Financial Stability Report

Issue No. 24

Reserve Bank of India
December 2021

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Foreword

We are now nearing two years of living with the pandemic. Many aspects of human life have been radically altered. The world has witnessed tragic loss of lives and livelihood, but we have also learnt a lot and adapted. In this period of swings between hope and despair, the indomitable human spirit has prevailed and humanity has undauntedly worked towards improving health and economic well being.

Across the world, economic activity has endured the waves of pandemic, buffered by exceptional policy support from governments, central banks and financial regulators. Challenges have also been brought on by sudden disruptions in supplies and logistics, shortages, job losses and destruction of businesses. The fallout of the pandemic on financial markets and institutions has been contained but the return to normalcy remains hesitant and uneven across regions and sectors.

After the destructive second wave of the pandemic in India in April-May 2021, which interrupted an economic recovery that was gaining a foothold in the second half of 2020-21, the Indian economy is regaining strength and resilience. Consumer confidence and business optimism are on the rise as the spread and scale of vaccination expands. The outlook is progressively improving, though there are headwinds from global developments and more recently from Omicron. Entrenching the recovery hinges on revival of private investment and shoring up private consumption, which remain below their pre-pandemic levels. Inflation remains a concern buffeted as it is by the build-up of cost-push pressures. Strong supply side measures to contain food and energy prices have, however, worked towards moderating these risks.

As highlighted in this issue of the Financial Stability Report, financial institutions in India have remained resilient amidst the pandemic and stability prevails in the financial markets, cushioned by policy and regulatory support. Balance sheets of banks remain strong and capital and liquidity buffers are being bolstered to mitigate future shocks, as reflected in the stress tests presented in this report. In the spectrum of financial markets that leverage on technology for their functioning, the need for robustness of infrastructure, data security and the soundness of rules and processes are of paramount importance, especially in the face of repeated and potentially crippling cyber attacks.

A strong, well-functioning and responsive financial sector fortifies the foundations of growth and the development of modern societies. While the pandemic induced bouts of volatility, spillovers and heightened uncertainty are challenging, the Indian financial system has stood up well and remains well prepared to meet the funding requirements of the economy. The process of capital augmentation and building up of liquidity buffers by financial entities through a combination of instruments is proceeding apace and needs to be sustained. The Reserve Bank of India remains resolute and committed in its endeavour to ensure a robust and efficient financial system that supports strong, sustainable and inclusive growth with macroeconomic and financial stability.

Shaktikanta Das
Governor

December 29, 2021

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List of Select Abbreviations

AFS	Available for Sale
€STR	Euro Short-Term Rate
AECs	Anonymity-Enhanced Cryptocurrencies
AEs	Advanced Economies
AI	Artificial Intelligence
AIFIs	All-India Financial Institutions
AMC-MFs	Asset Management Companies-Mutual Funds
AMFI	Association of Mutual Funds in India
AML	Anti-Money Laundering
API	Application Programming Interface
APY	Atal Pension Yojana
ARCs	Asset Reconstruction Companies
ARRs	Alternate Risk-free Rates
AUM	Assets Under Management
BCBS	Basel Committee on Banking Supervision
BIFR	Board for Industrial and Financial Reconstruction
BIS	Bureau of International Settlements
BoP	Balance of Payment
BSE	Bombay Stock Exchange
BSI	Banking Stability Indicator
CAB	Current Account Balance
CASA	Current Account Savings Account
CB	Central Bank
CBLO	Collateralized Borrowings & Lending Obligation
CC	Cash Credit
CCB	Cross Currency Basis
CCIL	Clearing Corporation of India Limited
CCPs	Central Counterparties
CD	Certificate of Deposit
CET-1	Common Equity Tier-1
CFT	Combating the Financing for Terrorism
CGFD	Centre's Gross Fiscal Deficit
CIRP	Corporate Insolvency Resolution Process
CME	Chicago Mercantile Exchange
CMR	CIBIL MSME Rank
COP	Conference of Parties
CPI	Consumer Price Inflation
CPMI	Committee on Payments and Market Infrastructures
CPs	Commercial Papers
CRAR	Capital to Risk-Weighted Assets Ratio
CRAs	Credit Rating Agencies
CRILC	Central Repository of Information on Large Credits
CRM	Credit Risk Mitigation
CRR	Cash Reserve Ratio
DeFi	Decentralised Finance
DICGC	Deposit Insurance and Credit Guarantee Corporation
DIF	Deposit Insurance Fund
DIIs	Domestic Institutional Investors
DPD	Days Past Dues
EBA	European Bank Authority
ECB	European Central Bank
ECLGS	Emergency Credit Line Guarantee Scheme
EMDEs	Emerging Market and Developing Economies
EMEs	Emerging Market Economies

ESG	Environmental, social and governance
ESRB	European Systemic Risk Board
EXIM	Export Import Bank of India
FAO	Food and Agricultural Organisation
FATF	Financial Action Task Force
FBs	Foreign Banks
FCs	Financial Creditors
FDI	Foredign Direct Investment
FIMMDA	Fixed Income Money Market and Derivatives Association of India
FPIs	Foreign Portfolio Investors
FRBs	Floating Rate Bonds
FSB	Financial Stability Board
FSDC	Financial Stability & Development Council
FSR	Financial Stability Report
FX	Foreign Exchange
GBI	Global Bond Index
GDP	Gross Domestic Product
GESI	Global Economic Surprise Index
GNPA	Gross Non-Performing Asset
G-Secs	Government Securities
HFCs	Housing Finance Companies
HFT	Held for Trading
HQLAs	High Quality Liquid Assets
HTM	Held To Maturity
IAIS	International Association of Insurance Supervisors
IBBI	Insolvency and Bankruptcy Board of India
IBC	Insolvency and Bankruptcy Code
IC	Insurance Company
ICEX	Indian Commodity Exchange
IFSCA	International Financial Services Centres Authority
IMF	International Monetary Fund
IOSCO	International Organisation of Securities Commissions
IRAC	Income Recognition and Asset Classification
IRD	Interest rate derivative
IRDAI	Insurance Regulatory and Development Authority
ISDA	International Swaps and Derivatives Association
LABs	Local Area Banks
LB	Large Borrowers
LCH	London Clearing House
LEF	Large Exposure Framework
LIBOR	London Inter-bank Offer Rate
MCX	Multi-Commodity Exchange of India
MES	Marginal Expected Shortfall
MFs	Mutual Funds
MHP	Minimum Holding Period
MIFOR	Mumbai Interbank Forward Offer Rate
ML	Machine Learning
MMFs	Money Market Funds
MMMFs	Money Market Mutual Funds
MRR	Minimum Retention Requirement
MSF	Marginal Standing Facility
MSME	Micro, Small and Medium Enterprises
MTM	Mark-To-Market
NABARD	National Bank for Agriculture and Rural Development
NARCL	National Asset Reconstruction Company Limited
NBFC	Non-Banking Financial Company
NBFC-BL	NBFC- Base Layer
NBFC-D	NBFC- Deposit Taking
NBFC-ICC	NBFC-Investment and Credit Company

NBFC-IDF	NBFC- Infrastructure Debt Fund
NBFC-IFC	NBFC- Infrastructure Finance Company
NBFC-MFI	NBFC-Micro Finance Institutions
NBFC-ML	NBFC-Middle Layer
NBFC-ND	NBFC-Non Deposit Taking
NBFC-P2P	NBFC-Peer-to-Peer Lending Platforms
NBFC-UL	NBFC- Upper Layer
NBFI	non-bank financial intermediation
NCDEX	National Commodity and Derivatives Exchange Limited
NCDs	Non-Convertible Debentures
NCGTC	National Credit Guarantee Trustee Company Limited
NCLT	National Company Law Tribunal
NDF	Non-Deliverable Forward
NDSI	Non-Deposit taking Systemically Important
NDTL	Net Demand & Time Liabilities
NeSL	National e-Governance Services Limited
NFB	Non-Fund Based
NGFS	Network for Greening the Financial System
NHB	National Housing Bank
NIM	Net Interest Margin
NNPA	Net Non performing Assets
NPA	Non-Performing Assets
NPS	National Pension Scheme
NSE	National Stock Exchange
NSUCBs	Non-Scheduled Urban Cooperative Banks
OD	OverDraft
OECD	Organisation for Economic Cooperation and Development
OEF	Open ended funds
OIS	Overnight Index Swap
OOI	Other Operating Income
OTC	Over-the-Counter
PAT	Profit After Tax
PCA	Principal Component Analysis
PCR	Provisioning Coverage Ratio
PDs	Primary Dealers
PFRDA	Pension Fund Regulatory and Development Authority
PFs	Pension Funds
PSBs	Public Sector Banks
PVBs	Private Banks
QE	Quantitative Easing
QIBs	Qualified Institutional Buyers
QIPs	Qualified Institutional Placements
RBIH	RBI Innovation Hub
RDG	Retail Direct Guilt
RF	Resolution Framework
RFR	Risk Free rate
RoA	Return on Asset
RoE	Return on Equity
RRB	Regional Rural Banks
RS	Regulatory Sandbox
SARON	Swiss Average Rate Overnight
SCBs	Scheduled Commercial Banks
SD	Standard Deviation
SDLs	State Development Loans
SEBI	Securities and Exchange Board of India
SFBs	Small Finance Banks
SIDBI	Small Industries Development Bank Of India
SIPs	Systematic Investment Plans
SITG	Skin-In-the-Game
SLR	Statutory Liquidity Ratio

SMA	Special Mention Account
SOFR	Secured Overnight Financing Rate
SONIA	Sterling Overnight Index Average
SPDs	Standalone Primary Dealers
SPE	Special Purpose Entity
SRF	Settlement Reserve Fund
SRI	Systemic Risk Indicator
SRS	Systemic Risk Survey
SUCBs	Scheduled Urban Cooperative Banks
TONA	Tokyo Overnight Average Rate
TReDS	Trade Receivable and Discounting System
UCB	Urban Cooperative bank
UPI	Unified Payment Interface
VRRR	Variable Rate Reverse Repo
WALR	Weighted Average Lending Rate
WTO	World Trade Organisation
YTM	Yield to Maturity

Overview

The Financial Stability Report (FSR) is published biannually and includes contributions from all the financial sector regulators. Accordingly, it reflects the collective assessment of the Sub Committee of the Financial Stability and Development Council (FSDC-SC) on risks to financial stability.

Macrofinancial Risks

The global recovery has been losing momentum in the second half of 2021, impacted by resurgence of infections in several parts of the world, supply disruptions and bottlenecks, persistent inflationary pressures and shifts in monetary policy stances and actions across systemic advanced economy (AE) central banks as also some emerging market economies (EMEs). Tightening of global financial conditions, superimposed on elevated domestic inflation has roiled EMEs, in particular. The US dollar posted large appreciations *vis-a-vis* EME currencies, which were also weakened by stubbornly rising energy prices. Capital flows to EME bond markets are showing signs of tapering off and flowing out, while equity flows have turned volatile. Realignment of interest rates in the process of policy normalisation could lead to discretionary shifts in portfolios among banks as well as recalibration of banking sector liabilities. More recently, Omicron has cast a shadow on global economic prospects.

Domestic Economy and Markets

On the domestic front, the second wave of the pandemic showed distinct signs of subsiding by July 2021. Localised restrictions have been eased and the engines of growth have started revving up, aided by progress in vaccination. During April-October 2021, all the deficit indicators of the central government exhibited improvement from their pre-pandemic levels. The borrowing programme has proceeded smoothly. The Indian corporate sector has gained strength and resilience through the pandemic and key financial parameters of listed non-financial private companies indicate improvement. Bank credit growth is showing signs of a gradual recovery, led by the retail segment, although flow of credit to lesser rated corporates remains hesitant. Micro, small and medium enterprises (MSMEs) as also the micro finance segment are reflecting signs of stress.

Financial Institutions: Soundness and Resilience

SCBs continued to bolster their capital - capital to risk-weighted assets ratio (CRAR) of SCBs reached 16.6 per cent in September 2021 - and their return on assets (RoA) and return on equity (RoE) were maintained in positive territory. While the asset quality of banks showed improvement, with the gross non-performing assets (GNPA) and net NPA (NNPA) ratios declining to 6.9 per cent and 2.3 per cent, respectively, their slippage ratio inched up in September 2021. The provisioning coverage ratio (PCR) increased from 67.6 in March 2021 to 68.1 per cent in September 2021.

Macro-stress tests for credit risk show that SCBs' GNPA ratio may increase from 6.9 per cent in September 2021 to 8.1 per cent by September 2022 under the baseline scenario and to 9.5 per cent under a severe stress scenario. The stress tests show that all banks would be able to comply with the minimum capital requirements even under severe stress scenarios.

The CRAR of urban co-operative banks (UCBs) stood at 12.9 per cent in September 2021 while that of NBFCs stood at 26.3 per cent.

Network analysis indicates that the total outstanding bilateral exposures among constituents of the financial system have been on an upswing since H1:2020-21, with SCBs having the largest share of

bilateral exposures *albeit* still below pre-pandemic levels. In terms of inter-sectoral exposures, asset management companies/mutual funds (AMC-MFs), followed by insurance companies, remained the dominant fund providers in the system, while NBFCs were the biggest receivers of funds, followed by housing finance companies (HFCs). A simulated contagion analysis showed that losses due to failure of the five banks with the maximum capacity to cause contagion increased in September 2021 *vis-à-vis* March 2021, but they would not lead to the failure of any additional bank.

Regulatory Initiatives and Other Developments in the Financial Sector

The global regulatory environment continues to evolve and get refined in spite of the pandemic. Financial regulators are devoting attention to distilling the lessons learned from the pandemic, analysing the ripple effects of rollback of policy support measures and enhancing the resilience of the financial system. On the domestic front, Government and financial sector regulators continued with their efforts towards achieving a sustainable recovery and enhancing the resilience of the financial system.

Assessment of Systemic Risk

In the Reserve Bank's latest Systemic Risk Survey (SRS), all broad categories of risks to the financial system – global; macroeconomic; financial market; institutional; and general – were perceived as 'medium' in magnitude, but risks arising on account of global and financial markets were rated higher than the rest. Commodity prices, domestic inflation, equity price volatility, asset quality deterioration, credit growth and cyber disruptions were rated as the major risks.

Chapter I
Macrofinancial Risks

The global recovery is clouded by the emergence of the Omicron variant of COVID-19. Inflationary pressures persist and monetary policy paths are diverging among major economies. On the domestic front, the recovery is regaining traction after the debilitating second wave of the pandemic. The corporate sector has displayed resilience and bank credit growth is showing signs of a gradual recovery, led by the retail segment. Stress is, however, visible among micro, small and medium enterprises (MSME) and in the micro finance segment.

Introduction

1.1 The emergence of Omicron as a COVID-19 variant of concern in late November 2021 caused panic to sweep across financial markets, triggering the worst 'Black Friday' plunge on record by the Dow Jones that reverberated worldwide. Bond yields and international crude prices turned volatile and the recent strength of the US dollar has been shaken. Fresh travel restrictions as well as quarantining and social distancing protocols have been imposed and countries are on high alert to ascertain the efficacy of existing vaccines to the new mutation.

1.2 Even ahead of Omicron, global growth and trade had begun to lose pace, stalled by formidable headwinds from supply disruptions and bottlenecks, logistics dysfunctions, shipping charges and port congestions as well as shortage in key intermediates and personnel. These forces, along with elevated commodity prices, have rendered inflationary pressures persistent across geographies, posing a serious risk to global economic prospects. As an increasing number of advanced economy (AE) central banks join their emerging market economy (EME) counterparts in either raising monetary policy rates or in telegraphing faster normalisation, global financial conditions have tightened and turned volatile. Retrenchment in capital flows across most EMEs have amplified currency depreciation among these countries. Many of them are contending with large pandemic-induced losses of gross domestic product (GDP) and jobs that will take years to reclaim, even if pre-pandemic levels are being sighted by some. Overall global demand has weakened, with world GDP growth estimated to have lost a full percentage point in Q3:2021 on a sequential seasonally adjusted annualised basis. Overall, the near-term outlook remains clouded, with global growth projections being trimmed by multilateral agencies.

1.3 Looking ahead, an important factor that is set to reshape the macroeconomic and financial landscape is the impact of climate change and the mitigating policy commitments at the Conference of the Parties – 26th United Nations Climate Change Conference (COP-26) - towards environmental resilience. Action on these assurances is being prioritised by the recent intensification of natural calamities - floods in the United Kingdom; heatwaves and wildfires in the United States, Canada and Australia; droughts in Brazil and higher frequency of cyclones and unseasonal rains in various parts of India. The World Bank estimates that more than 750 million South Asians have been affected by one or more climate-related disasters in the last two decades, with the damage exceeding $150 billion. The changing climate is likely to trigger even larger disasters[1]. At the same time, efforts towards shifting

[1] World Bank (2021), "Shifting Gears: Digitisation and Services-led Development", October.

to greener energy and curbing carbon emissions entail transitional implications for factory output, global supply chains, inflation conditions and overall economic activity. Combating climate change may pose medium-term trade-offs, particularly for developing countries facing formidable challenges in access to affordable financing and technology. In this context, the global Network for Greening the Financial System (NGFS), where India has been actively participating after joining it in April 2021, has been studying climate related risks through forward looking scenario analyses to draw out their monetary and financial implications.

1.4 Against this backdrop, this chapter examines the evolving macrofinancial risks arising from global developments and the spillovers to the domestic economy, with a specific emphasis on corporate and MSME sectors. The chapter concludes with salient findings of the Reserve Bank's latest Systemic Risk Survey conducted in November 2021.

I.1 Global Backdrop

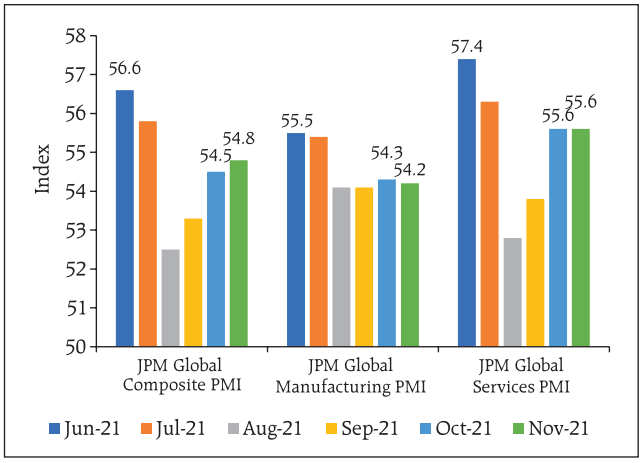
I.1.1 Macrofinancial Developments and Outlook

1.5 Since the July 2021 issue of the Financial Stability Report (FSR), the rejuvenation of the global recovery in the first half of 2021 has started losing momentum, impacted by resurgence of infections in several parts of the world, supply disruptions and bottlenecks and the persistent inflationary pressures that have manifested themselves in their wake. The slowdown in activity is occurring even in countries with relatively high vaccination rates that seemed to be emerging as global growth drivers. For many EMEs, however, vaccine access remains a binding constraint and output and employment remain below pre-pandemic levels. With inflation persisting at unconscionable levels, several EMEs were first off the mark in normalising and even tightening monetary policy. In AEs too, persistent price pressures have induced some of them to raise policy rates and/or contemplate hastening normalisation.

1.6 As macroeconomic performances diverge and precipitate wide differences in policy paths, global spillovers are unsettling financial markets, asset prices and capital flows with associated macrofinancial risks in this uncertain global environment. Yet, some recent high frequency indicators of macroeconomic conditions appear to be lagging these early warnings from financial developments.

1.7 The global composite purchasing managers' index (PMI) has risen to expansion zone since July 2020, accelerating to a four-month high in November 2021. Services sector activity has recorded sustained growth since September 2021, offsetting the slight moderation in manufacturing due to elevated price pressures and persistent supply shortages. Overall, financial and business services seem to be weathering the pandemic, while consumer services have weakened and manufacturing is facing headwinds from supply disruptions (Chart 1.1). Global retail e-commerce sales are surging on pent up demand and are expected to

Chart 1.1: Global Purchasing Managers' Indices (PMI)



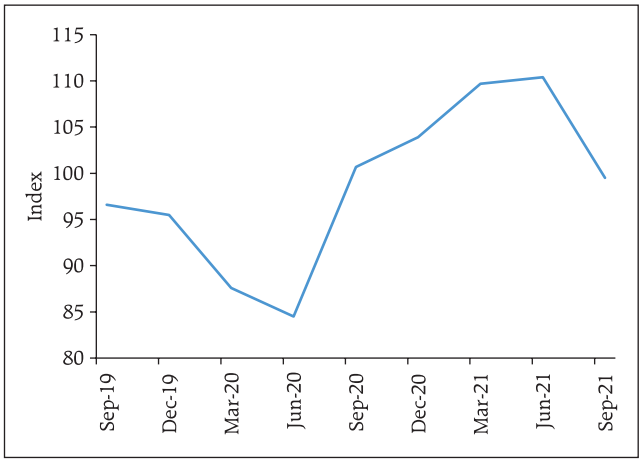
Source: Bloomberg.

close the year 2021 with a growth of 14.3 per cent in US dollar terms[2]. Global consumer confidence is upbeat with the progress on vaccination, with 41 per cent of respondents indicating increased spending on groceries, 33 per cent on fashion and 30 per cent on health and beauty[3].

1.8 World merchandise trade volumes, which had risen 22.4 per cent year-on-year in Q2:2021 have been slowing in the second half of the year, as reflected in the November 2021 reading of the Goods Trade Barometer of the World Trade Organization (WTO) at 99.5 - a sharp drop from the reading of 110.4 in August 2021 (Chart 1.2). The decline in the barometer reflects a combination of tapering import demand and disrupted production and supply of widely traded goods such as automobiles and semi-conductors. The Baltic Dry Index, a measure of shipping charges for dry bulk commodities, crossed its highest mark in more than a decade in October 2021, but it recorded a sudden drop in the remaining months of Q4 (Chart 1.3). According to the WTO, merchandise trade volume is projected to slow to 6.6 per cent by Q4:2021. Global trade volume is projected to grow by 9.7 per cent in 2021 and by 6.7 per cent in 2022[4].

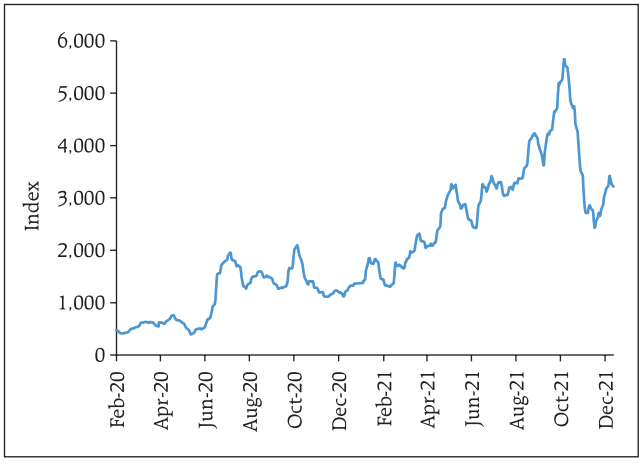
1.9 Even as slowing growth and persistent inflationary pressures have shifted the balance of risks around the global recovery to the downside, several new risks have emerged on the horizon. Decentralised Finance (DeFi), which is regarded as the new form of intermediation in crypto markets, has recently been flagged by the Bank for International Settlements (BIS) as carrying the danger of concentration of power. Vulnerabilities such as high leverage, liquidity mismatches, built-in interconnectedness and the absence of shock

Chart 1.2: Goods Trade Barometer



Source: WTO.

Chart 1.3: Baltic Dry Index



Source: Bloomberg.

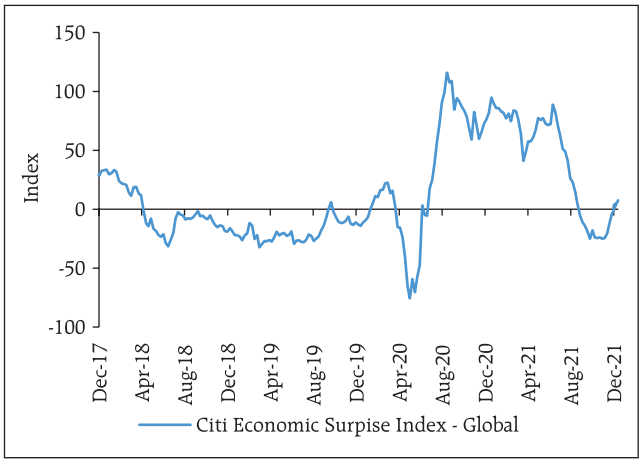
[2] Insider Intelligence – "Global Ecommerce Update", 2021.

[3] PWC – "Global Consumer Insights Pulse Survey", December 2021.

[4] IMF (2021), "World Economic Outlook", October.

absorbers such as banks could undermine financial stability as DeFi becomes widespread. Yet another risk stems from the rapid growth and consolidation of private markets that revolve around funds gathered from institutional investors by asset managers that are typically private equity or venture capital firms that have expanded into provision of credit. Private markets tend to be highly pro-cyclical in risk-taking patterns in their search for yields, thereby amplifying spillovers. The rapid growth of open-ended bond funds is another risk, exacerbating stress in financial markets, especially through fire sale dynamics as was seen in the March 2020 bond market turmoil and subsequent episodes. The rapid growth of foreign exchange derivative markets in EMEs, especially in Asia, has been accompanied by increased trading in forex derivatives in EME currencies against the US dollar, which has more than doubled since 2013. Since hedging instruments are typically short-term, maturity mismatches inherently develop between long-term dollar assets and short-term hedges, exposing investors to rollover risks and dollar funding shortages in periods of market stress. These developments impinge on a highly unsettled international environment clouded by uncertainties relating to the pace of normalisation of monetary policy by systemically important central banks, heightened geopolitical tensions and above all, the course of the pandemic. Reflecting these dynamics, the Global Economic Surprise Index (GESI), which compares incoming data with economists' forecasts, went into negative territory during Q3:2021 and it was only towards the end of November 2021 that it started to edge up (Chart 1.4).

Chart 1.4: Global Economic Surprise Index



Source: Bloomberg.

1.10 In October 2021, the International Monetary Fund (IMF) revised its outlook for the global economy downwards relative to its April 2021 projections. It expected that global output would grow by 5.9 per cent in 2021 before moderating to 4.9 per cent in 2022 (Table 1.1). The projections are marked by a widening divergence in growth paths for advanced

Table 1.1 : Growth Projections for 2021-2023

(per cent)

	2020	2021*	2022*	2023*
IMF				
Advanced Economies	-4.5	5.2	4.5	2.2
Emerging Markets and Developing Economies	-2.1	6.4	5.1	4.6
World	-3.1	5.9	4.9	3.6
OECD				
World	-3.4	5.6	4.5	3.2

Note *: Projections.
Source: IMF's World Economic Outlook Database (October 2021), OECD Economic Outlook, Volume 2021 Issue 2 (December).

economies and developing countries largely due to differences in coverage of vaccination and policy support. The IMF had indicated the likelihood of further downgrades in its projections due to the emergence of the Omicron variant[5].

1.11 More recently, *i.e.*, in December 2021, the Organisation for Economic Cooperation and Development (OECD) pointed to the loss of momentum of the global recovery and that it is becoming increasingly imbalanced. It noted that stronger and longer-lasting inflation pressures have emerged at an unusually early stage of the cycle, with labour shortages and supply bottlenecks. Accordingly, the OECD expects the global recovery to continue but moderate over time. The projection of global GDP growth for 2021 has been adjusted downwards from its earlier projection in September 2021 by 10 basis points to 5.6 per cent, while easing to 4.5 per cent in 2022 and 3.2 per cent in 2023 (Table 1.1). The OECD expects global output to grow by 3.8 per cent (y-o-y) in Q4:2021.

1.12 In the months following the release of the July 2021 FSR up to the emergence of Omicron, global financial markets had shown resilience amidst bouts of volatility triggered by resurgence of infections in various parts of the world, diverging paths of recoveries and consequent monetary stances and actions. Risk appetite had resumed in equity markets, with stock indices posting new highs in several countries. Equities were buoyed by the sustained strength of realised and expected earnings, despite elevated option prices conveying investor nervousness about the risk of imminent correction. The ground lost by stock prices in August and early September due to persisting supply chain disruptions and elevated commodity prices was recouped subsequently. Corporate bond markets too remained upbeat, with investment grade spreads below historical levels and even for lower rated high yield bonds right up to late November. Strong corporate results in the July-September quarter prompted corporate bond issuances above pre-pandemic levels, with record offerings of lower rated bonds. They were supported by easy financial conditions, including in private markets. Risk appetite extended to crypto assets, with the rising profile of DeFi providing added momentum.

1.13 By contrast, gilt bond markets experienced considerable volatility and patches of illiquidity. Market sentiment was unsettled by a growing certainty of normalisation of monetary policy sooner rather than later. The disconnect with central bank forward guidance produced wide fluctuations in the shape of yield curves in various countries. In November, when systemic central banks confirmed the commencement of normalisation amidst alarming increases in inflation prints, gilt markets started turning volatile, pricing in interest rate increases in advance of central bank communication. This was starkly reflected in the overnight index swap (OIS) rates, suggesting that government bond markets and central banks had widely differing perceptions on the macroeconomic outlook. The markets' view seemed to be confirmed by central banks pivoting to less accommodative guidance and shorter-term yields rose higher than longer-term yields, flattening yield curves across the world. Longer term yields had risen markedly between August and October, tracking crude prices which reflected similar sentiments about the redux of demand and earlier interest rate increases than later. Investor positioning and leverage amplified yield moments from October as the earlier complacency about relaxed lift-offs was jolted and there was a scurry for unwinding of positions even as liquidity became stretched. Real yields sank deeper into negative territory.

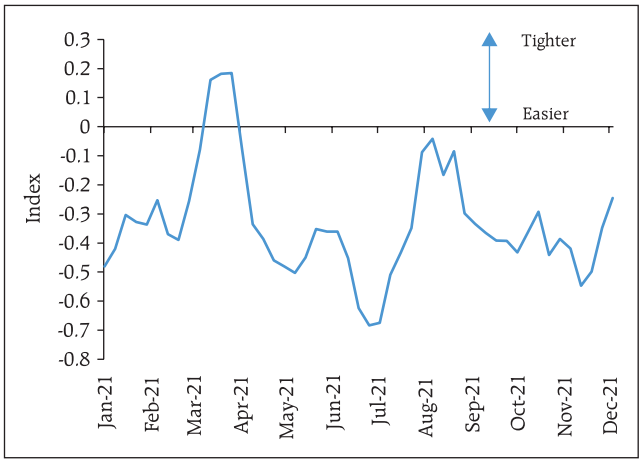
[5] Remarks by Ms.Kristalina Georgieva, Managing Director, IMF at the 'Reuters Next' Conference, December 4, 2021.

1.14 EMEs were roiled by the tightening of global financial conditions superimposed on elevated domestic inflation. Accordingly, persistent downward pressure on exchange rates ensued. In many of them, high inflation co-existed with flagging recoveries. In most EMEs, domestic financial conditions had considerably tightened when Omicron arrived. The US dollar posted large appreciations *vis-a-vis* EME currencies, which were also weakened by stubbornly rising crude prices. Equity portfolio flows dried up and turned into outflows. Flows into EME bond markets displayed country-specific patterns. In countries prompted to raise policy rates by inflation pressures, local bond yields rose, tightening their financial conditions further, and corporate bond spreads widened.

1.15 Omicron changed all this. Equity markets lost previous gains, and, in several countries, they were left with losses. Corporate bond spreads widened. Gilt yields turned volatile but fell in early December as the new variant spread apparently with milder symptoms than feared. In EMEs, currencies extended their depreciation and yields hardened, causing financial conditions to tighten further. Financial conditions have also tightened in AEs, almost symmetrically in the US and the Euro area. With Omicron triggering safe haven demand, there has been a sharp appreciation of the US dollar against both AE and EME currencies (Charts 1.5-1.7).

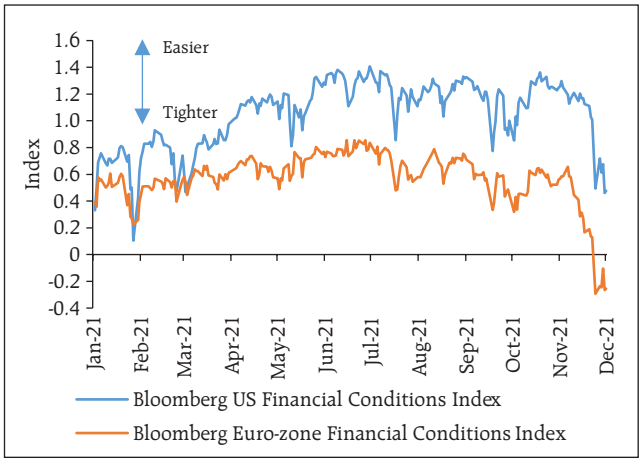
1.16 In contrast to bearishness in short to medium term yields of major AEs, especially in the US and the UK, German short-term yields have stayed flat, reflecting somewhat diminished economic prospects for the Euro zone and the sustainability of the European Central Bank (ECB)'s current accommodative stance. In the long-term

Chart 1.5: Citi EM Asia Financial Conditions Index



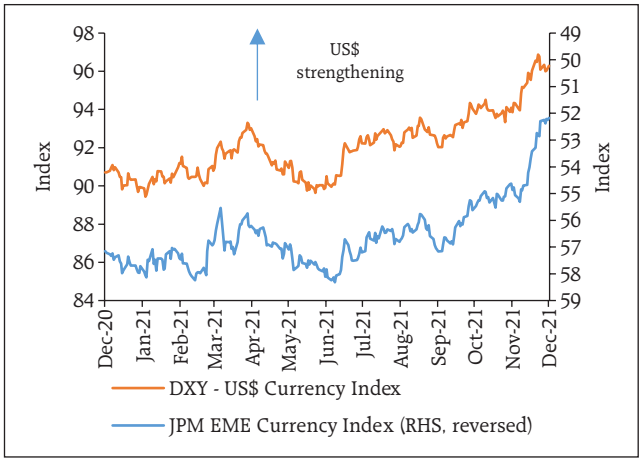
Source: Bloomberg.

Chart 1.6: Financial Conditions in Major Global Economies



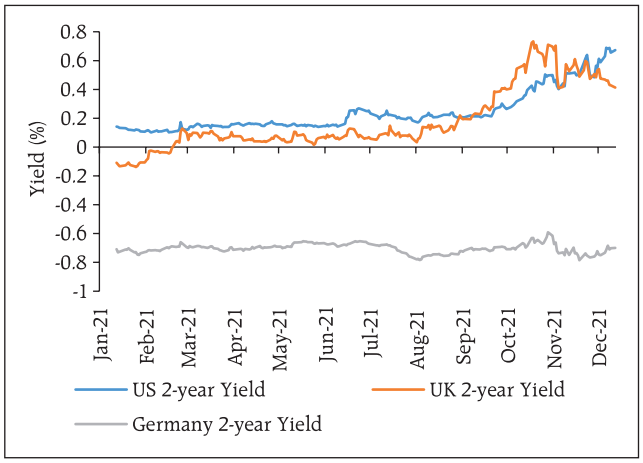
Source: Bloomberg.

Chart 1.7: Movement in AE and EME Currencies



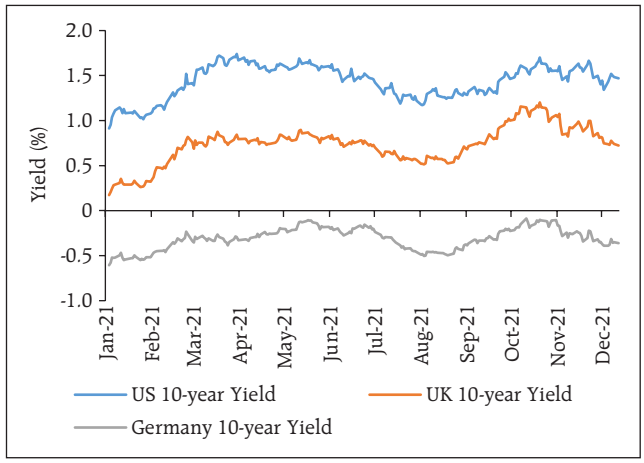
Source: Refinitiv.

Chart 1.8: 2-year Yield in Major Advanced Economies



Source: Bloomberg.

Chart 1.9: 10-year Yield in Major Advanced Economies



Source: Bloomberg.

too, German yields have moderated, which is also evident more recently in the US and the UK yields (Charts 1.8-1.9).

I.1.2 Other Global Macrofinancial Developments

1.17 The global macrofinancial environment is fraught with policy shifts across a broad range of large EMEs as also AEs.

A. Public Debt

1.18 The response to the pandemic has caused sovereign debt levels around the world to rise sharply, with the sizable fiscal stimuli to support lives and livelihoods (Table 1.2). This is likely to leave lasting scars on government finances, with implications for medium term fiscal sustainability and policy space to deal with future crises.

Table 1.2 : General Government Fiscal Balance, 2019–26: Overall Balance

(per cent of GDP)

	Actuals		Projections					
	2019	2020	2021	2022	2023	2024	2025	2026
World	**-3.6**	**-10.2**	**-7.9**	**-5.2**	**-4.2**	**-3.8**	**-3.6**	**-3.5**
Advanced G-20	-3.6	-11.7	-9.6	-5.4	-4.0	-3.6	-3.5	-3.5
Euro Area	-0.6	-7.2	-7.7	-3.4	-2.4	-2.0	-1.7	-1.6
France	-3.1	-9.2	-8.9	-4.7	-3.9	-3.6	-3.4	-3.4
Germany	1.5	-4.3	-6.8	-1.8	-0.4	0.0	0.5	0.5
Italy	-1.6	-9.5	-10.2	-4.7	-3.5	-2.9	-2.6	-2.4
Japan	-3.1	-10.3	-9.0	-3.9	-2.1	-2.1	-2.1	-2.2
United Kingdom	-2.3	-12.5	-11.9	-5.6	-3.6	-3.2	-3.1	-2.9
United States	-5.7	-14.9	-10.8	-6.9	-5.7	-5.2	-5.3	-5.3
Others	-0.2	-5.2	-4.2	-2.3	-1.4	-1.0	-0.7	-0.6
EMEs	**-4.7**	**-9.6**	**-6.6**	**-5.8**	**-5.2**	**-4.8**	**-4.4**	**-4.1**
Emerging G-20	-5.4	-10.3	-7.0	-6.3	-5.7	-5.2	-4.8	-4.4
Asia	-5.9	-10.8	-7.9	-7.0	-6.2	-5.7	-5.2	-4.8
China	-6.3	-11.2	-7.5	-6.8	-6.2	-5.6	-5.0	-4.5
India	-7.4	-12.8	-11.3	-9.7	-8.8	-8.3	-8.1	-7.8
Low-Income Developing Countries	**-3.9**	**-5.2**	**-5.4**	**-5.0**	**-4.5**	**-4.3**	**-4.1**	**-3.9**
World Output (per cent)	**2.8**	**-3.1**	**5.9**	**4.9**	**3.6**	**3.4**	**3.3**	**3.3**

Note: Overall Fiscal Balance refers to net lending (+) / net borrowing (-) of the government.
Source: IMF Fiscal Monitor, October 2021.

1.19 A significant share of the new supplies of debt paper was absorbed by central banks through quantitative easing (QE). As central banks turn off liquidity spigots even as fiscal conditions remain stretched, global debt markets are likely to face turbulent transitions.

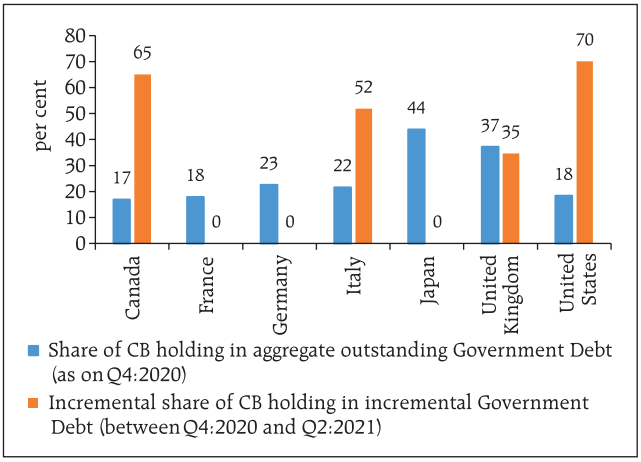
1.20 In the case of several AEs, central banks' aggregate holdings of government debt are significant; even going into 2021, they have continued to absorb a significant part of new issuances (Chart 1.10). Hence, as central banks get ready to unwind their extraordinary interventions in debt markets, expectations about the impact on liquidity and interest rates have turned bearish and yields have whipsawed (Chart 1.11).

1.21 Uncertainty regarding the risk-free sovereign rate has also led to volatility in funding markets, as reflected in the upward shift in the term structure of volatility for USD swaptions, with the 3-year rate as underlying (Chart 1.12).

B. Risks in Bank Balance Sheets

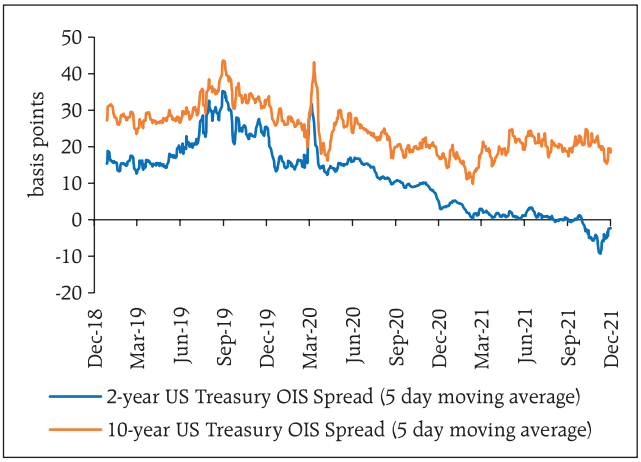
1.22 As policy normalisation commences in several countries, realignment of interest rates could lead to discretionary shifts in portfolios among domestic banks as well as recalibration of banking sector liabilities. In this context, a noteworthy adjustment has been observed in European banks' liability strategies, with demand for term funding issuances by banks (both short-term and long-term)

Chart 1.10: G-7 Central Banks' share of Government Debt and Issuances



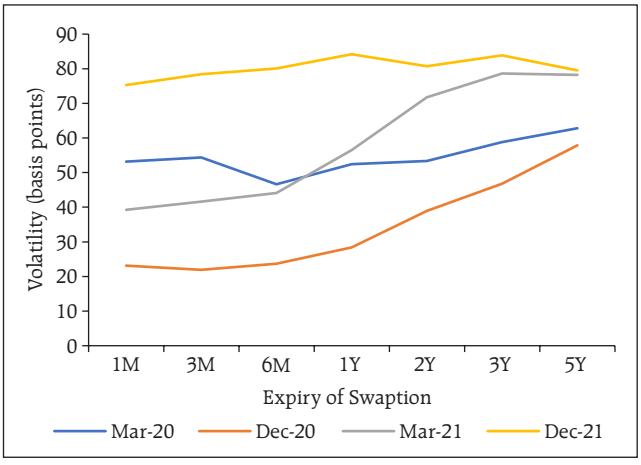
Source: IMF.

Chart 1.11: Smoothed 2-year and 10-year US Treasury and OIS Spread



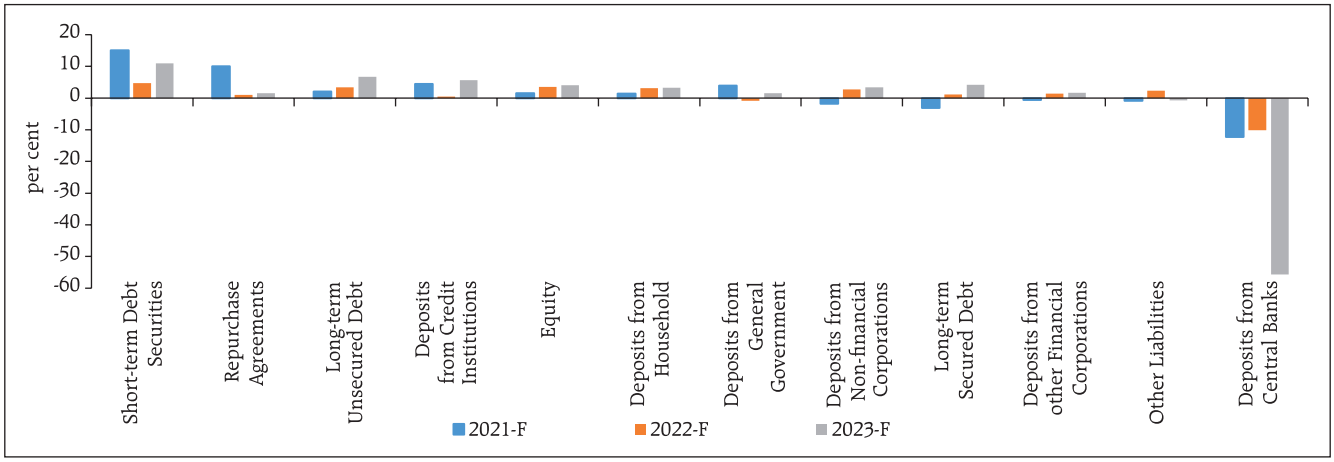
Source: Bloomberg.

Chart 1.12: Term Structure - USD Swaption 3-year Rate Volatility



Note: As on December 10, 2021
Source: Bloomberg

Chart 1.13: Growth Projections for Select Liability Classes of EBA Banks



Note: F - forecast.
Source: European Banking Authority (EBA).

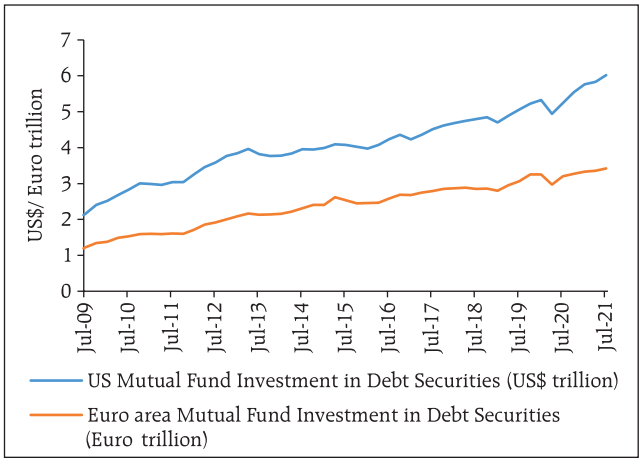
going up and central bank liquidity as a source of liability financing falling sharply (Chart 1.13).

C. Risks in the Non-Banking Financial Sector

1.23 Unprecedented QE by central banks and the resultant infusion of liquidity has led to large expansion of balance sheets of mutual funds, in particular, the bond / money market funds (Chart 1.14). Spillovers from such funds to asset market liquidity intensify in times of volatility. Lower interest rates have also resulted in expansion of leveraged bets on equity prices (margin trades) in some prominent markets. Liquidity risk remains a concern for some bond funds, particularly those which offer investors high redemption frequency while investing in asset classes that turn illiquid during times of stress[6].

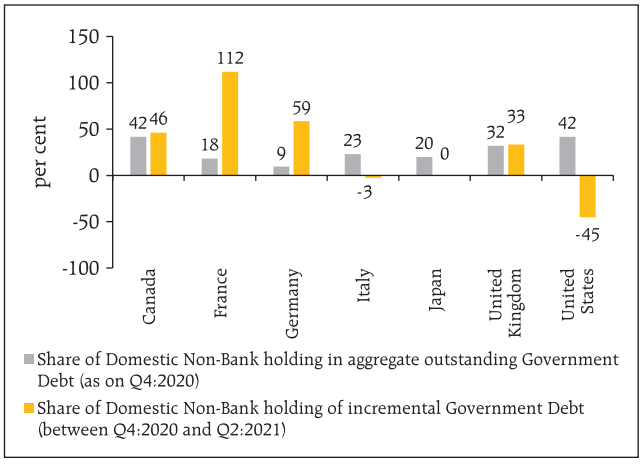
1.24 Moreover, domestic non-banks are major investors in government debt in several AEs (Chart 1.15). Their incremental share in government debt subscription remains significant. In the context of winding down of QE, any synchronised effort to shrink central banks' balance sheets may potentially lead to abrupt recalibration of interest rates levels.

Chart 1.14: US & Euro Area Select Mutual Fund Assets



Source: FRED, Federal Reserve Bank of St. Louis & ECB.

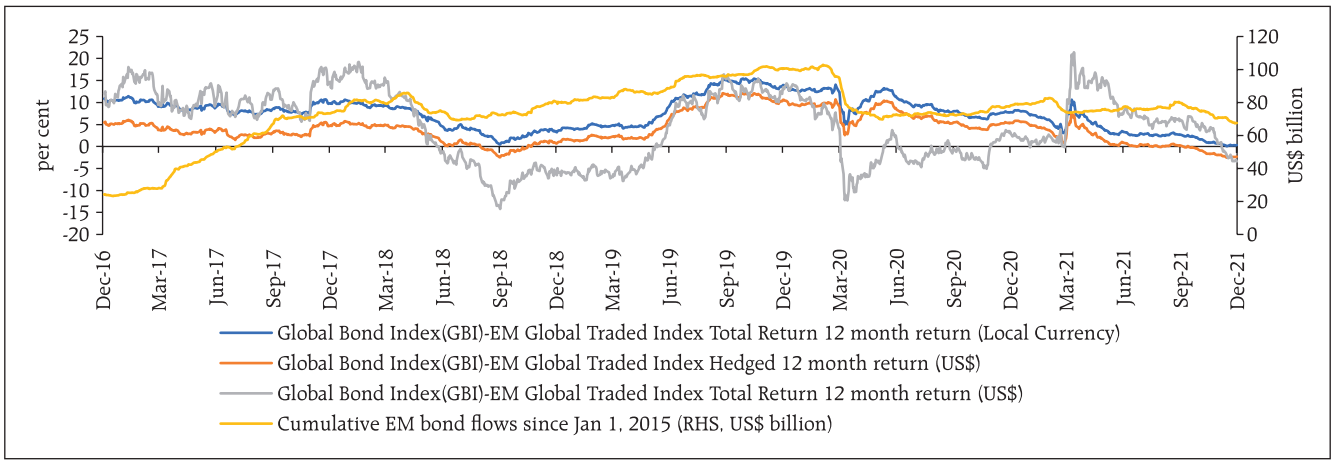
Chart 1.15: AE Domestic Non-Banks' Share of Government Debt and Issuances



Source: IMF

[6] European Securities and Markets Authority (ESMA) 2021, "Report on Trends, Risks and Vulnerabilities on Market Activities", September.

Chart 1.16: Emerging Market Bond Flows and Portfolio Returns



Note: Information has been obtained from sources believed to be reliable, but J.P. Morgan does not warrant its completeness or accuracy. The Index is used with permission. The Index may not be copied, used, or distributed without J.P. Morgan's prior written approval. Copyright 2021, J.P. Morgan Chase & Co. All rights.
Source: Institute of International Finance (IIF) and J P Morgan.

I.1.3 Capital Flows and Exchange Rate Volatility

1.25 In an international environment characterised by heightened uncertainty, EMEs are particularly susceptible to ebbs and flows in bond investors' risk appetite and hence the vicissitudes of capital flows - surges; sudden stops; reversals. Bond flows to EMEs have generally moved in line with portfolio returns, with the onset of the pandemic; however, they have flattened as investors scrambled to assess the emerging global interest rate environment (Chart 1.16).

1.26 Cross-border banking flows to non-bank entities of EMDEs remained relatively stable during the pandemic (Table 1.3). EME cross-currency basis (CCB) swaps, which declined sharply in the wake of the pandemic, have risen since, implying that the demand for US dollar flows through the CCB swap route has also normalised (Chart 1.17). While the Federal Reserve's currency swap lines with major economies (including EMEs such as Brazil and Mexico) had a stabilising effect, negative CCB swap rates persisted among EMEs till Q2:2021.

1.27 In recent years, equity and bond flows to EMEs have generally moved in sync. Since the

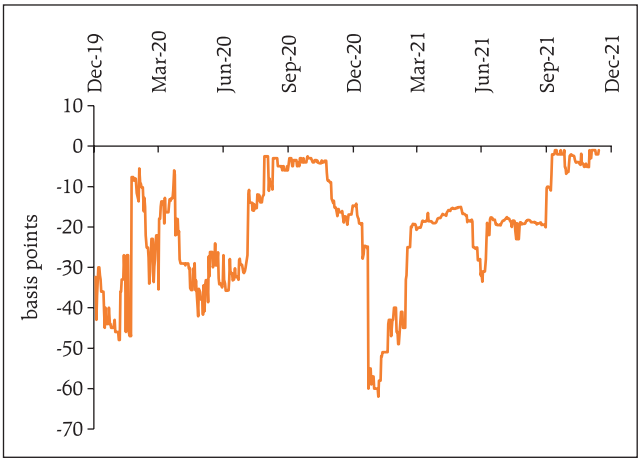
Table 1.3 : Cross-border Banking Flows to Non-Bank Entities of EMDEs

(USD billion)

Quarter	Non-Bank Sector		Projections	
	Claims	Liabilities	Claims	Liabilities
Q4-2019	2,123.1	1,327.2	1,590.6	941.8
Q1-2020	2,101.6	1,369.3	1,569.8	943.8
Q2-2020	2,127.0	1,346.0	1,585.9	945.9
Q3-2020	2,149.8	1,367.7	1,625.3	960.1
Q4-2020	2,227.9	1,419.2	1,672.7	1,011.5
Q1-2021	2,221.1	1,408.8	1,677.7	987.3
Q2-2021	2,246.5	1,462.6	1,684.4	1,030.9

Source: BIS.

Chart 1.17: Median Cross-Currency Basis Swap: Select EMEs[7]

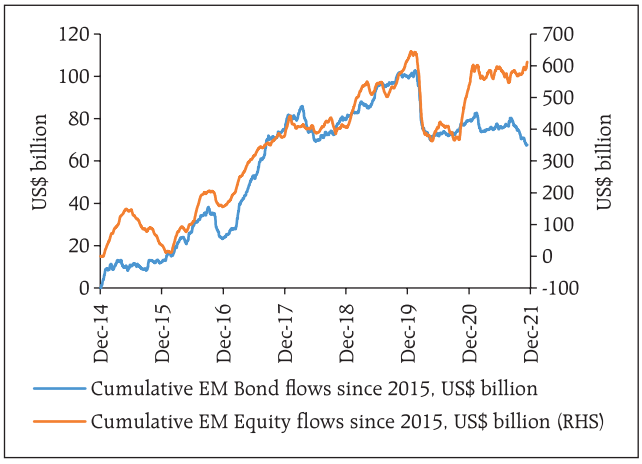


Source: Refinitiv.

[7] Economies include China, Hungary, Malaysia, Mexico, Poland, Russia, Saudi Arabia, South Africa, Thailand and Turkey.

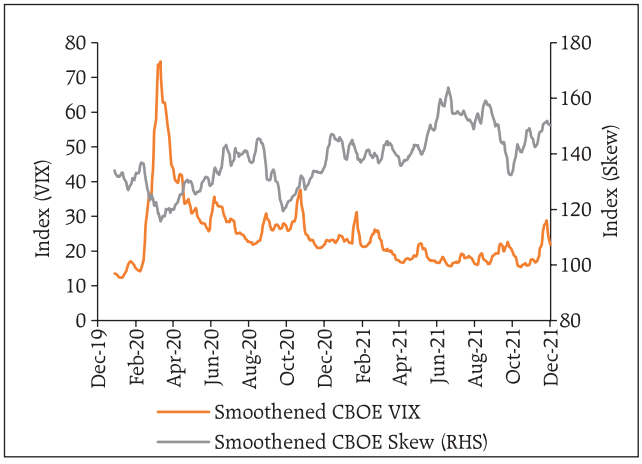
outbreak of the pandemic, however, equity flows to EMEs have been robust on the back of resilient corporate earnings (Chart 1.18). Concerns are, however, emerging about the slow recovery in contact intensive service sectors, the disruptions caused by global supply chains and finally, the uncertain prospects for the Chinese economy. As a result, while option implied volatility of S&P 500 (VIX) has been range-bound, a common market-based indicator representing cost of protection against sharp declines, *i.e.*, the CBOE Skew has been off its post-pandemic lows (Chart 1.19).

Chart 1.18: Portfolio Flows to Emerging Markets



Source: IIF.

Chart 1.19: Risk Perception of Investors



Source: Bloomberg.

I.1.4 London Inter Bank Offered Rate (LIBOR) Transition

1.28 The impending transition of Sterling, Euro, Swiss Franc and Japanese Yen LIBOR settings in all tenors, and US Dollar LIBOR 1-week and 2-month settings after end-December 2021 has imparted urgency to moving towards benchmarking of products in alternate risk-free rates (ARRs) and development of interest rate derivative (IRD) segments linked to ARRs. The average monthly ISDA-Clarus[8] risk-free rates (RFR) Adoption Indicator, which tracks how much global trading activity (as measured by DV01[9]) is conducted in cleared over-the-counter (OTC) and exchange-traded IRDs referencing ARRs in six major currencies, touched 17.4 per cent in Q3:2021, up from 11.0 per cent in the preceding quarter. Progress across currencies in adoption of ARR benchmarking has been uneven, with Euro-linked IRDs lagging (Table 1.4).

1.29 The adoption of the ARR Index for long-term IRDs has been slow even in currencies with significant ARR adoption, as per the data on OTC

Table 1.4: Percentage DV01 Contributed by RFRs - Currency wise

(per cent)

Month	RFR USD	RFR EUR	RFR GBP	RFR JPY	RFR AUD	RFR CHF
Jan-21	5.7	0.8	45.9	3.5	3.1	7.7
Feb-21	5.0	1.0	45.8	3.5	5.2	8.8
Mar-21	4.6	1.3	44.9	2.4	5.1	6.3
Apr-21	7.4	1.7	51.0	3.9	6.0	16.7
May-21	6.8	1.5	54.9	6.8	2.7	13.7
Jun-21	6.0	1.8	61.0	6.9	5.1	13.7
Jul-21	7.4	2.1	58.8	23.4	17.1	34.1
Aug-21	12.5	2.4	63.3	49.5	14.5	50.4
Sep-21	15.2	2.3	64.8	54.2	18.5	43.4
Oct-21	15.8	9.2	75.3	63.4	19.7	53.8

Source: ISDA Clarus RFR adoption indicator.

[8] ISDA - International Swaps and Derivatives Association

[9] DV01 measures the risk of bond portfolio (*viz.*, the price change in response to one basis point change in yield)

derivatives submitted to US regulators (Table 1.5). Nevertheless, the position has improved in Q3:2021 relative to Q2. Since real sector hedging of interest rate and currency exposures is largely dependent on a liquid and vibrant long-term derivatives segment, slow progress in this regard, particularly for the Euro, may have implications for efficient risk transfer.

I.1.5 Commodity Markets

1.30 Inflationary pressures have increased significantly in the recent months, especially across AEs, driven by upto 30 per cent year-on-year increases in energy prices (Table 1.6). Even food prices have remained far above their long-term growth rates.

1.31 Global commodity markets continued their rise during the second half of 2021, with patches of price corrections emanating from developments in China before the emergence of Omicron led to a sharp correction in the second half of November 2021. Some of the declines have started reverting again in early December. The outlook appears uncertain as supply bottlenecks gradually ease, global liquidity and monetary policy regimes begin recalibration to normalise and demand gathers steam.

1.32 Before Omicron, crude oil prices had been hardening, supported by pent-up demand and increasing mobility as more countries reopened their borders[10] (Chart 1.20). While call options dominated the trading volume since October 2021, bearish sentiments with regard to the near-term oil price outlook have surfaced recently due to the

Table 1.5 : US Reported RFR-linked Interest Rate Derivatives

(USD billion)

Quarter	Q3 2021		YTD Q3 2021	
	Traded Notional (US$ billions)	Trade Count	Traded Notional (US$ billions)	Trade Count
SOFR	**2,121.3**	**20,351**	**3,815.5**	**32,190**
Upto 1 year	595.9	966	1,338.2	1,850
1 to 5 years	882.1	8,437	1,535.5	14,456
Over 5 years	643.3	10,948	941.7	15,884
SONIA	**4,867.4**	**26,200**	**12,059.8**	**61,217**
Upto 1 year	3,510.9	2,766	8,667.5	6,735
1 to 5 years	815.0	8,810	2,010.5	19,921
Over 5 years	541.4	14,624	1,381.8	34,561
SARON	**81.9**	**1,222**	**100.6**	**1,460**
Up to 1 year	29.7	70	38.7	97
1 to 5 years	40.6	672	46.7	770
Over 5 years	11.6	480	15.1	593
TONA	**204.4**	**2,729**	**349.1**	**3,203**
Upto 1 year	65 .9	213	187.3	437
1 to 5 years	73.8	856	93.7	1,021
Over 5 years	64 .6	1,660	68.1	1,745
€STR	**184.2**	**857**	**320.5**	**1,586**
Upto 1 year	145.0	211	247.1	355
1 to 5 years	26.5	282	47.4	538
Over 5 years	12.7	364	26.1	693

SOFR - Secured Overnight Financing Rate (US)
SONIA - Sterling Overnight Index Average (UK)
SARON - Swiss Average Rate Overnight (Switzerland)
TONA - Tokyo Overnight Average Rate (Japan)
€STR - Euro Short-Term Rate (Euro area)
Source: ISDA Clarus quarterly RFR adoption report

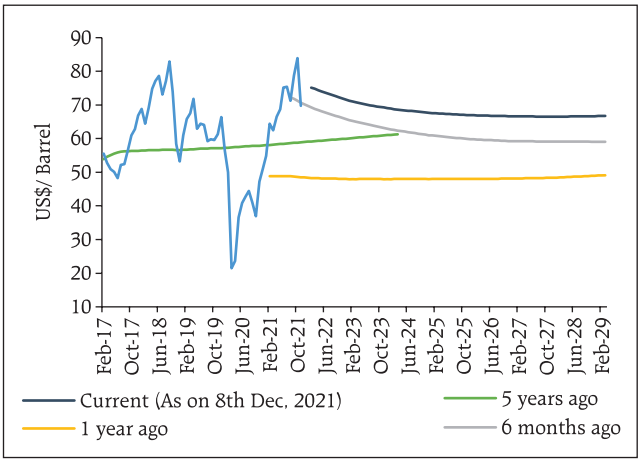
Table 1.6 : CPI Inflation in Select Advanced Economies

(per cent)

	Total	Energy	Food
US	6.2	30.0	5.4
UK	3.8	22.4	1.3
Germany	4.5	18.7	4.5
OECD – Total	5.2	24.2	4.5

Source: Organisation for Economic Co-operation and Development (OECD)

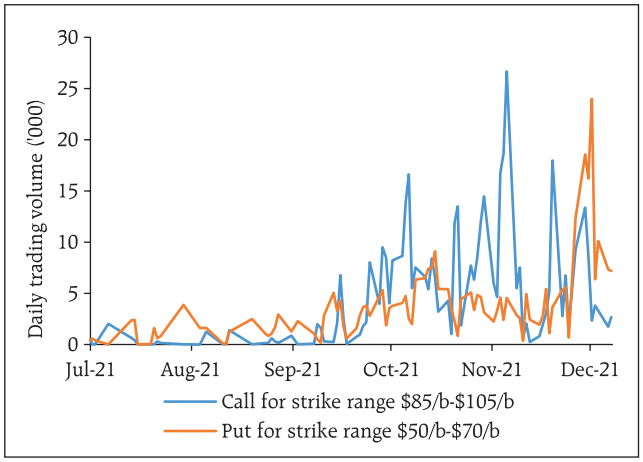
Chart 1.20: Brent Crude Spot and Futures - Price Trends



Source: Bloomberg.

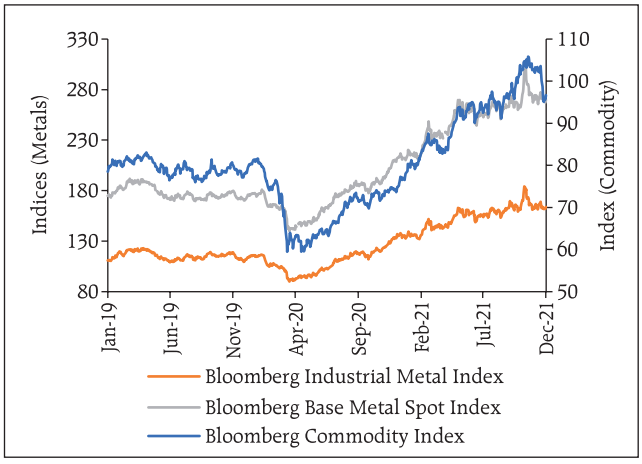
[10] International Energy Agency (IEA) 2021 – "Oil Market Report", November.

Chart 1.21: Daily Trading Volume for Brent Options at select Strike Prices



Source: Bloomberg.

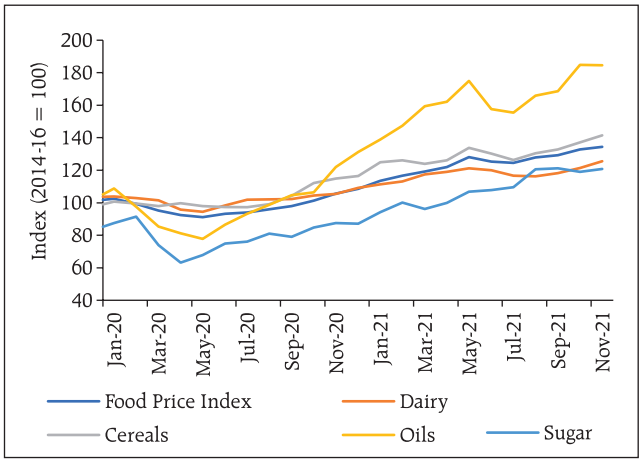
Chart 1.22: Bloomberg Commodity and Metal Indices



Source: Bloomberg.

emergence of Omicron (Chart 1.21). The World Bank expects non-energy commodity prices to soften from their current elevated levels as supply bottlenecks ease. The demand for industrial and base metals is, however, likely to be robust on the back of global investment in decarbonisation (Chart 1.22). Inflationary pressures are reinforced by the fall in production of food items, supply side disruptions and rising input costs. The food price index of the Food and Agriculture Organisation (FAO) rose by 27.3 per cent in November 2021 (y-o-y), led by sharp increases in prices of dairy products, cereals, edible oils and sugar (Chart 1.23).

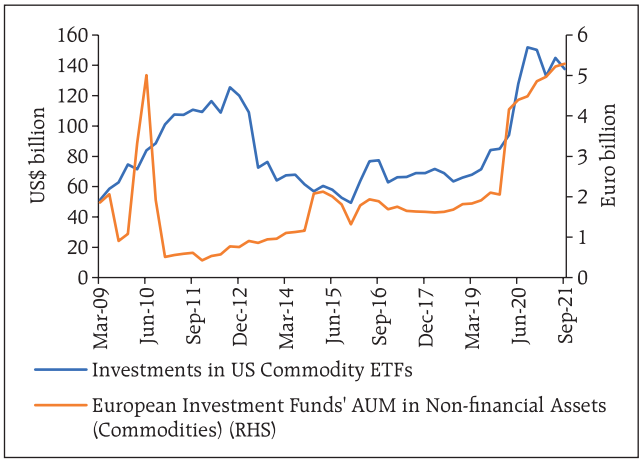
Chart 1.23: FAO Monthly Food Price Index



Source: Food and Agricultural Organisation, United Nations.

1.33 The role of investment funds in fuelling and sustaining bullishness in commodity prices is becoming increasingly important as the assets under management (AUM) of these funds are significant (Chart 1.24). Retail and institutional investments in commodities are estimated at USD 710 billion in October 2021 after taking into account the active and passive investments across Europe and US[11]. Such investments are driven by the motive of diversification of investment risk with imperfect pricing hedges. The commodities targeted by the investment funds span agricultural products to precious metals, with a recent spike in energy.

Chart 1.24: Investment in Commodity linked Investment Funds



Source: FRED, Federal Reserve Bank of St. Louis & ECB.

[11] Citi Research (2021)," Commodity Strategy", November.

I.1.6 Private Cryptocurrency Risks

1.34 The proliferation of private cryptocurrencies across the globe has sensitised regulators and governments to the associated risks. Private cryptocurrencies pose immediate risks to customer protection and anti-money laundering (AML) / combating the financing of terrorism (CFT). They are also prone to frauds and to extreme price volatility, given their highly speculative nature. Longer-term concerns relate to capital flow management, financial and macro-economic stability, monetary policy transmission and currency substitution.

1.35 According to the Financial Action Task Force (FATF)[12], the virtual asset ecosystem has seen the rise of Anonymity-Enhanced Cryptocurrencies (AECs), mixers and tumblers, decentralised platforms and exchanges, privacy wallets, and other types of products and services that enable or allow for reduced transparency and increased obfuscation of financial flows. New illicit financing typologies continue to emerge, including the increasing use of virtual-to-virtual layering schemes that attempt to further muddy transactions in a comparatively easy, cheap and anonymous manner.

1.36 Aggregate market capitalisation of the top 100 crypto currencies has reached USD 2.8 trillion[13]. In the EMEs that are subject to capital controls, free accessibility of crypto assets to residents can undermine their capital regulation framework.

1.37 To sum up, even as global growth and trade lose pace, global financial markets remain resilient, although Omicron has imparted heightened uncertainty. Although equity markets suffered the most, they have clawed back losses. Nonetheless, the risk of sharp corrections remains elevated. Corporate bond spreads have widened post-Omicron, but appetite remains strong, especially in the lower rated end of the spectrum. As central banks dial down their extraordinary liquidity support, short-term yields in the government bond markets are expected to rise more sharply than for longer maturities and flatten the yield curve. Patches of illiquidity and disorderly trading could well be encountered if divergences between the outlook of markets and forward guidance of central banks force unwinding of leveraged positions. Financial conditions are tightening for EMEs, with rising bond yields and currency depreciations. Elevated inflationary pressures co-existing with large slack in economic activity is complicating the conduct of monetary policy against the backdrop of limited fiscal space and the unrelenting grip of the pandemic.

1.38 The rapid growth of decentralised finance (DeFi) is geared predominantly towards speculation and investing and arbitrage in crypto assets, rather than towards the real economy. The limited application of anti-money laundering and know-your-customer (AML/KYC) provisions, together with transaction anonymity, exposes DeFi to illegal activities and market manipulation, and poses financial stability concerns.

1.39 Open ended funds (OEFs) are enhancing liquidity in bond markets, but they also have financial stability implications. Hence, their liquidity buffers could be expanded by a countercyclical add-on. In addition, OEFs could collectively be moved to redemption terms that are more closely aligned with the liquidity profile of their portfolios. Redemptions in kind supported by financial intermediaries to mitigate liquidity stresses could be an alternative approach to enhance resilience. Macroprudential

[12] FATF (2021), "Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers", October.

[13] According to coinmarketcap.com, accessed on November 15, 2021 at 4 pm IST.

tools should be stringent enough to help ensure liquidity mismatches are adequately managed and do not give rise to externalities. These tools should be able to identify and address systemic risks in the OEFs. The tools should be "usable" during episodes of stress.

1.40 Private markets have become an important financing channel for the real economy, especially in Asia where their dominant activity is venture capital. Private markets seem to exhibit relatively high procyclicality in risk-taking. In this context, funds involved in private credit reveal a strong sensitivity to monetary policy actions and stances.

1.41 Non-bank actors are bringing in dollar funding stresses, revealing gaps in traditional policy approaches to forex (FX) markets. These non-bank investors have traditionally been subject to less stringent FX liquidity regulation and risk management rules than banks, and financial authorities face challenges in monitoring their funding needs. At this stage, it is important to better understand non-bank investors' role in creating or propagating systemic risk so that policy actions can be taken to smooth out financial risk-taking over time. In this context, a consolidated approach to oversight that encompasses the root causes of dollar funding problems created by institutional investors and asset managers in FX markets may be appropriate. Risk based supervision can allow for flexible hedging of currency risk in order to mitigate spikes in the demand for short-term dollars in times of stress as well as incentivise longer-term hedging.

1.42 Finally, as the world prepares for combating climate change and enhancing environmental resilience, attention needs to go to environmental, social and governance (ESG) markets to support the transition. Here, accurate ESG information is key, with a reliable and standardised taxonomy for cross-country comparison and robust metrics.

I.2 Domestic Macrofinancial Risks

1.43 In India the second wave of the pandemic showed distinct signs of subsiding by July 2021. Localised restrictions were eased and the engines of growth started revving up, aided by the progress of vaccination. The number of daily new infections, which peaked at over 4 lakh cases in mid-May 2021, moderated to less than 60 thousand in early July and less than 10 thousand by early December 2021[14]. The pace of vaccination has been scaled up significantly, with 14 instances of ten million shots delivered on a single day, cumulatively numbering 1.42 billion up to December 28, 2021[15]. With nearly 60 per cent of the adult population fully vaccinated, rapid progress is being made towards attaining 80-90 per cent coverage of the target population equivalent to herd immunity levels[16].

1.44 In the period following the release of the July 2021 FSR, the Indian economy expanded by 8.4 per cent year-on-year (y-o-y) in July-September 2021, with the level of GDP exceeding pre-pandemic levels (July-September 2019) for the first time since the pandemic struck. More recent high-frequency indicators of economic activity suggest some loss of momentum in the third quarter of 2021-22. The pace of the recovery remains uneven across sectors, inflation formation is being subjected to repetitive supply shocks and the outlook is overcast with global risks. Omicron haunts near-term prospects.

[14] Ministry of Health and Family Welfare, Government of India.

[15] Bloomberg

[16] National Institute of Disaster Management (NIDM) 2021, "Third Wave Preparedness: Children's Vulnerability and Recovery", August.

I.2.1 Public Finance

1.45 During April-October 2021, all the deficit indicators of the centre (gross fiscal deficit; primary deficit; revenue deficit) exhibited improvement y-o-y as well as from their pre-pandemic levels. Gross tax revenues have been buoyant, with robust growth under all major heads, with direct taxes in the lead. Total expenditure grew 9.9 per cent, the noteworthy feature being expansion of capital outlay by 28.3 per cent, led by roads and highways (Table 1.7).

1.46 With the second supplementary demand of grants presented in December 2021, the budgeted fiscal deficit of 6.8 per cent of GDP may come under strain. It is important to note that the supplementary demand for grants embeds a substantial component of fiscal consolidation in the form of retirement of high cost repayment obligations relating to Air India. The size of gross government borrowing has proceeded at a pace that suggests that budget estimates will be adhered to (Table 1.8).

1.47 However, repayment obligations (difference between gross and net borrowings) of the central government indicate a significant uptrend going forward, implying that gross borrowing is likely to remain elevated notwithstanding fiscal consolidation (Chart 1.25).

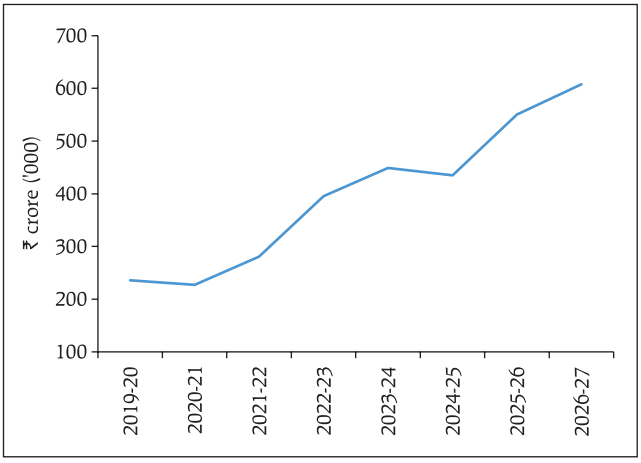
Table 1.7: Fiscal Indicators – Central Government

(₹ crore unless otherwise stated)

	Apr-Oct 2020	Apr-Oct 2021	% change (y-o-y)
Gross Tax Revenue	**8,75,591**	**13,64,101**	**55.79**
of which, Direct Tax Revenue*	3,86,025	6,59,066	70.73
of which, Indirect Tax Revenue#	4,45,673	6,46,283	45.01
Tax Revenue (Net)	**5,75,697**	**10,53,135**	**82.93**
Total Expenditure	**16,61,454**	**18,26,725**	**9.95**
of which, Capital Expenditure	1,97,355	2,53,270	28.33
Fiscal Deficit	**9,53,154**	**5,47,026**	**-42.61**
Revenue Deficit	**7,72,196**	**3,13,478**	**-59.40**
Primary Deficit	**6,19,698**	**1,47,289**	**-76.23**

* Includes Securities Transaction Tax, Fringe Benefit Tax, Wealth Tax *etc.*
# Includes Central GST, Integrated GST, Customs, Excise Duties, Service Tax.
Source: Controller General of Accounts (CGA), Ministry of Finance.

Chart 1.25: Repayment Obligations of Central Government – Dated Securities



Source: RBI (Outstanding dated central government securities as on December 10, 2021 for repayment obligations beyond March 2022)

Table 1.8 : Market Borrowings by the Centre and States

(face value in ₹ crore)

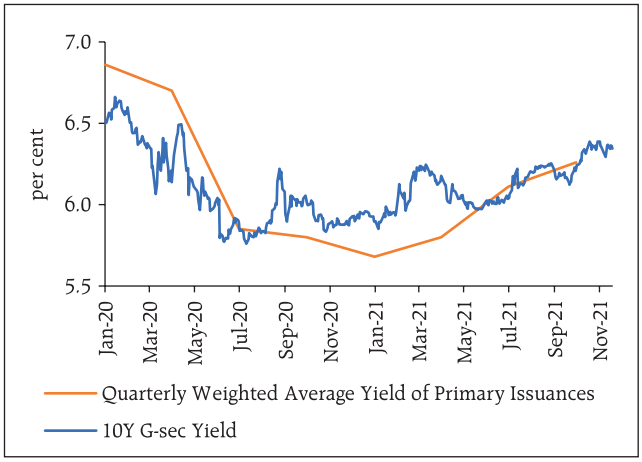
Item	Gross				Net		
	2019-20	2020-21	2021-22		2020-21	2021-22*	2021-22
			Budget	(Till Nov 26)		Budget	(Till Nov 26)
Government of India	7,10,000	13,70,324	12,05,500	8,70,357	11,43,114	9,67,708	6,55,800
State Governments	6,34,521	7,98,816	NA	4,06,246	6,51,777	NA	2,97,259

Source: RBI

1.48 During H1: 2021-22, SCBs' acquisition of government securities (G-Secs) and state development loans (SDLs) increased sharply, with their incremental holding accounting for 39 per cent and 68 per cent of the net issuance of G-Secs and SDLs, respectively. The dated G-Sec holding of the Reserve Bank also went up during the period, accounting for 27 per cent of the net issuance. (Tables 1.9 - 1.10).

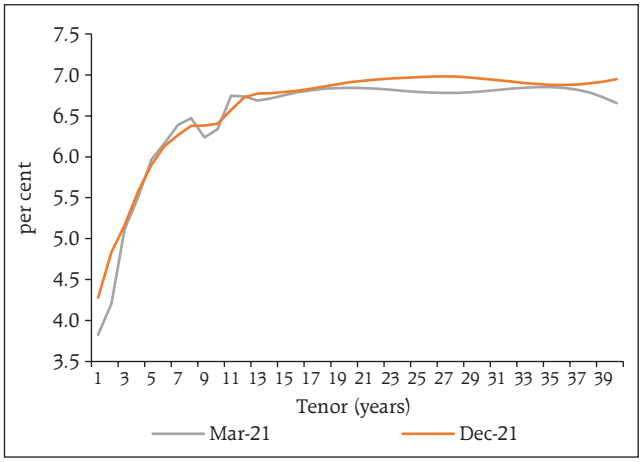
1.49 The quarterly weighted average cost of incremental government borrowing has inched up in line with market benchmark yield movements (Chart 1.26). Yields in the tenor bucket of 5-15 years have eased in December (as on December 13, 2021) *vis-à-vis* at the beginning of financial year (Chart 1.27). Transfers to the held-to-maturity (HTM) segment have risen for both G-Sec and SDLs, reflecting a general bearish outlook on interest rates and a decline in active interest rate risk (Table 1.11). Going forward, banks' reliance on trading gains through revaluation of assets to drive other operating income is likely to decline.

Chart 1.26: Central Government Primary and Secondary Market Yields



Source: Refinitiv, 'Public Debt Management - Quarterly Review, September 2021', Ministry of Finance and RBI staff calculations

Chart 1.27: Yield Curve Shifts between end-March 2021 and December 2021 (up to December 13, 2021)



Source: FIMMDA.

Table 1.9 : Incremental Holdings of dated G-Secs and SDLs : H1:2021-22

(₹ crore)

	G-Secs	SDLs
SCBs	2,30,585	1,85,441
Insurance Companies	59,082	-23,235
Provident Funds	-28,446	-94,811
RBI	1,61,179	5,454

Source: RBI.

Table 1.10 : Dated G-Secs and SDLs –Investor Profile

(per cent)

	G-Secs as a proportion to SCBs' domestic assets	SDLs as a proportion to SCBs' domestic assets	SLR securities as a proportion to SCBs' domestic assets	RBI holding as a proportion total outstanding G-Secs
Mar-2008	19.2	3.8	23.0	7.8
Mar-2015	16.5	5.0	21.6	13.5
Mar-2020	15.1	6.7	21.8	15.1
Mar-2021	15.5	7.0	22.5	16.2
Sep-2021	16.1	7.7	23.8	17.0

Source: RBI.

Table 1.11 : Bank Group-wise Incremental HTM holdings, H1:2021-22

(₹ crore)

	G-Secs	SDLs	Others	Total
Public Sector Banks (PSBs)	17,403	64,885	-24,101	58,187
Private Sector Banks (PVBs)	50,436	6,394	10,334	67,163
Foreign Banks (FBs)	5,478	580	-	6,058
All SCBs	73,317	71,858	-13,768	1,31,407

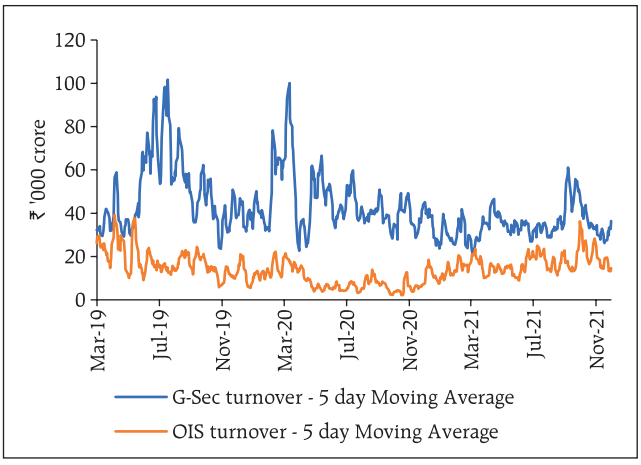
Note: Based on 46 SCBs which account for about 98 per cent of the total assets of the banking system.
Source: Individual bank submission to RBI.

I.2.2 Government Securities and Fixed Income Derivatives Markets

1.50 Domestic fixed income markets have remained resilient during the pandemic and volumes have picked up in recent months. The government securities market and overnight indexed swaps (OIS) market turnovers show a general rise in activity in both segments (Chart 1.28). This has also coincided with a softening of realised volatility in the 10-year segment, the most traded tenor, even as volatility has inched up at the short end of the curve in response to the rebalancing of liquidity by the Reserve Bank through variable rate reverse repo (VRRR) auctions.

1.51 The auction methodology for issue of benchmark securities of certain tenors and floating rate bonds (FRBs) was changed to the uniform price auction method in July 2021.This shift in auction methodology has generally narrowed bidding spreads and led to better price realisation (Box 1.1).

Chart 1.28: G-Sec and OIS Turnover



Source: CCIL.

Box 1.1: An Assessment of the Uniform Price Auction Method

The impact of the change in auction methodology to the uniform price auction method for issue of benchmark securities of 2-year, 3-year, 5-year, 10-year, 14-year tenors and FRBs was evaluated in respect of two parameters: (a) participation of auction underwriters, *i.e.*, the primary dealers (PDs); and (b) participation of other bidders.

For non-bank PDs' auction bids in respect of primary auctions of relevant tenors and the bidding behaviour of new PVBs during April 2020 - September 2021, the change in auction methodology appears to have had a statistically significant beneficial impact on the success ratio for both these investor classes (Table 1).

In addition to the success ratio, the intensity of bidding can be gauged from the spread between the weighted average price of bidding and weighted average price for bids accepted. The change in auction methodology has generally narrowed the spread of bidding (Table 2). Combined with the previous result of the crowding-in of additional investor interest due to uniform pricing, this implies a better price realisation for the Government under the revised auction methodology.

Table 1: Auction Methodology and Bidding Behaviour

Variable	PD Success Ratio	New PVB Success Ratio
Constant	0.115199	0.269432
	(4.324)***	(5.422)***
ACU_COMM_CUT_OFF	0.000184	-0.002425
	(0.214)	(-1.510)
YLD_CHG_ PREV_AUC	-0.000688	0.002726
	(-0.502)	(1.065)
YLD_CHG_ PREV_DAY	0.003674	0.001191
	(1.075)	(0.187)
MATURITY_ AUC_PAPER	0.006553	0.005462
	(3.518)***	(1.578)
DISCR_AUC_DUMMY	-0.049638	-0.092788
	(-2.084)**	(-2.089)**
R-squared	0.098065	0.051365
Adjusted R-squared	0.073555***	0.025587*

Note: *** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level; Values in parentheses represent standard error.
ACU_COMM_CUT_OFF: underwriting commission cut-off for relevant securities; YLD_CHG_PREV_AUC: difference in 10-year benchmark yield between previous trading day closing of next auction and prior auction closing (in basis points);
YLD_CHG_ PREV_DAY: difference in 10-year benchmark yield between auction day opening and previous day closing (in basis points);
MATURITY_AUC_PAPER: difference in number of years between maturity of the paper being auctioned and the settlement date; and
DISCR_AUC_DUMMY: auction performed under discriminatory method given dummy value of 1 and uniform price auction method given as 0.
Source: RBI staff calculations

(Contd...)

Table 2: Auction Methodology and Aggression in Bidding

Dependent Variable: SPREAD
Method: Least Squares
Sample: 1 190
Included observations: 190

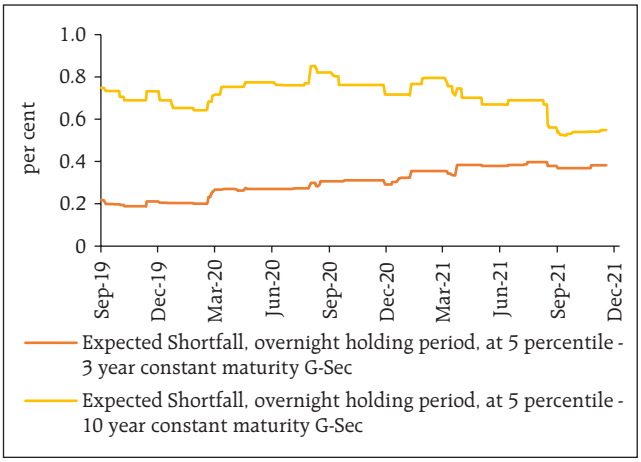
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.1819	0.0421	4.316	0.0000
YLD_CHG_ PREV_AUC	-0.0019	0.0033	-0.586	0.5581
YLD_CHG_ PREV_DAY	0.0138	0.0082	1.695	0.0917
ACU_COMM_CUT_OFF	0.0020	0.0020	0.996	0.3204
MATURITY_ AUC_PAPER	0.0254	0.0044	5.698	0.0000
UNIFORM_AUC_DUMMY	-0.2772	0.0559	-4.956	0.0000

R-squared	0.263	Mean dependent var	0.362
Adjusted R-squared	0.243	S.D. dependent var	0.322
S.E. of regression	0.280	Akaike info criterion	0.324
Sum squared residual	14.442	Schwarz criterion	0.426
Log likelihood	-24.794	Hannan-Quinn criterion	0.366
F-statistic	13.141	Durbin-Watson stat	1.888
Prob(F-statistic)	0.000		

Note: UNIFORM_AUC_DUMMY: uniform price auction given dummy value of 1 and auction performed under discriminatory method given as 0
Source: RBI staff calculations.

1.52 An analysis of the tenor varying volatility profile of the G-sec yield curve (Chart 1.29) reveals interesting results (Box 1.2). The analysis indicates that the three dominant factors in the evolution of volatility of term structure are: (a) simultaneous yield movements in the same direction across tenors; (b) slope of the term curve; and (c) idiosyncratic tenor specific risks. A one standard deviation (1-SD) shock to these factors leads to flattening of the yield curve. A causality test of the impact of interest rate expectations as embedded in the OIS swap curve indicates a lagged impact of the G-Sec on the OIS. While interest rate expectations affect the G-Sec curve initially, its subsequent shifts show a lagged effect on the OIS curve itself, pointing to interaction between the two curves through hedging behavior of market participants.

Chart 1.29: Market Risk in Overnight G-Sec Holdings



Source: Bloomberg and RBI staff calculations.

Box 1.2 – Term Structure of Volatility

In order to identify the drivers of the yield curve and to understand the interaction of the influence of interest rate expectations - as embedded in the OIS swap curve - on yield curve evolution, a principal component analysis (PCA) is undertaken, entailing identification of latent term structure volatility drivers to explain the underlying volatility[17] of the term structure. Since liquidity management operations underwent a shift to accommodation in 2019, this break is also captured in the analysis by using data from January 2019 to November 2021.

The results reveal common factors in the G-Sec curve[18] and the OIS curve[19] (Table 1). The first principal component (PC-1) is by far the most dominant component, explaining between 94 per cent to 96 per cent of volatility in the term structure. The first three components together practically account for the entire volatility of the term structure, irrespective of the underlying curves. PC-1 has positive factor loading across tenors, implying that this component can be deemed to be explaining risk arising out of simultaneous yield movements in the same direction across tenors. The second component (PC-2) has positive factor loadings in the OIS segment for the first three tenors (till 6 months) and a negative coefficient for the rest of the tenor. For the G-Sec par yield curve, the first four tenors of PC-2 (till 1-year) have negative loadings while the remaining tenors have positive loadings. Hence for both the curves, PC-2 can be seen as being indicative of the slope of the term structure. The third component generally seems to define idiosyncratic tenor specific risks.

A one standard deviation (1 SD) shock to PC-1 in the G-Sec curve entails a 113 bps increase in yields in the 1-year tenor and an increase of 46 basis points (bps) in the 10-year, implying a bearish flattening of 66 bps following the realisation of the shock. Similarly, a one standard deviation shock to PC-2 in the G-Sec curve (PC-1 and PC-2 being mutually orthogonal, such shocks can happen independently) entails a 2 bps rise in the 1-year yield and a 14 basis point reduction in the 10-year tenor, implying a bullish flattening of 16 bps. Thus, realisation of the interest rate shock scenarios entails a flattening of the yield curve.

Table 1: Principal Component Variance Analysis

(All numbers in per cent)

	OIS curve (Overnight – 5 years)	G-Sec curve (Overnight – 15 years)
PC-1	94.27	96.00
PC-1 + PC-2	99.73	98.44
PC-1 + PC-2 + PC-3	99.94	99.50

Source: FIMMDA and staff calculations.

Granger Causality test results indicate that the influence of PC-1 of the OIS curve on the PC-1 of the G-Sec curve shows unidirectional causality running from the OIS curve to the G-Sec curve at a single lag, but the causality becomes bi-directional as the number of lags increases, implying a lagged impact of G-Sec drivers on OIS drivers (Table 2). This also implies the interaction between the two curves through hedging.

The PC-2 series is stationary, implying the contemporaneous liquidity and interest rate regimes have little impact (Table 3).

Table 2: Analysis of interaction between movement in G-Sec and OIS Curve

Pairwise Granger Causality Tests
Sample: 1/01/2019 11/16/2021
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
PC_1_OIS does not Granger Cause G_SEC_PC_1	688	16.8290	5.E-05
G_SEC_PC_1 does not Granger Cause PC_1_OIS		0.00942	0.9227

Pairwise Granger Causality Tests
Sample: 1/01/2019 11/16/2021
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
PC_1_OIS does not Granger Cause G_SEC_PC_1	686	8.36042	0.0003
G_SEC_PC_1 does not Granger Cause PC_1_OIS		5.28576	0.0053

Source: RBI staff calculations

(Contd...)

[17] Risk Management – Approaches for fixed income markets, Golub, B.W and Tilman, L.M. remains the canonical reference for risk management through this approach. Although risk managers apply PCA decomposition based on spot rates, the present analysis is being done on par yield for insights on the issue from policy perspective.

[18] Tenors considered for G-Sec Curve include 1-month, 3-month, 6-month, 1-year, 2-year, 3-year and 5-year.

[19] Tenors considered for OIS Curve include CCIL O/N Repo, 3-month, 6-month, 1-year, 3-year, 5-year, 7-year, 10-year, 12-year and 15-year.

Table 3: Unit Root Analysis of Term Slope Series

Null Hypothesis: PC_2 has a unit root Exogenous: Constant Bandwidth: 3 (Newey-West automatic) using Bartlett kernel			Null Hypothesis: PC_2 has a unit root Exogenous: Constant Lag Length: 5 (Automatic - based on Modified AIC, maxlag=19)	
	Adj. t-Stat	**Prob.***		**t-Statistic**
Phillips-Perron test statistic	-3.471716	0.0090	Elliott-Rothenberg-Stock DF-GLS test statistic	-3.042102
Test critical values: 1% level	-3.439599		Test critical values: 1% level	-2.568342
5% level	-2.865512		5% level	-1.941286
10% level	-2.568942		10% level	-1.616388
*MacKinnon (1996) one-sided p-values.			*MacKinnon (1996)	
Residual variance (no correction)		0.011242		
HAC corrected variance (Bartlett kernel)		0.012988		

Source: RBI staff calculations.

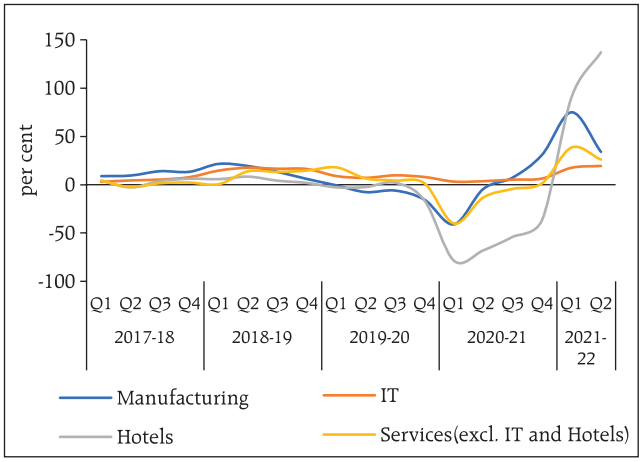
I.2.3 Corporate Sector

1.53 The Indian corporate sector gained strength and resilience in a steady and broad-based expansion through the pandemic. An analysis of key financial parameters of listed non-financial private companies[20] indicates improvement in demand conditions. Sales of manufacturing companies increased by 34.0 per cent (y-o-y) in Q2:2021-22. Sales growth for information technology (IT) companies, which had been positive throughout the pandemic, accelerated to 19.5 per cent (Chart 1.30).

1.54 Rising turnover contributed to higher operating profits of manufacturing and IT companies, and their pricing power in terms of operating profit margin and net profit margin remained stable in Q2:2021-22 (Chart 1.31). A disaggregated analysis of operating margins of 1,639 listed private manufacturing companies based on their balance

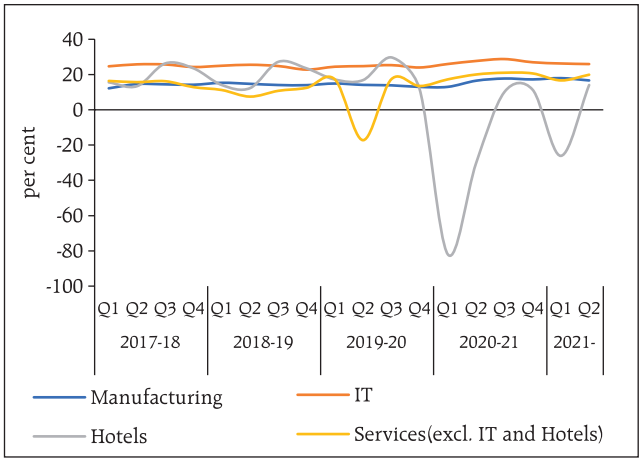
Chart 1.30: Sales of Listed Non-financial Private Companies – Growth

(y-o-y, per cent)



Source: Capitaline and RBI staff calculations.

Chart 1.31: Operating Profit Margin - Listed Non-financial Private Companies



Source: Capitaline and RBI staff calculations.

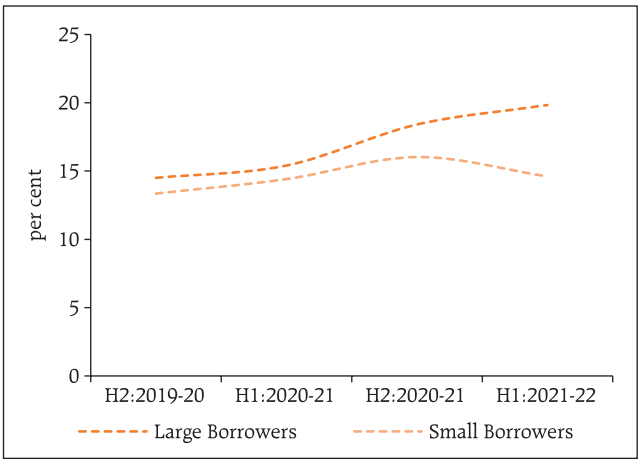
[20] The sample of listed companies for Q2:2021-22 comprised of 1,687 in manufacturing sector, 166 in information technology (IT) sector, 41 from the hotel industry and 538 from other service sector.

sheet debt shows smaller borrowers[21] recorded lower operating margin after the second wave of COVID-19 (Chart 1.32).

1.55 Retained earnings and short-term borrowings accounted for 38 per cent and 43 per cent, respectively, of sources of funds of manufacturing companies during H1:2021-22. Funds mobilised by them were deployed in building up inventories (16.6 per cent) and reducing long term debt (13.6 per cent). Trade receivables and payables increased, and cash holding declined, pointing to pick-up in business activity.

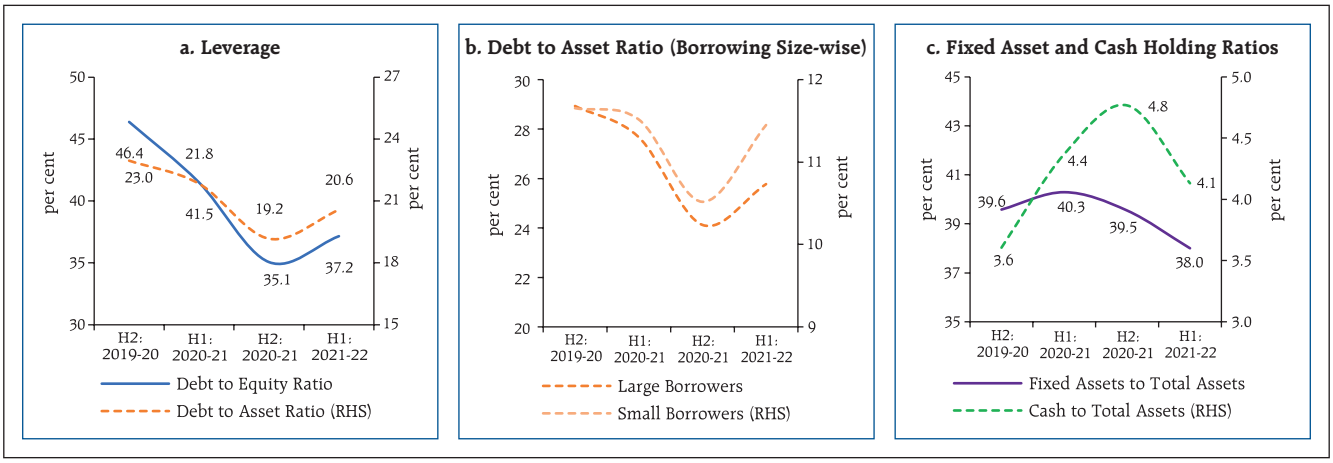
1.56 Deleveraging[22] by listed manufacturing companies during 2020-21 was suspended in H1:2021-22, and their cash holdings also moderated from the high levels witnessed during the pandemic (Charts 1.33 a and 1.33 b). Capital expenditure remained muted, as reflected in a decline in the share of fixed assets in total assets (Chart 1.33 c).

Chart 1.32: Operating Profit Margin - Listed Private Manufacturing Companies by Borrower Size



Note: Sample of 1639 companies.
Source: Capitaline and RBI staff calculations.

Chart 1.33: Leverage, Fixed Assets and Cash Holdings of Listed Private Manufacturing Companies



Note: Sample of 1639 companies.
Source: Capitaline and RBI staff calculations.

[21] Small borrowers refer to 1,538 listed private manufacturing companies with borrowing size upto ₹1000 crore as on March 31, 2020. The remaining 101 manufacturing companies with borrowing size ₹1000 or above are considered as large borrowers.

[22] Deleveraging is measured by debt to equity and debt to asset ratios.

I.2.4 External Sector Developments and Foreign Exchange Derivatives Markets

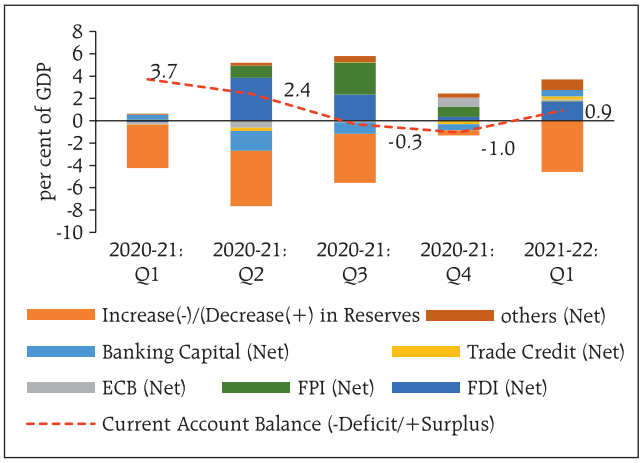
1.57 In an uncertain and volatile global economic environment, India's external sector has remained stable and viable during the pandemic. A narrowing trade deficit and an increase in net services receipts took the current account balance into a surplus of 0.9 per cent of GDP in Q1:2021-22, as against a deficit of 1.0 per cent in the previous quarter and a surplus of 3.7 per cent a year ago (Chart 1.34). In the financial account, foreign direct investment (FDI) and banking capital recorded large inflows during Q1:2021-22. These developments led to an accretion of foreign exchange reserves to the tune of USD 31.9 billion on a balance of payments (BoP) basis in Q1:2021-22.

1.58 Even as the trade deficit widened in subsequent months on the back of surging import demand, external financial requirements remain well supported. By December 17, 2021 the level of reserves stood at US$ 635.7 billion.

1.59 FDI inflows amounted to US$ 30.5 billion in H1:2021-22 up from US$ 29.2 billion in H1:2020-21. On the other hand, net foreign portfolio investment (FPI) turned sluggish as risk aversion intensified, with expectations of faster policy normalisation and more recently, with the emergence of Omicron. After recording net inflows US$ 7.6 billion during H1:2021-22, net outflows have occurred during Q3:2021-22 so far (Charts 1.35 a and 1.35 b).

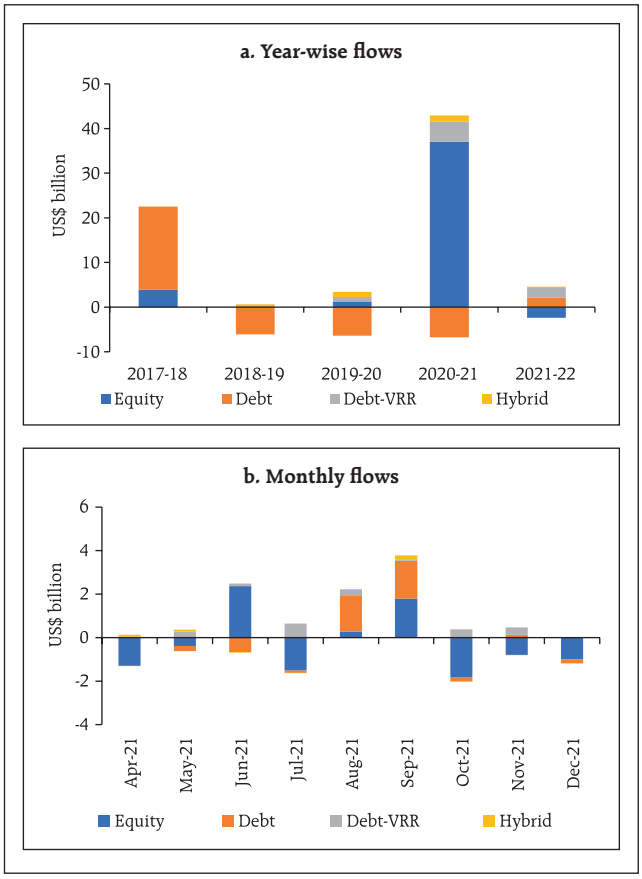
1.60 In terms of cross-border banking flows, foreign domiciled banks increased their total outlays into the Indian economy by 3.2 per cent during December 2019 to June 2021 mainly through local currency deployment even as foreign currency

Chart 1.34: India's Balance of Payments



Source: RBI.

Chart 1.35: Foreign Portfolio Investment



Note: Upto December 10, 2021.
Source: SEBI.

Table 1.12 : International Banking Flows to India

(in USD billion)

Item	Q2:2021			Q4:2019		
	Total	International	Local positions in local currencies	Total	International	Local positions in local currencies
Foreign banks	278.6	136.0	142.7	269.9	145.9	124.0
France	27.1	20.2	6.9	20.3	13.9	6.4
Japan	39.3	30.5	8.8	45.1	36.6	8.5
United Kingdom	72.6	20.5	52.1	64.7	21.0	43.7
United States	74.1	23.8	50.3	65.5	24.3	41.2

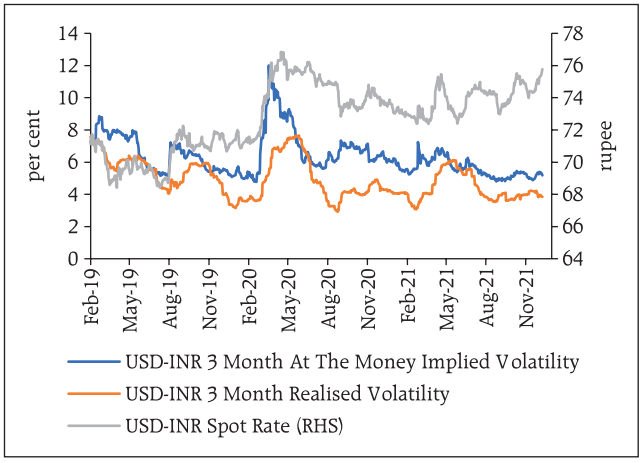
Source: BIS.

denominated deployment declined by 6.8 per cent (Table 1.12).

1.61 Amidst heightened global uncertainty, the USD-INR exchange rate moved sideways, largely immune to changes in global risk perceptions, capital flows to EMEs and monetary policy moves in advanced economies. Implied volatility, reflecting the market's forward-looking view on exchange rate movements, as also realised volatility have been range-bound (Chart 1.36). The options skew, reflecting the market's relative bias in valuations, also shows no perceptible directionality up to mid-November 2021. Subsequently, however, the INR has been trading lower till about mid-December, on account of foreign portfolio outflows, a stronger US dollar and uncertainty on the pace of tapering by the US Federal Reserve. Overall, the INR has depreciated by 1.73 per cent since end-June 2021 (up to December 10, 2021) against the US dollar (Chart 1.37).

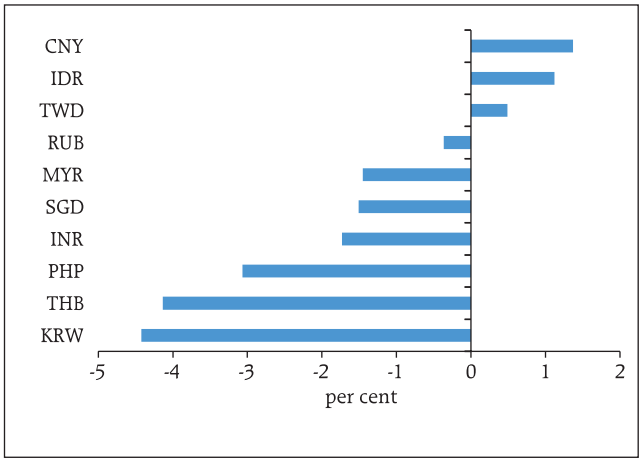
1.62 Non-deliverable inter-bank USD-INR forward trading volumes broadly tracked onshore inter-bank trades in the recent period; non-deliverable forwards (NDF) client trade volumes remain erratic but low

Chart 1.36: USD-INR and 3-month Historical and Implied Volatility



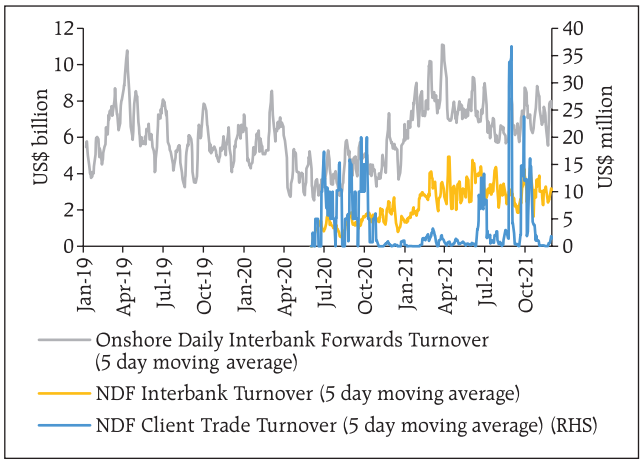
Source: Bloomberg.

Chart 1.37: Currencies against the US Dollar



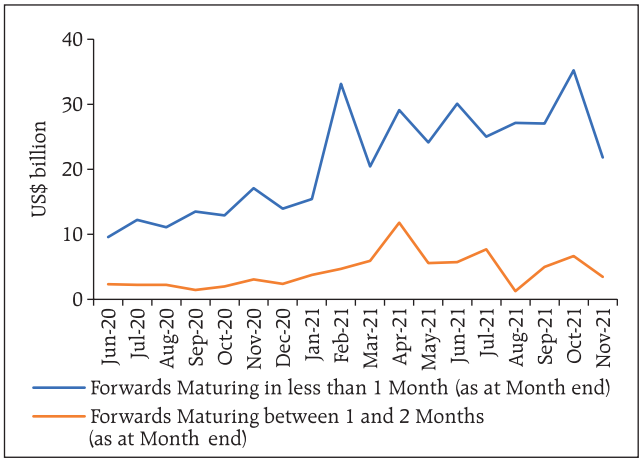
Note: As on December 10, 2021 over end-June 2021.
Source: Bloomberg.

Chart 1.38: Deliverable and Non-deliverable Daily Forward Trade Turnover



Source: RBI and CCIL.

Chart 1.39: Offshore Outstanding Forwards

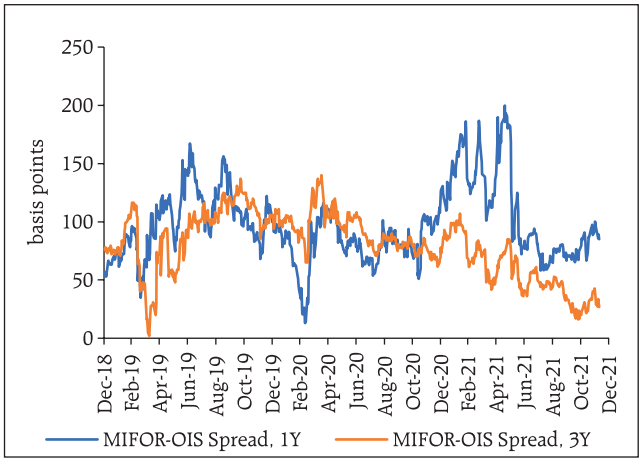


Source: RBI and CCIL.

(Chart 1.38). Offshore outstanding forwards of less than 1-month tenor show an uptrend (Chart 1.39).

1.63 Hedging pressures have remained elevated as reflected in the MIFOR-OIS[23] spread, which has remained wide in the one-year tenor *vis-a-vis* the domestic curve, indicating that higher premia are required to be paid to hedge foreign currency exposures (Chart 1.40). While the spread in the 3-year tenor has narrowed, the INR swaption with MIFOR as the floating leg (3-month X 3-year) is off its recent lows, implying participants' uncertainty about the evolution of 3-year MIFOR rates (Chart 1.41).

Chart 1.40: MIFOR-OIS Spreads



Source: Bloomberg.

Chart 1.41: INR Swaption

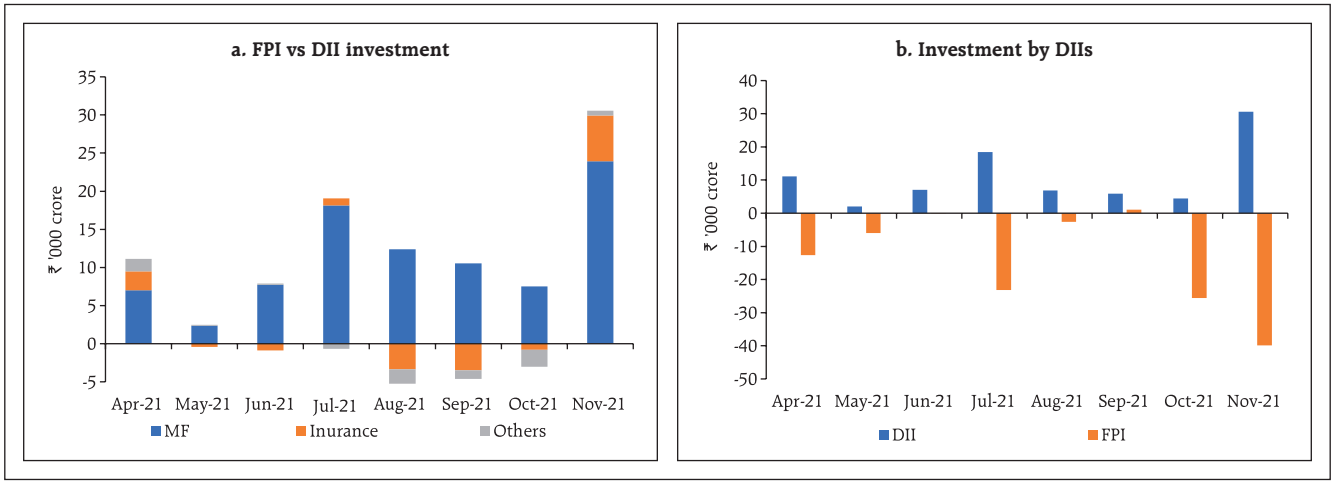
Note: For 3-month option expiry and 3-year swap tenor.
Source: Refinitiv.

I.2.5 Domestic Equity Market

1.64 Lifted by the bull run in equity markets across the globe, the Indian equity market surged on strong rallies with intermittent corrections. Among institutional participants in the cash segment, domestic institutional investors (DIIs) were net buyers during April-November 2021, offsetting the pullout by foreign portfolio investors. Mutual funds

[23] Spread between Mumbai Inter-Bank Forward Offer Rate (MIFOR) and the Overnight Index Swap (OIS) rate.

Chart 1.42: Trend in Investments in the Equity Cash Segment



Source: SEBI.

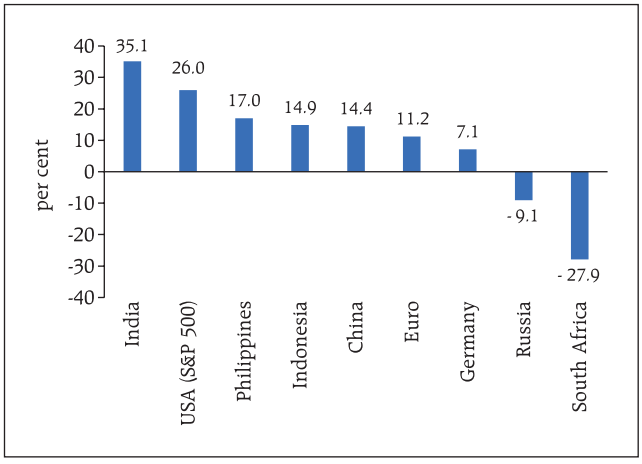
were the principal drivers; insurance companies were net sellers during this period (Chart 1.42 a and 1.42 b).

1.65 Strong investor interest has driven up price-earnings (P/E) ratios substantially. As on December 13, 2021, the one-year forward P/E ratio for India was 35.1 per cent above its 10-year average, and one of the highest in the world (Chart 1.43). Other valuation metrices like the price-to-book value (P/B) ratio, the market capitalisation to GDP ratio, and the cyclically adjusted P/E ratio or Shiller P/E are also above their historical averages (Table 1.13). This reflects some disconnect between the real economy and equity markets.

1.66 With abnormally higher valuations pushing up volatility, NSE VIX began to rise since September 2021 after touching a low of 11.8 at the end of July 2021. The NSE VIX stood at 16.6 as on December 13, 2021, a tad higher than its pre-COVID level, though it is still lower than its 5-year average of 17.8.

1.67 One of the features of the current rally in the equity market has been the increased participation of retail investors, whose shareholding in companies listed on the National Stock Exchange (NSE) has increased from 6.4 per cent in December 2019 to 7.1

Chart 1.43: 1-year Forward P/E Ratio over 10-year averages



Source: Bloomberg.

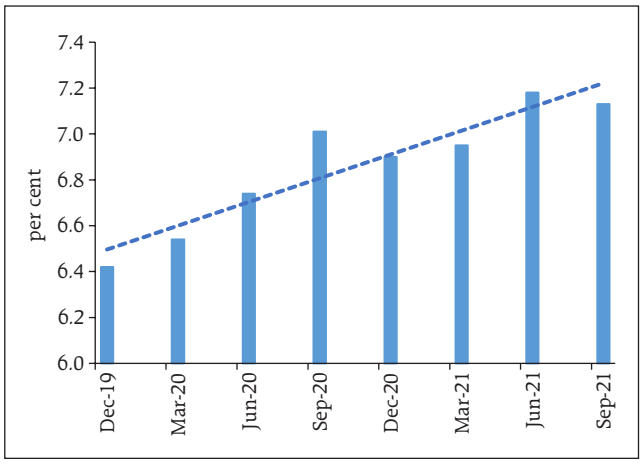
Table 1.13 : Valuation Metrices

	Long-Term Average	Current
Price-to-Book Value (P/B) Ratio	3.26	3.58
Market Capitalisation/ GDP ratio	75.77	119.16
Shiller Price-Earnings (P/E) Ratio	26.93	38.68

Note: 1. Long-term average of P/B ratio is calculated as average of annual P/B ratio since 1998-99.
2. Long-term average of Market Capitalisation/GDP ratio is calculated as average of annual Market Capitalisation/GDP ratio since 2012-13. Current Market Capitalisation/GDP ratio pertains to September 30, 2021.
3. Long-term average of Shiller P/E is calculated as average of daily values since April 03, 2017.

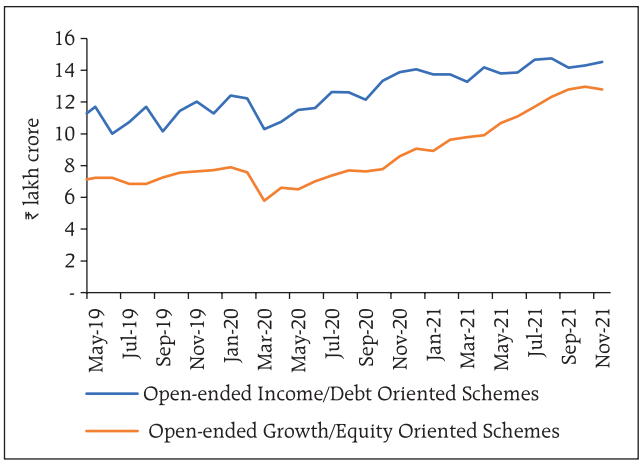
Source: BSE and Bloomberg

Chart 1.44: Retail Participation in Equity Markets (Ownership by Value)



Source: Prime Database.

Chart 1.45: AUMs of Open-ended Debt and Equity Funds



Source: Association of Mutual Funds in India (AMFI).

per cent in September 2021, in value terms (Chart 1.44). Significant increase in retail interest was also visible in the form of increased trading on exchanges, participation in IPOs and in other market segments like futures and derivatives.

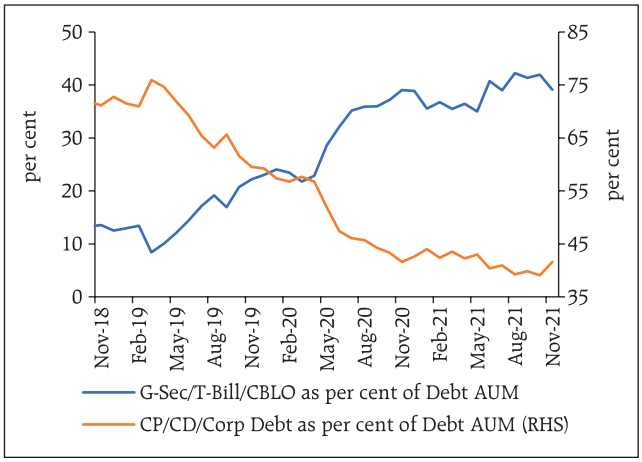
I.2.6 Mutual Funds

1.68 The assets under management (AUM) of open-ended mutual funds have grown steadily since the pandemic shock of March 2020. Given their size, they are of systemic importance (Chart 1.45).

1.69 The proportion of liquid assets held by debt mutual funds (MFs) is at its highest in the period since the failure of M/s Infrastructure Leasing & Financial Services Limited (IL&FS) in mid-2018 (Chart 1.46). While this acts as a bulwark against idiosyncratic fund specific shocks, any systemic shock affecting open ended MFs can have significant spillovers on to the secondary G-Sec segment.

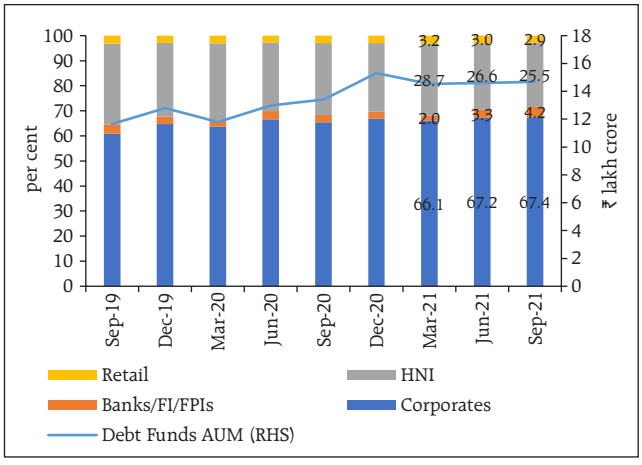
1.70 The investor profile of debt-oriented schemes is dominated by incorporated entities and high net worth individuals (Chart 1.47). The participation of these investors, who are active managers of investment risk, in equity schemes has grown post the COVID-19 outbreak, due to diversion of excess cash as gross returns of liquid funds declined. On the other hand, the share of retail participation in

Chart 1.46: MFs' Investment in G-Sec/T-Bills/ CBLO and Spread Products



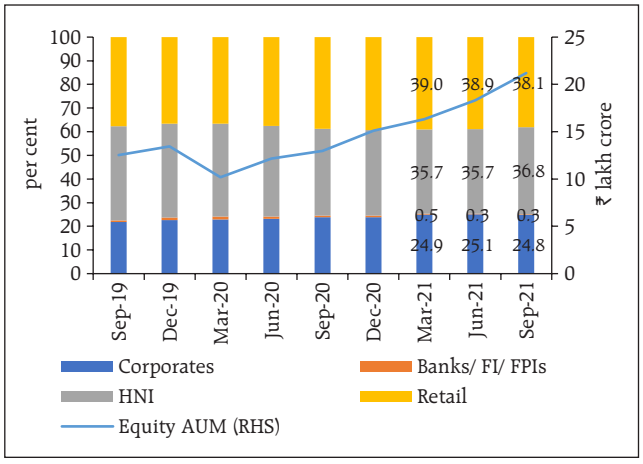
Source: SEBI.

Chart 1.47: Investor Profile of Debt Schemes



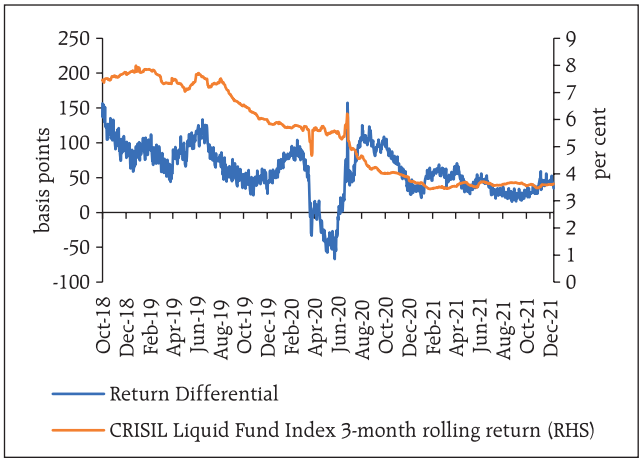
Source: AMFI.

Chart 1.48: Investor Profile of Equity Schemes*



Note: * includes hybrid schemes as well.
Source: AMFI.

Chart 1.49: Excess Return in Money Market Funds

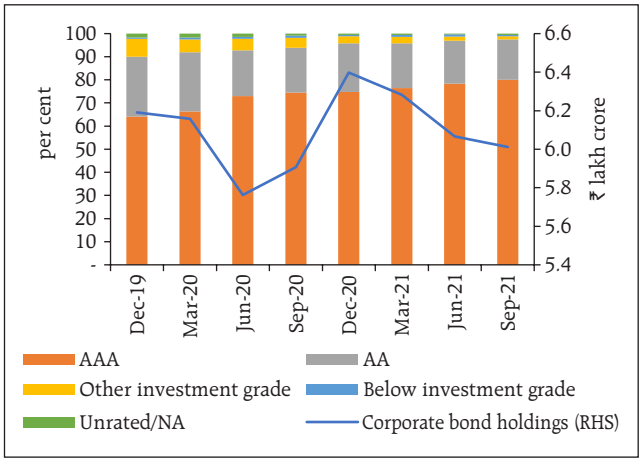


Source: CRISIL.

equity schemes of MFs has been declining after December 2020. (Charts 1.48-1.49).

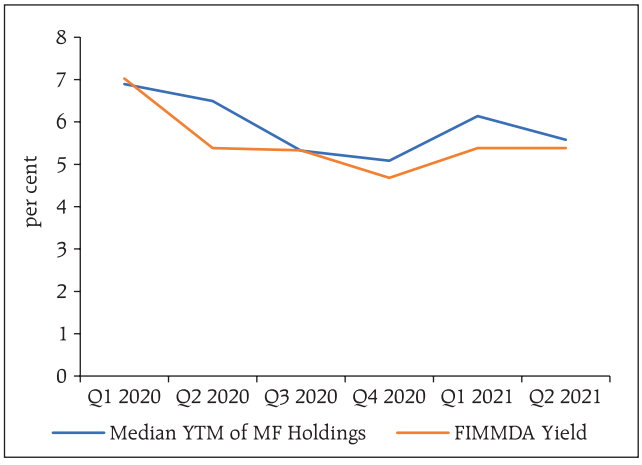
1.71 While the aggregate corpus of debt funds has risen, corporate bond holdings of mutual funds have trended downwards and the portfolio composition in terms of the ratings mix has moved in favour of better rated corporates (Chart 1.50). Moreover, a comparison of the median valuation of an illustrative 3-year AAA bond in the MF books *vis-a-vis* Fixed Income Money Market and Derivatives Association of India (FIMMDA) valuation models reveals that mutual fund bond portfolios are being valued conservatively, in general (Chart 1.51).

Chart 1.50: Corporate Bond holdings of Mutual Funds



Source: Prime Database.

Chart 1.51: 3-Year AAA Non-Financial Non-PSU Corporate YTM



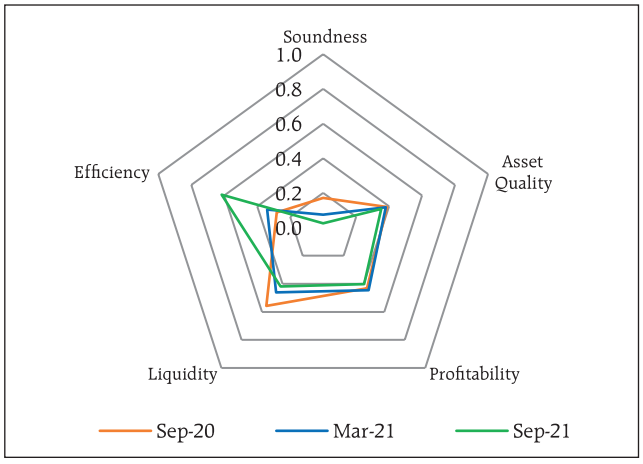
Source: FIMMDA and Prime Database.

I.2.7 Banking Stability Indicator

1.72 The banking stability indicator (BSI)[24], which indicates the changes in underlying conditions and risk factors of SCBs, showed improvement in soundness, asset quality, liquidity and profitability. The efficiency parameter worsened relative to the position in March 2021. Notably, the risk indicator for soundness was the least due to banks reporting

[24] For a detailed methodology and basic indicators used under different BSI dimensions please refer to Annex 2.

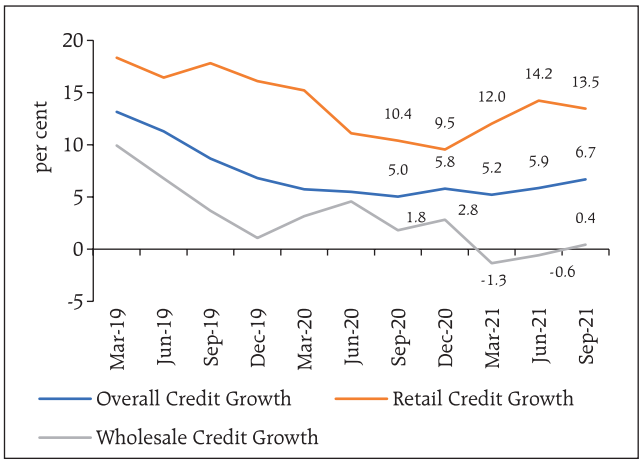
Chart 1.52: Banking Stability Map



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

Chart 1.53: Credit Growth - SCBs

(y-o-y, per cent)



Note: SCBs include PSBs, PVBs and FBs only.
Source: RBI supervisory returns, CRILC and staff calculations.

high levels of the capital to risk weighted assets ratio (CRAR) as well as Tier I to Tier II ratios. (Chart 1.52).

I.2.8 Bank Credit

1.73 Bank credit conditions are gradually improving - growth (y-o-y) in credit by SCBs rose to 7.1 per cent as on December 3, 2021 as against 5.4 per cent growth a year ago and 5.2 per cent in March 2021. In recent years, growth in wholesale credit (₹5 crore and above) has been lagging (Chart 1.53). Retail credit[25], on the other hand, has been generally recording double digit growth, although the pace of growth remains below its pre-COVID level. Housing loans and other personal loans constituted 64 per cent of incremental credit during the last two financial years (Table 1.14).

1.74 The retail led credit growth model is confronting headwinds: first, delinquencies in the consumer finance portfolio have risen, and second, the new-to-credit[26] segment, a key driver of consumer credit growth in the pre-pandemic period, is showing a decline in originations[27]. Analysis of historical data

Table 1.14 : Sectoral Share in Incremental Credit by SCBs

(per cent)

	2019-20	2020-21
Economic Sector		
a) Agriculture	1.8	21.7
b) Industry	4.7	-22.1
c) Transport operators	-0.4	1.1
d) Professional and other Services	8.8	-1.9
e) Personal Loans	64.1	64.4
of which, Housing Loan	30.0	31.2
f) Trade	17.9	21.8
g) Finance	13.0	9.7
h) Others	-10.0	5.6
Total credit	**100.0**	**100.0**
Organisational Sector		
i) Public Sector	22.7	11.1
ii) Private Corporate Sector	-11.7	-18.2
iii) Households Sector - Individuals	84.5	83.1
iv) Household Sector – Others than individuals *	1.0	23.4
v) Others **	3.5	0.6
Total credit	**100.0**	**100.0**

* including proprietary concerns, partnership firms, Hindu undivided families (HUFs)
** including MFIs, Non-profit institution serving household (NPISHs) and NRIs and cooperative sector
Source: Basic Statistical Returns, RBI.

[25] Retail loans comprise gross loans and advances of the banking sector wherein aggregate exposure of the obligor is less than ₹5 crore.

[26] Consumers who do not have a score at the time of loan origination for that particular month.

[27] TransUnion CIBIL analysis of consumer credit shows that balance level of 90 + days past due (dpd) have risen from 2.4 per cent in Q1 2020 to 3.01 per cent in Q3 2021. The origination volume from NTC consumers in terms of per cent share has fallen from 17 per cent in Q1 2020 to 14 per cent in Q3 2021

Table 1.15 : Growth in Wholesale Credit to PSUs

(y-o-y, per cent)

	Dec-19	Mar-20	Jun-20	Sep-20	Dec-20	Mar-21	Jun-21	Sep-21
	PSU							
PSB	12.9	19.4	21.8	15.9	17.5	3.6	5.9	11.6
PVB	21.7	44.3	86.7	96.0	89.1	56.6	32.9	16.7
PSBs + PVBs	13.8	21.8	27.8	23.8	25.3	9.7	9.6	12.4
	Non-PSU							
PSB	-9.9	-4.3	-4.1	-5.4	-4.0	-8.2	-10.1	-9.1
PVB	9.4	-0.9	-1.2	-6.1	-7.4	-6.0	-3.4	-0.8
PSBs + PVBs	-3.2	-3.0	-3.0	-5.7	-5.3	-7.4	-7.5	-5.8

Source: CRILC and RBI staff calculations.

shows that in EMEs, non-performing assets typically peak six to eight quarters after the onset of a severe recession (BIS 2021).

I.2.9 Wholesale Bank Credit

1.75 An analysis of the funded amount outstanding (₹5 crore and above)[28] shows that credit absorption by public sector units (PSUs) remains robust while non-PSU credit languishes in both public sector banks (PSBs) and private sector banks (PVBs) (Table 1.15).

1.76 The pace of fund mobilisation by the corporate sector (including non-banking financial borrowers) through market instruments has slowed down considerably in H1:2021-22 *vis-à-vis* a year ago (Table 1.16). Relatively high demand for borrowings through non-convertible debentures (NCDs) reflects efforts to lock in low-cost funding by highly rated corporates in anticipation of normalisation of liquidity conditions.

1.77 Credit extended by PVBs to non-PSU non-financial companies across investment grade ratings is showing signs of recovery, but it is yet to recover in respect of lending by PSBs to other than top rated corporates (Table 1.17).

1.78 In terms of size of banks' exposure to corporates, a decline is seen in the category of ₹1,000 crore and above while relatively smaller borrowers

Table 1.16 : Aggregate Mobilisation of Funds

(₹ '000 crore)

Quarter-end Outstanding Amount under	Mar-20	Sep-20	Mar-21	Sep-21
Commercial Paper (CP)	346	362	365	371
Non-Convertible Debentures (NCDs)[29]	2,712	2,825	3,014	3,085
Wholesale Credit[30]	5,582	5,410	5,507	5,497
Total	**8,640**	**8,597**	**8,886**	**8,953**

Source: NSDL, Prime Database and CRILC.

Table 1.17 : Growth in Wholesale Credit to Non-PSU Non-financial Companies

(y-o-y, per cent)

	PVBs				PSBs			
	Mar-20	Sep-20	Mar-21	Sep-21	Mar-20	Sep-20	Mar-21	Sep-21
AA and above	13.64	-2.01	-12.07	3.70	7.22	-6.04	-5.74	7.17
Other Investment Grade	-6.72	-6.69	-2.68	2.74	-2.73	4.46	3.11	-2.92
Below Investment Grade	5.93	0.47	-7.91	-11.01	-13.67	-9.59	-9.11	-17.41
Unrated/NA	-7.91	-9.94	-6.38	-3.14	-12.08	-12.08	-13.74	-12.72
Total	**-1.28**	**-5.68**	**-6.81**	**-1.33**	**-7.88**	**-6.60**	**-6.96**	**-8.78**

Source: Prime Database, CRILC and RBI staff calculations

[28] Comprising of "Companies" category which accounts for about 86 per cent of the total funded amount outstanding to wholesale obligors.

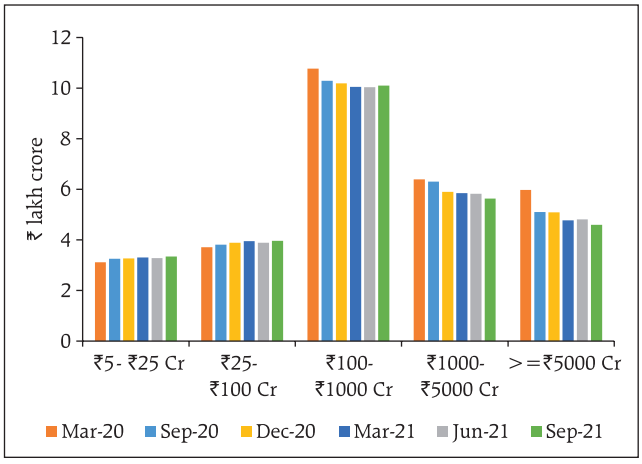
[29] Include private debt placements from April 2013 onwards with tenor and put/call option of above 365 days

[30] Wholesale credit numbers are for PSBs, PVBs and FBs combined based on CRILC data.

(with loan size between ₹5 - ₹1000 crore) maintained a sustained appetite for credit (Chart 1.54).

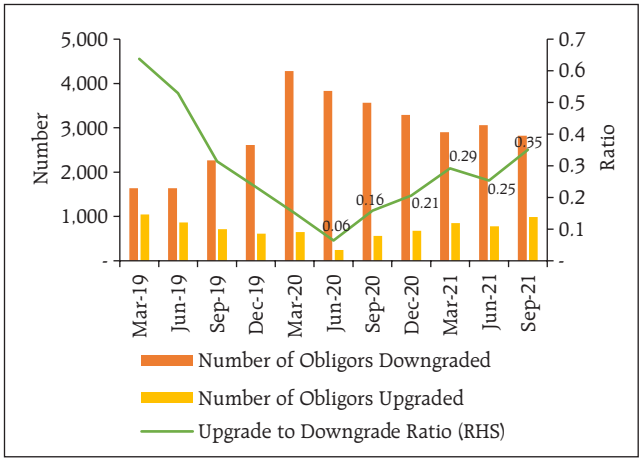
1.79 An examination of the transition in asset quality of a constant sample[31] of wholesale performing exposures (non-PSU non-financial companies) between the pre-COVID period (December 2019) and September 2021 shows adverse migration across all special mention account (SMA) categories. A more recent transition between June and September 2021 shows that the adverse transition has considerably slowed down (Tables 1.18-1.19). Overall the pace of ratings upgradation has, however, reduced in H1:2021-22(Chart 1.55).

Chart 1.54: Exposure Distribution of Non-PSU Non-Financial Obligors



Source: CRILC and RBI staff calculations.

Chart 1.55: Long Term Loan Ratings



Source: Prime Database.

Table 1.18 : SMA Transition Matrix of Wholesale Portfolios - Non-PSU Non-Financial Obligors , December-19 to September-21

Category	Outstanding in December 2019 (₹ crore)	September 2021					
		Growth in exposure over December 2019 (per cent)	Percentage of assets in various cohorts				
			0 dpd	SMA-0	SMA-1	SMA-2	NPA
0 dpd	18,89,192	0.35	92.9	2.9	0.8	0.6	2.8
SMA-0	1,63,602	-7.51	71.9	13.2	3.8	3.7	7.5
SMA-1	60,775	-3.58	50.1	13.7	9.6	3.8	22.7
SMA-2	55,110	-13.37	32.0	4.9	6.8	21.8	34.5
Grand Total	**21,68,679**	**-0.71**	**88.9**	**3.9**	**1.4**	**1.4**	**4.4**

Note: dpd – days past due. **Source:** CRILC and RBI staff calculations.

Table 1.19 : SMA Transition Matrix of Wholesale Portfolios - Non-PSU Non-Financial Obligors, June-21 to September-21

Category	Outstanding in June 2021 (₹ crore)	September 2021					
		Growth in exposure over June 2021 (per cent)	Percentage of assets in various stages				
			0 dpd	SMA-0	SMA-1	SMA-2	NPA
0 dpd	20,15,944	-0.03	96.7	2.1	0.4	0.2	0.6
SMA-0	1,49,982	-1.47	69.7	22.2	6.1	1.4	0.6
SMA-1	50,356	-2.61	43.1	20.2	17.5	10.4	8.8
SMA-2	52,454	-3.03	39.0	4.3	10.4	35.6	10.7
Grand Total	**22,68,736**	**-0.25**	**92.5**	**3.9**	**1.3**	**1.3**	**1.0**

Source: CRILC and RBI staff calculations

[31] Comprising of 62 per cent of funded amount outstanding to corporates in CRILC.

I.2.10 Credit flows to MSME Sector

1.80 Credit to the MSME segment slowed down (y-o-y) by the end of September 2021 *vis-a-vis* March 2021. The decline was particularly noticeable in the sub ₹25 crore ticket size across major bank groups (Table 1.20).

1.81 Under the Emergency Credit Line Guarantee Scheme (ECLGS)[32], loans amounting to ₹2.82 lakh crore were sanctioned till November 12, 2021, of which ₹2.28 lakh crore was disbursed (₹1.94 lakh crore by SCBs, forming 20.6 per cent of the incremental credit during the period). The draw down under ECLGS 1.0 and 2.0 comprised over 96 per cent of the total guarantees issued (Chart 1.56).

1.82 An analysis of detailed disbursal data reveals that guarantees of value up to ₹1 crore formed 51 per cent of the aggregate guarantees. Sixty-six per cent of the guarantees have been issued to micro, small and medium enterprises (Table 1.21).

Table 1.20 : Bank Credit to MSME Sector

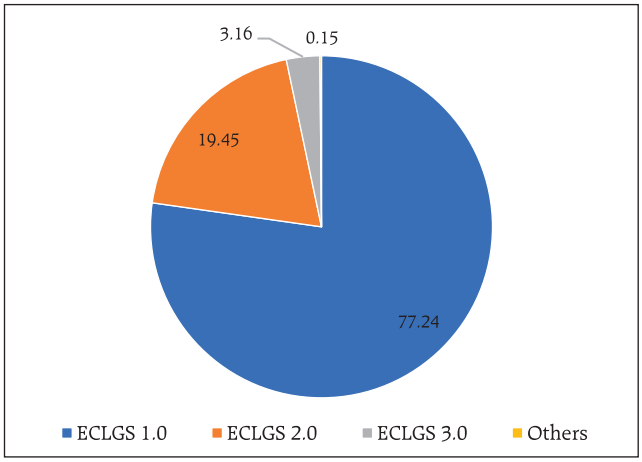
(y-o-y, per cent)

	PSB		PVB		PSB+PVB	
	Mar-21	Sep-21	Mar-21	Sep-21	Mar-21	Sep-21
Exposure < 25 crore	8.08	0.20	8.04	0.38	8.06	0.28
Aggregate MSME Exposure	0.89	1.01	9.23	2.98	4.50	1.90

Source: RBI supervisory returns and staff calculations.

Chart 1.56: ECLGS Guarantees

(per cent share)



Note: Others include ECLGS 1.0 Extension, ECLGS 2.0 Extension, ECLGS 3.0 Extension and ECLGS 4.0.
Source: National Credit Guarantee Trustee Company Limited (NCGTC).

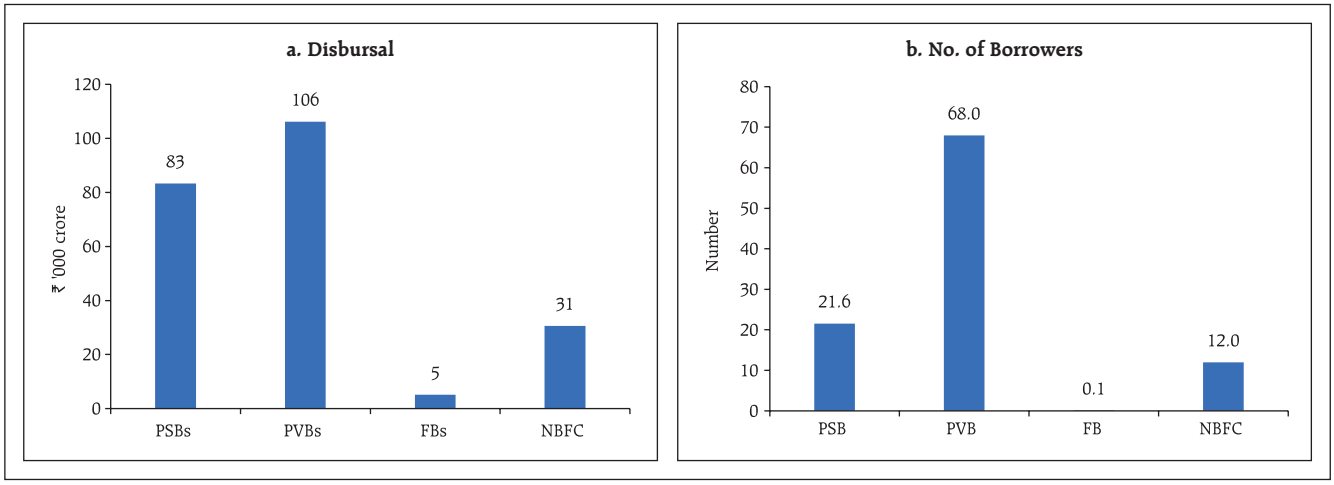
Table 1.21: ECLGS Guarantee Disbursement

	Number of beneficiaries	Guarantee Amount (₹ crore)	% Guarantee Amount
Slab wise			
Below 1 crore	1,15,57,518	133,955	50.9
1 - 5 crore	32,222	66,598	25.3
5 - 50 crore	4,915	55,781	21.2
50 - 500 crore	86	6,299	2.4
Type of Beneficiaries			
Micro	1,02,96,333	65,771	25.0
Small	4,98,509	66,3450	25.2
Medium	2,60,757	42,041	16.0
Other Business Enterprises	5,37,069	88,829	33.8

Note: Data as on November 12, 2021.
Source: NCGTC.

[32] Emergency Credit Line Guarantee Scheme (ECLGS), a Government initiative launched on May 20,2020 provides 100 per cent guarantee coverage from NCGTC to select borrowers. It was originally devised for MSMEs/business enterprises whose total fund-based credit outstanding across all lending institutions was up to ₹25 crore. The Scheme has undergone different iterations through the following components: ECLGS 1.0, ECLGS 1.0 (Extension), ECLGS 2.0, ECLGS 2.0 (Extension), ECLGS 3.0, ECLGS 3.0 (Extension) and ECLGS 4.0 since its launch. The validity of ECLGS stands extended to March 31, 2022 or till guarantees for an amount of ₹4.5 lakh crore are issued and disbursement under the scheme is permitted up to June 30, 2022.

Chart 1.57: Bank Group-wise ECLGS Guarantee



Note: Data as on November 12, 2021.
Source: NCGTC.

1.83 PVBs showed greater proclivity than PSBs for utilising the ECLGS scheme, covering a larger number of beneficiaries (Charts 1.57 a and 1.57 b).

1.84 Borrowers eligible for restructuring under the Reserve Bank's guidelines of May 05, 2021 and who had availed loans under ECLGS 1.0 of overall tenure of four years, are permitted to avail ECLGS loans of a tenure of five years (*i.e.*, repayment of interest only for the first 24 months with repayment of principal and interest in 36 months thereafter). As on November 12, 2021 a relatively small amount (₹752 crore) was restructured under this category. However, overall restructuring of MSME loans allowed under the Reserve Bank's May 2021 scheme showed significant offtake (Table 1.22). Moreover, MSME portfolio of PSBs and PVBs indicates accumulation in NPA and SMA-2 categories in September 2021 relative to March 2021 (Table 1.23). Also, the transition of low and medium risk

Table 1.22: Bank Group-wise Restructuring of MSME Portfolio

(₹ crore)

	Aggregate restructured portfolio	
	PSB	PVB
Restructuring - January 2019 scheme	26,190	2,174
Restructuring - February 2020 scheme	5,860	1,364
Restructuring - August 2020 scheme	24,816	11,027
Restructuring - May 2021 scheme	23,861	18,887

Source: RBI supervisory returns and staff calculations

Table 1.23: Bank Group-wise SMA distribution of MSME Portfolio

(per cent)

	PSBs					PVBs				
	0 days past due	SMA-0	SMA-1	SMA-2	NPA	0 days past due	SMA-0	SMA-1	SMA-2	NPA
Mar-21	61.2	10.2	8.4	3.4	16.8	89.4	3.8	2.4	0.8	3.6
Jun-21	60.9	10.9	4.6	4.8	18.8	86.0	5.9	2.8	1.7	3.6
Sep-21	66.6	7.6	3.4	3.9	18.5	87.9	5.5	1.7	2.1	2.8

Source: RBI supervisory returns and staff calculations.

MSME borrowers to the high-risk category remains noteworthy (Table 1.24).

I.2.11 Banks' Deposit Profile

1.85 The run-off profile of deposits since September 2019 shows that the growth in stable deposits (*i.e.*, deposits with low run-off profile) has lagged that of volatile deposits (Chart 1.58). Private sector banks with CRARs above 18 per

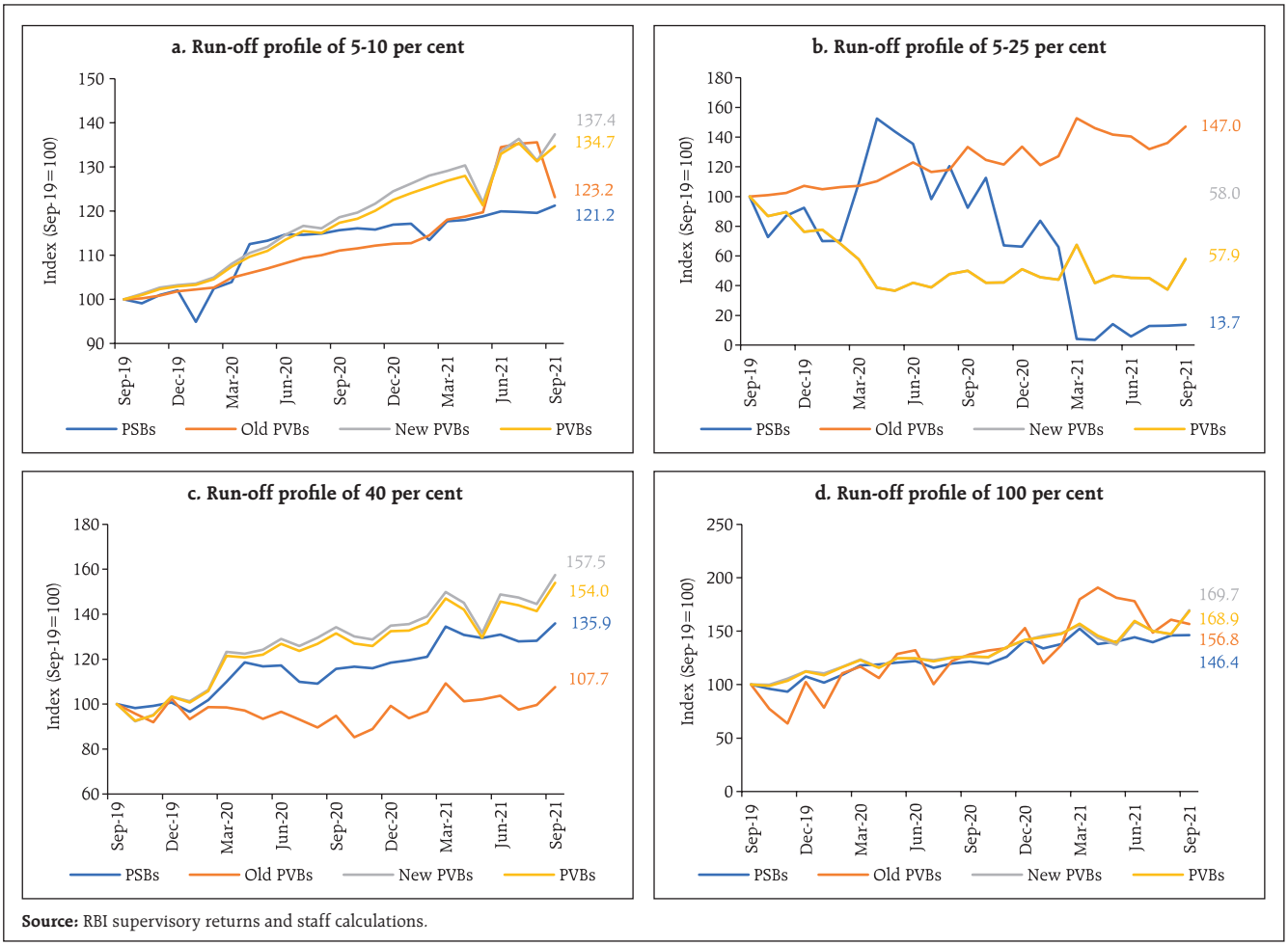
Table 1.24 : Borrower Transition Matrix (September 2020 - September 2021)

(per cent)

CMR[33] as of Sep-20	CMR as of Sep-21		
	CMR 1-3	CMR 4-6	CMR 7-10
CMR 1-3	67	23	10
CMR 4-6	11	57	32
CMR 7-10	1	10	89

Note: Low Risk (CMR 1-3), Medium Risk (4-6), High Risk (CMR 7-10)
Source: TransUnion CIBIL

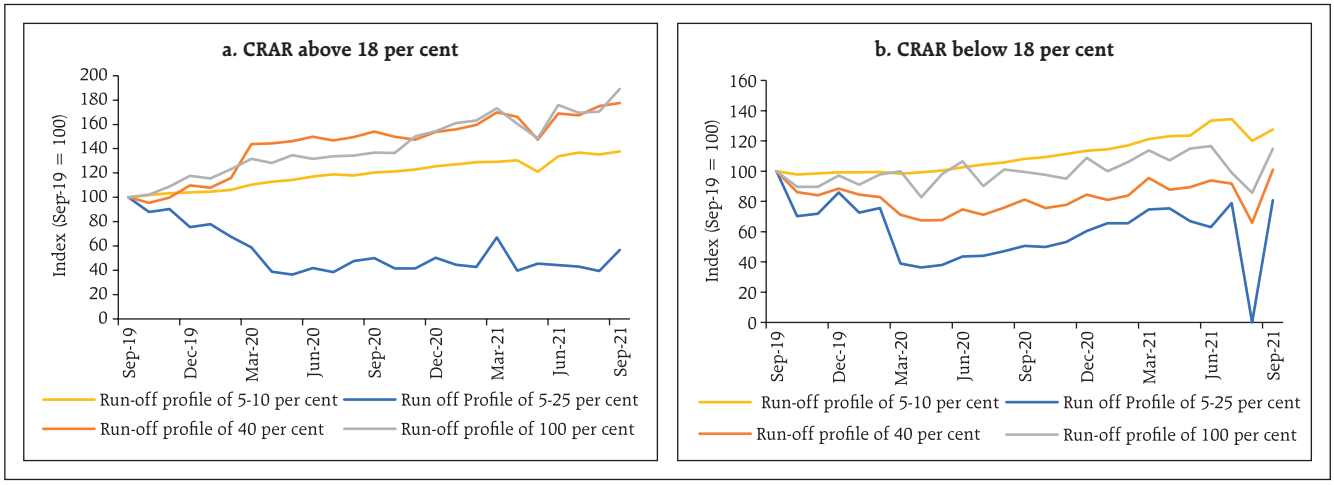
Chart 1.58: Run-off profiles of Deposits



Source: RBI supervisory returns and staff calculations.

[33] CIBIL MSME Rank (CMR) is a grade assigned to the MSME based on its credit profile, credit behaviour and firmographics on a scale of 1 to 10, CMR-1 being the least risky MSME and CMR-10 being the most risky MSME.

Chart 1.59: Deposit profiles of PVBs

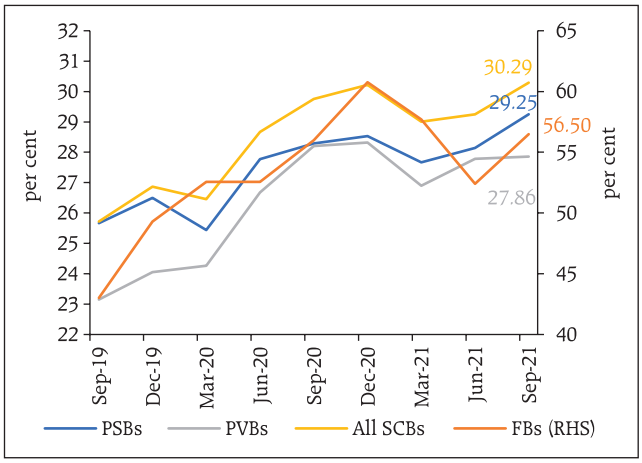


Source: RBI supervisory returns and staff calculations.

cent exhibited higher growth in volatile deposits (Chart 1.59). Deposits by corporates grew at a faster clip than retail deposits, symptomatic of lack of investment appetite among corporates. Operational deposits (*viz.*, generated by clearing, custody and cash management activities, which is a deposit class with favorable run-off rates) contracted across PSBs and new PVBs, and trailed far below the baseline numbers of September 2019, as system liquidity remained in large surplus throughout the period. A development associated with the growth in volatile deposits is a significant accumulation of G-Secs and other high quality liquid assets (HQLAs) across the banking spectrum (Chart 1.60).

Chart 1.60: SLR Maintenance by Bank Groups

(as per cent of NDTL)



Source: RBI supervisory returns and staff calculations.

I.2.12 Resolution Analysis

1.86 The Insolvency and Bankruptcy Code (IBC), 2016 represents a significant reform in the process of insolvency resolution in India. An analysis of 60 corporate debtors resolved under the Insolvency and Bankruptcy Code, 2016 between September 2019 and September 2021 shows that (a) the sample

median recovery rate was 24.7 per cent and (b) the longer bad loans remain on banks' balance sheets, the lower is the amount banks succeed in recovering, independent of the type of exposure or borrower (Table 1.25). This implies that reduction in the median gap between NPA identification and Corporate Insolvency Resolution Process (CIRP) commencement may have a pronounced effect on ultimate recovery.

1.87 An analysis of average delays in terms of initiation of insolvency under the IBC[34] since impairment shows significant delays in respect of asset classes held by asset reconstruction companies (ARCs) *vis-a-vis* other classes of creditors, in terms of initiation of insolvency proceedings (Chart 1.61).

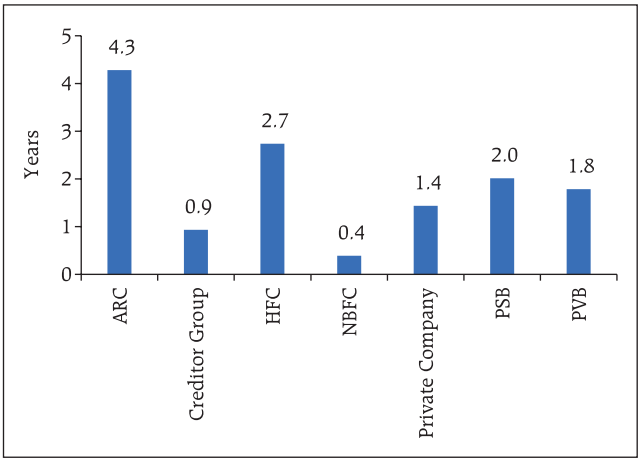
1.88 Examination of the one-year transition of substandard and various doubtful categories of large loans shows no meaningful recovery once banking assets are impaired. Hence, to the extent that the provisions of Income Recognition and Asset Classification (IRAC) norms do not incentivise referral for resolution, prospective recovery of assets is impaired since recoveries decline sharply with vintage. This has implications for both PSBs and PVBs which carry impairments of considerable vintage as well as for bad assets transfered to the National Asset Reconstruction Company Limited (NARCL) (Tables 1.26 and 1.27).

Table 1.25 : Recovery Rates and Delay in Various Stages in a Select Sample of Cases Resolved between September 2019 and September 2021

Recovery rate (per cent)	Number in the sample	Median gap between NPA identification and commencement of CIRP (years)	Median Gap between commencement of CIRP and approval of resolution plan (years)
<10	13	5.3	1.6
Between 10 and 25	17	3.3	1.7
Between 25 and 50	22	2.9	1.6
Greater than 50	8	0.9	1.6
Overall	60	3.3	1.7

Source: IBBI, CRILC and RBI staff calculations.

Chart 1.61: Delay in Initiation of Insolvency for Specific Creditor Cohorts



Source: National e-Governance Services Ltd. (NeSL) and RBI staff calculations.

Table 1.26 : One-year Transition Rate in Wholesale Substandard and Doubtful Assets

(per cent)

	Wholesale Substandard Assets			Wholesale Doubtful Assets		
	Mar-18	Mar-19	Mar-20	Mar-18	Mar-19	Mar-20
Standard	2.30	2.53	1.63	2.86	3.34	0.42
Non-CDR Standard Restructured	0.13	0.55	0.07	0.06	0.42	0.14
Substandard	0.99	1.20	1.03	0.01	0.00	0.61
Substandard Restructured	0.04	0.01	0.00	0.06	0.03	0.00
Doubtful	88.71	78.86	76.45	86.54	73.40	81.41
Doubtful Restructured	1.32	0.25	1.27	2.39	2.90	1.54
Loss	6.52	16.59	19.55	8.07	19.92	15.89

Source: CRILC and staff calculations.

[34] Based on data made available by National E-Governance Services Limited on initiation of insolvency proceedings between January 01, 2018 to February 27, 2020

Table 1.27 : NPA Composition* of PSBs and PVBs Combined

(per cent share in total NPAs)

	Mar-20	Jun-20	Sep-20	Dec-20	Mar-21	Jun-21	Sep-21
Substandard	12.7	11.8	8.4	4.6	12.8	10.6	11.0
Substandard Restructured	0.6	0.4	0.3	0.1	0.3	0.7	1.2
Doubtful (up to 1 year)	12.7	13.7	14.4	15.4	14.2	12.3	9.0
Doubtful (1-3 years)	25.1	22.9	20.0	21.0	21.2	21.5	20.5
Doubtful (over 3 years)	14.3	14.5	17.3	16.0	16.7	18.2	19.1
Doubtful Restructured	10.2	9.6	10.5	9.9	8.9	9.5	9.4
Loss	24.3	27.2	29.2	33.0	25.9	27.2	29.7

Note*: For Private Non-Financial Wholesale Obligors.
Source: CRILC and staff calculations.

1.89 The results of these analyses throw up the following issues: (a) the need for additional provisioning at early stages of impairment to internalise the costs imposed by delay in resolution of assets; (b) need for incentivising all channels of resolution so as to avoid delays and hence prevent erosion in value of assets; (c) need for reviewing provisioning norms in the light of actual recovery related data, including the impact of collateralisation on final recovery; and (d) while a pre-packaged resolution process under Chapter III A of the IBC is an important watershed for speeding up resolution of small assets, the risk of deferral of unviable units at the cost of imperilling ultimate recovery needs to be guarded against.

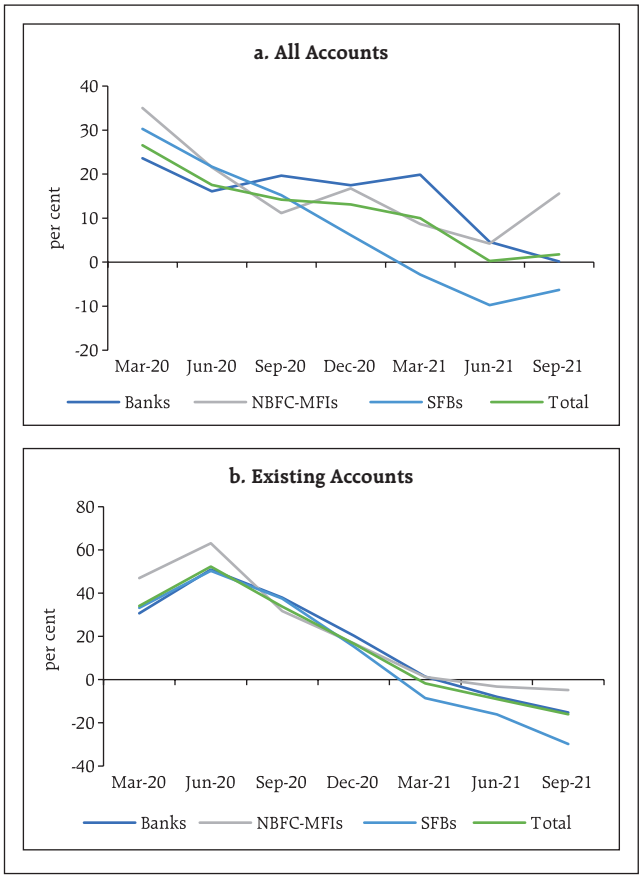
I.2.13 Microfinance Segment

1.90 Aggregate credit growth in the microfinance sector is showing some signs of stabilisation - although outstanding credit to the sector in September 2021 fell below March 2020 levels. The spurt in lending to existing borrowers seen at the onset of COVID-19 did not sustain and credit growth to this segment has started tracking aggregate portfolio growth (Chart 1.62).

1.91 Impairments measured in terms of 30+ dpd (days past due) and 90+ dpd rose following the first wave of the pandemic and escalated further during

Chart 1.62: Growth in Microfinance Portfolio

(y-o-y, per cent)



Note: Include all accounts which are 0-179 days past due (dpd).
Source: Equifax.

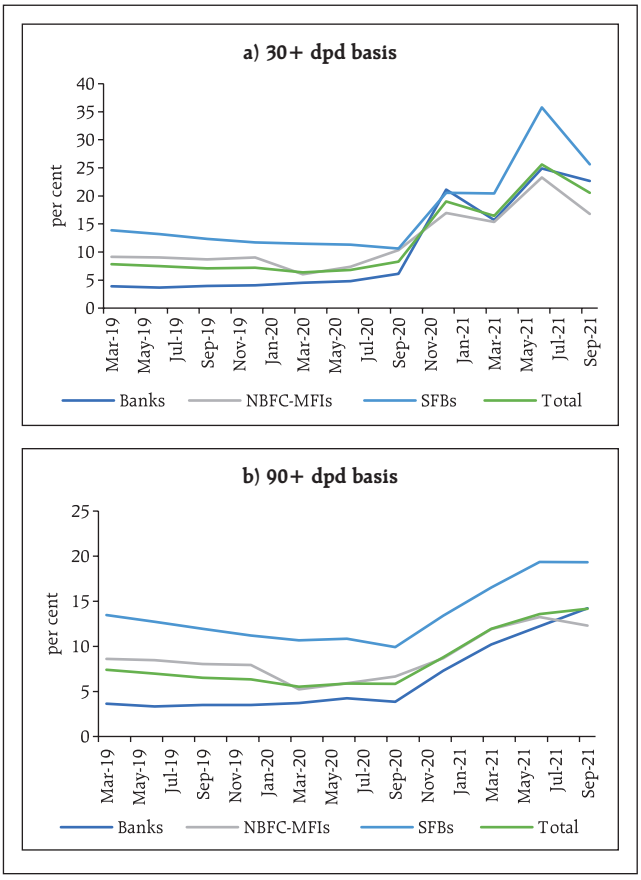
the second wave (Chart 1.63). While the recent 30+ dpd based impairment of the portfolio appears to have peaked, the 90+ dpd based impairment shows signs of moderation.

I.2.14 Non-Banking Financial Companies (NBFCs)

1.92 The NBFC space reveals divergent performances. While investment and credit companies (ICC), the largest segment of NBFCs, showed subdued asset growth, infrastructure finance companies (IFCs) – a segment dominated by PSU NBFCs –decelerated in H1:2021-22. NBFC-MFIs, a category particularly affected by the pandemic, exhibited uneven recovery (Table 1.28).

1.93 Banking sector exposure to private NBFC/ HFCs showed contrasting movements during 2021-22 (Chart 1.64 a). Bank lending to private NBFCs recovered in Q2:2021-22 after a steep decline in the preceding quarter. In case of private HFCs, however, banks' exposure continued to fall sharply after a

Chart 1.63: Microfinance Segment – Impairment



Source: Equifax.

Table 1.28 : Asset growth of select NBFCs[35]- A Segmental View

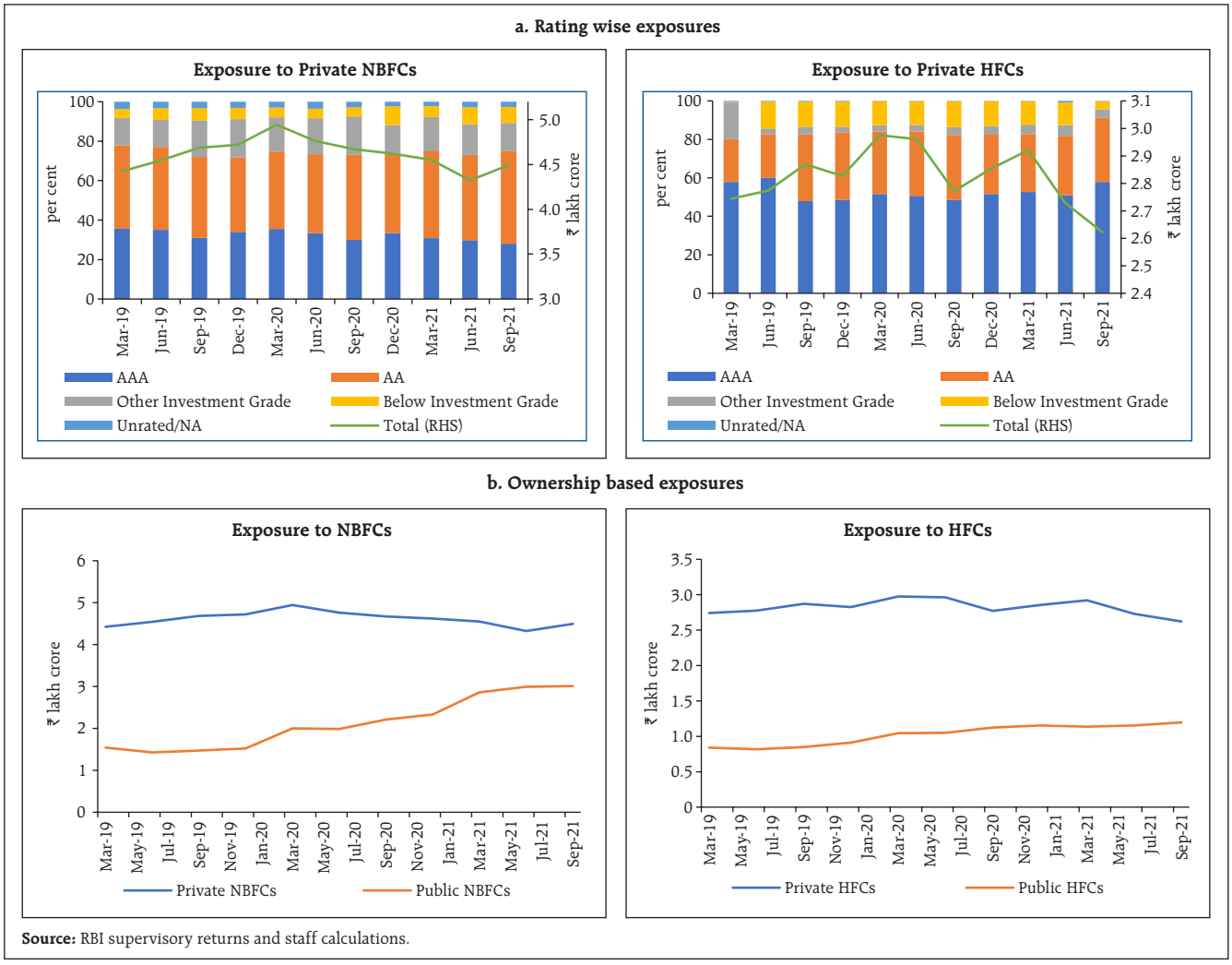
(Figures in ₹ '000 crore unless otherwise stated)

NBFC category	Asset size						
	Mar-20	Sep-20	Mar-21	Growth in Mar-21 (y-o-y, per cent)	Jun-21	Sep-21	Growth in Sep-21 over Mar-21 (per cent)
NBFC -Investment and Credit Company (331)	1,240.2	1,255.3	1,308.2	5.5	1,296.2	1,319.7	0.9
NBFC -Infrastructure Finance Company (8)	988.3	1,058.7	1,169.2	18.3	1,176.8	1,204.9	3.1
NBFC – Micro Finance Company (20)	36.0	35.0	40.6	13.0	38.5	42.6	4.8
NBFC-Infrastructure Debt Fund (4)	27.4	29.1	30.4	11.0	30.6	31.5	3.5
NBFC -Factor (4)	3.1	2.7	3.0	-4.4	2.6	2.8	-6.7
Grand Total (367)	**2,295.0**	**2,380.8**	**2,551.5**	**11.2**	**2,544.7**	**2,601.4**	**2.0**

Note: Figures in parentheses denote number of companies in each category.
Source: RBI supervisory returns and staff calculations.

[35] Sample NBFCs represent around 79 per cent of assets of the NBFC Universe in March 2021.

Chart 1.64: Bank Credit to NBFCs /HFCs

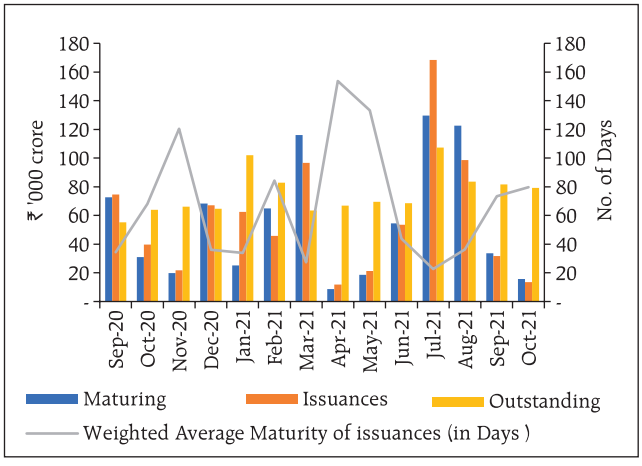


Source: RBI supervisory returns and staff calculations.

surge in H2:2020-21. Bank lending to PSU NBFCs and HFCs also reflected more active usage of credit limits by NBFCs (Chart 1.64 b).

1.94 Private NBFCs' activities in the money markets were characterised by a significant shortening of maturities and sizeable gross issuances, particularly during June-August 2021 (Chart 1.65). A

Chart 1.65: CP Issuances of Private NBFCs



Source: Prime Database and RBI staff calculations.

Table 1.29: Gross CP issuances by select NBFCs

(₹ crore)

	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21
NBFC-1	8,200	950	12,500	300	650	**4,930**	**18,890**	**8,150**	1,130	350
NBFC-2	16,390	7,605	20,410			**7,525**	**54,435**	**33,515**		
NBFC-3	8,340	3,648	16,361	100	105	**5,030**	**19,545**	**9,668**	500	185
NBFC-4	600	1,000	2,500			**1,025**	**2,965**	**1,835**	600	
NBFC-5	3,100	2,925	1,600	1,000	5,800	**5,510**	**5,620**	**6,410**	3,215	4,170
NBFC-6	1,825	1,200	10,200	550	78	**5,925**	**14,700**	**3,960**		1,700

Source: RBI supervisory returns and staff calculations.

Table 1.30 : Weighted average maturity of issuances of select NBFCs

(in days)

	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21
NBFC-1	16	122	11	90	87	**18**	**11**	**12**	85	245
NBFC-2	13	122	7			**7**	**10**	**15**		
NBFC-3	7	10	9	100	365	**24**	**9**	**12**	89	91
NBFC-4	7	7	9			**7**	**7**	**8**	7	
NBFC-5	35	43	23	7	44	**52**	**41**	**71**	95	42
NBFC-6	54	67	10	201	364	**27**	**21**	**89**		127

Source: RBI supervisory returns and staff calculations.

significant portion of the issuance was by six NBFCs in particular (Table 1.29). A few of these NBFCs also accounted for short term issuances during the period (Table 1.30).

1.95 The issuance of short term CPs make NBFCs vulnerable to any disruption in the CP market as the IL&FS related incidents demonstrated in 2019. With a view to estimating the systemic impact of the CP issuances, two approaches can be adopted. Firstly, the aggregate market activity for NBFCs in the instrument can be compared with the gross issuance outstanding in the relevant period. Second, gross outstanding CPs during the period can be compared with the aggregate on-balance sheet liability of the entity, a higher share implying more dependence on this volatile segment of funding. In July 2021, aggregate issuance by NBFCs 1, 2 and 3 comprised 52 per cent of the aggregate issuance, signifying high dependence of these NBFCs on CP markets. Moreover, considerable synchronisation in accumulation of exposures was seen during June-August 2021, making the sector as a whole significantly dependent on the normal functioning of this segment. For NBFCs 1, 2 and 3, intra-month CP exposures in July 2021 constituted a significant proportion of on-balance sheet liabilities (Table 1.31).

1.96 For the three NBFCs for which the structural liquidity of the near month bucket is available, gross maximum CP related outflows[36] in a week during the month of July 2021 was significantly large relative

Table 1.31 : Share of CP Outstanding in Aggregate Liability of Select NBFCs

	Maximum Intra month CP outstanding (July-21), ₹ crore	Outstanding CP as a proportion of total on balance sheet liability (June-21), per cent
NBFC-1	9,810	25.9
NBFC-2	24,980	30.8
NBFC-3	9,763	24.3

Source: RBI supervisory returns and staff calculations.

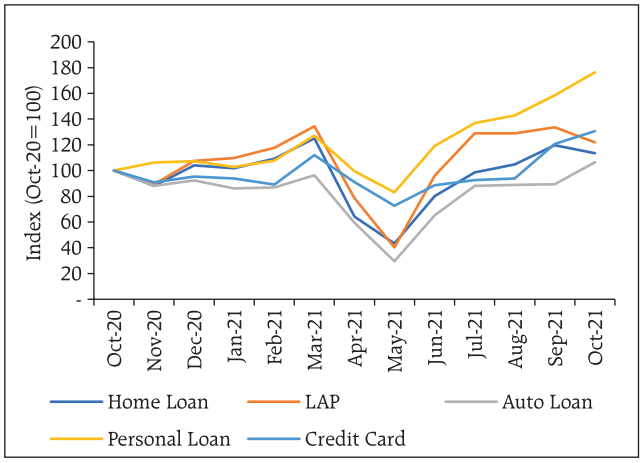
Table 1.32: Intra-month CP Related Outflows

	Actual intra month 0 - 7 days outflow as % of projected 1-month outflow in Structural Liquidity Statement on June-2021
NBFC-1	178.6
NBFC-2	197.7
NBFC-3	167.5

Source: RBI supervisory returns and staff calculations.

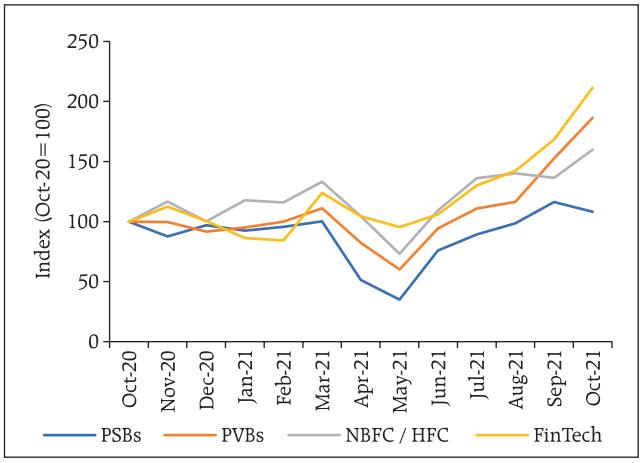
[36] Here the outflows are measured in gross rather than net because vulnerability on account of liquidity are typically measured in gross exposure rather than net.

Chart 1.66: Inquiry Volumes by Product Category



Source: TransUnion CIBIL.

Chart 1.67: Inquiry Volumes by Lender Category



Source: TransUnion CIBIL.

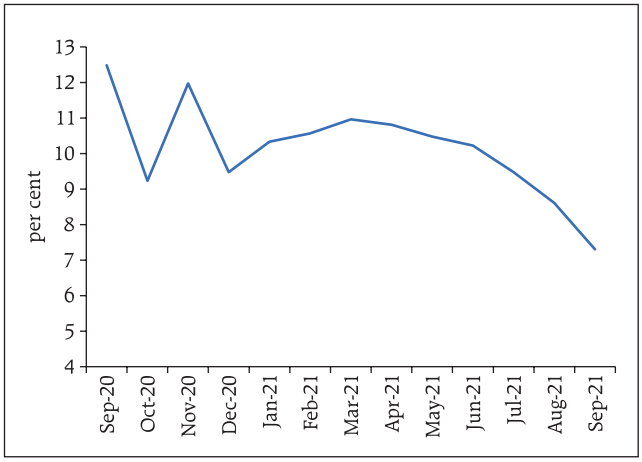
to the projected 1-month outflows (Table 1.32). Any smoothening of such exposures for reporting of structural liquidity positions in various buckets to supervisors at the end of the month may understate the risk that the balance sheet is exposed to.

I.2.15 Consumer Credit

1.97 The overall demand in consumer credit, as reflected in inquiry volumes[37], has recovered following the dip on account of the second wave. The upturn is led by demand for personal loan and credit card segments while demand from other product categories show signs of stabilization. Lending activity across all lender categories, barring PSBs, shows signs of accelerated credit growth after the second wave. Growth in credit active consumers[38] has, however, moderated consistently since September 2020 (Charts 1.66-1.68).

1.98 Inquiry volumes by risk[39] tier show leapfrogging of credit demand from sub-prime

Chart 1.68: Growth in Credit Active Consumers (y-o-y)



Source: TransUnion CIBIL.

[37] A credit inquiry is created when any borrower applies for a loan and permits the lender to pull their credit record. Inquiries are among the first credit market measures to change in credit record data in response to changes in economic activity.

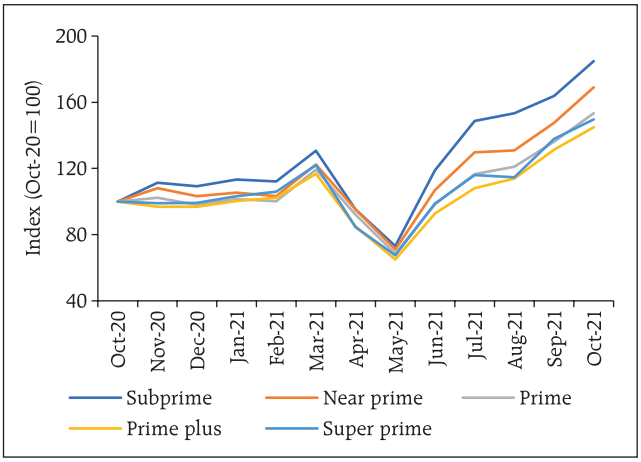
[38] Consumers with at least one outstanding credit account.

[39] The segregation of risk-tiers based on CIBIL scores is as follows - Super Prime: 791-900, Prime Plus: 771-790, Prime: 731-770, Near Prime: 681-730 and Sub-prime: 300-680.

consumers, particularly after the second wave (Chart 1.69). The distribution by risk across lender categories shows particular improvement in customer mix in the NBFC segment (Table 1.33). While PSBs show a disproportionate size of below prime borrowers in the consumer credit mix, their recent originations in the segment have shown a bias away from the segment (Table 1.34).

1.99 Impairment in consumer credit, measured in terms of the proportion of the portfolio at 90 days past due or beyond, shows signs of stabilisation after the pandemic, but at a fairly higher level for PSBs, relative to other lender categories (Table

Chart 1.69: Inquiry Volumes by Risk Tier



Source: TransUnion CIBIL.

Table 1.33: Consumer Distribution by Risk Tier and Lender Category

(as a per cent of credit active consumers)

Score Band	Select NBFCs[40] (24)		All NBFCs		All PSBs		All PVBs		Industry	
	Sep-20	Sep-21	Sep-20	Sep-21	Sep-20	Sep-21	Sep-20	Sep-21	Sep-20	Sep-21
Subprime	28.2	29.7	31.0	33.8	29.7	32.7	16.3	19.3	27.2	29.9
Near prime	28.5	21.3	28.7	21.8	27.6	25.1	19.5	16.5	25.5	21.6
Prime	28.4	33.1	28.2	31.4	27.7	25.6	33.2	32.5	28.8	28.4
Prime plus	13.6	14.3	11.0	11.8	11.1	12.1	21.4	21.3	13.6	14.6
Super prime	1.4	1.6	1.1	1.3	3.9	4.6	9.7	10.4	5.0	5.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Below Prime	56.6	51.1	59.7	55.6	57.3	57.8	35.8	35.9	52.7	51.4

Source: TransUnion CIBIL.

Table 1.34 : PSB Origination by Risk Tier

(as a % of origination volumes)

Risk Tier	Q3 2020	Q3 2021
Subprime	11.2	9.4
Near prime	20.6	19.0
Prime	36.4	40.9
Prime plus	12.9	15.5
Super prime	4.3	6.7
New To Credit	14.6	8.5
Total	100.0	100.0

Source: TransUnion CIBIL.

Table 1.35: Delinquency Levels in Aggregate Consumer Credit across all Product Categories

(per cent)

	PSB	PVB	NBFC / HFC	FinTech
Sep-20	5.48	1.56	2.53	1.82
Oct-20	5.38	1.55	2.45	1.94
Nov-20	5.10	1.93	2.90	2.87
Dec-20	4.94	2.49	3.39	5.88
Jan-21	4.87	2.66	3.76	6.60
Feb-21	4.54	2.61	3.43	6.22
Mar-21	4.89	2.01	3.04	3.14
Apr-21	4.92	2.03	3.95	3.56
May-21	5.69	2.48	5.09	4.69
Jun-21	5.88	2.67	4.59	3.70
Jul-21	5.60	2.80	4.58	4.74
Aug-21	5.54	2.66	4.21	4.93
Sep-21	5.03	2.23	3.77	4.56

Note: (1) based on 90 days past due balances.
(2) TransUnion CIBIL's FinTech category comprises of NBFCs registered with RBI and active in digital lending category as also peer to peer lending platforms.

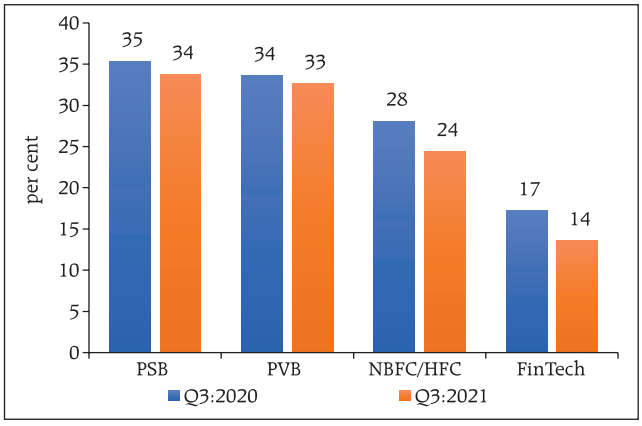
Source: TransUnion CIBIL

[40] A select list of 24 NBFCs particularly active in the consumer segment was segregated so as to examine issues of possible concentration of risk

1.35). Delinquency levels in terms of product types point to a general deterioration across product category levels in September 2021 relative to September 2020, with the credit card segment being the only exception. General lending standards in the industry have been tightened across lender category levels, leading to a drop in approval rates (Chart 1.70) as also moderation in the growth of balances (Chart 1.71).

1.100 Such migrations across major product categories across three periods - September 2019/20; June 2020/21; and September 2020/21 – reveal that adverse migration into riskier categories remains significant relative to September 2019/20. In respect of better rated categories, such migrations have, however, stabilised or are better relative to the pre-pandemic period, underscoring the asymmetric nature of the impact across risk categories (Table 1.36).

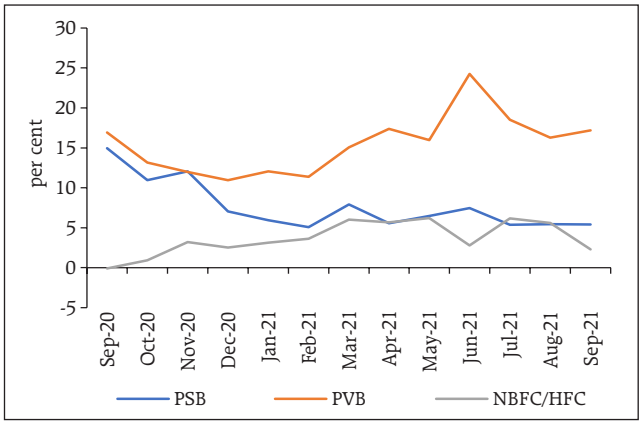
Chart 1.70: Approval Rates by Lender Category (per cent)



Source: TransUnion CIBIL.

Chart 1.71: Growth in Outstanding Balances Across Lender Category

(y-o-y, per cent)



Source: TransUnion CIBIL.

Table 1.36 : Score Migration[41] for Risk Categories (per cent)

		Subprime	Near prime	Prime	Prime plus	Super prime	Score tier downgrade	Score tier upgrade
Live Borrowers - Score Movement (Sep 2019 to Sep 2020)								
		Risk tier - Sep 2020						
Risk tier - Sep 2019	Subprime	61.1	25.9	10.9	1.7	0.4	0.0	38.9
	Near prime	19.3	33.9	36.2	8.9	1.7	19.3	46.8
	Prime	8.0	17.5	47.9	22.5	4.0	25.6	26.5
	Prime plus	3.8	9.9	29.5	46.4	10.4	43.2	10.4
	Super prime	2.3	7.3	17.7	21.2	51.5	48.5	0.0
Live Borrowers - Score Movement (Jun 2020 to Jun 2021)								
		Risk tier - June 2021						
Risk tier - June 2020	Subprime	71.3	17.2	8.9	2.0	0.6	0.0	28.7
	Near prime	28.3	29.1	31.0	9.5	2.1	28.3	42.6
	Prime	12.1	17.0	43.0	23.8	4.2	29.1	28.0
	Prime plus	6.4	10.7	25.5	46.4	11.0	42.6	11.0
	Super prime	3.1	7.6	16.6	21.4	51.4	48.6	0.0
Live Borrowers - Score Movement (Sep 2020 to Sep 2021)								
		Risk tier - Sep 2021						
Risk tier - Sep 2020	Subprime	68.0	18.7	10.3	2.4	0.7	0.0	32.0
	Near prime	25.0	30.0	32.7	10.0	2.3	25.0	45.0
	Prime	9.7	16.1	44.1	25.6	4.6	25.8	30.1
	Prime plus	4.3	9.3	24.8	49.6	11.9	38.4	11.9
	Super prime	2.5	6.6	16.8	21.4	52.6	47.4	0.0

Source: TransUnion CIBIL.

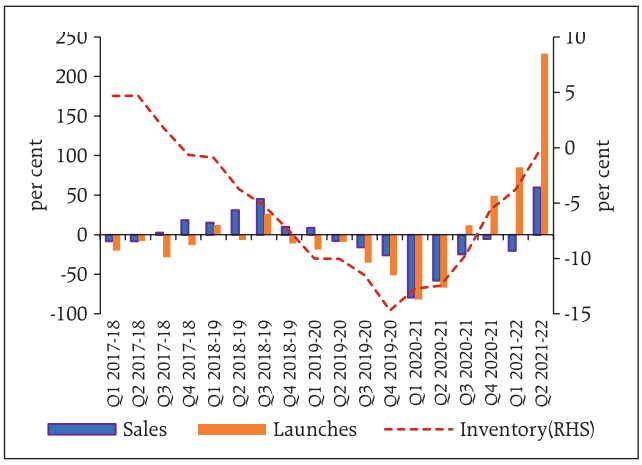
[41] Averaged across four major product categories *viz.* Auto Loan, Home Loan, Property Loan and Personal loan

I.2.16 Housing Market

1.101 The housing market is regaining momentum. House sales witnessed green shoots of recovery during Q2:2021-22, following a prolonged period of negative growth. Support measures adopted by government to boost the housing sector, a low interest rate environment and improved consumer confidence in the sector pushed up demand, along with a steep increase in new house launches during the last four quarters (Chart 1.72). New launches, especially in the affordable low-ticket segments, rose sharply and higher priced segments grew in terms of sales. Unsold inventory rose with new launches, but robust sales helped to bring down the inventory overhang during Q2:2021-22 (Chart 1.73).

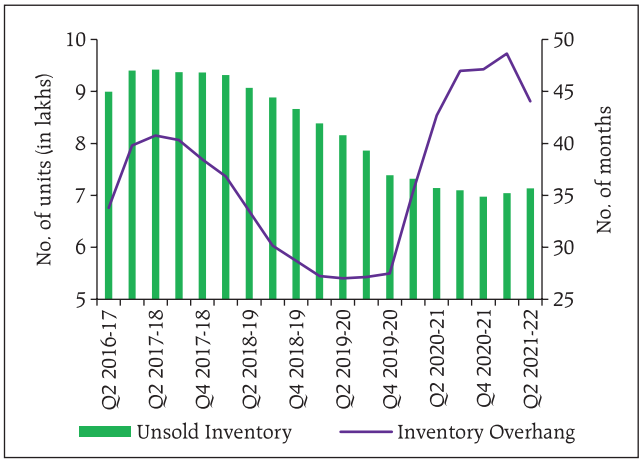
Chart 1.72: House Sales, Launches and Unsold Inventory

(y-o-y growth, in per cent)



Source: PropTiger Datalabs.

Chart 1.73: Unsold Inventory and Inventory Overhang



Source: PropTiger Datalabs.

I.2.17 Systemic Risk Survey[42]

1.102 In the November 2021 round of the Systemic Risk Survey (SRS), respondents perceived all broad categories of risks to the financial system - global, macroeconomic, financial market, institutional and general - as 'medium' in magnitude but rated global risks and financial market risks as comparatively higher than the rest. Among the components of the five broad risk categories, respondents viewed commodity prices, domestic inflation, equity price volatility, cyber risk, credit growth and asset quality as the major risk factors. Risk perceptions on global growth, current account deficit, interest rates, liquidity, terrorism and climate change increased, although they remained in the medium risk category.

1.103 Over half of the respondents envisage improvement in the prospects of the Indian banking sector in the next one year, with over 80 per cent expecting pick up in credit demand in the next three months. Forty-three per cent of the respondents also expected asset quality of the banking system to improve marginally in the next three months.

[42] Details are given in Annex 1.

1.104 Majority of the respondents felt that the Indian economy will recover completely from the fallout of the COVID-19 pandemic in a span of 1-2 years; sectors such as tourism and hospitality, aviation, automobiles, MSMEs, real estate, retail trade and entertainment could, however, exhibit slower recovery over the next one year.

Summary and Outlook

1.105 Globally, sovereign debt has ballooned as governments extended wide ranging fiscal support to tide their countries through the pandemic. This is likely to have a long-term impact on fiscal sustainability and crimp the policy space available for extended support should the Omicron variant prove to have a destabilizing effect on the economy.

1.106 The global macrofinancial outlook appears rather uncertain as systemically important economies start tightening their monetary policy stances faster than previously announced. The spillovers of such measures across asset classes and cross-border flows are likely to lead to volatility in EMEs. Policymakers in the latter will confront the challenge of calibrating their domestic policy responses to smoothen the impact of such spillovers as their economies simultaneously cope with the fallout of newer COVID-19 variants.

1.107 Domestically, the recovery that was interrupted by the second wave of the pandemic regained ground with easing of localised restrictions, aided by rapid progress of vaccination. Financial conditions remain conducive, engendered by the Reserve Bank's liquidity operations that ensure large liquidity surpluses in the system. In turn, this has enabled the smooth passage of the government's market borrowing programme. At the same time, the formal sector has gained strength and resilience, aided by the improvement in demand. Bank credit growth is showing signs of gradual recovery, although flow of credit to lesser rated corporates continues to be tepid. Signs of incipient stress in micro, small and medium enterprises (MSME) as also in the micro finance segment call for close monitoring of their portfolios.

Chapter II

Financial Institutions: Soundness and Resilience

Scheduled commercial banks (SCBs) improved their performance in terms of profitability, asset quality and capital adequacy. Macro-stress tests indicate that all banks would be able to comply with minimum capital requirements even in a severe stress scenario. Stress tests indicate that a significant number of NBFCs would be adversely impacted in the event of liquidity shocks. Network analysis points to increasing inter-bank exposure, raising contagion risks.

Introduction

2.1 In 2021-22 so far, the impact of the second wave of the pandemic on the financial system has been mitigated through regulatory and other policy support measures to cushion eligible borrowers, bolster the resilience of banks and, above all, to reinvigorate the flow of credit in order to kick-start private investment.

2.2 This chapter presents an evaluation of the soundness and resilience of financial intermediaries in India by analysing their recent performance as reflected in offsite returns. Section II.1 provides an assessment of activity indicators, asset quality and capital adequacy of scheduled commercial banks (SCBs). It also examines their resilience against macroeconomic shocks through stress tests and sensitivity analysis. Sections II.2 and II.3 evaluate recent performance of urban cooperative banks (UCBs) and NBFCs, respectively, with stress tests. The concluding Section II.4 sets out an analysis of the network structure and interconnectedness of the Indian financial system and the results of contagion analysis under adverse scenarios.

II.1 Scheduled Commercial Banks (SCBs)[1] [2]

2.3 Aggregate deposits growth (y-o-y) moderated from end-March 2021 to touch 9.3 per cent by December 3, 2021 (Chart 2.1 a). Current account and savings account (CASA) deposits continued to outpace term deposits, reflecting precautionary motives in the face of uncertainty (Chart 2.1 b).

2.4 SCBs' credit growth (y-o-y) has been inching up during the current financial year (Chart 2.1 c). Industrial advances, personal loans and service sector advances - in that order - accounted for the major share of bank credit by the end of H1:2021-22 (Chart 2.1 d). Agriculture and personal loan[3] books remained the drivers of loan growth. Industrial sector credit turned positive, contributed by PVBs and FBs, after contracting over the previous two years. Credit to the services sector saw a sequential improvement but lagged other sectors, principally due to PSBs' sliding advances to the sector (Chart 2.1 e). In the personal loans category, all segments except credit cards outstanding witnessed higher (y-o-y) growth. Housing loans, the mainstay of personal loans, maintained double digit growth (Chart 2.1 f).

[1] Analyses are mainly based on RBI's supervisory returns which cover only domestic operations of SCBs, except in the case of data on large borrowers, which are based on banks' global operations. For CRAR projections, a sample of 46 SCBs (including public sector banks (PSBs), private sector banks (PVBs) and foreign banks (FBs)) accounting for around 98 per cent of the assets of the total banking sector (non-RRB) have been considered.

[2] The analyses done in the chapter are based on the data available as of December 15,2021 which are provisional. SCBs include public sector banks, private sector banks and foreign banks.

[3] Personal loans refer to loans given to individuals and consist of (a) consumer credit, (b) education loan, (c) loans given for creation/ enhancement of immovable assets (*e.g.*, housing, *etc.*), and (d) loans given for investment in financial assets (shares, debentures, *etc.*)

Chart 2.1: Deposit and Credit Profile of SCBs

Source: RBI supervisory returns and staff calculations.

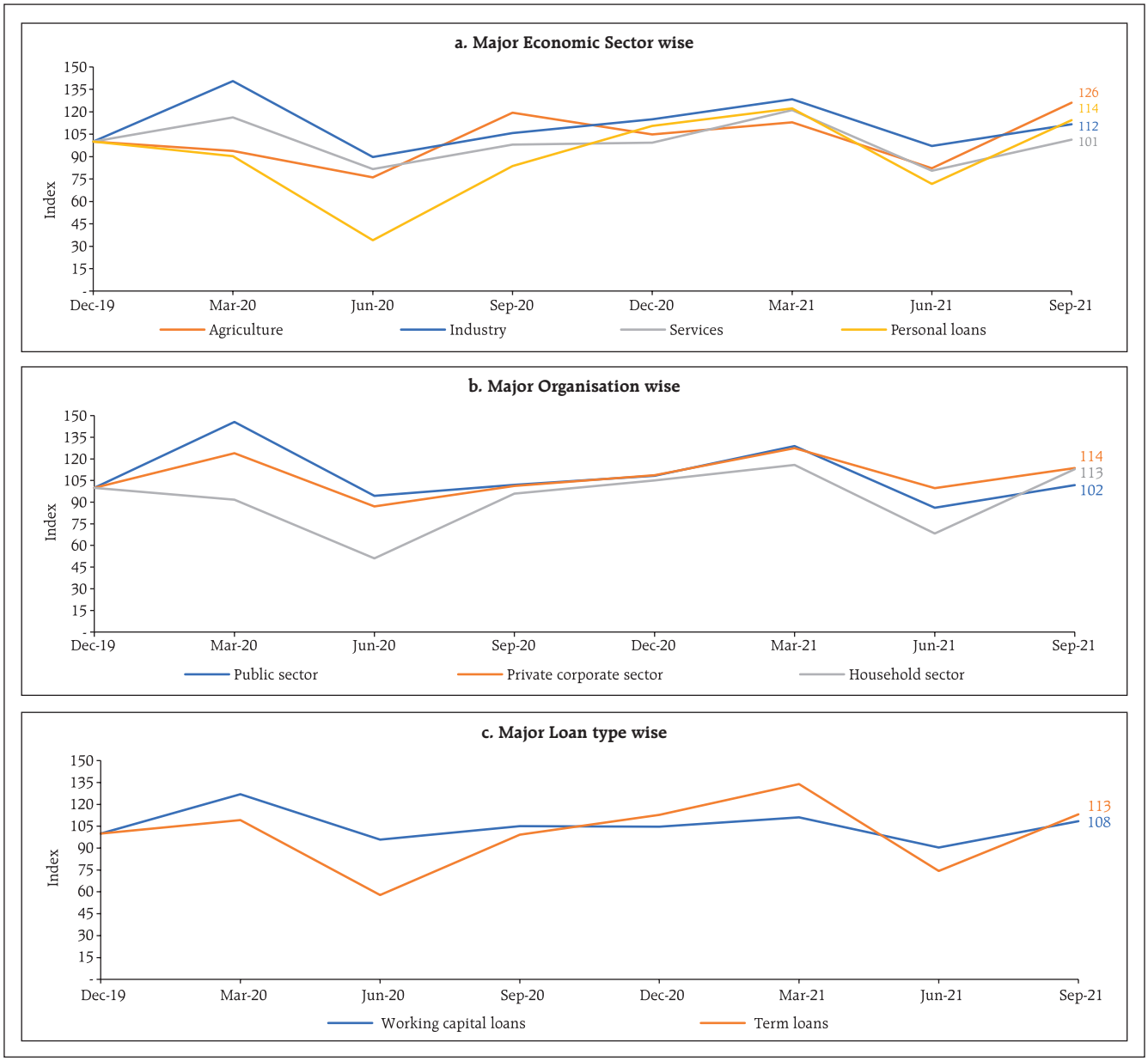
2.5 New loans extended by SCBs picked up momentum in Q2:2021-22 across sectors. Higher offtake was recorded by the private corporate and household sectors in the form of working capital and term loans (Chart 2.2 a, b and c).

II.1.1 Asset Quality

2.6 SCBs' gross non-performing assets (GNPA) ratio stood at 6.9 per cent at end-September 2021. Concomitantly, their net NPA (NNPA) ratio declined by 10 bps during H1:2021-22 (Chart 2.3 a and b).

Chart 2.2: New Loans by SCBs by Sector and Loan Type

(Indexed to December 2019 = 100)



Note: New loans' data pertain to PSBs, PVBs, FBs and SFBs.
Source: Basic Statistical Returns -1, RBI and staff calculations.

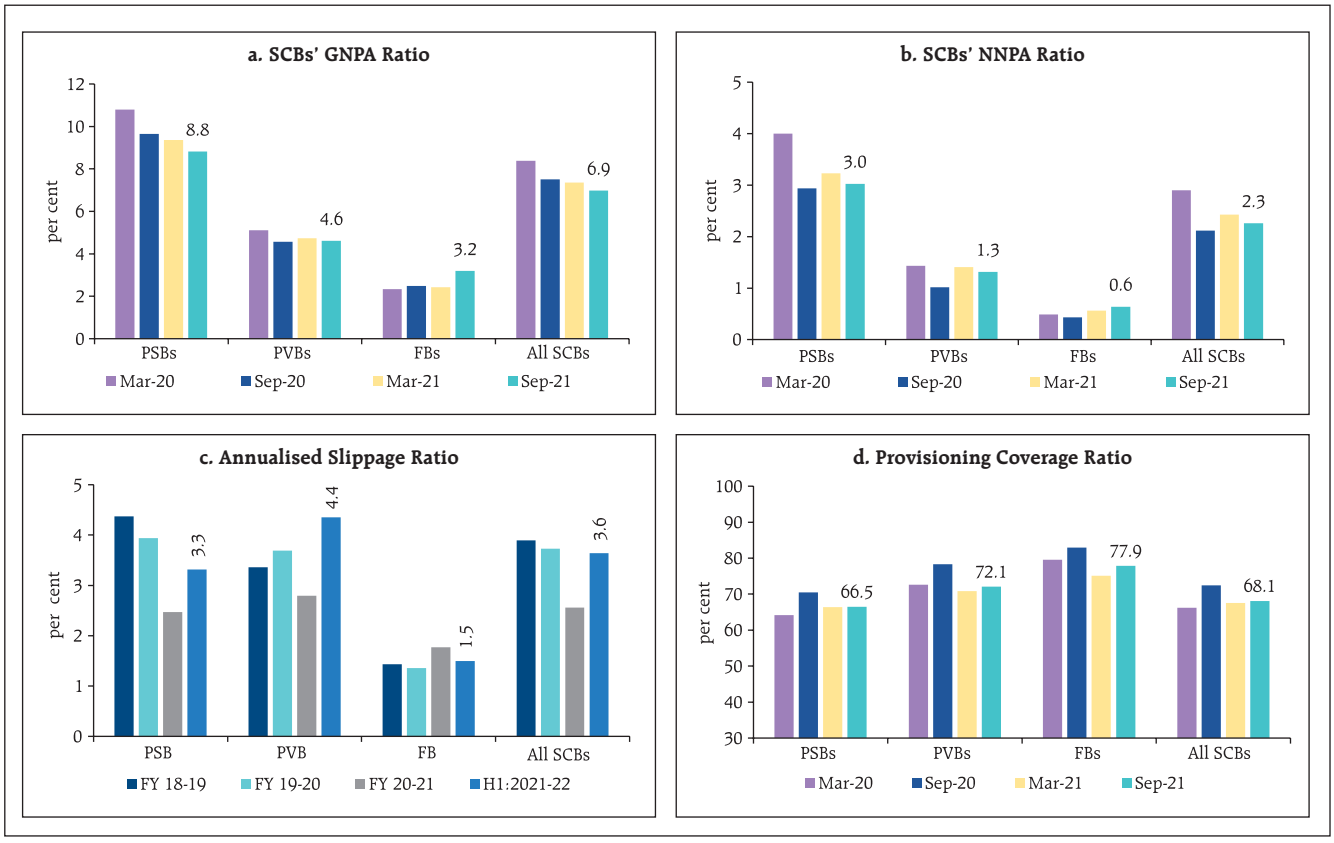
The annualised slippage ratio of SCBs inched up, with PVBs exhibiting a higher rate of deterioration in asset quality (Chart 2.3 c).The provisioning coverage ratio (PCR)[4] moved up from 67.6 per cent in March 2021 to 68.1 per cent in September 2021 (Chart 2.3 d).

II.1.2 Sectoral Asset Quality

2.7 In sectoral terms, the GNPA ratio for personal loans rose above its level six months ago as well as a year ago. The deterioration was led by housing and auto loans (Chart 2.4 a and b). The GNPA ratio for the industrial sector continued to decline, though some sub-sectors, *viz.*, food processing, chemical and infrastructure (excluding electricity) registered increases over their March 2021 levels (Chart 2.4 c).

2.8 Restructuring by entities impacted by the second COVID-19 wave under Resolution Framework (RF) 2.0 stood at 1.5 per cent of total advances as at end-September 2021 which covered 81.7 per cent of the borrower accounts where restructuring under the scheme was invoked. In the case of MSME and retail loans, the restructuring was to the extent of 2.4 per cent of total sectoral advances and covered 80.0 per cent of borrower accounts where it was invoked. A clearer picture of the aggregate extent of restructuring would be available after implementation of RF 2.0 which ends on December 31, 2021 (Chart 2.4 d).

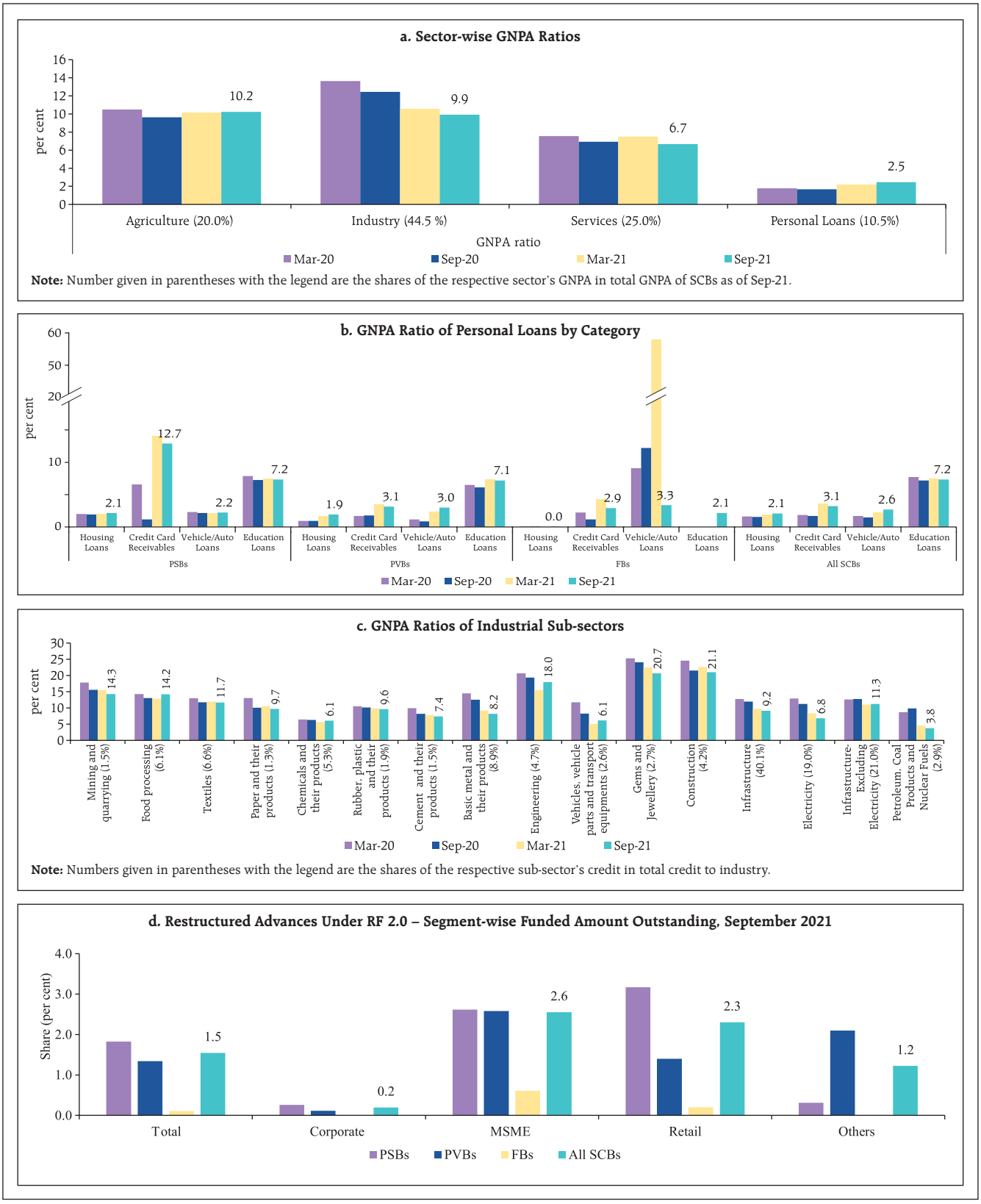
Chart 2.3: Select Asset Quality Indicators



Source: RBI supervisory returns and staff calculations.

[4] PCR is the proportion of provisions (without write-offs) held for NPAs to GNPA

Chart 2.4: Sectoral Asset Quality Indicators



Note: Number given in parentheses with the legend are the shares of the respective sector's GNPA in total GNPA of SCBs as of Sep-21.

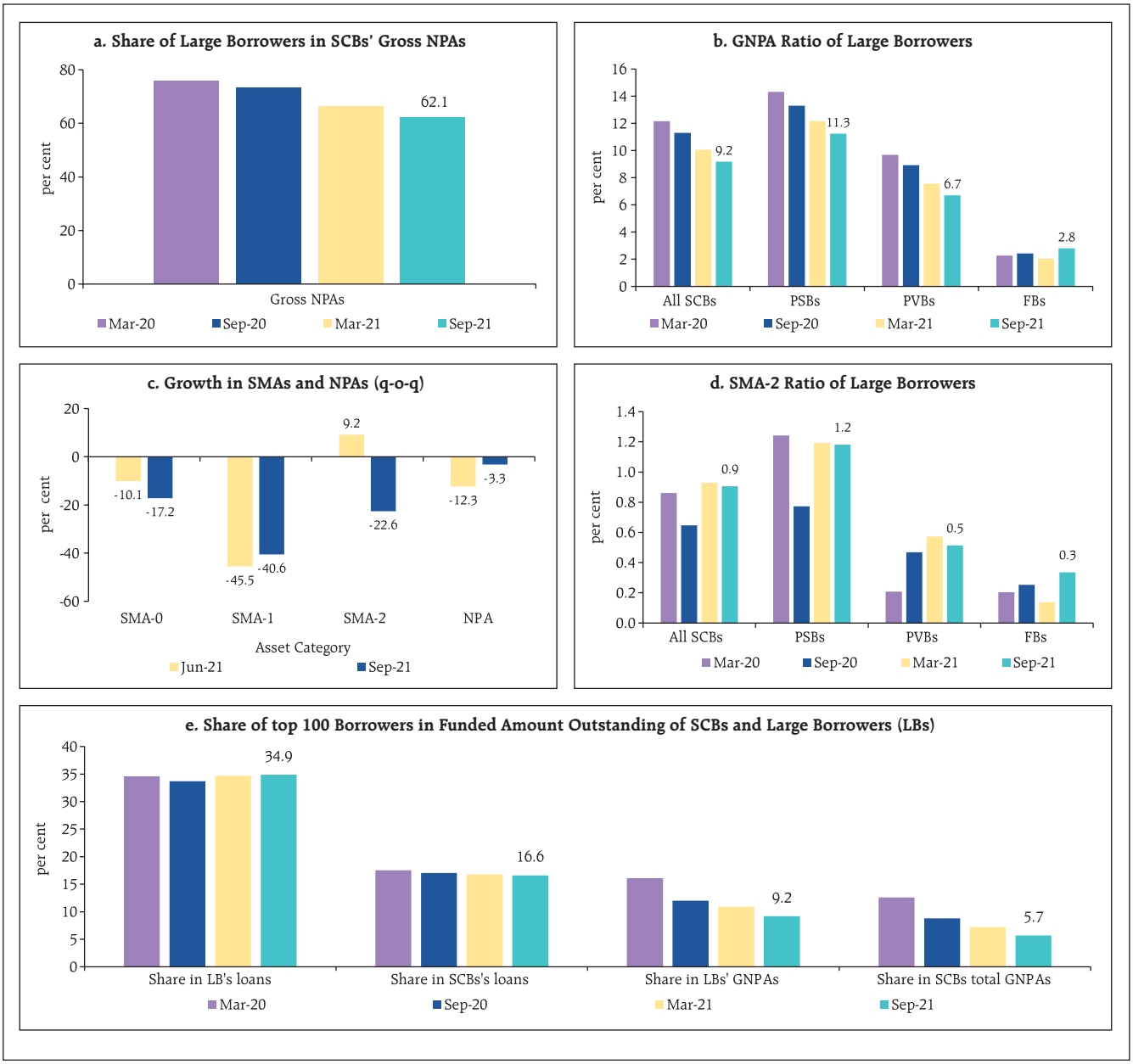
Note: Numbers given in parentheses with the legend are the shares of the respective sub-sector's credit in total credit to industry.

Source: RBI supervisory returns and staff calculations.

II.1.3 Credit Quality of Large Borrowers[5]

2.9 The share of large borrowers in GNPAs fell from 75.9 per cent in March 2020 to 62.1 per cent in September 2021 (Chart 2.5 a and b). Their loans in the special mention account (SMA[6]) buckets also declined (Chart 2.5 c and d). The share of the top 100 large borrowers in the total loan book shrunk marginally to 16.6 per cent while their share in SCBs' GNPA pool fell to 5.7 per cent (Chart 2.5 e).

Chart 2.5: Select Asset Quality Indicators of Large borrowers



Source: RBI supervisory returns and staff calculations.

[5] A large borrower is defined as one who has aggregate fund-based and non-fund-based exposure of ₹5 crore and above. This analysis is based on SCBs' global operations.

[6] a) Loans in the nature of revolving facilities like cash credit/overdraft: if outstanding balance remains continuously in excess of the sanctioned limit or drawing power, whichever is lower, for a period of 31-60 days - SMA-1 ;61-90 days - SMA-2.

b) Loans other than revolving facilities: if principal or interest payment or any other amount wholly or partly overdue remains outstanding upto 30 days - SMA-0; 31-60 days - SMA-1; 61-90 days - SMA-2.

II.1.4 Capital Adequacy

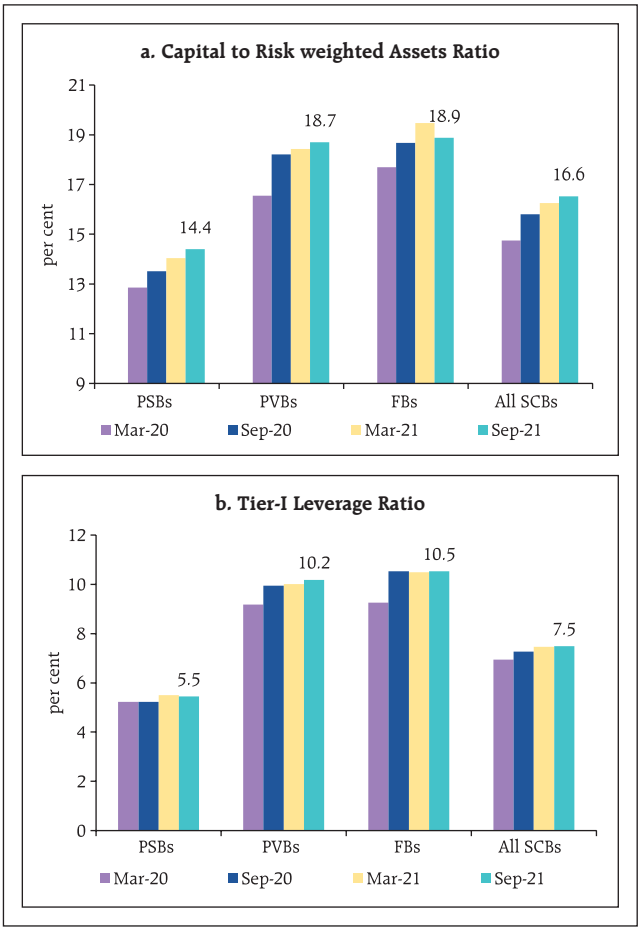
2.10 As in 2020-21, SCBs continued to bolster their capital through a mix of internal accruals and capital raising, including Tier I and II bonds, resulting in the capital to risk-weighted assets ratio (CRAR) rising to a new peak of 16.6 per cent in September 2021 (Chart 2.6 a). The system-level Tier-I leverage ratio[7] stood at 7.5 per cent in September 2021 (Chart 2.6 b).

II.1.5 Earnings and Profitability

2.11 For the past two years, net interest margin (NIM) of SCBs stood at 3.3 per cent (Chart 2.7 a). Their profits after tax (PAT) recorded a growth of 31 per cent (y-o-y). This was primarily due to an increase of 16 per cent in the PAT of PVBs and doubling of PSBs' profits, driven by 30 per cent increase (y-o-y) in other operating income (OOI) and 24 per cent decline (y-o-y) in provisions (Chart 2.7 b).

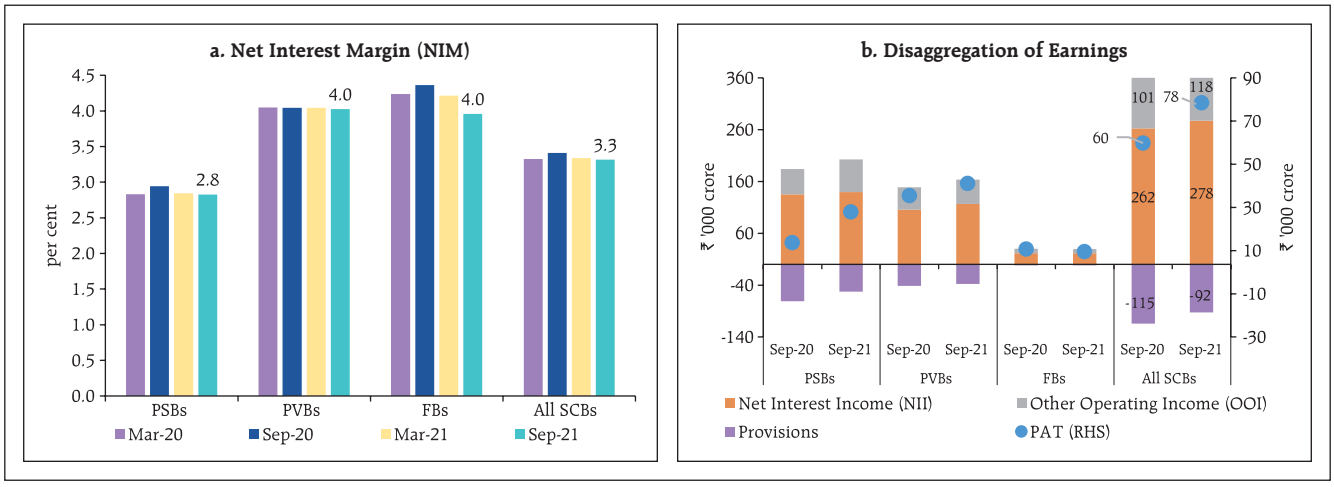
2.12 The return on assets (RoA) and return on equity (RoE) maintained their rising profile, with PSBs recording multi-year highs (Chart 2.7 c and d). The cost of funds and yield on assets declined across bank groups to reach their lowest levels in the last two decades (Chart 2.7 e and f).

Chart 2.6: Capital Adequacy



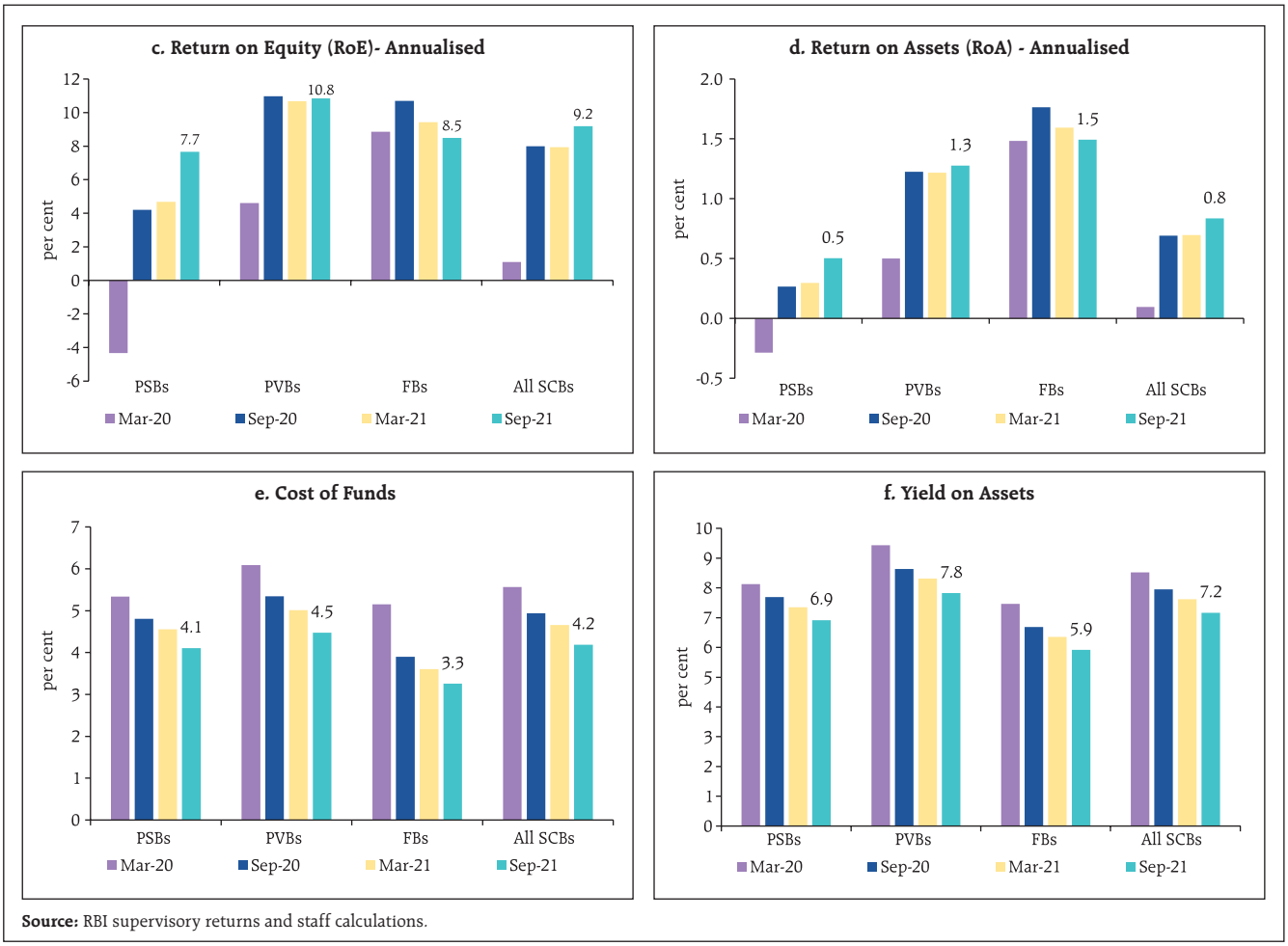
Source: RBI Supervisory Returns and Staff Calculations.

Chart 2.7: Select Performance Indicators of SCBs *(Contd.)*



[7] Tier I leverage ratio is the ratio of Tier I capital to total assets.

Chart 2.7: Select Performance Indicators of SCBs *(Concld.)*



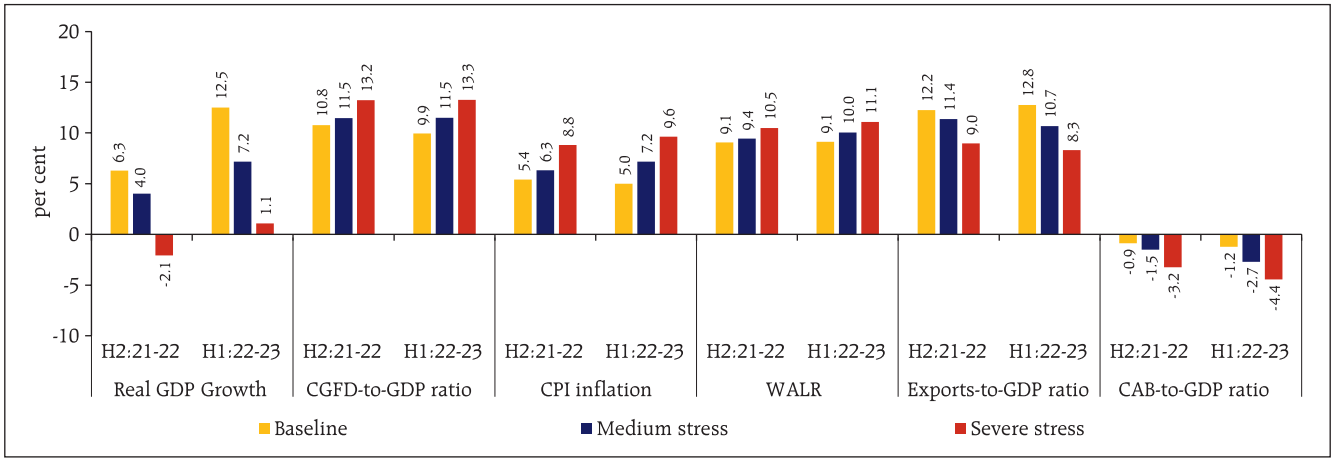
Source: RBI supervisory returns and staff calculations.

II.1.6 Resilience – Macro Stress Tests

2.13 The resilience of SCBs' balance sheets to unforeseen shocks emanating from the macroeconomic environment has been assessed by using macro-stress tests through which impairment and capital ratios are projected over a one-year horizon under a baseline and two adverse (medium and severe) scenarios. **The adverse scenarios are stringent conservative assessments under hypothetical adverse economic conditions and, therefore, these model outcomes should not be interpreted as forecasts.** The baseline scenario incorporates the forecasted values of macroeconomic variables.[8] The medium and severe adverse scenarios are arrived at by applying 0.25 to one standard deviation (SD) shocks and 1.25 to 2 SD shocks, respectively, to each of the macroeconomic variables, increasing the shocks by 25 basis points for each successive quarter (Chart 2.8).

[8] GDP growth, combined fiscal deficit-to-GDP ratio, CPI inflation, weighted average lending rate, exports-to-GDP ratio and current account balance-to-GDP ratio

Chart 2.8: Macroeconomic Scenario Assumptions for H2:2021-22 and H1:2022-23

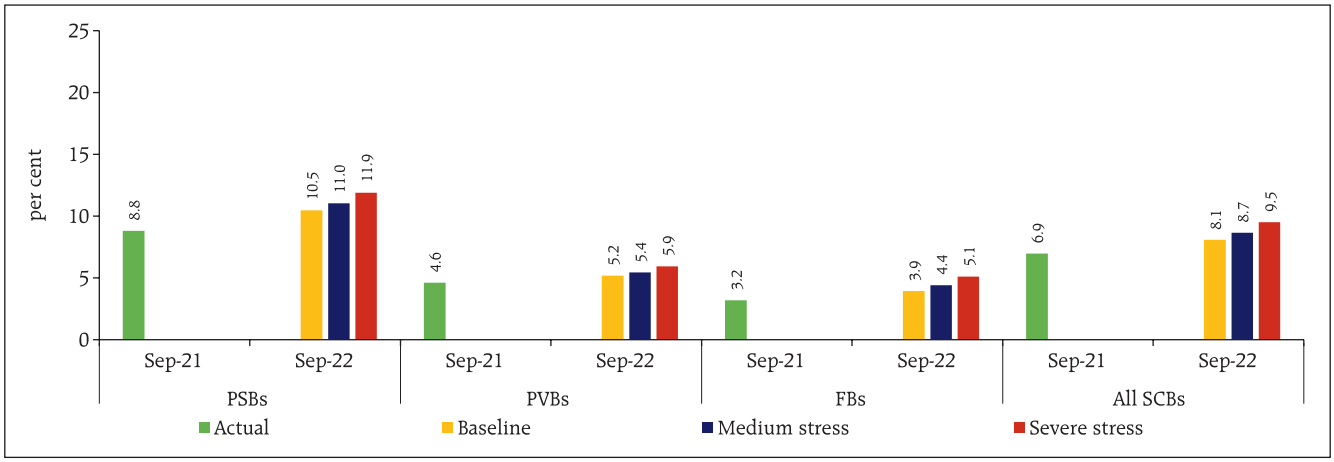


Source: RBI staff calculations.

2.14 Stress tests indicate that the GNPA ratio of all SCBs may increase to 8.1 per cent by September 2022 under the baseline scenario and further to 9.5 per cent under severe stress. Within the bank groups, PSBs' GNPA ratio of 8.8 per cent in September 2021 may deteriorate to 10.5 per cent by September 2022 under the baseline scenario; for PVBs, the share of bad loans may rise from 4.6 per cent to 5.2 per cent and for FBs, it is estimated to increase from 3.2 per cent to 3.9 per cent over the same period (Chart 2.9). On the other hand, if the stress conditions do not materialise and the situation turns optimistic relative to the baseline, GNPA ratio of all SCBs may moderate.

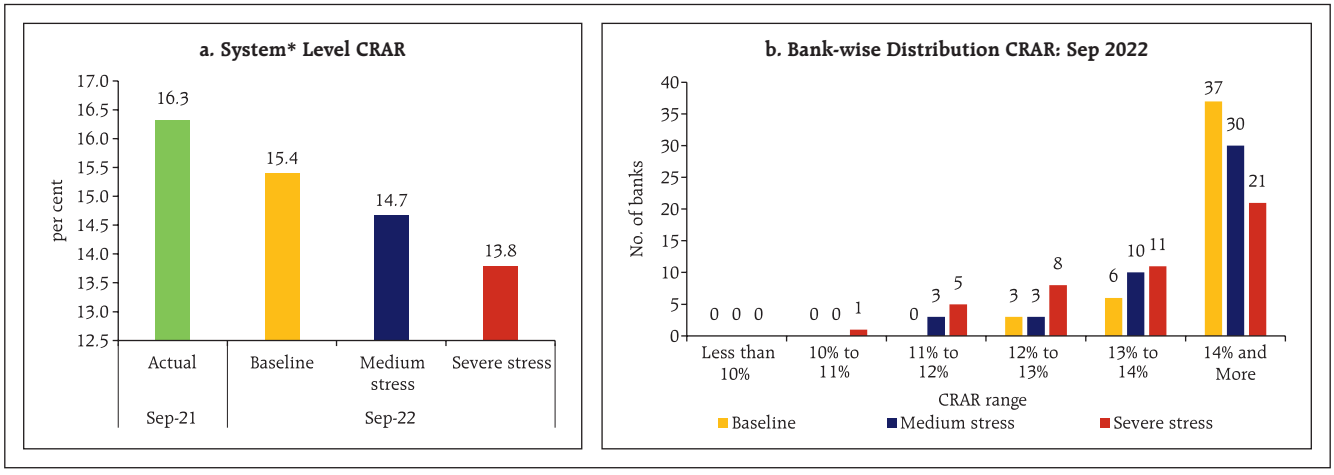
2.15 Stress test results indicate that the system level CRAR may decline to 15.4 per cent by September 2022 under the baseline scenario and to 14.7 per cent and 13.8 per cent under the medium and severe stress scenarios, respectively (Chart 2.10 a). All 46 banks would be able to maintain CRAR above the

Chart 2.9: Projection of SCBs' GNPA Ratios



Note: GNPAs are projected using three complementary econometric models- multivariate regression; vector autoregression (VAR) and quantile regression; the resulting GNPA ratios are averaged.
Source: RBI supervisory returns and staff calculations.

Chart 2.10: CRAR Projections



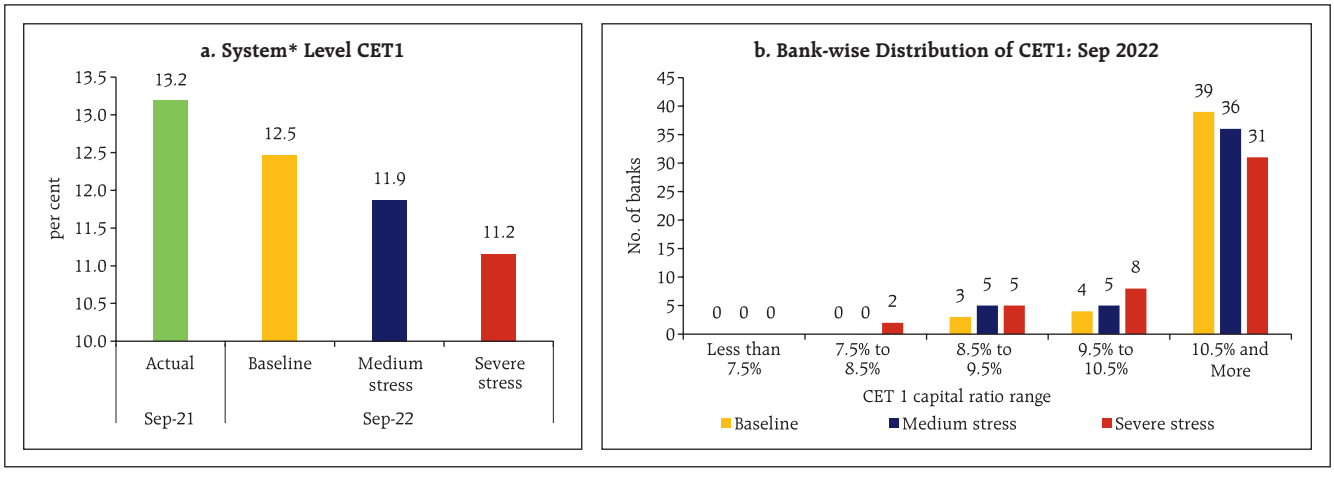
* For a system of 46 select banks.
Note: The capital projection is made under a conservative assumption of minimum profit transfer to capital reserves at 25 per cent for profit making SCBs. It does not take into account any capital infusion by stakeholders.
Source: RBI supervisory returns and staff calculations.

prescribed minimum capital level of 9 per cent as of September 2022 even in the worst case scenario (Chart 2.10 b).

2.16 The common equity Tier I (CET 1) capital ratio of SCBs may reach 12.5 per cent by September 2022 under the baseline scenario and decline to 11.9 per cent and 11.2 per cent under the medium and severe stress scenario, respectively (Chart 2.11 a). Even under adverse scenarios, no bank would face a decline of the CET 1 capital ratio below the regulatory minimum of 5.5 per cent (Chart 2.11 b).

2.17 While macro stress tests represent one method of assessing the resilience of the banking system against macroeconomic shocks, stock market indicators are also used to measure systemic risk in the banking sector. By this method, it is found that the systemic risk in the banking sector receded in

Chart 2.11: Projection of CET 1 Capital Ratio



* For a system of 46 select banks.
Note: The capital projection is made under a conservative assumption of minimum profit transfer to capital reserves at 25 per cent for profit making SCBs. It does not take into account any capital infusion by stakeholders.
Source: RBI supervisory returns and staff calculations.

2021 from its elevated level during the first wave of the pandemic. Also, systemic risk posed by PSBs was higher than PVBs and the risk generated by the category of merged PSBs is comparatively higher than the unmerged PSBs (Box 2.1).

Box 2.1: Systemic Risk in the Banking Sector

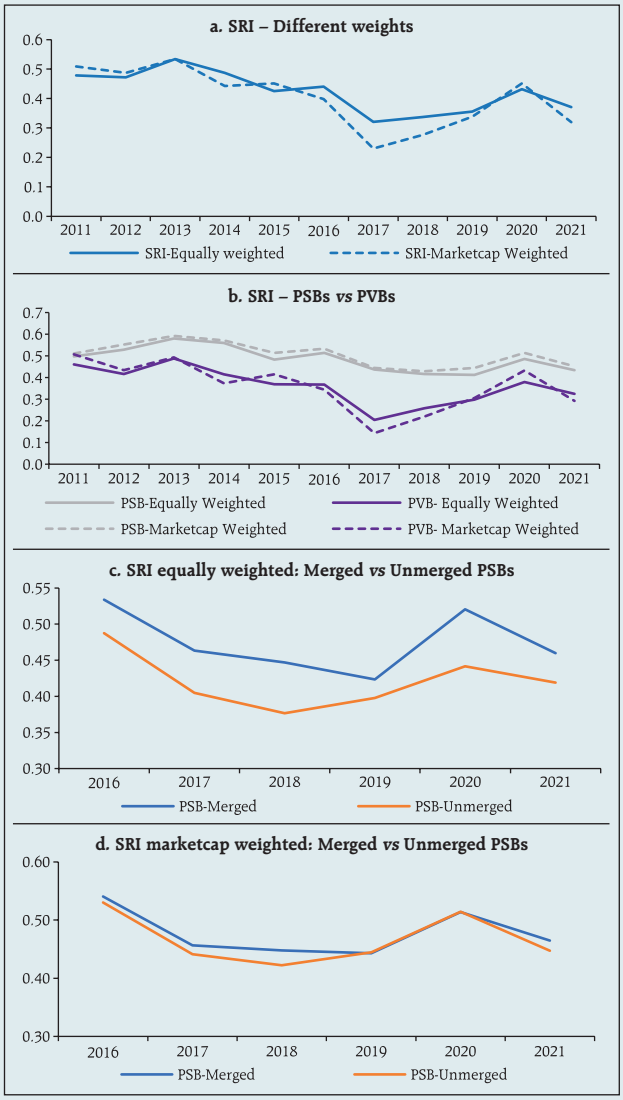
Assessment of systemic risk of the banking sector is an integral part of financial stability assessment and policy design. In this context, bank stock prices provide crucial forward-looking information on systemic risk.

Bank stock return correlation can be used as a simple indicator of systemic risk where high values indicate a necessary condition for systemic failures (Patro *et al.*, 2013). Conversely, when the stock return correlation is low, a triggering event is unlikely to cause systemic failure. Stock return correlations have the additional advantage of being simple, robust and not subject to model errors or data limitations.

Taking daily returns of 32 major bank stocks (covering 90 per cent of the banking sector assets), correlation (r_{ij}) of the daily stock returns for each bank pair (i,j) has been computed for each calendar year[9] from 2011 onwards. The systemic risk of the i^{th} bank for a year is the average of its stock return correlation with the rest of the 31 banks for that year. The aggregate systemic risk indicator (SRI) is arrived at by averaging bank-wise SRIs. While equally weighted SRI is computed as a simple average of bank-wise systemic risk, the SRI is also computed as a weighted average with weights based on market capitalisation at the beginning of each period.

The movements of the SRI indicates that systemic risk in the banking sector receded in 2021 from its elevated level during the first wave of the pandemic (Chart 1 a). Systemic risk posed by PSBs was higher than that of PVBs (Chart 1 b). A further deep dive reveals that the systemic risk generated by the category of merged PSBs[10] is comparatively higher than unmerged PSBs and the gap between the market cap weighted SRI of both these groups has remained low (Charts 1 c and d).

Chart 1: Systemic Risk Indicator (SRI)



Reference:

Patro, D. K., Qi, M., & Sun, X. (2013). A simple indicator of systemic risk. *Journal of Financial Stability*, *9*(1), 105-116.

[9] Data till end-October 2021 is used for the year 2021.

[10] PSB-Merged consists of PSBs merged w.e.f. April 1, 2020.

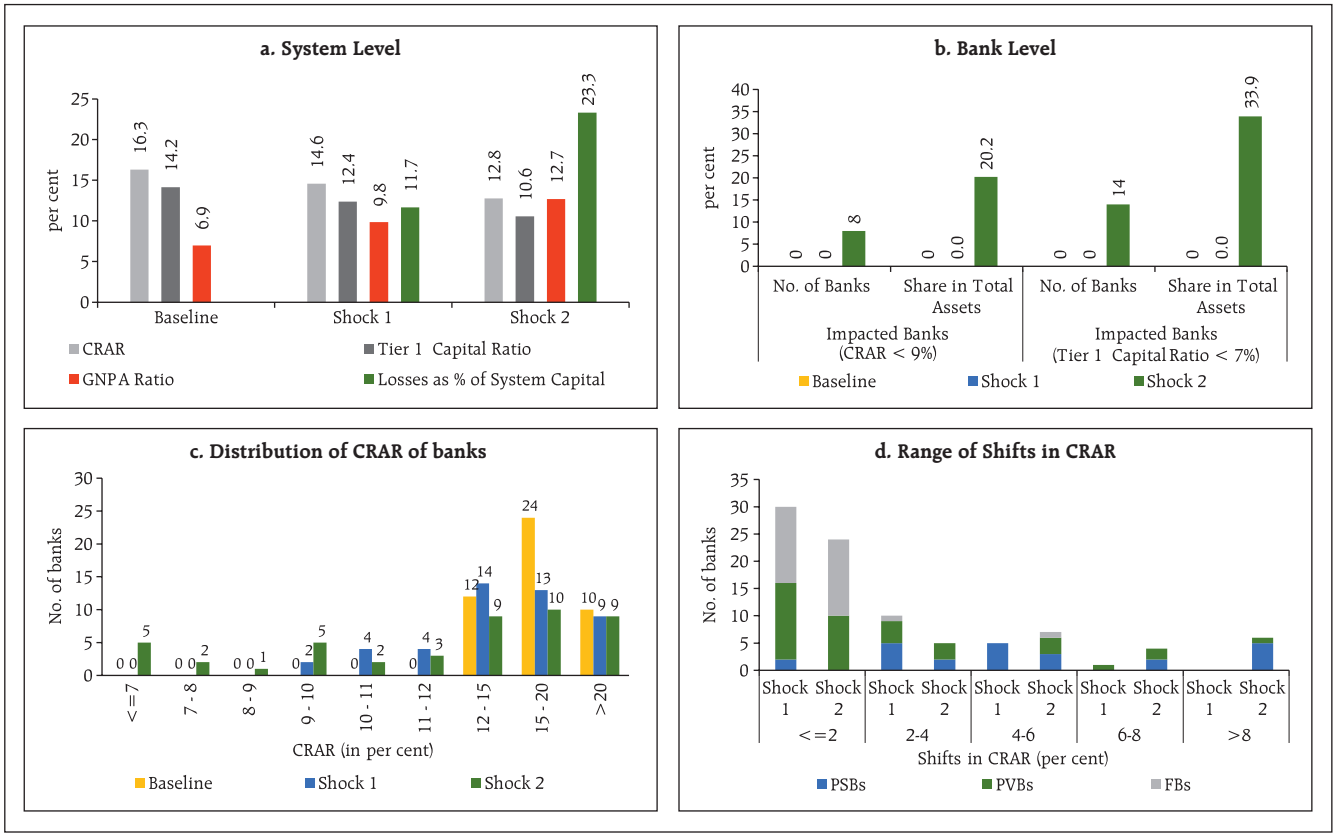
II.1.7 Sensitivity Analysis[11]

2.18 SCBs have been subjected to top-down[12] sensitivity analysis involving several single-factor shocks[13] to simulate credit, interest rate, equity price and liquidity risks under various stress scenarios[14], based on their realised position for September 2021.

a. Credit Risk

2.19 Two scenarios have been used to assess credit risk sensitivity, *viz.*, rise in the system-level GNPA by one SD[15] and two SD from its current level in a quarter. In the case of a severe shock (two SD), the GNPA ratio of 46 select SCBs moves up from 6.9 per cent to 12.7 per cent, system-level CRAR declines from 16.3 per cent to 12.8 per cent and the system-level capital impairment stands at 23.3 per cent (Chart 2.12 a). Further, eight banks with a share of 20.2 per cent in SCBs' total assets may fail to maintain the regulatory minimum level of CRAR under the same scenario (Chart 2.12 b). The CRAR would fall below 7 per cent in case of 5 banks (Chart 2.12 c) while 6 banks would record a decline of over

Chart 2.12: Credit Risk - Shocks and Outcomes



Note: For a system of select 46 SCBs
Shock 1: 1 SD shock on GNPA ratio
Shock 2: 2 SD shock on GNPA ratio
Source: RBI supervisory returns and staff calculations.

[11] Under macro stress tests, the shocks are in terms of adverse macroeconomic conditions, while in sensitivity analyses, shocks are applied to single factors like GNPAs, interest rate, equity prices, deposits, and the like, one at a time. Also, macro stress tests for GNPA ratios are applied at the system- and major bank-group levels, whereas the sensitivity analyses are conducted at system and individual bank levels.

[12] Top down stress tests are based on specific scenarios and on aggregate bank-wise data.

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

[14] Single factor sensitivity analysis stress tests are conducted for a sample of 46 SCBs accounting for 98 per cent of the total assets of the banking sector. The shocks designed under various hypothetical scenarios are extreme but plausible.

[15] The SD of the GNPA ratio is estimated by using quarterly data since March 2011. One SD shock approximates a 41 per cent increase in the level of GNPAs.

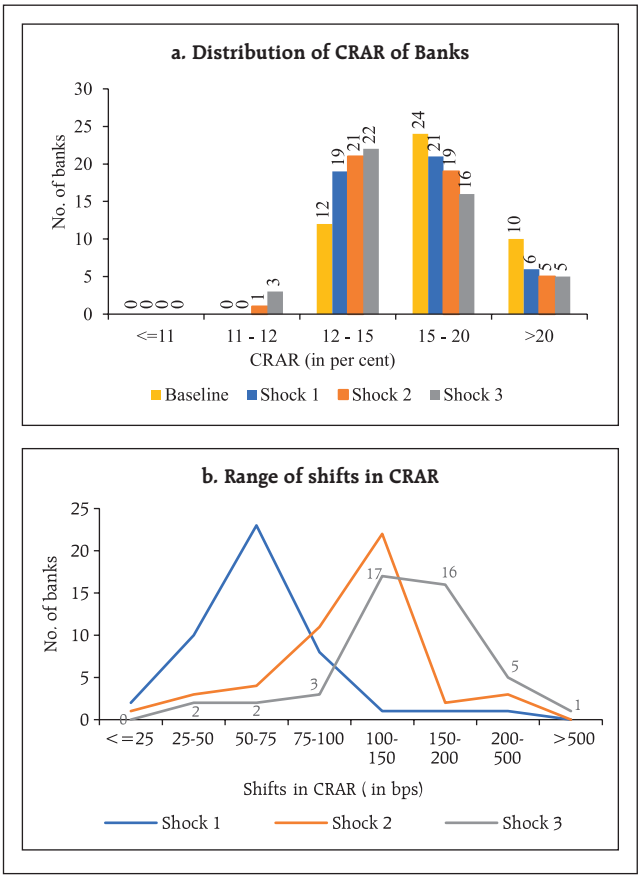
eight percentage points in the CRAR (Chart 2.12 d). PVBs and FBs, in general, would face lower erosion in CRAR than PSBs under both scenarios. A reverse stress test shows that a shock of 4.8 SD is required to bring down the system-level CRAR to 9 per cent.

b. Credit Concentration Risk

2.20 Stress tests on banks' credit concentration – considering top individual borrowers according to their standard exposures – showed that in the extreme scenario of the top three individual borrowers of the respective banks failing to repay[16], no bank will face a situation of a fall in CRAR below the regulatory requirement of 9 per cent (Chart 2.13 a) although 6 banks would experience a decline of more than two percentage points in their CRARs (Chart 2.13 b).

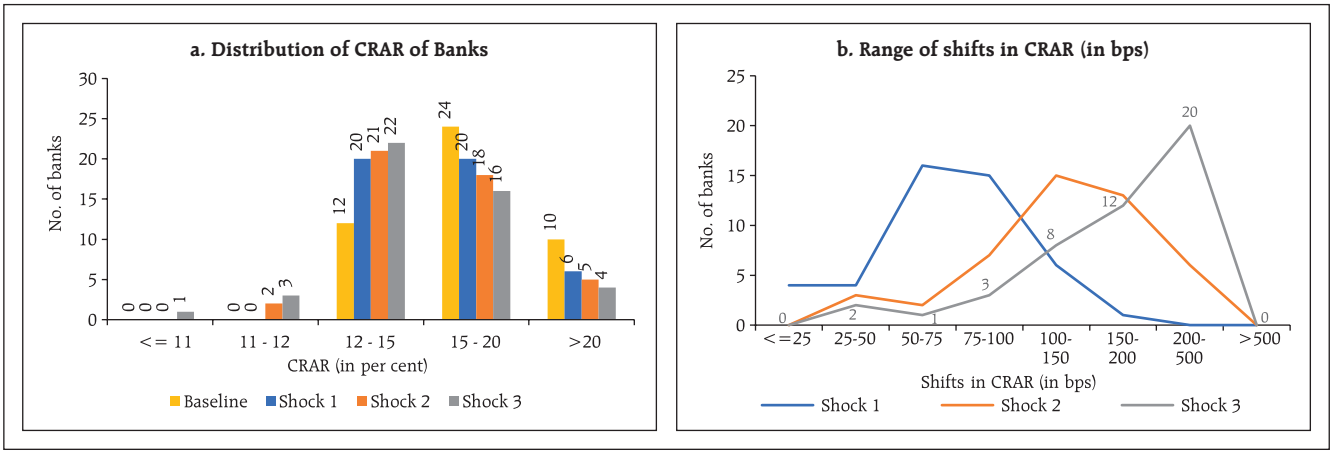
2.21 In the extreme scenario of the top three group borrowers in the standard category failing to repay[17], one bank's CRAR could fall below 11 per cent (Chart 2.14 a) and 20 banks would experience a decline in CRAR of more than two percentage points (Chart 2.14 b).

Chart 2.13: Credit Concentration Risk: Individual Borrowers – Exposure



Note: For a system of select 46 SCBs
Shock 1: Topmost individual borrower fails to meet payment commitments
Shock 2: Top 2 individual borrowers fail to meet their payment commitments
Shock 3: Top 3 individual borrowers fail to meet their payment commitments
Source: RBI supervisory returns and staff calculations.

Chart 2.14:Credit Concentration Risk: Group Borrowers – Exposure

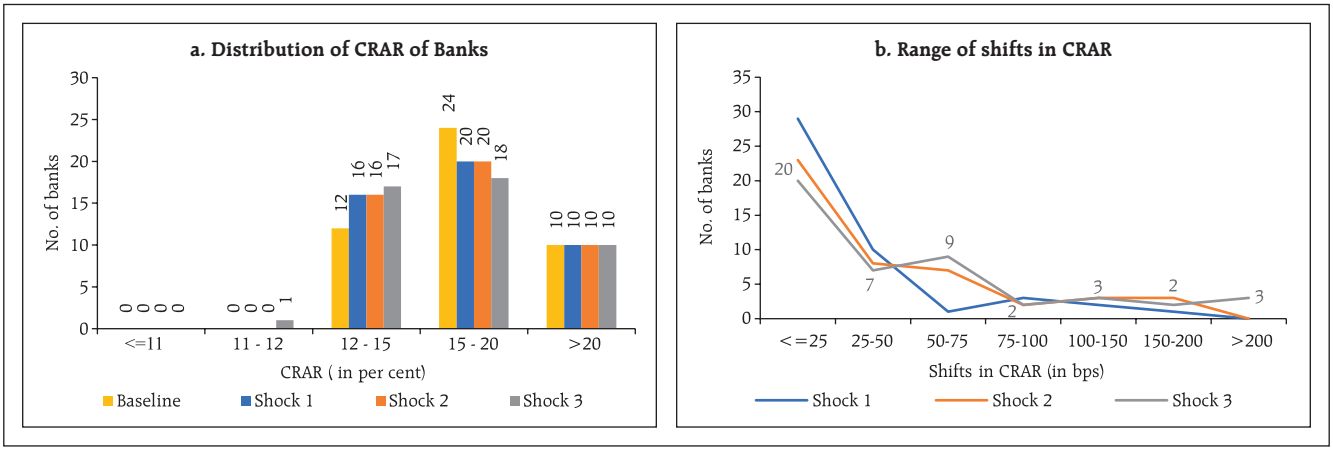


Note: For a system of select 46 SCBs
Shock 1: The top 1 group borrower fails to meet payment commitments
Shock 2: The top 2 group borrowers fail to meet payment commitments
Shock 3: The top 3 group borrowers fail to meet payment commitments
Source: RBI supervisory returns and staff calculations.

[16] In the case of default, the borrower in the standard category is considered to move to the sub-standard category.

[17] In the case of default, the group borrower in the standard category is considered to move to the sub-standard category.

Chart 2.15: Credit Concentration Risk: Individual Borrowers – Stressed Advances



Note: For a system of select 46 SCBs
Shock 1: Topmost stressed individual borrower fails to meet its payment commitments
Shock 2: Top 2 stressed individual borrowers fail to meet their payment commitments
Shock 3: Top 3 stressed individual borrowers fail to meet their payment commitments
Source: RBI supervisory returns and staff calculations.

2.22 In a scenario of the top three individual stressed borrowers of respective banks failing to repay[18], a majority of banks would experience a reduction of 25 bps or less in their CRARs (Chart 2.15 a and b).

c. Sectoral Credit Risk

2.23 Shocks applied to industry sub-sector wise GNPA ratios indicate varying magnitudes of increases in banks' GNPAs and capital. A two SD shock to the energy and basic metals and metal products segments would reduce the system-level CRAR by 17 bps and 13 bps, respectively (Table 2.1).

d. Interest Rate Risk

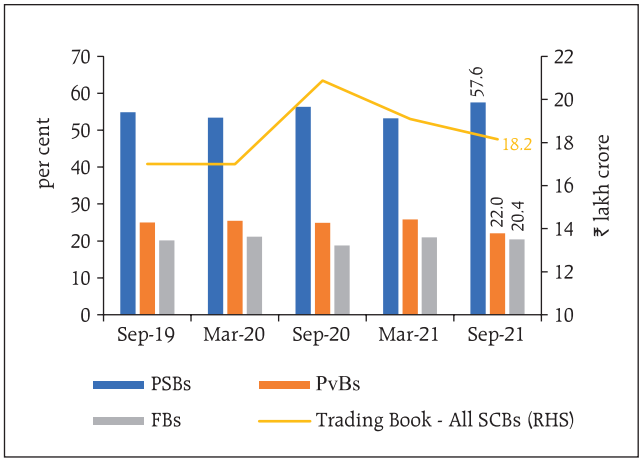
2.24 The market value of investments subject to fair value for the current sample of SCBs stood at ₹18.2 lakh crore in September 2021, dipping in two consecutive half-years (Chart 2.16). About 93 per cent of these investments were classified as available for sale (AFS) and the remaining as held for trading (HFT).

Table 2.1: Decline in System Level CRAR
(basis points, in descending order for top 10 most sensitive sectors)

Sector	1 SD	2 SD
Infrastructure - Energy (100%)	8	17
Basic Metal and Metal Products (164%)	7	13
Infrastructure - Transport (36%)	3	6
All Engineering (44%)	2	4
Textiles (35%)	2	4
Construction (29%)	2	3
Food Processing (24%)	1	3
Vehicles, Vehicle Parts and Transport Equipments (139%)	1	2
Infrastructure - Communication (48%)	1	2
Petroleum (non-infra), Coal Products (non-mining) and Nuclear Fuels (112%)	1	1

Note: For a system of select 46 banks.
Numbers in parentheses represent the growth in GNPAs of that sub-sector due to 1 SD shock to the sub-sector's GNPA ratio.
Source: RBI supervisory returns and staff calculations.

Chart 2.16: Trading Book Portfolio: Bank-group wise



Source: Individual bank submissions and RBI staff calculations.

[18] In case of failure, the borrower in sub-standard or restructured category is considered to move to the loss category.

2.25 The sensitivity (PV01[19]) of the AFS portfolio decreased *vis-à-vis* the June 2021 position at an aggregate level. PVBs and PSBs contributed to this by registering a decline of 10.6 per cent and 8.4 per cent, respectively, reflecting their increasing reliance on passive interest rate risk management. Although FBs saw a 5.8 per cent increase in their PV01 values in the same period, some positioning in the greater than 10-year segment by FBs involved bonds held as cover for hedging derivatives, which may not be active contributors to PV01 risk. In terms of PV01 curve positioning, the tenor-wise distribution for PSBs indicated a flattening bias in the 5-10 year bucket and greater than 10-year bucket relative to the less than 1 year and 1-5 year buckets. PVBs have built upon their views in the 1-5 year maturity bucket, while shrinking their exposure in the less than one year bucket by half on a sequential basis (Table 2.2).

2.26 As of end-September 2021, the yield curve softened to pre-second wave levels after the substantial spike observed in June 2021. Yield in buckets up to 20 years generally fell below March 2021 levels on the back of lower than anticipated government borrowing and inflation edging down towards the target. While there was a spike in the 8-10 year bucket, this may be ascribed to the change in benchmark security for yield curve computation (Chart 2.17).

2.27 Trading profits reduced in absolute as well as percentage terms across all bank groups during Q2:2021-22 (both q-o-q and y-o-y basis), driven by yield curve movements. Trading profits remained flat for PSBs, with quarterly spikes in intervening periods. In case of PVBs, trading profit halved and FBs remained in the red for the third consecutive quarter. The contribution of trading profits as a proportion of net other operating income (OOI) remained significant for PSBs while declining to low single digits for PVBs as their other income rebounded to pre-pandemic levels (Table 2.3).

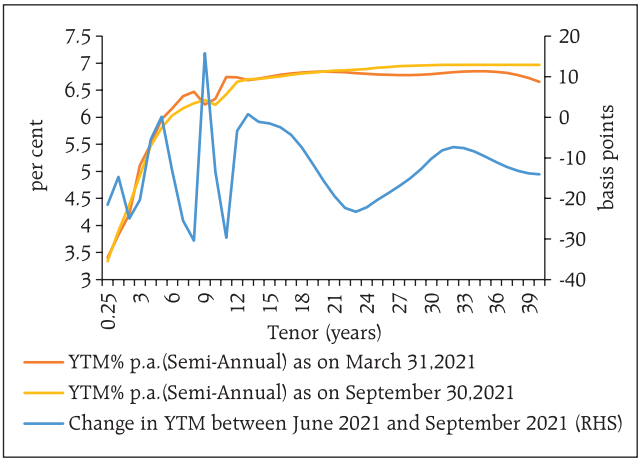
Table 2.2: Tenor-wise PV01 Distribution of AFS Portfolio

(in per cent)

Sector	Total (in ₹ crore)	< 1 year	1 -5 year	5 -10 year	> 10 years
PSBs	204.2 (222.9)	8.9 (9.9)	41.6 (43.1)	38.6 (36.9)	10.9 (10.1)
PVBs	44.6 (49.9)	15.2 (35.7)	58.3 (49.3)	13.7 (11.7)	12.8 (3.4)
FBs	121.4 (114.8)	4.0 (4.7)	25.8 (27.1)	9.7 (10.6)	60.5 (57.5)

Note: Values in the brackets indicate June 2021 figures.
Source: Individual bank submissions and RBI staff calculations.

Chart 2.17: Yield Curves and Shift in Yields across Tenors since March 2021



Source: Fixed Income Money Markets and Derivatives Association of India (FIMMDA).

Table 2.3: OOI - Profit/(loss) on Securities Trading

(in ₹ crore)

	Sep-20	Dec-20	Mar-21	Jun-21	Sep-21
PSBs	6,847	9,055	5,104	9,024	6,273
	(14.9%)	(18.0%)	(9.1%)	(17.7%)	(15.2%)
PVBs	4,523	4,825	2,499	3,669	1,996
	(10.3%)	(10.3%)	(5.4%)	(7.7%)	(4.4%)
FBs	622	12	-223	-417	-204
	(5.8%)	(0.2%)	(-1.9%)	(-4.3%)	(-2.6%)

Note: Figures in parentheses represent OOI-Profit/(Loss) as a percentage of Net Operating Income.
Source: RBI supervisory returns.

[19] PV01 is a measure of sensitivity of the absolute value of the portfolio to a one basis point change in the interest rate.

Table 2.4: Tenor-wise PV01 Distribution of HFT portfolio

(in per cent)

	Total (in ₹ crore)	< 1 year	1 -5 year	5 -10 year	> 10 years
PSBs	0.3 (0.4)	4.1 (2.9)	-35.0 (33.9)	166.0 (-21.1)	-35.1 (84.3)
PVBs	12.3 (9.6)	1.7 (3.8)	61.5 (76.4)	29.4 (5.1)	7.4 (14.7)
FBs	10.6 (17.8)	-1.9 (1.4)	30.0 (63.1)	45.9 (25.4)	26.0 (10.1)

Note: Values in the brackets indicate June 2021 figures.
Source: Individual bank submissions and RBI staff calculations.

2.28 Deposit flows to SCBs have significantly outpaced credit growth in the recent period. However, the active interest rate risk across SCBs has come down, although for PSBs the size of the portfolio held in the active interest rate book has increased. The interest rate exposure of PVBs and FBs in their HFT portfolios continued to be higher than that of PSBs. The tenor-wise PV01 distribution for all SCBs showed a pronounced shift towards the 5-10 year bucket (Table 2.4). Nevertheless, banks diverged in their interest rate outlook in the short term, with PSBs envisaging yield increases in the 1-5 year and more than 10-year buckets, and PVBs maintaining long positions in all the buckets. PV01 of PSBs was concentrated in the 5-10-year segment, although their total PV01 sensitivity remained small whereas PVBs and FBs focussed on the 1-5 year and 5-10 year buckets, respectively.

2.29 Any hardening of interest rates would depress investment income under the AFS and HFT categories (direct impact). It is assessed that a parallel upward shift of 2.5 percentage points in the yield curve would lower the system level CRAR by 77 bps and system level capital would decline by 5.6 per cent (Table 2.5).

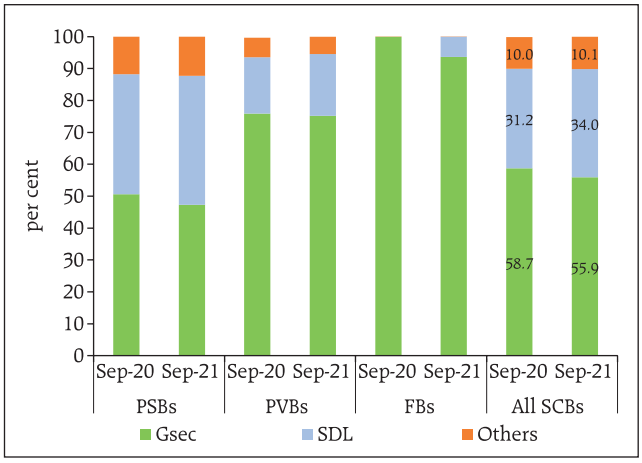
2.30 PSBs and PVBs augmented their HTM allocation through SDLs and their share of HTM portfolios increased on a y-o-y basis (Chart 2.18). The unrealised gains of PSBs were disproportionately concentrated in SDLs while those of PVBs were mostly in G-Secs, in line with their holdings (Chart 2.19).

Table 2.5: Interest Rate Risk – Bank-groups - Shocks and Impacts
(under shock of 250 basis points parallel upward shift of the INR yield curve)

	Public Sector Banks		Private Sector Banks		Foreign Banks		All SCBs	
	AFS	HFT	AFS	HFT	AFS	HFT	AFS	HFT
Modified Duration	2.0	2.6	1.4	1.8	3.6	3.1	2.2	2.2
Reduction in CRAR (bps)	78		28		277		77	

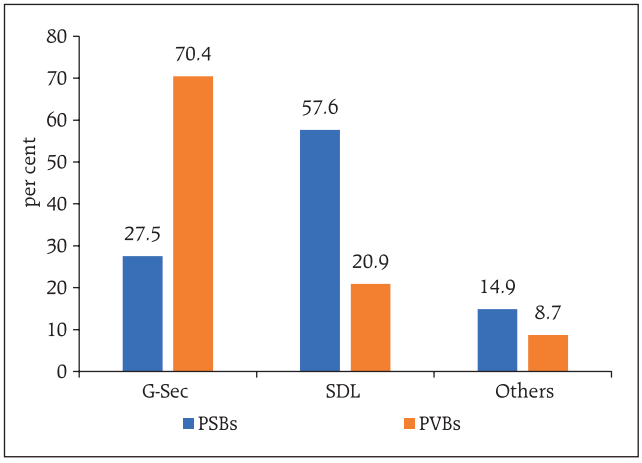
Source: Individual bank submissions and RBI staff calculations.

Chart 2.18: HTM Portfolio – Composition



Note: Increase in share of SDL in FBs' HTM portfolio is consequent to amalgamation of Lakshmi Vilas Bank Ltd. with DBS Bank India Ltd in November 2020.
Source: Individual bank submissions and RBI staff calculations.

Chart 2.19: HTM Portfolio – Unrealised Gains as on September 30, 2021



Source: Individual bank submissions and RBI staff calculations

2.31 Taking advantage of the regulatory dispensation permitting banks to classify SLR securities acquired between September 2020 and March 2022 under the HTM category, banks enlarged their HTM portfolio upto 20 per cent in September 2021. PSBs' and PVBs' holdings of SLR securities in HTM amounted to 20.4 per cent and 19.4 per cent of their NDTL, respectively, in September 2021, while it stood at 1.2 per cent for FBs.

e. Equity Price Risk

2.32 For the overall system, the impact of a significant fall in equity prices on banks' CRAR is limited in view of banks' low proportion of capital market exposures due to regulatory limits. In the extreme event of a 55 per cent drop in equity prices, the system level CRAR would decline by 49 bps but no bank's CRAR would fall below 9 per cent (Chart 2.20).

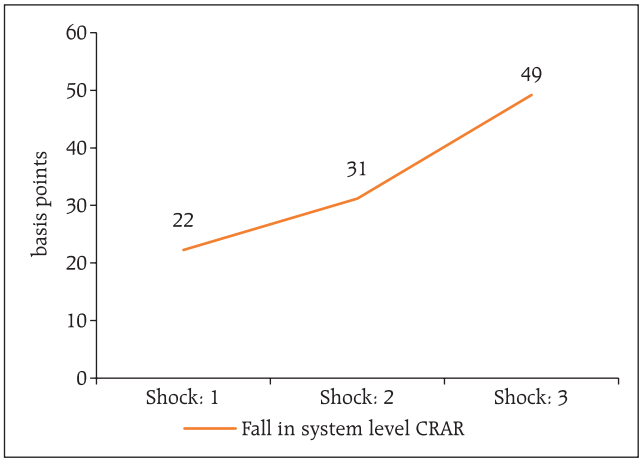
f. Liquidity Risk

2.33 Under the assumed scenarios of withdrawal of around 15 per cent of un-insured deposits[20] and a simultaneous usage of 75 per cent of the unutilised portions of sanctioned working capital limits, all banks in the sample will remain resilient, using their HQLAs[21] for meeting day-to-day liquidity requirements (Chart 2.21).

II.1.8 Bottom-up Stress Tests: Derivatives Portfolio

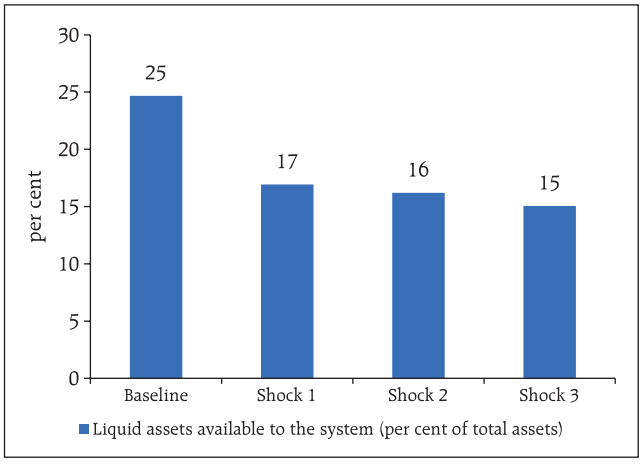
2.34 Select banks[22] have been subjected to a series of bottom-up stress tests (sensitivity analyses) on their derivative portfolios with the reference date as September 30, 2021 and involving four separate shocks on interest and foreign exchange rates carried out on a stand-alone basis. The shocks on interest

Chart 2.20: Equity Price Risk



Note: For a system of select 46 SCBs.
Shock 1: Equity prices drop by 25 per cent
Shock 2: Equity prices drop by 35 per cent
Shock 3: Equity prices drop by 55 per cent
Source: RBI supervisory returns and staff calculations.

Chart 2.21: Liquidity Risk – Shocks and Outcomes



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

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

Shock	Shock 1	Shock 2	Shock 3
Per cent withdrawal of un-insured deposits	10	12	15

Source: RBI supervisory returns and staff calculations.

[20] Un-insured deposits are estimated to be about 49 per cent of total deposits, based on ₹5 lakh deposit insurance limit (Source: DICGC Annual Report, 2020-21).

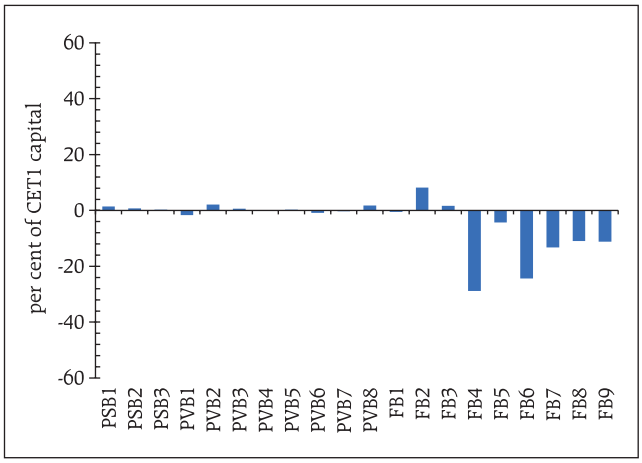
[21] HQLAs were computed as cash reserves in excess of required CRR, excess SLR investments, SLR investments at 3 per cent of NDTL (under MSF) (following the Circular DOR.BC.36/12.01.001/2020-21 dated February 5, 2021) and additional SLR investments at 15 per cent of NDTL (following the Circular DOR.BP.BC.No.65/21.04.098/2019-20 dated April 17, 2020).

[22] Stress tests on derivatives portfolios were conducted for a sample of 20 banks, constituting the major active authorised dealers and interest rate swap counterparties. Details of test scenarios are given in Annex 2.

rates ranged from 100 to 250 basis points on either side, while 20 per cent appreciation/depreciation shocks were assumed for foreign exchange rates.

2.35 The results indicated the following: (a) while most FBs reported significantly negative net mark-to-market (MTM) positions as a proportion of CET1 capital, the MTM impact was, by and large, muted for PSBs and PVBs (Chart 2.22); (b) banks on an average would gain from an interest rate rise; (c) positioning in forex derivatives is such that they stand to benefit marginally from INR depreciation and *vice versa;* (d) potential MTM gains from both rise in interest rates and depreciation of INR is lower in September 2021 than in March 2021, particularly in the latter case and (e) the fall in interest rates would trigger higher net MTM losses at end-September 2021 compared to the previous period (Chart 2.23).

Chart 2.22: MTM of Total Derivatives Portfolio, Select Banks – September 2021

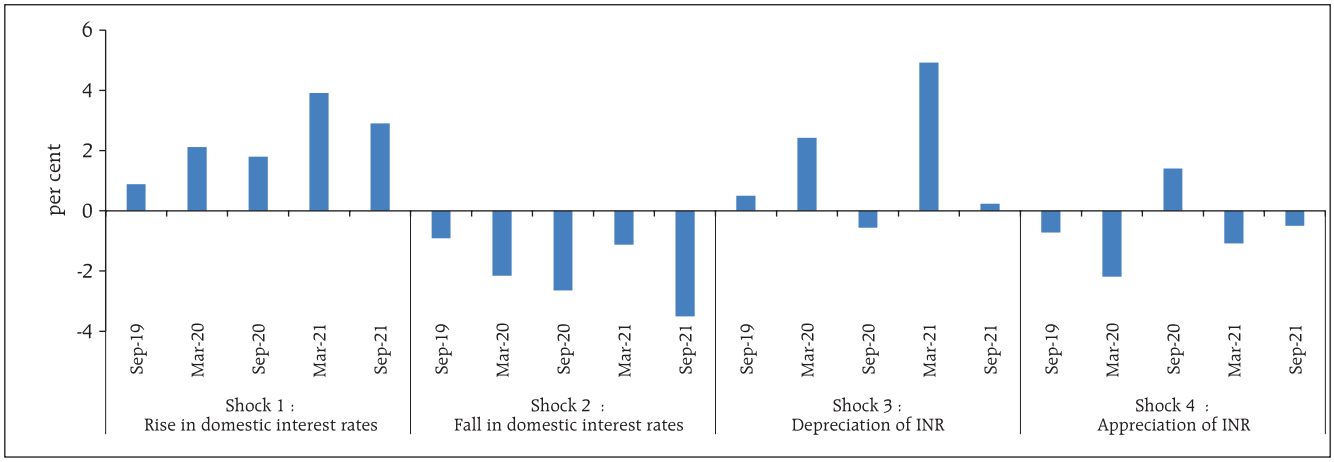


Note: PSB: Public sector bank, PVB: Private sector bank, FB: Foreign bank.
Source: Sample banks (Bottom-up stress tests on derivatives portfolio).

II.2 Primary (Urban) Cooperative Banks

2.36 Primary (urban) cooperative banks (UCBs)[23] witnessed marginal credit growth as at the end of September 2021, with non-scheduled UCBs (NSUCBs) being the principal contributors (Chart

Chart 2.23: Impact of Shocks on Derivatives Portfolio of Select Banks
(change in net MTM on application of a shock)



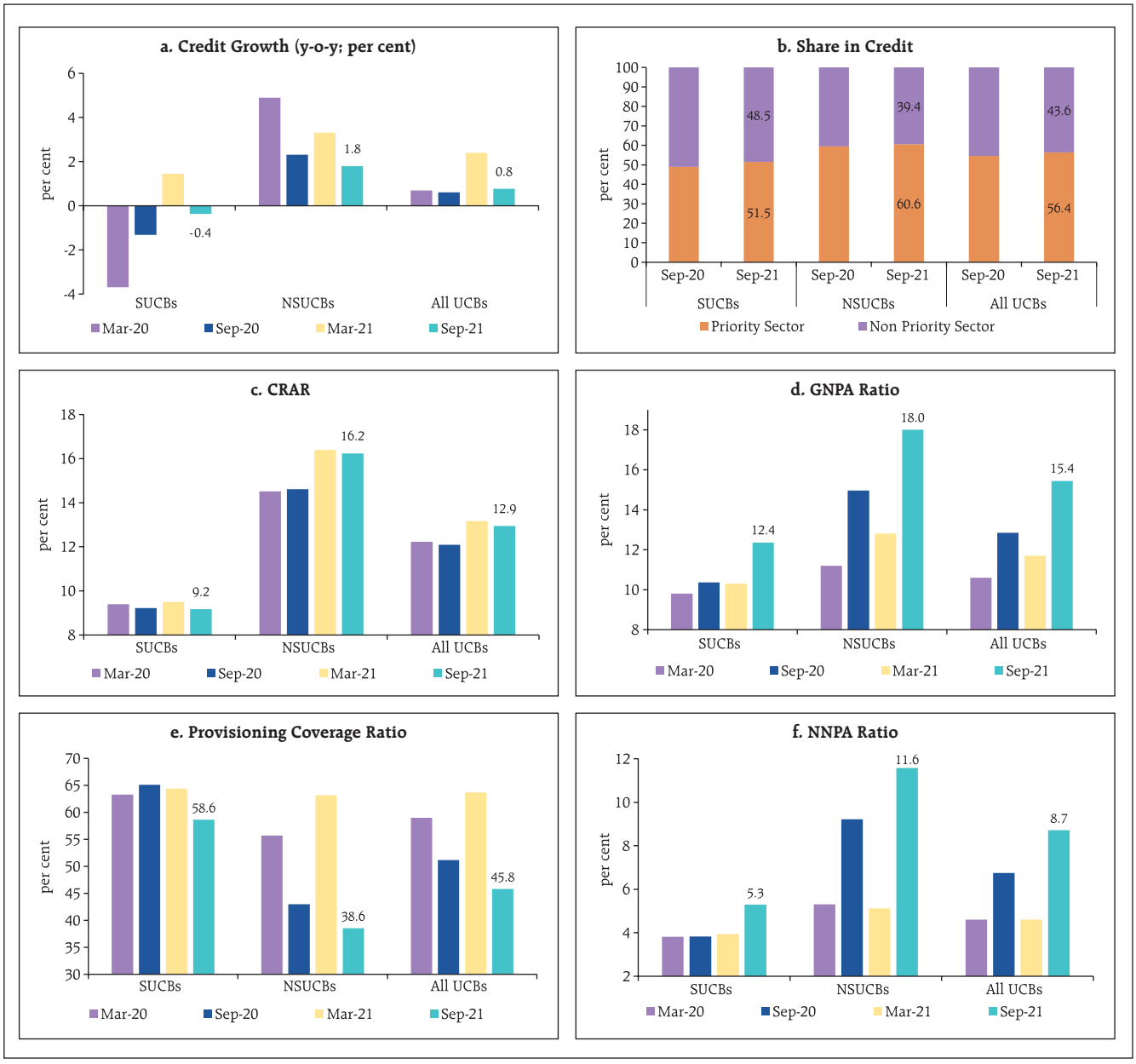
Note: Change in net MTM due to an applied shock is with respect to the baseline.
Source: Sample banks covered under bottom-up stress tests on derivative portfolio.

[23] Data are provisional and based on off-site surveillance (OSS) returns.

2.24 a). Priority sector lending accounted for more than half of UCBs' outstanding credit (Chart 2.24 b). The CRAR of UCBs deteriorated slightly from March 2021 to reach 12.9 per cent in September 2021 (Chart 2.24 c).

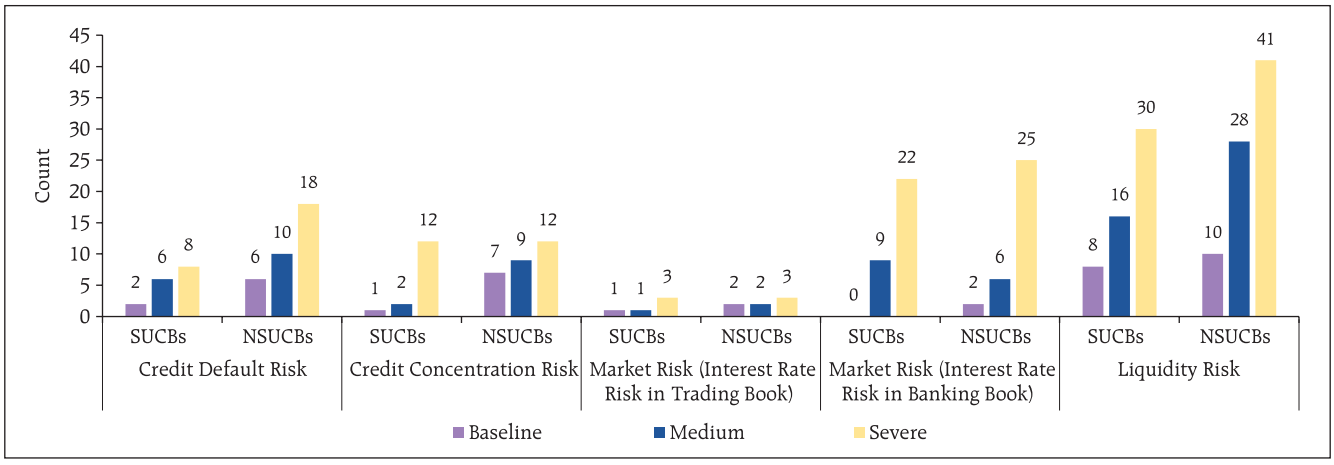
2.37 UCBs appear to have been particularly impacted by the second wave of COVID-19, with the GNPA ratios rising sharply for both SUCBs (12.4 per cent as at the end of September 2021) and NSUCBs (18.0 per cent) (Chart 2.24 d). Provisions dipped for both categories of UCBs, resulting in PCR for the sector falling to 45.8 per cent at the end of Q2:2021-22 and the NNPA ratio rising sharply to 8.7 per cent (Chart 2.24 e and f).

Chart 2.24: Credit Profile and Asset Quality Indicators of UCBs



Source: RBI supervisory returns and staff calculations.

Chart 2.25: Stress Test of UCBs



Source: RBI supervisory returns and staff calculations.

Stress Testing

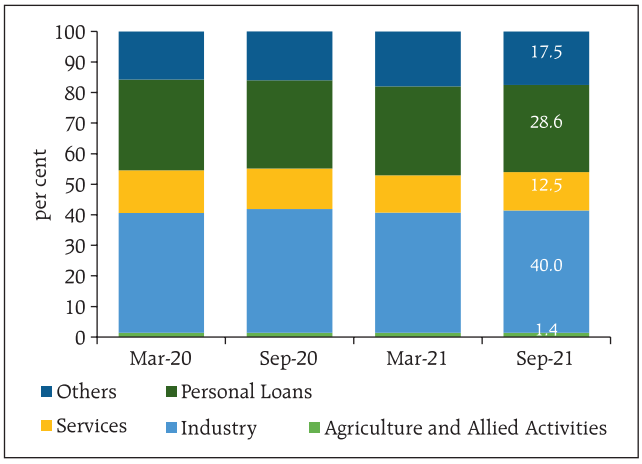
2.38 A select set of UCBs[24] have been subjected to stress tests covering credit risk (default risk and concentration risk), market risk (interest rate risk in trading book and banking book) and liquidity risk, based on their reported financial position as on March 31, 2021.

2.39 The results show that (a) in all the five parameters tested, a few banks fail even in the baseline scenario; (b) the largest number of UCBs are impacted in scenarios involving liquidity shocks; and (c) in general, the number of NSUCBs failing/ being impacted detrimentally in adverse scenarios is larger than that of SUCBs (Chart 2.25).

II.3 NBFCs [25]

2.40 Aggregate credit extended by NBFCs as at the end of September 2021 stood at ₹27.4 lakh crore. Loans to industry constituted the largest segment (40.0 per cent) of the credit portfolio, followed by personal loans (28.6 per cent), services (12.5 per cent) and agriculture (1.4 per cent) (Chart 2.26). Large industry and auto loans comprised the largest two

Chart 2.26: Sectoral Deployment of Credit



Source: RBI supervisory returns and staff calculations.

[24] The stress test is conducted with reference to the financial position as of March 2021 for select 118 UCBs (49 SUCBs, 69 NSUCBs) with asset size of more than ₹1,000 crore. The detailed methodology used for stress test is given in Annex 2.

[25] The analyses done in this section are based on deposit taking and non-deposit taking systemically important NBFCs' (excluding CICs) data available as of December 9,2021 which are provisional. Datasets of March 2020, September 2020, March 2021 and September 2021 consist of 411, 404, 409 and 421 entities, respectively.

sub-sectors of NBFCs' credit portfolio with shares of 32.4 per cent and 13.1 per cent, respectively. Government owned NBFCs had a dominant position in the NBFC space, accounting for 48.6 per cent of the aggregate credit extended and 81.0 per cent of the credit to the industries sector.

2.41 In terms of credit dispensation by category of NBFC, investment and credit companies and infrastructure finance companies predominated, with a share of 52.2 per cent and 44.0 per cent, respectively, in gross advances as on September 30, 2021 (Chart 2.27). Lending through NBFC-P2P accounts for a minuscule share of aggregate NBFC lending (₹2,093 crore as on September 30, 2021); however, there was significant traction in activity during the pandemic period, with threefold growth in both credit intermediated and number of lenders, owing to investors' search for higher yields in a low interest rate environment (Chart 2.28).

2.42 The CRAR of NBFCs stood at 26.3 per cent as at end-September 2021, a marginal increase of 10 bps as compared to March 2021. The return on assets (RoA) improved to 1.7 per cent in September 2021 from 1.3 per cent in March 2021 (Chart 2.29).

Chart 2.27: Share of Different NBFC Categories in Gross Advances

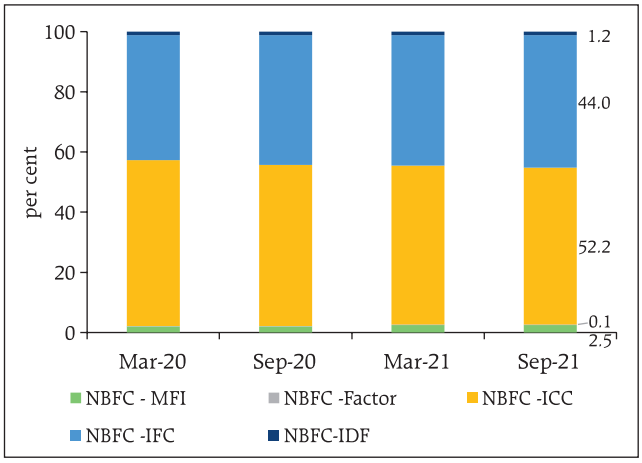
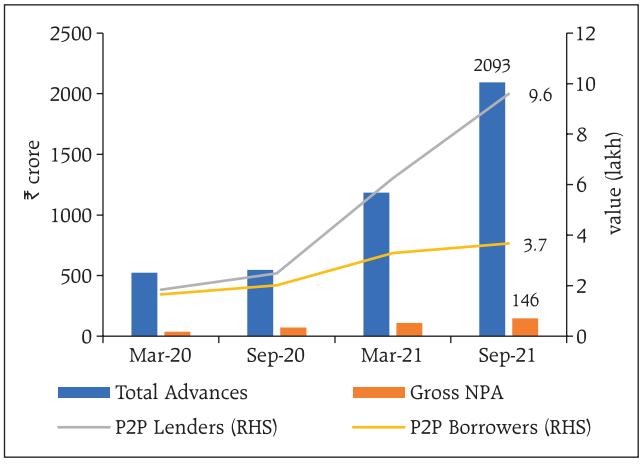
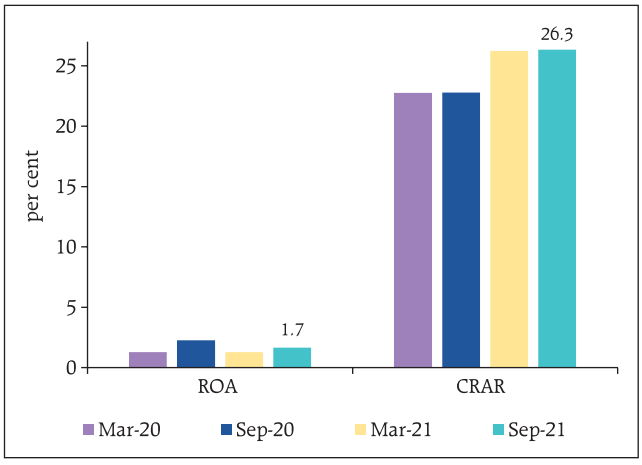


Chart 2.28: Profile of P2P NBFCs



Source: RBI supervisory returns and staff calculations.

Chart 2.29: Profitability and Capital Adequacy



Source: RBI supervisory returns and staff calculations.

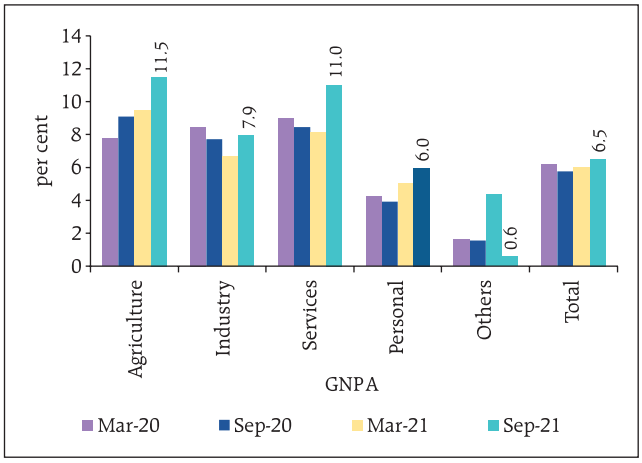
2.43 The GNPA ratio of NBFCs, which had declined in September 2020 reflecting the standstill on asset classification prevalent then, rose to reach 6.5 per cent as at the end of September 2021. GNPA in the industries sector, which forms the largest share of NBFC exposure, rose from 6.7 per cent in March 2021 to 7.9 per cent in September 2021 (Chart 2.30). Government owned NBFCs' share in the GNPAs of the sector stood at 31.6 per cent.

2.44 Borrowings constituted almost two-thirds of NBFCs' sources of funds (Chart 2.31). These were mainly in the form of debentures (41.0 per cent) and bank borrowings (31.2 per cent), with commercial paper (3.1 per cent) accounting for a minor share (Chart 2.32). Mutual funds were the single largest subscribers to the debentures issued by NBFCs, followed by insurance companies and banks.

Stress Test[26] - Credit Risk

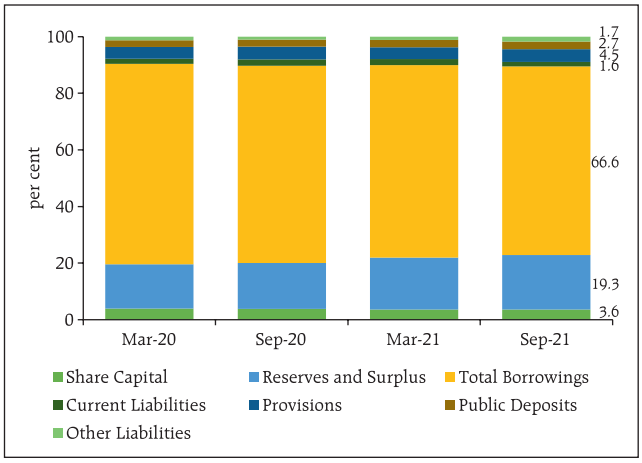
2.45 System level stress tests for assessing the resilience of the NBFC sector to credit risk shocks have been conducted for a sample of 191 NBFCs[27] under two scenarios – medium and high risk involving increase in GNPA ratio of the sector by 1 SD and 2 SD, respectively. As on March 2021 (baseline position), the GNPA ratio of the sample NBFCs stood at 6.5 per cent and CRAR at 26.6 per cent, with 10

Chart 2.30: Sectoral GNPA of NBFCs



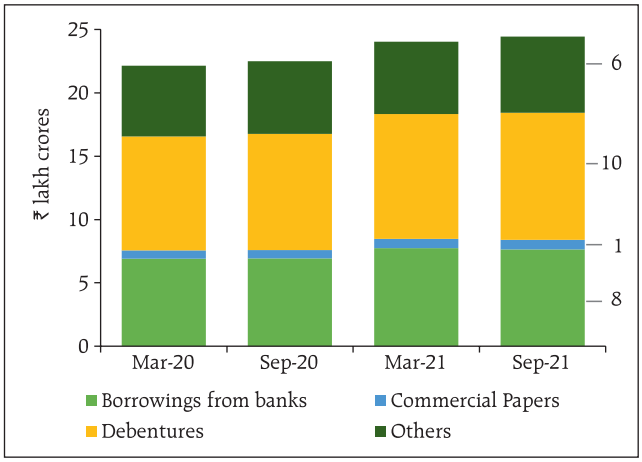
Source: RBI supervisory returns and staff calculations.

Chart 2.31: NBFCs' Sources of Funds



Source: RBI supervisory returns and staff calculations.

Chart 2.32: Borrowings by NBFCs



Source: RBI supervisory returns and staff calculations.

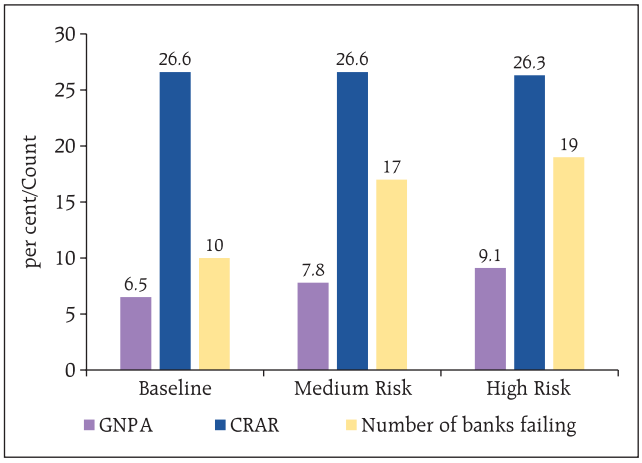
[26] The detailed methodology used for stress tests for NBFCs is given in Annex 2.

[27] The sample comprised of 10 deposit taking NBFCs and 181 non-deposit taking systemically important (NDSI) NBFCs of total asset size ₹33.98 lakh crore as on March 31, 2021, which forms around 86.1 per cent of total assets of the sector. One SD shock approximates a 20 per cent increase in the level of GNPAs.

NBFCs (accounting for 4.6 per cent of total assets of the sector as on March 31, 2021) reporting CRAR below the minimum regulatory requirement of 15 per cent (Chart 2.33).

2.46 In case of a high risk shock of 2 SD increase in the GNPA ratio, the CRAR of the sector would decline by 30 bps to 26.3 per cent, with no impact seen in the case of a 1 SD shock. The capital adequacy of the sector would remain above the minimum regulatory requirement of 15 per cent in both scenarios. However, on individual basis, under the impact of the shocks, the CRAR of 17 NBFCs – comprising 7.9 per cent of asset size of the sample – would fall below minimum regulatory requirements in the medium risk scenario, while 19 NBFCs – comprising 11.5 per cent of asset size of the sample – would be impacted similarly in the high risk scenario.

Chart 2.33: Credit Risk in NBFCs - System Level



Source: RBI supervisory returns and staff calculations.

Stress Test - Liquidity Risk

2.47 The resilience of the NBFC sector to liquidity shocks is assessed by capturing the impact of a combination of assumed increase in cash outflows and decrease in cash inflows[28]. Two scenarios are applied, *viz.*, medium risk involving a shock of 5 per cent contraction in inflows and 10 per cent rise in outflows, and high risk entailing a shock of 10 per cent decline in inflows and 15 per cent surge in outflows. The results indicate that the number of NBFCs which would face a negative cumulative mismatch in liquidity positions over the next one year in the medium and high risk scenarios may work out to 52 (covering 24.5 per cent of the asset size of the sample) and 67 (34.7 per cent), respectively (Table 2.6).

Table 2.6: Liquidity Risk in NBFCs

Cumulative Mismatch as a percentage of outflows over next one year	No. of NBFCs having liquidity mismatch		
	Baseline	Medium	High
Over 50 %	10 (5.9%)	10 (5.9%)	11 (6.1%)
Between 20% and 50%	1 (0.2%)	5 (2.8%)	22 (9.0%)
20% and below	7 (3.8%)	37 (15.8%)	34 (19.6%)

Note: Figures in parenthesis represent share in asset size of the sample.
Source: RBI supervisory returns and staff calculations.

[28] Stress testing based on liquidity risk was performed on a sample of 209 NBFCs – which includes 8 deposit taking NBFCs, 169 NDSI NBFCs and 32 core investment companies (CICs). Total asset size of the sample as on March 2021 was ₹21.5 lakh crore, comprising 54.6 per cent of the sector – government-owned NBFCs and companies presently under resolution are not included in the sample.

II.4 Interconnectedness

2.48 In a financial system network, the component financial institutions have bilateral links amongst themselves in the form of loans to, investments in, or deposits with each other. These linkages act as a source of funding, liquidity, investment and risk diversification, but they can also transform in adverse conditions into channels through which shocks can spread, leading to contagion and amplification of systemic shocks.

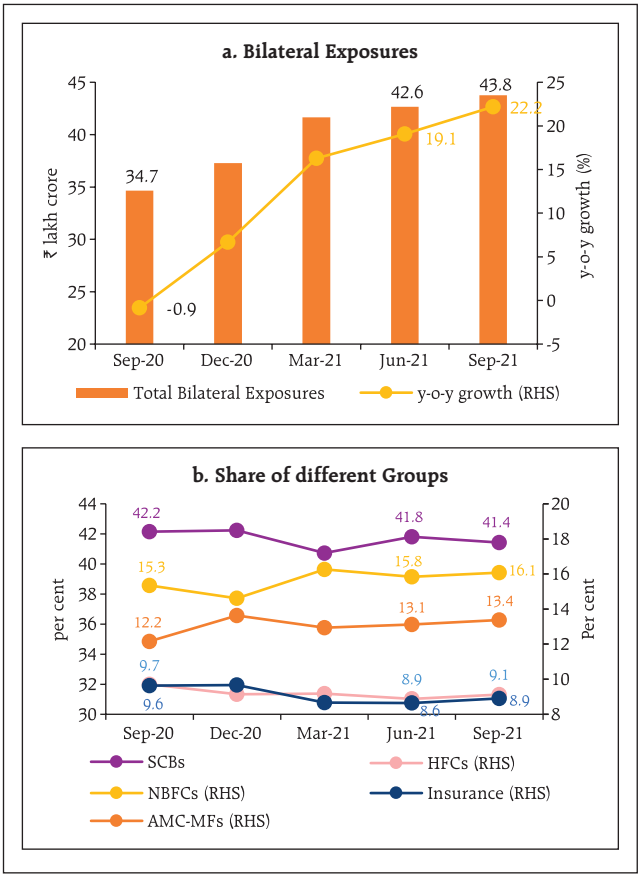
II.4.1 Financial System Network[29] [30]

2.49 The total outstanding bilateral exposures[31] among the entities in the financial system have been on an upswing since H1:2020-21 (Chart 2.34 a). This was primarily due to increased[32] exposures of SCBs to NBFCs and HFCs and of asset management companies - mutual funds (AMC-MFs) to the financial system.

2.50 SCBs had the largest share of bilateral exposures though it remained lower than pre-pandemic levels. The shares of NBFCs and HFCs slipped marginally from their March 2021 levels. Owing to the rally in the equity markets, the share of AMC-MFs in bilateral exposures continued to grow. (Chart 2.34 b).

2.51 In terms of inter-sectoral[33] exposures, AMC-MFs, followed by insurance companies, were the biggest fund providers in the system, whereas NBFCs were the biggest receiver of funds, followed

Chart 2.34: Bilateral Exposures between Entities in the Financial System



Source: Supervisory returns of various regulators and RBI staff calculations.

[29] 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.

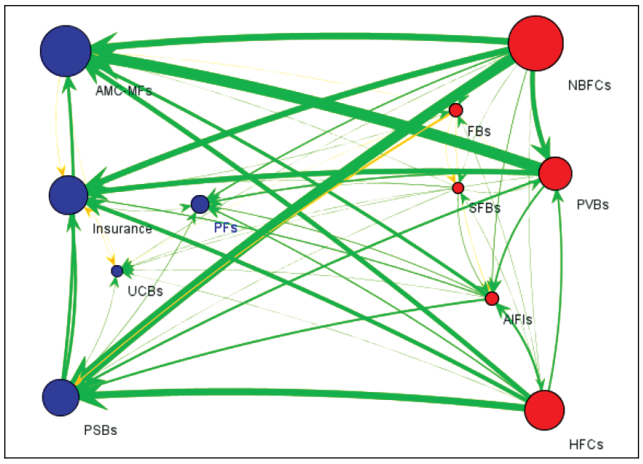
[30] Analysis presented here and in the subsequent part is based on data of 224 entities from the following *eight groups:* SCBs, scheduled UCBs (SUCBs), AMC-MFs, NBFCs, HFCs, insurance companies, pension funds and AIFIs. These 224 entities covered include 77 SCBs; 11 small finance banks (SFBs); 20 SUCBs; 25 AMC-MFs (which cover more than 98 per cent of the AUMs of the mutual fund sector); 40 NBFCs (both deposit taking and non-deposit taking systemically important companies, which represent about 70 per cent of total NBFC assets); 22 insurance companies (that cover more than 90 per cent of assets of the sector); 18 HFCs (which represent more than 95 per cent of total HFC asset); 7 Pension Funds(PFs) and 4 AIFIs (NABARD, EXIM, NHB and SIDBI).

[31] Includes exposures between entities of the same group. Exposures are outstanding position as on September 30, 2021 and are broadly divided into fund based and non-fund-based exposure. Fund based exposure includes money market instruments, deposits, loans and advances, long term debt instruments and equity investments. Non-fund-based exposure includes letter of credit, bank guarantee and derivate instruments (excluding settlement guaranteed by CCIL).

[32] Incorporation of 4 new entities in the financial network analysis also contributed to this increase.

[33] Inter-sectoral exposures do not include transactions among entities of the same sector in the financial system.

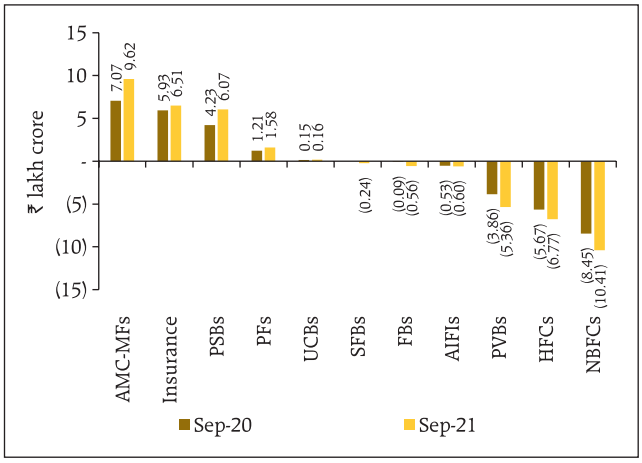
Chart 2.35: Network Plot of the Financial System - September 2021



Note: Receivables and payable do not include transactions among entities of the same group. Red circles are net payable institutions and the blue ones are net receivable institutions.

Source: Supervisory returns of various regulators and RBI staff calculations.

Chart 2.36: Net Receivables (+ve) / Payables (-ve) by Institutions



Source: Supervisory returns of various regulators and RBI staff calculations.

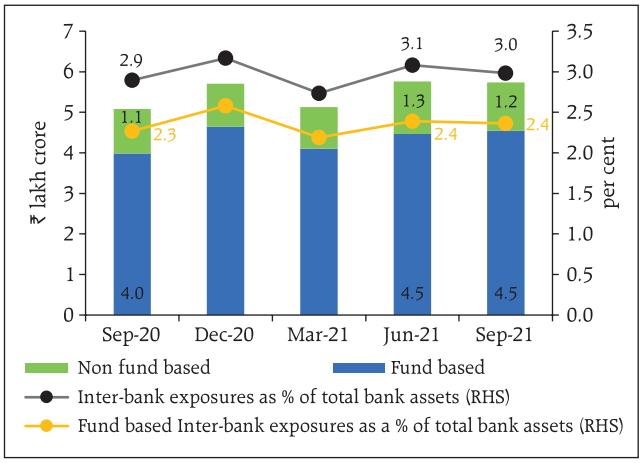
by HFCs. Among the major bank groups, PSBs had a net receivable position *vis-à-vis* the entire financial sector whereas PVBs had a net payable position (Chart 2.35).

2.52 In September 2021, the net receivables of PSBs and AMC-MFs from the financial system increased significantly as compared to the position a year ago. Among recipients of funds from the financial system, PVBs, NBFCs and HFCs recorded large increases[34] (Chart 2.36).

a. Inter-bank Market

2.53 Inter-bank exposures accounted for 3 per cent of the total assets of the banking system as of September 2021. The shares of both fund-based[35] and non-fund based (NFB)[36] inter-bank exposures in the total assets of the banking system diminished during 2020-21 as a fallout of bank mergers and abundant liquidity in the system. In 2021-22 so far, there was some uptick, with NFB exposure (primarily letters of credit and bank guarantees) back at pre-pandemic levels (Chart 2.37).

Chart 2.37: Inter-bank Market



Source: RBI supervisory returns and staff calculations.

[34] This is also due to inclusion of additional entities as compared to September 2020.

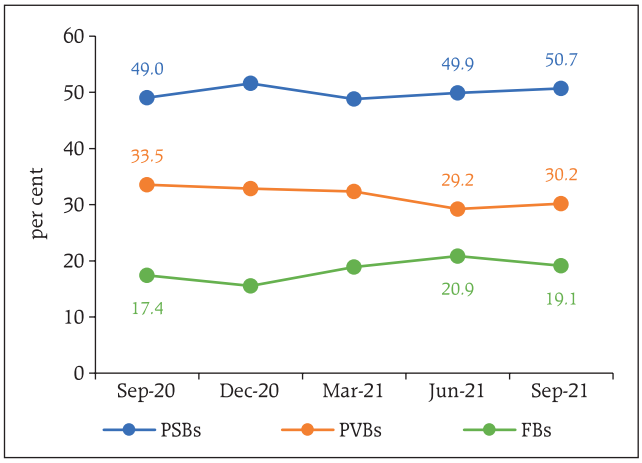
[35] Fund-based exposures include both short-term exposures and long-term exposures. Data on short-term exposures are collected across seven categories – repo (non-centrally cleared); call money; commercial paper; certificates of deposits; short-term loans; short-term deposits and other short-term exposures. Data on Long-term exposures are collected across five categories – Equity; Long-term Debt; Long-term loans; Long-term deposits and Other long-term liabilities.

[36] Non-Fund based exposure includes - outstanding bank guarantees, outstanding Letters of Credit, and positive mark-to-market positions in the derivatives market (except those exposures for which settlement is guaranteed by the CCIL).

2.54 PSBs continued to maintain their dominant position in the inter-bank market and their share increased sequentially. The share of PVBs declined over the March 2021 level, whereas that of FBs grew (Chart 2.38).

2.55 About 77 per cent of the fund-based inter-bank market was short-term (ST) in nature, in which ST deposits had the highest share, followed by ST loans and call money market exposure. Long-term (LT) loans predominated in LT fund-based inter-bank exposures (Chart 2.39).

Chart 2.38: Different Bank Groups in the Inter-Bank Market - September 2021

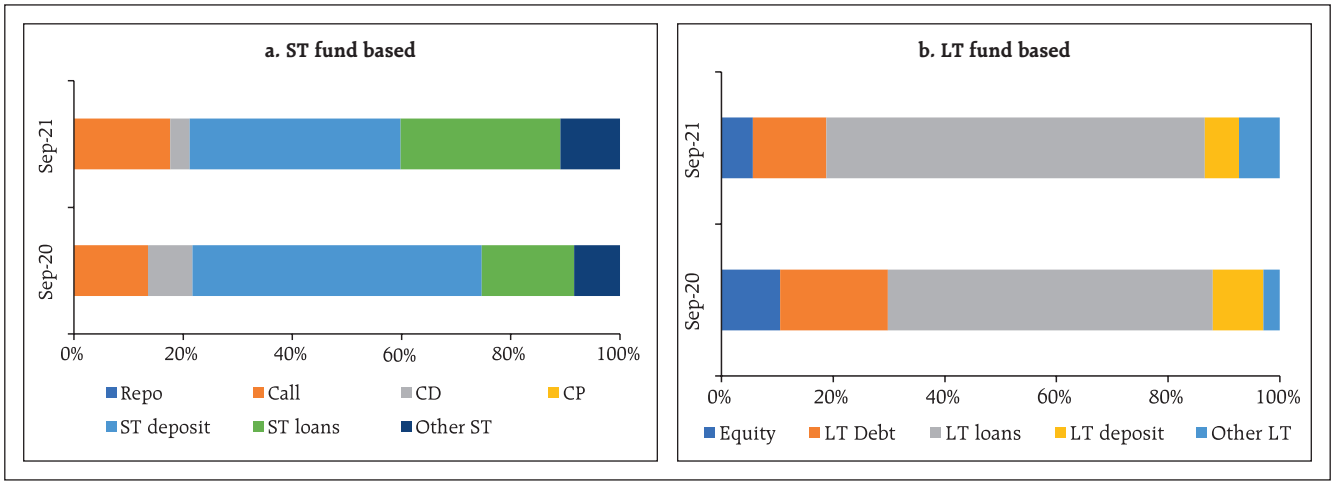


Source: RBI supervisory returns and staff calculations.

b. Inter-bank Market: Network Structure and Connectivity

2.56 The inter-bank market typically has a core-periphery network structure[37] [38]. As of end-September 2021, there were four banks in the inner-most core and six banks in the mid-core circle. The four banks in the inner-most core included large public and private sector banks. The banks in the mid-core were large PSBs and PVBs while most of the old private

Chart 2.39: Composition of Fund based Inter-Bank Market

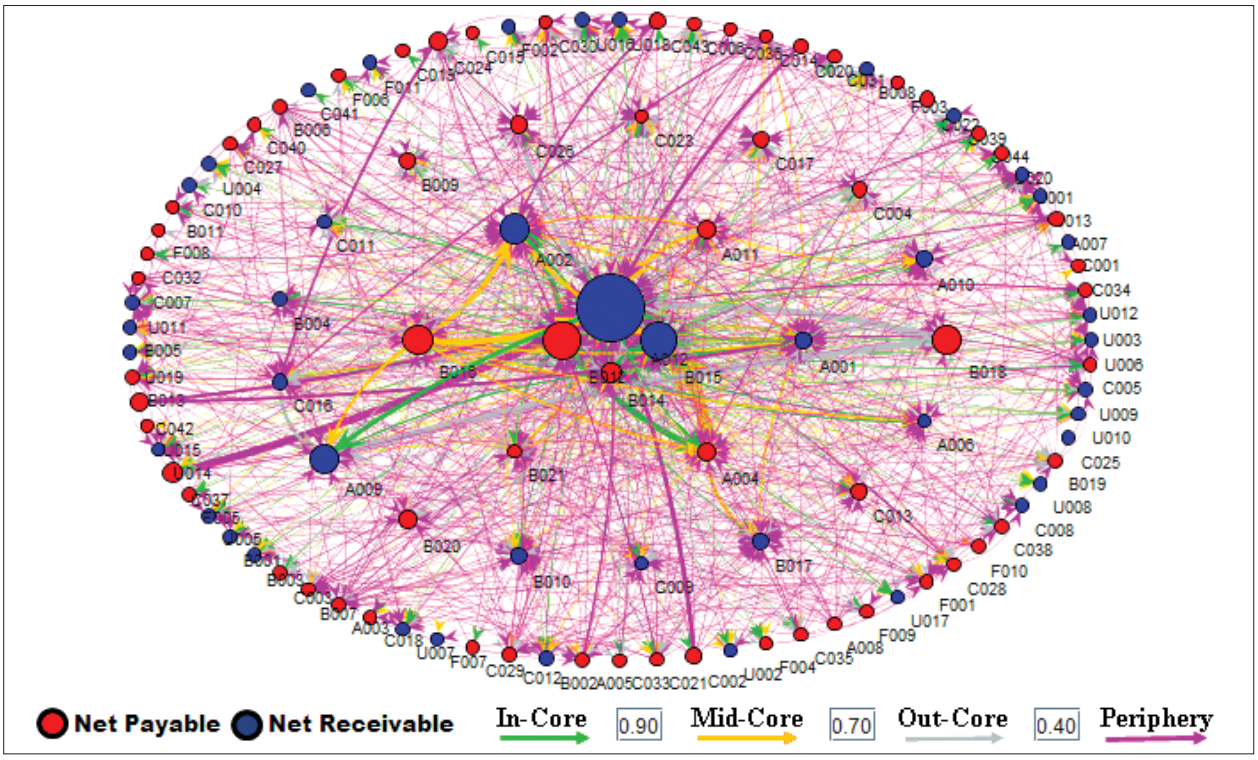


Source: RBI supervisory returns and staff calculations.

[37] The diagrammatic representation of the network of the banking system is that of a tiered structure, in which different banks have different degrees or levels of connectivity with others in the network. 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 (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.

[38] 77 SCBs,11 SFBs and 20 SUCBs were considered for this analysis.

Chart 2.40: Network Structure of the Indian Banking System (SCBs + SFBs+ SUCBs) - September 2021

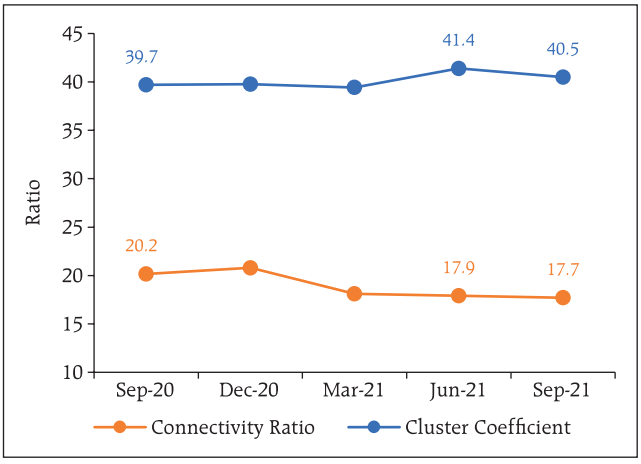


Source: RBI supervisory returns and staff calculations.

sector banks, foreign banks, SUCBs and SFBs formed the outer core (Chart 2.40).

2.57 The degree of interconnectedness in the banking system (SCBs), as measured by the connectivity ratio[39], which had reduced slightly in March 2021 on account of incorporation of additional FBs in the network, declined further in the next two quarters. The cluster coefficient[40] which depicts local interconnectedness (*i.e.*, tendency to cluster), increased in H1:2021-22 over March 2021 (Chart 2.41).

Chart 2.41: Connectivity Statistics of the Banking System (SCBs)



Source: RBI supervisory returns and staff calculations.

c. Exposure of AMC-MFs

2.58 In terms of inter-sectoral exposures, AMC-MFs maintained their position as the largest net providers of funds to the financial system as of end-September 2021. Their gross receivables stood at ₹10.63 lakh

[39] *The Connectivity ratio* measures the actual number links between the nodes relative to all possible links in a complete network.

[40] *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.

crore (around 29 per cent of their average AUM) whereas their gross payables were ₹1.01 lakh crore as at end-September 2021.

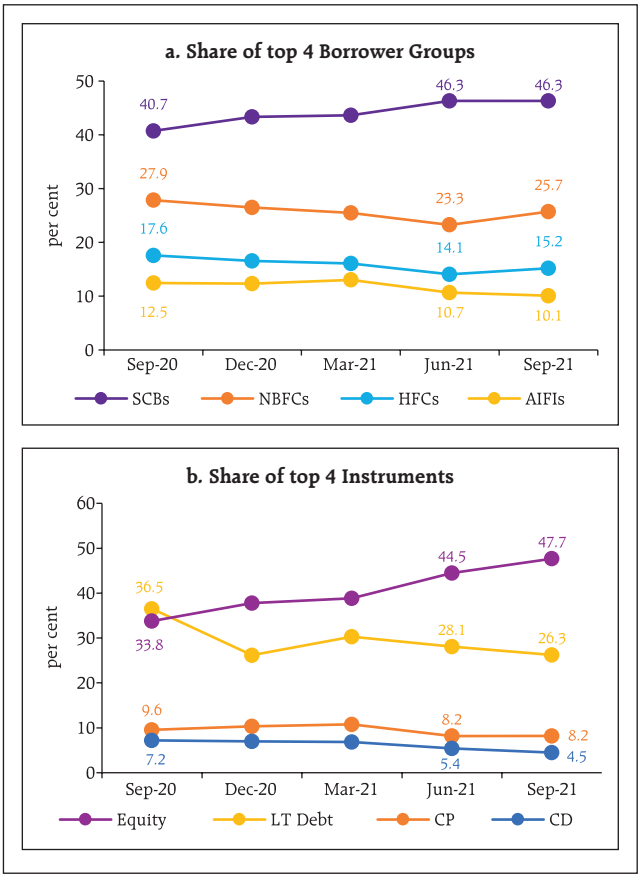
2.59 The major recipients of their funding were SCBs, followed by NBFCs, HFCs and AIFIs. Their exposure to banking sector stocks continued its upward momentum since September 2020 and reached pre-pandemic levels. Receivables from other sectors of the financial system, however, declined (Chart 2.42 a).

2.60 Instrument-wise, the share of equity holdings in AMC-MFs' receivables continued its upward trajectory since March 2020 as equity markets remained buoyant; while long-term (LT) debt, CPs and CDs declined in absolute and percentage terms (Chart 2.42 b).

d. Exposure of Insurance Companies

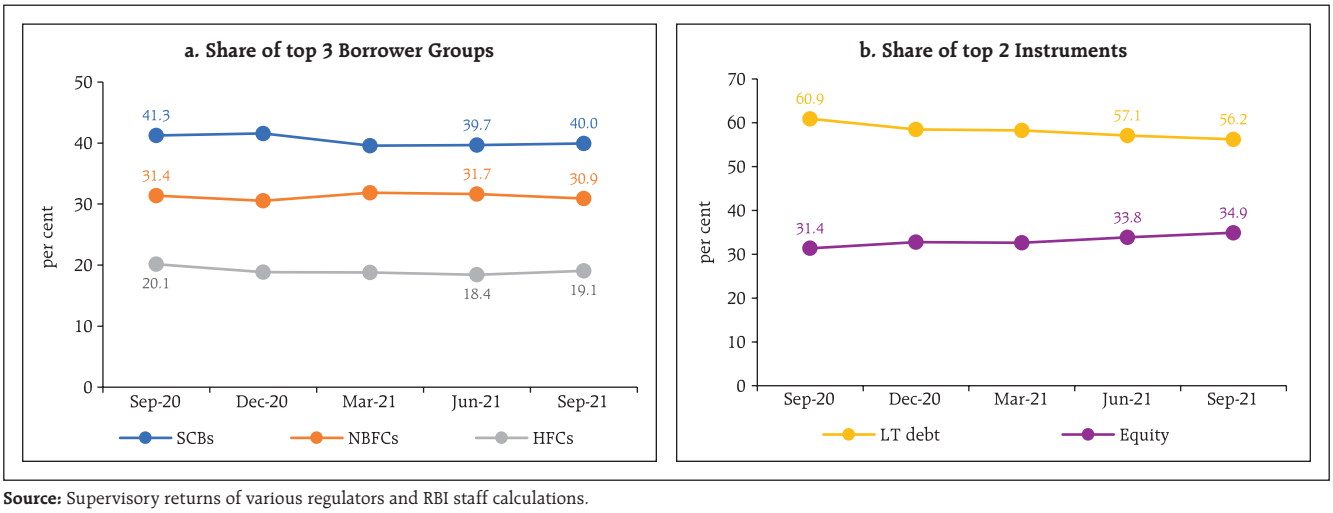
2.61 Insurance companies were the second largest net providers of funds to the financial system (gross receivables were at ₹6.95 lakh crore and gross payables at ₹0.45 lakh crore in September 2021). SCBs were the largest recipients of their funds, followed by NBFCs and HFCs, mainly in the form of LT debt and equity (Chart 2.43 a and b). LT debt mostly comprised of subscription to debt issued by NBFCs and HFCs.

Chart 2.42: Gross Receivables of AMC-MFs from the Financial System



Source: Supervisory returns of various regulators and RBI staff calculations.

Chart 2.43: Gross Receivables of Insurance Companies from the Financial System



Source: Supervisory returns of various regulators and RBI staff calculations.

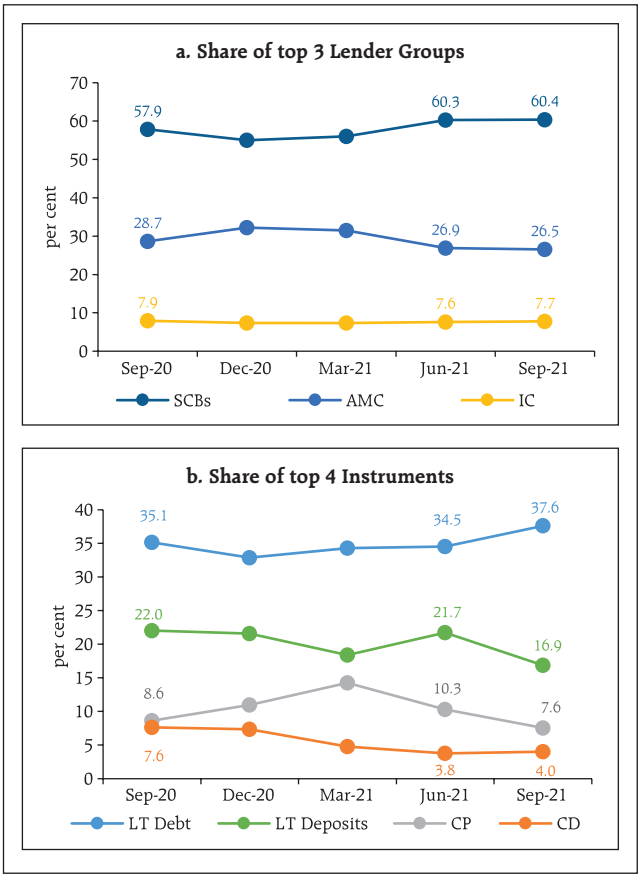
e. Exposure to AIFIs

2.62 AIFIs were net borrowers of funds from the financial system, with their gross payables and gross receivables having increased to ₹4.05 lakh crore and ₹3.45 lakh crore, respectively, in September 2021. They raised funds mainly from SCBs (primarily PVBs, although share of PSBs also grew), AMC-MFs and insurance companies (Chart 2.44 a). While LT debt remained the preferred instrument for raising funds, LT deposits declined on a sequential basis. CPs which had registered a sharp uptick as a source of AIFIs' funding in H2:2020:21, saw an equally sharp decline in H1:2021-22 (Chart 2.44 b).

f. Exposure to NBFCs

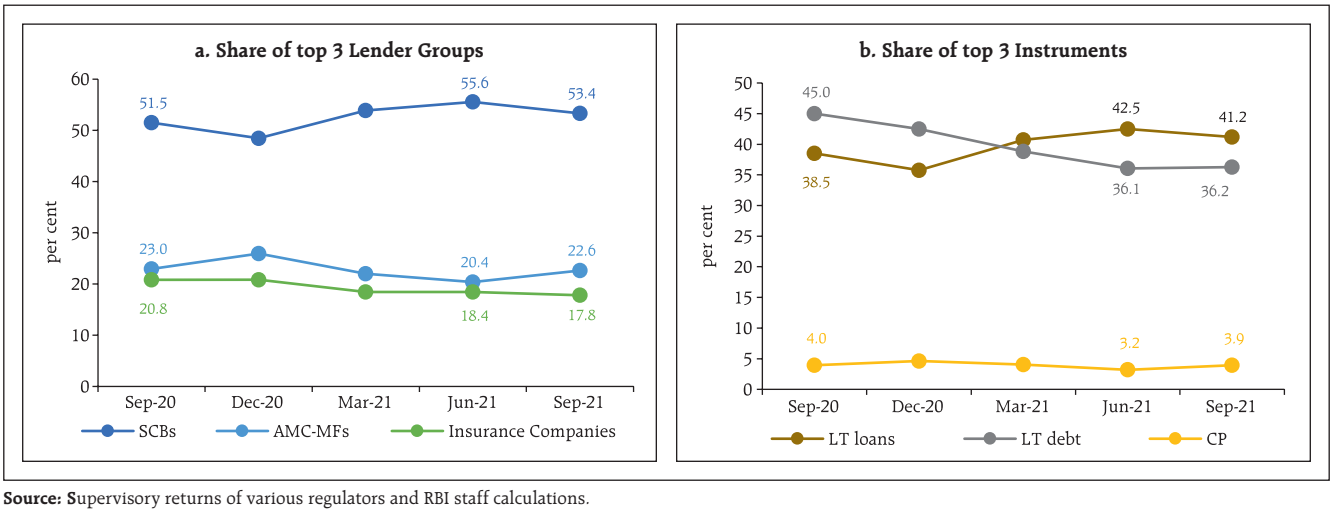
2.63 NBFCs were the largest net borrowers of funds from the financial system, with gross payables of ₹12.06 lakh crore and gross receivables of ₹1.65 lakh crore as at end-September 2021. The share of funding by SCBs remained the highest, though it decelerated in Q2:2021-22. The share of AMC-MFs increased relative to March 2021 while that of insurance companies dipped (Chart 2.45 a). During the half-year ended September 2021, the NBFC funding mix saw a decline in the share of LT debt instruments while that of LT loans increased (Chart 2.45 b).

Chart 2.44: Gross Payables of AIFIs to the Financial System



Source: Supervisory returns of various regulators and RBI staff calculations.

Chart 2.45: Gross Payables of NBFCs to the Financial System



Source: Supervisory returns of various regulators and RBI staff calculations.

g. Exposure to HFCs

2.64 HFCs were the second largest net borrowers of funds from the financial system, with gross payables of ₹7.38 lakh crore and gross receivables of ₹0.61 lakh crore as at end-September 2021. As at the end of FY:2020-21 and H1:2021-22, their borrowing profile was marked by a higher share of funding from SCBs and fall in that of AMC-MFs (Chart 2.46 a). The proportion of fund mobilisation through LT loans, LT debt instruments and CPs contracted since March 2021 while that through ST loans grew (Chart 2.46 b).

II.4.2 Contagion Analysis

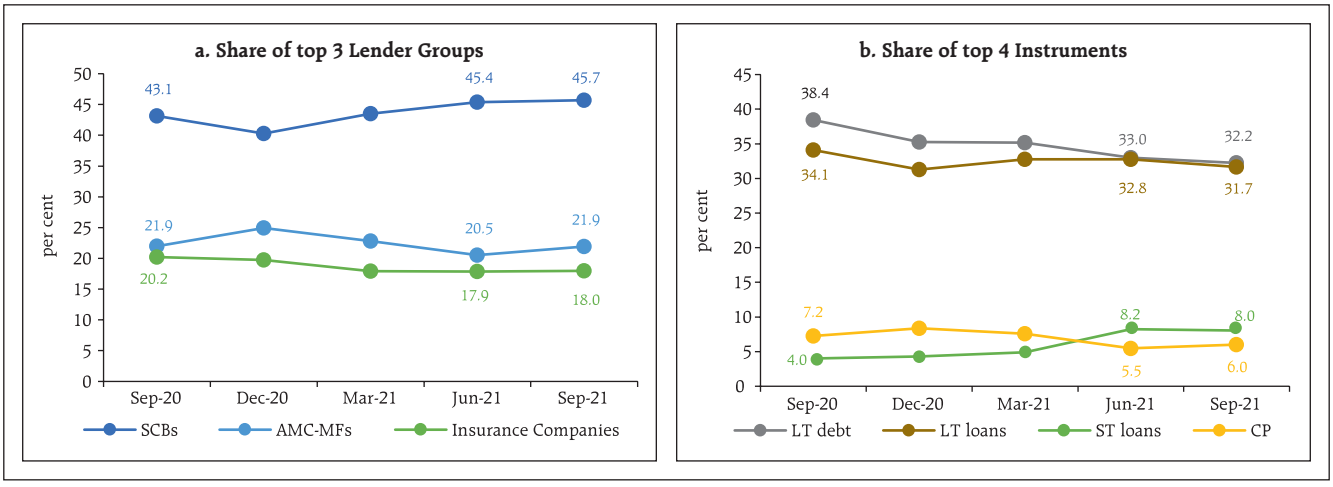
2.65 Contagion analysis uses network technology to estimate the systemic importance of individual banks. The failure of a systemically important bank leads to solvency and liquidity losses for the banking system the scale of which would depend on the capital and liquidity position of banks as well as the number, nature (whether it is a lender or a borrower) and magnitude of the interconnections that the failing bank has with the rest of the banking system.

a. Joint Solvency[41]-Liquidity[42] Contagion Losses for SCBs due to Bank Failure

2.66 In this analysis, the impact of discrete shocks on the banking system is gauged in terms of the number of bank failures that take place and the amount of solvency and liquidity losses that are incurred.

2.67 A contagion analysis of the banking network based on the end-September 2021 position indicates that the bank with the maximum capacity to cause contagion losses (Bank 1 in Table 2.7) is positioned in the inner-most core of the core-periphery network structure (Chart 2.40) and its failure would lead to a solvency loss of 2.67 per cent of the total Tier 1 capital of SCBs and liquidity loss of 0.03 per cent of total HQLA of the banking system. The analysis also shows that contagion losses due to failure of the five banks with the maximum capacity to cause contagion losses increased in September 2021 *vis-à-vis* March

Chart 2.46: Gross Payables of HFCs to the Financial System



Source: Supervisory returns of various regulators and RBI staff calculations.

[41] In solvency contagion analysis, gross loss to the banking system owing to a domino effect of one or more borrower banks failing is ascertained. Failure criterion for contagion analysis has been taken as Tier 1 capital falling below 7 per cent.

[42] In liquidity contagion analysis, a bank is considered to have failed when its liquid assets are not enough to tide over a liquidity stress caused by the failure of large net lender. Liquid assets are measured as: 18 per cent of NDTL + excess SLR + excess CRR.

2021, both in absolute and percentage terms, but would not lead to the failure of any additional bank (Table 2.7).

b. Solvency Contagion Losses for SCBs due to NBFC/HFC Failure

2.68 Banks provide a substantial part of the funding for NBFCs and HFCs which are the largest borrowers of funds from the financial system. Therefore, failure of any NBFC or HFC would act as a solvency shock to their lenders. The solvency losses caused by these shocks can spread further by contagion.

2.69 By end-September 2021, idiosyncratic failure of the NBFC or HFC with the maximum capacity to cause solvency losses to the banking system would have impacted banks' total Tier-1 capital by 2.28 per cent and 6.43 per cent, respectively, but would not lead to failure of any bank (Tables 2.8 and 2.9).

c. Solvency Contagion Impact[43] after Macroeconomic Shocks to SCBs

2.70 The contagion impact of the failure of a bank is likely to get magnified if macroeconomic shocks result in distress to the banking system in a generalised downturn of the economy. Such shocks would cause some SCBs to fail the solvency criterion, which then acts as a trigger for further solvency losses.

2.71 In the previous iteration, the shock was applied to the entity that could cause the maximum solvency contagion losses. In this iteration, however, the initial impact of such a shock on the individual bank's capital is taken from the macro-stress tests[44].

2.72 The initial capital loss due to macroeconomic shocks stood at 5.39 per cent, 9.72 per cent and

Table 2.7: Contagion losses due to Bank failure – September 2021

Trigger Code	% of Tier 1 capital of the Banking System	% of HQLA	Number of Bank defaulting due to solvency	Number of Bank defaulting due to liquidity
Bank 1	2.67	0.03	0	0
Bank 2	2.20	0.23	0	0
Bank 3	1.93	0.03	0	0
Bank 4	1.80	0.59	0	0
Bank 5	1.73	0.04	0	0

Note: 'Trigger banks' have been selected on the basis of solvency losses caused to the banking system.
Source: RBI supervisory returns and staff calculations.

Table 2.8: Contagion Losses due to NBFC failure – September 2021

Trigger Code	Solvency Losses as % of Tier -1 Capital of the Banking System	Number of Banks Defaulting due to solvency
NBFC 1	2.28	0
NBFC 2	1.80	0
NBFC 3	1.78	0
NBFC 4	1.25	0
NBFC 5	1.21	0

Note: Top five 'Trigger NBFCs' have been selected on the basis of solvency losses caused to the banking system.
Source: RBI supervisory returns and staff calculations.

Table 2.9: Contagion Losses due to HFC failure – September 2021

Trigger Code	Solvency Losses as % of Tier -1 Capital of the Banking System	Number of Banks Defaulting due to solvency
HFC 1	6.43	0
HFC 2	4.42	0
HFC 3	1.60	0
HFC 4	1.42	0
HFC 5	1.33	0

Note: Top five 'Trigger HFCs' have been selected on the basis of solvency losses caused to the banking system.
Source: RBI supervisory returns and staff calculations.

[43] Failure criterion for both PSBs and PVBs has been taken as Tier 1 CRAR falling below 7 per cent.

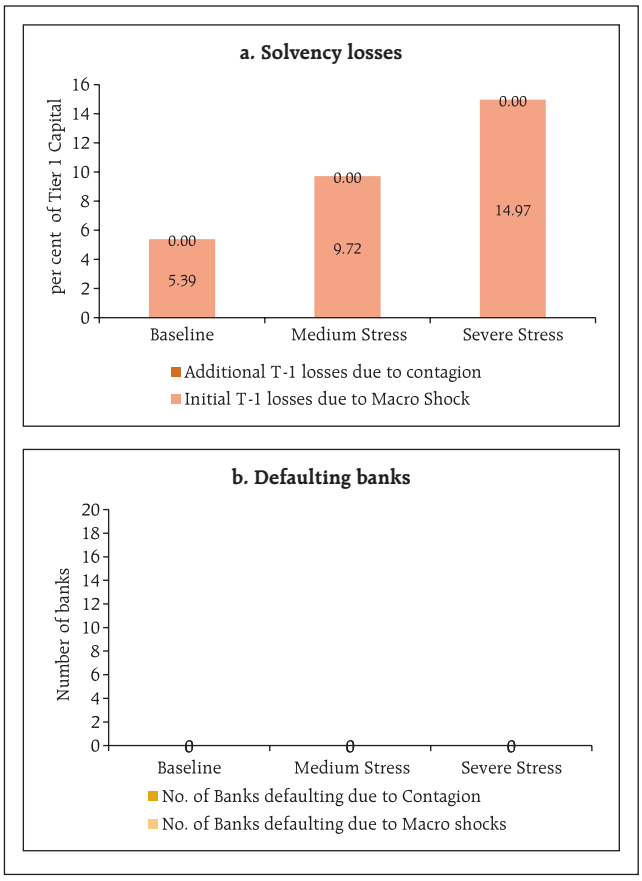
[44] The contagion analysis used the results of the macro-stress tests and made the following assumptions:

a) The projected losses under a macro scenario (calculated as reduction in projected Tier 1 CRAR, in percentage terms, in September 2022 with respect to the actual value in September 2021) were applied to the September 2021 capital position assuming proportionally similar balance sheet structures for both September 2021 and September 2022.

b) Bilateral exposures between financial entities are assumed to be similar for September 2021 and September 2022.

14.97 per cent of Tier-I capital for baseline, medium and severe stress scenarios, respectively. No bank fails to maintain Tier-I capital adequacy ratio of 7 per cent in any of the scenarios. As a result, there are no additional solvency losses to the banking system due to contagion (over and above the initial loss of capital due to the macro shocks) (Chart 2.47).

Chart 2.47: Contagion Impact of Macroeconomic Shocks (Solvency Contagion)



Note: The projected capital in September 2022 makes a conservative assumption of minimum profit transfer to capital reserves at 25 per cent and does not take into account any capital infusion by stakeholders.
Source: RBI supervisory returns and staff calculations.

Summary and Outlook

2.73 SCBs have emerged more robust after the two waves of the pandemic, while UCBs and NBFCs' asset quality has been dented. Stress tests indicate that banks are generally well placed to weather credit-related shocks, while UCBs and NBFCs present a more varied picture.

2.74 Going forward, as the economy recovers and credit demand rises, banks will need to ensure availability of sufficient capital to support credit growth. NBFCs and UCBs will have to be mindful of frailties on the liquidity front and ensure robust asset-liability management, apart from improving the quality of their credit portfolios. Considering the significant share of funding absorbed by NBFCs at the system level, continued attention to their financial health is warranted in the interest of financial stability.

Chapter III

Regulatory Initiatives in the Financial Sector

As economic activity charts an uneven and recently slowing path of recovery, global regulatory efforts focus on enhancing resilience of sectors which showed vulnerability during the pandemic. In India, the thrust of policy measures is to revive credit, widen investor bases in the G-Sec and securitisation markets and sharpen and harmonise the NBFC regulatory framework for focussed supervisory attention. The Securities and Exchange Board of India (SEBI) addressed fragilities of open-ended mutual funds through market-based mechanisms. The Insurance and Regulatory Development Authority of India's (IRDAI) initiatives cover the governance of insurance companies and cyber and trade credit insurance. The Pension Fund Regulatory and Development Authority's (PFRDA) focus was on expanding the coverage of the National Pension Scheme (NPS). The International Financial Services Centres Authority (IFSCA) continued to improve the regulatory framework for entities operating under it. The Financial Stability and Development Council (FSDC) remained committed to enhancing the robustness and stability of the financial system.

Introduction

3.1 An uneven economic rebound is losing steam against an inflation outlook clouded with upside risks. Transition challenges also include elevated levels of indebtedness across sovereigns, non-financial corporates and households, structural vulnerabilities in market-based finance structures, probability of higher insolvencies and credit losses when policy support is wound up and moral hazard from heightened expectations of more policy support. This chapter reviews regulatory initiatives globally and in India that are navigating this inflection point.

III.1 Global Regulatory Developments and Assessments

3.2 Global regulatory institutions mobilised in three distinct forms. Firstly, considerable regulatory attention is being paid to distil the lessons from the pandemic. Secondly, efforts are being directed towards increasing resilience of sectors and market segments which have faced difficulties in coping with the dislocations caused by the pandemic. Thirdly, attention is also being paid to the financial stability implications of COVID-19 support measures and their withdrawal.

III.1.1 Lessons from the Pandemic

3.3 According to the Financial Stability Board (FSB), the global financial system has shown resilience and endured the pandemic by virtue of swift policy responses[1]. Inadequacies have been observed in respect of capital and liquidity buffers as well as in the non-bank financial intermediation (NBFI) sector. There are concerns about excessive procyclicality in the financial system, highlighted by asset market dislocation during the pandemic. The Basel Committee on Banking Supervision (BCBS), the Committee on Payments and Market Infrastructures (CPMI) and the International Organisation of Securities Commissions (IOSCO) have analysed the margining practices of central counterparties (CCPs) covering initial margins (IMs) and variation margins (VMs), including from the point of view of transparency, predictability, and volatility[2]. A broad based and rapid increase in margin calls across the financial system has been noted across asset classes,

[1] FSB (2021),"Lessons Learnt from the COVID-19 Pandemic from a Financial Stability Perspective: Final report", October .

[2] IOSCO (2021), "Review of margining practices", October.

particularly with regard to CCPs while margining requirements for non-centrally cleared derivatives remained stable during the period. The FSB is taking forward a comprehensive work programme to improve functionality of international financial standards, reduce vulnerability and pro-cyclicality to safeguard global financial stability and support an equitable recovery from the pandemic.

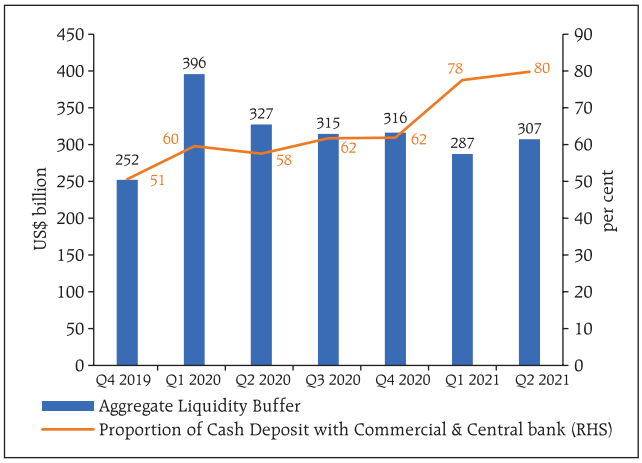
3.4 Central counterparties are highly interconnected with financial institutions and markets and, therefore, too important to fail. The increased volumes of trades being cleared through CCPs and their increasing global connectivity highlight the need for prudent management. In this regard, the size and composition of CCP liquidity buffers and the payment obligations of the CCP, if a clearing member defaults, is a pointer to the CCPs' own estimate of the probability of such dislocation and the markets available to CCPs to meet their payment obligations.

3.5 The public disclosure templates put together by the CPMI and the IOSCO require CCPs to report the size and make-up of their qualifying liquid resources on a quarterly basis. It defines eight sources of liquidity for CCPs: central bank cash; secured cash at commercial banks; unsecured cash at commercial banks; secured credit lines; unsecured credit lines; highly marketable collateral; supplementary liquidity; and other resources. Aggregate liquidity buffers maintained by three large global CCPs {*viz.*, the Chicago Mercantile Exchange (CME), Eurex Exchange and London Clearing House (LCH)} have declined after a sharp rise during the pandemic (Chart 3.1). Though the gross pool of liquidity buffers may *per se* not reflect procyclicality, an analysis of the composition of such buffers reflects a surge in the proportion of cash deposits at central banks. The aggregate proportion of cash deposits with commercial and central banks rose to 80 per cent of the liquidity pool at the expense of highly marketable collateral held in custody, the share of which in the total liquidity pool dropped from 46 per cent in Q4:2019 to 17 per cent in Q2:2021.

III.1.2 Systemic Resilience of Money Market Funds (MMFs)

3.6 The March 2020 market turmoil exposed vulnerabilities in money market funds (MMFs). The FSB has explored policy proposals to enhance resilience of MMFs to help address systemic risks and minimise the need for future extraordinary central bank interventions to support the sector[3]. The range of policy options to address MMF vulnerabilities include swing pricing imposed on redeeming fund investors; capital buffers to absorb credit losses; mechanisms to address regulatory thresholds that may give rise to cliff effects; and limits on eligible assets and additional liquidity requirements to reduce liquidity transformation.

Chart 3.1: Analysis of Aggregate Liquidity Buffer Maintained by Three Global Central Counterparties



Source: IOSCO and CPMI.

[3] FSB (2021)," Policy proposals to enhance MMF resilience", October.

III.1.3 Pandemic Measures: Financial Stability Implications

3.7 The European Systemic Risk Board (ESRB) has noted the significant rise in gross European bank debt, partly due to guaranteed loans that have eased liquidity risks and reduced firm defaults and provisioning[4]. However, if loans with public guarantees mature and are renewed without public guarantee, risk weights will increase, and the level of provisioning might turn out to be lower than required.

III.1.4 Other International Regulatory Developments

A. Banks

3.8 The FSB has offered suggestions to harmonise cyber incident reporting[5] to obviate (a) fragmentation across sectors and jurisdictions; (b) diversity in methodologies to measure its severity; and (c) variation in timeframes for reporting incidents and use of incident information. Greater convergence in reporting can be achieved by developing global best practices, identifying and understanding the difficulties in sharing common types of information across jurisdictions, and developing a taxonomy for cyber incident reporting with a common definition for 'cyber incident'.

3.9 On the London Interbank Offered Rate (LIBOR) cessation, the FSB has emphasised the need for market participants to act urgently to ensure that they are fully prepared for transition by the end of this year, with certain key USD settings continuing until end-June 2023 to support the rundown of legacy contracts, executed before January 1, 2022[6]. Continued reliance of global financial markets on LIBOR poses risks to global financial stability. The transition should be primarily to overnight risk-free rates (RFRs), the most robust benchmarks available, to avoid reintroducing the weaknesses of LIBOR. The FSB also underlines the need for potential alternative rates to reflect credible underlying markets underpinned by a sufficient volume of transactions.

B. Asset Markets

3.10 In the context of the growing role and influence of environmental, social and governance (ESG) ratings and data products providers in the financial markets responding to increased investor sensitivity to the potential financial risks posed by climate change and other ESG considerations, the IOSCO has recommended that regulators focus more attention on the use of ESG ratings and data products and the activities of the providers of such products and services[7]. It also recommends that the rating and data product providers should consider factors related to issuing high quality ratings and data products, including publicly disclosed data sources, defined methodologies, management of conflicts of interest, high levels of transparency and the handling of confidential information. Users of ESG ratings and data products could consider conducting due diligence on their usage in their internal processes. It also recommends improving information gathering processes, disclosures and communication between providers and entities subject to assessment.

3.11 The IOSCO has provided guidance to support its members in regulating and supervising the use of artificial intelligence (AI) and machine learning (ML) by market intermediaries and asset managers, in

[4] ESRB (2021),"Monitoring the financial stability implications of COVID-19 support measures", February

[5] FSB (2021),"Cyber Incident Reporting: Existing Approaches and Next Steps for Broader Convergence", October.

[6] FSB (2021),"FSB Statement to Support Preparations for LIBOR Cessation", November.

[7] IOSCO (2021),"Environmental, Social and Governance (ESG) Ratings and Data Products Providers", July.

view of its potential to create or amplify certain risks which can undermine financial market efficiency and consumer protection[8]. Regulators should a) consider stipulating that designated senior management should be made responsible for the oversight of AI and ML development, testing, deployment, monitoring and controls; (b) require firms to have adequate skills to develop the AI and ML as per needs and oversee controls; (c) stipulate oversight and monitoring of the performance of third party service providers; and (d) require firms to disclose meaningful information to customers around their use of AI and ML that impact client outcomes.

C. Crypto Currencies – Stablecoins

3.12 The President's Working Group on Financial Markets (PWG) set up by the US Treasury[9] acknowledged the rise of market capitalisation of stablecoins and outlined recommendations to protect against prudential risks. Stablecoins are digital assets that are designed to maintain a stable value relative to a national currency or other reference assets. They are predominantly used in the United States to facilitate trading, lending and borrowing of other digital assets. The market capitalisation of stablecoins issued by the largest stablecoin issuers exceeded $127 billion as of October 2021, a nearly 500 per cent increase over the preceding twelve months. The report states that if well-designed and appropriately regulated, stablecoins could support faster, more efficient, and more inclusive payments options. However, it raises concerns related to the potential for destabilising runs, disruptions in the payment system and concentration of economic power. It also highlights that stablecoins pose anti-money laundering (AML) / combating the financing of terrorism (CFT) risks, thereby raising concerns for market integrity and investor protection. It has recommended legislative changes to address the gaps in the authority of regulators to reduce these risks.

D. Climate Risk

3.13 The International Association of Insurance Supervisors (IAIS) analysed the impact of climate change on the asset side exposures of the insurance sector, based on data covering 75 per cent of the global insurance market[10]. It finds that more than 35 per cent of insurers' investment assets, including equities and corporate debt, loans and mortgages, sovereign bonds and real estate could be exposed to climate risks, with housing and energy-intensive sectors accounting for the major share. The recommendations for insurers include (a) incorporation of climate related risk in insurers' own risk and solvency assessment; (b) assessment of the impact of physical and transition risk on their investment portfolio and asset liability management; and (c) disclosure of material risks.

3.14 The Network for Greening the Financial System (NGFS) has highlighted that central banks and supervisors may increasingly be exposed to the risk of climate-related litigation involving substantial financial implications[11]. Financial institutions may increasingly face claims relating to disclosures for green financial products and potentially breach-of-contract claims relating to such products as well as breaches of fiduciary duties if, for instance, they decide to continue to finance polluting projects. Accordingly, supervisors need to ensure that their supervised entities adequately manage financial and operational risks resulting from potential climate-

[8] IOSCO (2021),"The use of artificial intelligence and machine learning by market intermediaries and asset managers (iosco.org)", September.

[9] US Treasury (2021), "Report on Stablecoins ", November.

[10] IAIS (2021)," Study on the impact of climate change on insurers' investments", September.

[11] NGFS (2021),"Climate-related litigation: Raising awareness about a growing source of risk", November

related litigation against themselves as well as against institutions to which they are exposed.

III.2 Domestic Regulatory Developments

3.15 During the period since July 2021, the Financial Stability and Development Council (FSDC) chaired by the Union Finance Minister met once on September 3, 2021. The meeting deliberated on the various mandates of the FSDC, *viz.*, financial stability; financial sector development; inter-regulatory coordination; financial literacy; financial inclusion; and macro prudential supervision of the economy, including the functioning of large financial conglomerates. The Council, *inter alia*, discussed issues relating to management of stressed assets, strengthening institutional mechanisms for financial stability analysis, financial inclusion, framework for resolution of financial institutions and issues related to IBC processes, banks' exposure to various sectors, data sharing mechanisms of government authorities, internationalisation of the Indian Rupee and pension sector related issues. The Council also took note of the activities undertaken by the FSDC Sub-Committee chaired by the Governor, Reserve Bank and the action taken by members on the past decisions of the FSDC.

III.3 Initiatives from Regulators/Authorities

3.16 Financial sector regulators launched several initiatives for the development of the financial system and enhancement of its robustness and resilience (Annex 3).

III.3.1 Transfer of Loan Exposures

3.17 The Reserve Bank issued directions governing transfer of loan exposures, both stressed and those not in default, in September 2021, harmonising the extant guidelines on such transfers and making them consistent with the current paradigm on resolution of stressed assets.

3.18 In terms of the directions in case of loans in default, transfer can be effected only through assignment or novation. While commercial banks, non-banking financial companies (NBFCs), all India financial institutions (AIFIs) and asset reconstruction companies (ARCs) have general permission to be transferees, specific permission has been given for transfer to any entity[12] permitted to hold loan exposures in terms of a statutory provision or under the regulations issued by a financial sector regulator, including corporates. The Swiss Challenge method has been made mandatory for price discovery where the aggregate exposure of all lenders is not less than ₹100 crore as well as in cases of transfer of loan exposures undertaken as a resolution plan under the prudential framework. ARCs have been permitted to acquire loans where frauds have been detected, on the lines of banks and NBFCs, so as to provide a level playing field, subject to all operational responsibilities related to frauds being transferred to them.

3.19 As regards loans not in default, the directions restrict transfer of loans by lending institutions regulated by the Reserve Bank to scheduled commercial banks (SCBs), NBFCs and AIFIs, with the permitted routes being through assignment, novation or loan participation. Transfers under loan syndications have also been brought under the ambit of the directions. The requirement of minimum holding period (MHP) for transfer of loans has been simplified.

III.3.2 Securitisation of Standard Assets

3.20 The Reserve Bank issued revised guidelines on securitisation of standard assets in September 2021, with a view to aligning the regulatory

[12] List of eligible entities is provided in the RBI circular DOR.STR.REC.51/21.04.048/2021-22 dated September 24, 2021.

framework with Basel III guidelines and developing a robust securitisation market while incentivising simpler securitisation structures. The directions permit only those securitisation transactions which are traditional securitisations *i.e.*, securities issued by a special purpose entity (SPE) where the cash flows are from a specified pool of underlying loans acquired from a lender. The Minimum Holding Period (MHP) and Minimum Retention Requirement (MRR) conditions have been simplified in line with the Master Direction on Transfer of Loan Exposures. The revisions also include permission for single asset securitisation, simplified instructions governing reset of credit enhancements, concessional capital regime in case of simple, transparent and comparable (STC) securitisations and capital framework in line with the Basel III norms.

III.3.3 Credit Risk Mitigation (CRM) for Derivative Transactions of Foreign Bank Branches

3.21 A Credit Risk Mitigation (CRM) mechanism was put in place through guidelines issued in September 2021 whereby the gross exposure of foreign bank branches in India to their head office (HO) [including overseas branches] can be offset by CRM while reckoning Large Exposure Framework (LEF) limits. The CRM will comprise of cash / unencumbered approved securities the sources of which should be interest-free funds from HOs or remittable surplus retained in the Indian books (reserves) held with the Reserve Bank[13]. As part of the grandfathering arrangement, foreign bank branches are permitted to exclude all derivative contracts executed prior to April 1, 2019 while computing derivative exposure on the HO / overseas branches.

III.3.4 Scale Based Regulation for NBFCs

3.22 The regulatory framework for NBFCs was revised in October 2021 to introduce scale-based regulation. Under the new framework, NBFCs are placed in four layers, based on their size, activity, and perceived riskiness, viz., Base Layer (BL), Middle Layer (ML), Upper Layer (UL) and a possible Top Layer (TL). The regulations are progressively tighter for the higher layers. Regulations for NBFCs in the Base Layer (NBFC-BL) are broadly in line with extant regulations for non-deposit taking NBFCs (NBFC-ND), except for changes in governance and prudential guidelines. NBFCs in the Middle Layer (NBFC-ML) will be regulated on the lines of systemically important non-deposit taking NBFCs (NBFC-ND-SI), deposit taking NBFCs (NBFC-D), core investment companies (CICs), standalone primary dealers (SPDs) and housing finance companies (HFCs), as the case may be, except for changes in capital, prudential and governance guidelines. NBFCs lying in the Upper Layer (NBFC-UL) are subject to regulations applicable to NBFCs in the Middle Layer (NBFC-ML) with additions such as introduction of common equity tier 1 and leverage requirements, mandatory listing, qualification of board members and the like. For NBFCs falling in the Top Layer (ideally vacant), while no specific regulation has been provided, they will, *inter alia*, be subjected to higher capital charges and enhanced supervisory engagement.

III.3.5 Opening of Current Accounts by Banks

3.23 In order to instil credit discipline and prevent diversion of funds, the Reserve Bank had issued revised instructions in August 2020, introducing restrictions on opening of current accounts and cash credit (CC) / overdraft (OD) facilities by banks. With a view to ensuring non-disruptive compliance with the spirit of the regulations, the guidelines were revised on October 29, 2021 permitting (a) borrowers where the aggregate exposure of the banking system is less than ₹5 crore, to open current accounts and CC/OD accounts without any restrictions; and (b) borrowers availing CC/OD facilities to maintain current accounts with any one of the banks with

[13] Details in circular DOR.CRE.REC.47/21.01.003/2021-22 dated September 09, 2021

which they have CC/OD facility, provided it has at least 10 per cent of the exposure of the banking system to that borrower; and to maintain collection accounts with other lending banks. Specified current accounts are exempted from the purview of the instructions.

III.3.6 Retail Direct Scheme

3.24 The Reserve Bank launched the RBI Retail Direct Scheme (RBI-RD) in November 2021 which allows individual investors to open a Retail Direct Gilt (RDG) Account with the Reserve Bank using an online portal to facilitate investing in G-Secs in the primary and secondary markets. By providing a safe, simple, direct and secured platform, the Scheme aims to ease the access of G-Sec market to retail investors.

III.3.7 Customer Protection

3.25 In the wake of the pandemic and the increased convenience of online transactions, financial transactions through the digital mode grew manifold. Concomitantly, complaints related to electronic and digital banking transactions *viz.*, ATM/debit cards, credit cards and mobile/electronic banking collectively witnessed a spurt and comprised more than 40 per cent of the total complaints received in Ombudsman offices (Chart 3.2). Complaints related to ATM/debit cards alone, however, declined as compared to the previous two years reflecting proactive measures undertaken by the Reserve Bank and the service providers.

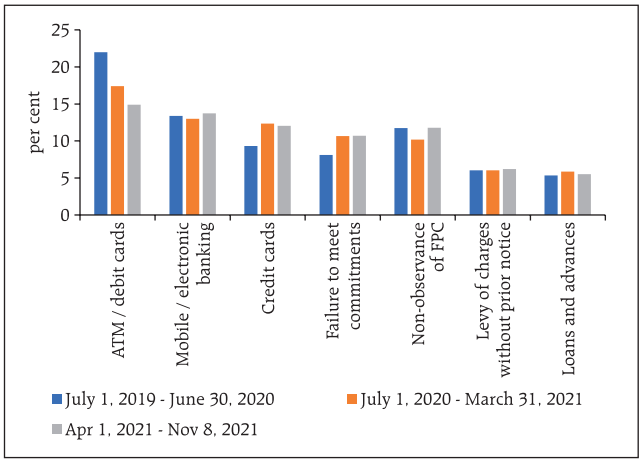
III.3.8 Integrated Ombudsman Scheme, 2021

3.26 The Reserve Bank - Integrated Ombudsman Scheme (RBI-OS) for providing cost free redress of customer complaints involving deficiency in services rendered by entities regulated by the Reserve Bank was launched in November 2021. The new scheme integrates the three existing ombudsman schemes pertaining to banking (launched in 2006), non-banking financial companies (introduced in 2018) and system participants[14] (notified in 2019). The Scheme, which has also been extended to cover non-scheduled primary urban co-operative banks with a deposit size of ₹50 crore and above, adopts a 'One Nation One Ombudsman' approach by making the redressal mechanism jurisdiction neutral.

III.3.9 Default Fund (DF) of CCIL

3.27 The Clearing Corporation of India Limited (CCIL) maintains prefunded default handling resources as a CCP for each of its clearing services that could be accessed if the losses on a defaulting member's portfolio exceed the resources made available by that member. These resources are maintained in excess of Cover-1 and Cover-2 stress loss[15]. They are funded by members' contributions as well as by the CCIL's own funds termed as Skin-In-The-Game (SITG) allocated from its Settlement Reserve Fund (SRF). CCIL's SITG corresponding to

Chart 3.2: Category of Complaints in Banking Ombudsman Offices



Source: Reserve Bank of India.

[14] System Participant means any person other than a bank participating in a payment system as defined under Section 2 of the Payment and Settlement Systems Act, 2007 excluding a 'System Provider'.

[15] Cover 1 stress loss - the highest stress loss on account of a member and its affiliates observed in the past six months.

Cover 2 stress loss - the sum of the highest stress loss on account of a member and its affiliates, and the second highest stress loss on account of a member and its affiliates is determined, for each stress scenario. The default fund quantum is set equal to the highest such sum in the past six months.

each clearing service default waterfall is computed as the higher of 25 per cent of the respective member's default fund or the highest contribution from a single member, subject to availability of resources in the SRF. The total default fund for each clearing service, comprising member contributions and the respective SITGs, is generally 125 per cent of Cover-1 / Cover-2 stress loss (along with stress loss of five weak entities). The default fund is revised on an intra-month basis in case stress loss (as per the segment's cover) exceeds a specific threshold.

3.28 Prior to October 2021, the methodology used by CCIL for the intra-month revision could have resulted in total prefunded resources going below 125 per cent of the Cover-1 / Cover-2 stress loss. From October 2021, as advised by the Reserve Bank, the CCIL has modified the methodology to ensure that the total prefunded resources are 125 per cent of Cover-1 / Cover-2 stress loss by increasing members' contributions even beyond 100 per cent, if required, in case the CCIL's SITG goes below 25 per cent of Cover-1 / Cover-2 stress loss due to shortfall in the SRF. The CCIL makes annual additions to the SRF, based on its estimate of resources required. The SRF balance stood at ₹1,750 crore as on March 31, 2021. The CCIL's SITG as a proportion to members' default fund contribution is much higher than most other global CCPs (Table 3.1).

3.29 The modified framework is expected to enhance financial stability and considering the systemic importance of financial market infrastructures like the CCIL, this will improve the resilience of the financial ecosystem.

III.3.10 Fintech

3.30 Fintech has accelerated transformation in the financial sector. The Financial Stability Board (FSB) defines Fintech as "technologically enabled financial innovation that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services". India is amongst the fastest growing fintech markets in the world. A recent survey indicates that 87 per cent of the digitally active population has adopted fintech, placing it as a leader in the world[16]. Several factors have contributed to the spectacular growth of fintech in India. They range from copious funding by venture capital, private equity and institutional investors driving innovation; increasing telecom, internet and smartphone penetration; favourable demographics[17]; and the emergence of the IndiaStack - a set of open APIs [e-KYC, e-Sign, DigiLocker, and Unified Payments Interface (UPI)] that allows governments, businesses, startups and developers to utilise digital infrastructure The Reserve Bank's calibrated regulatory approach has kept pace with the rapid developments in the fintech space (Box 3.1).

III.3.11 Enforcement

3.31 During the period July-November 2021, the Reserve Bank undertook enforcement action against 90 regulated entities (seven public sector banks, ten private sector banks, 64 co-operative banks, three foreign banks, one small finance bank and five non-bank finance companies) and imposed an aggregate penalty of ₹35.63 crore for non-compliance with / contravention of statutory provisions and directions issued by the Reserve Bank from time to time.

Table 3.1: SITG Ratios for selected CCPs

Sr. No.	CCP Name	SITG/DF Ratio* (per cent)
1	LCH SA	0.65
2	LCH	1.01
3	OCC	1.36
4	Eurex Clearing	2.61
5	CME	3.33
6	NASDAQ	10.87
7	Shanghai Clearing House	28.59
8	SGX DC	41.75

*In cases where resources are segregated by CCP at clearing service level or by currency, the resources are aggregated for determining the ratio.
Source: CCIL, CCP's Public Quantitative disclosures

[16] EY Global Fintech Adoption Index. Digitally active population refers to individuals who are active online.

[17] Over 65 per cent of the Indian population is below 35 years.

Box 3.1: Fintech Regulation in India – The Evolving Landscape

The Reserve Bank recognised the need for an enabling regulatory and supervisory framework to ensure orderly development of the fintech sector and address the associated issues such as financial stability, customer protection, cyber security and data protection as early as 2018 when a broad roadmap to leverage on the developments in fintech space was laid down in the Report of the Working Group on Fintech and Digital Banking.

2. The policy response to fintech so far has involved the following approaches, *viz.*, (i) applying existing regulatory frameworks to new innovations and their business models, often by focusing on the underlying economic function rather than the entity; (ii) adjusting existing regulatory frameworks to accommodate new entrants and the re-engineering of existing processes to allow adoption of new technologies; and (iii) creating new regulatory frameworks or regulations to include (or prohibit) fintech activities.

3. As fintech adoption picked up in the country, the Reserve Bank issued regulations/ guidelines for emerging areas such as payments banks (2014), account aggregators (2016), mobile wallets (2017), pre-paid instruments (2017), peer-to-peer (P2P) lending (2017) and invoice based lending (Trade Receivable and Discounting System-TReDS) (2018). The regulations span requirements on legal form, ownership and group structure, initial capital, fit and proper criteria for directors and senior management, prudential requirements on capital, liquidity, leverage, governance and risk management, cyber-security and disclosure, market conduct and data protection, grievance redressal mechanism and AML / CFT.

4. The Reserve Bank introduced a Regulatory Sandbox (RS) in 2019 to foster responsible innovation in financial services, promote efficiency and expand benefits to consumers. The first cohort on the theme 'Retail Payment' successfully tested products that can potentially revolutionise the digital payment landscape by using feature phone and offline payments. The second cohort on 'Cross Border Payments' is in progress and aims to address challenges of high cost, low speed, limited access and insufficient transparency in cross border payments. The third cohort on 'MSME Lending' envisages improved access to finance for micro, small and medium sized enterprises. The Reserve Bank has also set up the RBI Innovation Hub (RBIH), which is working towards creating an eco-system for idea generation and development through collaboration with tech innovators and academia for promoting access to financial markets and financial inclusion. The Hub would also develop internal infrastructure to promote fintech research.

5. Digitalisation of financial services can also bring in its wake various risks such as greater reliance on third-party service providers, mis-selling of financial products, breach of data privacy, unethical business conduct and illegitimate operations. The regulatory landscape for fintech is evolving to address such risks. The recently released report of the Working Group on Digital Lending is a pointer in this direction, through its thrust on enhancing customer protection and making the digital lending ecosystem safe and sound while encouraging innovation.

6. With a view to further channelising the potential of the country in fintech while managing attendant risks and ensuring effective regulation and supervision of entities, products and services, the Reserve Bank is currently in the process of consolidating all fintech related work under one umbrella. The new set up will be tasked with managing the entire gamut of fintech related activity in co-ordination with its regulatory and supervisory departments.

III.3.12 Swing Pricing Framework for Mutual Fund Schemes

3.32 With a view to ensuring fairness in treatment of incoming, existing and outgoing investors in mutual fund schemes, particularly during market dislocation, the SEBI introduced a swing pricing framework, which shall be effective from March 1, 2022, for open ended mutual fund schemes (with specified exceptions) for scenarios related to net outflows from the schemes. It provides for an

optional partial swing during normal times and a mandatory full swing during periods of market dislocation for high-risk open-ended debt schemes. When swing pricing is triggered, net asset value (NAV) for incoming and outgoing investors is adjusted for the swing factor.

III.4 Other Developments

III.4.1 Deposit Insurance

3.33 The Deposit Insurance and Credit Guarantee Corporation (DICGC) Act, 1961 was amended in August 2021 to provide for time bound payment (interim) of deposits to depositors up to the amount insured in the case of banks with restrictions on withdrawal of deposits imposed by the Reserve Bank. In terms of the amendment which came into effect from September 1, 2021 the insured bank is required to submit its claim within 45 days of imposition of such restrictions and the Corporation has to get the claims verified within 30 days and pay the depositors within the next 15 days. The amendment empowers the DICGC to make interim deposit insurance pay-outs to troubled banks, even if they are under the Reserve Bank's All Inclusive Directions (AID), within 90 days of imposition of such directions. In case the Reserve Bank finds it expedient to bring the bank under a scheme of amalgamation/compromise or arrangement/reconstruction, the liability of the Corporation will get extended by a further period of 90 days. The other amendments include raising the limit of 15 paise per ₹100 of deposits on insurance premium with the approval of the Reserve Bank of India. Furthermore, the DICGC, with the approval of its Board, may defer or vary the repayment period for the insured bank to discharge its liability to DICGC and charge penal interest of 2 per cent over the repo rate in case of delay. Consequent to these amendments, regulations on the procedure relating to claims settlement and granting time to insured banks for recovery of claims have also been amended. As of December 20, 2021, DICGC has paid ₹1,374 crore in respect of 1.09 lakh depositors of 16 out of 21 troubled banks that were eligible to receive such pay-outs.

3.34 The number of registered insured banks as on September 30, 2021 stood at 2,049 comprising 140 commercial banks (including 43 RRBs, two LABs, six payment banks and 11 small finance banks) and 1,909 co-operative banks. With the present limit of deposit insurance at ₹5 lakh, 98.1 per cent of the total deposit accounts, amounting to 267.2 crore, and 49.0 per cent, amounting to ₹78.02 lakh crore, of the total assessable deposits are fully protected.

3.35 During H1:2021-22, deposit insurance premium of ₹9,561 crore was collected, of which 93.5 per cent was contributed by commercial banks and the rest by co-operative banks. The settlement and recovery of claims from banks in H1: 2021-22 was significantly higher than a year ago. The Deposit Insurance Fund (DIF), built out of the premia paid by insured banks and coupon income received on investments in G-Secs, stood at ₹1.41 lakh crore, yielding a reserve ratio (ratio of DIF to insured deposits) of 1.81 per cent (Tables 3.2 to 3.4).

Table 3.2: Claims Settled and Recovery of Claims

(in ₹ crore)

Period	Claims Settled	Recovery of Claims
2021-22 (H1)	393	267
2020-21 (H1)	27.4	33.7

Source: Deposit Insurance and Credit Guarantee Corporation (DICGC).

Table 3.3: Deposit Insurance Premium

(in ₹ crore)

Period	Commercial Banks	Co-operative Banks
2021-22 (H1)	8,939.1	621.6

Source: Deposit Insurance and Credit Guarantee Corporation (DICGC)

Table 3.4: Deposit Insurance Fund (DIF)

(in ₹ crore)

As on	Deposit Insurance Fund	Reserve Ratio (per cent)
September 30, 2021	1,40,831	1.81
March 31, 2021	1,29,904	1.70

Source: Deposit Insurance and Credit Guarantee Corporation (DICGC).

III.4.2 Corporate Insolvency Resolution Process

3.36 Since the inception of the Insolvency and Bankruptcy Code in December 2016, 4708 CIRPs have commenced (as on September 30, 2021), of which 65 per cent have been closed. Of these, 23 per cent were closed on appeal or review or settled, 17 per cent were withdrawn, 46 per cent ended in orders for liquidation and 14 per cent culminated in approval of resolution plans (Table 3.5).

3.37 In case of the 421 CIRPs which ended in resolution, financial creditors (FCs) realised 36 per cent of their claims and 167 per cent of the liquidation value (Table 3.6).

Table 3.5: Corporate Insolvency Resolution Process

(Number)

Year / Quarter	CIRPs at the beginning of the Period	Admitted	Closure by				CIRPs at the end of the Period
			Appeal/ Review/ Settled	Withdrawal under Section 12A	Approval of Resolution Plan	Commencement of Liquidation	
2016-17	0	37	1	0	0	0	36
2017-18	36	706	94	0	20	91	537
2018-19	537	1157	153	97	79	306	1059
2019-20	1059	1986	343	216	139	542	1805
2020-21	1805	537	83	157	122	349	1631
Apr-Jun, 2021	1631	141	9	33	45	74	1611
Jul-Sep, 2021	1611	144	18	24	16	57	1640
Total	**NA**	**4708**	**701**	**527**	**421**	**1419**	**1640**

Note: 1. These CIRPs are in respect of 4593 CDs.
2. This excludes 1 CD which has moved directly from BIFR to resolution.
3. This Includes Dewan Housing Finance Corporation Limited data, the application filed by Reserve Bank was admitted under section 227 read with Financial Service Provider Rules of the Code.

Source: Compilation from website of the NCLT and filing by IPs.

Table 3.6: Outcome of CIRPs initiated Stakeholder-wise, as on September 30, 2021

Outcome	Description	CIRPs initiated by			
		Financial Creditor	Operational Creditor	Corporate Debtor	Total
Status of CIRPs	Closure by Appeal/Review/Settled	189	507	5	701
	Closure by Withdrawal u/s 12A	152	368	7	527
	Closure by Approval of Resolution Plan#	241	135	44	420
	Closure by Commencement of Liquidation	628	628	163	1419
	Ongoing	809	759	72	1640
	Total	**2019**	**2397**	**291**	**4707**
CIRPs yielding Resolution Plans	Realisation by FCs as per cent of Liquidation Value	181.5	115.2	140.8	166.6
	Realisation by FCs as per cent of their Claims	38.5	17.2	25.5	35.9
	Average time taken for Closure of CIRP	499	484	503	495
CIRPs yielding Liquidations	Liquidation Value as per cent of Claims	6.3	8.7	9.7	7.1
	Average time taken for Closure of CIRP	395	364	341	375

Note: # - This excludes Dewan Housing Finance Corporation Limited data, the application filed by Reserve Bank was admitted under section 227 read with FSP rules, of the Code.
Source: Compilation from website of the NCLT and filing by Insolvency Professionals

Table 3.7: Growth in SIPs (FY:2021-22)

Particulars	Existing at the beginning of 2021-22 (Excluding STP)	Registered during 2021-22	Matured during 2021-22	Terminated prematurely during 2021-22	Closing no. of SIPs at the end of Oct 31, 2021	AUM at the beginning 2021-22	AUM at the end of Oct 31, 2021
	(in ₹ lakhs)					(in ₹ crore)	
SIPs	368	137	13	33	458	4,24,817	5,49,518

Source: Securities and Exchange Board of India (SEBI).

III.4.3 Mutual Funds

3.38 The asset base of the MF industry exhibited robust sequential growth for the last five consecutive quarters and stood at ₹37,33,204 crore at the end of October 2021, an increase of 32 per cent y-o-y.

3.39 Investments in MFs through systematic investment plans (SIPs) saw a significant leap both in terms of the number of SIPs added during the period April-October 2021 and in AUM (Table 3.7).

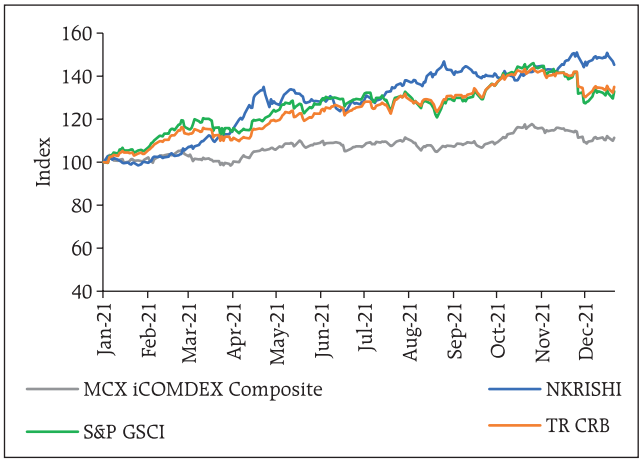
III.4.4 Commodity Derivatives

3.40 As on December 21, 2021, the benchmark domestic commodity derivative indices, MCX iCOMDEX composite and Nkrishi index, rose by 12.5 per cent and 27.3 per cent respectively, over March 2021 closing, reflecting strong demand (Chart 3.3).

3.41 Driven by the increase in crude oil and natural gas prices, the iCOMDEX energy index moved up by 27.0 per cent during the period, while the iCOMDEX base metal index surged by 23.8 per cent over March 2021. In comparison, the iCOMDEX bullion index rose more tepidly, reflecting plateauing investor sentiment in the wake of rise in interest rates and strengthening of the U.S. dollar (Chart 3.4).

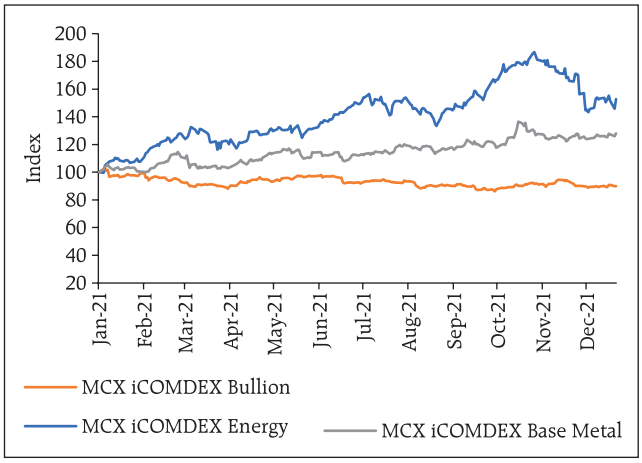
3.42 The aggregate turnover in commodity derivatives (across all exchanges) increased by 7.6 per cent over the corresponding period of the previous

Chart 3.3: Domestic and International Commodity Futures Indices



Note: The index value for Jan 2020 has been considered as 100.
Source: Multi-Commodity Exchange of India Ltd. (MCX), National Commodity and Derivatives Exchange Limited (NCDEX), S&P Global and Refinitiv.

Chart 3.4: Movement in select Sectoral Indices in Commodity Derivatives



Note: The index value for Jan 2020 has been considered as 100.
Source: MCX.

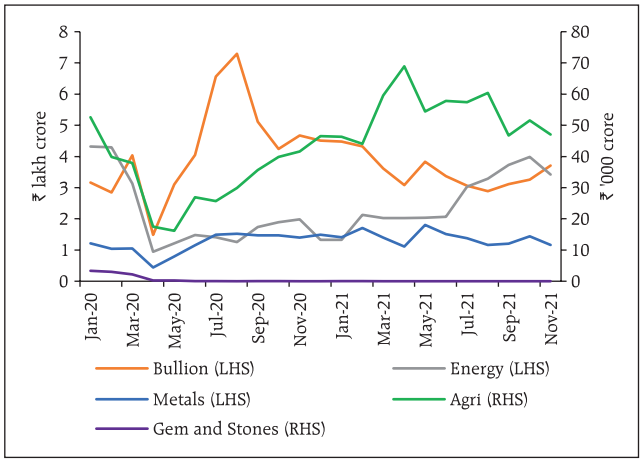
Table 3.8: Segment-wise Aggregate Turnover (Futures + Options)

(₹ crore)

FY Period/Turnover	Agri.	Bullion	Energy	Metals	Gems & Stones	Total Turnover
2020-21 (Apr-Nov)	2,33,199	36,51,498	11,92,105	9,74,567	554	60,51,924
2021-22(Apr-Nov)	4,44,235	26,31,306	23,56,489	10,77,780	0	65,09,810
Change (per cent)	90.5	-27.9	97.7	10.6	-100.0	7.6
Share (per cent) in 2021-22	6.8	40.4	36.2	16.6	0.0	-

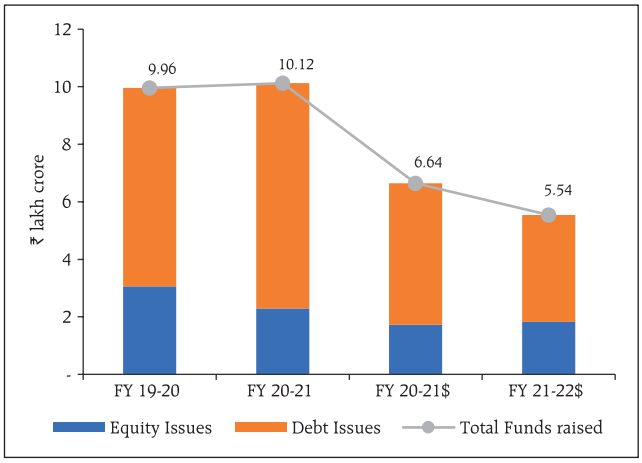
Note: Turnover includes Futures + Option turnover wherein Option Turnover is based on Notional value.
Turnover of Index Futures at MCX and NCDEX added in the respective sector.
Source: MCX, NCDEX, BSE, National Stock Exchange (NSE), Indian Commodity Exchange Ltd. (ICEX)

Chart 3.5: Commodity Derivatives Turnover at Exchanges



Note: Turnover includes Futures + Option turnover wherein Option Turnover is based on Notional value.
Turnover of Index Futures at MCX and NCDEX added in the respective sector.
Source: MCX, NCDEX, BSE, NSE, ICEX.

Chart 3.6: Funds Raised through Primary Market



Note: $ indicates till November end of the respective FY.
Source: Securities and Exchange Board of India (SEBI).

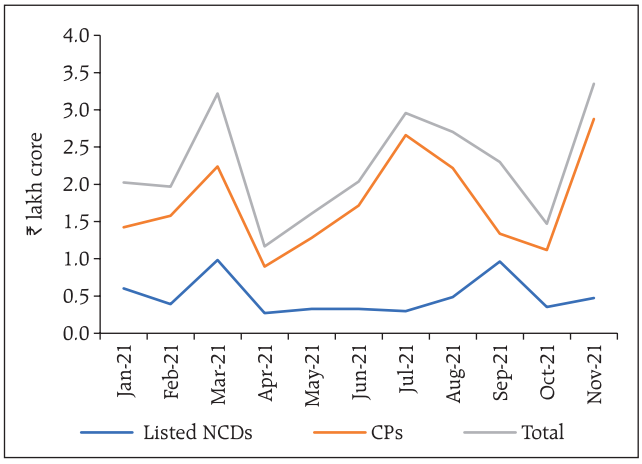
year, with energy derivatives being the driving factor (Table 3.8 and Chart 3.5).

III.4.5 Corporate Bond Market

3.43 The total capital raised in primary markets during the period April - November 2021 through equity [mainly qualified institutional placements (QIPs) and rights issues] and debt issuances stood at ₹5.5 lakh crore (Chart 3.6).

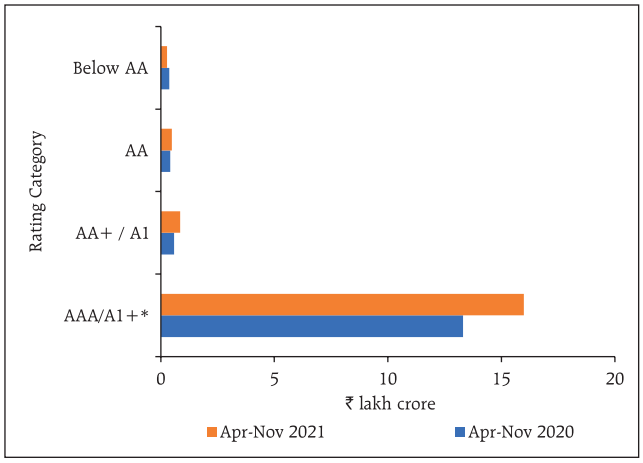
3.44 Issuances of listed NCDs at nearly ₹3.5 lakh crore were 22 per cent lower than those in the corresponding period last year. Conversely, CP issuances by corporates grew by 39 per cent over the same period. Highly rated instruments dominated the issuances (Charts 3.7 and 3.8).

Chart 3.7: Issuances of CPs and NCDs



Source: CDSL, NSDL

Chart 3.8: Rating-wise Issuance of CPs and Listed NCDs



* 97 per cent of the CP issuances are considered as A1+ rated
Source: Securities and Exchange Board of India (SEBI).

3.45 The major issuers of corporate bonds were NBFCs and PSUs, accounting for 59 per cent of outstanding corporate bonds as on September 30, 2021 (Chart 3.9 a) whereas qualified institutional buyers (QIBs), body corporates and mutual funds were their major subscribers (Chart 3.9 b).

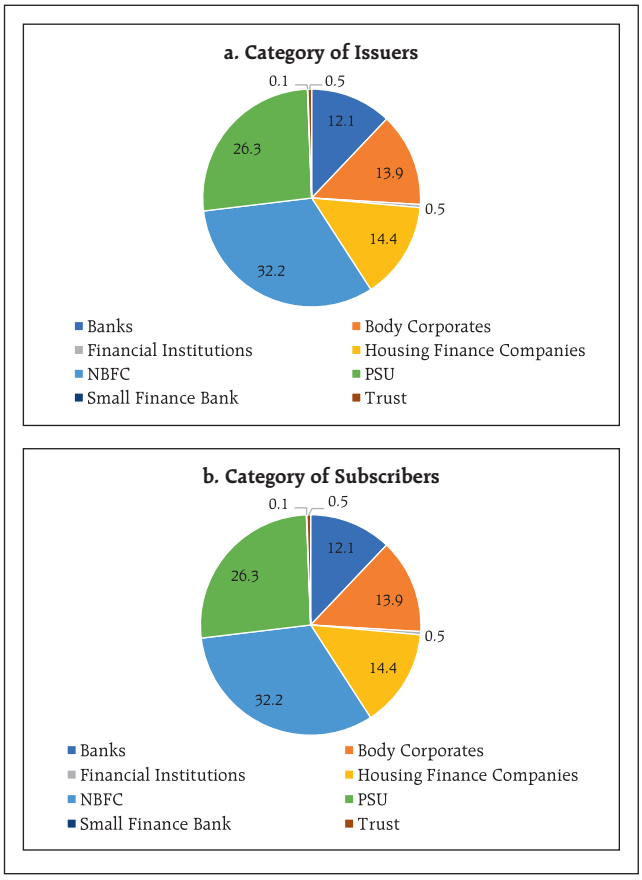
III.4.6 Credit Ratings

3.46 A quarterly analysis of the credit ratings of debt issues of listed companies by major credit rating agencies (CRAs) between Q4:2019-20 and Q2:2021-22 shows that on an aggregate basis, there has been a fall in the share of downgraded issues in general (Chart 3.10).

3.47 Rating downgrades (23 issuers) during the period April-September 2021 spanned across sectors,

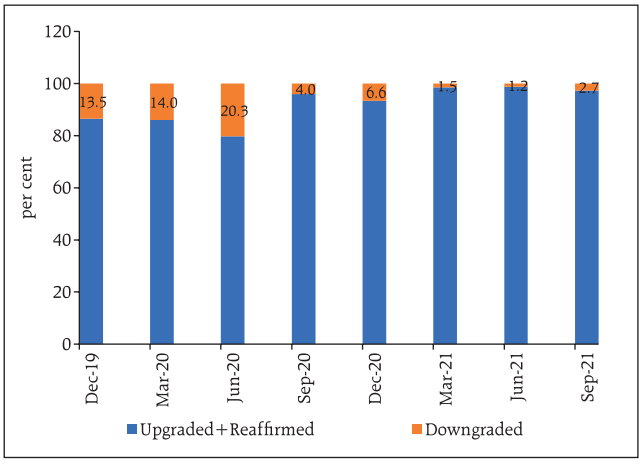
Chart 3.9: Category-wise Issuers and Subscribers of Corporate Bonds

(per cent share)



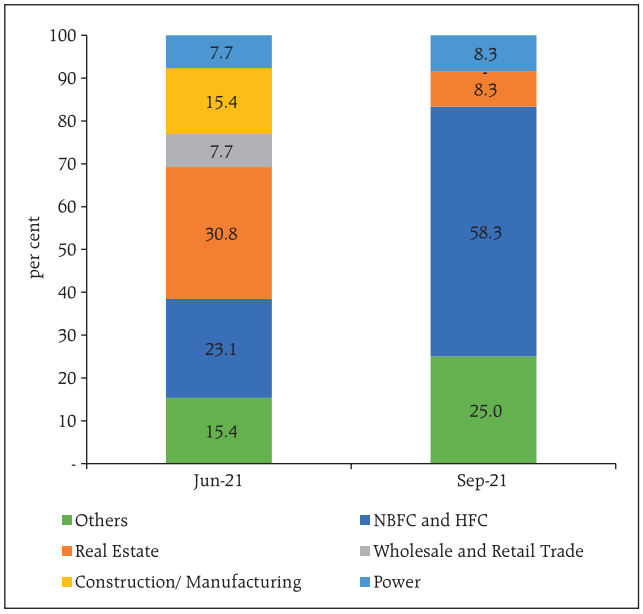
Note: As of September 2021.
Note: *Others include AIFs, CMs, FIs, FIIs, Foreign Nationals, FPI (Individuals), HUFs, IEPFs, NRIs Residents and Others.
Source: Securities and Exchange Board of India (SEBI).

Chart 3.10: Listed Debt Issues by Rating Actions



Source: Individual Credit Rating Agencies (CRAs) - CRISIL, ICRA and CARE.

Chart 3.11: Distribution of Rating Downgrades – Sector-wise



Source: Individual Credit Rating Agencies (CRAs) - CRISIL, ICRA and CARE

with NBFCs and HFCs accounting for the major share during Q2:2021-22 (Chart 3.11).

III.4.7 Insurance

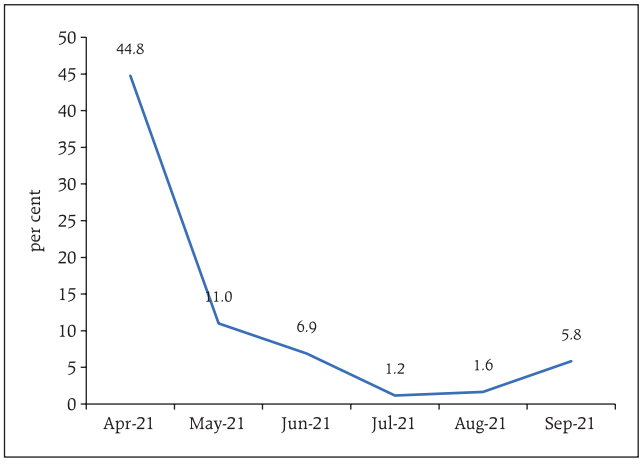
3.48 As of September 2021, the life insurance industry recorded growth of 5.82 per cent in new business premium (Chart 3.12). The total premium, which includes renewal premium, also recovered after a dip (Chart 3.13).

3.49 During the period April 2020 - September 2021, the life insurance industry received 1.38 lakh claims aggregating to ₹13,347 crore for COVID related deaths. Of these, 1.29 lakh death claims amounting to ₹11,059 crore were settled. The claim paid ratio in the above cases stood at 94.7 per cent in number and 84.7 per cent in amount.

III.4.8 Pension Funds

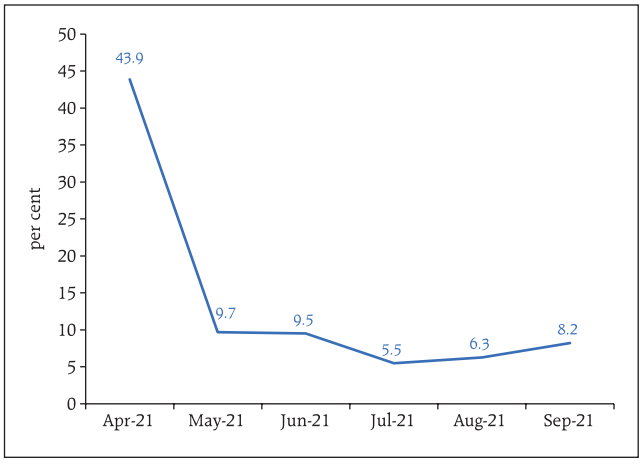
3.50 As on November 30, 2021, the National Pension System (NPS) and the Atal Pension Yojana (APY) recorded growth of 22.5 per cent y-o-y in number of subscribers and 29.1 per cent in the corpus (Charts 3.14 and 3.15).

Chart 3.12: First Year Premium Growth – Life Insurance



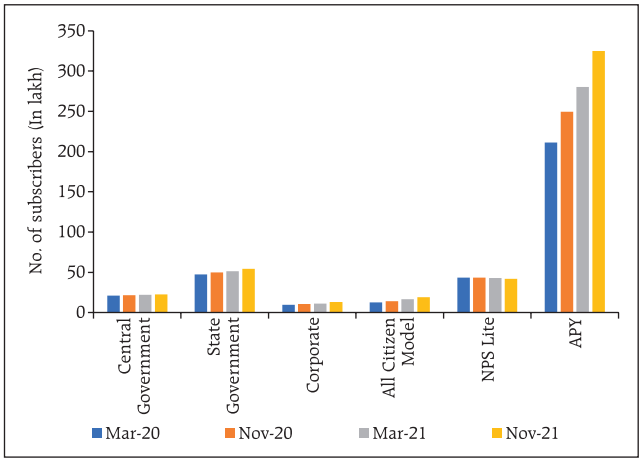
Source: Insurance Regulatory and Development Authority of India (IRDAI).

Chart 3.13: Growth in Total Premium – Life Insurance



Source: Insurance Regulatory and Development Authority of India (IRDAI).

Chart 3.14: NPS and APY Subscribers – Sector-wise



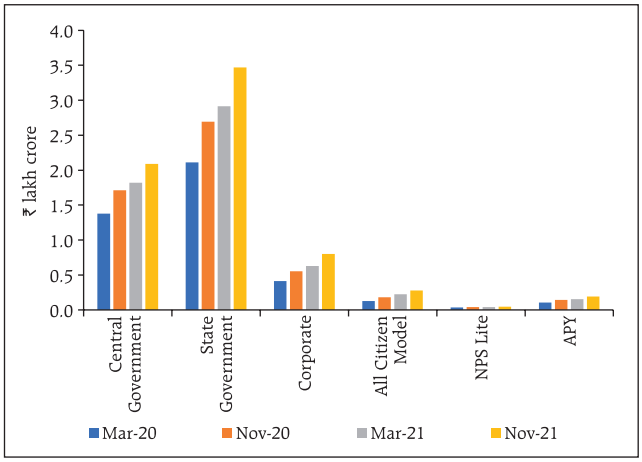
Source: Insurance Regulatory and Development Authority of India (IRDAI).

Summary and Outlook

3.51 The pandemic tested financial sector resilience in unparalleled ways. The financial system has, however, emerged healthier than was the case after the global financial crisis. As the economic outlook remains clouded, the global regulatory regime, which was on a pause mode with regards to ushering in more robust architecture, is putting the process back on course. Significant regulatory and supervisory attention to understand the layered impact of climate change on the economy and financial sector is also an ongoing endeavour.

3.52 Domestically, efforts to develop the regulatory architecture to increase resilience of the financial sector continue apace. The resilience of open-ended mutual funds, managing debt overhangs in the non-financial corporate sector and management of stressed assets remain policy priorities going forward. The new area of sustainable finance is also receiving due importance.

Chart 3.15: NPS and APY AUM – Sector-wise



Source: Pension Fund Regulatory and Development Authority (PFRDA).

Annexure 1

Systemic Risk Survey

Respondents to the 21st round of Systemic Risk Survey perceived all broad groups of risks to the Indian financial system (viz., global spillovers; macroeconomic uncertainty; financial market volatility; institutional vulnerability; and general risks) as 'medium'. Their perception of risks to financial stability included: (a) new wave of the pandemic and new mutations of the coronavirus; (b) faltering of the uneven economic recovery; (c) elevated inflation driven by global energy crisis and supply-side disruptions; and (d) disorderly monetary policy exits. A majority of them expected better prospects for the domestic banking sector over the next one year.

The twenty first round of the Reserve Bank of India's Systemic Risk Survey (SRS) was conducted during November 2021 to capture perceptions on major risks faced by the Indian financial system. For the first time, views of the panellists were also solicited in this round on (i) the sectors/sub-sectors of the Indian economy which are likely to exhibit slower recovery from the impact of the COVID-19 pandemic; (ii) the segments of the financial markets, that are expected to experience higher volatility in the next six months to one year; and (iii) the time frame within which they expect the Indian economy to recover fully from the fallout of the pandemic. The survey results, which are based on feedback from 37 respondents, are encapsulated below.

- The respondents perceived all broad categories of risks to the financial system – global spillovers; macroeconomic uncertainty; financial market volatility; institutional vulnerability; and general risks – as 'medium' in magnitude, but assessed global and financial market risks to be higher *vis-a-vis* other parameters (Figure 1).
- Commodity prices, domestic inflation, equity price volatility, cyber risk, credit growth and asset quality were perceived as the major risk drivers (Figure 2).

Figure 1: Major risk groups identified in the Systemic Risk Survey

Major Risk Groups	Nov-21	Apr-21	Change in Risk Perception*
A. Global Risks			No Change
B. Macroeconomic Risks			Decline
C. Financial Market Risks			Increase
D. Institutional Risks			Decline
E. General Risks			Increase

Source: RBI's Systemic Risk Survey (April 2021 and November 2021).

Note:
Risk Category

Very high	**High**	**Medium**	**Low**	**Very low**

* The risk perception, as it emanates from the half-yearly systemic risk survey may shift (increase/decrease) from one risk category to the other, which is reflected by the change in colour. The risk perception may also shift or remain unchanged within the same risk category (*i.e.*, boxes with the same colour in Figures 1 and 2).

Figure 2: Granular Risks identified in the Systemic Risk Survey

	Risks	Nov-21	Apr-21	Change in Risk Perception*
A. Global Risks	Global growth			Increase
	Sovereign risk / contagion			Decline
	Funding risk (External borrowings)			Decline
	Commodity price risk			Increase
B. Macro-economic Risks	Domestic growth			Decline
	Domestic inflation			Increase
	Current account deficit			Increase
	Capital inflows/ outflows (Reversal of FIIs, Slowdown in FDI)			Decline
	Sovereign rating downgrade			Decline
	Fiscal deficit			Decline
	Corporate sector risk			Decline
	Pace of infrastructure development			Decline
	Real estate prices			Decline
	Household savings			Decline
	Political uncertainty/ governance /policy implementation			Decline
C. Financial Market Risks	Foreign exchange rate risk			No Change
	Equity price volatility			Increase
	Interest rate risk			Increase
	Liquidity risk			Increase
D. Institutional Risks	Regulatory risk			Decline
	Asset quality deterioration			Decline
	Additional capital requirements of banks			Decline
	Access to funding by banks			Decline
	Level of credit growth			Decline
	Cyber risk			Increase
	Operational risk			No Change
E. General Risks	Terrorism			Increase
	Climate related risks			Increase
	Social unrest (Increasing inequality)			Decline

Note:
Risk Category

Very high	High	Medium	Low	Very low

* see footnote in Figure 1.

- Risk perception on global growth, the current account deficit, interest rates, liquidity, terrorism and climate change increased, but remained in the medium risk category.
- Risks posed to domestic growth, capital requirements of banks, the fiscal deficit, and corporate sector vulnerabilities were perceived to have declined.

- Over half of the respondents expected better prospects for the Indian banking sector over the next one year (Chart 1).
- Most respondents assigned medium probability to the occurrence of a high impact event in the global and domestic financial systems up to one to three years ahead (Chart 2), with the share of panellists assigning a low probability to such an event in the domestic financial system rising (Charts 2c, 2d, 2e and 2f).

Chart 1: Prospects for the Indian banking sector - One Year Ahead

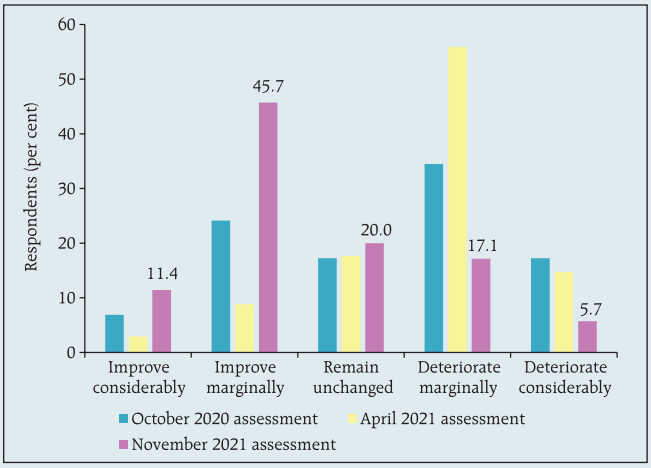
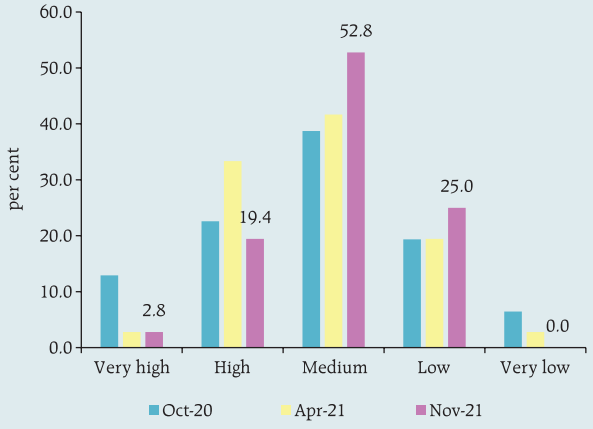


Chart 2: Perception on occurrence of high impact events and confidence in the financial systems

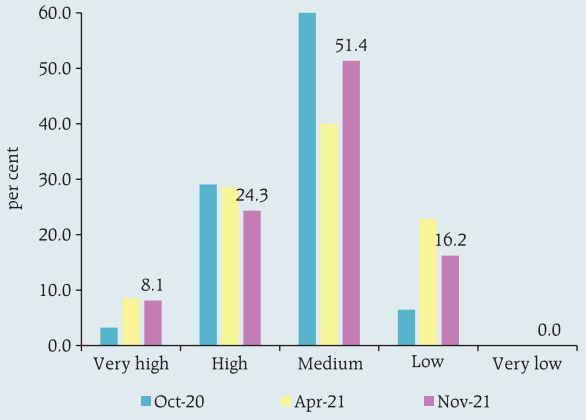
share of respondents (per cent)

A. Probability of high impact event in the global financial system

a. In the short term

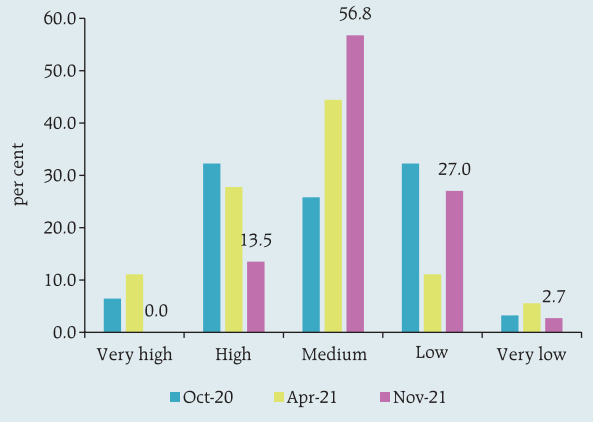


b. In the medium term

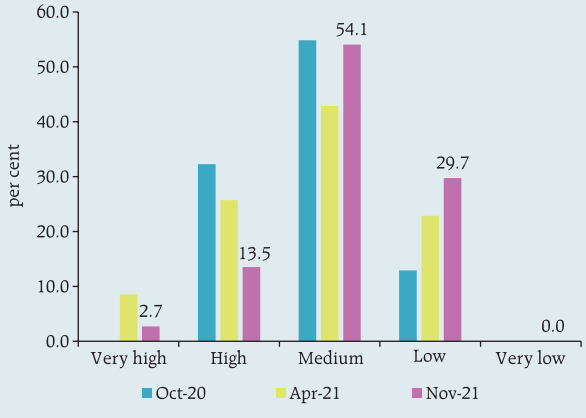


B. Probability of high impact event in the domestic financial system

c. In the short term

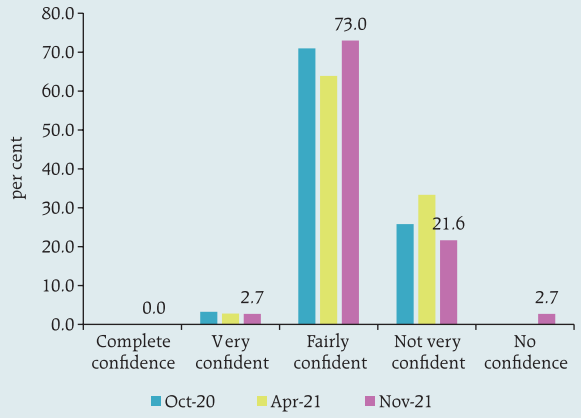


d. In the medium term

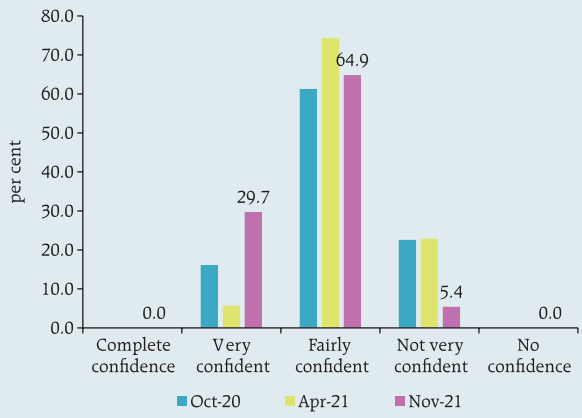


C. Confidence in the financial systems

e. Stability of Global financial system



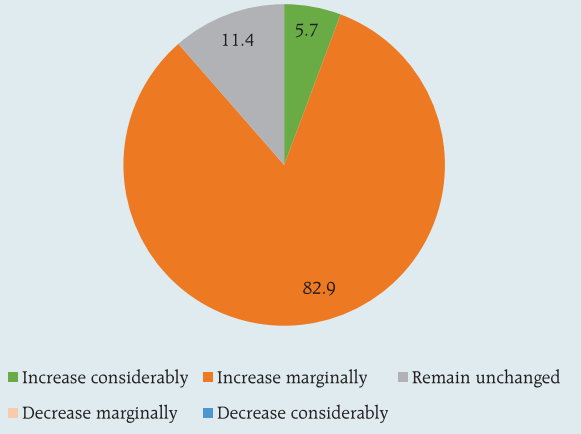
f. Stability of Indian financial system



- Over 80 per cent of the respondents expected a pick-up in credit demand over the next three months, with 43 per cent of them also expecting the quality of banks' assets to improve on account of better macroeconomic prospects, improving financial health of borrowers, setting up of the NARCL and ongoing restructuring of assets (Charts 3 a and 3 b).
- Majority of the respondents expected the Indian economy to recover completely from the fallout of the COVID-19 pandemic in a span of 1-2 years (Chart 4), but contact intensive sectors (tourism and hospitality; aviation; automobiles; MSMEs; retail trade; real estate; and entertainment) could lag over the year ahead.

Chart 3: Indian Banking Sector – Outlook (share in per cent)

a. Demand for credit: Likely change in next three months



b. Average credit quality: Likely change in next three months

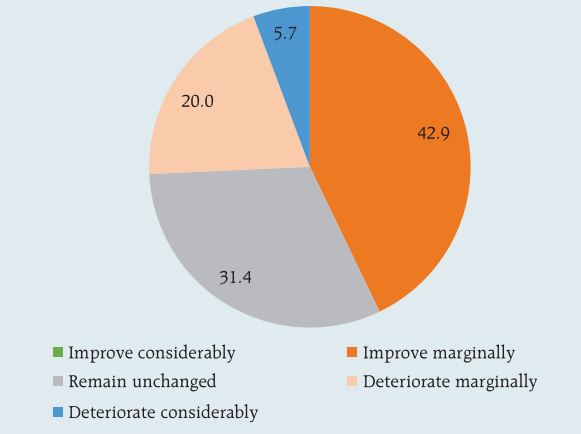
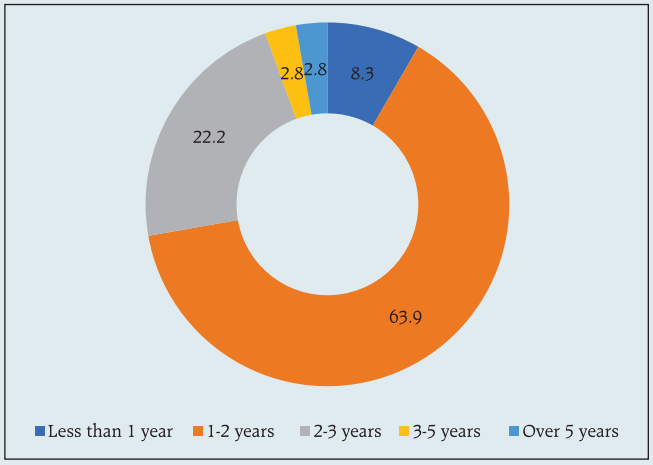


Chart 4: Timeframe for Full Recovery of Indian Economy (share in per cent)



Risks to Financial Stability

Panellists in the 21st round of the Reserve Bank of India's Systemic Risk Survey identified the following major risk factors for financial stability:

- new wave of the pandemic and new mutations of the coronavirus;
- faltering of the uneven recovery, global and domestic;
- rise in and persistence of elevated inflation driven by global energy crisis and supply-side disruptions including reasons of emission control; and
- disorderly monetary policy exits.

Annex 2

Methodologies

2.1 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. Each composite index is a relative measure during the sample period used for its construction, where a higher value means higher risk in that dimension.

The ratios used for constructing each composite index are given in Table 1. Each ratio is first 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. Thereafter, composite index of each dimension is calculated as a weighted average of the normalised ratios used for that dimension where the weights are based on the scores assigned for assessment for the CAMELS rating (exception: equal weights used for efficiency dimension). Thus, each composite index takes values between zero and one. Finally, the banking stability indicator is constructed as a simple average of these five composite indices.

Table 1: Ratios used for constructing the banking stability map and 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 Before Tax #	
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.

Macro stress testing

Macro stress test for credit risk ascertains the resilience of banks against macroeconomic shocks. It assesses the impact of macroeconomic shocks on GNPA ratio of banks (at system level and at major bank-group level) and finally on their capital adequacy (bank-by-bank and system level for a sample of 46 banks).

Impact of GNPA ratio

Here, the slippage ratio (SR)[1] is modelled as a function of macroeconomic variables, using various econometric models that relate the select banking system aggregates to macroeconomic variables. The system-level and bank group-level slippage ratios are modelled using (i) multivariate regression; (ii) VAR and (iii) quantile regression. The banking system aggregates include current and lagged values of slippage ratio, while macroeconomic variables include gross domestic product (GDP), weighted average lending rate (WALR), CPI (combined) inflation, exports-to-GDP ratio, annualized current account balance-to-GDP ratio and annualized combined gross fiscal deficit-to-GDP ratio.

While multivariate regression allows evaluating the impact of select macroeconomic variables on the banking system's GNPA, the VAR model takes into account the feedback effect also. In these methods, the conditional mean of slippage ratio is estimated wherein 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, wherein conditional quantile is estimated instead of the conditional mean to deal with tail risks and to account for the non-linear impact of macroeconomic shocks.

The following econometric models are used to estimate the impact of macroeconomic shocks on the slippage ratio:

System level models

The system level GNPAs are projected using three different but complementary econometric models: multivariate regression, VAR and quantile regression. The final projection is derived by averaging the projections based on these three models.

- *Multivariate regression*

  The following multivariate regression model is used for projecting the slippage ratio of SCBs as a whole:

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

  where, α_1, β_1, β_2, β_3, β_4, β_5 and $\beta_6 > 0$

- *VAR model*

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

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

  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.

The VAR model is estimated using slippage ratio, real WALR, nominal GDP growth, annualized current account balance-to-GDP ratio and annualized combined gross fiscal deficit-to-GDP ratio. The appropriate

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

order of VAR selected based on minimum information criteria as well as other diagnostics is two. The impact of various macroeconomic shocks is determined using the impulse response function of the selected VAR.

- *Quantile regression*

  The following quantile regression model is used to estimate the conditional quantile of slippage ratio at 0.8:

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

Bank group level models

The bank group-wise slippage ratios are projected using three different but complementary econometric models: multivariate regression, VAR and quantile regression. The final projection is derived by averaging the projections based on these three models.

- *Multivariate regression*

  The following multivariate regressions are used to model the slippage ratio of various bank groups:

  Public Sector Banks (PSBs):

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

  Private Sector Banks (PVBs):

  $$SR_t = \alpha_1 + \beta_1 SR_{t-1} + \beta_2 RWALR_{t-3} - \beta_3 \Delta NGDP_{t-1} - \beta_4 \left(\frac{EXP}{GDP}\right)_{t-1} + \beta_5 Dummy$$

  Foreign Banks (FBs):

  $$SR_t = \alpha_1 + \beta_1 SR_{t-1} + \beta_2 \Delta^2 CPI_{t-4} + \beta_3 \Delta\left(\frac{GFD}{GDP}\right)_{t-3} - \beta_4 \Delta\left(\frac{EXP}{GDP}\right)_{t-1} + \beta_5 Dummy$$

- *VAR model*

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

  PSBs: NGDP, RWALR, CAB- to -GDP ratio and GFD- to- GDP ratio of order 1.

  PVBs: NGDP, RWALR and exports- to- GDP ratio of order 1.

  FBs: GDP, CPI, exports- to- GDP ratio and GFD-to-GDP ratio of order 1.

- *Quantile regression*

  The following quantile regression models are used to model the conditional quantile of slippage ratios at 0.8 for various bank groups:

  Public Sector Banks (PSBs):

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

  Private Sector Banks (PVBs):

  $$SR_t = \alpha_1 + \beta_1 SR_{t-1} + \beta_2 RWALR_{t-4} - \beta_3 \Delta NGDP_{t-1} - \beta_4 \left(\frac{EXP}{GDP}\right)_{t-1} - \beta_5 \left(\frac{CAB}{GDP}\right)_{t-3} + \beta_6 Dummy$$

Foreign Banks (FBs):

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

Estimation of GNPAs from slippages

Once, slippage ratio is projected using the above-mentioned models, GNPA is projected using the identity given below:

$$GNPA_{t+1} = GNPA_t + Slippage_{(t,t+1)} - Recovery_{(t,t+1)} - Write\text{-}off_{(t,t+1)} - Upgradation_{(t,t+1)}$$

Derivation of GNPAs from slippage ratios, which are projected using the above mentioned credit risk econometric models, are based on the following assumptions: credit growth of 6.9 per cent, 7.5 per cent, 7.7 per cent and 7.8 per cent respectively; recovery rates of 3.6 per cent, 2.6 per cent, 2.0 per cent and 3.0 per cent, respectively; write-off rates of 5.7 per cent, 7.3 per cent, 5.3 per cent and 5.1 per cent respectively; upgradation rates of 1.0 per cent, 1.2 per cent, 2.3 per cent and 2.3 per cent respectively during quarters ending December 2021, March 2022, June 2022 and September 2022.

Impact on capital adequacy

The impact of macro shocks on capital adequacy of banks is captured through the following steps;

i. The impact on future capital accumulation is captured through projection of profit under the assumed macro scenarios, assuming that only 25 per cent of profit after tax (PAT) (which is minimum regulatory requirements) goes into capital of banks.

ii. The requirement of additional capital in future are projected by estimating risk-weighted assets (RWAs) using internal rating based (IRB) formula.

Formulae used are:

$$CRAR_{t+1} = \frac{Capital_t + 0.25 * PAT_{t+1}}{RWAs(credit\ risk)_{t+1} + RWAs(others)_{t+1}}$$

$$Common\ Equity\ Tier\ 1\ Capital\ Ratio_{t+1} = \frac{CET1_t + 0.25 * PAT_{t+1}}{RWAs(credit\ risk)_{t+1} + RWAs(others)_{t+1}}$$

where, PAT is projected using satellite models, elucidated in the subsequent section. RWAs (others), which is total RWAs minus RWAs of credit risk, is projected based on average growth rate observed in the past one year. RWAs (credit risk) is estimated using the IRB formula given below:

***IRB Formula**: Bank-wise RWA for credit risk is estimated using the following IRB formula;*

$$RWAs(credit\ risk) = 12.5 \times \left(\sum_{i=1}^{n} EAD_i \times K_i\right)$$

where, EADi is exposure at default of the bank in the sector i (i=1,2….n).

Ki is minimum capital requirement for the sector i which is calculated using the following formula:

$$= \left[LGD_i \times N\left[(1-R_i)^{-0.5} \times G(PD_i) + \left(\frac{R_i}{1-R_i}\right)^{0.5} \times G(0.999)\right] - PD_i \times LGD_i\right]$$
$$\times \left(1 - 1.5 \times b(PD_i)\right)^{-1} \times \left(1 + (M_i - 2.5) \times b(PD_i)\right)$$

where, LGD_i is loss given default of the sector i, PD_i is probability of default of the sector i, N(..) is cumulative distribution function of standard normal distribution, G(..) is inverse of cumulative distribution function of standard normal distribution, M_i is average maturity of loans of the sector (which is taken 2.5 for all the sector in this case), $b(PD_i)$ is smoothed maturity adjustment and R_i is correlation of the sector i with the general state of the economy. Calculation of both, b(PD) and R depend upon PD.

This IRB formula requires three major inputs, namely, sectoral PD, EAD and LGD. Here, sectoral PDs are proxied by annual slippage of the respective sectors using banking data. PD for a particular sector is taken as same (*i.e.* systemic shocks) for each of the 46 selected banks, whereas, EAD for a bank for a particular sector is total outstanding loan (net of NPAs) of the bank in that particular sector. Further, assumption on LGD was taken as follows; under the baseline scenario, LGD = 60 per cent (broadly as per the RBI guidelines on 'Capital Adequacy - The IRB Approach to Calculate Capital Requirement for Credit Risk'), which increases to 65 per cent under medium macroeconomic risk scenario and 70 per cent under severe macroeconomic risk.

Selected sectors: The following 17 sectors/sub-sectors (and others) are selected for the stress test.

Table 2: List of selected sectors/sub-sectors

Sr. No.	Sector/Sub-sector	Sr. No.	Sector/Sub-sector
1	Engineering	10	Basic Metal and Metal Products
2	Auto	11	Mining
3	Cement	12	Paper
4	Chemicals	13	Petroleum
5	Construction	14	Agriculture
6	Textiles	15	Retail-Housing
7	Food Processing	16	Retail-Others
8	Gems and Jewellery	17	Services
9	Infrastructure	18	Others

The stochastic relationship of sectoral annual slippage ratio (*i.e.* sectoral PDs) with macro variables is estimated using multivariate regression for each sector. Using these estimated regressions, sectoral PDs of each sector are projected for four quarters ahead under assumed baseline as well as two adverse scenarios, namely, medium stress and severe stress. The sectoral regression models are presented in the next section.

The bank-wise profit after tax (PAT) is projected using the following steps:

- Components of PAT (*i.e.* Net Interest Income(NII), Other Operating Income(OOI), Operating Expenses(OE) and Provisions & Write off) of each bank-group is projected under baseline and adverse scenarios, using the method explained in the subsequent section.
- Share of components of PAT of each bank (except income tax) in their respective bank-group is calculated.
- Each component of PAT (except income tax) of each bank is projected from the projected value of the component of PAT of respective bank-group and applying that bank's share in the particular component of PAT.

- Finally, bank-wise PAT was projected by appropriately adding or subtracting their components estimated in the previous step and using income tax rate at 35 per cent.

Using these formulae, assumptions and inputs, impact of assumed macro scenarios on the capital adequacy of each bank is estimated and future change in capital adequacy under baseline from the latest observed data and change in the capital adequacy of banks from baseline to adverse macro shocks are calculated. Finally, these changes are appropriately applied on the latest observed capital adequacy (under Standardised Approach) of the bank.

Projection of Sectoral PDs

1. *Engineering*

$$\Delta PD_t = \alpha + \beta_1 \Delta PD_{t-1} + \beta_2 \Delta WALR_{t-2} - \beta_3 \left(\frac{EXP}{GDP}\right)_{t-2} - \beta_4 \Delta GVA(Industry)_{t-3} + \beta_5 Dummy$$

2. *Auto*

$$PD_t = \alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GDP_{t-1} + \beta_3 WALR_{t-1} - \beta_4 \left(\frac{EXP}{GDP}\right)_{t-2} + \beta_5 \Delta CPI_{t-2} + \beta_6 Dummy$$

3. *Cement*

$$PD_t = \alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GDP_{t-2} + \beta_3 \Delta WALR_{t-1} - \beta_4 \left(\frac{EXP}{GDP}\right)_{t-2} + \beta_5 Dummy$$

4. *Chemicals and Chemical Products*

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta WALR_{t-1} - \beta_3 \Delta GDP_{t-1} + \beta_4 Dummy_t$$

5. *Construction*

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta WALR_{t-1} - \beta_3 \left(\frac{EXP}{GDP}\right)_{t-1} - \beta_4 \Delta GDP_{t-1} + \beta_5 Dummy_t$$

6. *Textiles*

$$PD_t = \alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GDP_{t-1} + \beta_3 \Delta WALR_{t-1} - \beta_4 \left(\frac{EXP}{GDP}\right)_{t-2} + \beta_5 \Delta CPI_{t-3} + \beta_6 Dummy$$

7. Food Processing

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta WALR_{t-3} - \beta_3 \left(\frac{EXP}{GDP}\right)_{t-1} - \beta_4 \Delta GDP_{t-2} + \beta_5 Dummy_t$$

8. Gems and Jewellery

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta WALR_{t-1} - \beta_3 \left(\frac{EXP}{GDP}\right)_{t-3} - \beta_4 \Delta GDP_{t-2} + \beta_5 Dummy_t$$

9. Infrastructure

$$PD_t = \alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GDP_{t-2} + \beta_3 WALR_{t-1} + \beta_4 \Delta CPI_{t-1} + \beta_5 Dummy_t$$

10. Basic Metal and Metal Products

$$PD_t = \alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GDP_{t-3} + \beta_3 WALR_{t-1} - \beta_4 \left(\frac{EXP}{GDP}\right)_{t-1} + \beta_5 Dummy_t$$

11. Mining and Quarrying

$$PD_t = \alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GDP_{t-2} + \beta_3 \Delta CPI_{t-1} - \beta_4 \left(\frac{EXP}{GDP}\right)_{t-2} + \beta_5 Dummy_t$$

12. Paper and Paper Products

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta WALR_{t-4} - \beta_3 \left(\frac{EXP}{GDP}\right)_{t-2} - \beta_4 \Delta GDP_{t-1} + \beta_5 Dummy_t$$

13. *Petroleum and Petroleum Products*

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta WALR_{t-2} - \beta_3 \left(\frac{EXP}{GDP}\right)_{t-2} - \beta_4 \Delta GDP_{t-2} + \beta_5 Dummy_t$$

14. *Agriculture*

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta WALR_{t-1} - \beta_3 \left(\frac{EXP}{GDP}\right)_{t-2} - \beta_4 \Delta GDP_{t-1} + \beta_5 Dummy_t$$

15. *Services*

$$\Delta PD_t = \alpha + \beta_1 \Delta PD_{t-1} + \beta_2 \Delta WALR_{t-1} - \beta_3 \left(\frac{EXP}{GDP}\right)_{t-2} - \beta_4 \Delta GDP_{t-2} + \beta_5 \Delta CPI_{t-1}$$

16. *Retail Housing*

$$\Delta PD_t = \alpha + \beta_1 \Delta PD_{t-1} + \beta_2 \Delta WALR_{t-2} - \beta_3 \Delta GDP_{t-1}$$

17. *Other Retail*

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta WALR_{t-2} - \beta_3 \left(\frac{EXP}{GDP}\right)_{t-1} + \beta_4 Dummy_t$$

18. *Others*

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta WALR_{t-2} - \beta_3 \Delta GDP_{t-1} + \beta_4 Dummy_t$$

Projection of bank-group wise PAT

The various components of PAT of major bank-groups (namely, PSBs, PVBs and FBs), such as, NII, OOI, OE and Provisions & Writeoff are projected using different time series econometric models (as given below). Finally, PAT is estimated using the following identity:

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

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 is projected using the following regression model:

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

$LNII$ is log of NII. $LNGDP\_SA$ is seasonally adjusted log of nominal GDP. Adv_Gr is the y-o-y growth rate of loans and 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): Log of OOI (LOOI) of SCBs is projected using the following regression model:

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

Operating Expense (OE): OE of SCBs is projected using an Autoregressive Moving Average (ARMA) model.

Provisions (including write-off): The required provisioning is projected using the following regression:

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

P_Adv is provisions to total advances ratio. ΔGDP is the y-o-y growth rate of real GDP. $GNPA$ is gross non-performing assets to total advances ratio.

Income Tax: The applicable income tax is 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.

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 (includes concentration risk)

To ascertain the resilience of banks, the credit portfolio was given a shock by increasing GNPA ratio for the entire portfolio. 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 (exposure based) the additional GNPAs under the assumed shocks were considered to fall into sub-standard category only and for credit concentration risk (based on stressed advances), stressed advances were considered to fall into loss category. 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.

Sectoral Risk

To ascertain the Sectoral credit risk of individual banks, the credit portfolios of particular sector was given a shock by increasing GNPA ratio for the sector. The analysis was carried out both at the aggregate level as well as at the individual bank level. Sector specific shocks based on standard deviation(SD) of GNPA ratios of a sector are used to study the impact on individual banks. The additional GNPAs under the assumed shocks were considered to fall into sub-standard category only. 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.

Equity price risk

Under the equity price risk, impact of a shock of a fall in the equity price index, by certain percentage points, on profit and bank capital were examined. The fall in value of the portfolio or income losses due to change in equity prices are accounted for the total loss of the banks because of the assumed shock. The estimated total losses so derived were reduced from the banks' capital.

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.

Bottom-up Stress testing: Select banks

Bottom-up sensitivity analysis was performed by 18 select scheduled commercial banks. A set of common scenarios and shock sizes were provided to the select banks. The tests were conducted using March 2021 data. Banks used their own methodologies for calculating losses in each case.

Bottom-up stress testing: Derivatives portfolios of select banks

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

	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

2.2 Primary (urban) Co-operative Banks

Stress testing of UCBs was conducted with reference to the reported position as on March 31, 2021. The banks were subjected to baseline, medium and severe stress scenarios in the areas of credit risk, market risk and liquidity risk as follows:

a. Credit Default Risk

- Under Credit Default Risk, the model aims to assess the impact of stressed credit portfolio of a bank on its CRAR.
- Arithmetic mean of annual growth rate was calculated based on reported data of NPAs between 2009 and 2020 of the UCB sector as a whole.
- The annual growth rate was calculated separately for each NPA class (sub-standard, D1, D2, D3 and loss assets). This annual growth rate formed the baseline stress scenario, which was further stressed by applying shocks of 1.5 Standard Deviation (SD) and 2.5 SD to generate medium and severe stress scenarios for each category separately.
- Based on the above methodology, the annual NPA growth rate matrix arrived at under the three stress scenarios was as below. These were further adjusted bank wise based on their NPA divergence level.

(per cent)

	Increase in Substandard Assets	Increase in D1 assets	Increase in D2 assets	Increase in D3 assets	Increase in Loss assets
Baseline Stress	22.06	18.08	16.53	13.88	4.81
Medium Stress	61.93	47.00	41.24	51.32	16.51
Severe Stress	88.52	66.27	57.71	76.27	24.31

b. Credit Concentration Risk

- It was assumed that under the three stress scenarios the top 1, 2 and 3 single borrower exposures respectively move from 'Standard Advances' category to 'Loss Advances' category leading to 100 per cent provisioning and its consequent impact on CRAR.

c. Interest Rate Risk in Trading Book

- The duration analysis approach was adopted for analyzing upward movement of interest rates on AFS and HFT portfolio of UCBs.
- Due to absence of data with respect to Modified Duration (MD) for UCBs, the model used the Weighted Average MD of small finance bamks (SFBs) given the structural similarities between SFBs and UCBs, with an increase of 50 basis points as a conservative approach.
- Upward movement of interest rates by 50 bps, 150 bps and 250 bps were assumed under the three stress scenarios and provisioning impact on CRAR was assessed.

d. Interest Rate Risk in Banking Book

- The Banking Book of UCBs was subjected to interest rate shocks of 50 bps, 150 bps and 250 bps under three stress scenarios and impact on Net Interest Income was arrived at.

Liquidity Risk

The stress test was conducted based on cumulative cash flows in the 1-28 days' time bucket. The cash inflows and outflows were stressed under baseline, medium, and severe scenarios as below:

(per cent)

Stress Scenario	Decrease in Inflows	Increase in Outflows
Baseline	5	25
Medium	5	50
Severe	5	100

The banks with negative cumulative mismatch (cash inflow less cash outflow) exceeding 20 per cent of the outflows were considered to be under stress on the basis of the circular RBI/2008-09/174 UBD. PCB. Cir. No12/12.05.001/2008-09 dated September 17, 2008, which stipulates that the mismatches (negative gap between cash inflows and outflows) during 1-14 days and 15-28-days' time bands in the normal course should not exceed 20 per cent of the cash outflows in each time band.

2.3 NBFC Stress Testing – Single factor sensitivity analysis

Credit Risk

A shock was applied to the credit portfolio of NBFCs at individual level and system level by increasing the GNPA ratio by 1 SD and 2 SD under medium and high-risk scenarios. Credit exposure and risk weighted assets (RWA) were assumed to grow at 75 per cent of compound annual growth rate compounded annual growth rate (CAGR) over the past three years. Additional NPAs due to shocks in credit risk were added to sub-standard advances and existing GNPAs were distributed based on ageing impact as per the extant regulations on provisioning requirements. Provisioning requirements were applied at 10 per cent for substandard advances, at the existing proportion as on March 2021 for doubtful advances and at 100 per

cent for loss advances as per the regulatory requirements. Additional provision requirements and income loss due to increase in GNPA were deducted from the earnings before provisions and taxes (EBPT) for 2020-21 to calculate new profit before tax (PBT). Tax rate of 22 per cent was applied to calculate profit after tax (PAT) and the entire PAT was accrued to existing capital with no dividend payment assumption. Based on the new capital and RWA, new capital to risk weighted assets ratio (CRAR) was arrived at for individual NBFCs and entire sector for the assumed scenarios.

Liquidity Risk

Stressed cash flows and mismatch in liquidity position were calculated by assigning predefined stress percentage to the overall cash inflows and outflows in different time buckets over the next one year. Projected outflows and inflows as on March 2021 over the next one year were considered for calculating the liquidity mismatch under baseline scenario. The shocks applied were 5 per cent and 10 per cent decrease in inflows and 10 per cent and 15 per cent increase in outflows for time buckets over the next one year for the medium and high risk scenarios respectively. Cumulative liquidity mismatch due to such shocks were calculated as per cent of cumulative outflows and NBFCs presenting negative cumulative mismatch were identified.

2.4 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 Ratio: This statistic measures the extent of links between the nodes relative to all possible links in a complete graph. For a directed graph, denoting total number of out degrees to equal $K = \sum_{i=1}^{N} k_i$ and N as the total number of nodes, connectivity ratio 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 *ki* neighbours the total number of all possible directed links between them is given by *ki (ki-1)*. Let *Ei* denote the actual number of links between agent i's *ki* neighbours, *viz.* those of i's *ki* neighbours who are also neighbours. The clustering coefficient Ci for bank i is given by the identity:

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

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

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

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 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 Tier-I CRAR goes below 7 per cent. The net receivables have been considered as loss for the receiving bank.

Liquidity contagion analysis

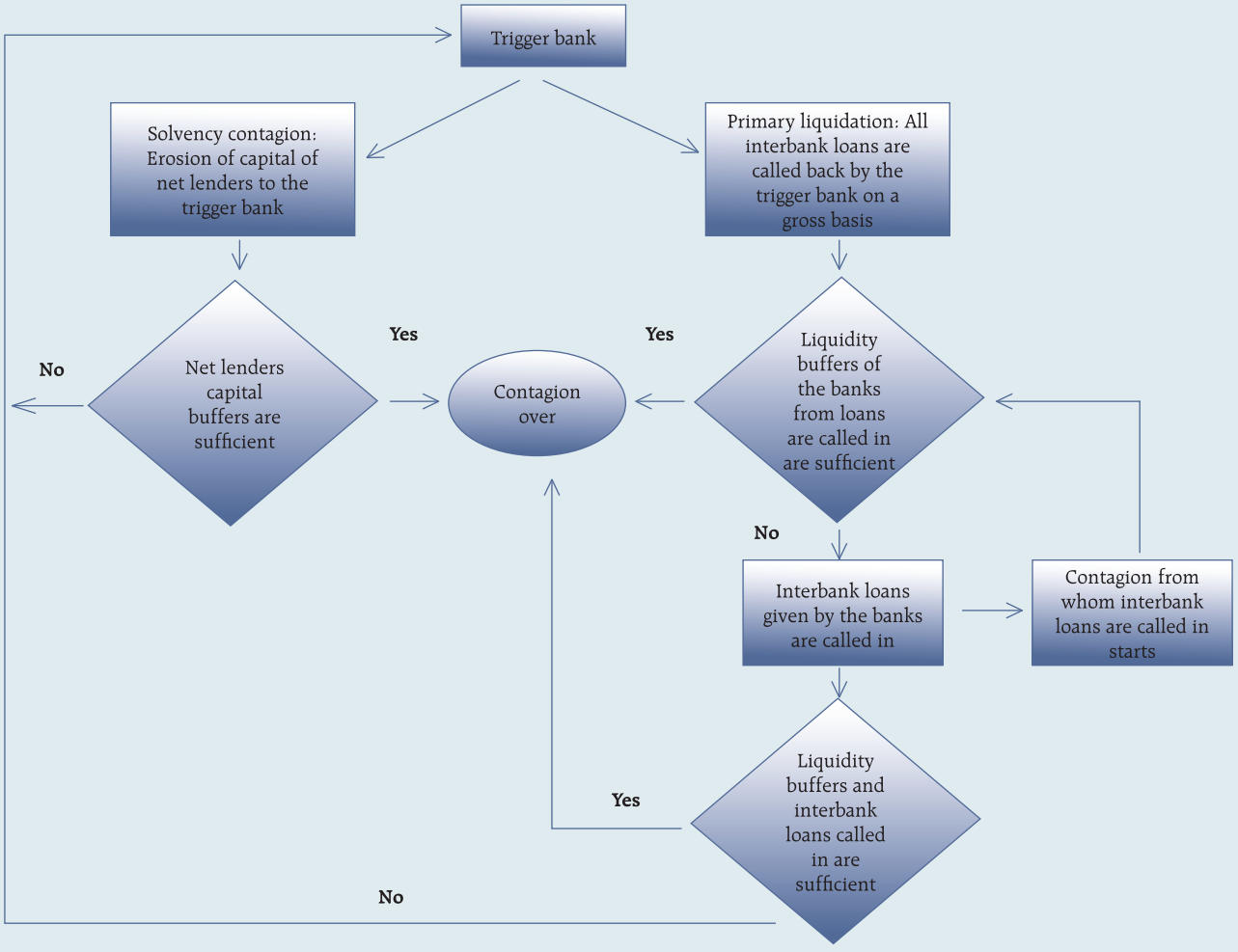
While the solvency contagion analysis assesses potential loss to the system owing to failure of a net borrower, liquidity contagion estimates potential loss to the system due to the failure of a net lender. The analysis is conducted on gross exposures between banks. The exposures include fund based and 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) 18 per cent of NDTL. 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 (referred to as primary liquidation), 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. This is referred to as secondary liquidation).

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.

Since equity and long-term loans may not crystallize in form of liquidity outflows for the counterparties of failed entities, they are not considered as callable in case of primary liquidation. Also, as the RBI guideline dated March 30, 2021 permits the bilateral netting of the MTM values in case of derivatives at counterparty level, exposures pertaining to derivative markets are considered to be callable on net basis in case of primary liquidation.

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.

Annex 3

Important Regulatory Measures

1) Reserve Bank of India

Date	Regulation	Rationale
July 28, 2021	**Access for Non-banks to Centralised Payment Systems:** Participation in centralised payment systems was widened with the inclusion of non-bank payment system providers, viz. prepaid payment instrument issuers, card networks and white label ATM operators as direct members.	To encourage participation of non-banks and lower the overall risk in the Reserve Bank operated payment systems.
August 03, 2021	**Framework for Outsourcing of Payment and Settlement-related Activities by Payment System Operators (PSO):** The framework which is applicable to non-bank PSOs sets minimum standards to manage risks in outsourcing of payment and / or settlement-related activities. PSOs need to comply with outsourcing framework by March 31, 2022.	To enable effective management of attendant risks in outsourcing of such activities.
August 17, 2021	**Financial Inclusion Index:** A Comprehensive Financial Inclusion Index (FI-Index) has been introduced comprising of three broad parameters (weights indicated in brackets) *viz.*, access (35 per cent), usage (45 per cent), and quality (20 per cent) with each of these consisting of various dimensions, which are computed based on a number of indicators. The annual FI-Index for the period ending March 2021 was 53.9 as against 43.4 for the period ending March 2017. The FI-Index will be published annually in July every year.	To measure the extent of financial inclusion across the country.
August 25, 2021	**Tokenisation – Card Transactions: Extending the Scope of Permitted Devices:** The Tokenised card transaction facility which was available only for mobile phones and tablets has been extended to other consumer devices – laptops, desktops, wearables (wrist watches, bands, *etc.*), Internet of Things (IoT) devices, *etc.* The device-based tokenisation framework was further extended to Card-on-File Tokenisation (CoFT) services vide circular dated September 07, 2021.	To extend tokenisation facilities to a broader class of devices to reduce vulnerability to frauds.

Date	Regulation	Rationale
August 26, 2021	**PIDF scheme extended to street vendors:** Street vendors identified as part of the PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi Scheme) in tier-1 and tier-2 centres were included as beneficiaries under the Payments Infrastructure Development Fund (PIDF) Scheme which is meant to encourage deployment of Point of Sale (PoS) infrastructure (both physical and digital modes) in tier-3 to tier-6 centres and north eastern states. This was in addition to street vendors in tier-3 to tier-6 centres who had already been covered under the Scheme earlier.	To provide fillip to the Reserve Bank's efforts towards promoting digital transactions at the grass root level.
September 24, 2021	**Securitisation of Standard Assets:** Master Direction – Reserve Bank of India (Securitisation of Standard Assets) Directions, 2021 was issued.[1]	To align with prudent global best practices and for development of a robust securitisation market.
September 24, 2021	**Transfer of Loan Exposures:** Master Direction – Reserve Bank of India (Transfer of Loan Exposures) Directions, 2021 was issued.[2]	To provide lenders greater flexibility in managing their risks and liquidity associated with loan exposures.
September 28, 2021	**Use of any alternative reference rate in place of LIBOR for interest payable in respect of export / import transactions:** In respect of export/import transactions AD banks were permitted to use any widely accepted/ alternative reference rate in place of LIBOR linked interest rates in the currency concerned.	In view of the impending cessation of LIBOR as a benchmark rate.
October 08, 2021	**Fourth regulatory sandbox Cohort:** RBI announced that 'Prevention and Mitigation of Financial Frauds' will be the theme for the Fourth Cohort under Regulatory Sandbox.	With a view to preparing the fintech ecosystem for fraud management.
October 22, 2021	**Scale Based Regulation for NBFCs:** A four-layered scale-based approach to regulate NBFCs starting from October 1, 2022, was introduced.[3]	To align the regulatory framework for NBFCs keeping in view their changing risk profile and systemic significance

[1] Key aspects of the Directions are highlighted in para 3.20 of Chapter III: Regulatory Initiatives in the Financial Sector.

[2] Key aspects of the Directions are highlighted in paras 3.17 to 3.19 of Chapter III: Regulatory Initiatives in the Financial Sector.

[3] Key aspects of the framework are highlighted in para 3.22 of Chapter III: Regulatory Initiatives in the Financial Sector.

Date	Regulation	Rationale
November 2, 2021	**Prompt Corrective Action (PCA) Framework for Scheduled Commercial Banks:** The PCA Framework for banks was revised. Apart From specifying the parameters relating to Capital, Asset Quality and Leverage that will be considered while placing a bank under PCA and the mandatory and discretionary actions that could be taken, the revised framework stipulates the conditions to be fulfilled for a bank to exit PCA.	To enable supervisory intervention at the appropriate time and require the Supervised Entity to initiate and implement remedial measures in a timely manner, so as to restore its financial health.
November 12, 2021	**Prudential norms on Income Recognition, Asset Classification and Provisioning pertaining to Advances (IRACP) – Clarifications:** The clarifications on existing IRACP norms pertain to, *inter alia*, specification of repayment date, classification of loans as SMA/NPA, upgradation of NPA accounts, loans under moratorium and consumer education.	To ensure uniformity in the implementation of IRACP norms across all lending institutions.
November 12, 2021	**Retail Direct Scheme:** The Retail Direct Scheme was launched facilitating investors to open a Retail Direct Gilt (RDG) Account with the Reserve Bank of India towards investing in G-Secs.	To provide retail investors easy access to the government securities market.
November 12, 2021	**The Reserve Bank - Integrated Ombudsman Scheme, 2021:** The three existing Ombudsman Schemes for Banks, NBFCs and System Participants[4] were merged into a single scheme viz., the Reserve Bank – Integrated Ombudsman Scheme, 2021 adopting the 'One Nation One Ombudsman' approach for grievance redressal.	To make the process of grievance redressal simpler and more responsive to the customers of Regulated Entities.
November 15, 2021	**Appointment of Internal Ombudsman by NBFCs:** Deposit-taking NBFCs (NBFCs-D) with 10 or more branches and non-deposit taking NBFCs (NBFCs-ND) with asset size of ₹5,000 crore and above and having public customer interface have been directed to appoint an Internal Ombudsman within six months from the date of issue of direction.	To strengthen internal grievance redressal system of NBFCs.

[4] System Participant' means any person other than a bank participating in a payment system as defined under Section 2 of the Payment and Settlement Systems Act, 2007 excluding a 'System Provider'.

2) Securities and Exchange Board of India

Date	Regulation	Rationale
July 15, 2021	Guidelines for online closure of trading and demat accounts were issued.	To enable faster closure of such accounts and improved ease of doing business.
July 16, 2021	Guidelines for credit rating agencies (CRAs) with respect to introduction of new expected loss-based rating scale and standardization of rating scales used by CRAs.	To strengthen and standardize the rating symbols used by CRAs and introduction of new rating symbols.
July 20, 2021	Segregation and monitoring of collateral at client level.	To mitigate the risk of misuse of client collateral and ensure expeditious settlement of clients' claims, in the event of default by a trading member / clearing member.
July 30, 2021	Revision of minimum subscription and trading lot for publicly issued REITs and InvITs .	To enable participation from a wider class of investors.
August 9, 2021	Unified and revamped SEBI (Issue and Listing of Non-Convertible Securities) Regulations, 2021.	To enable enhanced information, removing redundancy and streamlining disclosure requirements.
August 9, 2021	Calendar Spread margin benefit in commodity futures contracts.	To increase liquidity in far month contracts, facilitate hedging by value chain participants and reduce cost of trading.
August 13, 2021	Guidelines on Security and Covenant Monitoring using Distributed Ledger Technology.	To strengthen the process of security creation, monitoring of security, monitoring of asset cover and covenants of the non-convertible securities by Debenture Trustee using block chain technology.
August 17, 2021	Penalty for Repeated Delivery Default.	To strengthen the delivery mechanism and ensure market integrity.
September 7, 2021	Introduction of T+1 rolling settlement on an optional basis.	To facilitate increased trading turnover and reduced settlement risk.

Date	Regulation	Rationale
September 7, 2021	Introduction of corporate governance norms and other disclosures for high value debt listed entities.	To enhance robustness of the corporate bond market.
September 29, 2021	Swing pricing framework for mutual fund schemes.	To pass on the cost of redemptions to those investors who sell mutual fund scheme units, by way of adjusting NAV for swing factor.
October 4, 2021	Two-factor authentication (for online transactions) and signature method (for offline transactions) to authenticate redemption of units.	To prevent fraud in the accounts of unitholders.
October 13, 2021	Restrictions on creation of fixed deposits/ investments in liquid funds by stock brokers from client funds.	To prevent misuse of client funds lying with stock brokers.
November 24, 2021	Introduction of Silver Exchange Traded Funds.	To introduce investment in silver through a financial instrument such as an ETF, as silver has gained popularity as an inflation hedge alongside gold.

3) Insurance Regulatory and Development Authority of India

Date	Regulation	Rationale
July 09, 2021	Insurance Regulatory and Development Authority of India (Indian Insurance Companies) (Amendment) Regulations, 2021.	To bring clarity on governance framework of insurance companies.
September 08, 2021	Guidelines on Trade Credit insurance have been revised.	Considering the evolving insurance risk needs of various sectors and response to changing market conditions.
September 08, 2021	The guidance document on product structure for Cyber Insurance was issued.	Guidelines to insurers on structuring cyber insurance for individuals and identifying gaps that need to be filled.
September 08, 2021	Circular on Title Insurance Products was issued.	For legal protection of promotors in the early stages of development of the project and safeguarding the interests of individual buyers after taking over the physical possession of property.

Date	Regulation	Rationale
September 13, 2021	Circular was issued extending the timelines for sale and renewal of short term COVID specific health insurance policies including the COVID Standard indemnity product "Corona Kavach " COVID Standard benefit policy "Corona Rakshak" offered and renewed by all insurers up to 31.03.2022.	In view of the prevailing situation in the wake of second wave of COVID pandemic.
September 14, 2021	Circular was issued extending of timelines for (a) Issuance of Electronic Policies and (b) Dispensing with Physical documents and wet signature on the proposal form in respect of health insurance policies up to 31.3.2022.	To encourage digitization in insurance service processes.

4) Pension Fund Regulatory and Development Authority

Date	Regulation	Rationale
July 02, 2021	Relaxation of processing of exit applications by points of presence (PoPs).	To alleviate the COVID induced difficulties faced by the subscribers in submitting physical applications for exit/ withdrawal .
July 20,2021	Investment Guidelines for NPS Schemes (two sets of guidelines applicable to separate sets of schemes)	To strengthen the regulatory framework
July 20, 2021	Change in guidelines on aggregate holding of equity shares by a foreign company in Pension Funds	To raise the foreign holding limit in pension funds to 74 per cent of paid up capital on the lines of that permitted in case of insurance companies.
July 27, 2021	Guidelines for investment by pension funds in an Initial Public Offer (IPO), Follow on Public Offer (FPO) and/or Offer for Sale (OFS) under National Pension System (NPS) and other pension schemes regulated / administered by the Authority.	To lay down norms for such investments.
August 09, 2021	Guidelines for engaging business correspondents (BCs) or agents for distribution of pension schemes.	To facilitate the distribution of pension schemes.
August 23, 2021	Introduction of eNPS for Government sector subscribers	To provide a convenient and paperless onboarding experience for Government sector subscribers

Date	Regulation	Rationale
August 26, 2021	Increase of entry age up to 70 years under NPS.	To permit existing NPS subscribers to remain invested beyond 60 years/ beyond their superannuation, and to enable citizens above 65 years to open NPS accounts
September 21, 2021	Enhancement of lump sum withdrawal limit on exit.	To benefit subscribers
October 07, 2021	Revisions in the guidelines on empanelment of brokers	To strengthen the governance framework on empanelment of brokers.
October 27, 2021	Facility of online APY subscription through Aadhaar e KYC.	To simplify the subscription process and enhance coverage

5) Insolvency and Bankruptcy Board of India

Date	Regulation	Rationale
July 14, 2021	Amendment to IBBI (Insolvency Resolution Process for Corporate Persons) Regulations, 2016 (CIRP Regulations).	To enhance the discipline, transparency, and accountability in corporate insolvency proceedings.
July 22, 2021	Amendment to the IBBI (Model Bye-Laws and Governing Board of Insolvency Professional Agencies) Regulations, 2016 (Model Bye-Laws Regulations).	To provide prompt realisation of the monetary penalty by the Insolvency Professional Agencies (IPAs).
July 22, 2021	Amendment to the IBBI (Insolvency Professionals) Regulations, 2016	To clarify the eligibility criteria for registration as insolvency professional (IP), place a limit on the number of assignments that an IP can handle and streamline the process of granting recognition to insolvency professional entity (IPE).
September 30, 2021	Amendment to IBBI (Insolvency Resolution Process for Corporate Persons) Regulations, 2016	To enhance the conduct, improve timelines, and value maximisation in corporate insolvency proceedings.
September 30, 2021	Amendment to the IBBI (Liquidation Process) Regulations, 2016.	To streamline the liquidation process and increase transparency of process and accountability of the Liquidator.

6) International Financial Service Centres Authority

Date	Regulation	Rationale
July 6, 2021	IFSCA (Banking) (Second Amendment) Regulations, 2021	To improve the regulatory framework for banking units operating under IFSCA.
July 7, 2021	Framework for setting up of International Trade Financing Services Platform (ITFS) for providing Trade Finance Services at International Financial Services Centres (IFSCs)	To enable exporters and importers to avail various types of trade finance facilities on competitive terms, for their international trade transactions through a dedicated electronic platform viz, ITFS.
July 16, 2021	IFSCA (Issuance and Listing of Securities) Regulations, 2021	To introduce a unified regulatory framework specifying the requirements for issuance and listing of various types of securities and for initial and continuous disclosures.
August 13, 2021	Banking Handbook comprising (a) General directions (b) Conduct of Business directions and (c) Prudential directions which come into effect from January 1, 2022.	To communicate the Authority's regulatory expectations and to enhance ease of doing banking business in GIFT- City IFSC.
August 17, 2021	Guidelines on Factoring and Forfaiting of Receivables.	To regulate factoring and forfaiting activity.
August 26, 2021	Circular on Operating Guidelines on Bullion Exchange, Bullion Clearing Corporation, Bullion Depository and Vault Manager.	To enable the Bullion Exchange, Bullion Clearing Corporation, Bullion Depository and Vault Manager in an International Financial Service Centres (IFSC) to operationalise their activities as per IFSCA (Bullion Exchange) Regulation, 2020.
September 15, 2021	Circular on Clearing Membership for non-bank Custodians.	To permit any non-bank entity recognised as a custodian of assets/securities by IFSCA through the branch structure, to become a Clearing Member of a Clearing Corporation in GIFT-IFSC.

Date	Regulation	Rationale
September 17, 2021	Circular on Bullion Trading Member and Clearing Members in GIFT-IFSC.	To permit all members of the stock exchanges and clearing corporations in GIFT-IFSC to be enabled as bullion trading/ clearing members.
October 20, 2021	International Financial Services Centres Authority (Capital Market Intermediaries) Regulations, 2021	To provide for regulatory requirements on registration, obligations and responsibilities, inspection, and enforcement in respect of various types of capital market intermediaries.
October 21, 2021	International Financial Services Centres Authority (Insurance Intermediary) Regulations, 2021	To provide a comprehensive regulatory framework for registration and operations of insurance intermediaries in IFSC.
October 21, 2021	International Financial Services Centres Authority (Registration of Insurance Business) Regulations, 2021	To put in place the process of registration and operations of insurers and re-insurers in the IFSC.
October 21, 2021	International Financial Services Centres Authority (Operations of International Financial Services Centres Insurance Offices) Guidelines, 2021	To put in place a framework to address operational issues for such entities.