposit account maintained with a bank which has not been operated for ten years or more, or any amount remaining unclaimed for ten years or more. The bank shall calculate the cumulative balances in all such accounts, as on the day prior to the effective date and transfer the amount to the DEA Fund on the last working day of subsequent month along with the accrued interest. The DEA Fund will be utilised for promoting depositors' interest and for such other purposes which may be necessary for promoting depositors' interests as specified by the Reserve Bank from time to time.

Draft guidelines for differentiated bank licences: The final guidelines on payments banks and small banks have been issued by the Reserve Bank (paragraphs 3.35 and 3.36).

Developments in cross-border supervision:

- *Basel core principles:* In compliance with the FSAP (2011) assessment of the Reserve Bank as 'Materially Non-compliant' in respect of three Basel Core Principles (BCP) which include BCP 25 (Revised Principle 13) on 'Home-Host relationships', the Reserve Bank has made significant progress regarding supervisory information sharing and cooperation with jurisdictions where Indian banks are operating. As part of this process, the Reserve Bank has already entered into 20 Memoranda of Understanding (MoU) and one Letter for Supervisory Co-operation with overseas regulators/supervisors.
- *Supervisory colleges:* With a view to improving cooperation and information exchange between home and host supervisors, the Reserve Bank arranged a supervisory college with respect to two major Indian banks in 2013-14 (Bank of Baroda and Bank of India). Supervisory colleges were hosted earlier for State Bank of India and ICICI Bank Limited in 2012-13.
- *Inspection of overseas branches/subsidiaries of Indian banks:* Global operations of Indian banks are spread across 54 countries. In order to assess the financial position, systems and control of overseas branches, an inspection of eight banks in five overseas jurisdictions covering almost 60 per cent of the total overseas assets of Indian banks was undertaken in 2012-13. In 2013-14, an additional six banks in six jurisdictions covering another 20 per cent of the asset ownership were inspected.

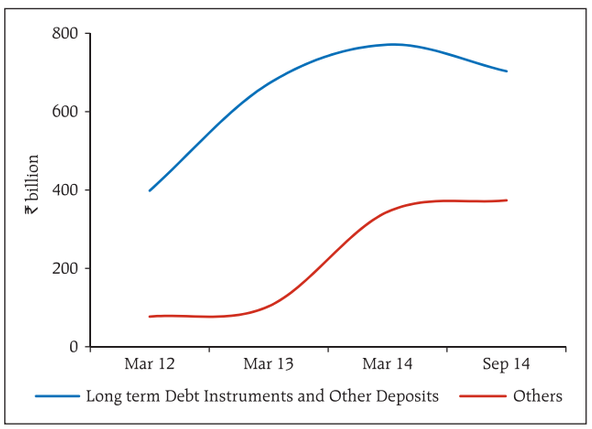
Appointing NBFCs as Business Correspondents: To hasten financial inclusion, the Reserve Bank has undertaken certain measures including allowing commercial banks to appoint NBFCs as Business Correspondents (BCs) (only NBFCs-ND are eligible to act as banks' BCs). While appointing NBFCs as BCs, banks have to ensure that their funds shouldn't co-mingle with those of the NBFCs. The banks also have to restrict NBFCs-ND while functioning as BCs from adopting practices such as offering savings or remittance functions only to their own customers and avoiding the forced bundling of services offered by them and the bank.

Development financial institutions: Dependence on special funding dispensations

3.41 Development financial institutions (DFIs) like National Bank for Agriculture and Rural Development (NABARD), Small Industries Development Bank of India (SIDBI) and National Housing Bank (NHB), among others have been playing an important role in the refinancing needs of banks and financial institutions in niche sectors. The banks subscribe to long term debt instruments issued by these institutions and also avail refinance facilities from them. However, certain peculiar features in the

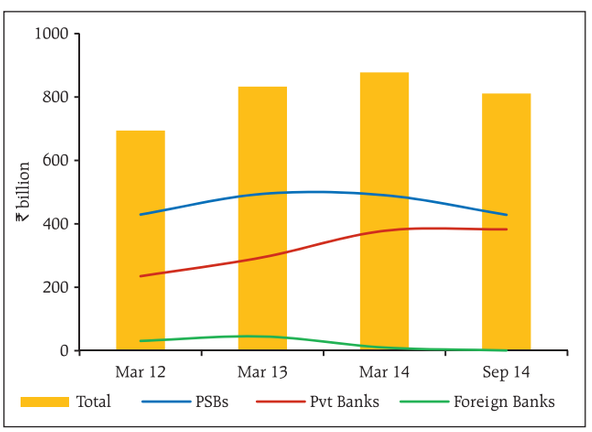
funding arrangements of DFIs may need a review in the evolving regulatory and business scenario, especially those pertaining to mandated contributions by banks to some special funds like the Rural Infrastructure Development Fund (RIDF).[22] The RIDF and certain other special funds, mainly in the nature of refinance funds, have been established within these DFIs for providing financial assistance to sectors such as micro, small and medium enterprises (MSME) and housing, and to institutions such as co-operative banks and regional rural banks (RRBs). These funds are growing rapidly and now utilise a major portion of shortfalls of the priority sector lending of banks. The banking sector's total investment in long term bonds and special funds taken together amounted to over ₹ 1 trillion as of September 2014. Simultaneously, outstanding loans and advances given by DFIs to the banking sector were over ₹800 billion during the same period. This indicates towards a possibility that a substantial amount of funds originally dedicated by banks for special purposes are getting back on to their balance sheets (Charts 3.10 and 3.11).

Chart 3.10: Banking sector investment[23] in DFIs



Source: RBI supervisory returns and staff calculations.

Chart 3.11: Loans and advances given by DFIs to the banking sector



Source: RBI supervisory returns and staff calculations.

Financial inclusion efforts by banks

3.42 The Reserve Bank had adopted financial inclusion as one of its major projects in January 2010. Subsequently, the financial inclusion initiative is being led by a technical group on financial Inclusion and financial literacy, under the FSDC sub-committee, involving all financial sector regulators and other government and non-government agencies. Banks have been advised to devise financial inclusion plans (FIPs) congruent with their business strategies and comparative advantages to make them an integral part of their corporate business plans. The initiative included targets required to be set by banks for opening banking outlets, Business Correspondent (BC) outlets opened in urban locations, opening of basic savings bank deposit accounts (BSBDAs), overdraft

[22] RIDF was established by the government and is managed by NABARD.

[23] Investments refer to subscription to long term bonds, deposits in special funds and other deposits. They do not include investments in equity, short term money market instruments and loans and advances.

(OD) facility availed in BSBDAs and farm and non-farm credit such as Kisan Credit Cards/ General Credit Cards (KCCs/GCCs) transactions in (Business Correspondent – Information and Communication Technology) (BC-ICT) accounts. Some important points on progress made during the first half under the financial inclusion plan for 2014-15 are provided given in Box 3.3.

Convergence with the Pradhan Mantri Jan Dhan Yojana (PMJDY)[24]

3.43 The objectives of PMJDY launched by the Government of India are mostly in sync with the financial inclusion objectives being advocated by the Reserve Bank. The implementation plan for PMJDY leverages on the policies laid down by the Reserve Bank under financial inclusion. The comprehensive FIP format devised by the Reserve Bank captures the required data which is being used by banks to report on the progress made under PMJDY also.

3.44 Going forward banks will have to revise their targets set under FIPs so as to match with the targets allocated to them by the government under PMJDY. The timeline for providing banking services in villages with populations below 2,000 under the roadmap may be advanced from March 2016 to August 2015. With revised targets for opening of basic bank accounts in place, banks will have to ensure opening of at least one bank account in each household by January 26, 2015.

3.45 While offering an overdraft facility of ₹5000, banks will need to follow proper due diligence and satisfactory operations in the account for six months.[25] In addition, banks are advised to undertake financial awareness campaigns in association with IBA so as to educate customers with regard to the facilities offered under the accounts opened under PMJDY.

Extending PMJDY to insurance and pension services

3.46 Given the low levels of penetration of insurance and pension, there is a case for subsequently extending or replicating a project on the lines of PMJDY, to include the provision of insurance and pension services for the common man.

Box 3.3: Financial Inclusion Plan: Progress up to September 2014

Progress made by domestic public and private sector banks (including RRBs) under their financial inclusion plan for the six month period from April 2014 to September 2014 includes:

An increase of 62,948 banking outlets during the current half year taking the total number of banking outlets to 446,752 as at the end of September 2014. BSBDAs reached 305 million for the half year ended September 2014 showing an increase of 62 million accounts during this period. There was considerable increase in the opening of BSBDAs during August/September 2014 in view of government's initiative under the *Pradhan Mantri Jan Dhan Yojana* (PMJDY).

Nearly 57 million accounts had been opened under PMJDY as at the end of September 2014. BC-ICT transactions in BSBDAs showed steady progress with 220 million transactions for the half year ended September 2014 as against 329 million transactions recorded for year ended March 2014.

KCCs which reflect flow of credit towards farm sector entrepreneurial activities increased by 1.2 million during the half year ended September 2014. GCCs which reflect flow of credit towards non-farm sector entrepreneurial activities increased by 1.3 million during the half year ended September 2014. As at end September 2014, 8.8 million accounts were outstanding with a balance of ₹1,165 billion.

[24] A comprehensive financial inclusion scheme launched by the Prime Minister in August 2014

[25] During the half year ended September 2014, 547,000 new BSBDA holders availed of the OD facility. However, as against the total BSBDAs of 305 million, only 6.6 million account holders have availed of the inbuilt OD facility so far.

Regulation of securities market

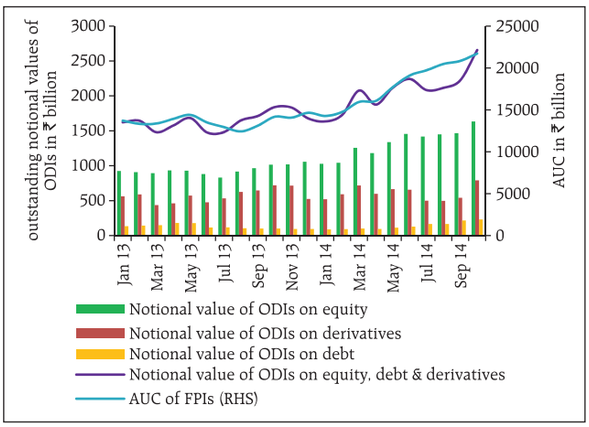
Trends in offshore derivatives instruments (ODIs)

3.47 Indian stock markets have seen rapid growth during the last 2-3 quarters, reflecting the confidence of investors in the fundamental strengths and prospects of the Indian economy. While the participation of the retail investor base still remains comparatively narrow and shallow, the potential and performance in terms of returns delivered by India's stock markets have been attracting substantial amounts of foreign investments through offshore derivatives instruments (ODIs).[26]

3.48 While foreign participation in Indian stock markets adds to the depth and liquidity, it also increases the risks of sudden episodes of heightened volatility due to several global and domestic factors. During the current phase of high growth in Indian stock market valuations, investments through ODIs also saw rapid growth and the notional values and assets under custody touched the highest levels in October 2014 (since 2008)(Chart 3.12).

3.49 The previous FSR had covered the major changes in the regulatory framework for foreign portfolio investors (FPIs) effected by the Securities and Exchnage Board of India (SEBI) which was aimed at, among other things, tightening the 'know your client' norms for issuance of ODIs. The regulations barred 'unregulated' foreign funds from dealing in ODIs even though their investment managers were under the regulation of their concerned regulators. The regulations for FPIs have been further strengthened with respect to requirements that the entities subscribing to ODIs shall be from the countries and jurisdictions which are members of relevant international standards setting bodies like International Organization of Securities Commissions (IOSCO) and Bank for International Settlements (BIS) and signatories to relevant multilateral and bilateral Memoranda of Understanding (MoUs) with SEBI. Subscription to ODIs from residents in countries identified in the public statement of the Financial Action Task Force (FATF) has been prohibited as compliance with international regulations for Anti-Money Laundering and Combating the Financing of Terrorism (AML/CFT).[27] Entities having opaque

Chart 3.12: Trends in offshore derivative instruments



Source: SEBI.

[26] Foreign investors can take exposure in securities that are listed or proposed to be listed on any recognised stock exchange in India through offshore derivatives instruments (ODIs). These instruments are issued by registered foreign portfolio investors (FPIs) to persons regulated by an appropriate foreign regulatory authority subject to compliance with 'know your client' norms.

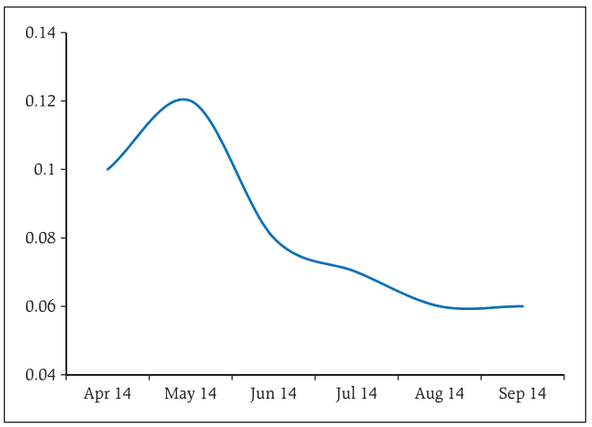
[27] SEBI (2014), "Conditions for issuance of Offshore Derivative Instruments under SEBI (Foreign Portfolio Investor) Regulations, 2014", Circular, November 24 [available at: http://www.sebi.gov.in/cms/sebi_data/attachdocs/1416827082538.pdf].

structures have been prohibited from subscribing to ODIs. Further the investment restrictions applicable to FPIs which require that the purchase of equity shares of each company by a single FPI or an investor group shall be below 10 per cent of the total issued capital of an Indian company, have been made applicable to the ODIs also.

Faster growth in the derivatives segment of equity markets

3.50 The previous FSR had raised the importance of trends showing higher growth in the volumes of equity derivatives as compared to that in cash market segments. The ratio of turnover of cash markets to that of derivatives markets continued its declining trend during the first six months of the current financial year 2014-15 (Chart 3.13).

Chart 3.13: Ratio of turnover in the cash market to that of the derivatives market
(during April-September 2014)



Source: SEBI.

Systemic risks from mutual funds: The Indian context

3.51 The Global Financial Stability Report (GFSR) (October 2014) observed that since 2007, mutual funds (MFs), exchange traded funds (ETFs) and households have become the largest owners of US corporate and foreign bonds, accounting for 30 per cent of the total holdings. Globally, from a financial stability perspective, credit intermediation through asset managers and markets has certain advantages over that through banks, as the investment risk is borne largely by investors and the liquidity is provided mostly by markets. However, funds investing in credit instruments have a number of features that could result in elevated financial stability risks. The previous FSR highlighted the structural characteristics of the Indian mutual fund industry which make it less prone to financial stability risks with appropriate fencing provided by SEBI regulations. Furthermore, retail participation in the mutual fund industry is low as typically corporates have a major share in the total Asset under Management (AuM) which is around 47 per cent. In addition, retail investors exhibit more 'sticky' behaviour in terms of holding to investments made in mutual funds.

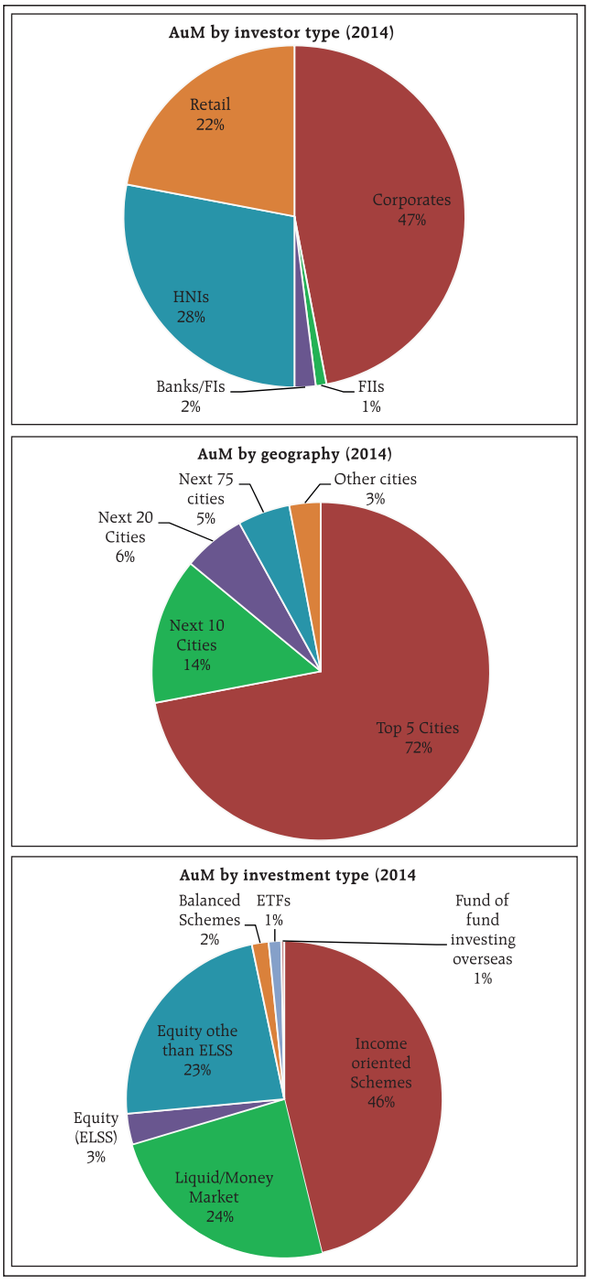
Holding pattern in the mutual fund industry

3.52 Across the globe, there is rich diversity in the mutual fund sector as the asset management industry offers a mix of traditional and alternative fund products to a wide and diverse investor space covering banks, corporate entities, insurance funds, pension funds, sovereign wealth funds (SWFs) and high net worth individuals (HNIs)/retail investors. The spread of Indian asset management is comparatively limited and concentrated in terms of investor categories, investment products and geographical reach (Chart 3.14).

3.53 Corporates hold close to half of the total AuM followed by HNIs and retail investors. The market is highly concentrated as the five largest metropolitan cities account for an almost three-fourth share of total AuM. While the range of investment products and fund schemes has expanded over the years, income oriented schemes attract a major share of investments followed by the liquid/money market and growth oriented schemes. It has been observed that in growth (equity) oriented schemes a major part of the investment for the long term is by retail investors, as compared to other investor categories.

3.54 The GFSR (October 2014), observed that the risk of a run may be intensified by the increased holdings of mutual funds.[28] Shares of different investors in composition of equity and non-equity AuM in 2014 in different tenure holding baskets ranging from extremely short term to long term, indicates that in the Indian context retail investors exhibit a tendency to hold mutual fund investments for longer durations in the case of both equity as well as non-equity investments (Charts 3.15 and 3.16). This tendency of retail investors may also reveal their vulnerability in falling behind the market when there is a reversal in trend due to any reason, including heavy selling by corporate or institutional investors.

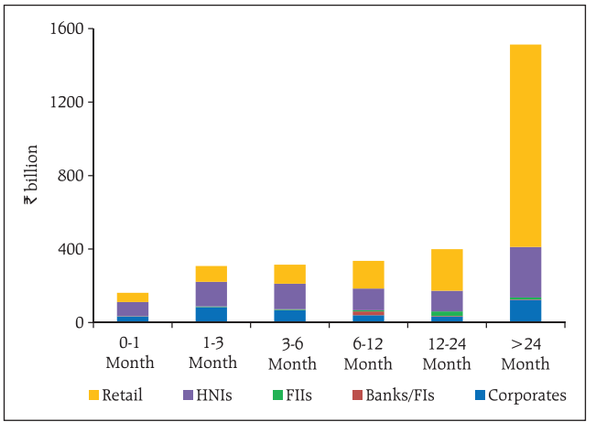
Chart 3.14: Distribution of AuM of mutual funds in India, by investor type, investment products and geographical reach



Source: SEBI.

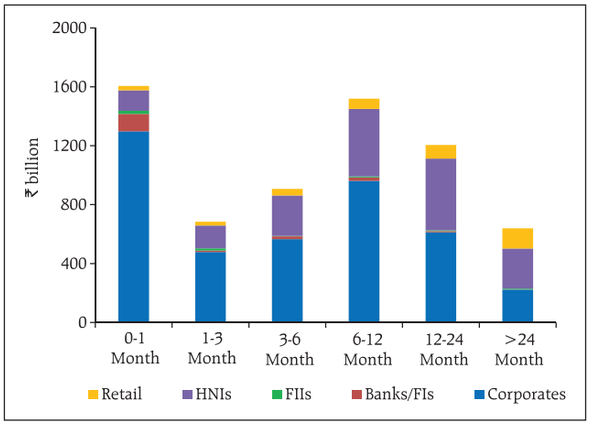
[28] Qi, Chen, Itay Goldstein, and Wei Jiang. 2010. "Payoff Complementarities and Financial Fragility: Evidence from Mutual Fund Outflows." *Journal of Financial Economics* 97 (2): 239–262

Chart 3.15: Equity AuM composition by investors (duration-wise)



Note: *Data as on September 30, 2014. HNIs defined as individuals investing ₹0.5 million and above.
Source: SEBI, AMFI.

Chart 3.16: Non-equity AuM composition by investors (duration-wise)



Note: *As on September 30, 2014. HNIs defined as individuals investing ₹0.5 million and above.
Source: SEBI, AMFI.

However, the principle of fair valuation adopted by MFs as per SEBI's directives in February 2012 ensures fair treatment to all investors, existing as well as those seeking to purchase or redeem units of MF schemes. Adoption of this principle takes away the incentive from investors to redeem prior to other investors, thereby reducing the redemption pressure on the scheme and risk of a run.

Concentration in equity portfolio holdings in mutual funds across schemes by AMCs

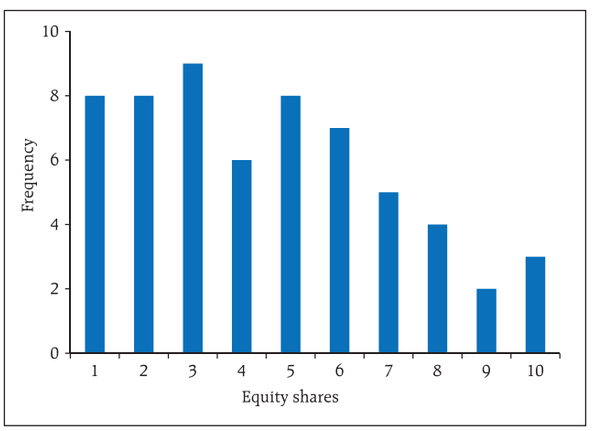
3.55 During the half year from April 2014 to September 2014, deployment in equity by mutual funds has surged about 50 per cent. There are 41 AMCs having AuM of ₹9,594.14 billion and the distribution indicates a high degree of concentration in the hands of a few AMCs, under a Pareto 80-20 principle. An analysis of portfolio holdings in equity of the top ten AMCs[29] along with their top ten holdings in equity stocks shows that the portfolio holdings of AMCs comprise quite a few common stocks indicating preference towards a select group of stocks (Table 3.4 and Chart 3.17).

Table 3.4: Select indicators on concentration in the Indian mutual fund industry

Equity AuM as percentage of total AuM	**31.6**
Top-10 AMCs equity AuM as percentage of total equity AuM	**77.7**
Top-10 stocks in each of top-10 AMCs/Total AuM of top-10 AMCs	**30.7**
AuM of top-10 stocks overall as percentage of total equity AuM of top-10 AMCs	**22.8**
Share of equity AuM of top-4 AMCs as percentage of total equity AuM	**49.0**

Source: AMCs.

Chart 3.17: Frequency distribution of commonly held equity shares by top-10 AMCs



Source: AMCs.

[29] On the basis of highest Equity AuM holdings as on 30 September, 2014.

3.56 An analysis of the total exposure of top ten AMCs to top ten stocks *vis-à-vis* the weightage of top ten stocks (on the basis of market capitalisation) in the index (CNX Nifty 100) also shows considerable concentration levels in AMCs' equity investments. While top ten stocks account for 46 per cent of the total market capitalisation of the index, the share of top ten stocks in the AuM of top ten AMCs is around 74 per cent, indicating a strong preference towards a select group of most liquid stocks. Although there are regulations limiting the exposure of AMCs/ schemes to particular scrip, a significantly high degree of concentration by the mutual fund sector may need to be further monitored from a wider perspective of its implications for stability and developing the securities market.

Financial market infrastructure

3.57 As part of the Committee on Payment and Settlement Systems (CPSS)[30] and FSB, the Reserve Bank is committed to implementing the CPSS-IOSCO 'Principles for Financial Market Infrastructure' (PFMIs). On the directions of the FSDC sub-committee, an Inter-Agency Implementation Group (IAIG) comprising members from the Reserve Bank, SEBI and the Forward Markets Commission (FMC) was constituted for monitoring the implementation of PFMIs in India. The Clearing Corporation of India Limited (CCIL) has been identified as an important FMI under the regulation of the Reserve Bank.

Importance of cyber security and possible conflict in priorities of PFMIs

3.58 With increasing use of electronic payments and internet and mobile banking information security and operational reliability challenges have become very important from the financial stability perspective. One of the clauses[31] under PFMIs requires that an FMI operator's business continuity plans must 'be designed to ensure that critical information technology (IT) systems can resume operations within two hours following disruptive events' and that there can be 'complete settlement' of transactions 'by the end of the day of the disruption, even in the case of extreme circumstances'. However, a rush to comply with this requirement may compromise the quality and completeness of the analysis of causes and far-reaching effects of any disruption. Restoring all the critical elements of the system may not be practically feasible in the event of a large-scale 'cyber attack' of a serious nature on a country's financial and other types of information network infrastructures. This may also be in conflict with Principle 16 of PFMIs which requires an FMI to safeguard the assets of its participants and minimise the risk of loss, as in the event of a cyber attack priority may need to be given to avoid loss, theft or fraudulent transfer of data related to financial assets and transactions.

Legal entity identifiers for India

3.59 The Reserve Bank of India selected CCIL to act as a local operating unit (LOU) for issuing globally compatible legal entity identifiers (LEIs) in India. Infrastructure in this regard has been set up, and the use of LEI codes is likely to be mandated for OTC derivatives transactions and large borrowers (legal entities) in a phased manner.

Payment and settlement systems

Increasing use of electronic modes of transactions

3.60 The payment and settlement system infrastructure in the country continued to perform without any major disruptions. Development in the system is evidenced by increasing use of electronic modes of transaction settlements. Close to 90 per

[30] Now named as the Committee on Payments and Market Infrastructures (CPMI).
[31] Key consideration under Principle 17 of PFMIs.

cent of the total settlement volumes was done through retail electronic modes as of August 2014. The share of paper-based clearing also declined marginally over the last year (Charts 3.18 and 3.19).

Security issues and risk mitigation measures related to 'card not present' transactions

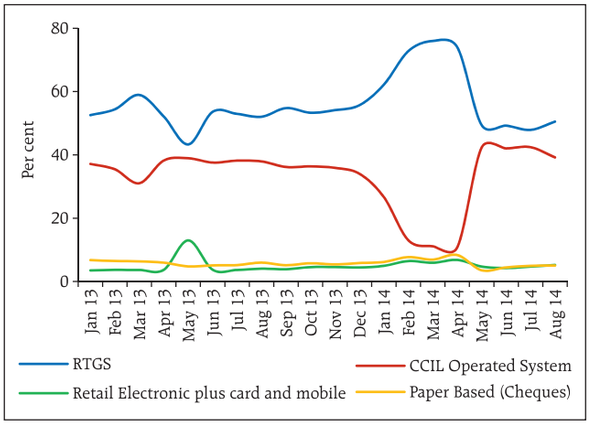
3.61 Reserve Bank's instructions on card transactions' security and risk mitigation, which have been issued from time to time since 2009, mandate the use of an additional factor of authentication (AFA) for all 'card not present' (CNP) transactions. This was earlier applicable to 'card transactions' in India with cards issued by banks in India. Recently, instances came to notice where entities, through adoption of alternate business/payment models, were violating these instructions on 'card not present' transactions which were being effected without the mandated additional authentication/validation even where the underlying transactions were essentially taking place between two residents in India.

3.62 In view of this, instructions were issued to banks advising them that where cards issued by banks in India are used for making 'card not present' payments towards purchase of goods and services provided within the country, such transactions have to be through a bank in India and the transaction should necessarily be settled only in Indian currency in adherence to extant instructions on security of card payments as well as foreign exchange guidelines.

Core settlement guarantee fund, Default Waterfall and Stress Test

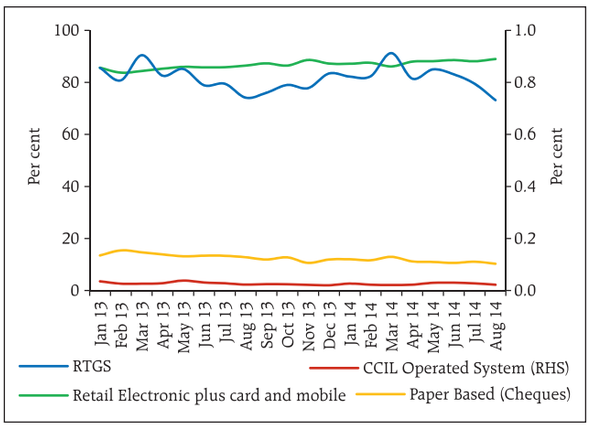
3.63 Continuing with the objective 'to promote orderly and healthy growth of the securities market in India' along with safeguarding the markets from systemic risks, SEBI has introduced a new layer of safety net in the form of 'core settlement guarantee fund' to mitigate risks from possible default in settlement of trades and strengthen risk management framework in the domestic capital markets.

Chart 3.18: Distribution of settlement systems
(in value)



Source: RBI.

Chart 3.19: Distribution of settlement systems
(in volume)



Source: RBI.

3.64 The new structure aims at enhancing the robustness of the present risk management system of the clearing corporations to enable them to deal with defaults of the clearing members much more effectively. The granular norms related to core settlement guarantee fund (SGF), stress testing and default procedures would bring greater clarity and uniformity as well as align the same with international best practices while enhancing the robustness of the present risk management system in the clearing corporations (Box 3.4).

Box 3.4: SEBI Guidelines on Core SGF, Default Waterfall and Stress Test

SEBI has issued detailed guidelines on Core SGF, Default Waterfall and Stress Test, with the following objectives:

a) create a core fund (called core settlement guarantee fund), within the SGF, against which no exposure is given and which is readily and unconditionally available to meet settlement obligations of clearing corporation in case of clearing member(s) failing to honour settlement obligation,

b) align stress testing practices of clearing corporations with FMI principles (norms for stress testing for credit risk, stress testing for liquidity risk and reverse stress testing including frequency and scenarios),

c) capture in stress testing, the risk due to possible default in settlement of both institutional and non-institutional trades,

d) harmonise default waterfalls across clearing corporations

e) limit the liability of non-defaulting members in view of the Basel capital adequacy requirements for exposure towards Central Counterparties (CCPs),

f) ring-fence each segment of clearing corporation from defaults in other segments, and

g) bring in uniformity in the stress testing and the risk management practices of different clearing corporations especially with regard to the default of members.

The default waterfall in any segment will generally follow the following order –

- Monies of defaulting member
- Insurance, if any
- Clearing Corporations' (CC) resources (equal to 5 per cent of MRC)
- Core SGF (within it also penalties and then CC to bear loss first to extent of 25 per cent of segment MRC, then pro rata allocation to all contributors)
- Proportion of remaining CC resources (excluding CC contribution to core SGFs of other segments and INR 100 Crore) equal to ratio of segment minimum required corpus (MRC) to sum of MRCs of all segments.
- CC/Stock Exchange contribution to Core SGFs of other segments and remaining CC resources to extent approved
- Capped additional contribution of non defaulting members (pre-specified by CC)
- Pro-rata haircut to pay-outs

Financial safety net: Deposit Insurance and Credit Guarantee Corporation (DICGC)

3.65 A strong deposit insurance system is a necessary component of financial stability arrangements in any jurisdiction. The previous FSRs have highlighted some issues and challenges facing the deposit insurance system in India which include, *inter alia*, those related to the adequacy of the Deposit Insurance Fund and coverage of deposit insurance, apart from ensuring compliance with the Core Principles for Effective Deposit Insurance Systems.[32]

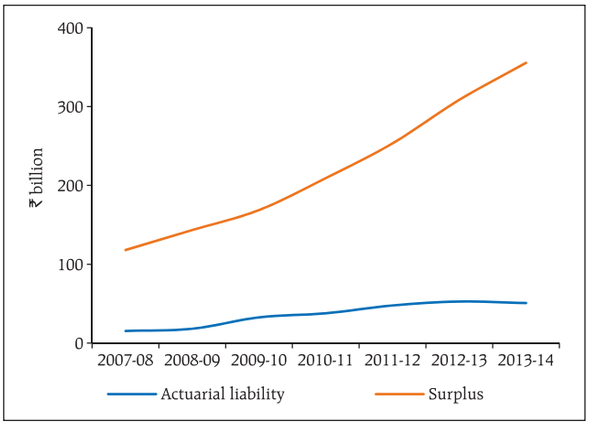
3.66 One of the core principles stresses on the requirement for funding (including assured liquidity funding) mechanisms necessary to ensure prompt reimbursement of depositors' claims and for banks to bear the cost of deposit insurance. At present in India, the DICGC maintains three distinct funds/ accounts: the Deposit Insurance Fund (DIF), the Credit Guarantee Fund (CGF), and the General fund (GF). Out of these, DIF is primarily used for settlement of claims from depositors and is sourced out of the premium paid by the insured banks and the investment income received from (and reinvested

[32] The International Association of Deposit Insurers has concluded the revision of its Core Principles for Effective Deposit Insurance Systems and the Compliance Assessment Methodology, and has submitted them to the Financial Stability Board.

in) central government securities. There is also an inflow of small amounts into this fund out of the recoveries made by the liquidators/administrators/ transferee banks. DICGC, thus, builds up its DIF through transfer of excess of income over expenditure each year after payment of income tax. This fund is used for settlement of claims of depositors of banks taken into liquidation/reconstruction/amalgamation. The size of DIF was around ₹441.5 billion as at end-June 2014 (Chart 3.20).

3.67 DIF consists of actuarial liabilities and accumulated surplus. Actuarial liabilities are the claims of depositors paid out from DIF by DICGC over the years and have witnessed a moderate growth at 12 per cent primarily because there was no failure by any major bank during this period. DICGC's liabilities crystallised largely on account of failure of co-operative banks implying some inherent weaknesses in the management of these institutions.[33]

Chart 3.20: Deposit insurance fund: Surplus and actuarial liabilities



Source: DICGC.

Pension sector

3.68 In the coming decades, developing countries like India will grow older much faster and that too at relatively low income levels. The Pension policy in India has traditionally been based on employment contracts and service conditions and has been financed through employer and employee participation. As a result, its coverage has been restricted to the organised sector and a vast majority of the workforce in the unorganised sector has remained outside the formal channels of old age financial support. Therefore, in view of the need for containing fiscal liabilities under control and transiting towards a sustainable pension system in India a product like the National Pension Scheme (NPS) needs to be pushed with greater vigour. While the Pension Fund Regulatory and Development Authority (PFRDA) can take a lead role in generating awareness and disseminating information about NPS, NPS needs to grow into a popular movement where all the stakeholders in the economy need to play an important role.

Inconsistencies in tax treatment of the NPS and other traditional pension systems

3.69 The NPS is voluntary whereas the Employee Provident Fund (EPF) is mandatory. The Employee Provident Fund Organisation (EPFO) is legally mandated and therefore, EPF accounts are maintained by corporates from the point of view of legal liability and guaranteed returns are determined each year by the government. Issues related to seamless portability across corporates and awareness about the product pose further challenges *vis-à-vis* other retirement products. There is a need for clarity regarding tax treatment of NPS as the decision on the EET (Exempt, Exempt, Taxable) status is still pending.

[33] Historically, in the Indian context the possibility of failure of the public sector is remote. Even important private sector banks facing problems have not 'failed' as mergers with other stronger public or private sector banks have been used as a preferred option in the recent past.

Commodity derivatives markets

Initiatives for improving hedger participation in commodity markets

3.70 To improve hedging in the market, the FMC has exempted participants making an early 'pay-in' of commodities to the exchanges from payment of all margins except the mark-to-market margin. Also, the positions taken by members who pre-pay the margin is not to be counted towards position limits and spread margin benefits are also allowed to such participants.

3.71 The computation methodology for open position limits for agricultural and non-agricultural commodities have been revised. In case of agricultural commodities, overall exchange wide gross position limit shall be capped at 50 per cent of the estimated production and imports. For members of the exchange, position limits shall be 10 times of the client level position limit or 20 per cent of the market wide open interest whichever is higher. Client level position limits shall be the numerical position limits as decided from time to time or 5 per cent of the market-wide open interest whichever is higher. In case of agricultural commodities and agricultural products, the client level position limit shall be limited to 1 per cent of the total production and import. The near month position limits have also been revised for agricultural commodities and have been restricted to 50 per cent of the overall position limits.

3.72 For improving transparency, the commodity futures exchanges have been directed to disclose on their websites, positions of top 10 trading clients in 'buy side' as well as 'sell side' in order of maximum open interest, the hedge position allocated to various hedgers, the delivery intent of the hedgers on a daily basis in an anonymous manner. In addition the exchanges also have to disclose, the pay-in and pay-out of commodities made by top 10 clients including hedgers on their website 10 days after completion of settlement, for the information of the market.

Annex 1

Systemic Risk Survey

The Systemic Risk Survey (SRS), the 7th in the series was conducted in October 2014[1] to capture the perceptions of experts, including market participants, on the major risks that the financial system is facing. The results indicate that global risks and macroeconomic risks continue to be perceived as major risks affecting the financial system. Perceptions about global risks, which tapered a bit during the last survey rose once again while the same about market risks continued to be in the medium risk category, though they too looked up. General risks that had been viewed as high in the last survey mainly on account of the then prevailing uncertainties about weather conditions, were viewed as low in the current round of the survey. Institutional risks continued to fall in the medium risk category, though moderated (Figure 1).

Within global risks, sovereign risks remain unchanged, while the risk of a global slowdown increased marginally. Further, the global inflation risk showed a downward trend though global funding risks remained in an elevated mode.

Within the macroeconomic risk category, risks from deterioration in the domestic economic outlook receded into the medium risk category with a distinct improvement in the sovereign rating front against the backdrop of political stability being in place. Surprisingly, perceptions about risks on account of CAD and fiscal deficit remained unchanged while the same about risks from domestic inflation and household savings lowered. Though the overall outlook has improved, risks emanating from the slow pace of infrastructure development, capital flows, real estate prices and the corporate sector went up to the high risk category.

Among institutional risks, the asset quality of banks continued to be a concern while regulatory risk, operational risk and the risk of low credit-off-take increased comparatively. With regard to general risks, risk perceptions emanating from terrorism and social unrest have increased (Figure 2).

Figure 1: Major risk groups identified in Systemic Risk Surveys (October 2014)

Major Risk Groups	Oct-14	Change	Apr-14	Change	Oct-13	Change	Apr-13	Change	Oct-12
A. Global Risks		⇧		⇩		⇔		⇔	
B. Macro-economic Risks		⇔		⇧		⇧		⇧	
C. Market Risks		⇧		⇩		⇧		⇩	
D. Institutional Risks		⇩		⇔		⇔		⇧	
E. General Risks		⇩		⇧		⇔		⇩	

Note:

Risk Category

Very high	High	Medium	Low	Very low

Change in risk since last survey		
⇧	⇔	⇩
Increased	Same	Decreased

Note: The risk perception, as it emanates from the systemic risk survey conducted at different time points (on a half-yearly basis in April and October), may shift (increase/decrease) from one category to the other, which is reflected by the change in colour. However, within the same risk category (that is, the boxes with the same colour), the risk perception may also increase/decrease or remain the same, which has been shown by arrow. The shift in risk perception is between two consecutive surveys.

Source: RBI Systemic Risk Surveys (October 2012 to October 2014) (half yearly).

[1] These surveys are conducted on a half-yearly basis. The first survey was conducted in October 2011.

Figure 2: Various risks identified in the Systemic Risk Survey (October 2014)

Risk Item		Oct-14	Change	Apr-14
A. Global Risks	Global slow down		⇧	
	Sovereign Risk / Contagion		⇔	
	Funding Risk (External Borrowings)		⇧	
	Global Inflation / Commodity Price Risk (including crude oil prices)		⇩	
	Other Global Risks		⇧	
B. Macro-economic Risks	Deterioration in domestic economic outlook		⇩	
	Domestic Inflation		⇩	
	Current Account Deficit		⇔	
	Capital inflows/ outflows (Reversal of FIIs, Slow down in FDI)		⇧	
	Sovereign rating downgrade		⇩	
	Fiscal Risk (High Fiscal deficit)		⇔	
	Corporate Sector Risk (High Leverage/ Low Profitability)		⇧	
	Lack / Slow pace of Infrastructure development		⇧	
	Real Estate Prices		⇧	
	Household savings		⇩	
	Political Risk		⇩	
	Other Macroeconomic Risks		⇩	
C. Market Risks	Foreign Exchange Rate Risk		⇧	
	Equity Price Volatility		⇔	
	Funding Risk / Liquidity Risk/ Interest Rate Risk		⇔	
	Other Market Risks		⇔	
D. Institutional Risks	Regulatory Risk		⇧	
	Asset quality deterioration		⇔	
	Additional capital requirements of banks		⇩	
	Funding difficulties of banks		⇧	
	Low credit off-take		⇧	
	Excessive credit growth		⇔	
	Operational Risk		⇧	
	Other Institutional Risks		⇧	
E. General Risks	Terrorism		⇧	
	Natural disaster/Weather conditions		⇩	
	Social unrest (Increasing inequality)		⇧	
	Other General Risks		⇧	

Note:

Risk Category

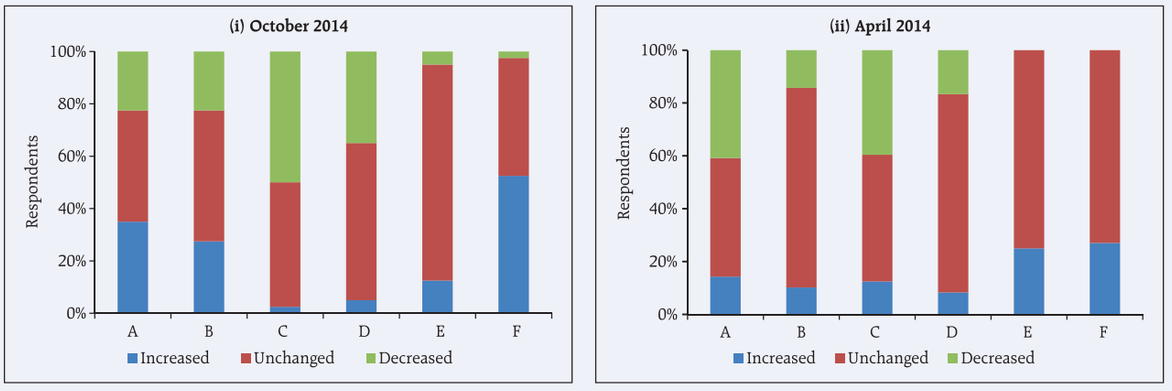
Very high	High	Medium	Low	Very low

Change in risk since last survey		
⇧	⇔	⇩
Increased	Same	Decreased

Note: The risk perception, as it emanates from the systemic risk survey conducted at different time points (on a half-yearly basis in April and October), may shift (increase/decrease) from one category to the other, which is reflected by the change in colour. However, within the same risk category (that is, boxes with the same colour), the risk perception may also increase/decrease or remain the same, which has been shown by arrow. The shift in risk perception is between two consecutive surveys.
Source: RBI Systemic Risk Surveys (April 2014 and October 2014).

In the current survey, participants felt that there is an increased possibility of a high impact event occurring in the global financial system in the period ahead (short to medium term) while their confidence in the global financial system has marginally deteriorated. However, the possibility of an occurrence of a high impact event in the Indian financial system in the period ahead (short to medium term) is perceived to be low with survey participants expressing higher confidence in the Indian financial system (Chart 1).

Chart 1 : Change in Perception over the past six months

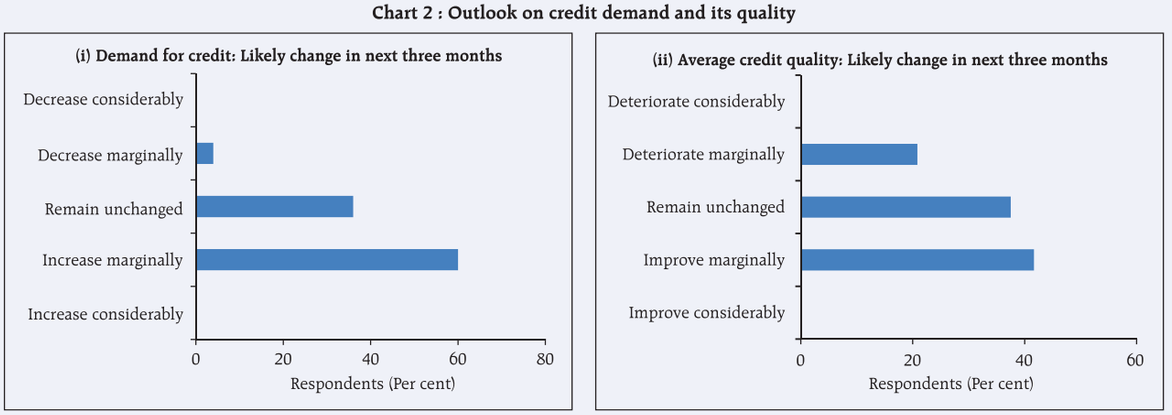


Note: A: A high impact event occurring in the global financial system in the period ahead (in the short term: up to 1 year)
B: A high impact event occurring in the global financial system in the period ahead (In the medium term: 1 to 3 years)
C: A high impact event occurring in the Indian financial system in the period ahead (in the short term: up to 1 year)
D: A high impact event occurring in the Indian financial system in the period ahead (in the medium term: 1 to 3 years)
E: Confidence in the stability of the global financial system as a whole
F: Confidence in the stability of the Indian financial system

Source: RBI Systemic Risk Surveys (April 2014 and October 2014).

On the issue of likely changes in demand for credit in the next three months, a majority of the stakeholders were of the view that it may increase but marginally. A majority of the respondents felt that the average quality of credit may improve marginally or is likely to remain unchanged in the next three months (Chart 2).

Chart 2 : Outlook on credit demand and its quality



Source: RBI Systemic Risk Survey (October 2014).

Annex 2
Methodologies

Banking stability map and indicator

The banking stability map and indicator presents an overall assessment of changes in underlying conditions and risk factors that have a bearing on the stability of the banking sector during a period. The ratios used for constructing each composite index are given in Table 1.

Table 1: Ratios used for constructing the banking stability map and the banking stability indicator

Dimension	Ratios			
Soundness	CRAR #	Tier-I Capital to Tier-II Capital #	Leverage ratio as Total-Assets to Capital and Reserves	
Asset-Quality	Net NPAs to Total-Advances	Gross NPAs to Total-Advances	Sub-Standard-advances to gross NPAs #	Restructured-Standard-Advances to Standard-Advances
Profitability	Return on Assets #	Net Interest Margin #	Growth in Profit #	
Liquidity	Liquid-Assets to Total-Assets #	Customer-Deposits to Total-Assets #	Non-Bank-Advances to Customer-Deposits	Deposits maturing within-1-year to Total Deposits
Efficiency	Cost to Income	Business (Credit + Deposits) to staff expenses #		Staff Expenses to Total Expenses

Note: # Negatively related to risk.

The five composite indices represent the five dimensions of soundness, asset-quality, profitability, liquidity and efficiency. Each composite index, representing a dimension of bank functioning, takes values between zero (minimum) and 1 (maximum). Each index is a relative measure during the sample period used for its construction, where a high value means the risk in that dimension is high. Therefore, an increase in the value of the index in any particular dimension indicates an increase in risk in that dimension for that period as compared to other periods. For each ratio used for a dimension, a weighted average for the banking sector is derived, where the weights are the ratio of individual bank assets to total banking system assets. Each index is normalised for the sample period as 'ratio-on-a-given-date minus minimum-value-in-sample-period divided by maximum-value-in-sample-period minus minimum-value-in-sample-period'. A composite index of each dimension is calculated as a weighted average of normalised ratios used for that dimension where the weights are based on the marks assigned for assessment for the CAMELS rating. Based on the individual composite index for each dimension, the banking stability indicator is constructed as a simple average of these five composite indices.

Estimation of losses: Expected losses, unexpected losses and expected shortfalls of SCBs

The following standard definitions were used for estimating these losses:

Expected Loss (EL) : EL is the average credit loss that the banking system expects from its credit exposure.

Unexpected Loss (UL) : UL at 100(1-α) per cent level of significance is the loss that may occur at the α-quantile of the loss distribution.

Expected Shortfall (ES) : When the distributions of loss (Z) are continuous, expected shortfall at the 100(1-α) per cent confidence level (ESα (Z)) is defined as, $ES_{\alpha}(Z) = E[Z \mid Z \geq VaR_{\alpha}(Z)]$. Hence, Expected Shortfall is the conditional expectation of loss given that the loss is beyond the VaR level.

These losses were estimated as: Loss = PD X LGD X EAD

Where, EAD = Exposure at Default, is the total advances of the banking system. EAD includes only on-balance sheet items as PD was derived only for on-balance sheet exposures.

LGD = Loss Given Default. Under the baseline scenario, the average LGD was taken as 60 per cent as per the RBI guidelines on 'Capital Adequacy - The IRB Approach to Calculate Capital Requirement for Credit Risk'. LGD was taken at 65 per cent and 70 per cent under medium and severe macroeconomic conditions respectively.

PD = Probability of Default. PD was defined as gross non-performing advances to total advances ratio. Because of unavailability of data on a number of default accounts, the size of default accounts (that is, the *G*NPA amount) was used for derivation of PDs.

The losses, EL, UL and ES, were estimated by using a simulated PD distribution. As a first step an empirical distribution of the PD was estimated using the Kernel Density Estimate; second using the empirically estimated probability density function, 20,000 random numbers were drawn based on the Monte Carlo simulation and finally, EL, UL and ES were calculated by taking PDs as average PD, 99.9 per cent VaR of PD and average PD beyond 99.9 per cent loss region respectively.

Macro stress testing

To ascertain the resilience of banks against macroeconomic shocks, a macro stress test for credit risk was conducted. Here, the credit risk indicator was modelled as a function of macroeconomic variables, using various econometric models that relate the banking system aggregate to macroeconomic variables. The time series econometric models used were: (i) multivariate regression to model system level slippage ratio; (ii) VAR to model system level slippage ratio; (iii) quantile regression to model system level slippage ratio; (iv) multivariate regression to model bank group-wise slippage ratio data; (v) VAR to model bank group-wise slippage ratio data; and (vi) multivariate regressions for sectoral GNPAs. The banking system aggregates include current and lagged values of slippage ratio, while macroeconomic variables include GDP growth, weighted average lending rate (WALR), CPI (combined) inflation, exports-to-GDP ratio $(\frac{Ex}{GDP})$, gross fiscal deficit-to-GDP ratio $(\frac{GFD}{GDP})$ and REER.

While multivariate regression allows evaluating the impact of selected macroeconomic variables on the banking system's GNPA and capital, the VAR model reflects the impact of the overall economic stress situation on the banks' capital and GNPA ratios, which also take into account the feedback effect. In these methods, the conditional mean of slippage[1] ratio is estimated and it is assumed that the impact of macro-variables on credit quality will remain the same irrespective of the level of the credit quality, which may not always be true. In order to relax this assumption, quantile regression was adapted to project credit quality, in which, in place of conditional mean the conditional quantile was estimated.

The Modelling Framework

The following multivariate models were run to estimate the impact of macroeconomic shocks on the GNPA ratio/ slippage ratio (SR):

System Level Models

The projection of system level GNPAs was done using three different but complementary econometric models: multivariate regression, vector autoregressive (which takes into account the feedback impact of credit quality to

[1] Slippages are fresh accretion to NPAs during a period. Slippage Ratio = Fresh NPAs/Standard Advances at the beginning of the period.

macro-variables and interaction effects) and quantile regression (which can deal with tail risks and takes into account the non-linear impact of macroeconomic shocks). The average of projections derived from these models was used for calculating the impact on CRAR.

- *Multivariate Regression*

  The analysis was carried out on the slippage ratio at the aggregate level for the commercial banking system as a whole.

$$SR_t = \alpha_1 + \beta_1 SR_{t-1} - \beta_2 \Delta GDP_{t-3} + \beta_3 WALR_{t-1} - \beta_4 \left(\frac{EX}{GDP}\right)_{t-2} + \beta_5 \Delta CPI_{t-1} + \beta_6 \left(\frac{GFD}{GDP}\right)_{t-1} - \beta_7 \ln(REER)_{t-1}$$

  Where, $\alpha_1, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and $\beta_7 > 0$.

- *Vector auto regression (VAR)*

  In notational form, mean-adjusted VAR of order p (VAR(p)) can be written as:

$$y_t = A_1 y_{t-1} + \ldots\ldots + A_p y_{t-p} + u_t \quad ; t=0,1,2,3,\ldots.$$

  Where, $y_t = (y_{1t}, \ldots\ldots, y_{Kt})'$ is a (K×1) vector of variables at time t, the A_i (i=1,2,…p) are fixed (K×K) coefficient matrices and $u_t = (u_{1t}, \ldots\ldots, u_{Kt})'$ is a K-dimensional white noise or innovation process.

  In order to estimate the VAR system, slippage ratio, WALR, CPI (combined) inflation, real GDP growth, gross fiscal deficit-to-GDP ratio and REER were selected. The appropriate order of VAR was selected based on minimum information criteria as well as other diagnostics and suitable order was found to be 2. Accordingly, VAR of order 2 (VAR(2)) was estimated and the stability of the model was checked based on roots of AR characteristic polynomial. Since all roots are found to be inside the unit circle, this selected model was found to fulfil the stability condition. The impact of various macroeconomic shocks was determined using the impulse response function of the selected VAR.

- *Quantile Regression*

  In order to estimate the slippage ratio at the desired level of the conditional quantile, the following quantile regression at median (which is the present quantile of the slippage ratio) was used:

$$SR_t = \alpha_1 - \beta_1 SR_{t-1} - \beta_2 \Delta GDP_{t-3} + \beta_3 WALR_{t-1} - \beta_4 \left(\frac{EX}{GDP}\right)_{t-2} + \beta_5 \Delta CPI_{t-1} + \beta_6 \left(\frac{GFD}{GDP}\right)_{t-2}$$

  Where, $\alpha_1, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and $\beta_6 > 0$.

Bank group level models

The projection of bank groups-wise GNPA are done using two different but complementary econometric models: multivariate regression and vector autoregressive. The average of projections derived from these models was used to calculate the impact on CRAR.

- *Multivariate regression*

  In order to model the slippage ratio of various bank groups, the following multivariate regressions for different bank groups were used:

  Public Sector Banks:

  $$SR_t = \alpha_1 - \beta_1 SR_{t-1} - \beta_2 \Delta GDP_{t-2} + \beta_3 WALR_{t-1} - \beta_4(\Delta \text{REER})_{t-3} + \beta_5 \Delta CPI_{t-1} + \beta_6 \left(\frac{GFD}{GDP}\right)_{t-2}$$

  Private Sector Banks:

  $$SR_t = \alpha_1 - \beta_1 SR_{t-1} - \beta_2 \Delta GDP_{t-1} + \beta_3 RWALR_{t-2} - \beta_4(\Delta \text{REER})_{t-3} - \beta_5 \left(\frac{EX}{GDP}\right)_{t-1}$$

  Foreign Banks:

  $$SR_t = \alpha_1 - \beta_1 SR_{t-1} + \beta_2 WALR_{t-2} - \beta_3(\Delta \text{REER})_{t-1} + \beta_4 \Delta CPI_{t-1} - \beta_5 \left(\frac{EX}{GDP}\right)_{t-1} + \beta_6 \text{Dummy}$$

- *Vector auto regression*

  In order to model the slippage ratio of various bank groups, different VAR models of different orders were estimated based on the following macro variables:

  Public Sector Banks: Real GDP growth, CPI (combined)-inflation, WALR and first difference of REER and GFD to GDP ratio of order 2.

  Private Sector Banks: Real GDP growth, real WALR and first difference of REER of order 1.

  Foreign Banks: CPI (combined)-inflation, WALR and REER of order 2.

Sector level models

- *Sectoral multivariate regression*

  The impact of macroeconomic shocks on various sectors was assessed by employing multivariate regression models using the aggregate GNPA ratio for each sector separately. The dependent variables consisted of lagged GNPAs, sectoral GDP growth, CPI (combined)-inflation and WALR.

Impact of exchange rate movement on asset quality

The impact of the exchange rate on the asset quality of SCBs was captured through REER (36 currencies trade based using CPI inflation) which was found to be small. This could be because of merchandise export to GDP ratio and CPI in a way subsumes the effect of REER. Substituting REER with other indicators also did not improve the results.

Estimation of GNPAs from slippages

Derivation of GNPAs from slippage ratios, which were projected from the earlier mentioned credit risk econometric models, were based on the following assumptions: credit growth of 15 per cent; recovery rate of 9.6 per cent, 6.7 per cent, 5.8 per cent and 5.2 per cent during March, June, September and December quarters respectively; write-off rates of 6.3 per cent, 4.4 per cent, 2.8 per cent and 4.8 per cent during March, June, September and December respectively.

Projection of PAT

There are various components of profit after tax (PAT) of banks like interest income, other income, operating expenses and provisions. Hence, these components are projected using different time series econometric models (as given later) and finally PAT was estimated using the following identity:

$$PAT = NII + OOI - OE - Provisions - Income\ Tax$$

where, NII is Net Interest Income, OOI is Other Operating Income and OE is Operating Expenses.

- *Net Interest Income (NII):* NII which is the difference between interest income and interest expenses is projected using the following regression equation:

  $$LNII_t = -\alpha_1 + \beta_1 \times LNII_{t-1} + \beta_2 \times LNGDP\_SA_{t-1} + \beta_3 \times Adv\_Gr_{t-1} + \beta_4 \times Spread_t$$

  where, α_1, $\beta_1, \beta_2, \beta_3$, and $\beta_4 > 0$, LNII is log of NII. LNGDP_SA is seasonally adjusted log of nominal GDP at factor cost. Adv_Gr is the y-o-y growth rate of advances. Spread is the difference between average interest rate earned by interest earning assets and average interest paid on interest bearing liabilities.

- *Other Operating Income (OOI):* The OOI of SCBs was projected using the following regression:

  $$LOOI_t = -\alpha_1 + \beta_1 \times LOOI_{t-1} + \beta_2 \times LNGDP\_SA_t$$

  where, α_1, β_1 and $\beta_2 > 0$.

- *Operating Expense (OE):* The OE of SCBs was projected using the Autoregressive Moving Average (ARMA) model.

- *Provision:* The required provisioning was projected using the following regression:

  $$P\_Adv_t = \alpha_1 + \beta_1 \times P\_Adv_{t-1} - \beta_2 \times RGDP\_Gr_{t-2} + \beta_3 \times GNPA_{t-1} - \beta_4 \times Dummy$$

  where, $\alpha_1, \beta_1, \beta_2, \beta_3$ and $\beta_4 > 0$, P_Adv is provisions to total advances ratio. RGDP_Gr is the y-o-y growth rate of real GDP. GNPA is gross non-performing advances to total advances ratio. Dummy is a time dummy.

- *Income Tax:* The required income tax was taken as 32 per cent of profit before tax, which is based on the past trend of ratio of income tax to profit before tax.

Impact of GNPAs on capital adequacy

Finally, impact on CRAR was estimated based on the PAT estimated as mentioned earlier. RWA growth was assumed at 10 per cent under the baseline, 12.5 per cent under medium risk and 15.5 per cent under severe risk scenarios. Regulatory capital growth was assumed to remain at the minimum by assuming minimum mandated transfer of 25 per cent of the profit to the reserves account. The projected values of the ratio of the non-performing advances were translated into capital ratios using the 'balance sheet approach', by which capital in the balance sheet is affected via provisions and net profits.

Single factor sensitivity analysis – Stress testing

As a part of quarterly surveillance, stress tests are conducted covering credit risk, interest rate risk, liquidity risk *etc.* and the resilience of commercial banks in response to these shocks is studied. The analysis is done on individual SCB as well as on the aggregated-system.

Credit risk

To ascertain the resilience of banks, the credit portfolio was given a shock by increasing GNPA levels for the entire portfolio as well as for few select sectors. For testing the credit concentration risk, default of the top

individual borrower(s) and the largest group borrower was assumed. The analysis was carried out both at the aggregate level as well as at the individual bank level. The assumed increase in GNPAs was distributed across sub-standard, doubtful and loss categories in the same proportion as prevailing in the existing stock of NPAs. However, for credit concentration risk the additional GNPAs under the assumed shocks were considered to fall into sub-standard category only. The provisioning norms used for these stress tests were based on existing average prescribed provisioning for different asset categories. The provisioning requirements were taken as 25, 75 and 100 per cent for sub-standard, doubtful and loss advances respectively. These norms were applied on additional GNPAs calculated under a stress scenario. As a result of the assumed increase in GNPAs, loss of income on the additional GNPAs for one quarter was also included in total losses in addition to additional provisioning requirements. The estimated provisioning requirements so derived were deduced from banks' capital and stressed capital adequacy ratios were derived.

Interest rate risk

Under assumed shocks of the shifting of the INR yield curve, there could be losses on account of the fall in value of the portfolio or decline in income These estimated losses were reduced from the banks' capital to arrive at stressed CRAR.

For interest rate risk in the trading portfolio (HFT + AFS), a duration analysis approach was considered for computing the valuation impact (portfolio losses). The portfolio losses on these investments were calculated for each time bucket based on the applied shocks. The resultant losses/gains were used to derive the impacted CRAR. In a separate exercise for interest rate shocks in the HTM portfolio, valuation losses were calculated for each time bucket on interest bearing assets using the duration approach. The valuation impact for the tests on the HTM portfolio was calculated under the assumption that the HTM portfolio would be marked-to-market.

Evaluation of the impact of interest rate risk on the banking book was done through 'income approach'. The impact of shocks were assessed by estimating income losses on the exposure gap of rate sensitive assets and liabilities, excluding AFS and HFT portfolios, for one year only for each time bucket separately. This reflects the impact on the current year profit and loss and income statements.

Liquidity risk

The aim of the liquidity stress tests is to assess the ability of a bank to withstand unexpected liquidity drain without taking recourse to any outside liquidity support. Various scenarios depict different proportions (depending on the type of deposits) of unexpected deposit withdrawals on account of sudden loss of depositors' confidence and assess the adequacy of liquid assets available to fund them. Another liquidity risk analysis based on the unutilised portion of credit lines which are sanctioned/committed/guaranteed (taking into account the undrawn working capital sanctioned limit, undrawn committed lines of credit and letters of credit and guarantees) was carried out to focus on banks' ability to fulfil the additional and sudden demand for credit with the help of their liquid assets only.

Assumptions in the liquidity stress tests include:

- It is assumed that banks will meet stressed withdrawal of deposits or additional demand for credit through sale of liquid assets only.
- The sale of investments is done with a haircut of 10 per cent of their market value.
- The stress test is done on a static mode.

Stress testing of the derivatives portfolios of select banks

The stress testing exercise focused on the derivatives portfolios of a representative sample set of the top 20 banks in terms of notional value of the derivatives portfolios. Each bank in the sample was asked to assess the impact of stress conditions on its respective derivatives portfolio.

In the case of domestic banks, the derivatives portfolios of both domestic and overseas operations were included. In case of foreign banks, only the domestic (Indian) position was considered for the exercise. For derivatives trade where hedge effectiveness was established it was exempted from stress tests, while all other trades were included.

The stress scenarios incorporated four sensitivity tests consisting of the spot USD/INR rate and domestic interest rates as parameters (Table 2).

Table 2: Shocks for Sensitivity Analysis

	Domestic Interest Rates	
Shock 1	Overnight	**+2.5 percentage points**
	Upto 1yr	**+1.5 percentage points**
	Above 1yr	**+1.0 percentage points**

	Domestic Interest Rates	
Shock 2	Overnight	**-2.5 percentage points**
	Upto 1yr	**-1.5 percentage points**
	Above 1yr	**-1.0 percentage points**

	Exchange rates	
Shock 3	USD/INR	**+20 per cent**

	Exchange Rates	
Shock 4	USD/INR	**-20 per cent**

Scheduled urban co-operative banks

Credit risk

Stress tests on credit risk were conducted on SUCBs using their asset portfolios as at end September 2014. The tests were based on a single factor sensitivity analysis. The impact on CRAR was studied under four different scenarios. The assumed scenarios were:

- Scenario I: 0.5 SD shock on GNPA (classified into sub-standard advances).
- Scenario II: 1 SD shock on GNPA (classified into loss advances).
- Scenario III: 0.5 SD shock on GNPA (classified into sub-standard advances).
- Scenario IV: 1 SD shock on GNPA (classified into loss advances).

Liquidity risk

A liquidity stress test based on a cash flow basis in the 1-28 days time bucket was also conducted, where mismatch (negative gap [cash inflow less than cash outflow]) exceeding 20 per cent of outflow was considered stressful.

- Scenario I: Cash outflows in the 1-28 days time bucket goes up by 50 per cent (no change in cash inflows).
- Scenario II: Cash outflows in the 1-28 days time bucket goes up by 100 per cent (no change in cash inflows).

Non-banking financial companies

Credit risk

Stress tests on credit risk were conducted on non-banking financial companies (including both deposit taking and non-deposit taking and systemically important) using their asset portfolios as at end September 2014. The tests were based on a single factor sensitivity analysis. The impact on CRAR was studied under two different scenarios:

- Scenario I: GNPA increased by 0.5 SD from the current level.
- Scenario II: GNPA increased by 1 SD from the current level.
- Scenario III: GNPA increased by 3 SD from the current level.

The assumed increase in GNPAs was distributed across sub-standard, doubtful and loss categories in the same proportion as prevailing in the existing stock of GNPAs. The additional provisioning requirement was adjusted from the current capital position. The stress test was conducted at individual NBFCs levels as well as at an aggregate level.

Interconnectedness: Network analysis

Matrix algebra is at the core of the network analysis, which is essentially an analysis of bilateral exposures between entities in the financial sector. Each institution's lendings and borrowings with all others in the system are plotted in a square matrix and are then mapped in a network graph. The network model uses various statistical measures to gauge the level of interconnectedness in the system. Some of the most important ones are:

Connectivity: This is a statistic that measures the extent of links between the nodes relative to all possible links in a complete graph.

Cluster Coefficient: Clustering in networks measures how interconnected each node is. Specifically, there should be an increased probability that two of a node's neighbours (banks' counterparties in case of the financial network) are also neighbours themselves. A high clustering coefficient for the network corresponds with high local interconnectedness prevailing in the system.

Shortest Path Length: This gives the average number of directed links between a node and each of the other nodes in the network. Those nodes with the shortest path can be identified as hubs in the system.

In-betweeness Centrality: This statistic reports how the shortest path lengths pass through a particular node.

Eigenvector Measure of Centrality: Eigenvector centrality is a measure of the importance of a node (bank) in a network. It describes how connected a node's neighbours are and attempts to capture more than just the number of out degrees or direct 'neighbours' that a node has. The algorithm assigns relative centrality scores to all nodes in the network and a bank's centrality score is proportional to the sum of the centrality scores of all nodes to which it is connected. In general, for a NxN matrix there will be N different eigen values, for which an

eigenvector solution exists. Each bank has a unique eigen value, which indicates its importance in the system. This measure is used in the network analysis to establish the systemic importance of a bank and by far it is the most crucial indicator.

Tiered Network Structures: Typically, financial networks tend to exhibit a tiered structure. A tiered structure is one where different institutions have different degrees or levels of connectivity with others in the network. In the present analysis, the most connected banks (based on their eigenvector measure of centrality) are in the innermost core. Banks are then placed in the mid-core, outer core and the periphery (the respective concentric circles around the centre in the diagrams), based on their level of relative connectivity. The range of connectivity of the banks is defined as a ratio of each bank's in degree and out degree divided by that of the most connected bank. Banks that are ranked in the top 10 percentile of this ratio constitute the inner core. This is followed by a mid-core of banks ranked between 90 and 70 percentile and a 3rd tier of banks ranked between the 40 and 70 percentile. Banks with a connectivity ratio of less than 40 per cent are categorised as the periphery.

Solvency contagion analysis

The contagion analysis is basically a stress test where the gross loss to the banking system owing to a domino effect of one or more banks failing is ascertained. We follow the round by round or sequential algorithm for simulating contagion that is now well known from Furfine (2003). Starting with a trigger bank i that fails at time 0, we denote the set of banks that go into distress at each round or iteration by Dq, q= 1,2, …For this analysis, a bank is considered to be in distress when its core CRAR goes below 6 per cent. The net receivables have been considered as loss for the receiving bank.

Liquidity contagion analysis

While the solvency contagion analysis assesses potential loss to the system owing to failure of a net borrower, liquidity contagion estimates potential loss to the system due to the failure of a net lender. The analysis is conducted on gross exposures between banks. The exposures include fund based and derivatives ones. The basic assumption for the analysis is that a bank will initially dip into its liquidity reserves or buffers to tide over a liquidity stress caused by the failure of a large net lender. The items considered under liquidity reserves are: (a) excess CRR balance; (b) excess SLR balance; (c) available marginal standing facility; and (d) available export credit refinance. If a bank is able to meet the stress with liquidity buffers alone, then there is no further contagion.

However, if the liquidity buffers alone are not sufficient, then a bank will call in all loans that are 'callable', resulting in a contagion. For the analysis only short-term assets like money lent in the call market and other very short-term loans are taken as callable. Following this, a bank may survive or may be liquidated. In this case there might be instances where a bank may survive by calling in loans, but in turn might propagate a further contagion causing other banks to come under duress. The second assumption used is that when a bank is liquidated, the funds lent by the bank are called in on a gross basis, whereas when a bank calls in a short-term loan without being liquidated, the loan is called in on a net basis (on the assumption that the counterparty is likely to first reduce its short-term lending against the same counterparty).