Financial Stability Report
December 2016
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Foreword

This issue of financial stability report (FSR), the 14th in the series, is being released at a time when global uncertainties are on the rise. The uptick in interest rates in the US and rise in some commodity prices, particularly crude oil, increase the risk of spillover to emerging markets. Domestic macroeconomic conditions remain stable with significant moderation in inflation, though growth momentum has slackened recently. The current account deficit remains modest. Moreover, structural reforms such as the move to a nationwide goods and services tax and legislation of bankruptcy code should impart resilience to the economy. The withdrawal of specified bank notes will impart far reaching changes going forward. It is expected to significantly transform the domestic economy in due course in terms of greater intermediation, efficiency gains, accountability and transparency through increasing adoption of digital modes of payments, notwithstanding the short-term disruptions in certain segments of the economy and public hardship. Overall, there is little room for complacency and it is important to guard against sporadic volatility in financial markets.

Meanwhile, we are adhering to global regulatory standards without losing sight of domestic compulsions. There are various regulatory changes underway globally to strengthen financial stability. At the same time, the global financial crisis has prompted regulators to require banks to undertake stress tests to see if their risk appetite matches their risk taking capacity. The asset quality review of Indian banks and the subsequent corrective actions are steps in this direction. While the domestic banking sector continues to face significant levels of stress partly reflecting legacy issues, on balance, enhanced transparency has helped to reinforce the stability of India's financial system.

Against this backdrop, this FSR reviews the health of the financial system and focuses on some emerging issues of systemic importance while outlining regulatory and consumer protection measures taken in the recent past.

Urjit R. Patel
Governor

December 29, 2016

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List of Select Abbreviations

AFS	Available For Sale
AIF	Alternative Investment Funds
AIFIs	All India Financial Institutions
AMC	Asset Management Company
AMC-MFs	Asset Management Companies – Mutual Funds
AML	Anti-Money Laundering
APY	Atal Pension Yojana
ASCL	Aggregate Sanctioned Credit Limit
ATMs	Automated Teller Machines
AUC	Asset Under Custody
AUM	Assets Under Management
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
BSE	Bombay Stock Exchange
BSI	Banking Stability Indicator
CCIL	Clearing Corporation of India Limited
CERT-In	Indian Computer Emergency Response Team
CIUs	Collective Investment Undertakings
CPC	Central Pay Commission
CPI	Consumer Price Index
CRAR	Capital To Risk-Weighted Assets Ratio
CRAs	Credit Rating Agencies
CRR	Cash Reserve Ratio
CSITE	Cyber Security and IT Examination
CSO	Central Statistics Office
CSPs	Covered Service Providers
DB	Dissemination Board
DER	Debt to Equity Ratio
DICGC	Deposit Insurance and Credit Guarantee Corporation
DPI	Deemed Public Issue
D-SIBs	Domestic Systemically Important Banks
EBIT	Earnings Before Interest & Tax
EBITDA	Earnings before interest, tax, depreciation and amortization
ECB	European Central Bank
ECBs	External Commercial Borrowings
ELCs	Exclusively Listed Companies
EME	Emerging Market Economies
EU	European Union
FALLCR	Facility to Avail Liquidity for Liquidity Coverage Ratio
FBs	Foreign Banks
FCA	Financial Conduct Authority
FCNR (B)	Foreign Currency Non-Resident (Bank)
FDI	Foreign Direct Investment
FDMC	Financial Data Management Centre
FEMA	Foreign Exchange Management Act
FPI	Foreign Portfolio Investments
FRDI	Financial Resolution and Deposit Insurance
FSB	Financial Stability Board
FSDC	Financial Stability and Development Council
FSLRC	Financial Sector Legislative Reforms Commission
FSR	Financial Stability Report
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GEMC	Growth and Emerging Markets Committee
GFCE	Government Final Consumption Expenditure
GFSI	Global Financial Stress Index
GFSR	Global Financial Stability Report
GIC	General Insurance Corporation
GNPA	Gross Non-Performing Advance

G-SIBs	Global Systemically Important Banks
G-SIIs	Global Systemically Important Insurers
GST	Goods and Services Tax
HFT	Held For Trading
HQLAs	High Quality Liquid Assets
HTM	Held To Maturity
IAIS	International Association of Insurance Supervisors
ICR	Interest Coverage Ratio
IFRS	International Financial Reporting Standards
IIF	Institute of International Finance
IMF	International Monetary Fund
Ind AS	Indian Accounting Standards
IOSCO	International Organisation of Securities Commissions
IRAC	Income Recognition, Asset Classification and provisioning
IRDAI	Insurance Regulatory and Development Authority of India
IRRBB	Interest Rate Risk in the Banking Book
KYC	Know Your Customer
LC	Life Cycle
LCR	Liquidity Coverage Ratio
LE	Large Exposure
LTA	Look Through Approach
MCA	Ministry of Corporate Affairs
MF	Mutual Fund
MoF	Ministry of Finance
MSCI	Morgan Stanley Capital International
MSME	Micro Small and Medium Enterprise
NBFCs	Non-Banking Financial Companies
NBFCs-D	Non-Banking Financial Companies-Deposit Accepting
NBFCs-ND	Non-Banking Financial Companies-Non-Deposit Accepting
NBFCs-ND-SI	Non-Banking Financial Companies-Non-Deposit Accepting-Systemically Important
NDTL	Net Demand and Time Liabilities
NGNF	Non-Government Non-Financial
NHAI	National Highways Authority of India
NHB	National Housing Bank
NPAs	Non-Performing Assets
NPLL	Normally Permitted Lending Limit
NPS	National Pension System
NSE	National Stock Exchange
NTNI	Non-Traditional Non-Insurance
ODIs	Offshore Derivative Instruments
OECD	Organisation for Economic Co-operation and Development
OPEC	Organisation of the Petroleum Exporting Countries
PAT	Profit After Tax
PBT	Profit Before Tax
PCE	Partial Credit Enhancement
PFCE	Private Final Consumption Expenditure
PFRDA	Pension Fund Regulatory and Development Authority
PMJDY	Pradhan Mantri Jan Dhan Yojana
PMJSBY	Pradhan Mantri Jeevan Suraksha Bima Yojana
PMLA	Prevention of Money Laundering Act
PNs	Participatory Notes
POS	Point of Sales
PPI	Prepaid Payment Instrument
PSBs	Public Sector Banks
PSS	Payment and Settlement Systems
PVBs	Private Sector Banks
QE	Quantitative Easing

RBI	Reserve Bank of India
RCAP	Regulatory Consistency Assessment Program
RCs	Reconstruction Companies
RoA	Return on Assets
RoE	Return on Equity
RRBs	Regional Rural Banks
RTGS	Real Time Gross Settlement
S&P	Standard and Poor
SBI	State Bank of India
SBN	Specified Bank Notes
SCBs	Scheduled Commercial Banks
SCs	Securitisation Companies
SD	Standard Deviation
SEBI	Securities and Exchange Board of India
SIFIs	Systemically Important Financial Institutions
SIT	Special Investigation Team
SLCCs	State Level Co-ordination Committees
SLR	Statutory Liquidity Ratio
SMA	Special Mention Account
SPARC	Supervisory Program for Assessment of Risk and Capital
SUCBs	Scheduled Urban Co-Operative Banks
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TBTF	Too Big to Fail
TLAC	Total Loss-Absorbing Capacity
TLTRO	Targeted Longer-Term Refinancing Operations
Y-o-Y	Year-on-Year

Overview

Macro-Financial Risks

Global Economy and Markets

Global recovery remains fragile amidst slowdown in trade, rising tendency towards protectionism and slower growth in productivity. Global financial markets continue to face elevated levels of uncertainty, notwithstanding the resilience exhibited in overcoming the outcomes of Brexit referendum and the US presidential election.

While the unconventional monetary policy measures have so far fallen short of achieving their intended objectives, the systemic central banks in advanced economies are unlikely to end them abruptly because of the concerns on potential impact on financial stability and limited scope for alternative measures on fiscal front. However, financial markets would continue to grapple with headwinds from uptick in US interest rates.

Domestic Economy and Markets

Domestic macroeconomic conditions remain stable with significant moderation in inflation. Moreover, reduced policy uncertainty and legislative and tax reforms such as implementation of goods and services tax (GST) and enactment of bankruptcy laws are expected to reinforce the benefits from the strong macro fundamentals. The withdrawal of legal tender status of specified bank notes (SBNs) could potentially transform the domestic economy. While the overall risks to the corporate sector moderated in 2016-17, concerns remain over its recovery.

India's external sector reflects significant improvement in terms of contraction of current account deficit, although there may be concerns on account of weakening of remittance inflows. While the redemption of foreign currency deposits raised in late 2013 was managed relatively smoothly, volatility in capital flows emanating from global events may add to exchange rate pressure.

Domestic debt and equity markets witnessed foreign portfolio investment outflows since October 2016 reflecting expectations of increase in the interest rates by the US Fed. The domestic mutual funds have emerged as a counter balance to foreign portfolio investors as they increased their net investments significantly.

Financial Institutions: Soundness and Resilience

The banking stability indicator (BSI) shows that the risks to the banking sector remained elevated due to continuous deterioration in asset quality, low profitability and liquidity. The business growth of scheduled commercial banks (SCBs) remained subdued with public sector banks (PSBs) continuing to lag behind their private sector peers. System level profit after tax (PAT) contracted on y-o-y basis in the first half of 2016-17.

The GNPA (gross non-performing advances) ratio of SCBs increased to 9.1 per cent in September 2016 from 7.8 per cent in March, pushing the overall stressed advances ratio to 12.3 per cent from 11.5 per cent. The large borrowers registered significant deterioration in their asset quality.

Stress Tests and Network Analysis

The macro stress test shows that GNPA ratio of SCBs may increase further if macroeconomic conditions deteriorate sharply. The PSBs may record the highest GNPA ratio and lowest capital to risk-weighted asset ratio (CRAR) among bank-groups although the CRAR at the system as well as bank-group levels may remain above the required regulatory minimum. Given the higher level of impairment, SCBs may remain risk averse in the near future as they focus on cleaning up their balance sheets and their capital

positions may remain insufficient to support higher credit growth.

Asset quality of scheduled urban co-operative banks (SUCBs) deteriorated. Asset quality of the non-banking financial companies (NBFCs) also worsened.

The degree of interconnectedness in the banking system measured by the connectivity ratio showed a declining trend. SCBs were the dominant players accounting for nearly 57 per cent of the total bilateral exposures followed by NBFCs. On a net basis, asset management companies managing mutual funds (AMC-MFs) followed by the insurance companies were the biggest fund providers in the system while NBFCs followed by SCBs were the biggest receivers of funds.

Financial Sector Regulation and Infrastructure

With the implementation of global regulatory reforms most of the major international banks have become more resilient in terms of capital and liquidity. However, risks of divergence from the demanding global standards amidst discriminatory treatment of foreign financial institutions seem to have increased. Scaling down on correspondent banking activities by some of the major global banks due to regulatory and profitability concerns may discourage formal financial intermediation channels to reach out to financially underserved parts of the world. At the same time, some risks inherent in banks may be getting transferred to other segments of the financial markets due to increased regulatory scrutiny and elevated capital requirements for banks.

While regulatory measures on partial credit enhancement will support the corporate bond market in India, the guidelines on market mechanism and large exposures will help in reducing banks' exposures to large corporates. The macroprudential and other regulatory measures are expected to enhance transparency in the functioning of financial markets and empower customers with wider product-choices and more effective mechanism for grievance redressal.

The Securities and Exchange Board of India (SEBI) has taken several measures that include tightening of insider trading norms and enhancing transparency in the policies and procedures adopted by credit rating agencies (CRAs).

The guidelines issued by Insurance Regulatory and Development Authority of India (IRDAI) seek to address operational aspects such as monitoring the foreign direct investment in insurance sector, approval of share transfer, and ceiling of holdings on various classes of investors, among others.

The National Pension System (NPS) continued to gain traction in terms of the number of subscribers as well as assets under management (AUM). Introduction of two new life cycle funds and creation of a separate asset class for alternate investment are expected to provide more options to investors in pension schemes.

Assessment of Systemic Risk

India's financial system remains stable. The stress on banking sector, particularly the PSBs remain significant. The results of the latest systemic risk survey (Annex 1) conducted by the Reserve Bank in October 2016 indicated that among risks affecting the financial system, 'global risks' were perceived to be in 'medium' category while average quality of credit was expected to remain unchanged over the next quarter.

Chapter I

Macro-Financial Risks

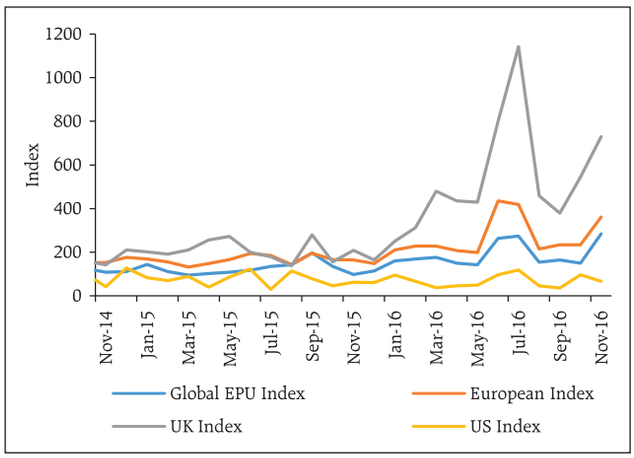
Global financial markets continue to face elevated levels of uncertainty notwithstanding resilience to the outcomes of Brexit referendum and the US election. While the unconventional monetary policy measures have so far fallen short of achieving their intended objectives, most central banks concerned in advanced economies are unlikely to end them abruptly because of limited scope for alternative measures on the fiscal front. A negative feedback loop arising from productivity and global trade slowdowns and rising protectionism is adding to the pessimistic outlook on global recovery. Furthermore, the uptick in US interest rates poses a significant risk to emerging financial markets.

While the spillover of global events on the domestic economy may continue to be significant, reduced policy uncertainty, along with tax and legislative reforms will help in realising the benefits from the strong macroeconomic fundamentals. The transition to the nationwide goods and services tax (GST) is guided by the goal of minimal impact on consumer price inflation, even as any reversal in global commodity prices will have to be carefully embedded in the overall considerations of macroeconomic policy. Other initiatives such as the withdrawal of legal tender status of specified bank notes (SBNs) could potentially transform the domestic economy. While the financial performance of the corporate sector has improved in 2016-17, the risk of lower turnover remains. In the external sector, the narrowing of the current account deficit partly reflects the external spillovers in the form of sluggish trade growth. The decline in the flow of remittances is also a concern. Going ahead, capital flow, more than trade, is likely to influence exchange rates.

Global backdrop

1.1 The June 2016 issue of the Financial Stability Report (FSR) was released around the time of the Brexit referendum, while this time, the global financial markets are coming to terms after being rattled by the uncertainties over the US election. Although financial markets across the world were significantly impacted immediately after the unexpected outcome of the Brexit referendum, the turmoil turned out to be short lived. This 'Brexit bounce' was mainly attributed to timely communication and effective contingency plans by authorities, especially the central banks. Similar resilience was witnessed in global financial markets subsequent to the US election. Subsequently, in early December 2016, the markets appeared to have shrugged off the outcome of referendum over constitutional reforms in Italy. However, there is still a lack of clarity over the long term implications of these mega events and other geo-political challenges (Chart 1.1).

Chart 1.1: Policy uncertainty index – global trends



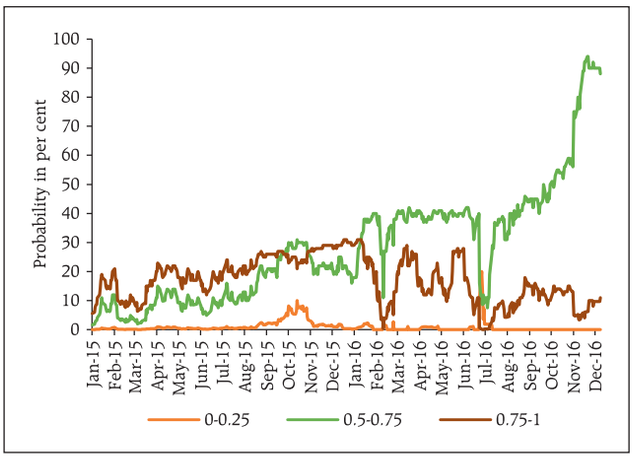
Source: Bloomberg.

1.2 On its part the US Fed, systemically the most important central bank, has been continuously trying to prepare markets for reversal of the extant monetary policy stance, even as concerns related to financial stability amidst possibilities of extreme market reactions were still seen to be influencing the monetary policy decisions. Its decision in December 2016 to increase interest rates comes with a relatively clearer recognition of improved prospects for labour market and economic growth. It is noteworthy that the preceding period of almost one year since the last increase in December 2015 was marked by a tendency to retreat from the expected course based on previous guidance linked to economic data. Nevertheless, the FOMC's December 2016 statement has been perceived as hawkish. Uncertainty has been reflected in the volatility in probability of interest rate changes during the period (Chart 1.2).

1.3 Asset prices were also seen to be influenced by the heightened risk appetite levels as search for higher yields is still evident (Chart 1.3). Although, there had been a hardening of yields in the US ahead of the Fed meeting in December 2016, the 10 year US treasury yields are still below the levels seen during the 'taper tantrum' in 2013. Political risks are playing out differently on bond prices in different jurisdictions, as could be seen in the US after the elections and in the UK post Brexit.

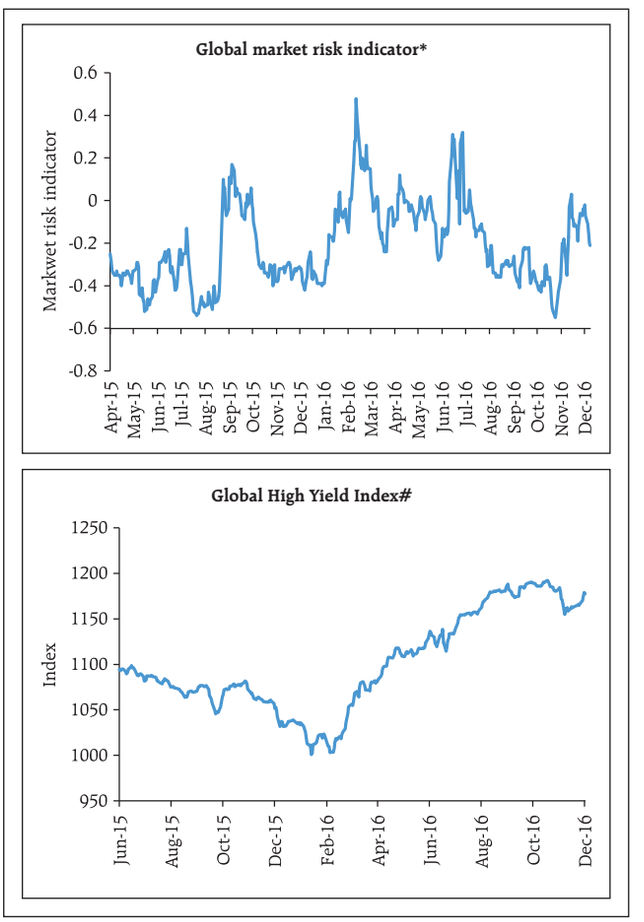
1.4 Meanwhile, a debate is raging over the efficacy of monetary policy and the need to shift focus to fiscal policy. For instance, the monetary policy stimulus seems to be hitting a *cul de sac* in Japan, and the Eurozone banks seem to be showing little interest in targeted longer-term refinancing operations (TLTRO)[1] despite the European Central Bank (ECB) offering substantial incentives to borrowing banks. Such instances also highlight the financial frictions that are coming in the way of desired monetary policy transmission. Rather, the

Chart 1.2: Trends in expectations about changes in US Fed fund rates



Note: Data updated as on December 9, 2016.
Source: Bloomberg.

Chart 1.3: Trends in risk appetite Global High Yield Index#



Note: * Bank of America Merrill Lynch GFSI Market Risk Index is a measure of future price swings implied by options trading in global equities, interest rates, currencies and commodities. Levels greater/less than 0 indicate more/less stress than normal.
Bloomberg Barclays Global High Yield Total Return Index Value Unhedged USD.
Source: Bloomberg; IIF emerging markets portfolio flows tracker.

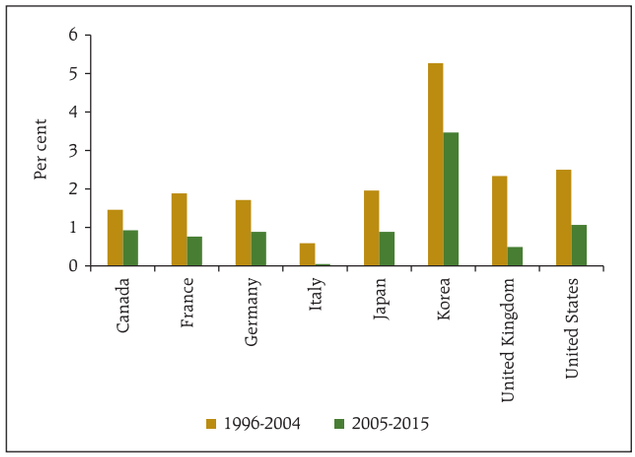
[1] Targeted longer-term refinancing operations (TLTRO-II).

considerably large size of the fiscal stimulus required[2] – seen against the constrained fiscal space in many economies – may incentivise the political economy to continue to rely on a loose monetary policy stance. For instance, ECB's recent decision to cut monthly bond buying programme, while extending the life of QE also confirmed the dilemmas within the common currency area. Besides, the efficacy and quantum of fiscal stimulus required may also depend upon the 'multiplier' of the intended fiscal measures[3].

1.5 For the real economy, tapering benefits from wage arbitrage and the unintended effects of automation aimed at scaling up efficiency, are showing profound impact on labour market dynamics. Prolonged recession has also led to some structural damage to the labour market[4]. In addition, a slowdown in productivity growth (Chart 1.4) has contributed to weak economic growth, probably on account of a credit boom-induced reallocation of labour into lower productivity growth sectors.[5] Thus, this context also calls for alternative solutions to lessen the burden on monetary policy.

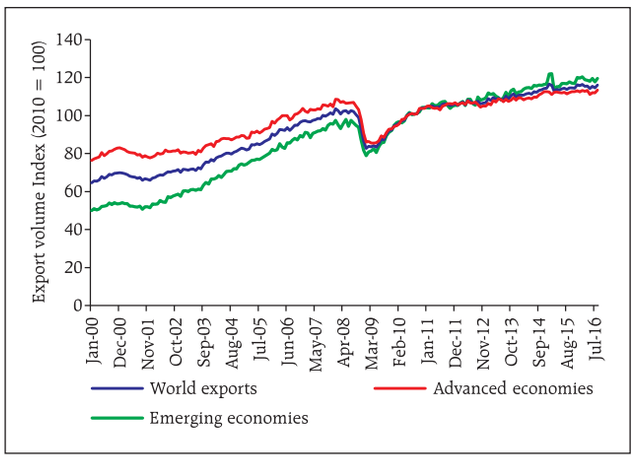
1.6 The last FSR had emphasised the need for assessing the growth trends in world trade in terms of volume as well as in terms of values measured in US dollars. Global trade in volume terms has been stagnant since 2015 (Chart 1.5). While the view that the creeping protectionism has started dragging the growth in world economy is gaining traction, the long-term trends, such as the shortening of global supply chains, demographics and the increasing role of digital trade, could also be playing an important role. However, there is enough evidence that growing non-trade barriers and opposition to trade pacts are compelling businesses to change their strategies

Chart 1.4: Productivity* slowdown in advanced economies



Note: *GDP per hour worked; percentage change at annual rate.
Source: Compendium of Productivity Indicators (2016), OECD.

Chart 1.5: Trends in world trade



Source: Netherlands Bureau for Economic Policy Analysis

[2] Biven, Josh (2016), 'Why is recovery taking so long – and who's to blame?' Economic Policy Institute, August.

[3] For instance, impact of tax cuts may be different from that of fiscal spending on infrastructure.

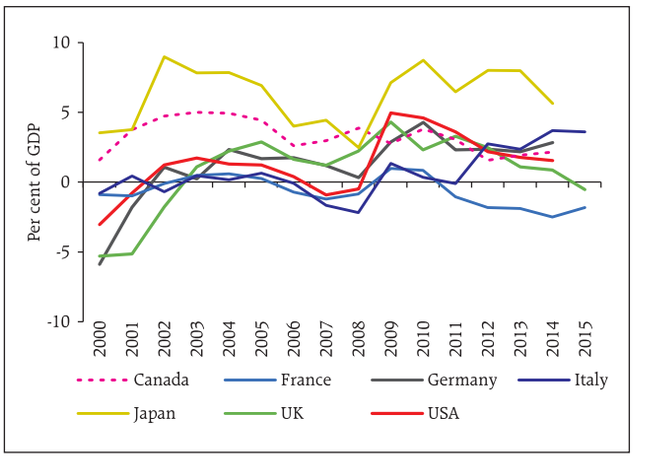
[4] Reifschneider, Dave, William Wascher, and David W. Wilcox (2015). 'Aggregate Supply in the United States: Recent Developments and Implications for the Conduct of Monetary Policy,' *IMF Economic Review,* vol. 63 (May).

[5] Borio, C., E. Kharroubi, C. Upper, and F. Zampolli (2016). 'Labour reallocation and productivity dynamics: financial causes, real consequences', *BIS Working Papers* No. 534, January.

from globalisation to 'localisation' – not on the basis of sound economic logic of cost-benefit analysis but out of respect for political economy compulsions. Whether the resultant cost-push inflation is desirable for those countries looking for higher inflation is a moot point.

1.7 With slack in demand, growing corporate savings too is a matter of concern. There is some evidence of the strong link between corporate net lending and macroeconomic performance suggesting significant leakages from aggregate demand[6] (Chart 1.6). In the broader context, there is a need to address the growing pessimism, given the potentially influential role played by sentiments in shaping future outcomes (Box 1.1).

Chart 1.6: Corporate savings in select major economies



Source: OECD.

Box 1.1: Countercyclical Thinking

The response to the global financial crisis, to some extent, has resulted in an emphasis on 'de-risking' for the sake of financial stability. However, global financial markets play by the cardinal principle of regulatory dialectics (see FSR, June 2013), and risk taking is an inherent part of financial market activity. Whether the re-regulation is able to strike a balance between risk appetite and risk capacity sufficiently is a moot point. It is possible that the practitioners of finance may become hostage to established theories and concepts generating 'self-fulfilling prophesies' that tend to lean towards pessimism in the current scenario. For instance, issues such as corporate leverage, dwindling capex, gaps in pension funds, interpretation of market liquidity and dependence on market forecasts, probably, need to be discerned differently.

First, corporate leverage *per se* is neither good nor bad. However, leverage amplifies both the good and bad outcomes of corporate financial decisions depending on whether the income generating capacity is higher than the cost of capital, and whether the productivity of the assets financed by leverage is growing faster than the pace of income growth. In any case, 'financing' decisions may not always capture these outcomes *ex-ante*. Similarly, the secular decline in capex needs to be viewed against the changing structure of many economies, where capex is shifting to less capital intensive sectors such as technology and R&D, reflecting an effort at improving the efficiency of capital.

Then, given the ultra-low or negative interest rates, there are worries over pension fund deficits. Not that these concerns are misplaced but is there an alternative way of looking at the problem? It has been suggested that there should be a move away from market based valuation (using the 'risk free' yield). Given the contributions made to the fund (the principal) and future benefits (the present value of cash flows at the time of retirement), one can calculate the accrual rate which in turn can be used to arrive at the present value of the fund's liabilities that can be matched with the market value of the assets held.

Technological advances and constant information flows are also changing the way in which volatility used to be viewed. Even as the jury is still out on the reasons for the fall of the British pound during the illiquid 'graveyard shift,'[7] the increased frequency and

(Contd...)

[6] Gruber, Joseph W., and Steven B. Kamin (2015). 'The Corporate Saving Glut in the Aftermath of the Global financial Crisis', International Finance Discussion Papers 1150.

[7] The sharp fall of the pound during early October 2016 happened during Asian trading hours when the US and European traders were away.

size of market moves need to appreciate the dynamics of market liquidity and impact costs. In other words, traders and electronic trading mechanisms can add as much to liquidity as they take it away.

Lastly, the role and credibility of market forecasts as an aid for decision making needs to be rethought, especially in the light of the experience with the Brexit and the US presidential polls. The market gyrations around these events indicate that the influence of uncertainty and expectations around potentially disruptive outcomes of certain events on market moves may exceed the actual effect on the market when the same unexpected outcomes become realities *ex post.*

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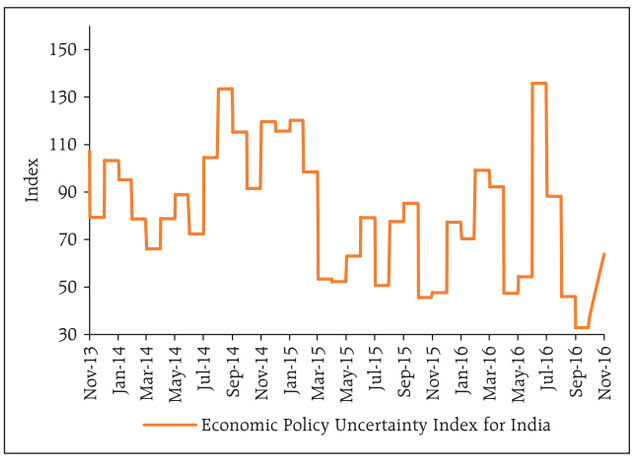
1. Michael J. Mauboussin, Dan Callahan, Darius Majd (2015), 'Capital Allocation: Evidence, Analytical Methods and Assessment Guidance', Credit Suisse.

2. Con Keating, Ole Settergren, Andrew Slater (2012), 'Keep your lid on! A financial analyst's view of the cost and valuation of DB pension provision', Long Finance.

Domestic economy

1.8 Given the global backdrop, the spillovers to the domestic economy and financial markets are significant though not insurmountable in view of the continued strength of macro fundamentals. One redeeming feature of Indian economy is the relatively lower levels of policy uncertainty (Chart 1.7). The consensus arrived at in implementing the nationwide goods and services tax (GST) has been a significant development with a huge potential for promoting domestic trade and growth. The enactment of the national bankruptcy law is another significant reform, though commensurate steps for capacity building will be the key to effective implementation of these measures. Pressure on the rupee on account of redemption of foreign currency deposits – raised towards the end of 2013 to contain rupee volatility – has been dealt with relative ease. The 'one time fund infusion scheme' approved by the Indian government will enable the National Highways Authority of India (NHAI) to extend loans to eligible, languishing road projects to ensure their completion on a priority basis. India's ranking in the Global Competitiveness Index for 2016-17, released by the World Economic Forum (WEF), improved 16 places to 39, making it the fastest riser up the ranks among 138 countries surveyed. This is the second year in a row that India has jumped 16 spots. India also ranks 130 out of 189 countries in the ease of doing business released by World Bank, moving up four places from last year's adjusted ranking of 134. The newly started ranking of states[8] in terms of their business-friendly policies could encourage a healthy competitive environment in the Indian federal structure leading to further improvement in the country's international rankings on these parameters.

Chart 1.7: Economic policy uncertainty index – India



Source: Bloomberg.

[8] 'Ease of Doing Business Reforms Ranking 2015-16,' conducted by the Department of Industrial Policy and Promotion (DIPP), Government of India and the World Bank.

1.9 Amidst this, the government's resolve to take on the shadow economy (Box 1.2) through various measures are expected to deliver net direct and collateral benefits to the economy in the long run, and will also improve India's international standing. Such measures include, among others, the income disclosure scheme, setting up of a Special Investigation Team (SIT), enacting a law regarding undisclosed foreign income and assets, amending the Double Taxation Avoidance Agreement between India and Mauritius and India and Cyprus, reaching an understanding with Switzerland for getting information on bank accounts held by Indians[9] and amending the Benami Transactions Act. Further, the initiatives for encouraging the use of non-cash and digital payments and withdrawal of legal tender status of specified bank notes (SBNs), accompanied by changes in income tax rules are expected to result in a shift away from the significant dependence of Indian economy on cash-based transactions[10].

Output growth, external trade and inflation

1.10 In 2016-17:Q2, real gross domestic product (GDP) at market prices showed a higher growth of 7.3 per cent as compared with 7.1 per cent in the previous quarter. GDP growth rate, however, was lower as compared to the corresponding quarter of previous year, largely due to contraction in fixed investment. Capex spending remains a concern due to excess available capacity and financial stress in

Box 1.2: System D

In recent literature and usage, shadow economy is also referred to as System D. Though estimating the size of the shadow economy is challenging, according to the Organisation for Economic Co-operation and Development (OECD) half of the world's workers were employed in the shadow economy in 2009 (this number is likely to grow to two-thirds by 2020). According to an article published in *Foreign Policy,* the global black market approximately valued at US$ 10 trillion, is the world's second largest "economy" and is also the fastest growing one (Neuwirth, 2011). The term shadow economy may refer to black economy or black money. There is no uniform definition of black money in economic theory and various other terms such as 'unaccounted income', 'black income', 'dirty money', 'black wealth', 'underground wealth', 'black economy', 'parallel economy' are also used in this regard. In the Indian context, the White Paper on Black Money, released by Department of Revenue, Ministry of Finance in 2002 adopted a definition of black money "as assets or resources that have neither been reported to the public authorities at the time of their generation nor disclosed at any point of time during their possession."

One of the many problems with the shadow economy is that it renders official statistics unreliable and severely impacts policy formulations by governments. Besides, the loss of tax revenues may force governments to hike tax rates, which in turn may further encourage greater activity in the shadow economy. As per some analyses, in the US a 1 percentage point increase in personal income tax rates, other things being equal, tends to increase the size of the shadow economy by 1.4 percentage points. Similarly, a 1 point increase in a regulation index (ranging from 1 to 5) corresponds to a 10 per cent increase in the shadow economy. There is also evidence in some economies of dynamic mobility between the official and shadow economies depending on the relative 'net' wage levels; this in turn is an indication of the influence of tax rates and rigidities in labour markets on the size of the official versus shadow economies.

While the impact of the shadow economy on direct tax revenues is a concern, its role in contributing to indirect taxes and economic growth is debatable. The best way to contain the shadow economy is to improve governance and quality of public services, avoid excessive regulations, impose stringent penalties and have a compatible tax structure.

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[9] With respect to the Hong Kong and Shanghai Banking Corporation (HSBC).

[10] (Source:http://finmin.nic.in/press_room/2016/press_cancellation_high_denomination_notes.pdf).

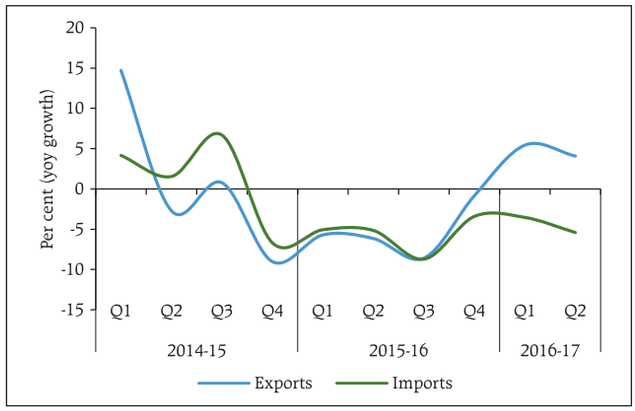
large brown field projects, especially in sectors such as iron and steel, construction, textiles and power amidst an environment of fragile global growth. Growth in exports and contraction in imports continued in 2016-17:Q2 (Chart 1.8). However, downside risk to export demand remains.

1.11 The overall consumption expenditure picked up sharply in 2016-17:Q2 steered by both private final consumption expenditure (PFCE) and government final consumption expenditure (GFCE). Downside risks to GDP growth in the near term persist through short-term disruptions in economic activity in cash-intensive sectors amid withdrawal of legal tender status of SBNs (Reserve Bank of India (2016), Fifth Bi-monthly Monetary Policy Statement, 2016-17[11]).

1.12 The immediate financial impact of withdrawal of SBNs, announced on November 8, 2016 was a surge in bank deposits with a commensurate fall in currency in circulation. In terms of macroeconomic impact, there is a dampening effect on inflation with a temporary loss of momentum in the growth of real gross value added (GVA). The Reserve Bank has revised downward the GVA growth for 2016-17 to 7.1 per cent from 7.6 per cent, with evenly balanced risks. However, the precise impact of the same on the economy may be difficult to capture at this stage and the disruptions in the cash intensive sectors of the economy are likely to be transitory. In the interim, policy measures to sterilise the impact of excess liquidity resulted in higher investment in government securities by the banking system and a fall in Reserve Bank's investments in government securities as also credit to commercial banks. Notwithstanding the short-term disruptions in certain segments of the economy, withdrawal of SBNs is expected to significantly transform the domestic economy in the long run in terms of greater intermediation and increasing efficiency gains through adoption of digital modes of payments.

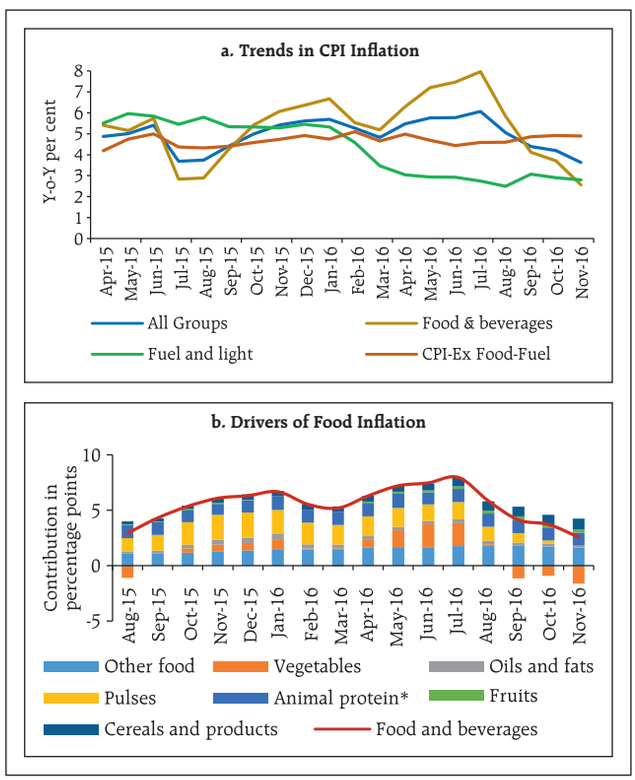
1.13 Retail inflation measured by consumer price index (CPI) eased, though inflation in sugar and protein-rich items such as pulses remained elevated. Normal monsoon conditions and pro-active supply management measures by the Government significantly helped in reining in the food inflation (Chart 1.9). However, stickiness in CPI inflation-

Chart 1.8: Trends in growth of exports and imports



Source: CSO.

Chart 1.9: Trends in inflation



Note: * Animal protein (in Chart 1.9 – b) includes milk and milk products, egg, meat and fish.
Source: CSO.

[11] Reserve Bank of India (2016), Fifth Bi-monthly Monetary Policy Statement, 2016-17, available at https://rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=38818

excluding food and fuel, could set a floor to headline inflation[12]. Going ahead, unfavourable base effect, likely firming up of crude prices after the agreement between OPEC and non-OPEC countries on production cut and exchange rate volatility emanating from external factors may result in inflationary pressures.

Impact of GST and 7th central pay commission (CPC) award on inflation

1.14 In the CPI basket, a majority of the items (food group) are outside the purview of GST.[13] Although a partial impact on services may be observed post its implementation, the framework put in place for GST is guided by the principle that the transition should have a minimal impact on CPI inflation.

1.15 Among the recommendations of the 7th central pay commission (CPC), the government is yet to decide on accepting the hike in allowances. The implementation of house rent allowance (HRA) will affect the magnitude of the direct effect of house rent on CPI but this will largely be statistical in nature. The indirect impact arising out of aggregate demand effects and rise in inflation expectations, however, may warrant some caution.

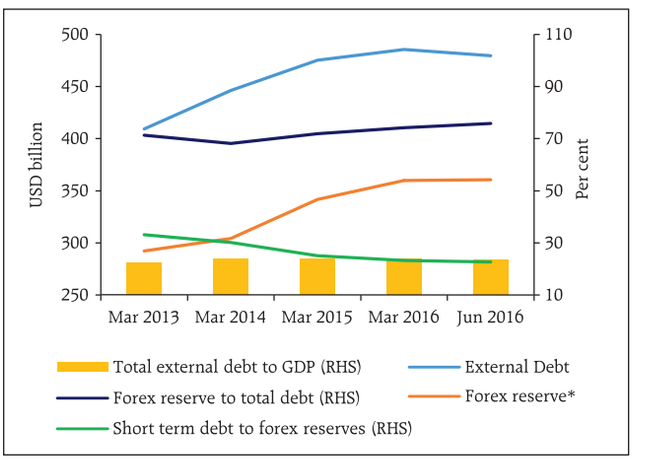
Fiscal deficit

1.16 As per the union budget, fiscal deficit was projected at 3.5 per cent of GDP during 2016-17. While lower-than-expected revenues through disinvestments and telecom spectrum auctions may stretch the fiscal deficit, the additional revenue from measures such as income disclosure schemes may compensate for this. Though the short-term impact of the measures undertaken to contain the shadow economy and tax evasion, both in terms of changes in GDP and revenues, is difficult to capture, these measures are expected to have a positive impact both on GDP and on fiscal deficit in the long run.

External sector indicators

1.17 India's external sector vulnerability indicators improved in 2016-17:Q1. The current account deficit has narrowed to 0.6 per cent in 2016-17:Q2 from 1.1 per cent of GDP in 2015-16. External debt – both in absolute and relative terms (as ratio to GDP), has declined and the foreign exchange reserves now cover a larger portion of total external debt and about 11 months of imports (Chart 1.10).

Chart 1.10: India's external sector indicators



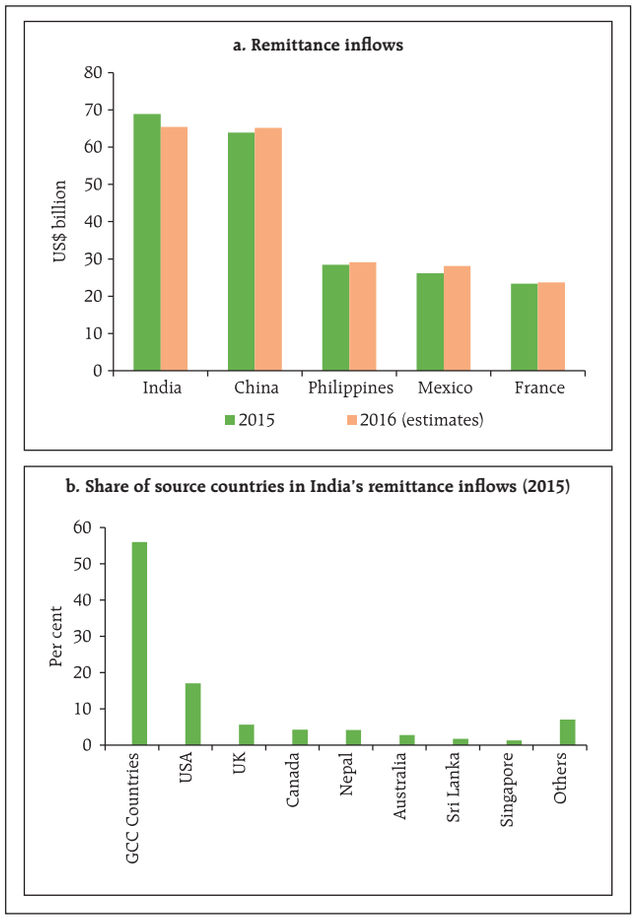
Note *: As on December 16, 2016.
Source: RBI and Government of India.

[12] Reserve Bank of India (2016), Fifth Bi-monthly Monetary Policy Statement, 2016-17.

[13] Edited transcript of the Reserve Bank of India's post-policy conference call with the media, August 9, 2016.

1.18 One potential source of stress in India's balance of payments is the decline in the flow of remittances. Globally, remittance flows are expected to increase only marginally in 2016.[14] Projections suggest a decline in remittances only in the case of India in the top five remittance receiving countries. A major portion of remittances to India originate from the Gulf countries (Chart 1.11). Low oil prices, subdued growth in source countries and change in labour policies in some Gulf Cooperation Council (GCC) countries, among other factors, have adversely affected such flows to India.

Chart 1.11: Trends in India's remittance inflows

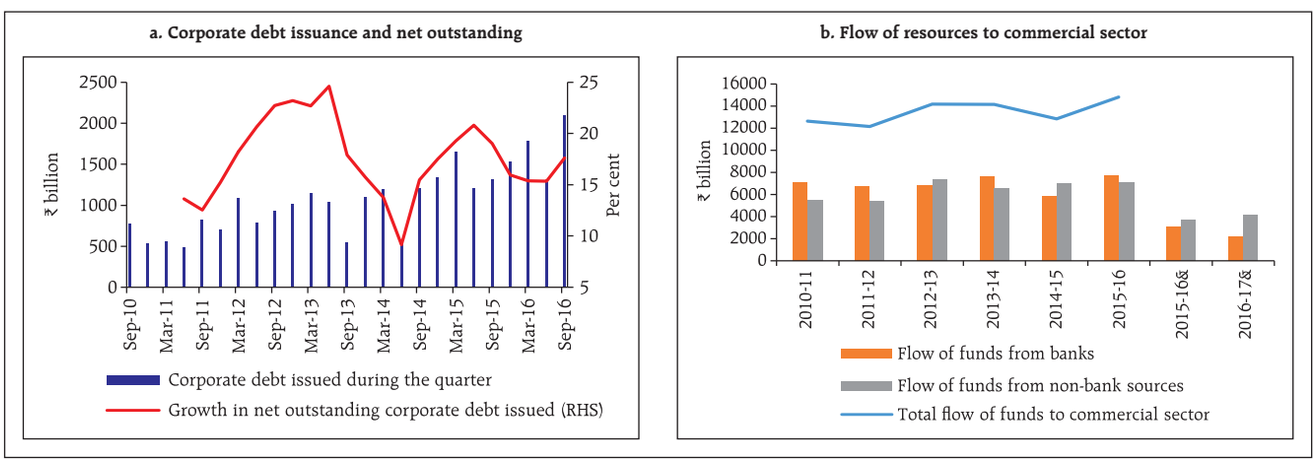


Source: The World Bank.

Credit flow to the commercial sector

1.19 While growth in bank credit has continued to decline (see Chart 2.1, Chapter II), corporate debt issuance has shown robust trends (Chart 1.12a). The total flow of resources from the financial sector to the commercial sector remained sluggish during the first half of the current financial year, mainly due to the reduced contribution from banks (Chart 1.12b). The overall resource mobilisation through the primary securities market witnessed increase during the first half of financial year 2016-17 as compared to

Chart 1.12: Resource mobilisation from bank and non-bank sources

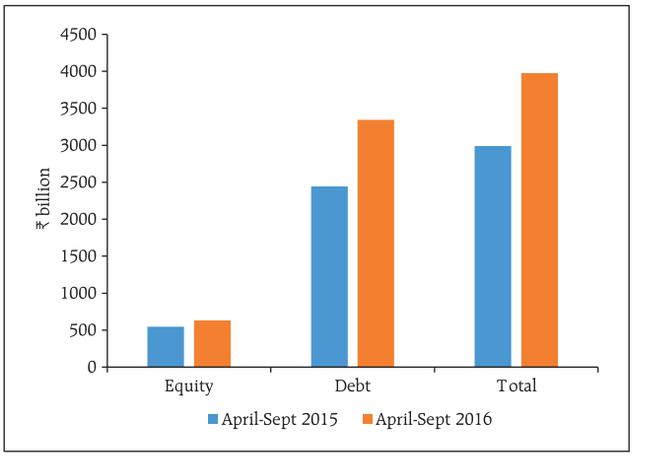


Note: & Refers to data for 2015-16 and 2016-17 for the period from April 1 to November 11. The figures for non-bank sources include domestic as well as foreign sources.
Source: RBI, SEBI and staff calculations.

[14] World Bank (2016), 'Trends in Remittances, 2016: A New Normal of Slow Growth', October 6. (http://blogs.worldbank.org/peoplemove/trends-remittances-2016-new-normal-slow-growth%20).

the corresponding period of previous financial year, especially in the public and rights issuance of debt securities (Chart 1.13).

Chart 1.13: Funds raised through the primary market



Note: Include public issue, rights issue, qualified institutional placement, preferential allotment and private placement
Source: SEBI.

Asset prices

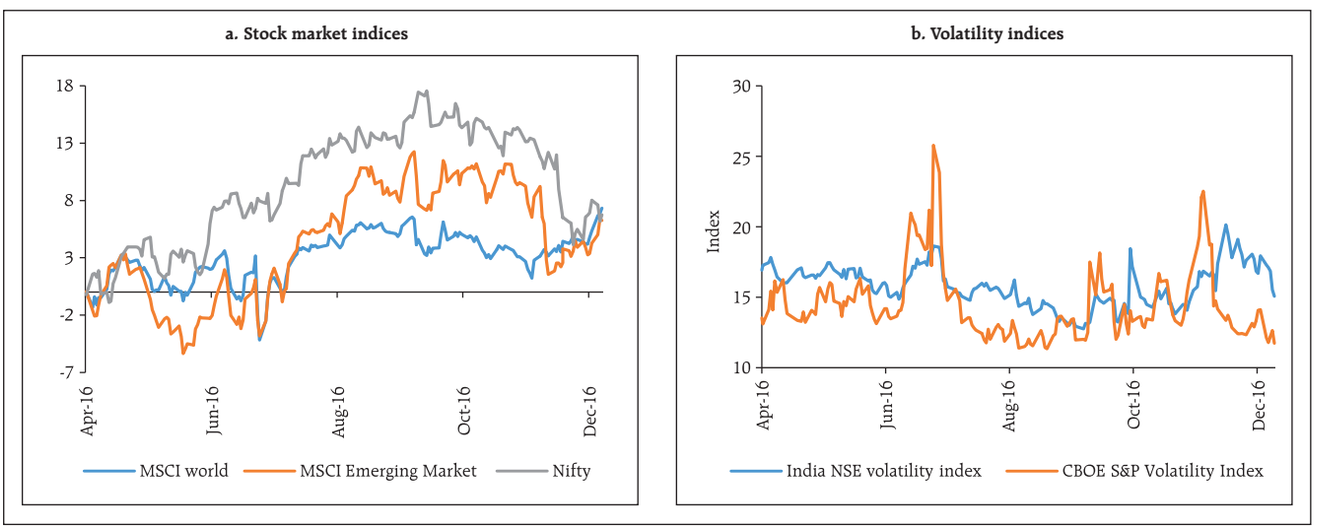
Stock prices

1.20 The NSE-Nifty, one of India's major benchmark indices, outperformed both the MSCI World and Emerging Market indices from the beginning of this financial year till November 2016 (Chart 1.14 a). The NSE Volatility Index was also observed to remain in a relatively narrow range as compared to the S&P Volatility Index for the US markets during the period since April 2016 till November 2016 (Chart 1.14 b).

Bond markets and currency movements

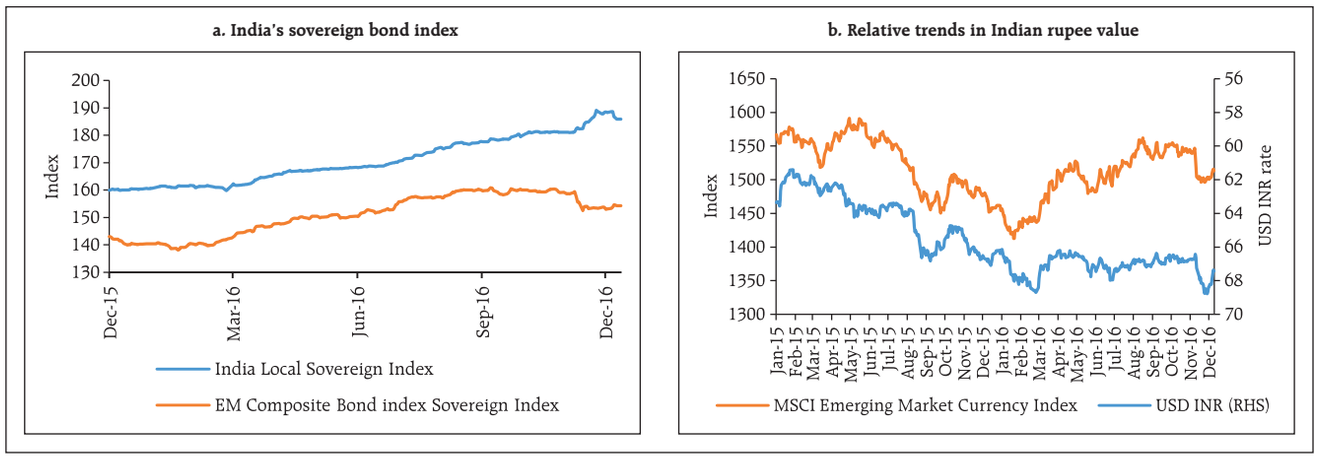
1.21 The Indian bond market has witnessed a long rally during the six months till early October 2016, when foreign investors started selling Indian bonds (along with the bonds in other EMEs) seeking to reduce exposure to EME assets amid rising probability of a Fed interest rate increase in December

Chart 1.14: Comparative returns and volatility of the Indian equity market



Source: Bloomberg, SEBI.

Chart 1.15: Trends in India's bond markets and currency markets



Source: SEBI; Bloomberg.

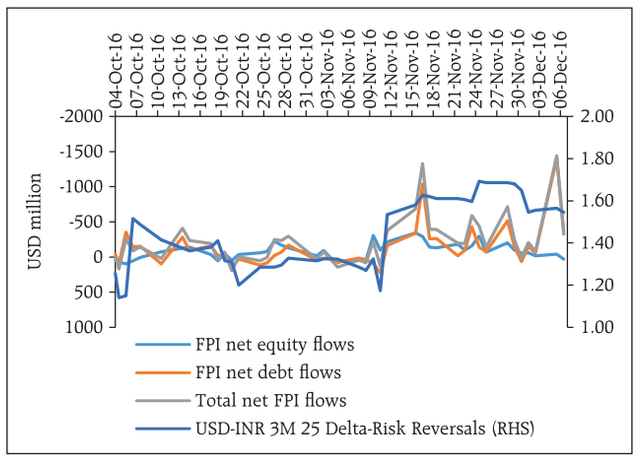
2016 (Chart 1.15 a). With the strengthening of US dollar against most of the emerging market currencies, the Indian rupee has also been under pressure since November 2016 (Chart 1.15 b).

1.22 The net foreign portfolio investments (FPIs) in Indian markets turned negative during 2015-16. Notwithstanding the increased significance of the domestic MFs in Indian capital markets, the FPIs continue to play an important role in the swings of equity, bond and currency markets (Chart 1.16).

House prices

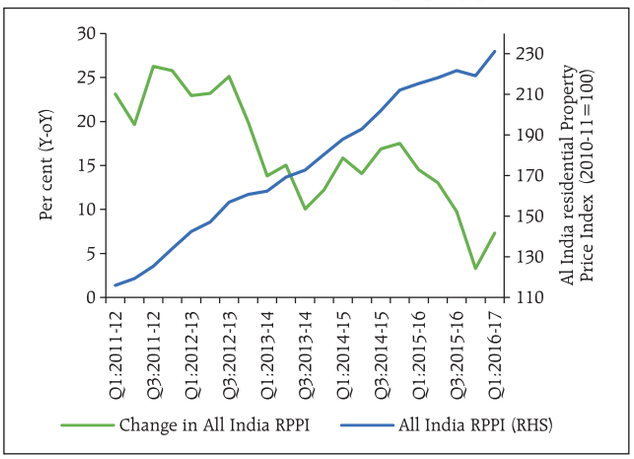
1.23 The all-India house price index posted an annual increase of 7.3 per cent in 2016-17:Q1 after moderation over four consecutive quarters (Chart 1.17). The push to regulate the realty sector is likely to have an impact on housing finance segments as it may help curb speculative activities significantly. While the stressed advances ratio in the retail housing sector increased slightly in recent quarters, still there are no systemic risk concerns from this sector.

Chart 1.16: FPI flows and USD-INR



Note: The Risk Reversal is defined as the implied volatility for Call Options minus the implied volatility for Put Options on the base currency with the same delta.
Source: Bloomberg

Chart 1.17: Trends in residential property prices



Note: RPPI refers to Residential Property Price Index (Base March 2011=100)
Source: Residential Asset Price Monitoring Survey, RBI

Corporate sector

1.24 The half-yearly positions of select non-government non-financial (NGNF) listed companies[15] indicate marked improvement in the performance of the corporate sector on a y-o-y basis (Table 1.1). As per the implementation road map for adoption of Indian Accounting Standards (Ind AS) – which are converged with the International Financial Reporting Standards (IFRS), all companies, other than insurance, banking and non-banking finance companies, having net worth of ₹5 billion or above were required to prepare their financial statements as per Ind AS from 2016-17 onwards. Therefore, the Ind AS-based financial statements for the current period (half year ended on September 30, 2016) may not be strictly comparable with the results of earlier periods.

Corporate leverage[16]

Trend

1.25 During the period of September 2015 to September 2016, 42.2 per cent of NGNF listed companies in the select sample witnessed deleveraging, while the total borrowings remained the same for another 17.3 per cent of the companies. Though the total borrowings increased for only 40.4 per cent companies, the growth of total borrowings of such companies was much higher than the reduction in total borrowings of companies which deleveraged, thus influencing the total borrowings of the companies in the sample (Table 1.2).

Table 1.1: Select financial ratios of performance of NGNF listed companies

	First-half of 2014-15	Second-half of 2014-15	First-half of 2015-16	Second-half of 2015-16	First-half of 2016-17
Sales growth (y-o-y) (per cent)	5.8	-2.3	-3.5	2.2	1.9
Net profit to average* total asset (per cent)	2.6	1.9	2.6	2.1	3.1
Solvency ratio & (per cent)	13.8	12.1	14.5	12.9	18.3
Debt to equity ratio #	0.38	0.39	0.38	0.38	0.32
Interest coverage ratio $ (number of times)	5.8	4.9	5.4	5.0	5.8
Interest payment ^ to average* borrowings (per cent)	10.1	10.1	10.3	10.0	9.3

Note: * Average is based on outstanding opening and closing positions for the half year.
& Solvency ratio is defined as sum of profit after tax (PAT) and depreciation to total borrowings (long and short term).
# Debt is taken as long term borrowings and equity is the net worth.
& ICR is defined as EBITDA to interest expense ratio, where EBITDA is earnings before interest, taxes, depreciation and amortisation, which is derived as EBITDA = EBIT + depreciation and amortisation. EBIT is earnings before interest and taxes.
^ Annualised interest payment is used.
Source: RBI (Half-yearly statements of select NGNF listed companies).

Table 1.2: NGNF listed companies: Change in corporate debt

(per cent)

Comparison of total borrowings of individual companies in two periods	No. of Companies	Total borrowings		
		Share in Sep-15	Share in Sep-16	Growth (y-o-y)
Companies showing a decrease in total borrowings	42.2	41.0	31.9	-16.1
Companies showing an increase in total borrowings	40.4	58.8	67.9	24.5
Companies showing no change in total borrowings	17.3	0.2	0.2	0.0
Total	**100.0**	**100.0**	**100.0**	**7.8**

Note: 1. For common companies.
2. Debt is taken as total borrowings.
Source: RBI (Half-yearly statements of select NGNF listed companies).

[15] Based on half-yearly data of about 2,400 to 2,700 NGNF listed companies starting from half-year ended September 2013. A common set of companies have been taken while calculating growth and doing other comparisons.

[16] For the analysis of corporate leverage, debt to equity ratio has been used, where debt is taken as long term borrowings and equity is the net worth. However, to look at the overall deleveraging trend of companies (in terms of growth and share), total borrowings (long and short term) has been used for comparison.

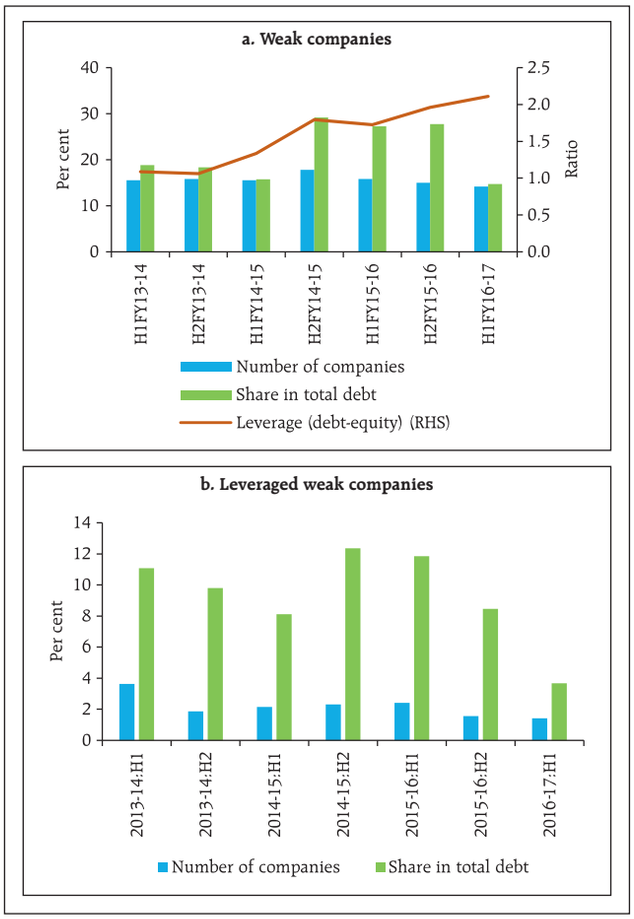
Tail risk

1.26 The proportion of 'leveraged' companies in the sample [defined as those either with negative net worth or debt to equity ratio (DER) >=2], though marginally up from March 2016 position, has remained much lower at 14.5 per cent in September 2016 as compared to 19.4 per cent in September 2015. The share of such companies in the total debt has declined further to 16.0 per cent in September 2016 from 20.6 per cent in March 2016 which was 30.5 per cent in September 2015. Similarly, the proportion of 'highly leveraged' companies (defined as 'leveraged' companies with DER>=3) declined from 15.3 per cent to 13.5 per cent with the share of debt of these companies in the total debt coming down from 24.9 to 14.5 per cent (Table 1.3).

Debt servicing capacity

1.27 An analysis of the current trends in debt servicing capacity and leverage of 'weak' companies [defined as those having interest coverage ratio (ICR) <1] was undertaken using the same sample, which shows significant improvement in 2016-17. The analysis shows that 14.1 per cent of companies were 'weak' in the select sample as at end September 2016, compared to 15.8 per cent in September 2015. The share of debt of these 'weak' companies also fell sharply to 14.7 per cent of total debt in the first half of 2016-17 from 27.3 per cent in the first half of 2015-16. However, the DER of these 'weak' companies increased to 2.1 from 1.7. The proportion of 'leveraged weak'[17] companies sharply declined to 1.4 per cent from 2.4 per cent during this period. The share of debt of 'leveraged weak' companies also declined significantly to 3.7 per cent from 11.8 per cent (Chart 1.18).

Chart 1.18: NGNF listed companies: 'Weak' companies – current trend
(2013-14 to 2016-17)



Source: RBI (Half-yearly statements of select NGNF listed companies).

Table 1.3: NGNF listed companies: Tail risk in corporate leverage

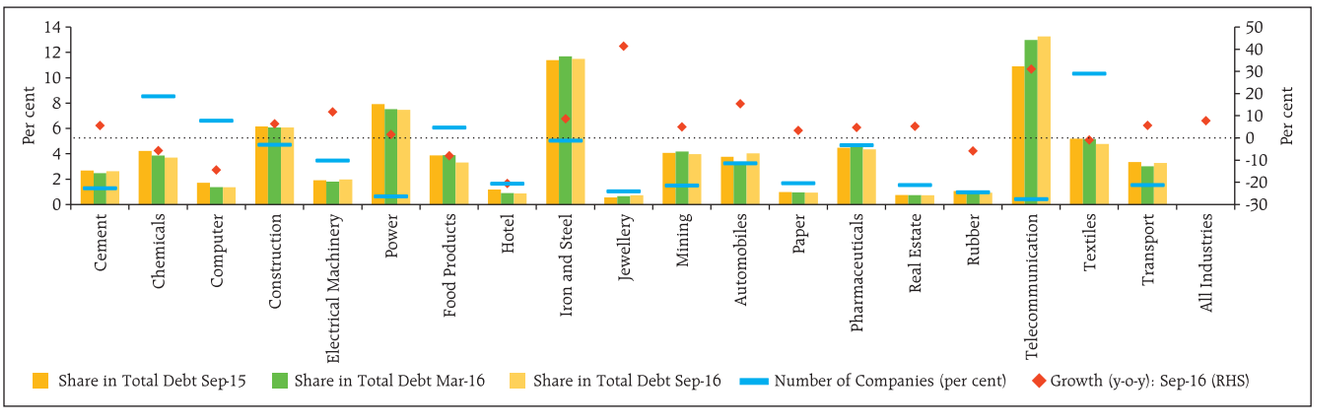
(per cent)

Leverage	Number of companies (as percentage of total companies)				Share of debt to total debt			
	Mar'15	Sep'15	Mar'16	Sep'16	Mar'15	Sep'15	Mar'16	Sep'16
Negative Net worth or DER >= 2	19.0	19.4	14.0	14.5	33.8	30.5	20.6	16.0
Negative Net worth or DER >= 3	14.2	15.3	12.9	13.5	23.0	24.9	19.0	14.5

Source: RBI (Half-yearly statements of select NGNF listed companies).

[17] Companies with DER >= 2 were classified as 'leveraged'. The 'leveraged weak' companies are those with DER >=2 or having negative net worth among the 'weak' companies. 'Leveraged' companies include companies having negative net worth as these companies would also have solvency issues.

Chart 1.19: Debt of select industries



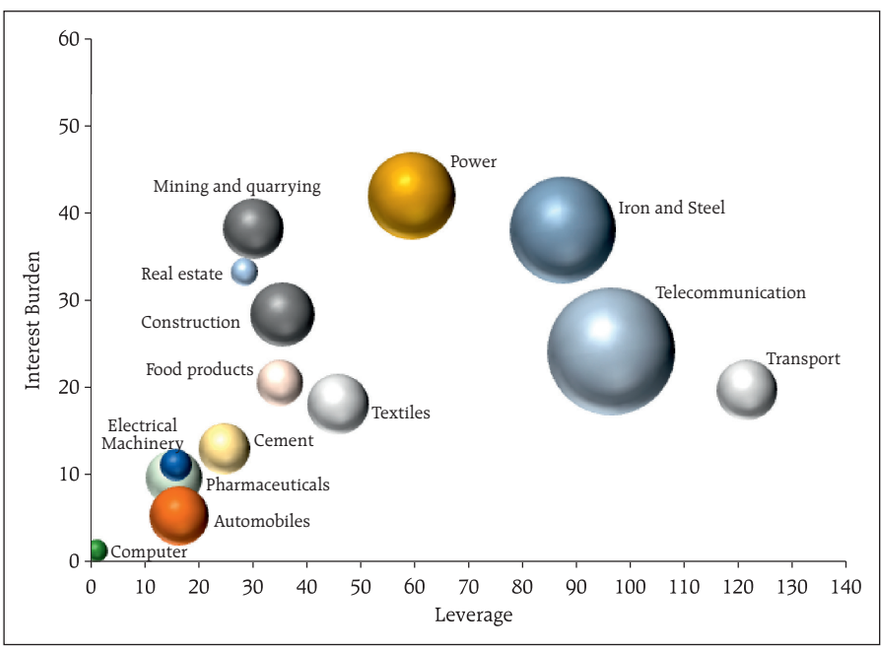
Note: For common companies.
Debt is taken as total borrowings.
Source: RBI (Half-yearly statements of select NGNF listed companies).

Sectoral analysis of corporate leverage

1.28 The total borrowings by companies in chemical, computer, food products, hotel, rubber and textiles industries decreased during the period from September 2015 to September 2016. On the other hand, cement, construction, electrical machinery, power, iron & steel, jewellery, mining, automobiles, papers, pharmaceuticals, real estate, telecommunications and transport industries contributed towards an increase in total borrowings (Chart 1.19).

1.29 A risk profile of select industries as at end September 2016 showed that iron & steel and power industries had high leverage as well as interest burden[18]. Telecommunication and transport industries also had relatively high leverage (Chart 1.20).

Chart 1.20: Risk profiles of select industries (September 2016)



Note: Size of the bubble is based on relative share of debt of the industry in total debt of all industries derived from sample companies.
Source: RBI (Half-yearly statements of select NGNF listed companies).

[18] Interest burden is defined as the interest expense as a percentage of EBITDA.

Trends in pledging of shares by promoters and credit rating downgrades

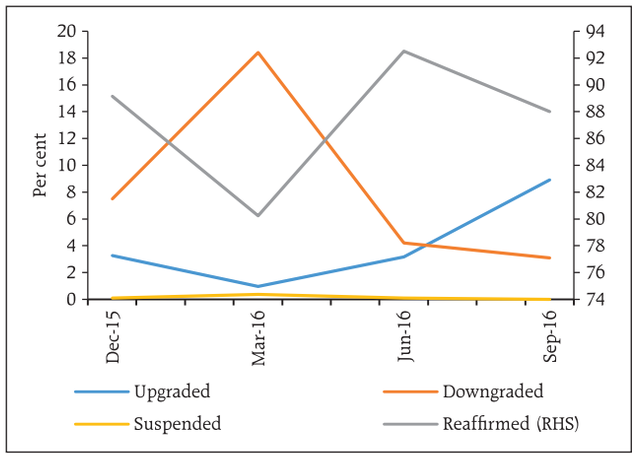
1.30 The stress in corporate debt is also supported by data on the shares pledged by promoters. The percentage of shares pledged by promoters out of their holdings in all listed companies across NSE and BSE has shown a gradual increasing trend over the years. Across all NSE listed companies (including companies with no pledging), the percentage of promoter held shares pledged went up from 15.2 per cent in March to 15.3 per cent in June 2016. The corresponding numbers were 13.8 per cent in December 2013, 14.4 per cent in December 2014 and 14.8 per cent in December 2015.

1.31 An analysis of the trends in credit ratings (quarterly data from December 2015 to September 2016) of corporate debt instruments rated by three major CRAs in India shows significant improvements in 'upgraded' ratings from 3.3 per cent of the total rated instruments in December 2015 to 8.9 per cent in September 2016 (Chart 1.21). Simultaneously, there has been a decline in 'downgraded' ratings from 7.5 per cent to 3.1 per cent during the same period.

Corporate sector risks

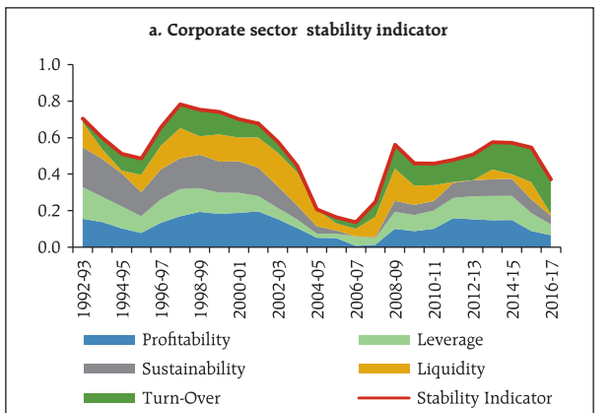
1.32 The corporate sector stability indicator and map[19] indicate that the overall risks to the corporate sector, which increased after the global financial crisis during 2007-08, have shown moderation in recent past. However, the risks due to lower demand (turnover)[20] remain (Charts 1.22).

Chart 1.21: Trends in credit ratings of debt instruments

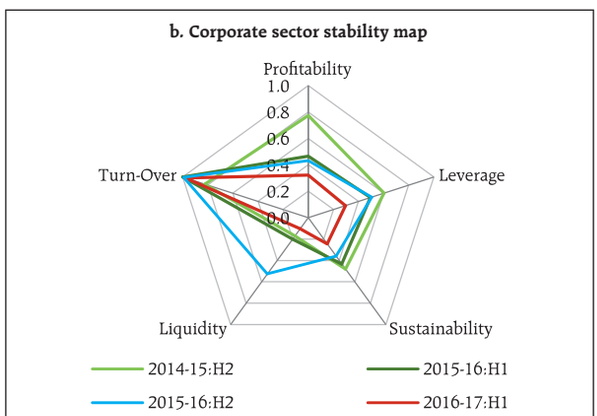


Source: SEBI.

Chart 1.22: Corporate sector stability indicator and map



Note: Increase in indicator value shows lower stability.
The width of each dimension signifies its contribution towards risk.



Note: Away from the centre signifies increase in risk.

Source: RBI (Half-yearly statements of select NGNF listed companies) and staff calculations.

[19] From 1992-93 to 2011-12 annual balance sheet data have been taken, while from 2012-13 to 2016-17, the half-yearly data have been used. The detailed methodology and basic indicators used under different dimensions are given in Annex 2.

[20] Turnover is derived as sales to assets ratio.

Chapter II

Financial Institutions: Soundness and Resilience

The business of scheduled commercial banks (SCBs) remained subdued mainly due to the muted performance of public sector banks (PSBs). The asset quality of banks deteriorated further between March and September 2016. PSBs continued to record the lowest capital to risk-weighted assets ratio (CRAR) among the bank groups with negative returns on their assets.

The banking stability indicator shows that the risks to the banking sector remained elevated due to continuous deterioration in asset quality, low profitability and liquidity. Given the higher levels of impairment, SCBs may remain risk averse in the near future as they clean up their balance sheets and their capital position may remain insufficient to support higher credit growth. Stress tests of SCBs show that their GNPA ratio may increase further if macroeconomic conditions deteriorate sharply.

The asset quality of scheduled urban co-operative banks (SUCBs) as well as non-banking financial companies (NBFCs) deteriorated. The capital adequacy of SUCBs, however, improved marginally.

Section I

Scheduled commercial banks[1]

2.1 In this section, the soundness and resilience of scheduled commercial banks (SCBs)[2] is discussed under two broad sub-heads: i) performance on functional aspects and ii) resilience using macro-stress tests through scenarios and single factor sensitivity analyses.

Performance

2.2 SCBs' business growth continued to be subdued with public sector banks (PSBs) continuing to lag behind their private sector peers. Overall, capital adequacy in terms of capital to risk-weighted assets ratio (CRAR) remained unchanged at 13.3 per cent, whereas, the Tier-I leverage ratio[3] at the system level increased marginally between March and September 2016. System level profit after tax (PAT) contracted on y-o-y basis in the first half of 2016-17 due to higher growth in risk provisions, loan write-off and decline in net interest income (NII). PSBs as a group continued to record losses. SCBs' return on assets (RoA) marginally improved to 0.4 per cent from 0.3 per cent and return on equity (RoE) increased to 5.0 per cent from 3.2 per cent between March and September 2016 (Chart 2.1).

[1] Analyses undertaken in the chapter are based on latest available data which are provisional.

[2] Analyses are based on supervisory returns which cover only domestic operations of SCBs, except in the case of data on large borrowers, which is based on banks' global operations. SCBs include public sector, private sector and foreign banks.

[3] 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.

Chart 2.1: Select performance indicators of SCBs

Note: PSBs=Public sector banks, PVBs=Private sector banks and FBs=Foreign banks.

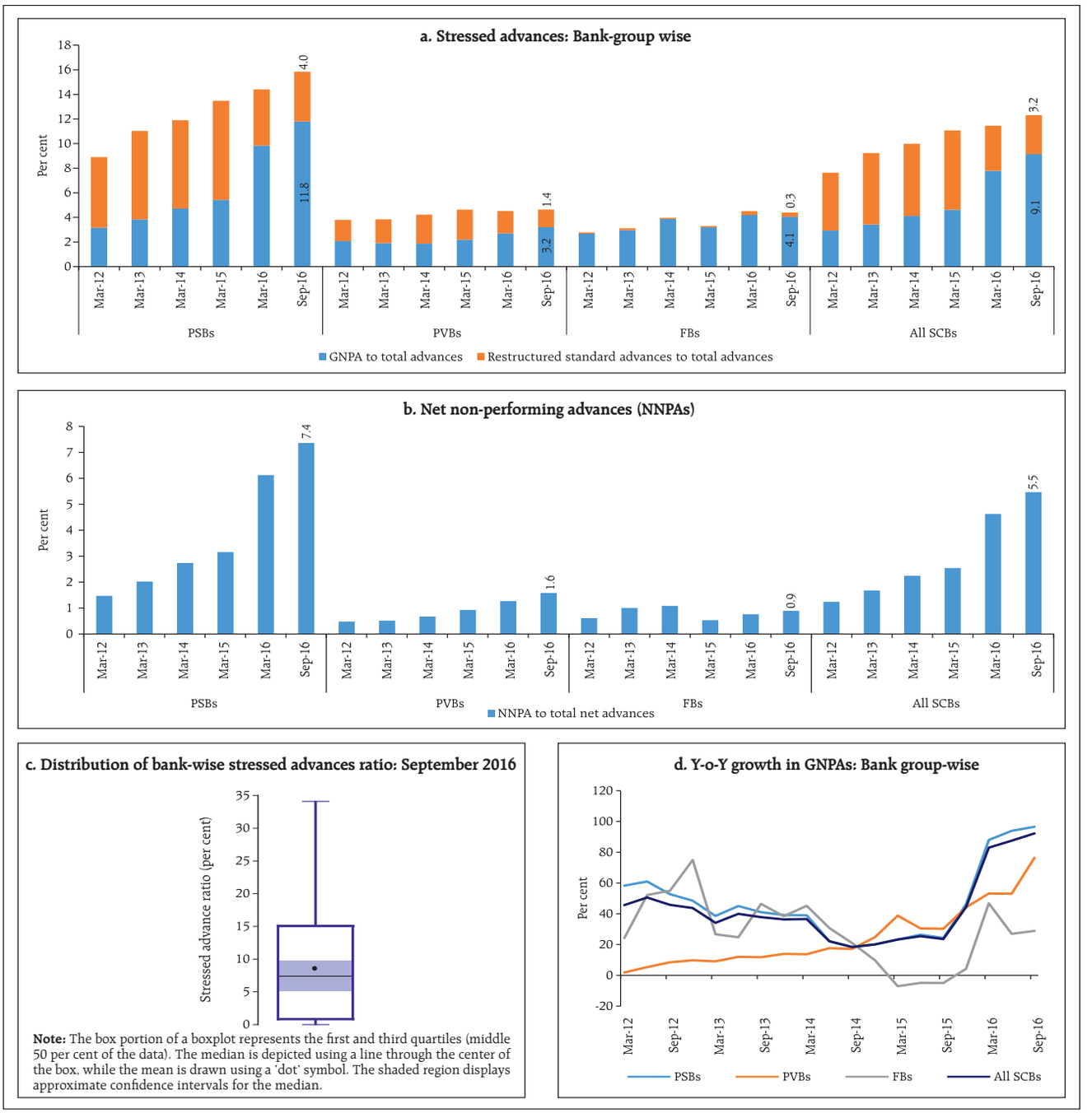
Note: RoA and RoE are annual/annualised number.

Source: RBI supervisory returns.

Asset quality

2.3 The asset quality of banks deteriorated further. The gross non-performing advances (GNPAs) ratio of SCBs increased to 9.1 per cent from 7.8 per cent between March and September 2016, pushing the overall stressed advances[4] ratio to 12.3 per cent from 11.5 per cent (Chart 2.2). Given the higher levels of impairment, SCBs may remain risk averse in the near future as they clean up their balance sheets and their capital position may remain insufficient to support higher credit growth.

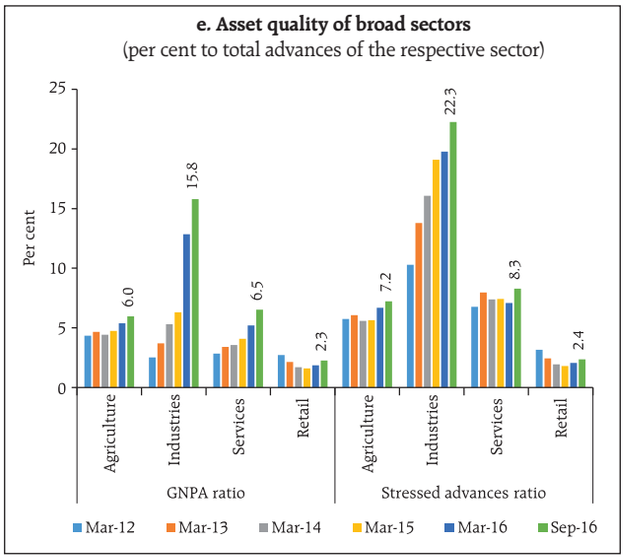
Chart 2.2: Select asset quality indicators of SCBs

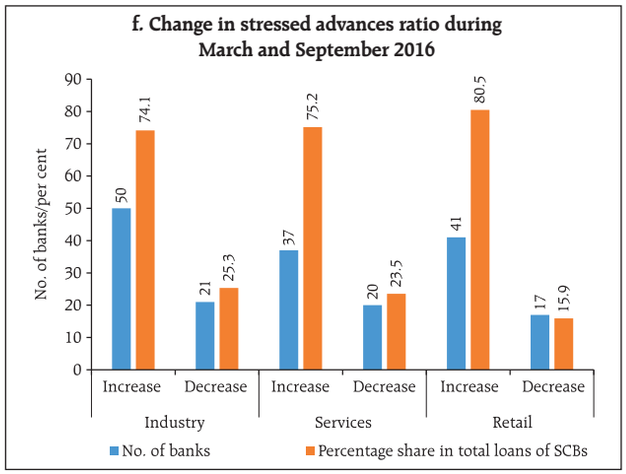


Note: The box portion of a boxplot represents the first and third quartiles (middle 50 per cent of the data). The median is depicted using a line through the center of the box, while the mean is drawn using a 'dot' symbol. The shaded region displays approximate confidence intervals for the median.

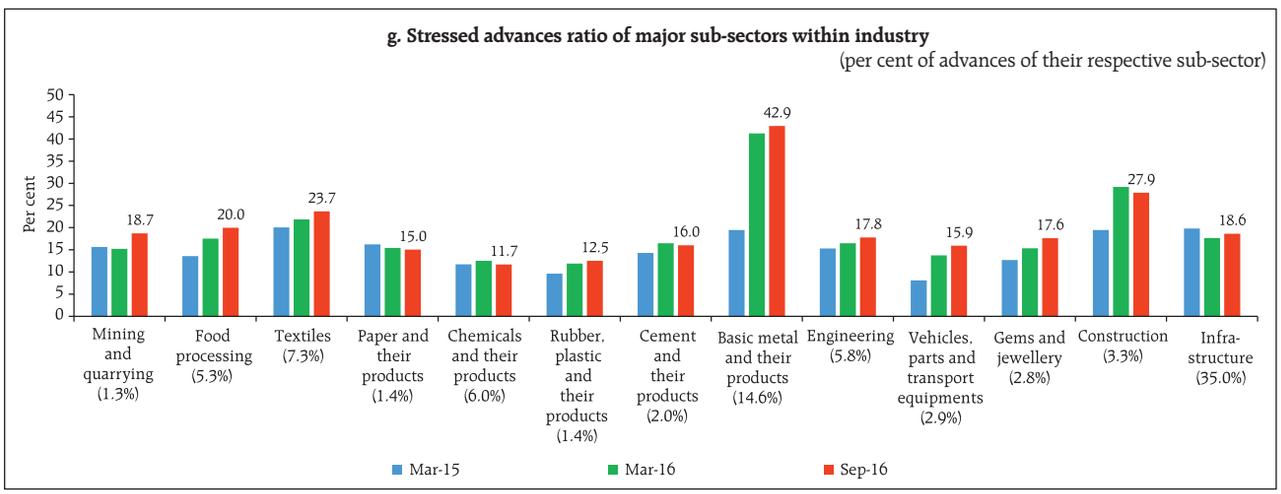
[4] For the purpose of analysing the asset quality, stressed advances are defined as GNPAs plus restructured standard advances.

Chart 2.2: Select asset quality indicators of SCBs *(Concld.)*

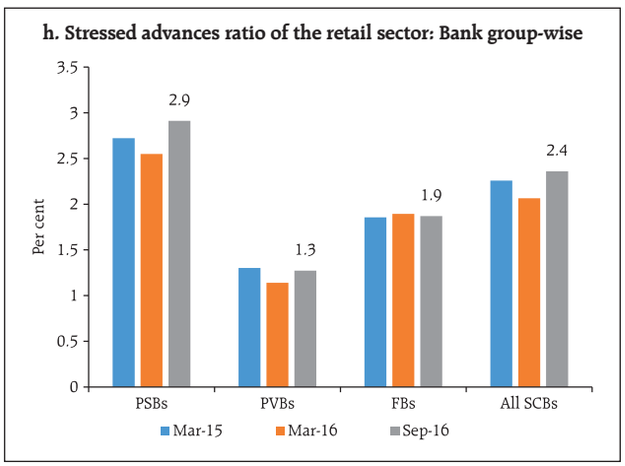


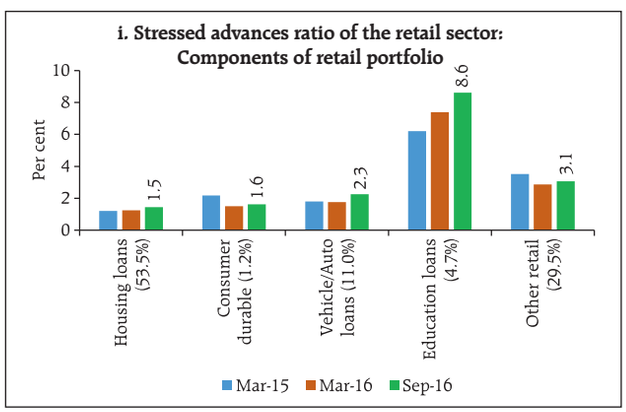


Note: The above chart shows number of banks (and their share in total loans of SCBs) which registered either increase or decrease in stresses advances ratio in major sectors during March and September 2016.



Note: Numbers given in parenthesis with the legend is share of the respective sub-sector's credit in total credit to industry.





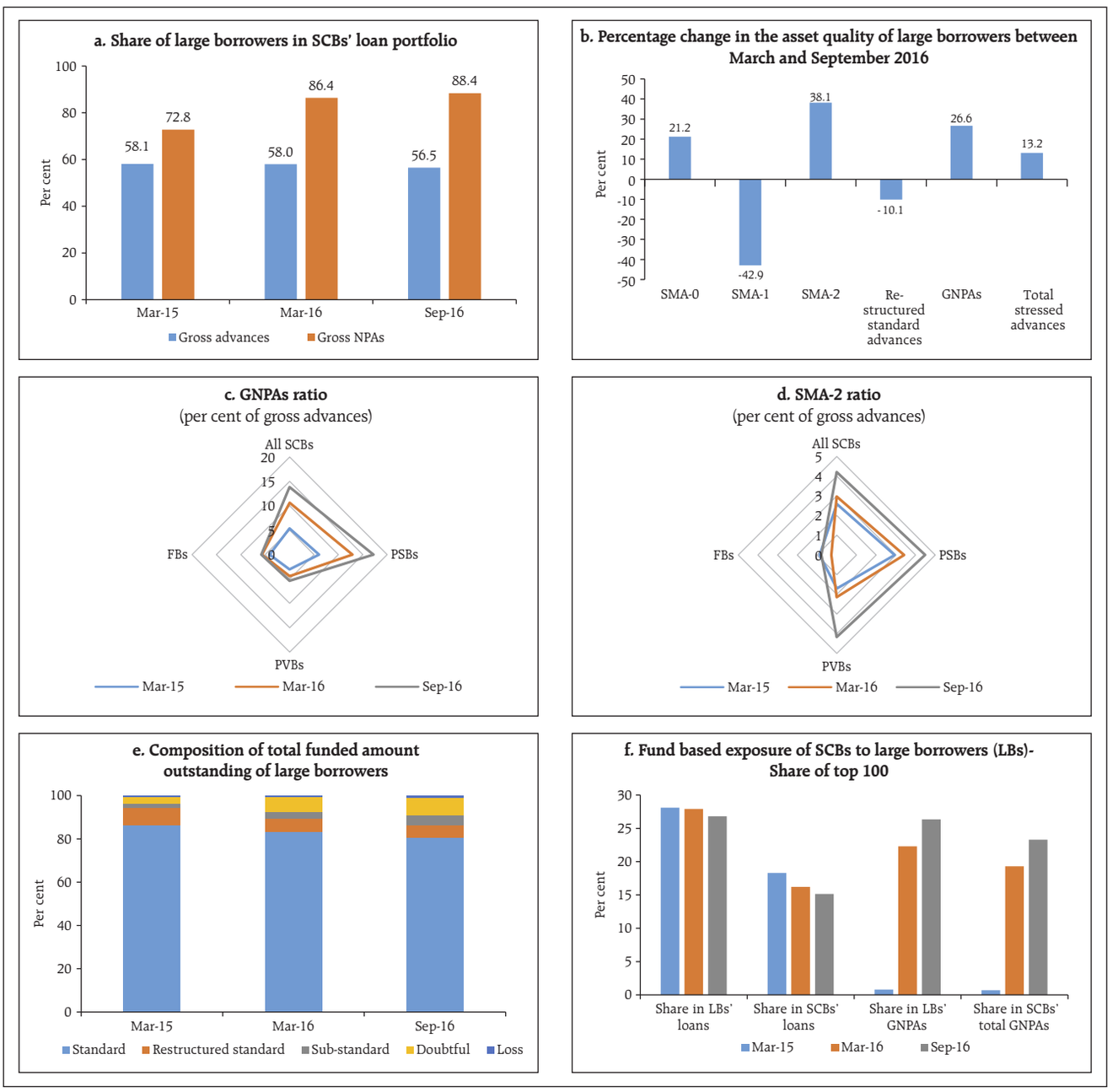
Note: Numbers given in parenthesis with the legend is share of the respective sub-sector's credit in total retail credit.

Source: RBI supervisory returns.

Credit quality of large borrowers[5]

2.4 The asset quality of large borrowers deteriorated significantly. The share of special mention accounts[6] (SMA)-2 increased across bank-groups. The share of large borrowers' in SCBs' total loan portfolio declined between March and September 2016, whereas, their share in GNPAs increased during the same period (Chart 2.3).

Chart 2.3: Select asset quality indicators of large borrowers



Source: RBI supervisory returns.

[5] A large borrower is defined as one who has aggregate fund-based and non-fund based exposure of ₹50 million and more.

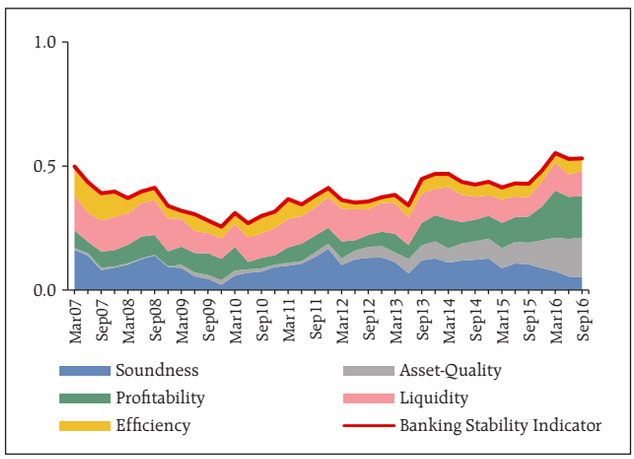
[6] Before a loan account turns into a NPA banks are required to identify incipient stress in the account by creating three sub-asset categories of SMAs: i) SMA-0: Principal or interest payment not overdue for more than 30 days but account showing signs of incipient stress, ii) SMA-1: Principal or interest payment overdue between 31-60 days, and iii) SMA-2: Principal or interest payment overdue between 61-90 days.

Risks

Banking stability indicator

2.5 The banking stability indicator (BSI)[7] shows that the risks to the banking sector remained elevated since the publication of the last FSR.[8] Though the soundness of banks reflecting their capital position improved further, continuous deterioration in their asset quality, low profitability and liquidity contributed to the high level of overall risk (Charts 2.4 and 2.5).

Chart 2.4: Banking stability indicator



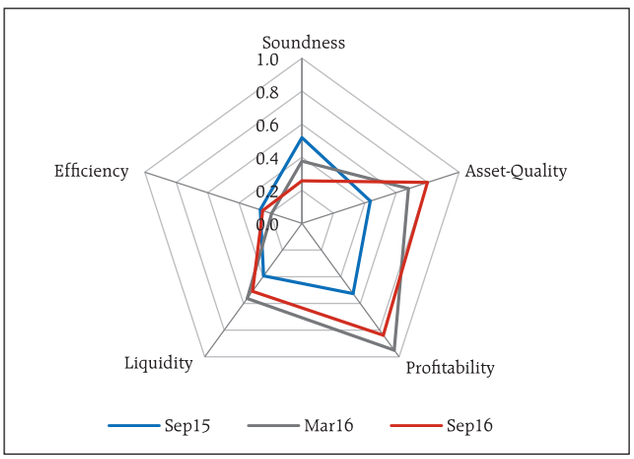
Note: Increase in indicator value shows lower stability. The width of each dimension signifies its contribution towards risk.
Source: RBI supervisory returns and staff calculations.

Resilience – Stress tests

Macro stress test-Credit risk[9]

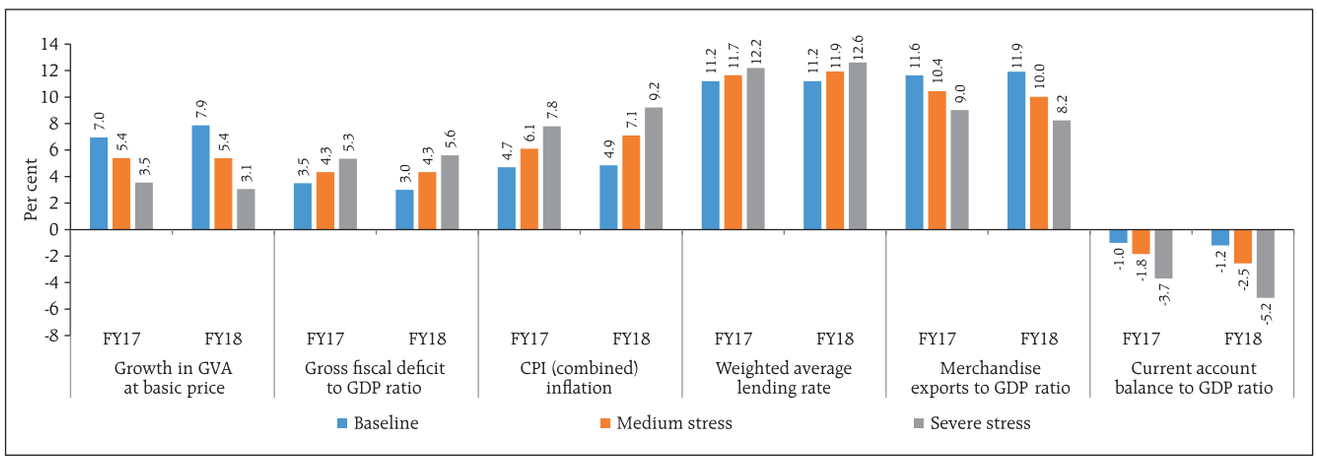
2.6 The resilience of the Indian banking system against macroeconomic shocks was tested through a series of macro stress tests for credit risk at system, bank group and sectoral levels. These tests encompassed assumed risk scenarios incorporating a baseline and two (medium and severe) adverse macroeconomic risk scenarios (Chart 2.6). The adverse scenarios were derived based on standard

Chart 2.5: Banking stability map



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

Chart 2.6: Macroeconomic scenario assumptions[10]



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

[8] FSR, June 2016 (with reference to data as at end March 2016).

[9] The detailed methodology is given in Annex 2.

[10] These stress scenarios are stringent and conservative assessments under hypothetical-severely adverse economic conditions and should not be interpreted as forecasts or expected outcomes. For the financial year 2016-17 (FY17) the numbers correspond to the last two quarters.

deviations of the historical values of the macroeconomic variable: up to 1 standard deviation (SD) for medium risk and 1.25 to 2 SD for severe risk (10 years historical data).

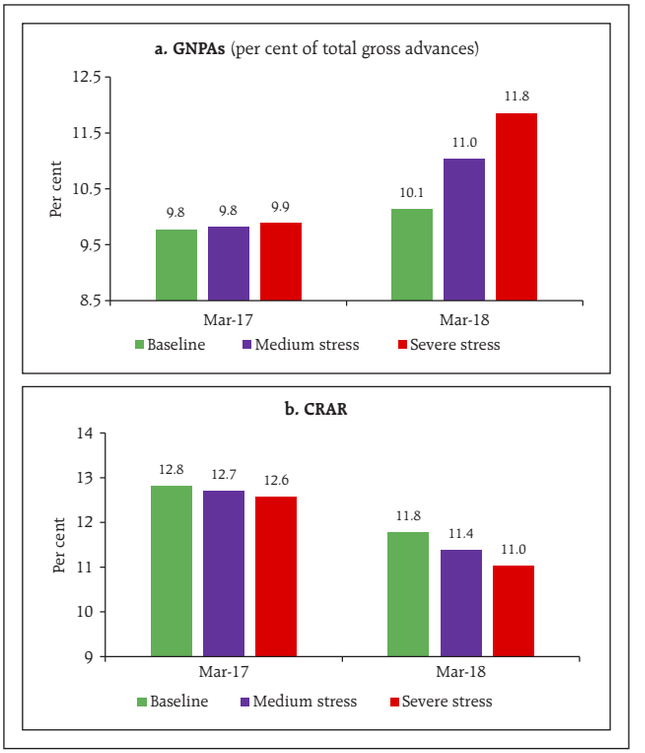
System level credit risk

2.7 The stress test indicated that under the baseline scenario, the GNPA ratio may increase from 9.1 per cent in September 2016 to 9.8 per cent by March 2017 and further to 10.1 per cent by March 2018. If the macroeconomic conditions deteriorate, the GNPA ratio may increase further under such consequential stress scenarios. However, the system level CRAR may remain above the required regulatory minimum (Chart 2.7).

Bank group level credit risk

2.8 Among the bank groups, PSBs may continue to register the highest GNPA ratio. Under baseline scenario, the PSBs' GNPA ratio may increase to 12.5 per cent in March 2017 and then to 12.9 per cent in March 2018 from 11.8 per cent in September 2016, which could increase further under a severe stress scenario. PSBs may continue to record the lowest CRAR among bank groups (Chart 2.8).

Chart 2.7: Projection of system level GNPAs and CRAR of SCBs (under various scenarios)

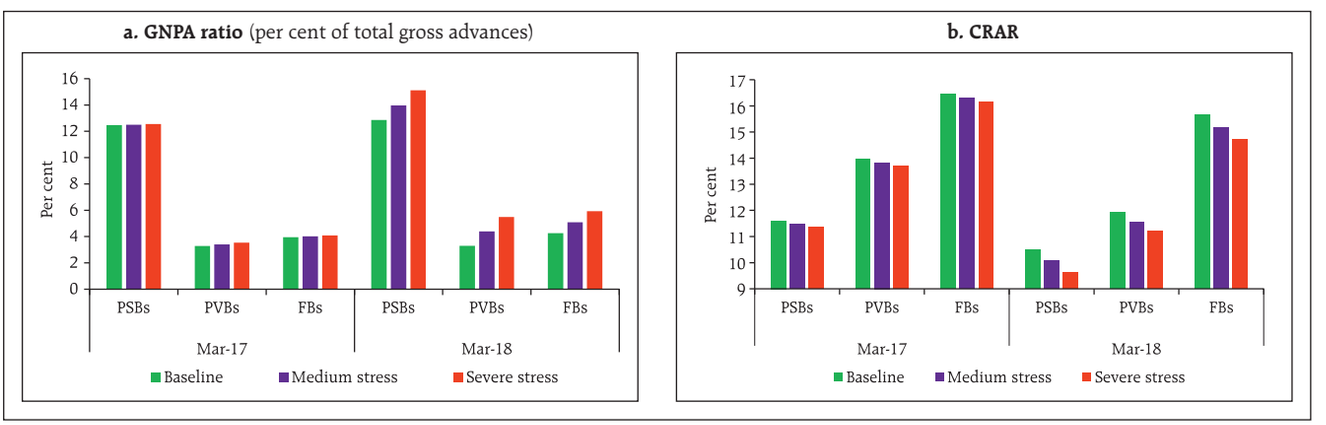


Note: 1. The projection of system level GNPAs has been done using three different, but complementary econometric models: multivariate regression, vector autoregressive and quantile regression. The average GNPA ratio of these three models is given in the chart.

2. The CRAR projection is made under a conservative assumption of minimum profit transfer to capital reserves at 25 per cent. It does not take into account any capital infusion by stakeholders. However, capital infusion in PSBs planned by the government will have positive impact on projected CRAR of SCBs.

Source: RBI supervisory returns and staff calculations.

Chart 2.8: Projection of bank group-wise GNPA ratio and CRAR (under various scenarios)



Note: 1.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 ratio of these two models is given in the chart.

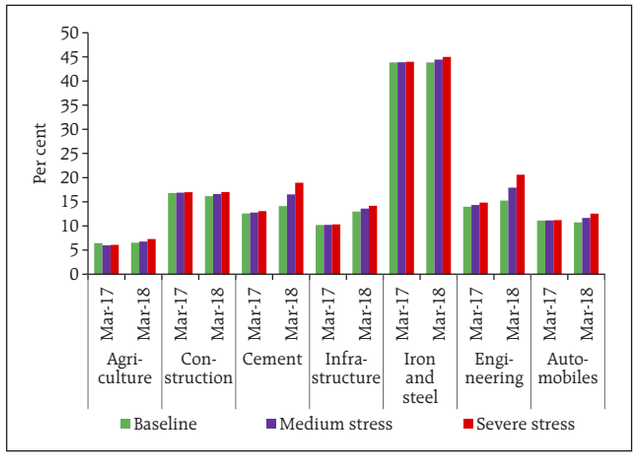
2. The CRAR projection is made under a conservative assumption of minimum profit transfer to capital reserves at 25 per cent. It does not take into account any capital infusion by stakeholders. However, capital infusion in PSBs planned by the government will have positive impact on their projected CRAR.

Source: RBI supervisory returns and staff calculations.

Sectoral credit risk

2.9 A macro-stress test of sectoral credit risk reveals that among the select seven sectors, iron and steel is expected to register the highest GNPAs followed by construction and engineering in March 2017 as well as in March 2018 under the baseline scenario (Chart 2.9).

Chart 2.9: Projected Sectoral NPAs under various scenarios
(per cent to total advances)

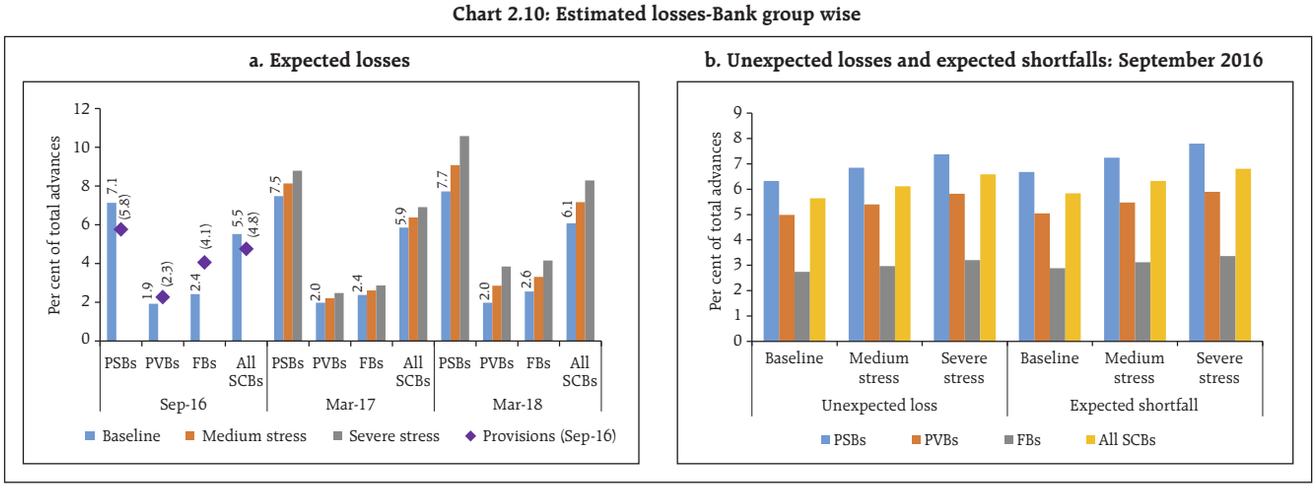


Source: RBI supervisory returns and staff calculations.

Estimation of losses[11] for credit risk: Provisioning and capital adequacy

2.10 Extant provisions[12] as per cent of their total advances – 5.8 per cent for PSBs, 2.3 per cent for PVBs and 4.1 per cent for FBs as of September 2016 – seem to be insufficient to meet expected losses (ELs) under stress scenarios. Specifically, PSBs need to further increase their provisioning levels to meet the ELs arising from credit risk, under baseline and adverse macroeconomic risk scenarios. However, the present level of total capital[13] (Tier-I plus Tier-II) as per cent of total advances across bank groups is expected to be sufficient to meet estimated unexpected losses (ULs) and expected shortfalls (ESs) arising from credit risk, even under severe macroeconomic stress conditions (Chart 2.10).

Chart 2.10: Estimated losses-Bank group wise



Source: RBI supervisory returns and staff calculations.

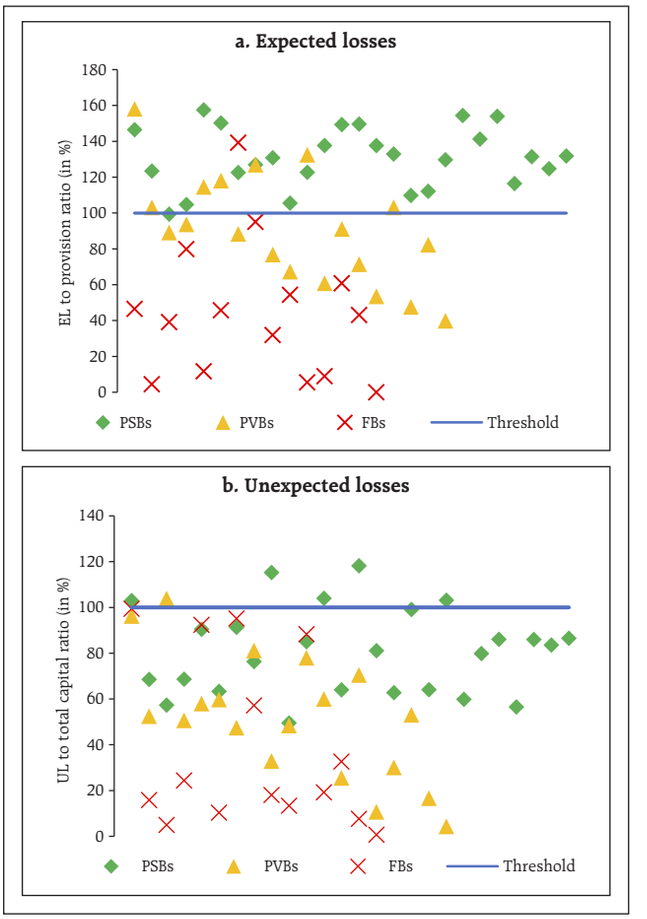
[11] The procedure adopted for estimating losses is given in Annex 2. Internationally, estimated losses (ELs& ULs) approach is recommended for the purpose of making provisions and capital for the next one year. For this, PD is derived based on annual slippage. As the purpose of this study is to judge 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 the next one year, the PD used here is based on GNPA ratio.

[12] Provisions include provisions for credit losses, risk provisions for standard advances and provisions for restructured standard advances.

[13] As of September 2016, the level of total capital as per cent of total advances was 14.0 per cent for PSBs, 20.1 per cent for PVBs and 34.9 per cent for FBs.

2.11 The bank-wise[14] estimation of ELs and ULs arising from credit risk shows that 33 banks, which had a 74 per cent share in the total advances of the select 60 banks, may be unable to meet their ELs with their existing provisions. On the other hand, six banks (with a 7 per cent share in the total advances of the select banks) were estimated to have ULs exceeding their total capital (Chart 2.11).

Chart 2.11: Estimation of losses: Bank-wise: September 2016



Source: RBI supervisory returns and staff calculations.

Sensitivity analysis: Bank level[15]

2.12 Single factor sensitivity stress tests[16] (top-down) were carried out on SCBs[17] to assess their vulnerabilities and resilience under various scenarios.[18] SCBs' resilience with respect to credit, interest rate and liquidity risks was studied by imparting extreme but plausible shocks. The results are based on September 2016 data.

Credit risk

2.13 A severe credit shock is likely to impact capital adequacy and profitability of a significant number of banks. The impact of various static credit shocks for banks showed that system level CRAR will remain above the required minimum of 9 per cent. Under a severe shock of 3 SD[19] (that is, if the average GNPA ratio of 60 select SCBs moves up to 15.3 per cent from 9.3 per cent), the system level CRAR and Tier-1 CRAR will decline to 10.6 per cent and 8.0 per cent respectively. At the individual bank-level, the stress test results show that 23 banks having a share of 40.7 per cent of SCBs' total assets might fail to

[14] Bank-wise estimation of ELs and ULs was done for 60 SCBs which cover 99 per cent of the total assets of SCBs.

[15] The sensitivity analysis was undertaken in addition to 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 the macro stress tests was credit risk, the sensitivity analysis covered credit, interest rate and liquidity risks.

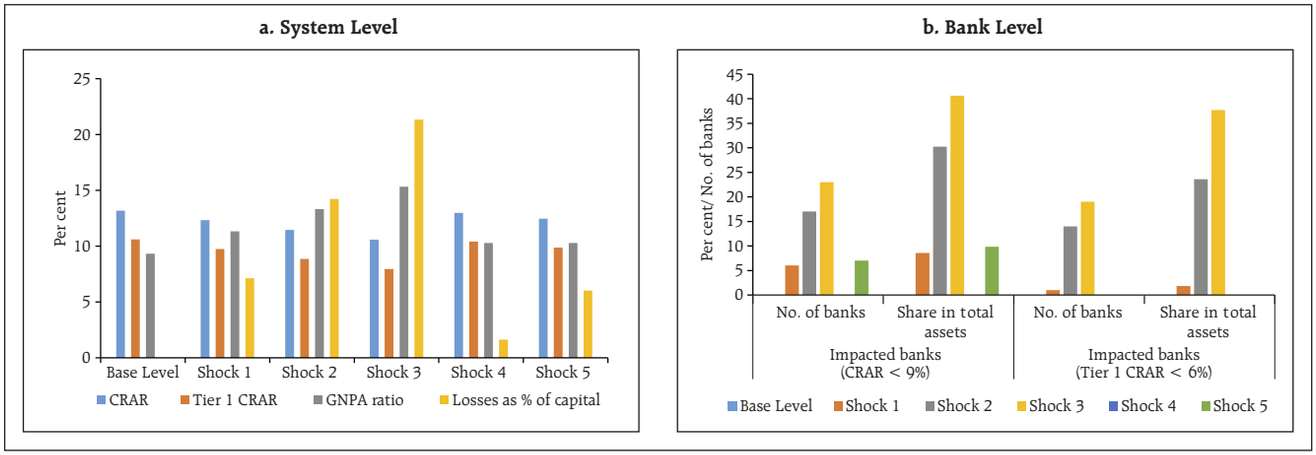
[16] For details of the stress tests, see Annex 2.

[17] Single factor sensitivity analysis stress tests were conducted for a sample of 60 SCBs accounting for 99 per cent of the total assets of SCBs.

[18] The shocks designed under various hypothetical scenarios are extreme but plausible.

[19] The SD of the GNPA ratio is estimated using quarterly data since 2003. One SD shock approximates a 21 per cent increase in GNPAs.

Chart 2.12: Credit risk – Shocks and Impacts



Shock 1: 1 SD shock on GNPAs
Shock 2: 2 SD shock on GNPAs
Shock 3: 3 SD shock on GNPAs
Shock 4: 30 per cent of restructured standard advances turn into GNPAs (sub-standard category)
Shock 5: 30 per cent of restructured standard advances turn into GNPAs (loss category) – written off

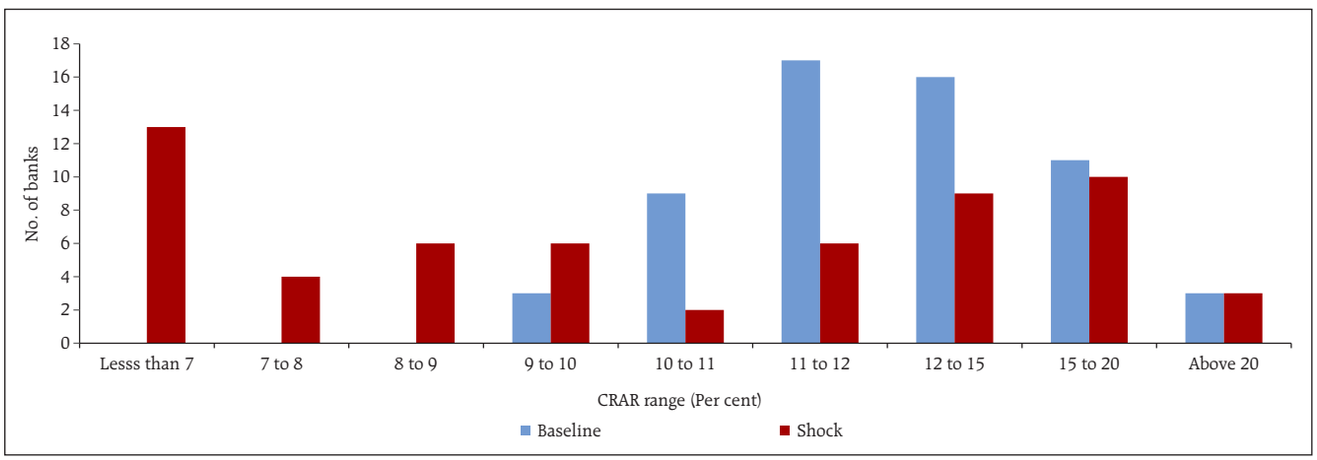
Note: System of select 60 SCBs.
Source: RBI supervisory returns and staff calculations.

maintain the required CRAR under such severe shock. PSBs were found to be severely impacted with the CRAR of 20 PSBs likely to go down below 9 per cent (Charts 2.12 and 2.13).

Credit concentration risk

2.14 Stress tests on banks' credit concentration risks, considering top individual borrowers according to their stressed advances showed that the impact[20] (under three different scenarios) was significant for 11 banks, comprising about 13.5 per cent of the assets, which may fail to maintain 9 per cent CRAR in at least one of the scenarios. The impact could be 63 per cent of profit before tax (PBT) under the scenario of a default by the topmost stressed borrower and 112 per cent in case the top two stressed borrowers fail. The impact on CRAR at the system level under the assumed scenarios of failure

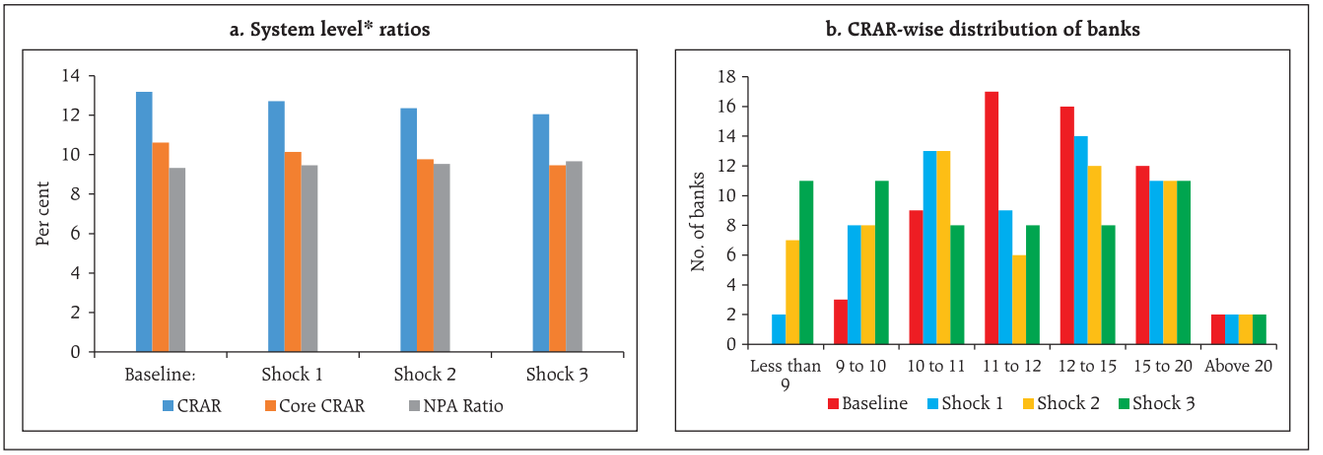
Chart 2.13: CRAR-wise distribution of banks
(under a 3 SD shock on GNPA ratio)



Note: System of select 60 SCBs.
Source: RBI supervisory returns and staff calculations.

[20] In case of failure, the borrower is considered to move into the loss category. Please see Annex 2 for details.

Chart 2.14: Credit concentration risk: Individual borrowers – Stressed advances



Shock 1: Top stressed individual borrower defaults
Shock 2: Top two stressed individual borrowers default
Shock 3: Top three stressed individual borrowers default

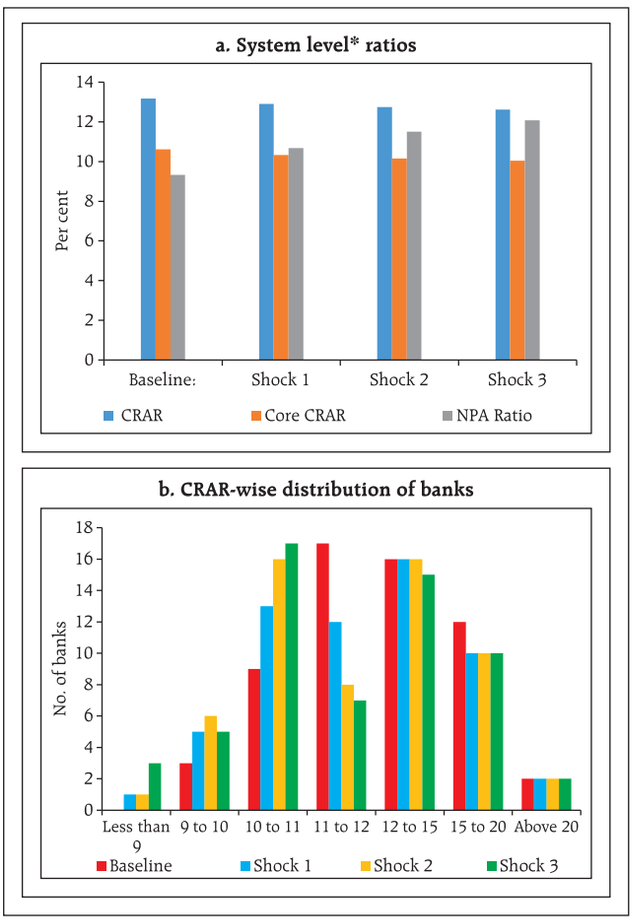
Note: * System of select 60 SCBs.
Source: RBI supervisory returns and staff calculations.

of the top one, two and three stressed borrowers will be 46, 83 and 112 basis points (Chart 2.14).

2.15 Stress tests on banks' credit concentration risks, considering top individual borrowers according to their exposures, showed that the impact[21] (under three different scenarios) was significant for three banks, comprising about 3.9 per cent of the assets, as they may fail to maintain 9 per cent CRAR in at least one of the scenarios. The losses could be 37 per cent of PBT under the scenario of a default by the topmost individual borrower and 59 per cent in case the top two individual borrowers default. The impact on CRAR at the system level under the assumed scenarios of default of the top three individual borrowers will be 56 basis points (Chart 2.15).

2.16 Stress tests using 10 different scenarios, based on the information of group borrowers reveal that the losses could be around 5 per cent and 9 per cent of the capital at the system level under the

Chart 2.15: Credit concentration risk: Individual borrowers – Exposure



Shock 1: Top individual borrower defaults
Shock 2: Top two individual borrowers default
Shock 3: Top three individual borrowers default

Note: * System of select 60 SCBs.
Source: RBI supervisory returns and staff calculations.

[21] In case of default, the borrower is considered to move into the sub-standard category. Please see Annex 2 for details.

Table 2.1: Credit concentration risk: Group borrowers – Exposure

Shocks		System level*				Bank level	
		CRAR	Core CRAR	NPA ratio	Losses as % of capital	Impacted banks (CRAR < 9%)	
Baseline (Before shock)		13.2	10.6	9.3	---	No. of banks	Share in total assets of SCBs (in %)
Shock 1	The top 1 group borrower defaults	12.6	10.0	12.4	5.1	2	0.2
Shock 2	The top 2 group borrowers default	12.1	9.5	14.6	8.8	5	4.9
Shock 3	The top 3 group borrowers default	11.7	9.1	16.5	12.0	8	9.7
Shock 4	The top 4 group borrowers default	11.4	8.8	18.1	14.7	10	11.0
Shock 5	The top 5 group borrowers default	11.1	8.5	19.6	17.2	12	16.2
Shock 6	The top 6 group borrowers default	10.8	8.2	20.8	19.3	15	18.4
Shock 7	The top 7 group borrowers default	10.6	8.0	21.9	21.0	17	22.8
Shock 8	The top 8 group borrowers default	10.4	7.8	22.7	22.4	20	28.2
Shock 9	The top 9 group borrowers default	10.3	7.7	23.4	23.6	21	28.8
Shock 10	The top 10 group borrowers default	10.3	7.7	23.7	24.2	22	29.5

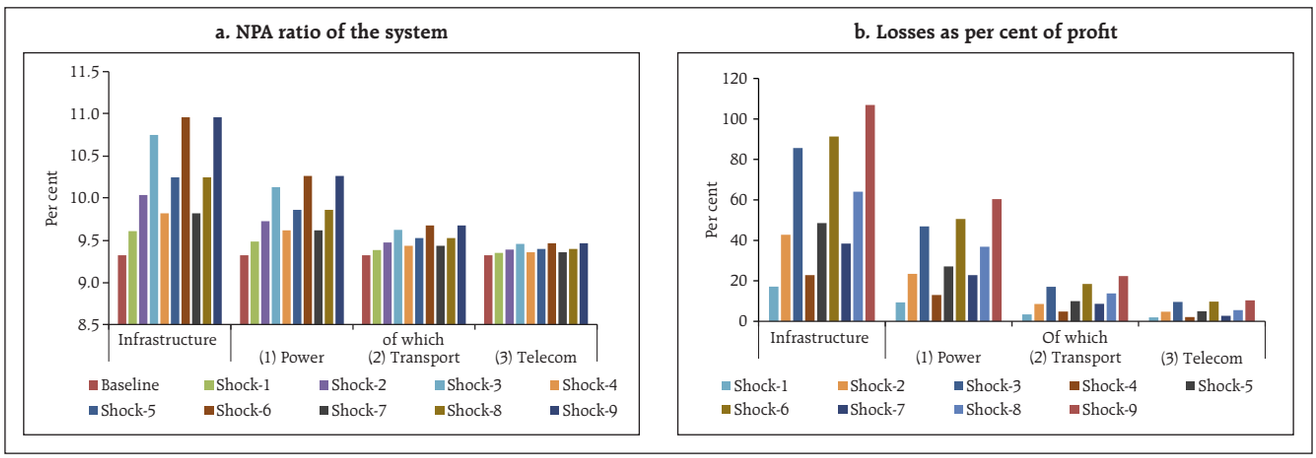
Note: * System of select 60 SCBs.
Source: RBI supervisory returns and staff calculations.

assumed scenarios of default[22] by the top group borrower and by the top two group borrowers. As many as 22 banks will not be able to maintain their CRAR at 9 per cent if top 10 group borrowers default (Table 2.1).

Sectoral credit risk

2.17 Credit risk arising from exposure to the infrastructure sector (specifically power, transport and telecommunications) was examined through a sectoral credit stress test where GNPA ratio of the sector was assumed to increase by a fixed percentage point impacting the overall GNPA ratio of the banking system. The results showed that shocks to the infrastructure segment will impact the profitability of banks considerably, with the most significant effect of the single factor shock being on the power and transport sectors (Chart 2.16).

Chart 2.16: Sectoral credit risk: Infrastructure – Shocks and Impacts



Note: 1. A system of select 60 SCBs.
2. Shock assumes percentage increase in the sectoral NPA ratio and conversion of a portion of restructured standard advances into NPAs.

Shocks	Shock-1	Shock-2	Shock-3	Shock-4	Shock-5	Shock-6	Shock-7	Shock-8	Shock-9
Shock on restructured standard advances &	0			15			15		
Shock on other standard advances #	2	5	10	2	5	10	2	5	10

& Shocks 1-3: No shock on restructured standard advances; Shocks 4-6: Restructured standard advances to sub-standard category; Shocks 7-9: Restructured standard advances to loss category.
# The new NPAs arising out of standard advances (other than restructured standard advances) have been assumed to be distributed among different asset classes (following the existing pattern) in the shock scenario.
Source: RBI supervisory returns and staff calculations.

[22] In case of default, the borrower is considered to move into the sub-standard category. Please see Annex 2 for details.

Interest rate risk

2.18 For investments under available for sale (AFS) and held for trading (HFT) categories (direct impact) a parallel upward shift of 2.5 percentage points in the yield curve will lower the CRAR by about 94 basis points at the system level (Table 2.2). At the disaggregated level, five banks accounting for 4.7 per cent of the total assets were impacted adversely and their CRAR fell below 9 per cent. The total loss of capital at the system level is estimated to be about 8.1 per cent. The assumed shock of a 2.5 percentage points parallel upward shift of the yield curve on the held to maturity (HTM) portfolios of banks, *if marked-to-market*, will reduce the CRAR by about 281 basis points resulting in 23 banks' CRAR falling below 9 per cent. The income impact on SCBs' banking books[23] could be about 29 per cent of their latest annual PBT under the assumed shock of a parallel downward shift of 2.5 percentage points in the yield curve.[24]

Table 2.2: Interest rate risk – Bank groups – Shocks and Impacts
(under shock of 250 basis points parallel upward shift of the INR yield curve)

(per cent)

	PSBs		PVBs		FBs	
	AFS	HFT	AFS	HFT	AFS	HFT
Modified duration	3.6	5.1	2.1	4.2	1.1	2.4
Share in total investments	32.5	0.7	34.7	5.5	86.2	13.8
Reduction in CRAR (bps)	112		48		131	

Source: RBI supervisory returns and staff calculations.

Liquidity risk

2.19 The liquidity risk analysis aims to capture the impact of deposit run-offs and increased demand for the unutilised portions of credit lines which were sanctioned/committed/guaranteed. Banks in general may be in a position to withstand liquidity shocks with their high quality liquid assets (HQLAs)[25] and SLR investments. In assumed scenarios, there will be increased withdrawals of un-insured deposits[26] and simultaneously there will also be increased demand for credit resulting in withdrawal of the unutilised portions of sanctioned working capital limits as well as utilisation of credit commitments and guarantees extended by banks to their customers. Using their HQLAs for meeting day-to-day liquidity requirements, most banks (49 out of the 60 banks in the sample) will remain resilient in a scenario of assumed sudden and unexpected withdrawals of around 10 per cent of deposits along with the utilisation of 75 per cent of their committed

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

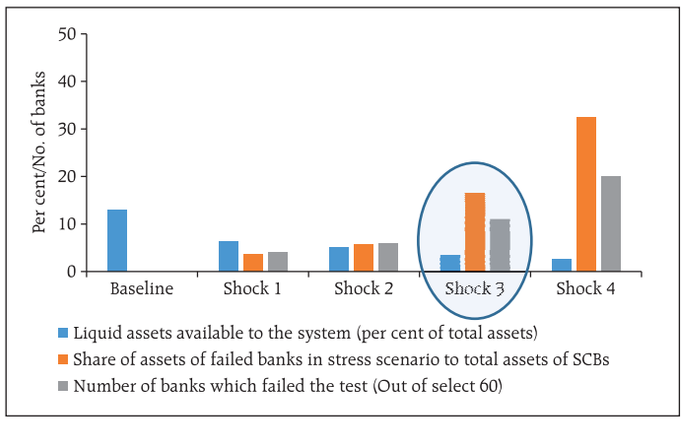
[24] The stress test results give the conservative estimates by considering the movements which may result in losses for banks. For a parallel downward shift of 2.5 percentage points in the yield curve, the valuation gain in trading books may be 8.1 per cent of capital or about 120 per cent of total annual profits of SCBs. On the other hand, for a parallel upward shift of 2.5 percentage points in the yield curve, the income gain in banking books may be about 29 per cent of the total annual profits of SCBs or 1.9 per cent of capital. Therefore, for a parallel upward shift in the yield curve, the net loss may be 6.1 per cent of capital or about 91 per cent of total annual profits of SCBs, whereas the system will gain the same in case of a downward shift in the yield curve.

[25] In view of the implementation of the liquidity coverage ratio (LCR) with effect from January 1, 2015 in India, the definition of liquid assets was revised for stress testing. For this stress testing exercise, HQLAs were computed as cash reserves in excess of required CRR, excess SLR investments, SLR investments at 2 per cent of NDTL (under MSF) and additional SLR investments at 8 per cent of NDTL (following the circular DBR.BP.BC 52/21.04.098/2014-15 dated November28, 2014 and DBR.BP.BC.No. 77/21.04.098/2015-16 dated February 11, 2016).

[26] Presently un-insured deposits are about 69 per cent of total deposits (Source: DICGC, *Handbook of Statistics on the Indian Economy*).

Chart 2.17: Liquidity risk – Shocks and impacts using HQLAs

(using HQLAs for liquidity support)



Note: 1.A bank was considered 'failed' in the test when it was unable to meet the requirements under stress scenarios (on imparting shocks) with the help of its liquid assets (stock of liquid assets turned negative under stress conditions).

2. Shocks: Liquidity shocks include a demand for 75 per cent of the committed credit lines (comprising unutilised portions of sanctioned working capital limits as well as credit commitments towards their customers) and also a withdrawal of a portion of un-insured deposits:

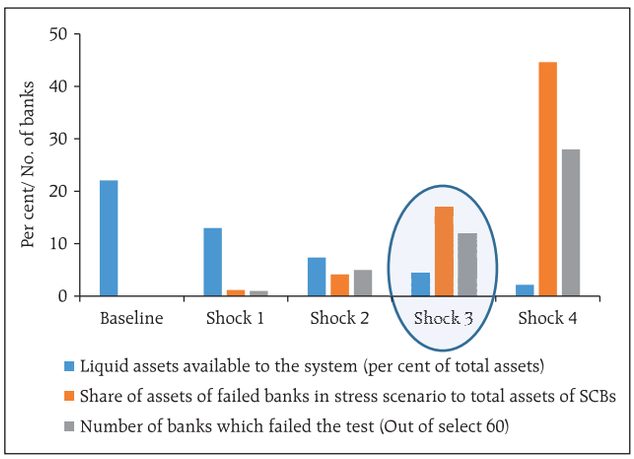
Shock 1: 5 per cent cumulative (un-insured) deposit withdrawal.
Shock 2: 7 per cent cumulative (un-insured) deposit withdrawal.
Shock 3: 10 per cent cumulative (un-insured) deposit withdrawal.
Shock 4: 12 per cent cumulative (un-insured) deposit withdrawal.

Source: RBI supervisory returns and staff calculations.

credit lines (Chart 2.17). In case of 'incremental shocks' in an extreme crisis, banks will be able to withstand further (about 15 per cent) withdrawals of deposits using their remaining SLR investments through specific policy measures taken as per requirements (Chart 2.18).

Chart 2.18: Liquidity risk – Shocks and Impacts

(using full SLR along with excess CRR for liquidity support)



Note: 1.A bank was considered 'failed' in the test when it was unable to meet the requirements under stress scenarios (on imparting shocks) with the help of its liquid assets (stock of liquid assets turned negative under stress conditions).

2. Shocks: Liquidity shocks include a demand for 75 per cent of the committed credit lines (comprising unutilised portions of sanctioned working capital limits as well as credit commitments towards their customers) and also a withdrawal of a portion of un-insured deposits:

Shock 1: 5 per cent cumulative (un-insured) deposit withdrawal.
Shock 2: 7 per cent cumulative (un-insured) deposit withdrawal.
Shock 3: 10 per cent cumulative (un-insured) deposit withdrawal.
Shock 4: 12 per cent cumulative (un-insured) deposit withdrawal.

Source: RBI supervisory returns and staff calculations.

Stress testing of the derivatives portfolio of banks – Bottom-up stress tests

2.20 A series of bottom-up stress tests (sensitivity analyses) on derivatives portfolio were conducted for select sample banks[27] with the reference date as at end of September 2016. 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, while 20 per cent appreciation/depreciation were assumed for foreign exchange rates. The stress tests were carried out for individual shocks on a stand-alone basis.

2.21 In the sample, the marked-to-market (MTM) value of the derivatives portfolio for the banks varied with PSBs and PVBs, except one, registering small positive as well as negative MTM, while most of the FBs had a relatively large positive as well as negative MTM. Most of the PSBs and PVBs had positive net

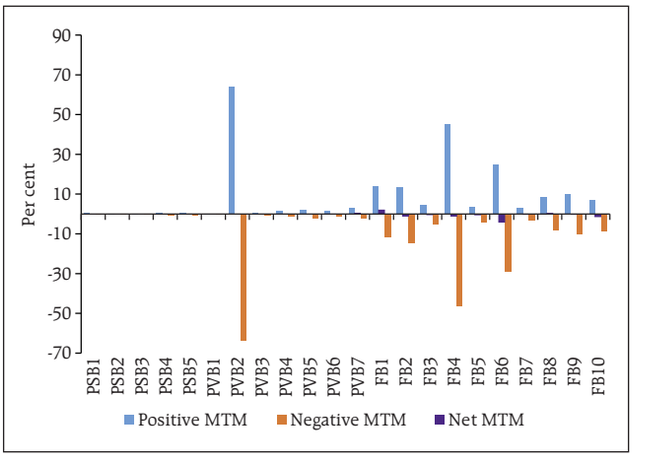
[27] Stress tests on derivatives portfolio were conducted for a sample of 22 banks. Details are given in Annex 2.

MTM, while most of the FBs recorded negative net MTM (Chart 2.19).

2.22 The stress test results showed that the average net impact of interest rate shocks on sample banks were negligible. The foreign exchange shock scenarios also showed a relatively lower impact in recent quarters (Chart 2.20).

Chart 2.19: MTM of Total Derivatives- September 2016

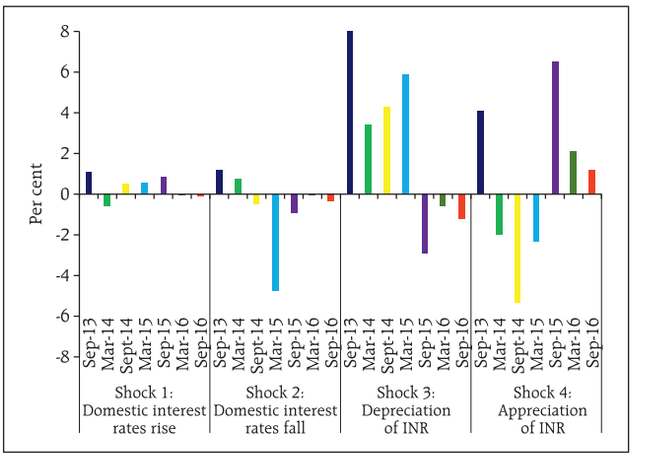
(per cent to total balance sheet assets)



Note: PSB: Public sector bank, PVB: Private sector bank, FB: Foreign bank.
Source: Sample banks (Bottom-up stress tests on derivatives portfolio).

Chart 2.20: Stress tests – Impact of shocks on derivative portfolio of select banks (change in net MTM on application of a shock)

(per cent to capital funds)



Note: Change in net MTM due to an applied shock with respect to the baseline.
Source: Sample banks (Bottom-up stress tests on derivative portfolio).

Section II

Scheduled urban co-operative banks

Performance

2.23 At the system level,[28] the CRAR of scheduled urban co-operative banks (SUCBs) increased marginally from 12.8 per cent to 13.0 per cent between March and September 2016. However, at a disaggregated level, five banks failed to maintain the minimum required CRAR of 9 per cent. GNPAs of SUCBs as a percentage of gross advances increased sharply to 8.6 per cent from 6.6 per cent and their provision coverage ratio[29] increased to 47.2 per cent from 46.7 per cent during the same period. Further, RoA increased from 0.6 per cent to 0.9 per cent and the liquidity ratio[30] fell marginally from 34.8 per cent to 34.7 per cent during the same period.

Resilience – Stress tests

Credit risk

2.24 The impact of credit risk shocks on the CRAR of SUCBs was observed under four different scenarios.[31] The results show that even under the adverse scenario of one SD increase in GNPAs (third scenario), the system level CRAR of SUCBs came down below the minimum regulatory requirement. Individually, a large number of banks (out of 54

[28] System of 54 SUCBs.

[29] Provision coverage ratio=provisions held for NPA*100/GNPAs.

[30] Liquidity ratio = (cash + dues from banks + SLR investment)*100/total assets.

[31] The four scenarios are: i) 1 SD shock in GNPA (classified into sub-standard advances), ii) 2 SD shock in GNPA (classified into sub-standard advances), iii) 1 SD shock in GNPA (classified into loss advances), and iv) 2 SD shock in GNPA (classified into loss advances). SD was estimated using 10 years' data. For details of the stress tests, see Annex 2.

banks, 28 banks under scenario iii and 40 banks under scenario iv) may not be able to meet the required CRAR levels.

Liquidity risk

2.25 A stress test on liquidity risk was carried out using two different scenarios; i) 50 per cent and ii) 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 SUCBs may be significantly impacted under a stress scenario (out of 54 banks, 26 banks under Scenario i and 35 banks under Scenario ii).

Section III

Non-banking financial companies

2.26 As of September 2016, there were 11,555 non-banking financial companies (NBFCs) registered with the Reserve Bank, of which 188 were deposit-accepting (NBFCs-D) and 11,367 were non-deposit accepting (NBFCs-ND). There were 220 systemically important non-deposit accepting NBFCs (NBFCs-ND-SI)[32]. All NBFCs-D and NBFCs-ND-SI are subject to prudential regulations such as capital adequacy requirements and provisioning norms along with reporting requirements.

Performance

2.27 The aggregated balance sheet of the NBFC sector expanded by 8.5 per cent on a y-o-y basis in September 2016 as compared to 15.5 per cent in March 2016. Loans and advances increased by 10.5 per cent while total borrowings increased by 7.4 per cent in September 2016 (Table 2.3). Net profit as a percentage to total income improved between March and September 2016, whereas, RoA remained unchanged at 2.2 per cent (Table 2.4).

Table 2.3: Consolidated balance sheet of the NBFC sector: Y-o-Y growth

(per cent)

	Mar-16	Sep-16
1. Share capital	4.8	9.9
2. Reserves and surplus	14.3	9.1
3. Total borrowings	15.3	7.4
4. Current liabilities and provisions	31.8	13.8
Total liabilities / assets	**15.5**	**8.5**
1. Loans & advances	16.6	10.5
2. Investments	10.8	0.6
3. Other assets	12.7	4.8
Income/expenditure		
1. Total income	15.8	6.4
2. Total expenditure	15.8	1.5
3. Net profit	15.6	20.8

Source: RBI supervisory returns.

Table 2.4: Select ratios of the NBFC sector

(per cent)

	Mar-16	Sep-16
1. Capital market exposure (CME) to total assets	8.5	8.1
2. Leverage ratio	3.9	3.6
3. Net profit to total income	18.3	18.6
4. RoA (Annualised)	2.2	2.2
5. RoE (Annualised)	10.6	10.5

Source: RBI supervisory returns.

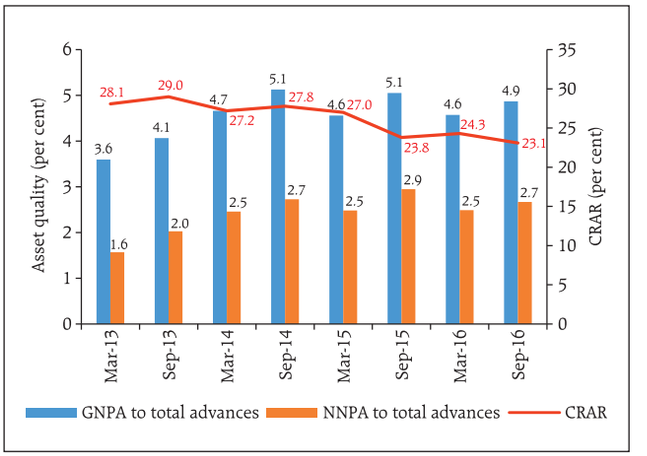
[32] NBFCs-ND-SIs are NBFCs-ND with assets of ₹5 billion and above.

Asset quality and capital adequacy

2.28 GNPAs of the NBFC sector as a percentage of total advances increased to 4.9 per cent from 4.6 per cent between March and September 2016. NNPAs as a percentage of total advances also increased to 2.7 per cent from 2.5 per cent during the same period (Chart 2.21).

2.29 As per extant guidelines, NBFCs[33] are required to maintain a minimum capital consisting of Tier-I[34] and Tier-II capital, of not less than 15 per cent of their aggregate risk-weighted assets. The CRAR of NBFC sector as a whole declined to 23.1 per cent from 24.3 per cent between March and September 2016 (Chart 2.21).

Chart 2.21: Asset quality and capital adequacy of the NBFC sector



Source: RBI supervisory returns.

Resilience – Stress tests

System level

2.30 A stress test on the credit risk for the NBFC sector as a whole for the half year ended September 2016 was carried out under three scenarios: (i) GNPA increase by 0.5 SD, (ii) GNPA increase by 1 SD and (iii) GNPA increase by 3 SD. The results indicate that in the first scenario, CRAR of the sector declined to 21.0 from 23.1 and in the second scenario, it declined to 15.3 per cent but remained above the regulatory minimum of 15 per cent.

Individual NBFCs

2.31 A stress test on the credit risk for individual NBFCs was also conducted for the same period under the above three scenarios. The results indicate that under scenarios (i) and (ii), around 5 per cent of the companies will not be able to comply with the minimum regulatory capital requirements of 15 per cent; 9 per cent of the companies will not be able to comply with the minimum regulatory CRAR norm under the third scenario.

Section IV

Interconnectedness[35]

Trends in the interbank market

2.32 The size of the interbank market[36] declined by around 2 per cent (y-o-y) in September 2016. Interbank exposures in September 2016 constituted nearly 6 per cent of the total assets of the banking system. The fund-based segment recorded a share of

[33] Deposit taking NBFCs and non-deposit taking NBFCs having asset size of ₹5 billion and above.

[34] As per the revised guidelines issued on November 10, 2014, minimum Tier-I capital for NBFCs-ND-SI (having asset size of ₹5 billion and above) and all deposit taking NBFCs was 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).

[35] 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.

[36] Besides transacting among themselves over the call, notice and other short-term markets, banks also invest in each other's long-term instruments and take positions through derivatives and other non-fund based exposures. The interbank market as connoted in the current analysis is a total of all outstanding exposures; short-term, long-term, fund and non-fund based between banks.

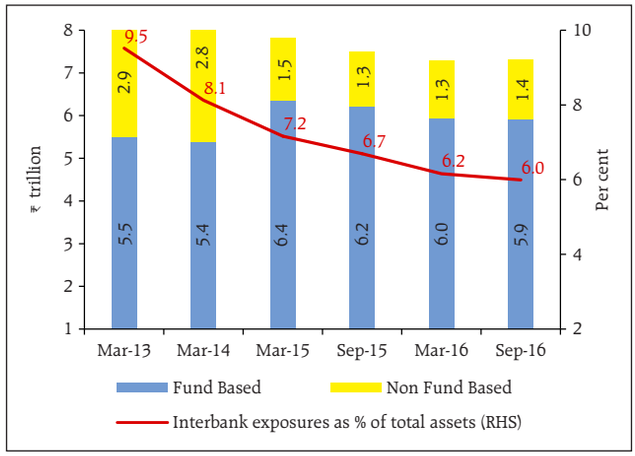
around 81 per cent in September 2016 as against 83 per cent in September 2015 (Chart 2.22).

2.33 PSBs continued to be the largest contributors in the interbank market followed by PVBs. However, the share of PSBs has been decreasing since March 2015 even as private and foreign banks are increasing their exposure (Chart 2.23).

2.34 The quantum and share of long-term[37] bilateral exposures (fund based) between banks have been steadily increasing over the years. Long-term exposures increased from ₹2.6 trillion in March 2013 to ₹3.5 trillion in September 2016. From a share of 53 per cent in the interbank market (fund-based) in March 2013, short-term[38] exposures fell to 40 per cent in September 2016 (Chart 2.24).

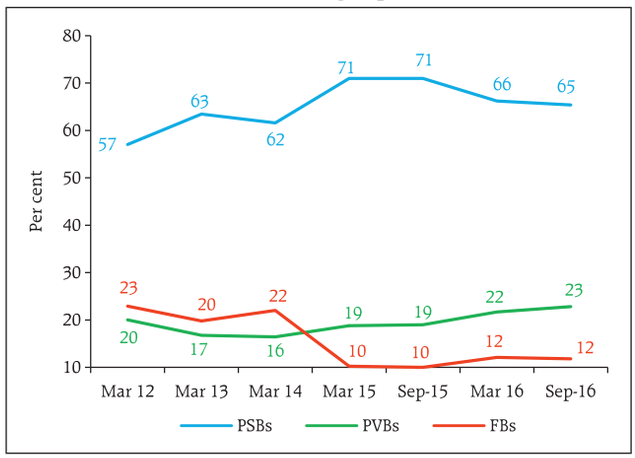
2.35 In the short term market, the share of call and certificate of deposits (CDs) has been decreasing steadily and accounted for about 39 per cent in September 2016. In the long term market, the share of capital instruments and of debt instruments and

Chart 2.22: Size (turnover) of the interbank market



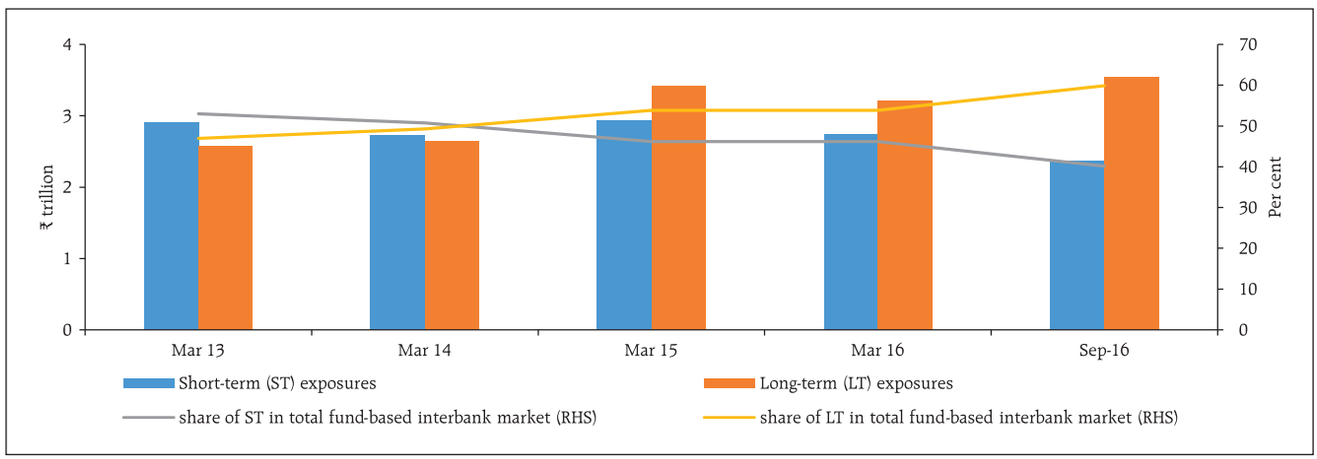
Source: RBI supervisory returns and staff calculations.

Chart 2.23: Share of different bank groups in the interbank market



Source: RBI supervisory returns.

Chart 2.24: Long-term and short-term exposures in fund-based interbank market

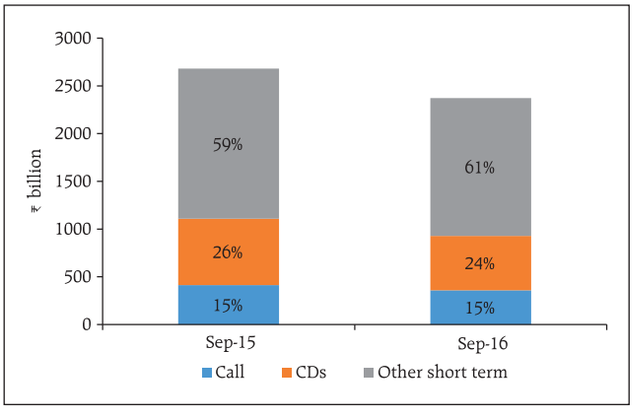


Source: RBI supervisory returns.

[37] Long-term exposures (fund based) denote those where residual maturity is above 1 year.

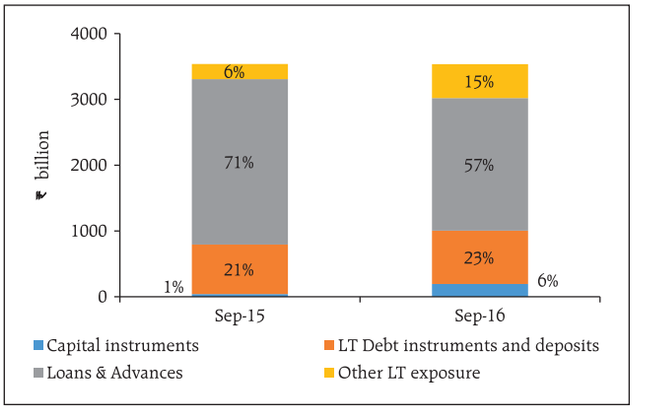
[38] Short-term exposures (fund based) denote those where residual maturity is less than 1 year.

Chart 2.25: Composition of short-term fund-based interbank market



Note: Other short term includes short term deposits, short term lending, *etc.*
Source: RBI supervisory returns.

Chart 2.26: Composition of long-term fund-based interbank market



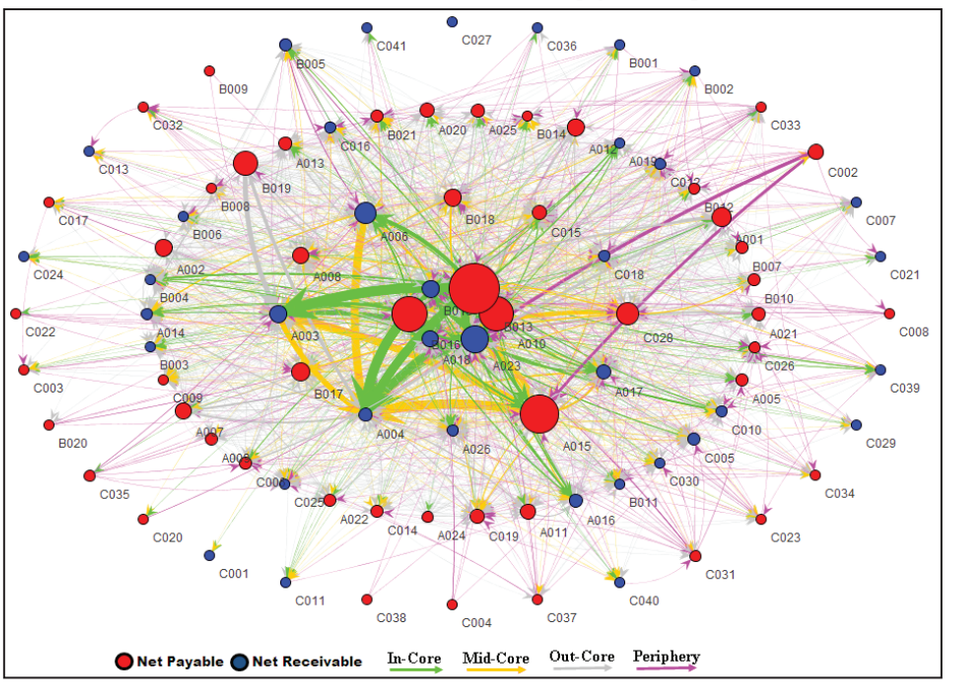
Note: Other long term primarily includes funded trade finance products.
Source: RBI supervisory returns.

deposits increased while that of loans and advances declined (Charts 2.25 and 2.26).

Network structure and connectivity

2.36 The network structure[39] of the banking system has been consistently tiered over the years, with the same set of banks dominating. The number of such banks was nine in March 2012 which came down to six in September 2016. The dominant banks are depicted in the inner most circle of the network plot (Chart 2.27).

Chart 2.27: Network structure of the Indian banking system – September 2016

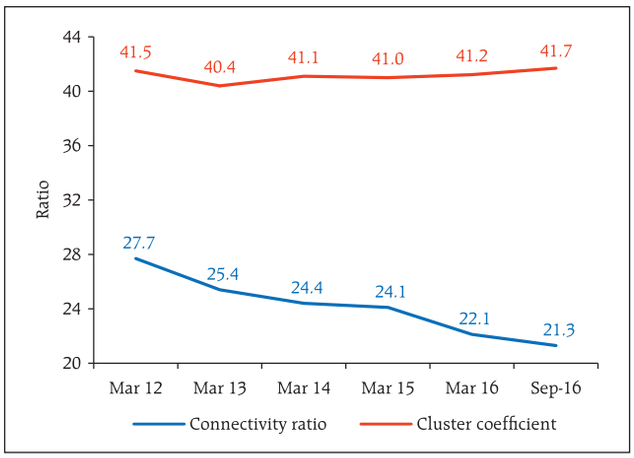


Source: RBI supervisory returns and staff calculations.

[39] The diagrammatic representation of the network of the banking system is that of a tiered structure, where different banks have different degrees or levels of connectivity with others in the network. In the present analysis, the most connected banks are in the inner most core (at the centre of the network diagram). Banks are then placed in the mid core, outer core and the periphery (the respective concentric circles around the centre in the diagram), based on their level of relative connectivity. The colour coding of the links in the tiered network diagram represents borrowings from different tiers in the network (for example, the green links represent borrowings from the banks in the inner core). Each ball represents a bank and they are weighted according to their net positions *vis-à-vis* all other banks in the system. The lines linking each bank are weighted on the basis of outstanding exposures.

2.37 The degree of interconnectedness in the banking system can be measured by the connectivity ratio[40] which showed a declining trend indicating that the links/ connections between the banks have reduced over time. The cluster coefficient[41] which depicts local interconnectedness remained stable during March 2012 and September 2016 indicating that the clustering/grouping within the banking system network did not change much over time (Chart 2.28).

Chart 2.28: Connectivity statistics of the banking system



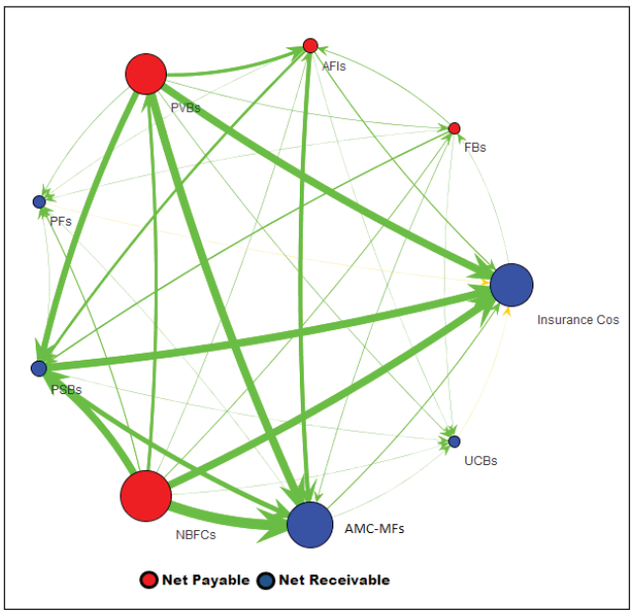
Source: RBI supervisory returns and staff calculations.

Network of the financial system[42]

2.38 From the perspective of the larger financial system, SCBs are the dominant players accounting for nearly 57 per cent of the total bilateral exposures followed by NBFCs at 13 per cent, asset management companies managing mutual funds (AMC-MFs) at 11 per cent, insurance companies and all India financial institutions (AIFIs) at 9 per cent each. UCBs and pension funds together account for nearly 1 per cent of the total bilateral exposures in the financial system.

2.39 On a net basis, AMC-MFs followed by the insurance companies are the biggest fund providers in the system while NBFCs followed by SCBs are the biggest receivers of funds. Within the SCBs, however, both PVBs and FBs have a net payable position *vis-à-vis* the entire financial sector whereas PSBs have a net receivable position (Chart 2.29).

Chart 2.29: Network plot of the financial system



Note: The analysis is confined to bilateral exposure (both fund and non-fund based) among a select sample of regulated financial institutions.
Source: RBI supervisory returns and staff calculations.

2.40 Among the net lenders (that is those who have a net receivable position against the rest of the financial system), the net exposure of AMC-MFs declined between March and September 2016, while

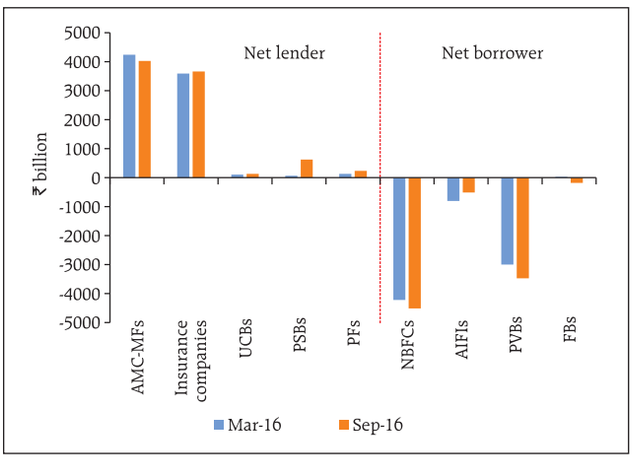
[40] *Connectivity ratio:* This is a statistic that measures the extent of links between the nodes relative to all possible links in a complete graph.

[41] *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 cluster coefficient for the network corresponds with high local interconnectedness prevailing in the system.

[42] The financial system as connoted in the current analysis refers to a select sample of regulated financial institutions. The analysis is confined to bilateral exposure (both fund and non-fund based) among the entities in the sample. The sample includes 86 SCBs, 22 AMC-MFs (which cover more than 90 per cent of the AUMs of the mutual fund sector), 21 insurance companies (both life and non-life that cover more than 90 per cent of assets of the insurance companies), 34 NBFCs (both deposit taking and non-deposit taking systemically important NBFCs), 20 SUCBs (that cover nearly 80 per cent of the assets of SUCBs), four AIFIs (*viz.*, NABARD, Exim Bank, NHB, SIDBI) and seven pension funds appointed by PFRDA under NPS. In case of pension funds, the data pertains to the schemes managed by pension funds and regulated/ administered by PFRDA.

that of insurance companies, pension funds, UCBs and PSBs increased. Among the net borrowers (*i.e.* those who have a net payable position against the rest of the financial system), the net exposure of AIFIs declined, while that of NBFCs and PVBs increased. FBs which were net lenders in March 2016 turned net borrowers in September 2016 (Chart 2.30).

Chart 2.30: Net lending (+ve)/ borrowing (-ve) by the institutions



Note: The analysis is confined to bilateral exposure (both fund and non-fund based) among a select sample of regulated financial institutions.
Source: RBI supervisory returns and staff calculations.

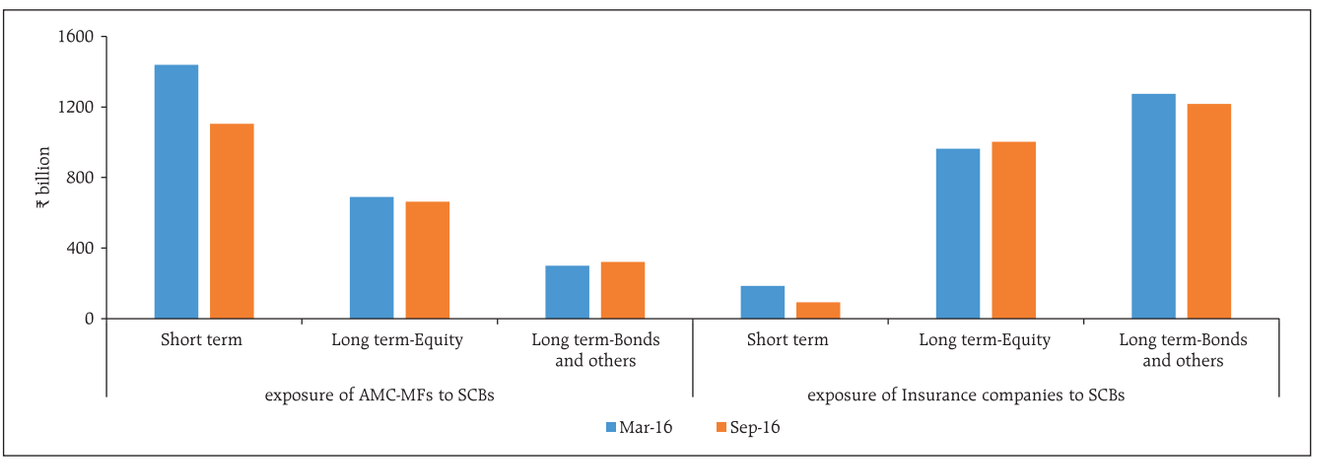
Interaction between SCBs, AMC-MFs and insurance companies[43]

2.41 As at the end of September 2016, the gross receivables of AMC-MFs towards the financial system was around 28 per cent of its average assets under management (AUM), while the gross receivables of the banking system was around 9 per cent of its total assets.[44]

2.42 The banking sector had a gross exposure (receivable) of nearly ₹134 billion in September 2016 towards the insurance and mutual fund sectors taken together (as against ₹176 billion in March 2016). At the same time, the combined exposure (gross receivable) of AMC-MFs and insurance companies towards the banking sector was nearly ₹4.4 trillion (as against ₹4.9 trillion in March 2016), which accounted for nearly 4 per cent of the total liabilities of the banking system in September 2016.

2.43 While the gross exposure (receivable) of AMC-MFs to banks was primarily short-term (₹1.1 trillion), the insurance companies had substantial long-term exposure (₹2.2 trillion) (Chart 2.31).

Chart 2.31: Pattern of AMC-MFs' and insurance companies' exposure (gross fund based receivables) to banks



Note: The analysis is confined to bilateral exposure among 86 SCBs and a select sample of AMC-MFs and insurance companies.
Source: RBI supervisory returns.

[43] The analysis is confined to bilateral exposure (both fund and non-fund based) among 86 SCBs and a select sample of AMC-MFs and insurance companies.

[44] The exposure of AMC-MFs and SCBs to the financial system also includes exposure to entities within the same group. Only on-balance sheet assets from domestic operations of the SCBs have been considered.

Exposure to NBFCs

2.44 NBFCs were the largest net receivers of funds from the rest of the financial system with SCBs accounting for 36 per cent, followed by AMC-MFs (at 34 per cent) and insurance companies (at 25 per cent). Pension funds accounted for nearly 3 per cent of the net borrowings by NBFCs from within the financial system.[45]

2.45 A part of the churning in the domestic banking sector is probably benefitting the NBFCs even as the regulatory stance is to harmonise the regulation of NBFCs with that of banks. Notwithstanding the increasing level of regulations for NBFCs, a significant share of bank finance to NBFCs and the better performance of the latter suggest that banks which are currently distressed have a scope to improve their margins by reworking their strategies.

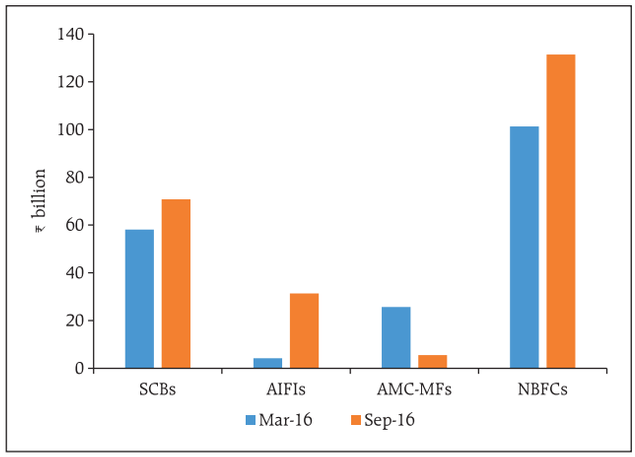
Exposure of Pension funds[46]

2.46 Pension funds were net lenders in the financial system with a gross exposure (receivable) of ₹239 billion in September 2016, of which almost 97 per cent was by way of bonds and other long term instruments. Within the financial system as referred to in the analysis here, nearly 55 per cent of the exposure (gross receivables) of pension funds was to the NBFC sector followed by the banking sector (30 per cent).[47] Pension funds' exposure (gross receivables) grew by 26 per cent between March and September 2016, mainly fuelled by an increase in their exposure to the NBFC sector (Chart 2.32).

Contagion analysis[48]

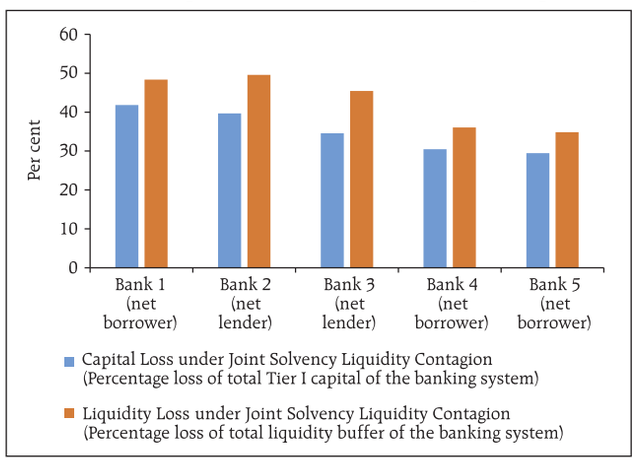
2.47 A contagion analysis using network tools is a stress test which is carried out to estimate potential losses that could happen in the event of failure of one or more banks. The maximum (top 5) estimated impact under the joint solvency liquidity contagion[49] in terms of loss of liquidity and Tier-I capital of the banking system is given in Chart 2.33.

Chart 2.32: Gross exposure (receivable) of pension funds



Note: These exposures are not on the balance sheet of the pension funds but on the balance sheet of the NPS schemes managed by pension funds. The analysis is confined to bilateral exposure (both fund and non-fund based) among a select sample of regulated entities.
Source: RBI supervisory returns.

Chart 2.33: Top 5 banks with maximum contagion impact



Note: A bank is classified as net lender if its receivables are more than its payables within the interbank system and as net borrower if its payables are more than its receivables.
Source: RBI Supervisory returns and staff calculations.

[45] The numbers quoted in this paragraph are confined to a select sample of NBFCs which are significant from a contagion perspective and their bilateral exposure with a sample of regulated financial institutions.

[46] The data pertains to the exposure of the schemes managed by the seven pension funds and regulated/ administered by PFRDA.

[47] Exposure of pension funds to UCBs and Insurance companies (in the selected sample) was nil.

[48] For methodology, refer Annex 2.

[49] Theoretically, a net borrower bank will generate a solvency contagion while a net lender bank will generate a liquidity contagion. However, in reality, both solvency and liquidity contagions are likely to occur simultaneously (*i.e.* joint solvency liquidity contagion) as typically a bank is net borrower *vis-à-vis* some counterparties while remaining a net lender against some others.

Chapter III

Financial Sector Regulation

The global regulatory standards continue to be strengthened. However, the risks of divergence from the demanding global standards amidst discriminatory treatment of foreign financial institutions have increased. Further, cutting down on correspondent banking activities by some of the major global banks due to regulatory and profitability concerns may discourage formal financial intermediation channels to reach out to financially underserved parts of the world. At the same time, some risks inherent in banks may be getting transferred to other segments of the financial markets due to increasing regulatory scrutiny and elevated capital requirements for banks.

In domestic financial markets, a number of macroprudential and other regulatory measures taken are expected to enhance transparency in the functioning of financial markets and empower customers with wider product-choices and more effective grievance redressal, leading to further strengthening of the financial sector.

An effective implementation of guidelines on capacity building in the banking sector and shift to Ind AS for banks and insurance companies will require dedicated efforts by these entities. While regulatory measures on partial credit enhancement will further support the corporate bond market, the guidelines on market mechanism and large exposures will help in reducing banks' exposures to large corporates. Introduction of two new life cycle funds and creation of a separate asset class for alternate investment are expected to provide more options to investors in pension schemes.

Section A

International and domestic regulatory developments

I. The banking sector

3.1 Major developments in global regulatory standards include regulatory capital treatment of banks' investments in instruments that comprise total loss-absorbing capacity (TLAC)[1] for global systemically important banks (G-SIBs) and standards for interest rate risk in the banking book (IRRBB)[2]. In addition, the Basel Committee on Banking Supervision (BCBS) has released a consultative document[3] and a discussion paper on policy considerations related to the regulatory treatment of accounting provisions under the Basel III regulatory capital framework; it has also issued revisions to the securitisation framework[4].

3.2 Adoption of BCBS standards by various jurisdictions, as reflected in their Regulatory Consistency Assessment Program (RCAP) reports, has been satisfactory. However, given the political economies' waning appetite for globalisation, especially in the developed countries, the risk of major divergences from Basel standards, especially the more demanding ones, become substantive. Already there are signs of discomfort, especially in the Eurozone, over new proposals such as risk weighting floors for credit risk and more capital for conduct risk. Meanwhile, there is also a proposal by the European Commission to stipulate higher capital

[1] BIS (2016), 'TLAC holdings standard', October. Available at : https://www.bis.org/bcbs/publ/d387.htm

[2] BIS (2016), 'Interest rate risk in the banking book', April. Available at : https://www.bis.org/bcbs/publ/d368.htm

[3] BIS (2016), 'Regulatory treatment of accounting provisions – interim approach and transitional arrangements – consultative document', October. Available at : https://www.bis.org/bcbs/publ/d386.htm

[4] BIS (2016), 'Revisions to the securitisation framework', July. Available at : https://www.bis.org/bcbs/publ/d374.htm

requirements for large foreign banks with subsidiaries in the EU. Seen as retaliation to the extant US regulatory stance on European banks, these developments may impact global cooperation on the standard setting mechanism. On the other side of the Atlantic, it is speculated that the political transition in the US could pose risks to Dodd Frank reforms. At the same time, debates over effectively addressing the issue of 'too big to fail' (TBTF) continue (Box 3.1). The constant tweaking of

Box 3.1: TBTF – Who is benefitting?

The previous issues of FSR have highlighted that globally the balance sheet size of 'big' banks had continued to grow, notwithstanding the regulatory measures (additional capital requirements and resolution framework leading to 'living wills'). The International Monetary Fund (IMF), in its Global Financial Stability Report (GFSR), released in April 2014[5], had indicated that the probability of governments bailing out SIBs still remained high, across regions.

Besides the controversies surrounding the label of TBTF – (one, without paying an insurance premium the bank concerned receives an insurance from the tax payer against defaults and two, the ensuing moral hazard that comes with the insurance in the form of incentivising bank managements to take riskier bets) – theoretically, this added insurance policy should increase the valuations of banks being labelled as TBTF. However, if that happens, the TBTF transfers wealth from new buyers to existing holders of equity/debt. In other words, new buyers are paying for the TBTF insurance via higher equity and bond prices. "To summarise, the value of being designated TBTF is capitalised into the price of a firm's equities and its bonds. TBTF provides a windfall capital gain to shareholders and creditors at the time of the designation. But after that, new buyers of equities and debt are paying for that status. Consequently, determining who gets "bailed out" when an institution is TBTF is a more complicated task than it appears". (Waller, Christopher, 2016)

There is some evidence that the TBTF status is not only visible in lower funding costs but is also reflected in abnormally low returns (adjusted to risks) on their stocks (Gandhi and Lustig 2015). Similar evidence could be gathered for German bank stocks (Nitschka, Thomas 2016).The larger issue that may be of interest is that debt and associated covenants have a disciplining role too on managements. But for public institutions, with embedded sovereign guarantee, there may not be any incentive to insist on covenants. Although, the long term foreign currency debt could be an exception to this, the disciplining role of debt might be at risk. In fact, beyond a certain threshold, there could possibly be a risk of regulatory capture by these institutions as their bargaining power in terms of systemic stability increases. This in turn may lead to 'accounting' and 'regulatory' solutions (forbearances) to an otherwise economic problem.

While the debate continues, the Financial Stability Board (FSB) has published the 2016 list of global systemically important banks (G-SIBs)[6] and global systemically important insurers (G-SIIs)[7]. The 30 banks and 9 insurers on the 2016 lists remain the same as those on the 2015 list, but in the G-SIB list four banks moved to a higher bucket, and three banks moved to a lower bucket which correspond to required levels of additional capital buffers. On domestic front also, there was no change in the banks identified as domestic systemically important banks (D-SIBs) in 2016[8].

References:

1. Waller, Christopher, (2016): Who Exactly Benefits from Too Big To Fail?, Economic Research, Federal Reserve Bank of St. Louis, 2016, NO. 13 (Posted 2016-06-27)

2. Gandhi and Lustig, (2015): Size Anomalies in U.S. Bank Stock Returns, The Journal of Finance, April 2015, Volume 70, Issue 2

3. Nitschka, Thomas, (2016): Is There a Too-Big-to-Fail Discount in Excess Returns on German Banks' Stocks?, International Finance

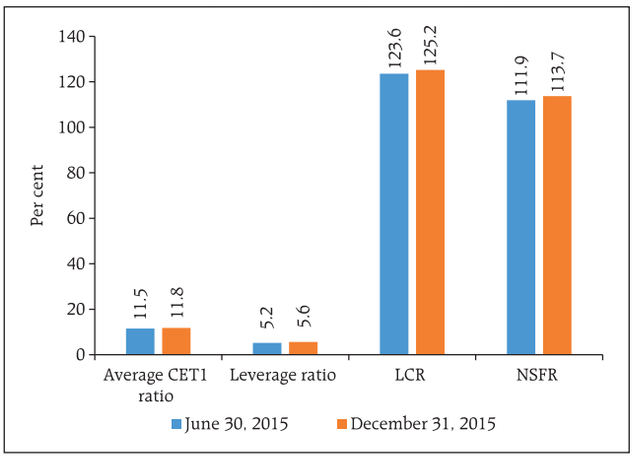
[5] IMF (2014) Global Financial Stability Report, April. Available at : https://www.imf.org/External/Pubs/FT/GFSR/2014/01/pdf/c3.pdf
[6] Financial Stability Board 2016 G-SIB List, November. Available at : http://www.fsb.org/2016/11/fsb-publishes-2016-g-sib-list/
[7] Financial Stability Board 2016 G-SII List, November. Available at : http://www.fsb.org/2016/11/fsb-publishes-2016-g-sii-list/
[8] RBI (2016) , Press Releases, 'RBI identifies SBI and ICICI Bank as D-SIBs in 2016', August. Available at : https://rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=37872

regulations seems to be impacting IT systems and budgets suggesting the need for an infrequent but periodical calendar-based approach to regulatory changes.[9]

3.3 While on the one hand, with reforms, banks appear to be getting more resilient in terms of capital and liquidity with the gradual implementation of Basel III (see Chart 3.1), on the other hand they have cut activities that are deemed too costly to be commercially pursued amid regulatory and profit pressures.[10] Further, cutting down on correspondent banking activities by some of the major global banks due to regulatory and profitability concerns may discourage formal financial intermediation channels to reach out to financially underserved parts of the world. With increasing scrutiny of banks and improved capital provisions, banks have become stronger than they were before the crisis. However, a view is emerging on whether the risks are moving into the markets. There is also scepticism over the adequacy of the re-regulatory process in appreciating and addressing the gap between risk appetite and risk capacity (the current framework does not prescribe capital requirements based on this gap) of entities that operate across the financial sector on the one hand and unambiguously distinguishing and treating credit and liquidity risks on the other (Persaud, Avinash 2016).

3.4 The process of implementation of the BCBS standards for the banks in India continues as Reserve Bank issued the final guidelines on the Large Exposures (LE) Framework to be fully implemented by March 31, 2019 (Table 3.1). Although the BCBS proposals to apply non-zero risk weights and disallow exemption from the large exposure (LE) rules on banks' sovereign exposure are still work-in-progress, the Reserve Bank has allowed exemptions to the sovereign exposures from LE limits in its LE Framework which is in line with the BCBS' April 2014 LE standards. In addition, elements of the Basel III capital framework will be selectively applied to the four all-India financial institutions (AIFIs) from April 1, 2018.[11]

Chart 3.1: Select capital and liquidity ratios for group 1 banks



Source: Basel III Monitoring Report September 2016 https://www.bis.org/bcbs/publ/d378.pdf

[9] In this context, for instance, there have been some calls in the US for a need for a review of constant regulatory changes. USGAO (2016) Report to the Chairman, Committee on Financial Services, House of Representatives, November. Available at : http://www.gao.gov/assets/690/681020.pdf

[10] Jaime Caruana (2016), BIS Speech at Third GPFI-FSI Conference on Standard-Setting Bodies and Innovative Financial Inclusion on 'Financial inclusion and the fintech revolution: implications for supervision and oversight', October. Available at : http://www.bis.org/speeches/sp161026.htm & World Bank Group Surveys Probe 'De-Risking' Practices. Available at : http://www.worldbank.org/en/topic/financialmarketintegrity/publication/world-bank-group-surveys-probe-derisking-practicesaspx?prid=37872.

[11] AIFIs currently operate under the Basel I capital framework.

II. The securities market

3.5 The Growth and Emerging Markets Committee (GEMC) of the International Organisation of Securities Commissions (IOSCO) has published its report on 'Corporate Governance in Emerging Markets.'[12] The report, *inter-alia*, discusses the issue of 'Director Independence' based on (i) the concept of 'independence' itself; and (ii) the ability of directors to provide constructive criticism, without being divisive.

3.6 SEBI has undertaken several regulatory reform measures (Table 3.1) for the domestic securities market including tightening of insider trading norms and enhancing transparency in the policies of credit rating agencies (CRAs). Further, IOSCO has recently published a consultation report[13] on other CRA products (OCPs). As the CRAs in India also widen their reach and scope and offer a number of services through their affiliates, which may not be regulated, the contents and objectives of the report are very relevant and will be useful in understanding the risks and benefits arising from such products and services of CRAs.

III. The insurance sector

3.7 The International Association of Insurance Supervisors (IAIS) recently came out with a document[14] which set out the rationale for the IAIS's revisions of the non-traditional non-insurance (NTNI) definition and a detailed description of potentially systemic insurance product features. It also revised and clarified the concepts of substantial liquidity risk and macroeconomic exposure.

IV. Recent regulatory initiatives and their rationale

3.8 Some of the recent regulatory initiatives, including prudential and consumer protection measures with the rationale thereof are given in Table 3.1

Table 3.1: Important prudential and consumer protection measures & rationale thereof July – December 2016

Date	Measure	Rationale/Purpose
1. Reserve Bank of India		
July 14	An Inter-regulatory Working Group on Fin Tech and Digital Banking set up.	i. To undertake a scoping exercise to gain a general understanding of the major Fin Tech innovations/ developments, counterparties/entities, technology platforms involved and how markets, and the financial sector in particular, are adopting new delivery channels, products and technologies. ii. To assess opportunities and risks arising from the digitisation of the financial system. iii. To assess the implications and challenges for various financial sector functions such as intermediation, clearing and payments being taken up by non-financial entities. iv. To examine cross-country practices. v. To chalk out appropriate regulatory responses with a view to re-aligning/re-orienting regulatory guidelines and statutory provisions for enhancing Fin Tech/digital banking-associated opportunities while simultaneously managing the evolving challenges and risk dimensions.

[12] OICU-IOSCO (2016) Report on Corporate Governance, October. Available at : http://www.iosco.org/library/pubdocs/pdf/IOSCOPD544.pdf.

[13] OICU-IOSCO (2016) Media Release,' IOSCO consults on Other CRA Products and their use by market participants', November Available at : https://www.iosco.org/news/pdf/IOSCONEWS443.pdf

[14] IAIS (2016) ,'*Systemic Risk from Insurance Product Features* (previously referred to as non-traditional, non-insurance activities and products)', June.

Date	Measure	Rationale/Purpose
July 21	Banks were permitted to reckon government securities held by them up to another 1 per cent of their net demand and time liabilities (NDTL) under the facility to avail liquidity for liquidity coverage ratio (FALLCR) within the mandatory SLR requirements as level 1 high quality liquid assets (HQLA) for the purpose of computing their liquidity coverage ratio (LCR). Hence, the total carve-out from SLR available to banks will be 11 per cent of their NDTL.	The Reserve Bank started the phasing-in of LCR under Basel III reforms from January 2015 with a minimum requirement of 60 per cent with a gradual increase of 10 per cent each year to reach 100 per cent from January 2019. As India already had a statutory liquidity ratio (SLR) and the introduction of LCR significantly increased the requirement of holding HQLAs by banks, a need was felt to rationalise the HQLA requirements under the two ratios by common reckoning of government bonds- to a certain extent. This measure will help banks in meeting the increasing minimum LCR while maintaining their financing of other assets.
August 4	Website 'Sachet' launched to curb illegal collection of deposits.	India is a vast country with different types of entities engaged in providing financial services. Further, the presence of different regulators for different kinds of entities, overlapping of regulatory roles, the presence of regulatory gaps and low levels of financial literacy among the people make it difficult for the common man to differentiate between a regulated and an unregulated entity and to find a suitable forum for redressal of his grievances arising from transactions with such entities. This initiative enables the public to obtain information regarding entities that are allowed to accept deposits, lodge complaints and also share information regarding illegal acceptance of deposits by unscrupulous entities. The website will also help enhance coordination among regulators and state government agencies and thus be useful in curbing instances of unauthorised acceptance of deposits by unscrupulous entities.
August 4	Regulatory guidelines on implementing the Indian Accounting Standards (Ind AS) for all-India financial institutions issued. AIFIs shall comply with Ind AS for financial statements for accounting periods beginning from April 1, 2018 onwards, with comparatives for the period ending March 31, 2018 or thereafter.	MCA outlined the roadmap for implementing the international financial reporting standards (IFRS) converged Ind AS for banks, non-banking financial companies, select all-India term lending and refinancing institutions and insurance entities in January 2016. All scheduled commercial banks have to comply with Ind AS from April 1, 2018. The guidelines broadly advises AIFIs about the steps to facilitate implementation of Ind AS.
August 25	Guidelines on enhancing credit supply for large borrowers through the market mechanism issued. The guidelines introduced the concepts of 'specified borrower' and 'normally permitted lending limit' (NPLL) for the purpose of setting in disincentives for borrowing from the banking sector beyond a certain cut-off. NPLL means 50 per cent of the incremental funds raised by a specified borrower over and above the aggregate sanctioned credit limit (ASCL) as on the reference date, in the financial years (FYs) succeeding the FY in which the reference date falls. As per the prudential measures proposed under the disincentive mechanism, from 2017-18 onwards incremental exposure of the banking system to a specified borrower beyond NPLL shall be deemed to carry higher risk which shall be recognised by way of additional provisioning (3 percentage points over and above the applicable provision) and higher risk weights (75 percentage points over and above the applicable risk weight) for the exposure.	While the regulatory measures for addressing the concentration risk to individual banks arising from their exposures to individual and group entities existed since 1989, build-up of concentration risk at the banking system level from banks' collective exposures to specific counterparties has been a matter of concern. These guidelines address this concern by dis-incentivising aggregate borrowing by a borrower from the banking system beyond a cut-off limit.

Date	Measure	Rationale/Purpose
August 25	In a partial review of its instructions on 'partial credit enhancement (PCE) to corporate bonds' the Reserve Bank allowed an increase in the aggregate exposure limit from the banking system for a specific bond issue to 50 per cent of the bond issue size from the extant limit of 20 per cent of the bond issue size. In addition, within the aggregate limit, a limit of up to 20 per cent of the bond issue size for an individual bank has been allowed.	Reserve Bank's circular dated September 24, 2015 on PCE capped the aggregate exposure limit of all banks towards the PCE for a given bond issue at 20 per cent of the bond issue size. In order to further support the development of corporate bonds market, RBI has allowed this higher exposure limit.
September 1	Guidelines on Sale of Stressed Assets by Banks issued.	The Reserve Bank, as part of the Framework for Revitalising Distressed Assets in the Economy, had previously amended certain guidelines relating to sale of non-performing assets (NPAs) by banks to Securitisation Companies (SCs)/ Reconstruction Companies (RCs). The current guidelines have been issued with a view to further strengthen banks' ability to resolve their stressed assets effectively, and put in place an improved framework governing sale of such assets by banks to SCs/RCs/other banks/ Non-Banking Financial Companies /Financial Institutions *etc.*
October 27	A framework permitting AD category-I banks to allow start-ups to raise external commercial borrowings (ECB) limited to US$ 3 million or equivalent per financial year issued.	This was issued with a view to facilitating start-ups to access funding through ECB route.
November 10	Schemes for stressed assets – revisions issued, which revise certain provisions under various previous guidelines -- Framework for Revitalising Distressed Assets, Flexible Structuring of Project Loans, Strategic Debt Restructuring Scheme, Scheme for Sustainable Structuring of Stressed Assets, *etc.*	The changes in these guidelines have been carried out with the objectives of : (i) harmonising the stand-still clause as applicable in case of the Strategic Debt Restructuring Scheme with other guidelines; (ii) clarifying the deemed date of commencement of commercial operations; and (iii) partially modifying of certain guidelines based on the experience gained in using these tools in resolving stressed assets and feedback received from stakeholders as also taking into consideration the requirements of the construction sector.
November 21	A short-term deferment of classification of the loan assets of its regulated entities (REs) as substandard allowed. Under this instruction, an additional 60 days have been permitted beyond what is applicable for the concerned RE for recognition of a loan account as substandard. This relaxation will be available only in certain cases of dues payable between November 1, 2016 and December 31, 2016.	In view of the need of some more time to repay the loan dues by small borrowers due to consequences arising from withdrawal of the legal tender status of the existing ₹500 and ₹1,000 notes (SBN), RBI has allowed this short term change in its income recognition, asset classification and provisioning (IRAC) norms.
December 1	Final guidelines on large exposures (LE) Framework issued with a view to implementing the BCBS' Standards on Large Exposures (April 2014) with effect from March 31, 2019. The salient features of the proposed LE Framework include: 1. The LE limit in respect of each counterparty and group of connected counterparties, under normal circumstances, will be capped at 20 per cent and 25 per cent respectively of the eligible capital base. 2. The eligible capital base will be defined as the Tier 1 capital of the bank as against 'Capital Funds' at present. 3. A group of connected counterparties will be identified on the basis of objectively defined 'control' criteria.	Concentration risk arising from large exposures of banks to a few single or group of interconnected counterparties has been a matter of concern and Reserve Bank had prescribed single and group exposure norms in the matter since March 1989. In order to foster a convergence among widely divergent national regulations on dealing with large exposures, the BCBS issued the Standards on 'Supervisory framework for measuring and controlling large exposures' in April 2014. The Reserve Bank has decided to suitably adopt these standards for banks in India. These standards propose to objectively define a group of connected counterparties on the basis of 'Control' criteria and lower the exposure ceiling to such groups. These standards also propose adoption of "Look Through Approach" (LTA) for collective investment undertakings (CIUs), securitisation vehicles and other structures to determine the relevant counterparties.

Date	Measure	Rationale/Purpose
2. Securities and Exchange Board of India (SEBI)		
September 1	Additional risk management norms for commodity derivatives markets issued. These include at least a 2-day margin period of risk, delivery period margins, steps to regain matched books, concentration margins and default waterfalls for national commodity derivatives exchanges.	To streamline and strengthen the risk management framework and to avoid any systemic risk across national commodity derivatives exchanges.
September 7	Guidelines on restrictions on promoters and whole-time directors of compulsorily delisted companies pending fulfilment of exit offers to the shareholders issued.	To ensure effective enforcement of exit option to the public shareholders in case of compulsory delisting.
September 20	Guidelines on Enhanced Disclosures (*viz.* commission paid to distributors, average Total Expense Ratio) in Consolidated Account Statement (guidelines issued on September 20, 2016 read with that issued on March 18, 2016)	To increase transparency of information to investors.
September 23	Regulatory framework for commodity derivatives brokers issued.	To harmonise regulatory provisions for brokers across equity and commodity derivatives markets.
October 10	Exclusively listed companies (ELC) of derecognised / non-operational / exited stock exchanges placed in the Dissemination Board (DB)	To protect the interest of shareholders of such ELCs by providing them an exit option
October 26	Guidelines on freezing of promoter and promoter group demat accounts for non-compliance with certain provisions of listing regulations issued.	To ensure effective enforcement with regard to the prescribed 'uniform fine structure' for non-compliance with certain provisions of SEBI's listing regulations and standard operating procedure for suspension and revocation of trading of specified securities.
November 1	Enhanced standards for credit rating agencies (CRAs) issued. These are aimed at bringing in greater transparency in CRAs' policies, enhancing the standards followed by the industry thereby facilitating ease of understanding the ratings by investors. The circular broadly covers the policies with respect to non-co-operation by the issuer, accountability and managing the conflict of interest of the members of a rating committee, standardising the format of CRAs' press releases and disclosure on their websites amongst others.	CRAs play an important role in financial sectors. Reducing mechanistic reliance on CRAs was one of the major reform agendas of the Financial Stability Board in the wake of the global financial crisis. However, due to challenges in finding alternative standards of creditworthiness and inadequate internal resources for risk assessment, CRAs remain significant providers of credit ratings in India and other developing countries. Against this backdrop, higher transparency in CRAs' procedures and policies can add to a better understanding of the ratings assigned by them by the users of such ratings.
November 23	SEBI's board decision – FPIs permitted to invest in unlisted non-convertible debentures and securitised debt instruments.	To enhance the investor base in unlisted debt securities and securitised debt instruments.
November 23	SEBI's board decision- amendment to listing regulations to enforce disclosures and shareholder approval for private equity funds entering into compensation agreements to incentivise promoters, directors and key managerial personnel of listed investee companies.	To prevent potential unfair practices.
3. Insurance Regulatory and Development Authority of India (IRDAI)		
July 12	Non insistence of Advance Discharge Voucher for releasing payments	In order to protect the policyholders, the Authority issued this guideline intimating the Life Insurers "Not to withhold or delay the payment for the reason of non-execution of advance discharge voucher and to make the policy payment to the policyholders to discharge its contractual obligations".

Date	Measure	Rationale/Purpose
July 18	Insurance Regulatory and Development Authority of India (Health Insurance) Regulations, 2016.	• Additional norms for protection of interest of policyholders • Enhance the scope of health insurance product innovation • Enabling mechanism to reward healthy behaviour of policyholders • Facilitation in group health insurance product approval process
August 5	The Authority has issued IRDAI (Listed Indian Insurance companies) Guidelines, 2016 applicable to all insurers who have listed their equity shares or are in the process of getting their shares listed on the stock exchanges. These guidelines are in addition to IRDAI (Issuance of Capital by Indian Insurance Companies transacting Life Insurance Business) Regulations, 2015 and IRDAI (Issuance of Capital by Indian Insurance Companies transacting other than Life Insurance Business) Regulations, 2015 and cover aspects related to minimum promoter shareholding and provisions relating to transfer of the shares. The Guidelines are also applicable to an insurance intermediary licensed by the Authority provided that such insurance intermediaries are drawing more than 50 per cent of its revenue from insurance business.	The guidelines seek to address operational aspects such as monitoring the foreign direct investment (FDI) in insurance sector, approval of share transfer, ceiling of holding on various classes of the investors, listing of the Insurers.
November 7	Guidelines on Point of Sales (POS) Person for Life Insurance	These guidelines allowing marketing of simple plain products by POS persons are aimed at providing easy access to life insurance to people at large and enhancing insurance penetration and density.
November 7	Guidelines on Point of Sales (POS) Products for Life Insurance	The guidelines prescribe the eligible products that can be sold by Point of Sales Persons.
4. Pension Fund Regulatory and Development Authority (PFRDA)		
November 4	Two new life cycle (LC) funds (LC 75 and LC 25) introduced for private sector subscribers, in addition to the existing life cycle fund to provide a pre-programmed diversification of assets in various asset classes as per the age and risk profile of the subscriber.	A prudential investor regime envisages appropriate fund-age allocation and diversification across asset classes in accordance with the risk appetite of the subscribers. However, for those unwilling or unable to make a choice of asset allocations, life cycle funds not only provide a simpler and professional way of managing funds but also provide investors with a pre-programmed opportunity to adequately diversify and rebalance their portfolios in accordance with their age-specific risk levels. The life cycle fund is based on the globally accepted best practice of 'declining risk appetite with increasing age.' Presently, NPS provides for one life cycle fund option to NPS subscribers wherein equity allocation is capped at 50 per cent, tapering off to 10 per cent at the time of retirement. This life cycle fund is also the default option for private sector subscribers. Now, in accordance with the recommendations of the Bajpai Committee, two more life cycle funds have been floated: a) the aggressive life cycle fund wherein for the first time subscribers are allowed investments up to 75 per cent in equity, tapering off to 15 per cent by the time they near retirement, b) the conservative life cycle fund wherein the maximum exposure in equity shall be 25 per cent, tapering off to 5 per cent by the time subscriber approaches retirement.

Date	Measure	Rationale/Purpose
November 4	Guidelines on the creation of separate asset class A (for alternate investments) issued. This creates a separate asset class 'A' (for alternate investments) for private sector NPS subscribers in addition to existing asset classes E, C and G. Investments in asset class A will comprise of the following- 1. Commercial mortgage based securities or residential mortgage based securities. 2. Units issued by real estate investment trusts regulated by SEBI. 3. Asset backed securities regulated by SEBI. 4. Units of Infrastructure Investment Trusts regulated by SEBI. 5. Alternative investment funds (AIF categories I and II) registered with SEBI.	Internationally, institutional investors like PFs consider alternative investments as potential revenue earners due to their benefits as tools of diversification (with low or negative correlation with the other traditional assets in the portfolio), lower volatility and higher risk adjusted returns. Investments in alternative investment funds will help in risk diversification and returns optimisation since the returns of these asset classes are not directly co-related to the returns from traditional asset classes. Any downtrend in other asset classes may be compensated up to some extent by returns generated by these instruments and vice-versa. Therefore, the introduction of alternative investment funds and the creation of a separate asset class A (alternate investment) will allow pension funds to diversify their portfolios and hence reduce the risks associated with specific traditional asset classes and also help them in achieving optimum returns.

Section B

Other developments

I. The Financial Stability and Development Council

3.9 Financial Stability and Development Council (FSDC) held one meeting (15th meeting of FSDC on July 5, 2016) since the publication of the last FSR in June 2016,wherein issues such as rising bank NPAs, developing a robust regulatory framework for various credit guarantee schemes of the Government, comprehensive scheme for identification of systemically important financial institutions (SIFIs) across all sub-sectors of financial sector and possible stress in the financial markets on account of maturity of concessional swaps in 2013 against FCNR deposits were discussed.

3.10 The FSDC sub-committee held one meeting (18th meeting of FSDC-SC) on August 29, 2016, wherein report of Financial Stability Board (FSB) Peer Review of India, report of the Working Group (WG) on Development of Corporate Bond Market in India, proposed Bill on setting up of statutory Financial Data Management Centre (FDMC)[15], Minimum Assured Return Scheme (MARS) under National Pension System (NPS) and regulation of spot exchanges were discussed. The sub-committee also reviewed the functioning of the technical groups supporting it and functioning of the state level co-ordination committees (SLCCs) in various states/ union territories. As decided in the previous sub-committee meeting held in April 2016, the Ministry of Finance (MoF) has set up a working group on issues related to gold, SEBI has formed a committee on the stewardship code and the Reserve Bank has set up an Inter-regulatory working group on Fin Tech and digital banking and another committee on household finances.

II. The banking sector

Capacity building

3.11 Effective and capable human resources in regulated entities are important for implementing and fulfilling regulatory objectives. The Reserve Bank had constituted a Committee on Capacity Building (July 2014), with the objective of implementing non-legislative recommendations of the Financial Sector Legislative Reforms Commission (FSLRC) relating to capacity building in banks and

[15] DEA, MoF had set up a committee to study the financial data management legal framework in India, in May 2016. The report of the committee will be placed in the public domain shortly.

non-banks, streamlining training interventions and suggesting changes thereto in view of ever increasing challenges in the banking and non-banking sectors. In August 2016, the Reserve Bank issued guidelines on capacity building in banks and AIFIs prescribing adoption of some of the recommendations of the committee. Banks are required to identify specialised areas for certification of the staff manning key responsibilities. To begin with, the banks are required to make acquiring a certification mandatory for: (i) treasury operations – dealers, mid-office operations; (ii) risk management – credit risk, market risk, operational risk, enterprise-wide risk, information security, liquidity risk; (iii) accounting – preparing of financial results, audit function; and (iv) credit management – credit appraisal, rating, monitoring, credit administration.

Bank supervision: Concerns and developments

Frauds in technology and traditional banking environments

3.12 In the recent past, frauds in the technology environment have accentuated through malware attacks and skimming frauds in ATMs, misuse of SWIFT messages by employees and attacks on the SWIFT messaging system of a bank. Considering the large scale penetration of ATMs in semi-urban and rural areas and a massive addition of new customers under the Jan Dhan scheme with ATM cards, it is of utmost importance that ATMs' operations are carried out in a completely sanitised manner. While the Reserve Bank has issued caution advices and specific instructions in this regard, banks need to be vigilant.

3.13 The instances of large scale forex remittances in the guise of import advances/payments is another area of supervisory concern. While banks may not have any credit exposures to such parties remitting forex, misuse of banking channels for such remittances is a serious concern, and, therefore, banks need to enhance rigour in their data analytics and reporting structures to aid board level governance. The Reserve Bank has enhanced regulatory and supervisory instructions in this regard and many banks in India have been penalised for violation of instructions issued under Prevention of Money Laundering Act (PMLA) and Foreign Exchange Management Act (FEMA). Similarly, the instances of contravention of Reserve Bank's instructions on opening of current account and providing non-fund based credit facilities (bill/LCs discounting/guarantees) by banks to constituents who are not their regular borrowers also need to be addressed.

Move towards cyber security risk audit of banks

3.14 Recognising the potential impact of major cyber security incidents on the stability of financial system, Reserve Bank established a Cyber Security and IT Examination (CSITE) Cell in 2015. Comprehensive guidelines on "Cyber Security Framework in Banks" covering best practices has been issued in June 2016. IT examinations and thematic studies, independent of financial supervision, are conducted to assess the robustness of banks' cyber infrastructure and governance practices. Cyber drills are also conducted in collaboration with the Indian Computer Emergency Response Team (CERT-In) to evaluate the cyber security incident response capabilities in banks.

Full coverage under risk based supervision (RBS) by the end of the year

3.15 Introduced in 2012-13, supervisory program for assessment of risk and capital (SPARC) has been successfully implemented over three supervisory cycles for the banks operating in India, covering more than 65 per cent of the banking system assets and liabilities. While the newly licensed banks are ab-initio covered under this supervisory program, from 2016-17 supervisory cycle, all scheduled commercial banks (excluding RRBs and Local Area Banks) have been placed under the SPARC framework.

III. Implementation of Ind AS

3.16 The Ministry of Corporate Affairs (MCA), Government of India had notified the Companies (Indian Accounting Standards) Rules, 2015 in February 2015. In January 2016, MCA outlined the roadmap for implementing the International Financial Reporting Standards (IFRS) converged Indian Accounting Standards (Ind AS) for banks, non-banking financial companies, select all-India term lending and refinancing institutions and insurance entities. The process of convergence of the current accounting framework in India with IFRS has started with certain categories of corporates transitioning to Ind AS in this financial year. The Reserve Bank has issued directions in February & August 2016 in terms of which all scheduled commercial banks (excluding regional rural banks) and AIFIs shall prepare Ind AS financial statements for accounting periods commencing from April 1, 2018 (with previous year comparatives).

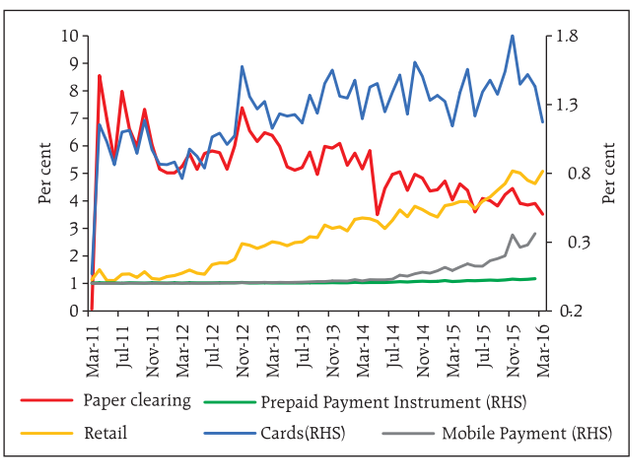
3.17 Insurance companies are also required to prepare Ind AS based financial statements for accounting periods beginning April 1, 2018. IRDAI has constituted an implementation group of accountants, actuaries, industry experts and officials of the Authority with the mandate of examining the implications of implementing Ind AS, addressing implementation issues and facilitating the formulation of operational guidelines to converge with Ind AS in the Indian insurance sector.

IV. Payment and settlement systems

3.18 Payment and settlement systems (PSS) as part of the financial market infrastructure (FMI), play a critical role in ensuring an efficient and stable financial system and in the smooth functioning of the overall economy. As mentioned in previous FSRs, India has been keeping pace in adopting international standards and best practices and implementing global regulatory reforms which seek to adequately address the systemic risks associated with FMIs.

3.19 As the regulatory and supervisory authority for payment and settlement systems[16] (except those under stock exchanges), the Reserve Bank has adopted a broad approach towards facilitating and encouraging an increasing number of payment transactions, especially large value transactions in electronic (non-cash) modes. The share of electronic transactions in total transactions in volume terms moved up to 84.4 per cent from 74.6 per cent, accounting for more than 95.2 per cent in value terms. While a large proportion of these are on account of RTGS and the Clearing Corporation of Indian Limited (CCIL), the share of retail electronic payments and mobile payments is steadily increasing (Chart 3.2).

Chart 3.2: Share of various categories of payment systems*



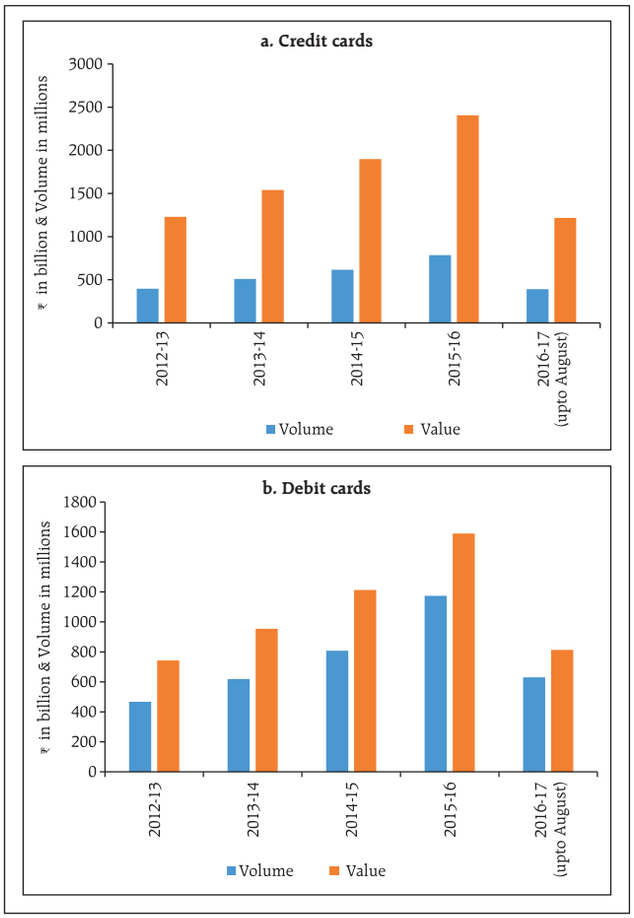
Note: * Excluding the share of RTGS and CCIL.
Source: RBI

[16] under the Payment and Settlement Systems Act, 2007.

3.20 There is a trend of increasing shift towards electronic payment systems, with the usage of card payments (credit cards and debit cards) registering consistent growth (Chart 3.3).

3.21 Recent initiatives towards reducing the size of the cash economy are likely to sharply increase the use of digital money and its equivalents. The Reserve Bank in its 'Vision 2018' document reassured that it would take further measures 'to encourage greater use of electronic payments by all sections of society so as to achieve a "less-cash" society.' Apart from addressing security concerns, other measures will be required to effect a larger 'cultural' shift away from proclivity for cash in the present Indian context. Frictions that create a wedge between electronic modes of transaction and cash not only in terms of ease but also in terms of costs need to be addressed in bringing electronic payment channels closer to cash.

Chart 3.3: Trends in usage of credit cards and debit cards



Source: RBI

V. Fin Tech and Reg Tech

3.22 Rapid developments are taking place in the area of Fin Tech globally. Market players, mainly technology start-ups, as well as regulators and central banks are evolving to the technological innovations in financial services. It is understood that the future of financial regulation, supervision and policymaking lies in using technology and data to improve the speed, quality and comprehensiveness of information in support of targeted, risk-based decision making. Reg Tech can reduce the cost of compliance for financial institutions and increase consumer trust and participation in the system. Regulators across the globe are trying to proactively engage with the tech firms to customise the technological applications to improve the regulatory process. Many jurisdictions have established regulatory sandboxes and innovation hubs for testing of new products/services and providing support/guidance to regulated as well as unregulated entities. Certain advanced jurisdictions have set up "Innovation Accelerators", which are partnership arrangements between innovators/Fin Tech providers and/or incumbent firms and official sector authorities to 'accelerate' growth. Adoption of technology by regulators popularly known as Reg Tech has been discussed in Box 3.2.

Box 3.2: Reg Tech

The increasing use of computational and network technologies in delivering different types of financial services while striving to protect the integrity of financial data and transactions through advanced applications such as cryptography, block-chain and machine learning (collectively referred to as 'Fin Tech') are resulting in a completely new approach to the business of finance. There is a need for all stakeholders including business firms, consumers, policymakers and regulators to understand and adopt the trends and developments in Fin Tech, along with the inherent risks as an essential first step. This has assumed greater significance for the authorities since apart from its potential for improving efficiency and financial inclusion, the fast-paced innovations (for example, virtual currency and P2P lending) have brought risks and concerns about data security and consumer protection on the one hand and the far-reaching potential impact of the effectiveness of monetary policy itself on the other. It may sound paradoxical but after the initial fretting over digital currencies many central banks around the world seem to be examining the feasibility of creating their own digital currencies.

While Fin Tech is mainly pushed by the competitive forces brought by the new wave technology start-ups, the changing landscape of regulatory and supervisory reporting, especially coping with jurisdiction-specific and often conflicting or different regulatory frameworks poses additional challenges to financial sector participants as also to regulators. Apart from increasing the cost of compliance for regulated entities, the complexity and information intensive oversight requirements also pose challenges to regulators who look for a needle of wisdom amidst a stack of information.

Reg Tech, which is an extension of Fin Tech is the market response to such challenges. IBM's recent acquisition of Promontory, a leading 'risk management and regulatory compliance' consultancy firm whose staff includes former employees of SEC, the Fed and other regulators is one such effort to cater to the Reg Tech market through a man-machine symbiosis – expert human knowledge and the cognitive artificial-intelligence platform.

From one perspective, as defined by the Financial Conduct Authority (FCA) of the UK[1] Reg Tech can be seen as a part of the universe of Fin Tech, referring to the '*technologies that may facilitate the delivery of regulatory requirements more efficiently and effectively than existing capabilities.*' However, from a broader perspective, Reg Tech may be seen as representing '*the next logical evolution of financial services regulation and … offers the potential of continuous monitoring capacity, providing close to real-time insights, through deep learning and artificial intelligence filters, into the functioning of the markets nationally and globally, looking forward to identify problems in advance rather than simply taking enforcement action after the fact*[2].

A report by the Institute of International Finance (IIF)[3] suggests that developing Reg Tech solutions will help in processes related to risk data aggregation; modelling, scenario analysis and forecasting; monitoring payment transactions; identifying clients and legal persons; monitoring a financial institution's internal culture and behaviour; trading in financial markets; and identifying new regulations applicable to financial institutions.

Apart from regulatory evolution, as the Fin Tech process has made the finance industry far more vulnerable to cyber-attacks and other types of cyber frauds, Reg Tech will need to be seen as a response to such threats and risks. The automation of processes related to 'know your customer' (KYC) and 'anti-money laundering' (AML) can be considered examples of basic Reg Tech applications.

The scope of Reg Tech is immense because as Fin Tech graduates from digitisation of money to monetisation of data, the regulatory framework, especially macro-prudential policy tools, will need to be supported by developments in Reg Tech to address challenges such as data integrity, data sovereignty and algorithm supervision.

References:

1. (FCA), UK, 'Call for Input: Supporting the development and adoption of RegTech.' (https://www.fca.org.uk/news/news-stories/call-input-supporting-development-and-adoption-regtech).

2. Arner, Douglas W., Jànos Barberis, and Ross P. Buckley (forthcoming), 'FinTech, RegTech and the Reconceptualisation of Financial Regulation.' (http://ssrn.com/abstract=2847806).

3. 'Regtech in financial services: Technology solutions for compliance and reporting', IIF Report, March 2016 (https://www.iif.com/…/regtech-financial-services-solutions-compliance-and-reporting).

3.23 One of the areas that is fast growing in the digital payments space is prepaid payment instruments (PPI) and it will be inevitable that the new developments come with some consumer protection issues. Recently the Consumer Financial Protection Bureau (CFPB) in the US decided to regulate one of the fastest-growing concerns of finance. Concerns emerged as customers were sometimes unable to access their money and account balances because of 'technical problems.' The free float of funds that is available with a PPI issuer is a major attraction for the entities operating in this space. However, it may be subject to misuse, especially if the unutilised funds are subject to forfeiture. In case of most of the advanced jurisdictions, the escheatment clauses are clear that where the unutilised funds as per the extant laws need to be transferred to the state as unclaimed property, the card company will deactivate the card and make available the funds to the owner on request and issue a new card.

VI. Evolving insolvency and resolution framework

3.24 A Committee was set up in March 2016 as a follow up of the proposal made in the Union Budget 2016-17, to frame a 'Code on Resolution of Financial Firms' for a specialised resolution mechanism to deal with bankruptcy situations in banks, insurance companies and other financial sector entities. The committee has since come out with the draft Financial Resolution and Deposit Insurance (FRDI) Bill[17], 2016 for public comments.

3.25 The draft Bill prescribes setting up of a Resolution Corporation (RC), which would help India to broadly adhere to the Financial Stability Board's Key Attributes (FSB KAs) of Effective Resolution Regimes for Financial Institutions[18] by addressing the gaps in the current resolution mechanism in India in terms of legal framework, resolution tools, liquidation, coverage of entities, cross border cooperation and oversight framework. The proposed RC would subsume the role of DICGC which currently undertakes only the 'pay box' function *i.e.*, reimbursement of insured amount to the depositors of failed banks. This framework aims to position RC to play a vital role in maintaining financial stability. The other salient features of FRDI Bill, 2016 are given in Box 3.3.

[17] http://dea.gov.in/sites/default/files/Press_FRDI_Bill28092016.pdf ; Ministry of Finance Committee Draft (2016) , 'THE FINANCIAL RESOLUTION AND DEPOSIT INSURANCE BILL'. http://www.finmin.nic.in/fslrc/FRDI%20Bill-27092016.pdf

[18] Financial Stability Board (2014) 'Key Attributes of Effective Resolution Regimes for Financial Institutions'. October. Available at : http://www.fsb.org/wp-content/uploads/r_141015.pdf

Box: 3.3: Financial Resolution and Deposit Insurance (FRDI) Bill 2016

1. **Composition of the Board:** The board of the RC would consist of eleven members headed by Chairperson having five *ex-officio* members representing Ministry of Finance, RBI, SEBI, IRDAI and PFRDA along with upto three whole time members and two independent members to be appointed by the Central Government.

2. **Scope:** The proposed RC intends to cover the financial sector entities *viz.*, banks, insurance companies, non banking financial companies, holding companies, financial market infrastructures, systemically important financial institutions (SIFIs) and any other entity which may be notified by the Central Government for the purpose of resolution while confining the deposit insurance only to banks. The entities that will be covered under RC have been classified under two categories *viz.*, Covered Service Providers (CSPs-all entities as mentioned above) for the purpose of resolution and Insured Service Providers (ISPs – only banks) for the purpose of Deposit Insurance.

3. **Powers and functions of RC:** The RC would provide Deposit Insurance, assign risk to viability of a CSP, inspect a CSP, resolve a CSP and act as liquidator for a CSP apart from any other operations as mentioned in the Bill.

4. **Powers of Investigation, Search and Seizure and Inspections:** The RC would have substantial powers to conduct searches and seizures and investigations of CSP when the CSP is classified as imminent or critical by the appropriate regulator or RC. RC has the power of independent inspection when there is difference of opinion with appropriate regulator in classifying the entity as material. It can also inspect an entity on continuous basis in imminent stage.

5. **Defining Risk to Viability:** Based on certain parameters, a five-stage "risk to viability framework" for CSPs, *viz.*, (i) low, (ii) moderate, (iii) material, (iv) imminent, and (v) critical has been proposed. The Board shall, in consultation with the appropriate Regulator, specify objective criteria for classification of CSP into any of the five categories. The first two stages ("low risk to viability" and "moderate risk to viability") would be such that the CSP's probability of failure is below acceptable level. At these stages, the RC would have no powers of investigation, search or seizure on the CSPs. The only exceptions are SIFIs, which would submit "Resolution Plans" irrespective of their financial situation. This plan will help in devising optimal resolution strategies for these firms. Also, SIFIs may at any point be jointly inspected by the respective regulator(s) and the RC.

6. **Material risk-to-viability:** The CSPs categorised as material risk-to-viability would be more risk averse than those of the low and moderate risk-to-viability. This category signifies the first breach of threshold of acceptable probability of failure along with breach of prudential regulation requirements. When classified as 'material risk-to-viability', a CSP has to prepare a Resolution Plan and send to RC. The CSP also has to prepare a Restoration Plan to send to regulators.

7. **Imminent risk-to-viability:** The stage of the CSP is well above acceptable probability of failure. A CSP can also be categorised under this type of risk-to-viability if it fails to submit/implement resolution plan or restoration plan or if it is determined that there has been a major fraud in the firm that significantly affects the viability of CSP.

8. **Critical risk-to-viability:** At this stage, the classification is done through an order in writing. As soon as this is done, the RC would become the Administrator for the CSP.

9. **Resolution tools:** Four major resolution tools are envisaged in the Bill which will be used after the CSP is categorised as "critical risk to viability". They are: (i) Sale to or merger with another institution; (ii) Transfer of assets and liabilities to a Bridge Service Provider; (iii) Bail-in and (iv) Liquidation. These resolution tools would help to extend the mandate of the RC beyond 'Pay box' into 'Pay box plus'. Liquidation option should be considered only when the other resolution tools are not optimal. Definite timelines have been prescribed under resolution mechanism.

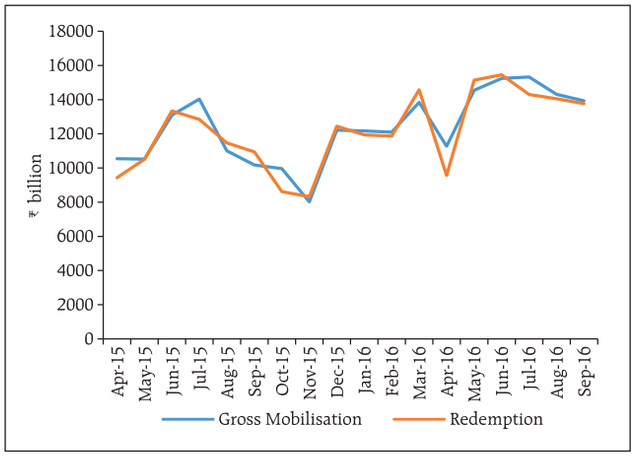
VII. Capital markets

Redemption of mutual funds (MFs)

3.26 The assets under management (AUM) of the mutual fund industry increased by 33 per cent to ₹15,801 billion in September 2016 from ₹11,873 billion in September 2015 (Chart 3.4). However, trends in redemptions, which closely followed the total fresh mobilisations during the period April 2015 – July 2016 point towards risks to market equilibrium in the event of sudden and sizeable redemption pressures.

3.27 With a view to avoiding a systemic crisis from high redemptions, the AMCs are authorised to impose provisional restrictions on redemption in a specific scheme, after obtaining approval from the Board of Directors of the Asset Management Company (AMC) and the Trustees. The earlier guidelines in respect of restrictions on redemption were general in nature and did not specifically spell out the circumstances in which restriction on redemption was to be applied, leading to discretionary practices in the industry. In order to bring in more clarity while simultaneously protecting the interests of the investors, SEBI in May 2016 issued guidelines on circumstances under which AMCs can restrict the redemptions. Restriction may be imposed when there are circumstances leading to a systemic crisis or event that severely constricts market liquidity or the efficient functioning of markets such as (i) Liquidity issues – when market at large becomes illiquid affecting almost all securities rather than any issuer specific security, (ii)Market failures, exchange closures – when markets are affected by unexpected events which impact the functioning of exchanges or the regular course of transactions and (iii) Operational issues – when exceptional circumstances are caused by force majeure, unpredictable operational problems and technical failures. It also, inter-alia, prescribed that redemption requests up to ₹0.2 million shall not be subject to such restriction and restriction on redemption may be imposed for a specified period of time not exceeding 10 working days in any 90 days' period. The possibility that an investor's right to redeem may be restricted in such exceptional circumstances, needs to be disclosed prominently in scheme related documents.

Chart 3.4: Mutual funds' mobilisation and redemption



Source: SEBI

Investment through PNs/ODIs

3.28 For increasing transparency and to remove any possibility of misuse of investments though Offshore Derivative Instruments (ODIs)/Participatory Notes (PNs), it is essential to know more about the source and intent of the investments entering the country through this route. SEBI has been, from time to time, taking appropriate measures to effectively regulate the issuance of ODIs/PNs. Continuing the same trend SEBI has recently taken a few steps to streamline the process of issuance and reporting of ODIs, duly taking in-to consideration the recommendations of Special Investigation Team (SIT) on black money.

3.29 In August 2007 the total value of PNs as a share of Asset Under Custody (AUC) of foreign institutional investors (FIIs) was about 51 per cent which came down to around 20 per cent in

December 2008; further it remained under 20 per cent and gradually came down to 16.5 per cent in January 2011 and subsequently to 8.8 per cent in October 2016. This clearly indicates the impact of the consistent policy initiatives taken by SEBI over the years including the recent one taken in the form of circular dated June 10, 2016 and amendment of SEBI (Foreign Portfolio Investor) Regulations, 2014. This shows that with the increasing transparency requirements, the chances of routing of black money though this route is insignificant.

VIII. The insurance sector

General Insurance

3.30 Occurrence of natural calamities/disasters/ contagious diseases in India at an increased frequency is a matter of concern. Given low level of awareness amongst the public regarding general insurance and lower penetration of non-life insurance cover for small businesses, such calamities may give rise to systemic risk.

Insurance Pools-Terrorism Pool & Nuclear Insurance Pool

3.31 Insurance pools provide protection to insurance companies and strengthen the financial stability by providing cushion against large number of claims arising from catastrophic risks. In the Indian context, two such important pools were formed where international reinsurance were not available.

3.32 The Indian Market Terrorism Risk Insurance Pool was formed as an initiative by all the non-life insurance companies in India in April 2002, after terrorism cover was withdrawn by international reinsurers post 9/11. The Pool is administered by GIC Re and is applicable to insurance of terrorism risk covered under property insurance policies. With effect from April 1, 2014, the limit of indemnity per location has been enhanced to ₹15 billion from the previous level of ₹10 billion and the premium rates have been revised downward.

3.33 Nuclear risks are normally excluded from the traditional form of insurance globally and such requirements are met by the formation of nuclear pools. Nuclear operators are required to maintain an insurance coverage/financial security of ₹15 billion as stipulated under the Civil Liability for Nuclear Damage Act, 2010. Since India did not have any pool for nuclear risk cover, GIC Re, the Indian Reinsurer with other Indian general insurance companies formed the nuclear pool to meet the said requirements, in December 2015. The pool is administered by GIC Re.

Health Insurance

3.34 The guidelines on product filing in health insurance business and guidelines on standardisation in health insurance were notified by IRDAI on July 29, 2016, which, inter-alia, cover additional norms for protection of interests of policyholders. These norms, inter-alia, prescribe the insurers to endeavour to design their underwriting policy to provide cover to sub-standard lives also. Denial of proposal shall be the last resort. However, denial of claims on account of pre-existing diseases remains a major concern.

Trade credit insurance

3.35 Given the backdrop of enhanced need for trade credit insurance in the economy, especially in the MSME sector, IRDAI has issued revised guidelines on 'trade credit insurance' in March 2016. The guidelines intend to enhance the scope of trade credit business, and has cautiously inbuilt certain parameters to avoid misuse of the scope with restrictions like (i) insurer to mandatorily assess the credit risk of any buyer who contributes more than 2 per cent of the total turnover of the policyholder, (ii) trade credit policy not to grant an indemnity of more than 85 per cent of the trade receivables from each

buyer, and (iii) aggregate net retentions of the insurer for trade credit insurance not to exceed 5 per cent of net-worth.

IX. The pension sector

Growth under National Pension System

3.36 The National Pension System (NPS) continued to gain traction in terms of the number of subscribers as well as assets under management (AUM). The total number of subscribers increased from 8.75 million in March 2015 to 12.12 million in March 2016 and stood at 13.77 million in October 2016. AUM increased from ₹809 billion in March 2015 to ₹1,177 billion in March 2016 and stood at ₹1,539 billion in October 2016.

Increase in the coverage of the unorganised sector through the Atal Pension Yojana

3.37 A large proportion of the workforce (88 per cent) in India is engaged in the unorganised sector having tenuous labour market links, seasonal employment and low levels of income hence posing huge challenges for pension inclusion. The Finance Minister announced the Atal Pension Yojana (APY) in his Budget Speech for 2015-16 as a part of trinity of the Prime Minister's financial inclusion schemes – the Pradhan Mantri Jan Dhan Yojana (PMJDY) and the Pradhan Mantri Jeevan Suraksha Bima Yojana (PMJSBY). Under APY, subscribers receive a fixed minimum pension of ₹1,000 to ₹5,000 per month at the age of 60 years, depending on their contribution, which itself varies according to the age when joining APY. The benefit of minimum pension will be guaranteed by the government. In case subscribers join before end-March 2016, the central government will co-contribute 50 per cent of the subscribers' contribution or ₹1,000 per annum, whichever is lower, for a period of five years (that is, from 2015-16 to 2019-20), to each eligible subscriber's account who is not a member of any statutory social security scheme and who is not an income tax payer. As on October 22, 2016, 394 banks had registered 36.15 lakh subscribers with a total AUM of ₹12.4 billion.

X. Consumer protection

3.38 While risks to consumers from phishing and vishing remain high, instances of cheating where unregulated entities posing themselves to be regulated ones, were noticed. It is essential that public perceptions of regulated entities with different levels and degrees of regulation are retained and consumers are not misled into believing that they all belong to the same category.[19]

3.39 To combat the risks in the form of collective investment schemes, multi-level marketing and deemed public issues[20] without the necessary regulatory approval, SLCCs[21] have launched the web-portal 'Sachet' which enables public access to information regarding entities that are allowed to accept deposits and lodge complaints. The portal also facilitates sharing of information regarding illegal acceptance of deposits by unscrupulous

[19] For instance, use of abbreviated names by some UCBs without giving the full names to indicate that they are co-operative banks and not commercial banks may create ambiguous expectations for some unsophisticated customers.

[20] Under the Companies Act, 2013, any offer or allotment of securities is considered as a public issue if the number of offerees/allottees exceeds 200 persons in a financial year, as against the cap of 49 persons provided in the Companies Act, 1956. As per the provisions of Companies Act, 2013 and SEBI Regulations, no issuer shall make a public issue of these securities unless it has made an application to the recognised stock exchange(s) for listing of such securities and filed the offer document with RoC/stock exchange/SEBI *etc.* The issuer is also required to make disclosures about the issuer company, the promoters of the company, the risk factors *etc.*

[21] State Level Coordination Committees (SLCCs) formed in all states, with the objective to control the incidents of unauthorised acceptance of deposits by unscrupulous entities, act as a joint forum at the state level to facilitate information sharing among the regulators *viz.* RBI,SEBI,IRDAI,NHB,PFRDA, Registrar of Companies (RoCs) *etc.* and enforcement agencies of the states.

Table 3.2: Interim and final orders passed by SEBI

Sl. No.	F.Y	Interim Orders			Final Orders		
		No. of Orders (CIS)	No. of Orders (DPI)	Total	No. of Orders (CIS)	No. of Orders (DPI)	Total
1	2014-15	51	108#	159	14	9	23
2	2015-16	13	90	103	34	80	114
3	2016-17*	0	6	6	8	24	32
Total		64	204	268	56	113	169

***** Till September 2016 CIS – Collective Investment Scheme; DPI – Deemed Public Issue
# Includes 5 interim orders passed in 2013-14.
Source: SEBI

entities. However, such activities appear to have abated as seen in a decline in the number of interim and final orders passed by SEBI to such entities directing them to stop collecting funds from investors under unauthorised schemes[22] (Table 3.2). Further the receipt of number of complaints by SEBI regarding unauthorised money collection activities have also declined over the period of time.

[22] SEBI regulates Collective Investment Schemes as defined under Section 11A of SEBI Act, 1992. There are various regulators/ law enforcement agencies such as State Governments, Economic Offence Wings, RBI, MCA, *etc.* who regulate unauthorised money collection under various laws administered by them

Annex 1

Systemic Risk Survey

The systemic risk survey (SRS), the eleventh in the series, was conducted during October-November 2016[1] to capture the perceptions of experts, including market participants, on the major risks presently faced by the financial system. According to the survey results global risks were perceived as medium risks affecting the financial system. The risk perception on macroeconomic conditions and institutional positions have been categorised in the medium risk category in the current survey. Market risks as well as general risks have been perceived to be in low risk category in this survey (Figure 1).

Figure 1: Major risk groups identified in systemic risk survey (October 2016)

A. Global Risks	B. Macro-economic Risks	C. Financial Market Risks	D. Institutional Risks	E. General Risks

Note:
Risk Category

Very high	High	Medium	Low	Very low

Source: RBI systemic risk survey (October 2016).

Within global risks, the risk on account of global growth, sovereign contagion and commodity prices were categorised as medium risk. Within the macroeconomic risks group, corporate sector risk and pace of infrastructure development were perceived to be in high risk category, while risk on account of domestic growth, domestic inflation, capital flows and household savings were considered to be in medium risk category in the current survey. The respondents have rated the foreign exchange risk, equity price volatility and interest rate risk in medium risk category as part of the financial market risks. Among the institutional risks, the asset quality of banks, risk on account of capital requirement, credit growth and cyber risk were perceived as high risk factors (Figure 2).

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

Figure 2 : Various risks identified in systemic risk survey (October 2016)		
	Risk items	
A. Global Risks	Global growth	
	Sovereign risk / contagion	
	Funding risk (External borrowings)	
	Commodity price risk (including crude oil prices)	
	Other global risks	
B. Macro-economic Risks	Domestic growth	
	Domestic inflation	
	Current account deficit	
	Capital inflows/ outflows (Reversal of FIIs, Slowdown in FDI)	
	Sovereign rating downgrade	
	Fiscal deficit	
	Corporate sector risk	
	Pace of infrastructure development	
	Real estate prices	
	Household savings	
	Political uncertainty/ governance /policy implementation	
	Other macroeconomic risks	
C. Financial Market Risks	Foreign exchange rate risk	
	Equity price volatility	
	Interest rate risk	
	Liquidity risk	
	Other financial market risks	
D. Institutional Risks	Regulatory risk	
	Asset quality deterioration	
	Additional capital requirements of banks	
	Access to funding by banks	
	Level of credit growth	
	Cyber risk	
	Operational risk	
	Other institutional risks	
E. General Risks	Terrorism	
	Climate related risks	
	Social unrest (Increasing inequality)	
	Other general risks	

Note:
Risk Category

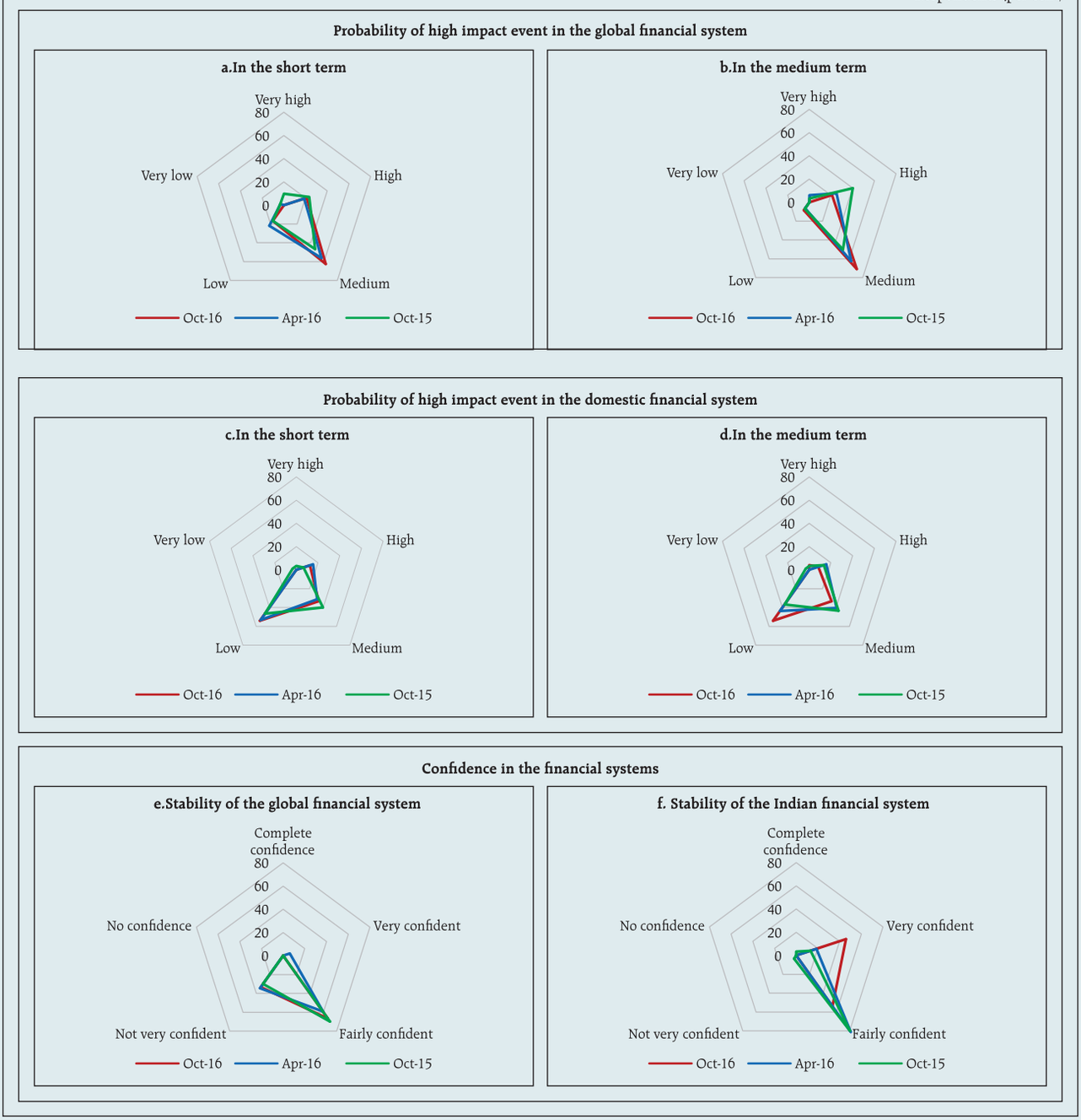
Very high	High	Medium	Low	Very low

Source: RBI systemic risk survey (October 2016).

Majority of the participants in the current round of survey felt that the possibility of a high impact event occurring in the global financial system in the short term as well as in the medium term period is medium, while majority felt that possibility of occurrence of such event in the domestic financial system is low. Most respondents continued to be fairly confident in the global financial system, while there was a significant increase in the respondents in the current survey who reflected their high confidence in the Indian financial system (Chart 1).

Chart 1: Perception on occurrence of high impact events and confidence in the financial systems

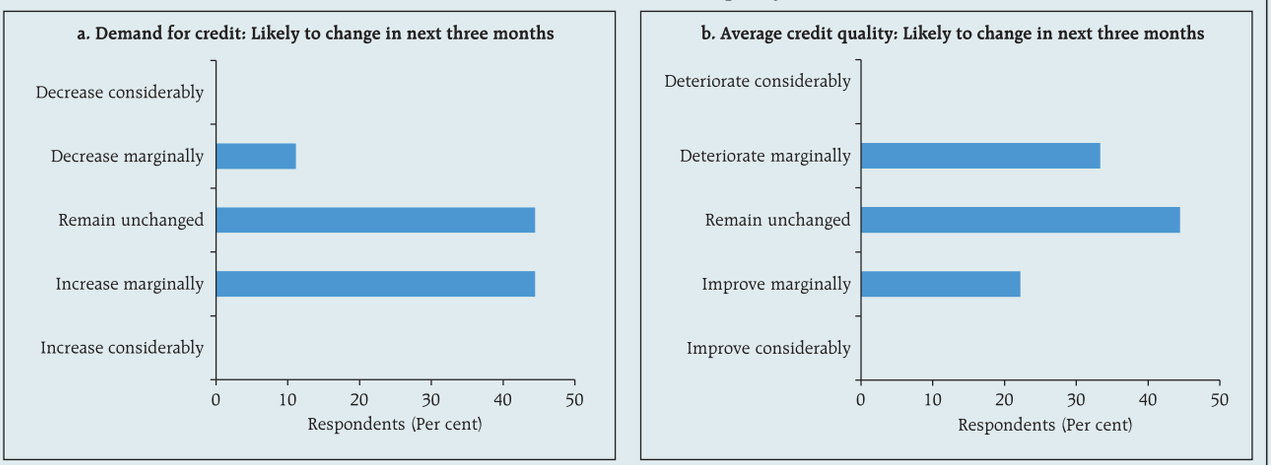
Respondents (per cent)



Source: RBI systemic risk surveys (October 2015, April 2016 and October 2016).

On the issue of likely changes in demand for credit in the next three months, the majority of the respondents were of the view that it might either increase marginally or remain unchanged. A majority of the respondents indicated that the average quality of credit would remain unchanged in the next three months, though, a number of respondents also perceived that it is likely to deteriorate (Chart 2).

Chart 2: Outlook on credit demand and its quality (October 2016)



Source: RBI systemic risk survey (October 2016).

Annex 2
Methodologies

2.1 Corporate sector

Corporate sector stability indicator and map

The corporate sector stability indicator and map have been constructed using the following method:

Data: The balance sheet data of non-government non-financial public limited companies.

Frequency: Annual (1992-93 to 2011-12). From 2012-13 to 2016-17, the half-yearly balance sheet data is used for the analysis.

The ratios used under each dimensions are given in the Table 1.

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

Dimensions	Ratios
Profitability	RoA (Gross Profit/Total Assets) #, Operating Profit/Sales #, Profit After Tax/Sales #
Leverage	Debt/ Assets, Debt/ Equity; (Debt is taken as Total Borrowings)
Sustainability	Interest Coverage Ratio (EBIT to interest expenses) #, interest expenses/total expenditure;
Liquidity	Quick Assets/ Current Liabilities (quick ratio) #;
Turn-Over	Total Sales / Total Assets #.

Negatively related to risk.

First, the ratios were converted into standard normal variate [$z = \frac{x-\mu}{\sigma}$]. Then, z's were bounded between 0 and 1 using relative distance transformatio [$d = \frac{z-\min(z)}{\max(z)-\min(z)}$]. For (#) negatively related ratios (to risk), one's complement was used. For each dimension a composite index was derived as a simple average of relevant d's (principal component analysis (PCA) also gives equal weights). The Map is constructed using composite index for each dimension.

The overall corporate sector stability indicator is a weighted average of 5 dimensions. The weights are obtained using PCA. The derived weights for 5 dimensions are as follows:

Profitability	Leverage	Sustainability	Liquidity	Turn-Over
25%	25%	25%	10%	15%

2.2 Scheduled commercial banks

Banking stability map and indicator

The banking stability map and indicator present 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 five composite indices used in the banking stability map and indicator represent the five dimensions

of soundness, asset-quality, profitability, liquidity and efficiency. The ratios used for constructing each composite index are given in Table 2.

Table 2: 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.

Each composite index, representing a dimension of bank functioning, takes values between zero and 1. Each index is a relative measure during the sample period used for its construction, where a higher 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 using the following formula:

$$\frac{X_t - min\ (X_t)}{max(X_t) - min\ (X_t)}$$

Where, X_t is the value of the ratio at time t. 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. 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 minus expected loss.

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, $ES_\alpha (Z) = E[Z \mid Z \geq VaR_\alpha (Z)]$ minus expected loss. Hence, Expected Shortfall is the conditional expectation of loss given that the loss is beyond the VaR level minus expected loss.

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 select banking system aggregates to macroeconomic variables. The time series econometric models used were: (i) multivariate regression to model system level slippage ratio; (ii) Vector Autoregression (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; (v) VAR to model bank group-wise slippage ratio; and (vi) multivariate regressions for sectoral GNPAs. The banking system aggregates include current and lagged values of slippage ratio, while macroeconomic variables include gross value added (GVA) at basic price growth, weighted average lending rate (WALR), CPI (combined) inflation, exports-to-GDP ratio $\left(\frac{Ex}{GDP}\right)$, current account balance to GDP ratio $\left(\frac{CAB}{GDP}\right)$ and gross fiscal deficit-to-GDP ratio $\left(\frac{GFD}{GDP}\right)$.

While multivariate regression allows evaluating the impact of select 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, and also takes into account the feedback effect. In these methods, the conditional mean of slippage ratio[1] 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 adopted to project credit quality, wherein conditional quantile was estimated instead of the conditional mean and hence it can deal with tail risks and takes into account the non-linear impact of macroeconomic shocks.

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

The modelling framework

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

System level models

The system level GNPAs were projected using three different but complementary econometric models: multivariate regression, VAR and quantile regression. 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.

$$SR_t = \alpha_1 + \beta_1 SR_{t-1} - \beta_2 \Delta GVA_{t-2} + \beta_3 WALR_{t-1} - \beta_4 \left(\frac{EX}{GDP}\right)_{t-1} + \beta_5 \Delta CPI_{t-4} + \beta_6 \left(\frac{GFD}{GDP}\right)_{t-2}$$

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

- *VAR model*

  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 model, slippage ratio, WALR, CPI (combined) inflation, GVA at basic price growth and gross fiscal deficit-to-GDP ratio 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. The impact of various macroeconomic shocks was determined using the impulse response function of the selected VAR.

- *Quantile regression*

In order to estimate the conditional quantile of slippage ratio at 0.8, the following quantile regression was used:

$$SR_t = \alpha_1 + \beta_1 SR_{t-1} - \beta_2 \Delta GVA_{t-2} + \beta_3 WALR_{t-1} - \beta_4 \left(\frac{EX}{GDP}\right)_{t-3} + \beta_5 \Delta CPI_{t-5}$$

Bank group level models

The bank groups-wise SR were projected using two different but complementary econometric models: multivariate regression and VAR. 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:

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

  Private Sector Banks:

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

  Foreign Banks:

  $$SR_t = \alpha_1 + \beta_1 SR_{t-1} + \beta_2 WALR_{t-2} + \beta_3 \Delta CPI_{t-1} - \beta_4 \left(\frac{EX}{GDP}\right)_{t-5} + \beta_5 \text{Dummy}$$

- *VAR model*

  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: GVA at basic price growth, CPI (combined)-inflation, WALR, CAB to GDP Ratio and GFD to GDP ratio of order 2.

  Private Sector Banks: GVA at basic price growth, real WALR and Exports to GDP ratio of order 1.

  Foreign Banks: CPI (combined)-inflation, WALR and CAB to GDP ratio 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, GVA at basic price growth (aggregate or sectoral), CPI (combined)-inflation, WALR and export to GDP ratio.

Estimation of GNPAs from slippages

Derivation of GNPAs from slippage ratios, which were projected from the above mentioned credit risk econometric models, were based on the following assumptions: credit growth of 10 per cent; recovery rate of 3.9 per cent, 3.0 per cent, 2.2 per cent and 2.9 per cent during March, June, September and December quarters respectively; write-off rates of 5.5 per cent, 3.9 per cent, 1.8 per cent and 4.0 per cent during March, June, September and December respectively; Un-gradation rates of 3.2 per cent, 3.3 per cent, 2.6 per cent and 2.4 per cent during March, June, September and December respectively.

Projection of PAT

The various components of profit after tax (PAT) of banks, like, interest income, other income, operating expenses and provisions were projected using different time series econometric models (as given below).

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 is the difference between interest income and interest expense and was projected using the following regression model:

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

LNII is log of NII. LNGVA_SA is seasonally adjusted log of nominal GVA. 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 model:

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

LOOI is log of OOI.

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:

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

P_Adv is provisions to total advances ratio. RGVA_Gr is the y-o-y growth rate of real GVA. GNPA is gross non-performing advances to total advances ratio. Dummy is a time dummy.

Income Tax: The applicable income tax was taken as 35 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 in the previous section. RWA growth was assumed at 10 per cent under the baseline, 12 per cent under medium risk and 14 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 without considering any capital infusion by the stake holders. The projected values of the GNPAs ratio were translated into capital ratios using the 'balance sheet approach', under 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 SCBs as well as on the system level.

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(s) 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 per cent, 75 per cent 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 the incremental provisioning requirements. The estimated provisioning requirements so derived were deducted from banks' capital and stressed capital adequacy ratios were computed.

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 the '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.

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 along with a demand for unutilised portion of sanctioned/committed/guaranteed credit lines (taking into account the undrawn working capital sanctioned limit, undrawn committed lines of credit and letters of credit and guarantees). The stress tests were carried out to assess banks' ability to fulfil the additional and sudden demand for credit with the help of their liquid assets alone.

Assumptions used in the liquidity stress tests are given below:

- 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 on their market value.
- The stress test is done under a 'static' mode.

Stress testing the derivatives portfolios of select banks

The stress testing exercise focused on the derivatives portfolios of a representative sample set of top 22 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 their respective derivatives portfolios.

In case of domestic banks, the derivatives portfolio of both domestic and overseas operations was 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 the 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 3: Shocks for sensitivity analysis

	Domestic interest rates	
Shock 1	Overnight	**+2.5 percentage points**
	Up to 1yr	**+1.5 percentage points**
	Above 1yr	**+1.0 percentage points**

	Domestic interest rates	
Shock 2	Overnight	**-2.5 percentage points**
	Up to 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**

2.3 Scheduled urban co-operative banks

Single factor sensitivity analysis – Stress testing

Credit risk

Stress tests on credit risk were conducted on SUCBs. The tests were based on a single factor sensitivity analysis. The impact on CRAR was studied under following four different scenarios, using the historical standard deviations (SD).

- Scenario I: 1 SD shock on GNPA (classified into sub-standard advances).
- Scenario II: 2 SD shock on GNPA (classified into sub-standard advances).
- Scenario III: 1 SD shock on GNPA (classified into loss advances).
- Scenario IV: 2 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 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).

2.4 Non-banking financial companies

Single factor sensitivity analysis – Stress testing

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). The tests were based on a single factor sensitivity analysis. The impact on CRAR was studied under three different scenarios, based on historical SD:

- 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 NBFC level as well as at the aggregate level.

2.5 Interconnectedness – Network analysis

Matrix algebra is at the core of the network analysis, which uses the bilateral exposures between entities in the financial sector. Each institution's lendings to and borrowings from all other institutions 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 important measures are given below:

Connectivity: This statistic measures the extent of links between the nodes relative to all possible links in a complete graph. For a directed graph, denoting the total number of out degrees to equal $K = \sum_{i=1}^{N} k_i$ and N as the total number of nodes, connectivity of a graph is given as $\frac{K}{N(N-1)}$.

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 a financial network) are neighbours to each other also. A high clustering coefficient for the network corresponds with high local interconnectedness prevailing in the system. For each bank with k_i neighbours the total number of all possible directed links between them is given by $k_i (k_i\text{-}1)$. Let E_i denote the actual number of links between agent i's k_i neighbours, *viz.* those of i's k_i neighbours who are also neighbours. The clustering coefficient C_i for bank i is given by the identity:

$$C_i = \frac{E_i}{k_i(k_i - 1)}$$

The clustering coefficient (C) of the network as a whole is the average of all C_i's:

$$C = \frac{\sum_{i=1}^{N} C_i}{N}$$

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 nodes centrality score is proportional to the sum of the centrality scores of all nodes to which it is connected. 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.

Colour code of the network chart: The blue balls and the red balls represent net lender and net borrower banks respectively in the network chart. The colour coding of the links in the tiered network diagram represents the borrowing from different tiers in the network (for example, the green links represent borrowings from the banks in the inner core).

Solvency contagion analysis

The contagion analysis is in nature of 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

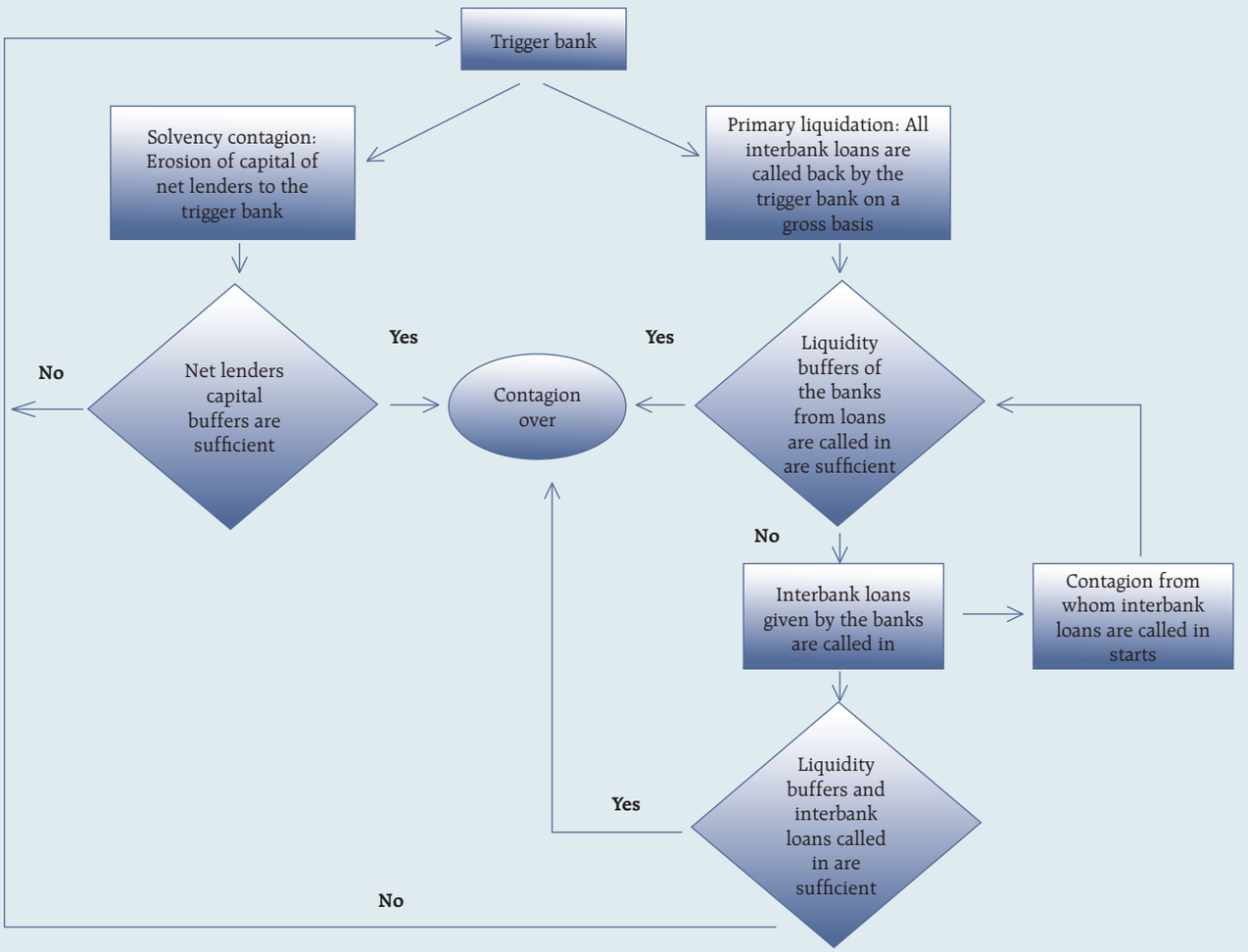
While the solvency contagion analysis assesses potential loss to the system owing to failure of a net borrower, liquidity contagion estimates potential loss to the system due to the failure of a net lender. The analysis is conducted on gross exposures between banks. The exposures include fund based and 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; and (c) available marginal standing facility. 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).

Joint solvency-liquidity contagion analysis

A bank typically has both positive net lending positions against some banks while against some other banks it might have a negative net lending position. In the event of failure of such a bank, both solvency and liquidity contagion will happen concurrently. This mechanism is explained by the following flowchart:

Flowchart of Joint Liquidity-Solvency contagion due to a bank coming under distress



The trigger bank is assumed to have failed for some endogenous reason, *i.e.*, it becomes insolvent and thus impacts all its creditor banks. At the same time it starts to liquidate its assets to meet as much of its obligations as possible. This process of liquidation generates a liquidity contagion as the trigger bank starts to call back its loans.

The lender/creditor banks that are well capitalised will survive the shock and will generate no further contagion. On the other hand, those lender banks whose capital falls below the threshold will trigger a fresh contagion. Similarly, the borrowers whose liquidity buffers are sufficient will be able to tide over the stress without causing further contagion. But some banks may be able to address the liquidity stress only by calling in short term assets. This process of calling in short term assets will again propagate a contagion.

The contagion from both the solvency and liquidity side will stop/stabilise when the loss/shocks are fully absorbed by the system with no further failures.