

Financial Stability Report

Issue No. 27



Reserve Bank of India
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Foreword

Over the last three years, the global economy has been navigating successive high-amplitude shocks: the COVID-19 pandemic waves; protracted geopolitical hostilities; rapid monetary policy tightening; and the recent banking turmoil. Economic fragmentation is threatening macroeconomic prospects, especially among emerging market and developing economies (EMDEs).

Despite these heightened uncertainties and formidable headwinds, the Indian economy has made a solid recovery and is among the fastest growing large economies. In this fragile global milieu, balancing the policy trade-offs, preserving macroeconomic and financial stability, shoring up confidence and supporting sustainable growth are top priorities for policymakers world over.

Since the last issue of the Financial Stability Report (FSR) in December 2022, the global and Indian financial systems have charted somewhat different trajectories. The global financial system has been impacted by significant strains since early March 2023 from the banking turmoil in the U.S. and Europe. In contrast, the financial sector in India has been stable and resilient, as reflected in sustained growth in bank credit, low levels of non-performing assets and adequate capital and liquidity buffers. Both banking and corporate sector balance sheets have been strengthened, engendering a 'twin balance sheet advantage' for growth¹. The reach and depth of financial intermediation is being aided by technology and growing digitalisation, which provide new opportunities for growth and financial inclusion.

As the recent banking turmoil in certain advanced economies (AEs) suggests, new risks have necessitated reassessment of global standards on financial sector regulations. While international cooperation among regulators on these issues is of paramount importance, so far as India is concerned, both regulators and regulated entities need to stay the course with an unwavering commitment to ensuring a stable financial system. It has to be remembered that seeds of vulnerability often get sown during good times when risks tend to get overlooked².

International cooperation and regulatory focus are also needed to tackle other challenges such as cyber risks and climate change. Through its G20 presidency, India is striving to improve the efficacy of multilateralism in several such areas. These efforts are fittingly captured in India's theme for G20: *One Earth, One Family, One Future*.

Financial stability is non-negotiable and all stakeholders in the financial system must work to preserve this at all times. The Reserve Bank and the other financial regulators remain steadfast in their commitment to safeguard financial stability in the face of potential and emerging challenges.

Shaktikanta Das

Governor

June 28, 2023

¹ Das, Shaktikanta (2023), Minutes of the Monetary Policy Committee Meeting, June 6 to 8.

² Das, Shaktikanta (2023), "Governance in Banks: Driving Sustainable Growth and Stability", Inaugural Address at the Conference of Directors of Banks organised by the Reserve Bank of India for Public Sector and Private Sector Banks, May.

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List of Select Abbreviations

AA	Adjudicating Authority	CD	Certificate of Deposit
ADL	Autoregressive Distributed Lag	CDS	Credit Default Swap
AEs	Advanced Economies	CDSL	Central Depository Services Limited
AFS	Available for Sale	CET1	Common Equity Tier 1
AI	Artificial Intelligence	CERT-IN	Computer Emergency Response Team
AID	All Inclusive Direction	CFT	Countering the Financing of Terrorism
AIFs	Alternative Investment Funds	CGFS	Committee on the Global Financial System
AIFIs	All-India Financial Institutions	CIC	Core Investment Company
AMC	Asset Management Companies	CIR	Cyber Incident Reporting
AMFI	Association of Mutual Funds in India	CIRP	Corporate Insolvency Resolution Process
AML	Anti Money Laundering	CMs	Clearing Members
APY	Atal Pension Yojana	CPFIR	Central Payments Fraud Information Registry
ARC	Asset Reconstruction Companies	CPI	Consumer Price Index
ART	Asset-Referenced Tokens	CRAR	Capital to Risk-Weighted Assets Ratio
ASC	Advisory Scientific Committee	CRAs	Central Record Keeping Agencies
AUM	Assets Under Management	CyRST	Cyber Resilience Scenario Testing
BCP	Business Continuity Plan	CBDC	Central Bank Digital Currencies
BIFR	Board for Industrial and Financial Reconstruction	CUG	Closed User Group
BIS	Bank for International Settlements	DeFi	Decentralised Finance
BoP	Balance of Payments	DGA	Duration Gap Analysis
BRR	Business Responsibility Report	DICGC	Deposit Insurance and Credit Guarantee Corporation
BRSR	Business Responsibility and Sustainability Report	DIF	Deposit Insurance Fund
BSI	Banking Stability Indicator	DIIs	Domestic Institutional Investments
CAD	Current Account Deficit	DLA	Digital Lending Apps
CAGR	Compounded Annual Growth Rate	DLG	Default Loss Guarantee
CASA	Current Account and Savings Account	DPAW	Digital Payments Awareness Week
CASP	Crypto Asset Service Providers	DPD	Days Past Due
CBDCs	Central Bank Digital Currencies	DPI	Digital Public Infrastructure
CCs	Clearing Corporations		
CCB	Capital Conservation Buffer		
CCPs	Central Counterparties		

Abbreviations

DRP	Disaster Recovery Plan	FSSI	Financial System Stress Indicator
EAR	Earnings At Risk	FSWM	Financially Sound and Well Managed
ECBs	External Commercial Borrowings	FY	Financial Year
ECLGS	Emergency Credit Line Guarantee Scheme	GARCH	Generalised Auto-Regressive Conditional Heteroskedasticity
EMDEs	Emerging Market and Developing Economies	GCC	Global Capability Centres
EMEs	Emerging Market Economies	GDP	Gross Domestic Product
EMT	Electronic Money Tokens	GFC	Global Financial Crisis
ESG	Environmental, Social, and Governance	GFD	Gross Fiscal Deficit
ESRB	European Systemic Risk Board	GIFT	Gujarat International Finance Tec-City
EVE	Economic Value of Equity	GNPA	Gross Non-Performing Asset
FAO	Food and Agriculture Organisation	GPT	Generative Pre-Trained Transformer
FAR	Fully Accessible Route	GSDP	Gross State Domestic Product
FBIL	Financial Benchmark India Pvt Ltd	G-SIB	Global Systemically Important Bank
FBs	Foreign Banks	GST	Goods and Services Tax
FCI	Financial Conditions Index	HFCs	Housing Finance Companies
FDI	Foreign Direct Investment	HFT	Held for Trading
FDIC	Federal Deposit Insurance Corporation	HPI	House Price Index
FF	Financing Framework	HQLAs	High Quality Liquid Assets
FIIs	Foreign Institutional Investments	HTM	Held-to-Maturity
FIRE	Format for Incident Reporting Exchange	IBC	Insolvency and Bankruptcy Code
FLDG	First Loss Default Guarantee	IBU	IFSC Banking Unit
FMI	Financial Market Infrastructure	ICR	Interest Coverage Ratio
FoF	Fund-of-Funds	ICMA	International Capital Market Association
FPI	Foreign Portfolio Investment	IEA	International Energy Agency
FRBM	Fiscal Responsibility and Budget Management	IFSC	International Financial Services Centre
FSB	Financial Stability Board	IFSCA	International Financial Services Centres Authority
FSDC	Financial Stability & Development Council	IMF	International Monetary Fund
FSDC-SC	Sub Committee of the Financial Stability and Development Council	INDC	Intended Nationally Determined Contributions
FSR	Financial Stability Report	INFINET	Indian Financial Network
		InvITs	Infrastructure Investment Trusts
		IOSCO	International Organization of Securities Commissions

IP/RR	Interest Payments to Revenue Receipts	NBFIs	Non-Banking Financial Intermediaries
IRB	Internal Rating Based	NCD	Non-Convertible Debentures
IRDAI	Insurance Regulatory and Development Authority of India	NCGTC	National Credit Guarantee Trustee Company Limited
IRRA	Investor Risk Reduction Access	NCLT	National Company Law Tribunal
IRENA	International Renewable Energy Agency	NDC	Nationally Determined Contributions
IRRBB	Interest Rate Risk in Banking Book	NDDC	Non-Deliverable Derivative Contracts
IVCA	Indian Venture and Alternate Capital Association	NDF	Non-Deliverable Forwards
KYC	Know Your Customer	NDSI	Non-Deposit Taking Systemically Important Companies
LABs	Local Area Banks	NDTL	Net Demand & Time Liabilities
LAF	Liquidity Adjustment Facility	NFT	Non-Fungible Tokens
LCR	Liquidity Coverage Ratio	NII	Net Interest Income
LRS	Liberalised Remittance Scheme	NIM	Net Interest Margin
LOLR	Lender of Last Resort	NNPA	Net Non performing Assets
LPCC	Limited Purpose Clearing Corporation	NOF	Net Owned Funds
LSP	Lending Service Providers	NPA	Non-Performing Asset
LT	Long-term	NPS	National Pension System
LTV	Loan-to-Value	NRIs	Non-resident Indians
MDG	Modified Duration Gap	NSDL	National Securities Depository Limited
MF	Mutual Fund	NSE	National Stock Exchange
MICA	Markets in Crypto Assets	NSO	National Statistical Office
MII	Market Infrastructure Institutions	NSUCBs	Non-Scheduled Urban Cooperative Banks
MISP	Motor Insurance Service Provider	OECD	Organisation for Economic Co-operation and Development
ML	Machine Learning	OIS	Overnight Indexed Swap
MMLR	Market Maker of Last Resort	OOI	Other Operating Income
MRC	Minimum Required Corpus	OTC	Over-the-Counter
MSME	Micro, Small and Medium Enterprises	P2M	Person-to-Merchant
MTM	Mark-To-Market	PAT	Profit After Tax
MVE	Market Value of Equity	PCR	Provisioning Coverage Ratio
NaBFID	National Bank for Financing Infrastructure and Development	PCM	Professional Clearing Member
NBFC	Non-Banking Financial Company	PD	Probability of Default

Abbreviations

P/E	Price-to-Earnings	SD	Standard Deviation
PFCE	Private Final Consumption Expenditure	SDLs	State Development Loans
PFMI	Principles of Financial Market Infrastructures	SEBI	Securities and Exchange Board of India
PPI	Prepaid Payment Instrument	SFBs	Small Finance Banks
PFRDA	Pension Fund Regulatory and Development Authority	SFMS	Structured Financial Messaging System
PLI	Production Linked Investment	SGF	Settlement Guarantee Fund
PMI	Purchasing Managers' Indices	SITO	Systemic Impact Tolerance Objective
PSBs	Public Sector Banks	SLR	Statutory Liquidity Ratio
PSO	Payment System Operator	SMA	Special Mention Accounts
PSUs	Public Sector Undertakings	SRS	Systemic Risk Survey
PVBs	Private Sector Banks	SREP	Supervisory Review and Evaluation Process
RAPMS	Residential Asset Price Monitoring Survey	SUCBs	Scheduled Urban Cooperative Banks
RB-IO	Reserve Bank - Integrated Ombudsman Scheme	TAT	Turn Around time
ReBIT	Reserve Bank Information Technology Private Limited	T-Bills	Treasury Bills
REITs	Real Estate Investment Trusts	TFP	Total Factor Productivity
REs	Regulated Entities	TGA	Traditional Gap Analysis
RECO	Revenue Expenditure to Capital Outlay	TradFi	Traditional Finance
RoA	Return on Asset	TREDS	Trade Receivables Discounting System
RoE	Return on Equity	UCB	Urban Cooperative Bank
RRBs	Regional Rural Banks	UPI	Unified Payment Interface
RSA	Rate-Sensitive Assets	VAPT	Vulnerability Assessment and Penetration Testing
RSL	Rate-Sensitive Liabilities	VAR	Vector Auto Regression
RWA	Risk-Weighted Assets	VC	Venture Capital
SCBs	Scheduled Commercial Banks	VCIP	Video-based Customer Identification Process
SCC	Stakeholders' Consultation Committee	WB	World Bank
		YCC	Yield Curve Control

Overview

The Financial Stability Report (FSR) is a half-yearly publication with contributions from all the financial sector regulators. The FSR reflects the collective assessment of the Sub Committee of the Financial Stability and Development Council on prevailing and emerging vulnerabilities to the Indian financial system.

Macrofinancial Risks

The stability of the global financial system is tested by high inflation, tight financial conditions and banking system fragilities. Simultaneously, geopolitical tensions and economic fragmentation are threatening macroeconomic stability. Bouts of volatility surge through financial markets amidst rapid shifts in investor sentiments. Emerging market economies (EMEs) could face significant spillover risks and asymmetric effects of macrofinancial instability.

Domestic Economy and Markets

The Indian economy presents a picture of resilience, supported by strong macroeconomic fundamentals. Sustained growth momentum, moderating inflation and anchoring of inflation expectations, a narrowing current account deficit (CAD) and rising foreign exchange reserves, ongoing fiscal consolidation and a robust financial system are setting the economy on a path of sustained growth.

Healthy balance sheets of banks and corporates are engendering a new credit and investment cycle. Strong revenue growth, higher profits and lower leverage are helping corporates to improve their bottom lines. Banks and non-bank financial intermediaries are posting strong earnings and robust credit growth with strengthening buffers. These improvements are brightening the prospects of the Indian economy, fortified by the rising pace

of real economic activity, corporate resilience and sound and efficient financial intermediation.

Financial Institutions: Soundness and Resilience

Scheduled commercial banks (SCBs) bolstered their capital base, with the capital to risk-weighted assets ratio (CRAR) and the common equity tier 1 (CET1) capital ratio at historical highs of 17.1 per cent and 13.9 per cent, respectively, in March 2023 and have steadily enhanced their returns on assets (RoA) and returns on equity (RoE). SCBs' gross non-performing assets (GNPA) ratio continued its downtrend and fell to a 10-year low of 3.9 per cent in March 2023 and the net non-performing assets (NNPA) ratio declined to 1.0 per cent. The provisioning coverage ratio (PCR) rose to 74.0 per cent. Led by strong growth in net interest income and significant reduction in provisions, the profit after tax of SCBs registered a growth of 38.4 per cent in 2022-23.

Macro stress tests for credit risk reveal that SCBs are well-capitalised and all banks would be able to comply with the minimum capital requirements even under adverse stress scenarios.

The CRAR of urban co-operative banks (UCBs) rose to 16.5 per cent in March 2023 while that of NBFCs stood at 27.5 per cent. The solvency ratio of the insurance sector remains above the minimum threshold limit of 150 per cent.

Network analysis indicates that the total outstanding bilateral exposures among constituents of the financial system continued to grow. SCBs have the largest bilateral exposures in the Indian financial system, although their share declined in March 2023. A simulated contagion analysis shows that losses due to failure of five banks with the maximum capacity to cause contagion would not lead to failure of any additional bank.

Regulatory Initiatives and Other Developments in the Financial Sector

Regulatory efforts across the globe are focusing on improving financial system resilience amid interaction between higher interest rates and weak internal risk management practices in banks. Addressing liquidity and leverage vulnerabilities in non-bank financial intermediaries (NBFIs) remains a policy priority. Intensifying supervisory efforts to close data gaps, identify emerging risks and initiate strong and appropriate actions are gaining attention. Risks to the financial system from climate change, digital finance and cyberattacks are other key focus areas. Domestic regulatory priorities continue to focus on improving safety and soundness of financial institutions, increasing the financial system's resilience to shocks and promoting financial system

efficiency to ensure financial stability and support sustainable economic growth.

Assessment of Systemic Risk

The latest Systemic Risk Survey of the Reserve Bank carried out in May 2023 showed that risk across most categories that contribute to domestic systemic risk have receded. Risk from global spillovers, however, remained in the 'high' risk category with more than half of the respondents expressing falling confidence in the stability of the global financial system. Tightening of global financial conditions, global growth slowdown and volatility in capital flows were cited as major risks. 94 per cent of the respondents expressed confidence in the Indian financial system with more than half of the respondents assessing improved domestic banking sector prospects over a one-year horizon.

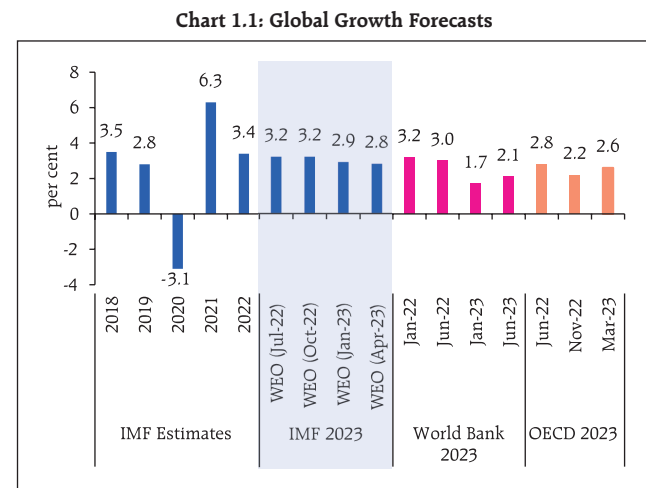
Chapter I

Macrofinancial Risks

The resilience of the global financial system has been tested by the recent banking turmoil and interaction between monetary policy tightening and financial sector stress. Uncertainty about the global macro-financial outlook has risen. Against this backdrop, the Indian economy and the domestic financial system remain resilient in an environment of macroeconomic and financial stability. The health of the Indian banking system is robust, fortified by non-performing loans at a multi-year low and adequate level of capital and liquidity buffers.

Introduction

1.1 Since the December 2022 issue of the Financial Stability Report (FSR), the global macrofinancial environment, which was unsettled by overlapping strains from tightening of financial conditions in response to aggressive monetary policy actions, the lingering effects of the war in Ukraine and a recessionary macroeconomic outlook, was jolted in March 2023 by banking failures in advanced economies (AEs) that tested the resilience of the global financial system. In the event, forceful and swift resolution by policy authorities in the affected jurisdictions have restored stability and contained a broader spillover. The loss of confidence among depositors, amplified by mobile apps and social media, has warranted rethink on financial regulation, including run-off factors assumed for deposits and the 30-days stress period for calculating net cash outflows, and the contours of deposit insurance. While timely interventions have calmed global financial markets, uncertainty about the global economic outlook has risen and the balance of risks has tilted to the downside. The International Monetary Fund (IMF) in its April 2023 projections expects global growth to slow down further from 3.4 per cent in 2022 and bottom out at 2.8 per cent in 2023 (Chart 1.1). Meanwhile, with inflation easing grudgingly but still at elevated levels - core inflation, *i.e.*, inflation excluding volatile



Source: IMF, World Bank, OECD.

food and energy prices, has been more persistent than anticipated – central banks have moderated the size of rate actions and some have paused. They remain focused, however, on returning inflation to target while employing the full range of prudential

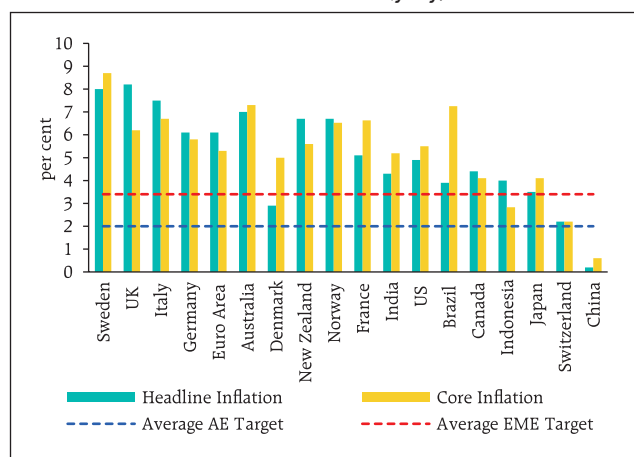
policies and liquidity management tools to address threats to financial stability (Chart 1.2).

1.2 The strains in the banking sector raise the key question as to whether the recent events are isolated occurrences that could be the result of idiosyncratic risks in a few banks brought on by tighter monetary and financial conditions, or do they point to a broader systemic risk that could threaten the stability of the global financial system? During the last 15 years since the global financial crisis (GFC), global bond markets have grown much faster than nominal GDP¹, financial institutions hold higher volumes of securities than before and a prolonged low interest rate regime has led to repricing of these securities, all of which increase the severity of the impact of interest rate changes.

1.3 Financial markets in emerging market and developing economies (EMDEs) have so far remained largely insulated from spillovers from the banking turmoil in the AEs. Yet, if instability recurs and is more widespread, it could prompt an increase in global risk aversion, leading to capital outflows from EMDEs as an asset class. Furthermore, some of them are faced with serious concerns on debt sustainability. Issuance conditions for sovereign debt have also deteriorated. Smaller and low-income economies are reeling under debt overhangs, difficulties in raising new debt and rollover risks.

1.4 The Indian economy has exhibited stability and resilience in these challenging conditions. Positioned to be among the fastest growing major economies despite multiple global headwinds, the momentum of growth is building up with the strengthening of domestic demand conditions, strong public investment in infrastructure, smooth

Chart 1.2: Inflation (y-o-y)



Note: AE – Advanced Economies; EME – Emerging Market Economies; As on June 13, 2023.

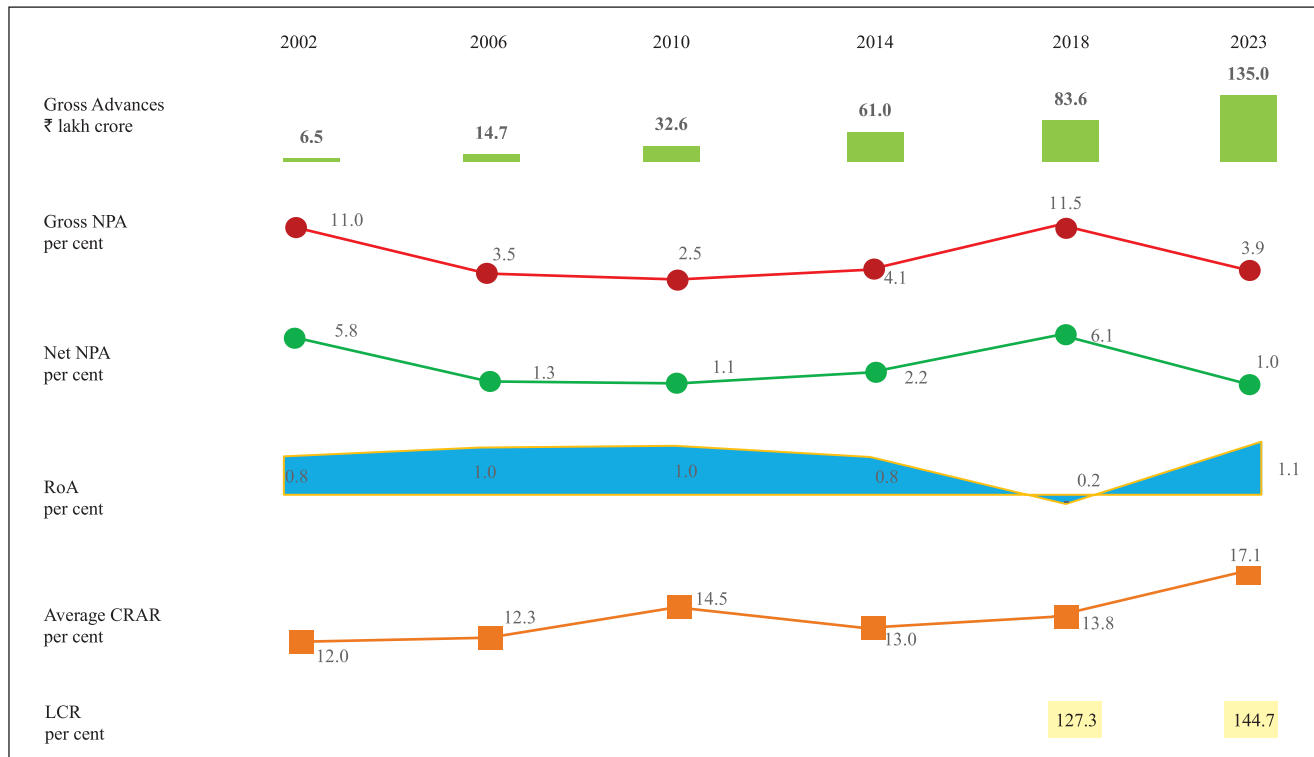
Source: Bloomberg.

funding of the financing needs of businesses and households, and business optimism. India's purchasing managers' indices (PMIs) continue to outperform regional and global indices for both manufacturing and services. The Indian economy is projected to grow at 6.5 per cent during 2023-24, with risks evenly balanced at this juncture. The persistence of core inflation, notwithstanding a dip in April 2023, slower global growth and potential volatility in the global financial system, however, could pose risks to the growth trajectory.

1.5 Headline inflation in India has gradually moderated from its peak of 7.8 per cent in April 2022 to 4.3 per cent in May 2023 due to the combined impact of monetary tightening, supply side measures and easing of global supply bottlenecks. Core inflation has also eased but remains above 5 per cent. The pursuit of price stability while keeping in mind the objective of growth, therefore, remains the overarching priority of the Reserve Bank.

¹ Global GDP (nominal): US\$ 58.5 trillion (2007); US\$ 100.2 trillion (2022)
Global bond market: US\$ 70 trillion (2007); US\$ 133 trillion (2022)

[71 per cent growth].
[90 per cent growth].

Chart 1.3: Banking Sector Soundness Indicators²

Note: Updated on June 15, 2023.

Source: RBI supervisory returns and staff calculations.

1.6 The Indian financial system, led by a sound banking system, remains stable and supportive of the productive needs of the economy. Aided by robust earnings, adequate capital and liquidity buffers and improving asset quality, Indian banks are well positioned to sustain the upturn in the credit cycle that has been underway since early 2022 (Chart 1.3).

1.7 India's digital public infrastructure (DPI) fosters financial innovation and competition, improves financial inclusion, and in general democratises finance. The DPI is driving economic growth and improving the efficiency and resilience of the financial system.

1.1 Global Backdrop

1.1.1 Macroeconomic Development and Outlook

1.8 The global economic outlook remains shrouded by elevated levels of uncertainty with sporadic bouts of volatility in financial markets triggering rapid shifts in risk-on-risk-off sentiments, with idiosyncratic shocks propagating into ripple effects and spillovers that pose threats to financial stability. This is constraining the degrees of freedom available to monetary policy in the pursuit of its mandate of macroeconomic stability. Meanwhile, some easing of inflationary pressures has emboldened a tempering of aggressive policy rate responses, fuelling expectations that the rate tightening cycle

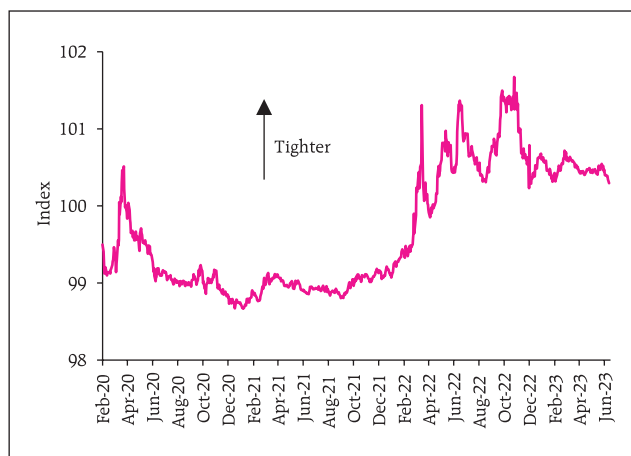
² As at end-March.

is close to running its course. The experience with the recent banking turmoil and its resolution has also prompted market participants to re-evaluate the future path of monetary policy. Financial conditions are reflecting these vicissitudes (Chart 1.4).

1.9 The slowdown in monetary tightening by central banks has resulted in bond yields declining. Mounting levels of debt and declining market liquidity, however, are unsettling market sentiments.

1.10 The impending review of the monetary policy by the Bank of Japan, including yield curve control (YCC), and the inevitability of quantitative tightening by systemic central banks to normalise their bloated balance sheets, even as patches of illiquidity in core bond markets surface, have increased the sensitivity to shocks and led to amplification of volatility

Chart 1.4: Financial Conditions Index

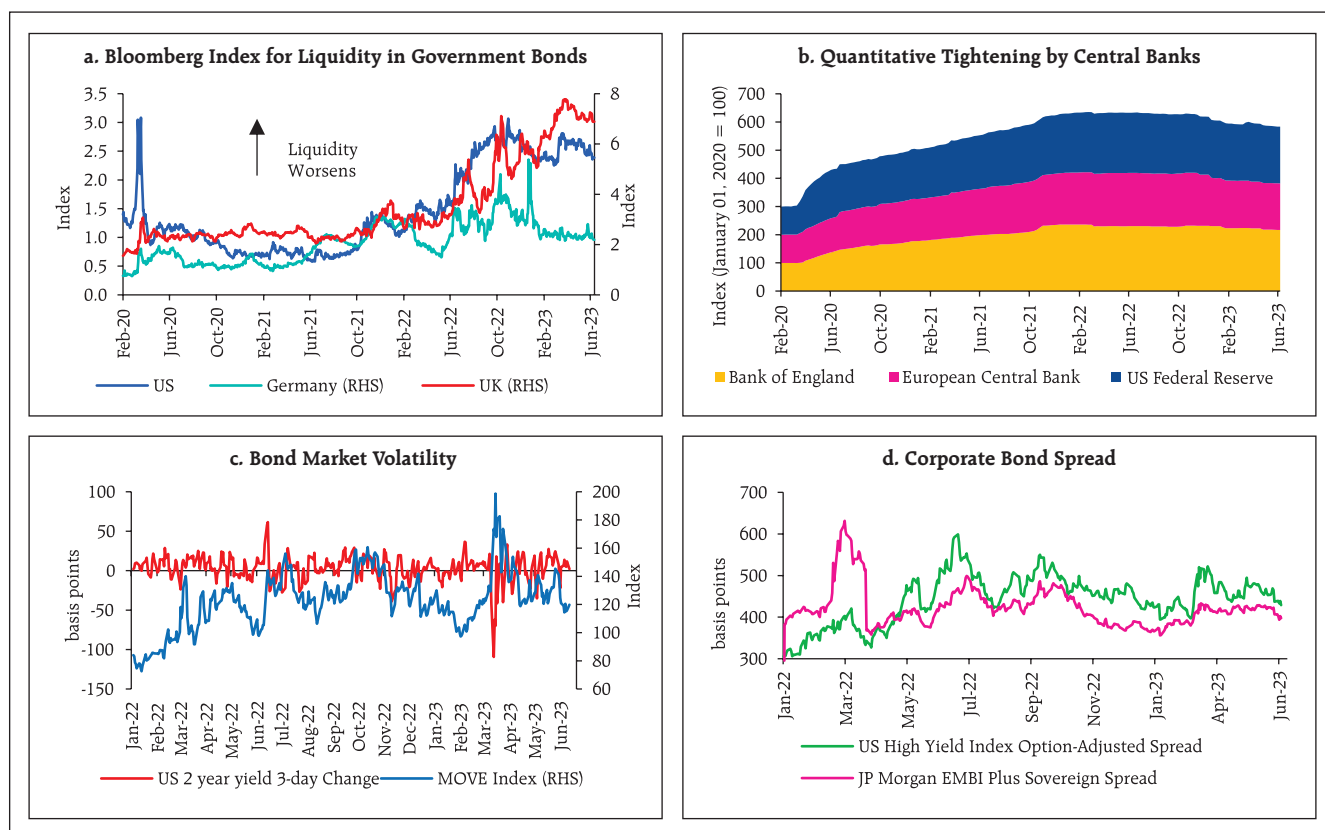


Note: Financial Conditions Index (FCI) is a composite index of individual country FCIs, based on policy rate, riskless long-term bond yield, corporate credit spread, equity price variable and trade-weighted exchange rate.

Source: Goldman Sachs.

in government bond and private credit markets (Chart 1.5 a, b, c and d).

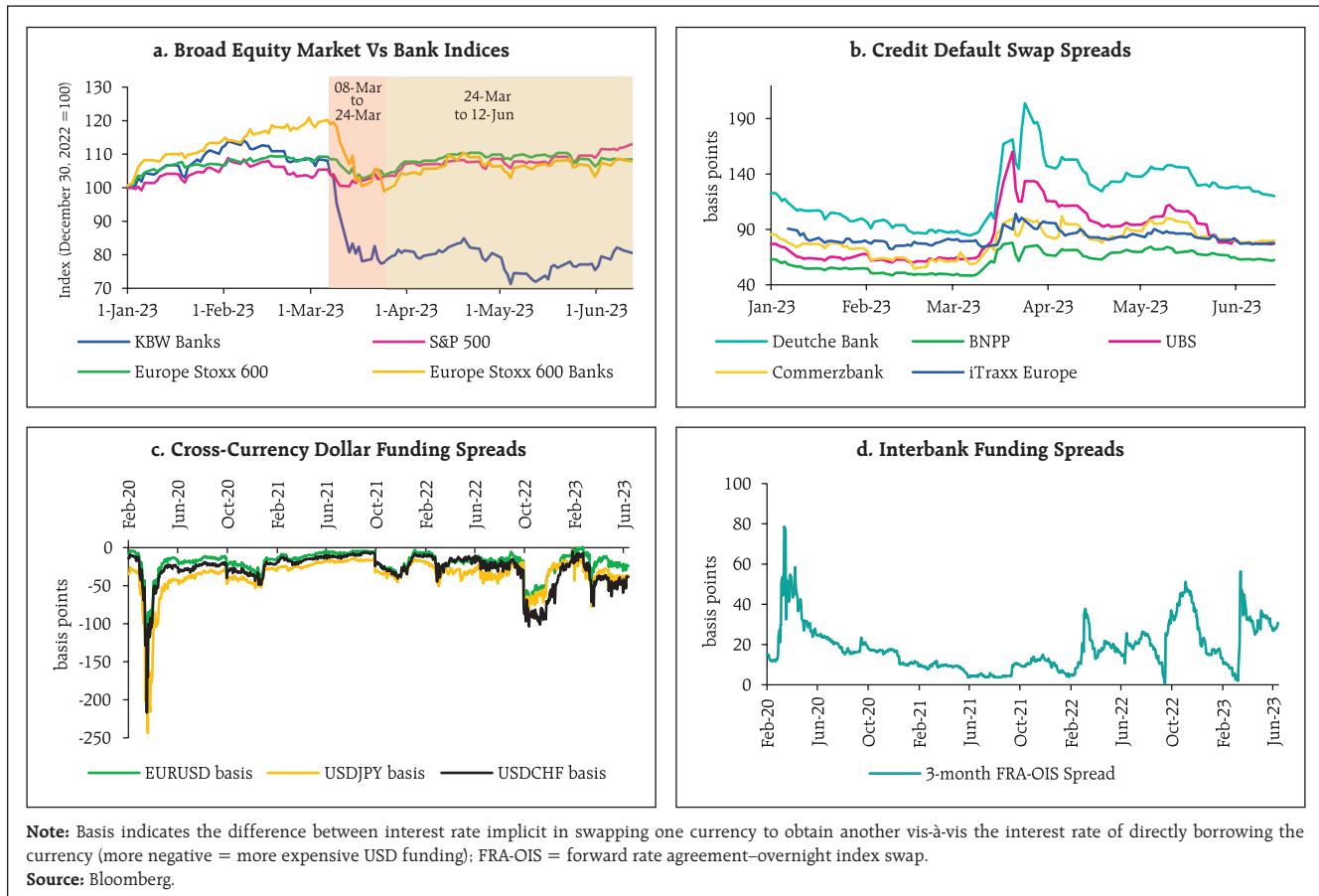
Chart 1.5: Bond Market



Note: MOVE Index tracks US fixed income market volatility; EMBI stands for Emerging Markets Bond Index.

Source: Bloomberg, Federal Reserve Bank of St Louis, FRED, Eurostat and Bank of England.

Chart 1.6: Impact of Banking Turmoil on Equity and Funding Markets

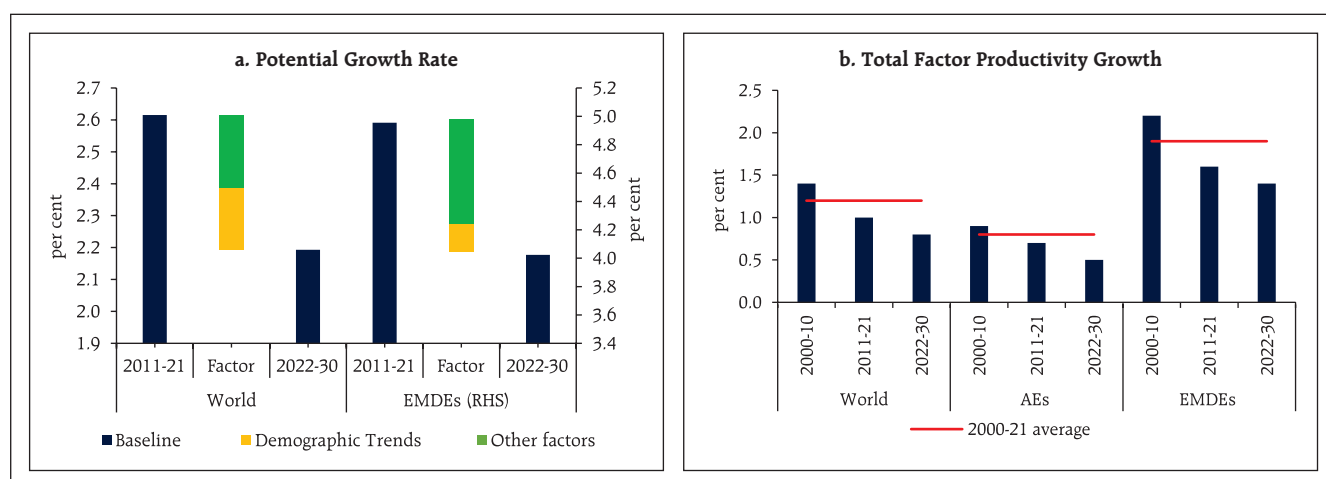


1.11 The recent banking turmoil also led to sell-off in equity markets. Credit default swap (CDS) spreads rose sharply and interbank funding spreads widened (Chart 1.6 a, b, c and d).

1.12 Underlying these developments, powerful structural forces are at work, with implications for medium and longer-term prospects for the global

economy. They include an aging labour force, declining growth rates in total factor productivity (TFP), and deceleration in human capital development. Consequently, global potential growth – the maximum sustainable rate at which economies can grow without generating excess inflation – is likely to decline to a 30-year low over this decade

Chart 1.7: Global Potential Growth



Source: World Bank.

(Chart 1.7 a and b). The ensuing global slowdown might become accentuated by financial crises that appear to be recurring with rising intensity and exposing newer vulnerabilities³.

1.13 In sum, global macrofinancial risks have increased against the backdrop of heightened market volatility and an uncertain economic outlook. The global financial system's resilience will be tested going forward and this calls for pro-active policy actions to secure financial stability in the face of new challenges.

1.1.2 Other Global Macroeconomic Risks

1.14 The goals of macroeconomic and financial stability policies complement and interact with each other in normal times. As the bank runs in March 2023 in some jurisdictions revealed, aggressive withdrawal from ultra-accommodative monetary policy can pose financial stability risks when business models and risk management practices have adapted to a prolonged period of very low interest rates and abundant liquidity. In this milieu, financial stability considerations can be constraints

on the conduct of independent monetary policy. Increasingly, decisions relating to monetary policy are being viewed as conditioned by the obligation to take into account the need to preserve financial stability, and this impinges on the size and timing of rate actions and/ or modulation of liquidity.

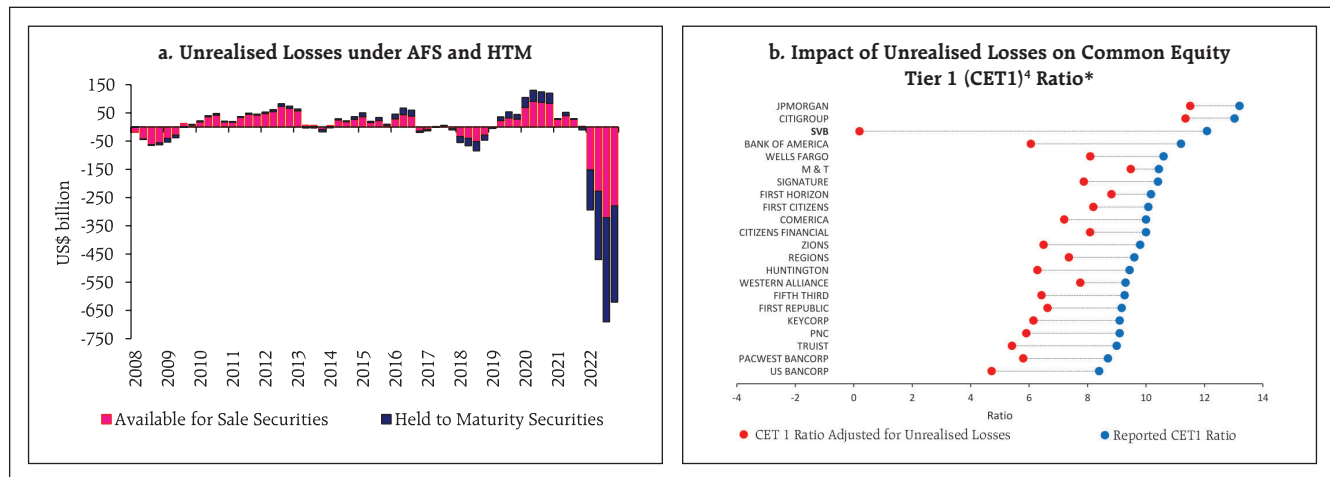
1.15 Among recent macrofinancial developments, the salient ones which have the potential to interact with global macrofinancial vulnerabilities include the banking turmoil, high levels of non-financial sector debt, leverage and liquidity risks in the non-bank financial intermediaries (NBFIs), financial fragmentation, climate change, growth of digital finance and the rising role of artificial intelligence (AI) in financial services.

A. Banking Turmoil

1.16 The episodes of sudden failures of banks in the U.S. and Europe since March 2023 came after a period of prolonged easy monetary conditions in response to the pandemic, which lulled financial institutions into not reckoning with the inevitable reversal of the interest rate cycle. Unbridled

³ Kose, M. Ayhan, and Ohnsorge, Franziska, eds. (2023). "Falling Long-Term Growth Prospects: Trends, Expectations, and Policies", Washington, DC: World Bank.

Chart 1.8: Valuation Losses



Note: * For Q4:2022.

Source: Federal Deposit Insurance Corporation (FDIC) and Bloomberg.

maturity transformation and liquidity mismatches as well as light touch regulation and supervision amplified the risks to financial stability. Unhedged or inadequately hedged investment portfolios brought unrealised losses on balance sheets due to fire sales. Confidence runs became intensified by mobile apps and social media. These developments presented new dimensions in the interface between macroeconomic and financial stability.

1.17 The recent banking turmoil also showed how unprepared banks were to manage the transition to rapid increases in interest rates by central banks, which exposed fault lines in their balance sheets. As rates rose, valuation losses spiked in banks, in particular in their held-to-maturity (HTM) portfolios, which are not marked-to-market. The aggregate valuation losses in the U.S. banking system grew from US\$ 8 billion at the end of 2021 to more than

US\$ 620 billion at the end of 2022. Sizable portfolios of uninsured deposits exacerbated the impact of valuation losses on capital positions and worsened their risk profiles (Chart 1.8 a and b).

1.18 In this context, it is estimated that out of the US\$ 23.1 trillion of U.S. banking system assets at end-March 2023⁵ (a) the market value of the assets, including loan portfolio, is US\$ 2.2 trillion lower than that suggested by the book value; (b) over 190 banks with assets of US\$ 300 billion are potentially at risk of impairment even if only half of uninsured depositors choose to withdraw, as the mark-to-market value of their remaining assets after these withdrawals would not be enough to repay all insured deposits; and (c) after the recent fall in the value of assets, more than 2,000 banks will have negative equity relative to their non-equity liabilities⁶.

⁴ Common Equity Tier (CET) - I ratio is percentage of common equity tier I capital to risk-weighted assets.

⁵ Board of Governors of the Federal Reserve System H.8 – Assets and Liabilities of Commercial Banks in the United States.

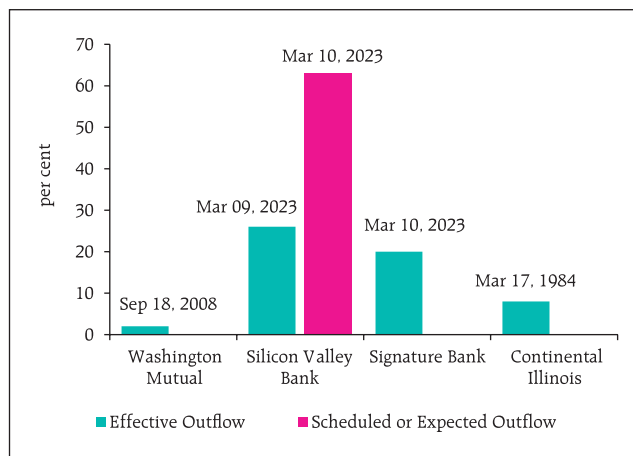
⁶ Jiang, Erica, Matvos, Gregor, Piskorski, Tomasz, and Seru, Amit (2023), "Monetary Tightening and U.S. Bank Fragility in 2023: Mark-to-Market Losses and Uninsured Depositor Runs?", NBER Working Paper 31048, April.

1.19 In comparison to prior bank runs, the speed of runs in the recent episode was unprecedented – one-day withdrawal rates were more than 20 per cent⁷ (Chart 1.9).

1.20 As stated earlier, the speed of the run was amplified via messaging apps and social media (Chart 1.10).

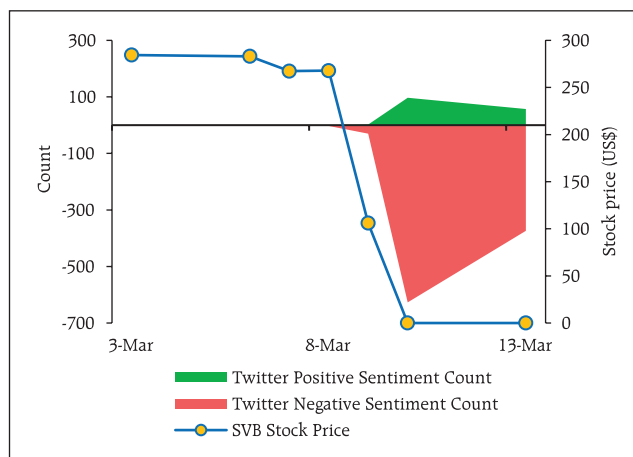
1.21 Unlike the GFC episode, the March 2023 banking turmoil is so far restricted to relatively smaller and midsized regional banks in the U.S. On the other hand, the failure of a global systemically important bank (G-SIB) in Europe was a consequence of a series of idiosyncratic problems in recent years that resulted in loss of trust among its depositors and investors. The banking turmoil offers important lessons: First, irrespective of the size of banks, contagion can only be resolved through swift and forceful interventions by public authorities. The distinction between systemic and non-systemic banks, may therefore, require a rethink as all banking crises have potential systemic implications. Second, the stability of deposits predicated the solvency of a bank. Therefore, partial deposit insurance is a dichotomy that may not work in a banking crisis, as retaining the confidence of depositors is the key to prevent bank runs. Third, the speed of modern-day bank runs demands revisit of existing liquidity regulations, which assume a smaller run-off factor for 'stable' deposits and a 30-days stress period for calculating net cash outflows. Finally, intrusive and comprehensive bank supervision alongside sound risk management by banks is essential to improve their resilience and lessen the probability of bank runs. Careful assessment of business models, identifying hidden losses and disincentivising excessive risk taking would be core components of this approach. Moreover, dilution of regulatory standards of any kind can trigger spillovers, necessitating distress acquisitions or bailouts.

Chart 1.9: Peak 1-day Withdrawal Rates for Runs on the Largest Banks, by Inflation-Adjusted Total Assets (share of pre-run deposits)



Source: For Washington Mutual, Jonathan D Rose (2015), "Old-Fashioned Deposit Runs," Finance and Economics Discussion Series 2015-111 (Washington: Board of Governors of the Federal Reserve System, December). For Silicon Valley Bank, Federal Financial Institutions Examination Council, Consolidated Reports of Condition and Income; California Department of Financial Protection and Innovation (2023), "Order Taking Possession of Property and Business" (San Francisco: DFPI, March 10); and Board of Governors of the Federal Reserve System (2023), Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank (Washington: Board of Governors, April). For Signature Bank, Federal Deposit Insurance Corporation (2023), FDIC's Supervision of Signature Bank. (Washington: FDIC, April). For Continental Illinois, Mark Carlson and Jonathan Rose (2019), "The Incentives of Large Sophisticated Creditors to Run on a Too Big to Fail Financial Institution," Journal of Financial Stability, vol. 41 (April), pp. 91–104.

Chart 1.10: Social Media Impact on SVB



Source: Bloomberg.

⁷ Board of Governors of the Federal Reserve System (2023), "Financial Stability Report", May.

B. Non-financial Sector Debt Burden

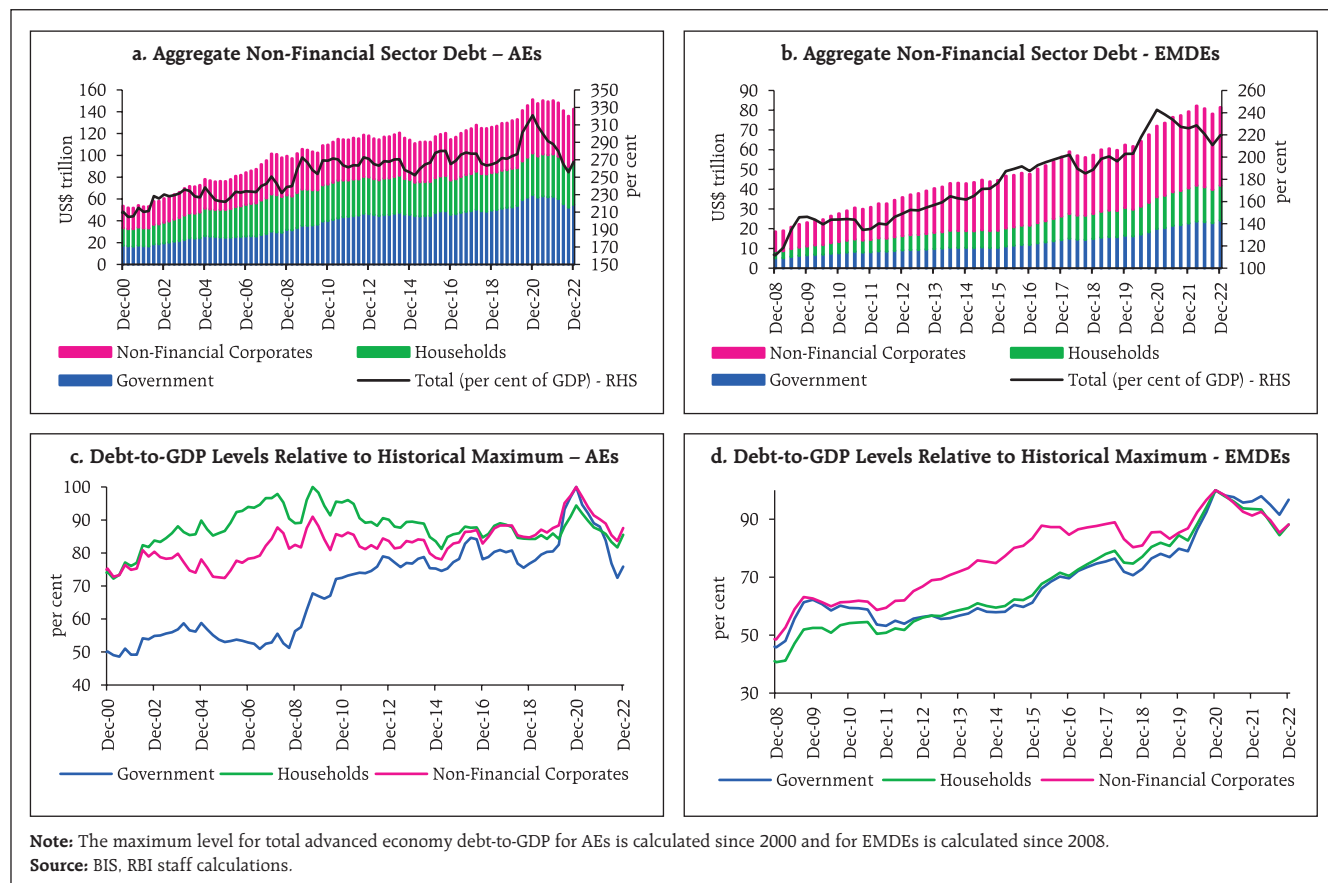
1.22 Debt levels in all three components of the non-financial sector, viz., governments, non-financial corporates and households remain high, though they have marginally declined from the pandemic period peaks in both AEs and EMDEs (Chart 1.11 a, b, c and d).

1.23 High levels of debt in a period of elevated interest rates and increased uncertainty make debt servicing difficult for borrowers, which remains a major vulnerability in the face of two tricky propositions. First, there is a growing chorus demanding reduction in public debt, which rose significantly during the pandemic, especially in

AEs. Second, quantitative tightening by central banks could pose challenges for governments at a time when market liquidity is poor and fresh debt issuance must be absorbed by private investors.

1.24 In a tightening monetary policy cycle, high private debt levels impact aggregate demand through multiple channels. First, they lower disposable income by increasing debt service costs. Second, they strain the balance sheets of businesses and households. Third, by distributing income from debtors with high marginal propensity to consume to savers with less propensity to spend, they reduce aggregate demand, especially if the share of variable rate and short-maturity debt is high⁸.

Chart 1.11: Non-financial Sector Debt



⁸ Ampudia, Miguel, Fiore Fiorella De, Kharroubi, Enisse and Manea, Cristina (2023), "Private debt, monetary policy tightening and aggregate demand", Bank for International Settlements (BIS) Bulletin No 70, February.

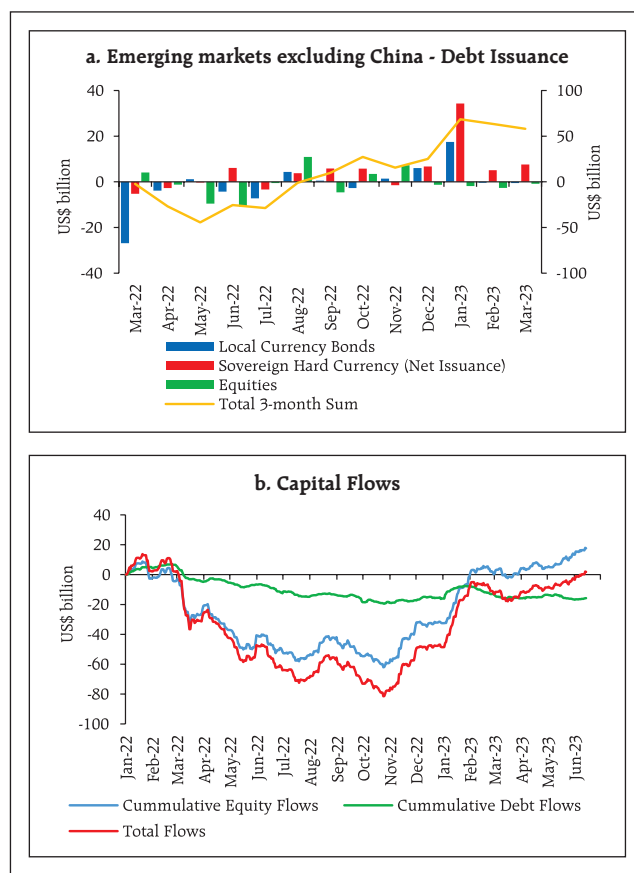
1.25 EMDEs and frontier economies remain particularly vulnerable as high debt levels could create debt servicing difficulties and consequent capital outflows. Increase in bond spreads and depreciation in exchange rates may aggravate their debt burden. More recently, issuances of fresh bonds are slowing, while capital flows are yet to fully recover (Chart 1.12 a and b). According to the IMF, spreads of over 40 per cent of frontier bonds with maturity till 2025 are trading at distressed levels, *i.e.*, 1,000 basis points above US treasuries⁹.

C. Non-Banking Financial Intermediaries (NBFIs)

1.26 NBFIs, which now account for nearly half of all global financial assets¹⁰, play a vital role in the global financial system, fostering efficiency and diversification of risks, and as a major source of capital flows to EMDEs. During the recent banking turmoil in the U.S., depositors shifted a significant portion of their funds to NBFIs from relatively more intensely regulated and supervised banking sector. Balance sheets of NBFIs involve high degrees of liquidity and maturity transformation, making them vulnerable to economic fluctuations and prone to asset valuation changes as monetary conditions change. Their leverage and liquidity profiles carry the potential to amplify shocks, especially, with their growing interconnectedness with the rest of the financial system.

1.27 While authorities have put in guardrails to control banking sector leverage, pockets of high leverage remain among NBFIs, posing systemic concerns. Elevated levels of off-balance sheet financial leverage indicate that overall synthetic

Chart 1.12: Emerging Market Debt and Capital Flows



Source: IMF and IIF.

⁹ International Monetary Fund (2023), "Global Financial Stability Report: Safeguarding Financial Stability amid High Inflation and Geopolitical Risks", April.

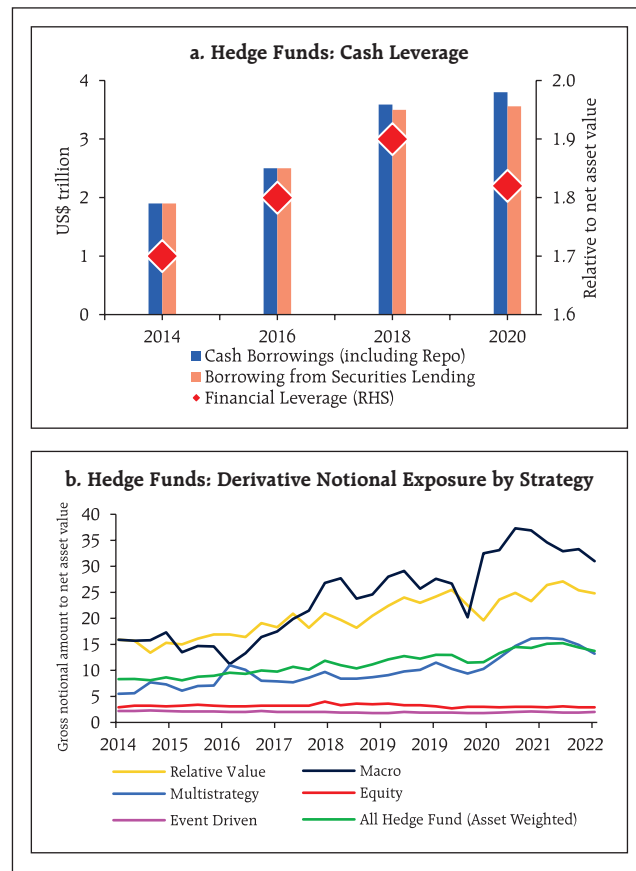
¹⁰ Financial Stability Board (2022), "Global Monitoring Report on Nonbank Financial Intermediation", December.

leverage may be approaching historic highs (Chart 1.13 a and b).

1.28 Hedge funds aim to generate risk-adjusted returns in all market conditions, which can magnify financial stress. Their reliance on prime brokers¹¹, creates hidden leverage in the financial system. Significant data gaps as well as limitations in aggregating existing data make it difficult to monitor and assess the impact of NBFIs leverage and impede formulation of risk-mitigating measures.

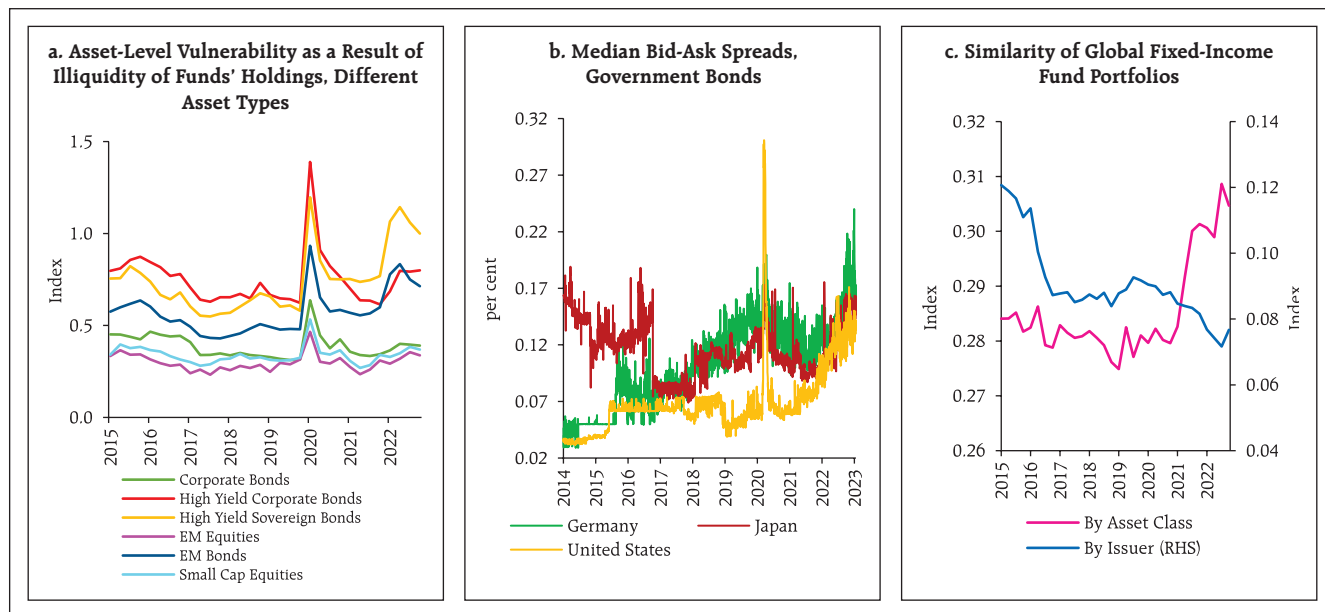
1.29 The NBFIs universe covers a wide range of institutions with different business models and liquidity needs. As the market turmoil in March 2020 and the UK gilts crisis in September 2022 showed, liquidity stress in the NBFIs sector can spill over to the broader financial system. Three major liquidity-related vulnerabilities associated with NBFIs are: (i) liquidity mismatches, which involve promising investors daily redemption of shares while holding illiquid assets (Chart 1.14 a); (ii) liquidity

Chart 1.13: NBFIs Leverage



Source: IMF.

Chart 1.14: NBFIs Liquidity-related Vulnerabilities



Source: IMF.

¹¹ Prime broker refers to a large financial institution that offers services such as securities lending, cash management, custody services, leveraged, transaction execution and settlement services to large institutional clients or hedge funds.

spirals that result in deterioration in funding and market liquidity due to decline in asset prices (Chart 1.14 b); and (iii) crowded trades in which entities have common exposures (Chart 1.14 c)¹².

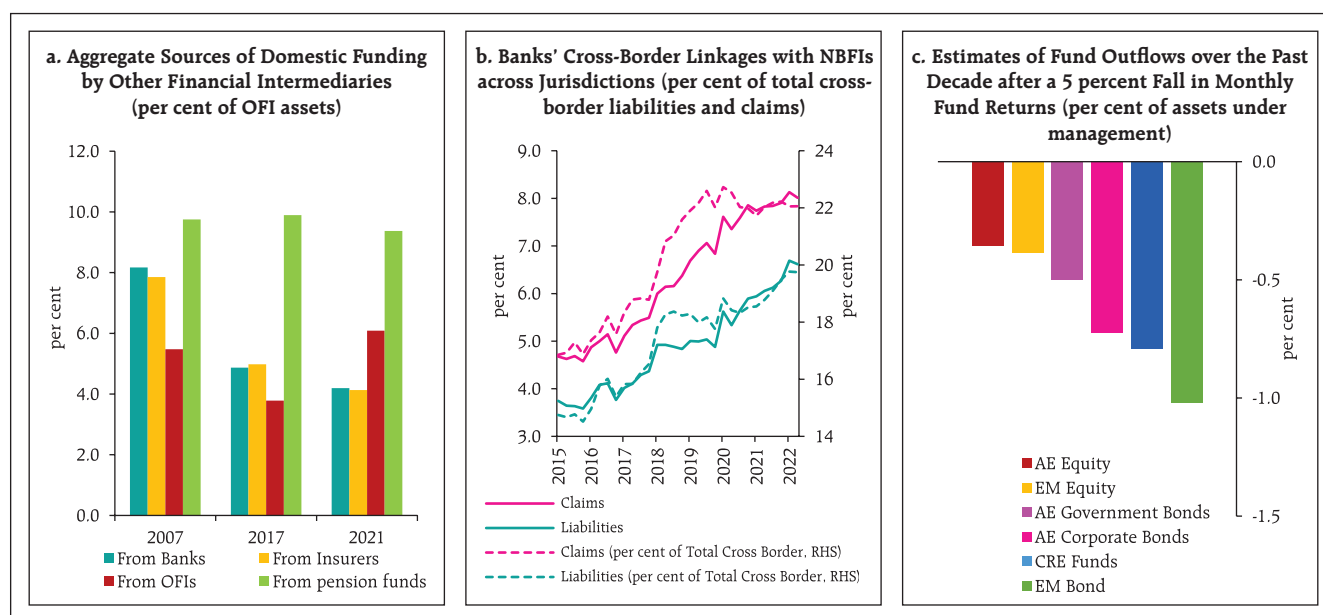
1.30 Interconnectedness of NBFIs with the rest of the financial system has increased over the years even though the share of funding of other financial institutions (OFIs, *i.e.*, NBFIs other than insurance corporations, pension funds and financial auxiliaries) by banks and insurance companies has come down. This can exacerbate the procyclicality of capital flows to EMDEs (Chart 1.15 a, b and c).

D. Financial Fragmentation

1.31 Amidst escalating geopolitical tensions, there are serious concerns about the fragmentation of the global economy and the financial system.

Impediments to flows of capital and technology have increased, with adverse implications for cross-border investment, global payment networks and asset prices through two important channels. The financial channel leads to reallocation of capital and consequent liquidity and solvency stress on financial and non-financial firms as well as households through increased risk aversion among investors and/ or through restrictions on capital flows and payments. The real channel poses restrictions on international trade, technology transfer and supply chain disruptions. The two channels are mutually reinforcing and vulnerable to adverse feedback loops, which can impact the balance sheets of both banks and NBFIs. The financial channel can increase the cost of funding, leading to decline in investments and overall profitability (Chart

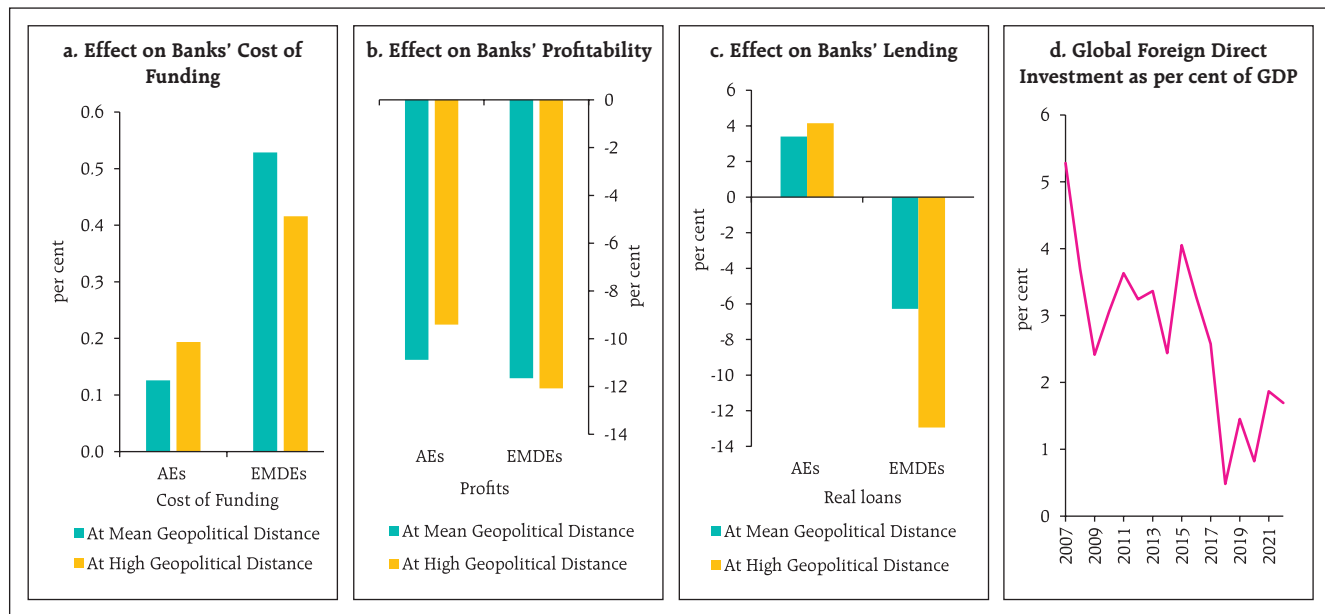
Chart 1.15: Financial Linkages of NBFIs



Note: CRE – Commercial real estate.
Source: IMF.

¹² International Monetary Fund (2023), "Global Financial Stability Report: Safeguarding Financial Stability amid High Inflation and Geopolitical Risks", April.

Chart 1.16: Impact of Economic and Financial Fragmentation



Note: Charts a, b and c show the effect on bank outcome variables when a country experiences a one-standard-deviation increase in geopolitical distance in relation to foreign lenders. The outcome variables are (1) total interest expenses-to-total interest-bearing liabilities, (2) (log) operating profits-to-total assets, and (3) (log) real outstanding gross loans. 'At mean geopolitical distance' shows the association of geopolitical distance with outcome variables, which are both positive and statistically significant whereas 'at high geopolitical distance' examine the nonlinearities in these associations, i.e., whether the effect of geopolitical distance could be different if the geopolitical distance is already at high level.

Source: IMF.

1.16 a, b and c) as well as reduce foreign direct investment (FDI) – global FDI fell from a high of 5.3 per cent of GDP in 2007 to as low as 0.5 per cent in 2018, before recovering to 1.7 per cent in 2022 (Chart 1.16 d). The real channel transmission, on the other hand, could diminish risk-taking capacity of financial institutions and constrain funding of real sector growth requirements.

E. Climate Change

1.32 Climate change is recognised as a strong theme for coordinated policy action. Global efforts to reduce carbon emissions and transition to a greener economy would require massive investment in most countries. The average yearly investment needed to complete the transition so that emissions hit net zero by 2050 is projected at US\$ 5 trillion (estimates range from US\$1.9 trillion to US\$ 9.2 trillion) for the next three decades (Table 1.1).

Table 1.1: Investment Requirement to reach Net Zero by 2050

Source	Average annual investment till 2050 (US\$ trillion)	Scenario/ Scope/ Assumption
McKinsey	9.2	Investments across energy supply, energy demand and land use
Bloomberg New Energy Finance (BNEF)	6.7	Growth in new demand-side sectors anticipated
International Energy Agency (IEA)	4.5	Energy related investment
International Renewable Energy Agency (IRENA)	4.4	Energy related investment
Rockefeller Foundation and BCG	3.8	Considers all type of financing related to climate impact
Energy Transitions Commission	3.5	Gross investment
Goldman Sachs	1.9	Incremental infrastructure investment

Source: BNEF, Energy Transitions Commission, Goldman Sachs, IEA, IRENA, McKinsey, Rockefeller Foundation and BCG.

¹³ International Energy Agency (2021), "Net Zero 2050 - A Roadmap for the Global Energy Sector", October.

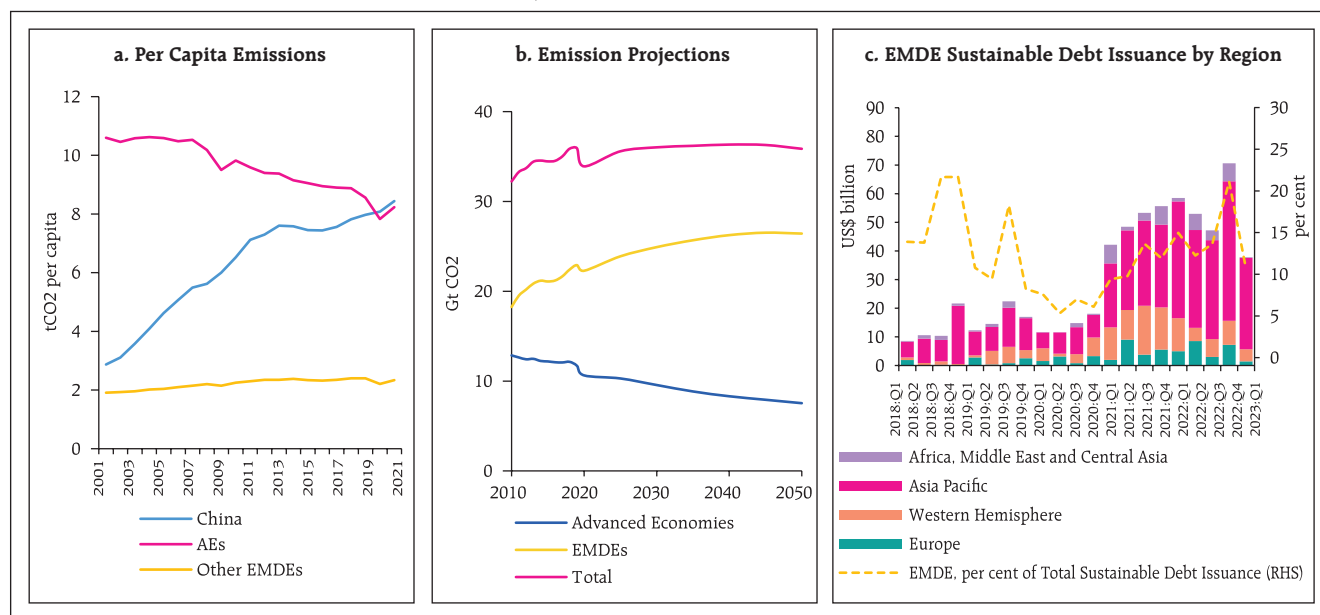
1.33 Population growth, economic growth, and urbanisation are projected to lead to faster rise in emissions in EDMEs, based on current policies and stated nationally determined contributions (NDCs)¹³. On a per capita basis, however, emissions are lower in EMDEs (excluding China), compared to their AE counterparts (Chart 1.17 a and b). Nevertheless, substantial investments are required towards decarbonisation in EMDEs. Estimates show that EMDEs will require climate finance in the range of US\$ 2 – US\$ 3 trillion by 2030¹⁴, which amounts to nearly half of the total annual global investment needs. Sustainable debt issuances by EMDEs have, however, declined sharply in Q1:2023¹⁵ (Chart 1.17 c).

1.34 From a financial stability perspective, risks arise from physical risks (*i.e.*, severe weather events such as floods, storms, heatwaves and fires) and

transition risks (*i.e.*, risks associated with adjusting to a low-carbon economy driven by government policies, technological developments and change in consumer preferences). Physical risks affect banks directly by increasing credit, market, operational and liquidity risks which, in turn, can impact their profitability and solvency. The effect of transition risks, on the other hand, will vary depending upon whether the transition is orderly or disorderly. A disorderly transition will result in significant adjustment costs for all economic agents, leading to stranded financial assets and increasing probability of default by borrowers.

1.35 Severe natural disaster incidents would increase system-wide non-performing loans (NPLs) and keep them at elevated levels for longer period. The gross NPL ratio is estimated to increase by 0.37 percentage points in the year after disaster events.

Chart 1.17: Carbon Emission and Climate Finance



Note: Gt CO2 stands for gigatonnes of CO2.

Source: IEA, BloombergNEF.

¹⁴ The IEA estimates that investment will need to be in the region of US\$ 1.8 trillion. Similarly, The Independent High-Level Expert Group on Climate Finance (IHLEG) projects that approximately US\$ 2.4 trillion will be needed, while Intergovernmental Panel on Climate Change (IPCC) report provides a figure closer to US\$ 3 trillion.

¹⁵ Calendar year.

The ratio will increase by 0.56 and 0.60 percentage points on an average in year two and three with episodes involving multiple disasters¹⁶ (Chart 1.18).

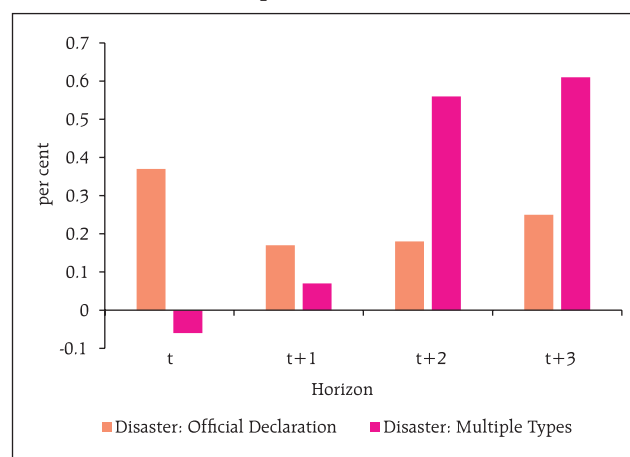
1.36 Given the effect of climate-related events on the financial sector, two major challenges can arise, *viz.*, (i) recalibrating operations and business strategies to support green transition; and (ii) strengthening resilience in the face of rising vulnerability to adverse climate change¹⁷. Accordingly, global efforts are intensifying for collecting reliable data to identify the channels through which climate-related events affect the financial sector with a focus on rigorous stress-testing for climate risks.

F. Growth of Digital Finance

1.37 Digital money and payments systems are transforming the global finance landscape, with profound implications for the international monetary and financial system. Digital innovations contribute to welfare gains by smoothening business processes and facilitating customer services. They are, however, also vulnerable to quick system-wide disruptions with amplified spillovers. Appropriate safeguards are, therefore, required to be built into their design, regulation and integration with existing systems, taking into account their ramifications for currency substitution, capital flows and financial disintermediation¹⁸.

1.38 The recent banking turmoil highlighted how transition to digital banking has altered the value of the deposit franchise¹⁹ and impacted the stability

Chart 1.18: Estimated Effects of Climate-related Disaster Episodes on NPLs



Source: Owen Nie, Martijn Regelink, Dieter Wang (2023), "Banking Sector Risk in the Aftermath of Climate Change and Environmental-Related Natural Disasters", Policy Research Working Paper No. WPS 10326, World Bank Group, February.

of the banking system. Empirical evidence that is now available²⁰ shows that (a) deposit beta, which measures the sensitivity in deposit rates in response to central bank rate changes, is significantly higher among digital banks²¹ relative to non-digital banks; and (b) the market value of the failed Silicon Valley Bank as of December 2022 was US\$ 5 billion less than the value of liabilities if the parameters of digital bank were applied.

1.39 The turmoil in crypto markets throughout 2022, which included the bankruptcy of the largest crypto trading platform, and the failure of two banks in March 2023 that had significant exposure to the crypto industry, highlights the growing linkages between the traditional banking system and the

¹⁶ Nie, Ou, Regelink, Martijn Gert Jan, and Wang, Dieter (2023), "Banking Sector Risk in the Aftermath of Climate Change and Environmental-Related Natural Disasters", Policy Research Working Paper No. WPS 10326, World Bank Group, February.

¹⁷ Reserve Bank of India (2023), "Report on Currency and Finance, 2022-23", May.

¹⁸ IMF (2023), "Initial Considerations of the Implications of Digital Money for the International Monetary System", May.

¹⁹ Deposit franchise value is a function of stickiness of deposits. A bank can survive as long as the value of the deposit franchise exceeds the shortfall between market value of its assets and liabilities.

²⁰ Koont, Naz, Santos, Tano, Zingales, Luigi (2023), "Destabilizing Digital 'Bank Walks'", New Working Paper Series No. 328, Stigler Center for the Study of the Economy and the State, University of Chicago Booth School of Business, May.

²¹ Ibid. A bank is considered as 'Digital Bank' if it has a digital platform, *i.e.*, mobile applications on either the Apple or Android App Store, with at least 300 reviews.

crypto ecosystem (Chart 1.19 a and b). At the same time, decentralised finance (DeFi), which aims to replicate functions of traditional finance (TradFi), is emerging among the fastest-growing segments in the crypto ecosystem.

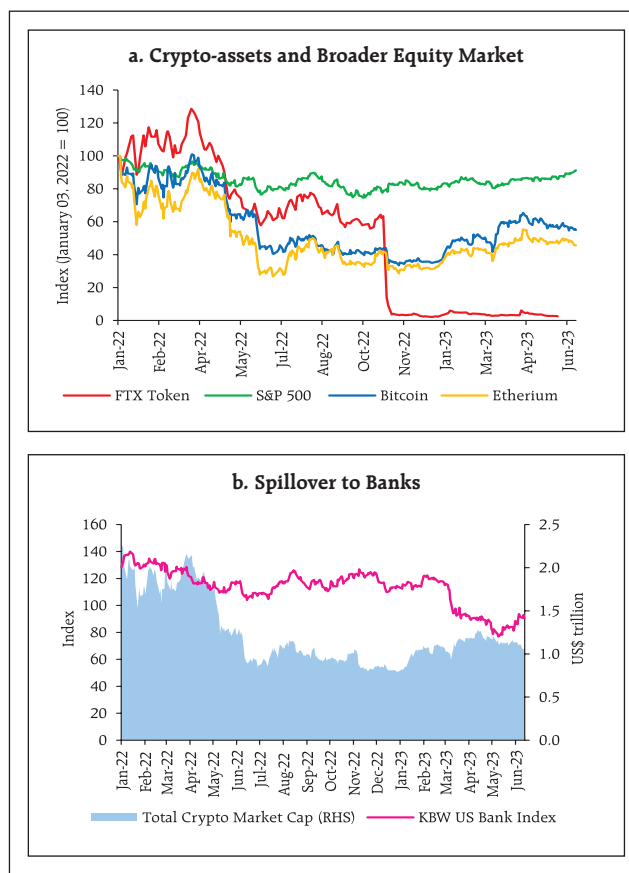
G. Artificial Intelligence and Financial Services

1.40 Technological advancements aided by affordable high-end computing power have led to widespread adoption of artificial intelligence (AI) tools across different spheres. AI is reshaping financial services by its wide-ranging applications, which encompass process automation, risk assessment, credit scoring, regulatory compliance, customised financial products, and predictive analytics. AI-powered chatbots and machine learning (ML) algorithms ensure round-the-clock customer support and can detect fraudulent activities expeditiously, thereby enhancing operational efficiency and precision.

1.41 The public release of OpenAI's generative pre-trained transformer (GPT) model in June 2020 led to a striking change in the way knowledge is acquired from the internet. While there is an animated debate on the potential impact of AI on humanity, big technology companies are in fierce competition for enhancing user experiences to gain an edge in market power in emerging technologies (Chart 1.20).

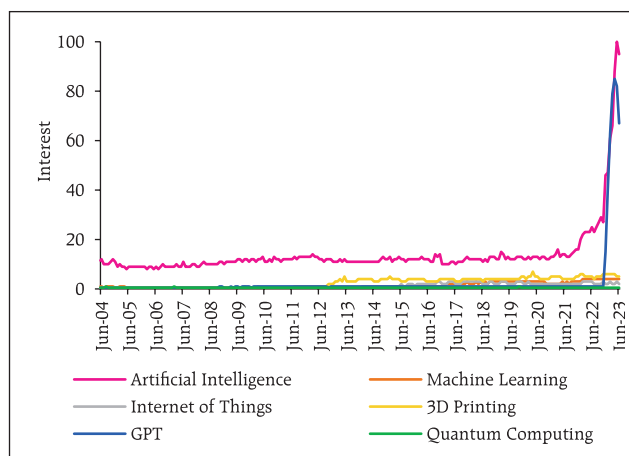
1.42 International organisations are stressing on the need for enhanced safeguards and global cooperation in this context. A proactive and informed approach for navigating risks needs to prioritise: (a) customer expectations; (b) cybersecurity threats; (c) data privacy; (d) sensitivity to ethical concerns related to bias, transparency and accountability; (e) collaboration among financial institutions and industry stakeholders for integration of processes; (f) regulatory compliance; and (g) minimising skill gap to keep pace with rapid technological changes²².

Chart 1.19: Crypto Fall and Spillover to Banks



Source: Bloomberg, Coinmarketcap.

Chart 1.20: Google Trend of Emerging Technologies

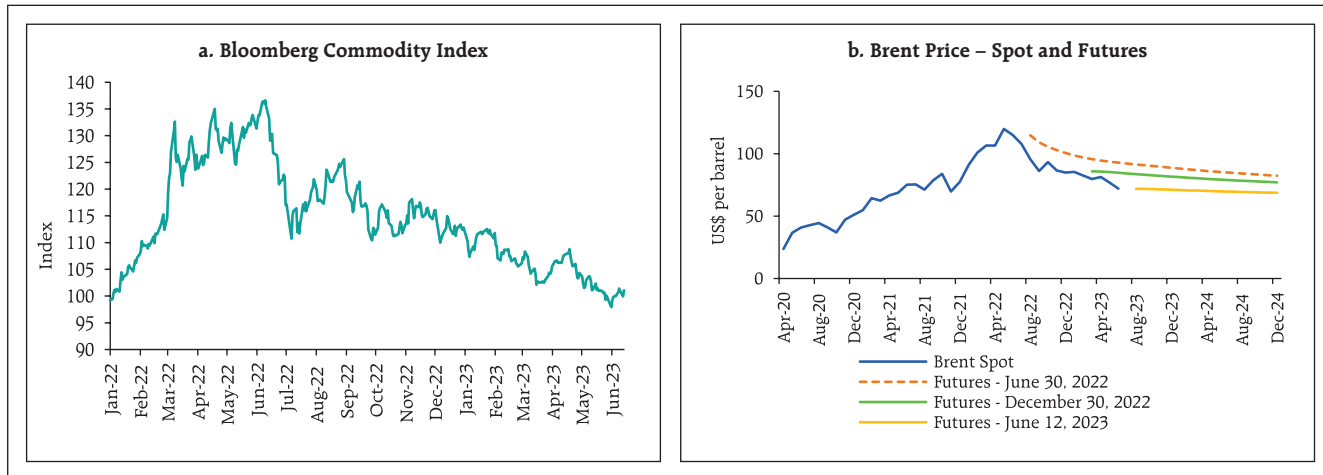


Note: Interest represents search interest relative to the highest point on the chart for the given region and time.

Source: Google Trends.

²² OECD (2021), "Artificial Intelligence, Machine Learning and Big Data in Finance: Opportunities, Challenges and Implications for Policy Makers", August.

Chart 1.21: Commodity Index and Brent Prices



Source: Bloomberg.

1.43 Quantum computing can further enrich optimisation in the financial sector and enhance encryption algorithms as well as break encryption technologies. Its potential impact on AI based financial services, however, needs to be assessed carefully, with the need for development of quantum resistant encryption to safeguard sensitive financial data. Models and training data used to create AI will need to be regularly re-programmed to learn and improve to remain relevant and obviate any systemic disruption in financial services. This requires regular collaboration with stakeholders for seizing opportunities, measuring and managing risks and adjusting policies, regulations and supervisory approaches to ensure an inclusive, sustainable and secure financial intermediation.

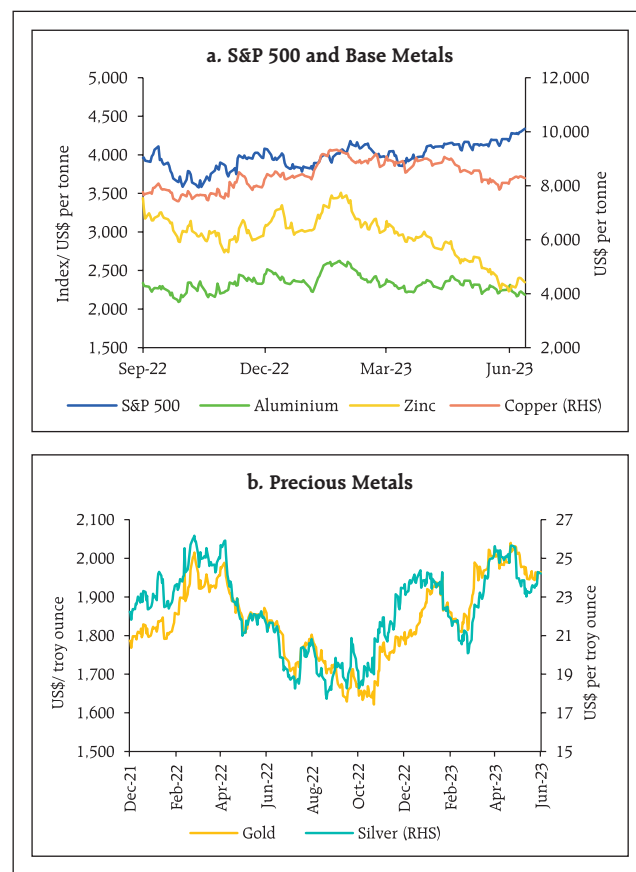
H. Commodity Markets

1.44 Prices of major commodities such as fuel and energy, metals, edible oils, wheat and maize have moderated during 2023 so far, although their future evolution would depend on fundamental factors including the strength of global demand, monetary conditions and the course of geopolitical developments (Chart 1.21 a and b).

1.45 Industrial metals prices have traded sideways and moved broadly in tandem with other risk assets.

In contrast, price of precious metals, viz., gold and silver, have risen, reflecting the highly uncertain macroeconomic and financial environment (Chart 1.22 a and b).

Chart 1.22: Base and Precious Metals



Source: Bloomberg.

1.46 Global food prices, which surged around the onset of the Russia-Ukraine war, have been undergoing gradual correction since mid-2022 (Chart 1.23). During 2023 so far, wheat futures have dropped by over 15 per cent, and overall cereals have recorded a 12 per cent price decline. While supplies of wheat and corn have benefited from the 'Black Sea Grain Initiative', geopolitical stress continues to pose risks.

1.47 Despite the moderation in prices of salient food articles, countries in the middle and low income categories continue to face food insecurity - the number of people facing acute food insecurity increased from 192.8 million in 2021 to 257.8 million in 2022²³ with conflicts, weather extremes, and global as well as national economic shocks acting as interrelated and mutually reinforcing drivers.

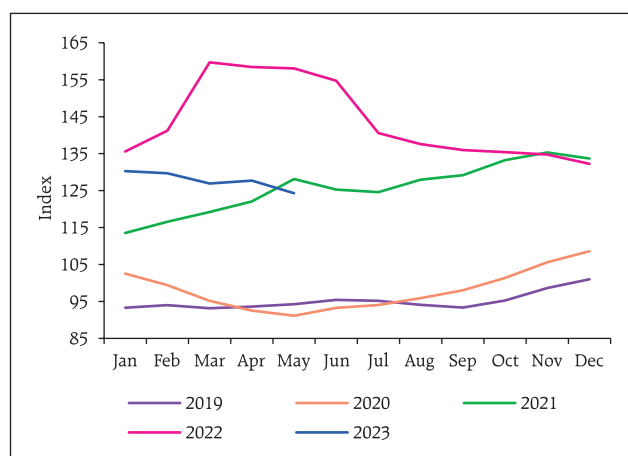
1.48 The World Meteorological Organisation²⁴ projects a moderate probability (60 per cent chance) of the onset of *El Niño* during May-July 2023. This probability is expected to increase to 60-70 per cent during June-August and it is highly likely (with a chance of 70-80 per cent) that *El Niño* will persist into the boreal autumn (*i.e.*, September–October) of 2023. As per the World Bank²⁵, *El Niño* could affect agricultural production on more than 25 per cent of the global cropland.

1.49 The IMF expects both fuel and non-fuel commodity prices to generally decline in 2023 amidst slowing global demand (Chart 1.24).

1.2 Domestic Macrofinancial Risks

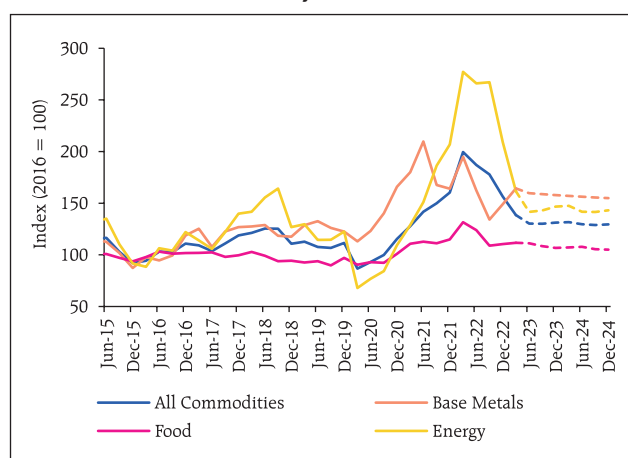
1.50 The Indian economy has exhibited resilience and dynamism in spite of formidable headwinds and an uncertain global economic outlook. The

Chart 1.23: Food Prices (FAO Food Price Index)



Source: Food and Agriculture Organisation (FAO).

Chart 1.24: Commodity Price Indices and Forecast



Note: Adjusted for inflation using the US consumer price index (CPI). Dashed lines are the forecasts from Q1:2023 to Q4:2024.

Source: IMF.

²³ Global Network Against Food Crises (2023), Global Report on Food Crises (weblink: <https://www.fsplatform.org/sites/default/files/resources/files/GRFC2023-hi-res.pdf>).

²⁴ World Meteorological Organisation (2023), "El Niño/La Niña Southern Oscillation (ENSO)", April (weblink: <https://public.wmo.int/en/our-mandate/climate>).

²⁵ World Bank (2023), Food Security Update, May (weblink: <https://www.worldbank.org/en/topic/agriculture/brief/food-security-update>).

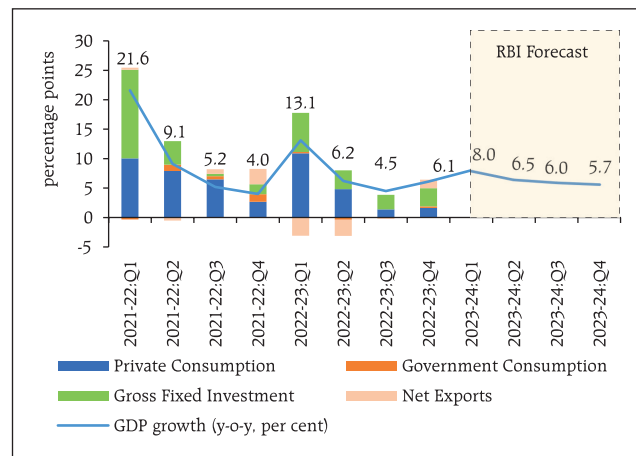
rising momentum of domestic economic activity is supported by an environment of macroeconomic stability marked by moderating inflation, fiscal consolidation, external viability and financial stability. The domestic financial system has been largely immune to the recent banking turmoil in some AEs. Indian banks have reinforced their capital bases and their asset quality has improved. The aggregated balance sheet of non-banking financial companies (NBFCs) also remains healthy and assets under management (AUM) of mutual funds have recorded steady growth. These developments augur well for the prospects of financial intermediation in the context of the evolving macroeconomic and financial outlook for India.

I.2.1 Domestic Growth and Inflation

1.51 Buoyed by both private and government consumption demand, rising investment and improving consumer and business optimism, India's real GDP grew by 5.3 per cent in H2:2022-23 and is projected to grow by 6.5 per cent in 2023-24 (Chart 1.25).

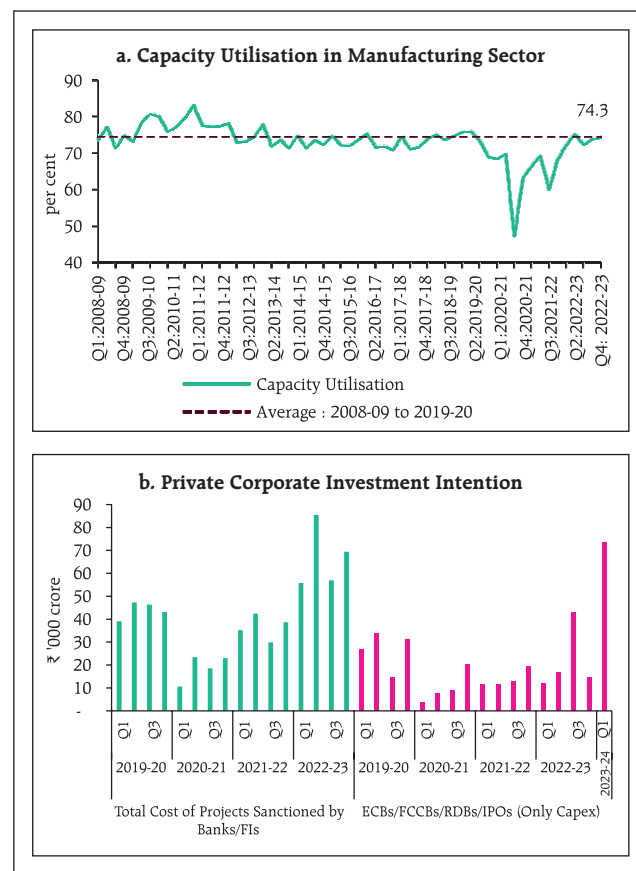
1.52 The revival in domestic demand, increasing capacity utilisation in the manufacturing sector, easing input cost pressures and more recently, improvement in profitability are catalysing the commercial sector to avail more finances from domestic as well as external sources than a year ago (Chart 1.26 a and b).

Chart 1.25: GDP Growth (Weighted Contribution)



Source: National Statistical Office, MOSPI.

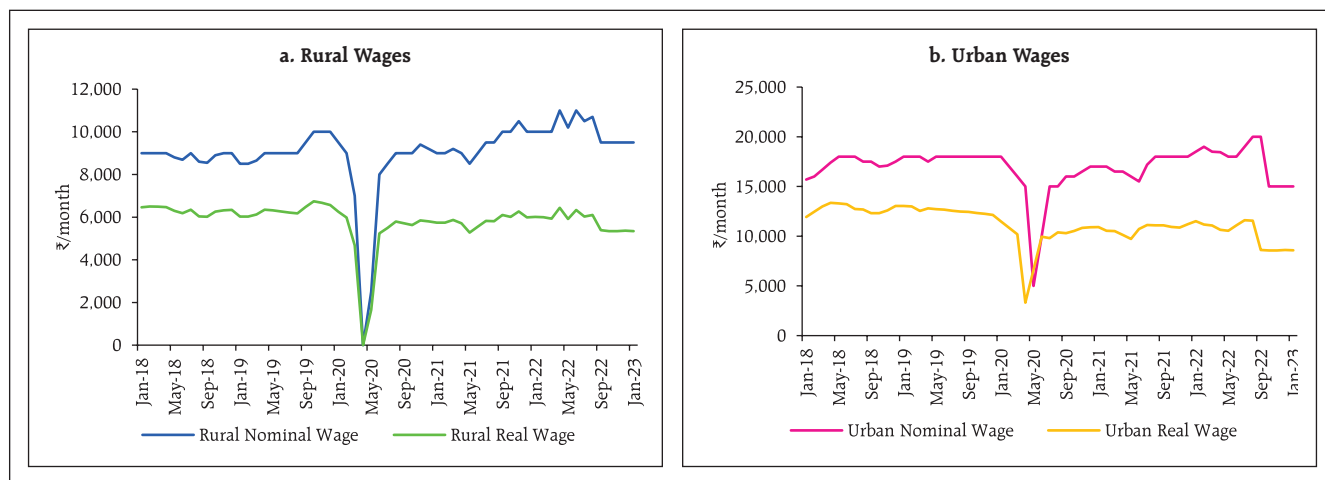
Chart 1.26: Private Investment



Note: For 2023-24, External Commercial Borrowing (ECB) Data is up to May 30, 2023 while IPO is up to April-2023; ECB – External Commercial Borrowings; FCCB – Foreign Currency Convertible Bonds; RDB – Rupee Denominated Bonds; IPO – Initial Public Offerings.

Source: RBI, SEBI and Project financed data collected from select banks/FIs and RBI staff calculations.

Chart 1.27: Stagnant Real Wages

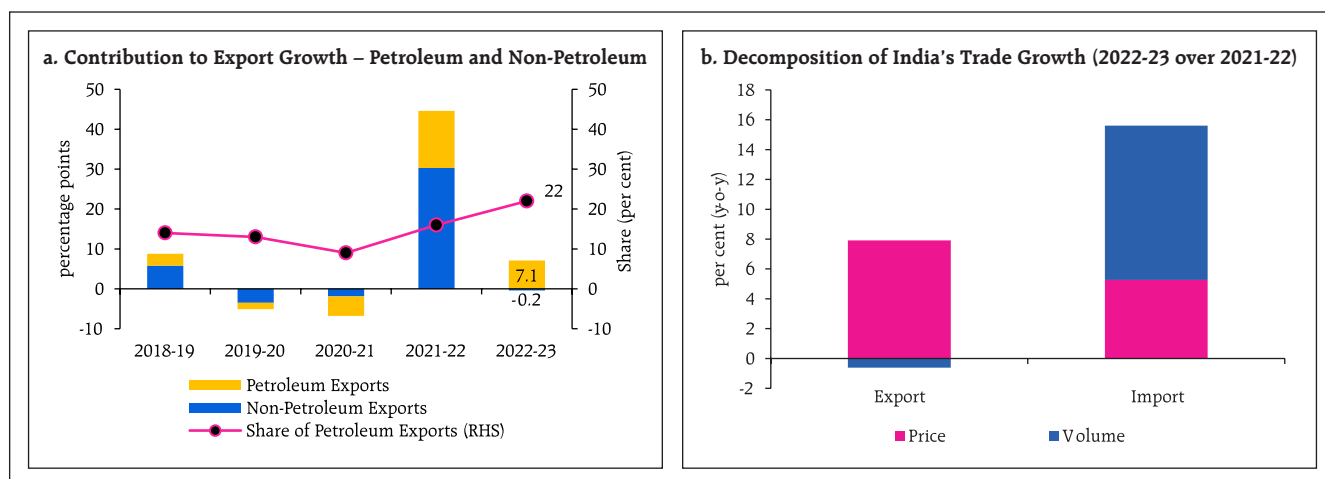


Note: Real wage is obtained by deflating nominal wage income of rural and urban households using the CPI Rural (2012=100) and CPI Urban (2012=100) index, respectively.
Source: RBI staff calculations and Consumer Pyramids Household Survey, CMIE.

1.53 Moderation in real wages and recent signs of tempering of private consumption are emerging as constraining factors (Chart 1.27 a and b), alongside weakening external demand, which may impact export prospects (Chart 1.28 a and b).

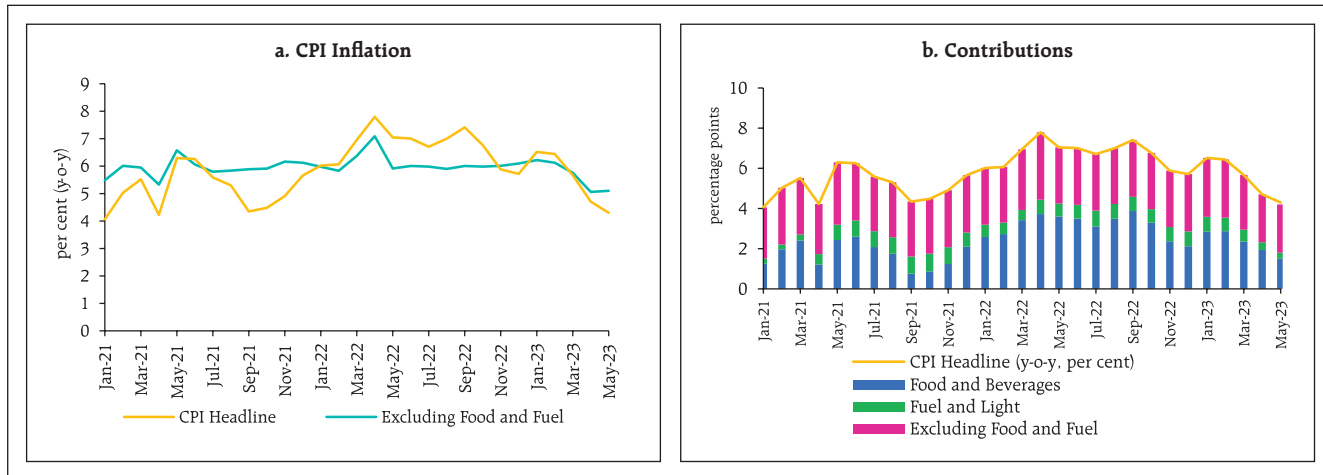
1.54 Driven down by a broad-based moderation in prices, the headline consumer price index (CPI) inflation came down sharply from a peak of 7.8 per cent in April 2022 to 4.3 per cent in May 2023, though core inflation (*i.e.*, excluding food and fuel items) remained somewhat higher at 5.1 per cent

Chart 1.28: Merchandise Trade Performance



Source: RBI staff calculations and Directorate General of Commercial Intelligence & Statistics (DGCI&S).

Chart 1.29: Inflation – Trends and Drivers



Note: CPI inflation for April-May 2021 was computed based on imputed CPI indices for April-May 2020.
Source: National Statistical Office (NSO), RBI staff calculations.

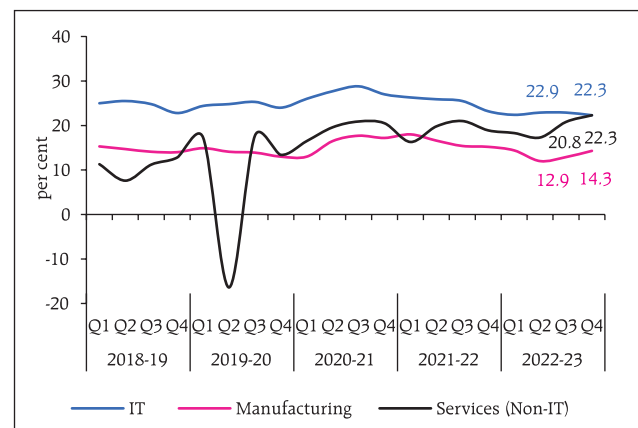
(Chart 1.29 a and b). A combination of monetary policy tightening and supply-side measures led to this disinflation. According to the latest households' inflation expectations survey (June 2023), inflation expectations of households have been moderating since September 2022.

1.2.2 Corporate Sector

1.55 The improvement in demand conditions has sustained growth, earnings and profitability of the private corporate sector (Chart 1.30).

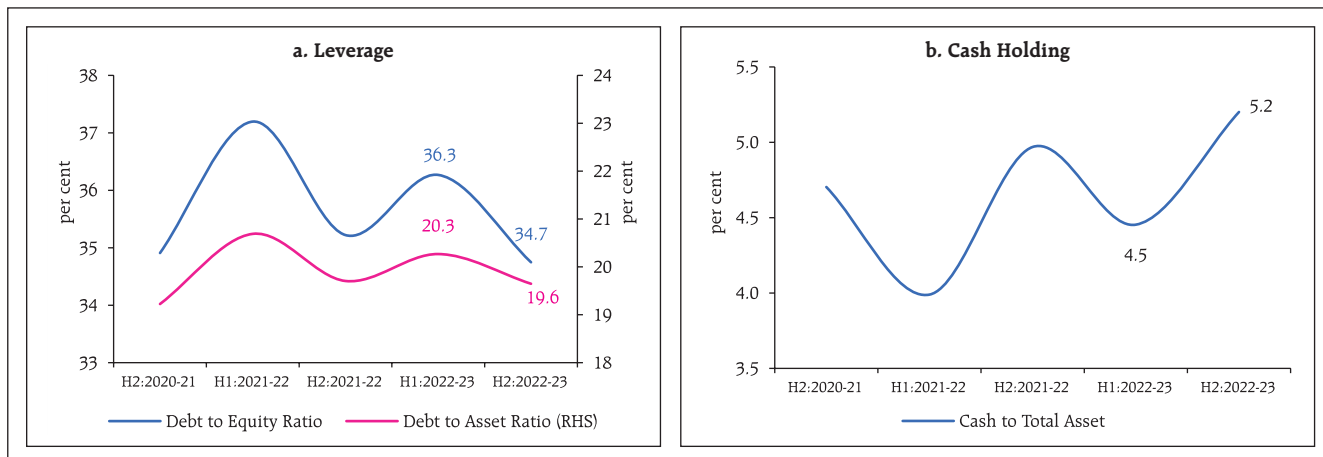
1.56 Leverage of listed private non-financial companies declined in H2:2022-23 due to lower levels of debt and increase in retained earnings (Chart 1.31a). The share of cash holdings (including

Chart 1.30: Operating Profit Margin - Listed Private Non-Financial Companies



Note: Sample of 2,774 listed private non-financial companies used for Q4:2022-23.
Source: Capitaline, RBI staff calculations.

Chart 1.31: Select Ratios of Listed Private Manufacturing Companies



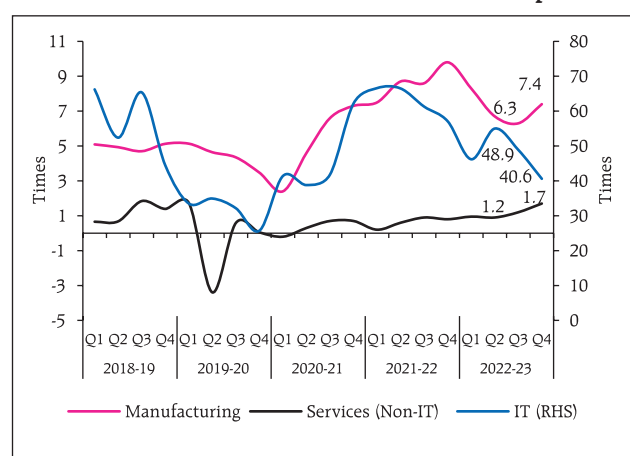
Note: Data is based on 1550 common listed private manufacturing companies.
Source: Capitaline and RBI staff calculations.

balances with banks and highly liquid investments) in total assets increased during H2:2022-23 (Chart 1.31 b). The share of fixed assets in the total use of funds went marginally above 40 per cent during both H1 and H2 of 2022-23.

1.57 In India, the share of debt held by listed private non-financial companies with interest coverage ratio (ICR) below unity has been declining steadily from 2016-17. Moreover, their share in aggregate sales is low, indicating that the sub-unity ICR group is dominated by smaller companies (Table 1.2). Also, non-IT services companies have significantly higher debt servicing vulnerability *vis-à-vis* manufacturing companies, whereas IT companies are in the most comfortable position (Chart 1.32).

1.58 An analysis of the listed private non-financial companies with ICR below unity showed that the exposure of SCBs to them was limited to 0.5 per cent of their total loans and advances. Thus, from

Chart 1.32: ICR of Listed Private Non-Financial Companies



Note: Sample of 2,774 listed private non-financial companies used for Q4:2022-23.
Source: Capitaline, RBI staff calculations.

a systemic risk perspective, the threat to banking system stability is limited.

1.59 Start-ups across geographies are witnessing a synchronised funding crunch. Venture capital (VC) funding has seen a marked downturn across funding

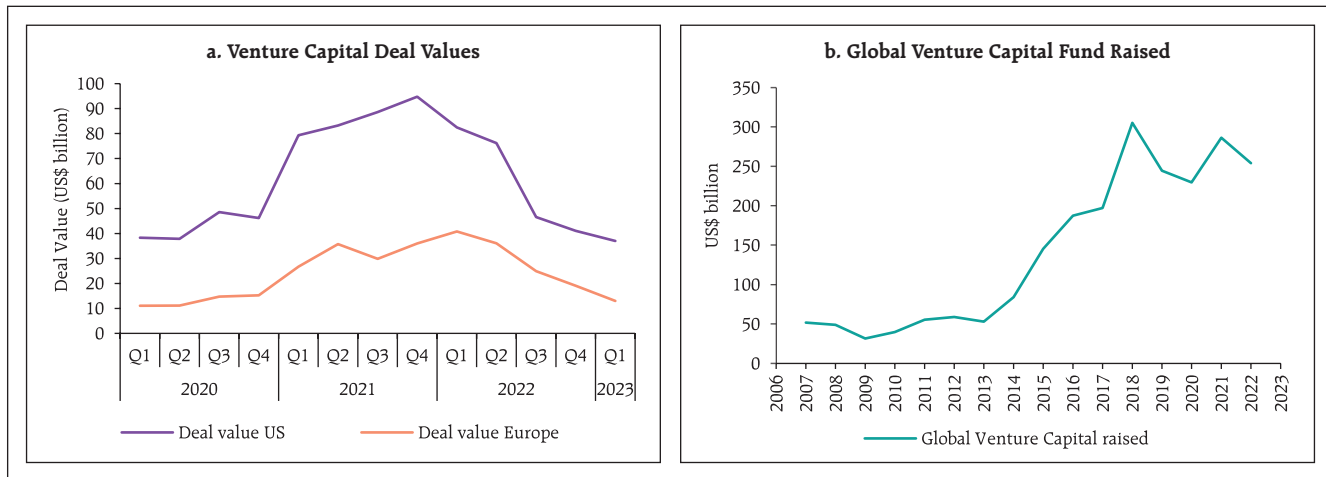
Table 1.2: Share of Debt[#] held by Listed Private Non-Financial Companies by ICR Categories

Items	Audited Balance Sheet						Half-yearly (unaudited)		
	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	H2:2021-22	H1:2022-23	H2:2022-23
No. of sample Companies	3,238	3,231	3,205	3,163	3,103	2,963	2,844	2,690	2,710
Share in sample companies									
(per cent)									
ICR ≤ 1**	35.5	34.2	34.1	37.6	34.7	32.6	32.7	28.2	27.5
1 < ICR ≤ 4	34.8	34.3	27.6	25.2	31.5	15.2	14.5	23.4	25.1
ICR > 4	29.6	31.5	38.3	37.2	33.8	52.2	52.8	48.4	47.4
Sales share of companies with ICR < 1									
(per cent)									
	Manufacturing		IT		Non-IT services		Aggregate		
2020-21	6.8		3.0		44.1		10.5		
2021-22	5.1		1.6		36.5		9.3		
2022-23*	3.6		1.3		20.9		5.4		

Note: [#] debt Includes total liabilities less total equity (including reserves); * based on quarterly results of 2774 companies; ** also includes companies with negative ICR.

Source: Capitaline, RBI Staff Calculations.

Chart 1.33: Moderation in Global VC Fund Raising



Source: Pitchbook Data, RBI Staff calculations.

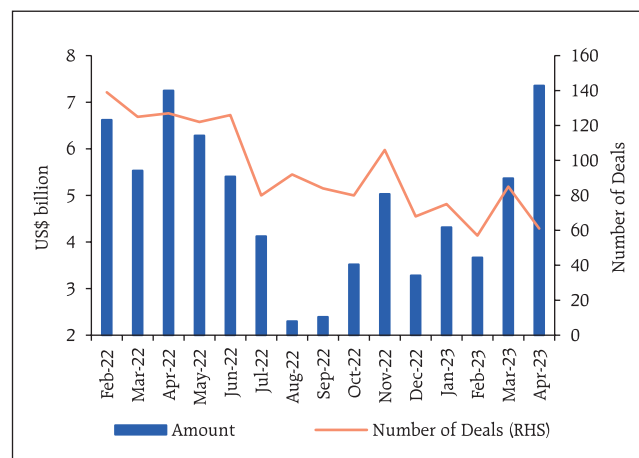
stages and sectors from its peak level in 2021 (Chart 1.33 a and b).

1.60 Start-ups in India are also facing funding stress²⁶ (Chart 1.34). Tighter liquidity conditions, uncertain global macroeconomic outlook, and geopolitical fragmentation continue to pose risks that may trigger correction in valuations of these firms and a wave of consolidation. Investors are also exercising more caution due to lacklustre stock market performance of some new age technology companies, which significantly depend on foreign capital and are, therefore, more exposed to risks of tightening global financial conditions.

1.2.3 Money, Government Securities and Corporate Bonds Markets

1.61 Domestic liquidity conditions have tightened with fuller monetary policy transmission. Long-term rates have plateaued since the December FSR and, in

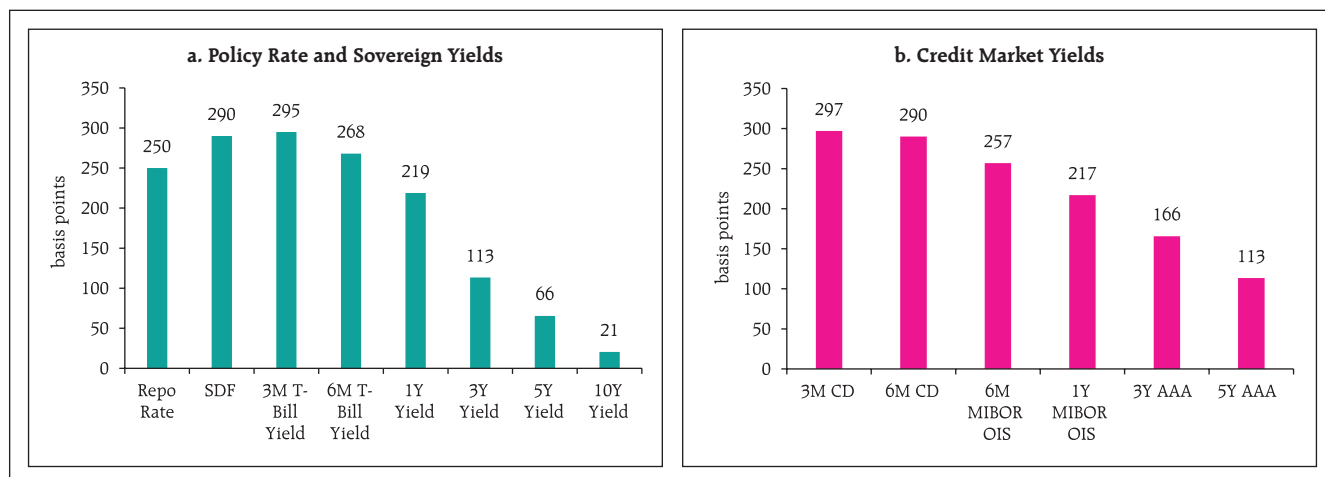
Chart 1.34: PE/VC Investments in India



Source: Indian Venture and Alternate Capital Association (IVCA) – Ernst & Young (EY) PE/VC Roundup Report.

²⁶ <https://www.reuters.com/world/india/once-booming-indian-startups-set-more-pain-funding-crunch-worsens-2023-04-19/>

Chart 1.35: Financial Conditions (interest rate changes since March 31, 2022*)



Note: * Up to June 15, 2023.

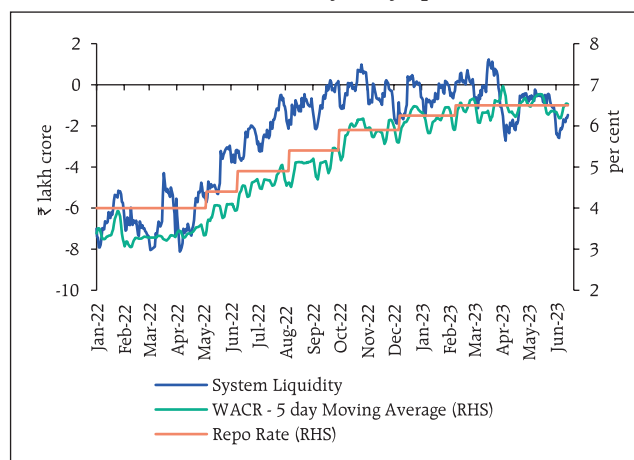
Source: RBI, Financial Benchmark India Pvt Ltd (FBIL) and Bloomberg.

some cases, eased subsequently as markets factor in the recent fall in inflation (Chart 1.35 a and b).

1.62 Average daily absorptions under the liquidity adjustment facility (LAF) declined from ₹2.86 lakh crore during the financial year 2022-23 to ₹1.75 lakh crore in April-June 2023 (till June 20, 2023). Maturity of long-term repos, seasonal expansion in currency, variation in government spending and withdrawal of ₹2000 denomination bank notes from circulation have contributed to changes in liquidity conditions. The Reserve Bank has modulated the system-level liquidity through its main and fine-tuning operations and ensured that money market rates have generally evolved in an orderly manner (Chart 1.36).

1.63 The sovereign yield curve flattened as short and long-term yields converged, with term spreads

Chart 1.36: Monetary Policy Operations



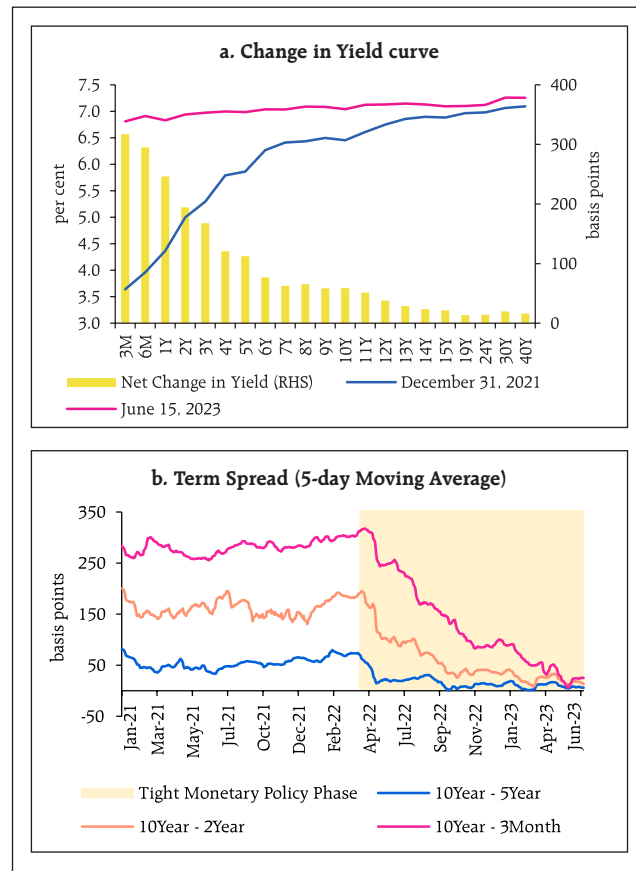
Note: +ve/-ve represents injection/ absorption of liquidity.

Source: DBIE, RBI Staff calculations.

falling to multi-period lows (Chart 1.37 a and b). In response to monetary tightening that began in April 2022, tightness in system liquidity and global monetary policy developments, short-term yields rose faster than long-term yields. In general, such 'bear flattening'²⁷ marks a transition. For the Indian economy, it is signalling re-anchoring of inflation expectations amidst growth momentum in underlying economic activity.

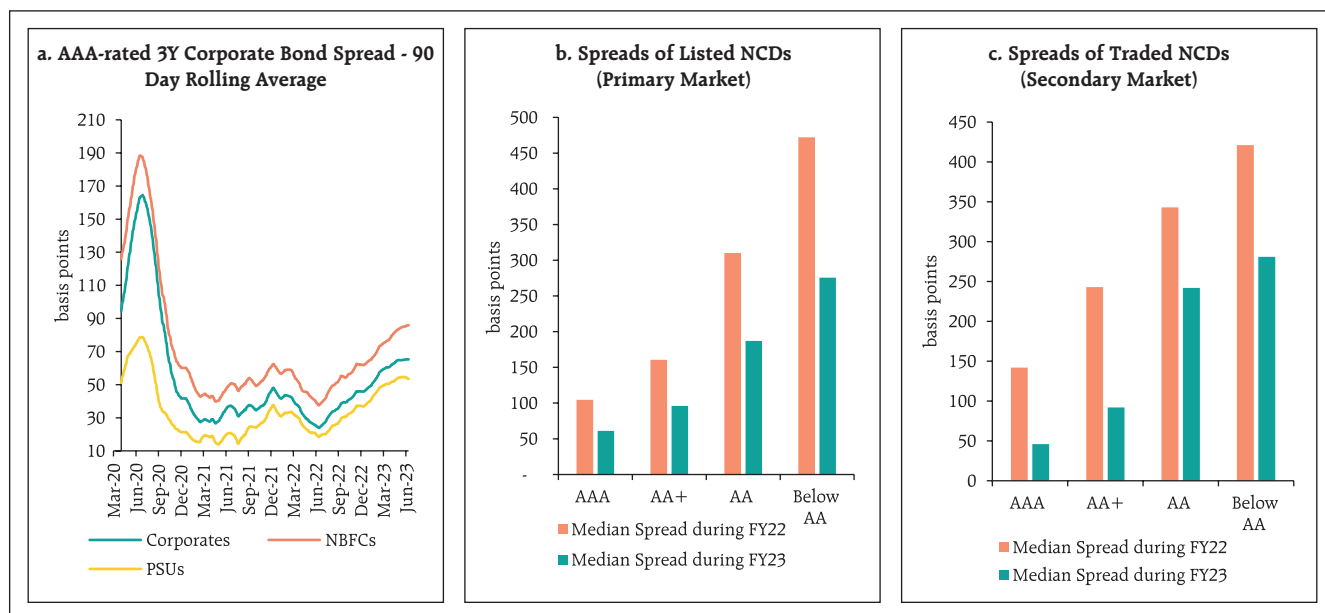
1.64 Corporate bond spreads of AAA-rated firms increased moderately but remained below the levels seen during the onset of the pandemic (Chart 1.38 a). The median spreads of listed non-convertible debentures (NCDs) over the benchmark yield of 3-year government security declined for all rating grades, both in the primary and secondary segments (Chart 1.38 b and c).

Chart 1.37: Sovereign Yield Curve and Term Spread



Source: Refinitiv, RBI Staff calculations.

Chart 1.38: Corporate Bond Spreads



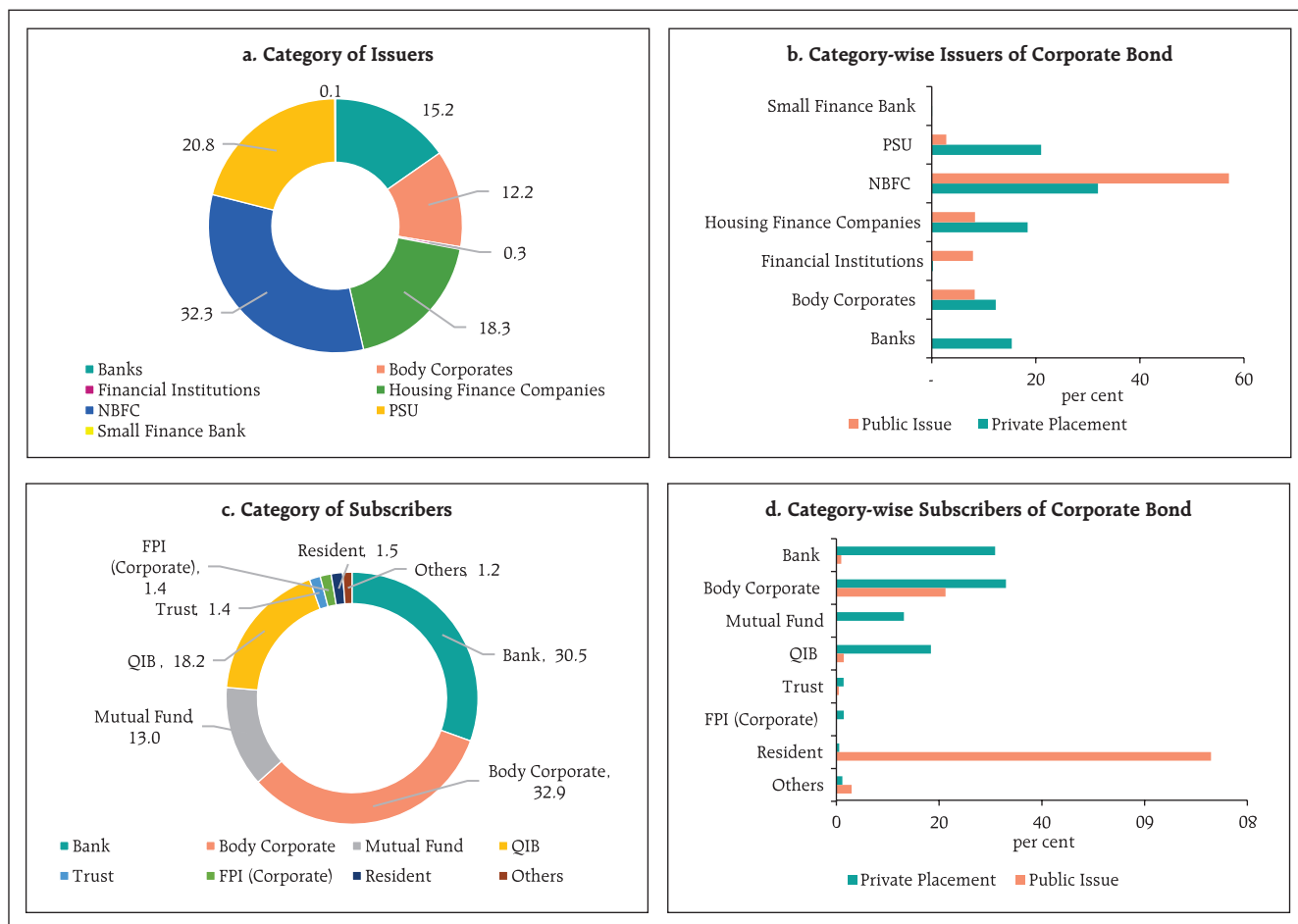
Source: Bloomberg, National Stock Exchange of India Ltd (NSE), BSE.

²⁷ Bear flattening refers to short-term rates rising faster than the long-term rates leading to a flattening of the yield curve.

1.65 NBFCs, housing finance companies (HFCs) and public sector undertakings (PSUs) were the major issuers of corporate bonds (Chart 1.39 a). NBFCs, in particular, have raised more funds through

public issues than private placement (Chart 1.39 b). Banks and corporates were the main subscribers with residents dominating the public issue space (Chart 1.39 c and d).

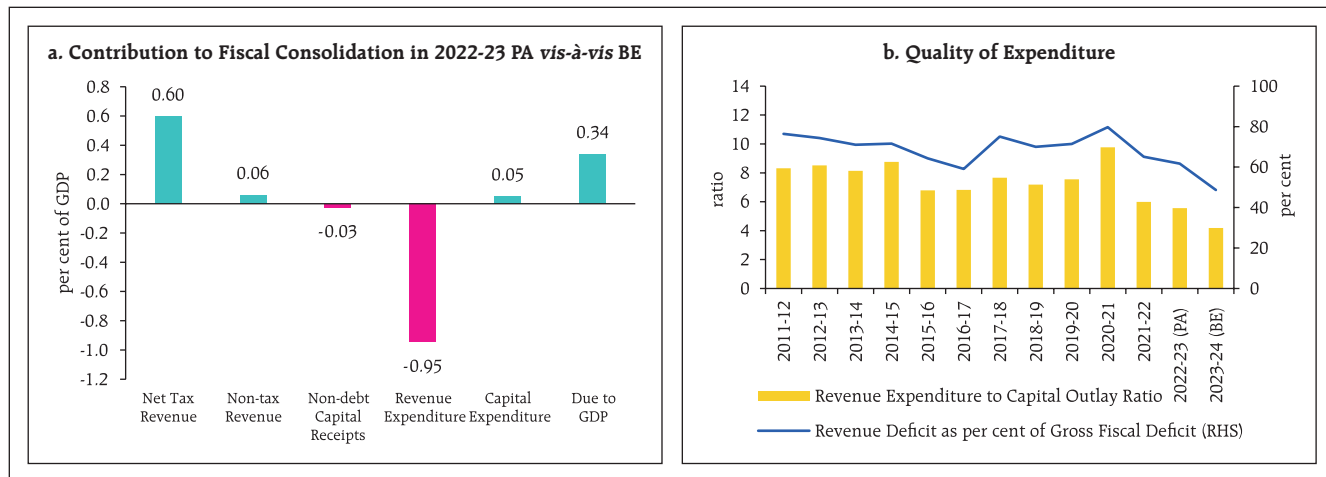
Chart 1.39: Corporate Bond Issuance and Subscription in 2022-23



Note: QIB stands for Qualified Institutional Buyers. *Others include Alternative Investment Funds (AIFs), Clearing Members (CMs), Financial Institutional (FIs), FIIs, Foreign Nationals, FPI (Individuals), HUFs, NRIs and Others.

Source: National Securities Depository Limited (NSDL), Central Depository Services (India) Limited (CDSL).

Chart 1.40: Central Government Finances



Note: PA – Provisional Accounts; BE – Budget Estimates.

Source: Union Budget Documents, Controller General of Accounts (CGA) and RBI staff calculations.

1.2.4 Government Finance

1.66 In 2022-23 (PA), the government achieved its budgeted gross fiscal deficit (GFD) target of 6.4 per cent of GDP, as higher subsidy payouts on the back of elevated commodity prices were offset by buoyant direct tax and Goods and services tax (GST) collections (Chart 1.40 a). Year-on-year (y-o-y) growth in capital expenditure stood at 24.2 per cent, *vis-à-vis* revenue expenditure growth of 7.9 per cent, reflecting the ongoing improvement in the quality of expenditure (Chart 1.40 b).

1.67 In 2023-24 (BE), the GFD is budgeted at 5.9 per cent of GDP, a reduction of 44 basis points over 2022-23 (PA) [Table 1.3]. The consolidation is sought to be achieved through containment of revenue expenditure at 11.6 per cent of GDP, with a rollback of spending on subsidies. Capital expenditure, on the other hand, is budgeted to rise to 3.3 per cent of GDP, from an average of 1.7 per cent of GDP during 2010-20, led by the Ministries of road and railways. Further, to incentivise capex by state governments, the scheme for providing financial assistance to states for capital investment has been extended to 2023-

Table 1.3: Central Government Finances - Key Deficit Indicators

(per cent of GDP)

Item	2021-22	2022-23 (PA)	2023-24 (BE)
Revenue Deficit	4.4	3.9	2.9
Gross Fiscal Deficit	6.8	6.4	5.9

Note: PA – Provisional Accounts; BE – Budget Estimates.

Source: CGA and Union Budget Documents.

24 (BE) with an enhanced outlay of ₹1.3 lakh crore. On the receipts side, gross tax revenue is budgeted to increase by 10.1 per cent, with direct and indirect taxes expected to grow at 9.8 per cent and 10.4 per cent, respectively. The centre's debt-to-GDP ratio at 60.1 per cent in 2021-22 is budgeted to decline to 57.8 per cent in 2023-24 as fiscal rectitude continues.

1.68 Net market borrowings of the central government during 2023-24 is budgeted at 3.9 per cent of GDP²⁸ *vis-à-vis* the pre-pandemic (2018-2020) average of 2.4 per cent of GDP. The weighted average yield of primary government securities (G-sec) issuances increased to 7.32 per cent in 2022-

²⁸ Net market borrowings stood at 4.1 per cent of GDP in 2022-23 (RE).

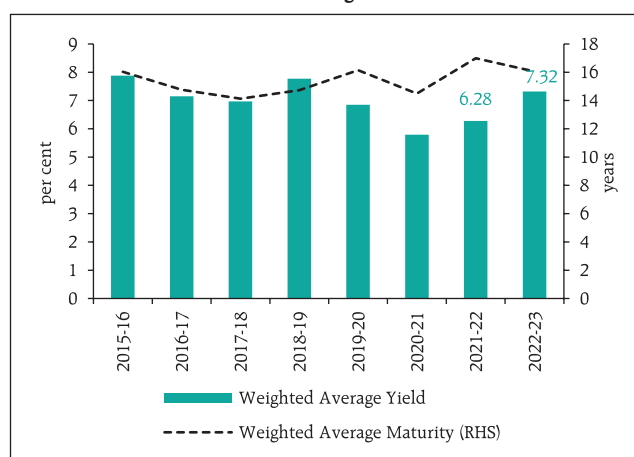
23 from 6.28 per cent in the previous financial year (Chart 1.41).

1.69 States' fiscal position has witnessed a sharp revival from the pandemic-induced deterioration seen during 2020-21. The consolidated gross fiscal deficit (GFD) of states and Union Territories (UTs) declined from the peak of 4.1 per cent of GDP in 2020-21 to 2.8 per cent in 2021-22²⁹ and has remained at the same level in 2022-23³⁰ as well, which is much lower than the budget estimate of 3.4 per cent for the year. This swift consolidation was primarily driven by a decline in revenue expenditure coupled with an increase in states' own tax revenue led by states' GST. For 2023-24³¹, the states have budgeted a GFD-GDP ratio of 3.2 per cent, which is significantly lower than the indicative target of 3.5 per cent set by the central government.

1.70 Capital Expenditure (capex) of the states reached 2.5 per cent of GDP in 2021-22 and remained at the same level in 2022-23 (PA). States' capex is budgeted to increase further to 3.2 per cent of GDP in 2023-24 (BE). Revenue expenditure, on the other hand, declined from 14.2 per cent of GDP in 2021-22 to 13.5 per cent in 2022-23 (PA). This has resulted in an improvement in the quality of expenditure - the revenue expenditure to capital outlay (RECO) ratio for the states has improved from 7.1 during 2020-21 to 5.1 in 2023-24 (BE) (Table 1.4).

1.71 Reflecting strong fiscal consolidation efforts of the states, their total outstanding liabilities have moderated significantly in the last three years. After reaching a 15-year high of 31.0 per cent of GDP at end March 2021, states' outstanding liabilities came down to 27.9 per cent of GDP by end March 2023 (Chart 1.42). Debt service burden of the states measured in terms of interest payments to revenue

Chart 1.41: Market Borrowing of Central Government



Source: RBI.

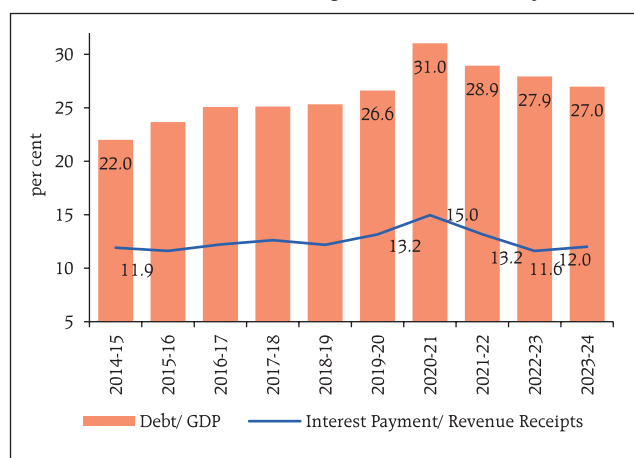
Table 1.4: State Government Finances - Key Fiscal Indicators
(per cent of GDP)

Item	2021-22 Accounts	2022-23 (PA)	2023-24 (BE)
Revenue Deficit	0.4	0.3	0.2
Gross Fiscal Deficit	2.8	2.8	3.2
Primary Deficit	1.0	1.2	1.4
RECO Ratio	6.2	6.1	5.1

Note: PA - Provisional Accounts; BE - Budget Estimates.

Source: Budget document of states and CAG.

Chart 1.42: States' Outstanding Debt and Interest Payments



Note: Data for 2023-24 are budget estimates and for 2022-23 are provisional accounts.

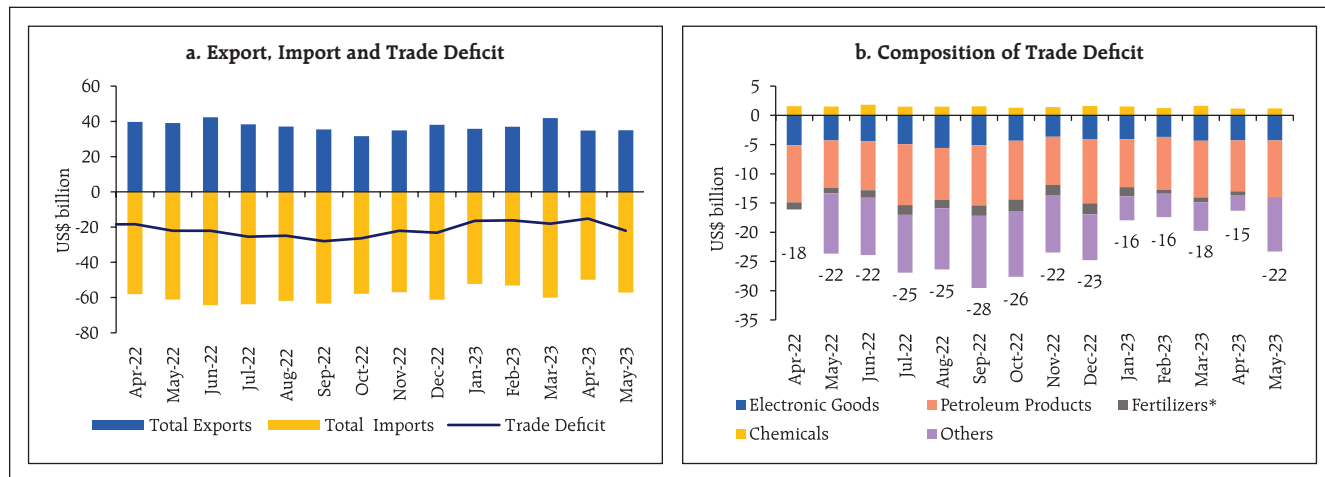
Source: Budget document of states; and CAG.

²⁹ Data for 2021-22 is based on accounts data available for 28 states supplemented with budget estimates for the remaining 3 states/UTs.

³⁰ The data for 2022-23 has been compiled by combining latest available accounts data for 25 states from the Comptroller and Auditor General (CAG) and budget estimates (BE) for remaining six states and UTs for 2022-23.

³¹ Data for 2023-24 (BE) pertain to 29 states and is taken as a per cent of their combined Gross State Domestic Product (GSDP).

Chart 1.43: Exports, Imports and Trade Deficit



Note: * Export and Import data for fertilizer is unavailable for May 2023.
Source: DGCIS.

receipts (IP/RR) ratio has also moderated during this period.

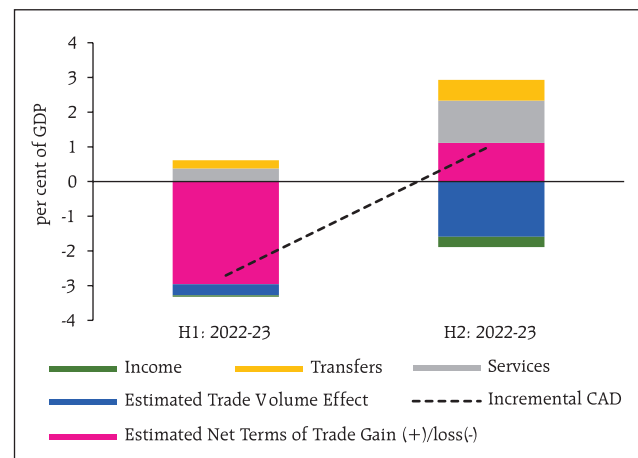
1.72 At 27.9 per cent of GDP at end-March 2023, the debt level of the states is still higher than the 20 per cent limit recommended by the Fiscal Responsibility and Budget Management (FRBM) Review Committee (2018) and warrants further consolidation. At a disaggregated level, a few large states have debt-to-GSDP ratios exceeding 35 per cent.

1.2.5 External Sector and Foreign Exchange Market

1.73 External sector sustainability has improved on the back of strong exports of services and a narrowing of merchandise trade deficit, which fell to US\$ 22.1 billion in May 2023 from a peak of US\$ 28.0 billion in September 2022 (Chart 1.43 a and b).

1.74 India's current account deficit (CAD) narrowed to 0.2 per cent of GDP (at current market prices) in Q4:2022-23 from 3.8 per cent and 2.0 per cent in Q2 and Q3 of 2022-23, respectively. A narrowing of the merchandise trade deficit and robust services exports were the major factors that contributed to the decline in the CAD (Chart 1.44).

Chart 1.44: Sources of Current Account Balance



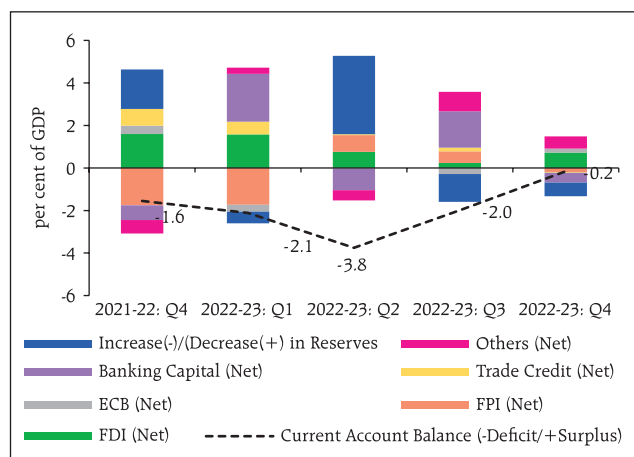
Note: In estimation of net terms of trade changes, the figures for February 2023 were repeated for March 2023 due to unavailability of March data.
Sources: IMF and RBI staff calculations.

1.75 As net capital inflows exceeded the CAD, there was an accretion to the foreign exchange reserves to the tune of US\$ 5.6 billion on a balance of payments (BoP) basis during Q4:2022-23 (Chart 1.45).

1.76 The information technology sector has led the robust growth in exports of services. Export through technology driven innovations in professional and management consulting services, research and development, drugs and pharmaceutical products and mobile handsets are also gaining global market share (Chart 1.46 a and b). The proliferation of global capability centres (GCCs) that provide services such as automation, consulting, AI and machine learning, is instrumental in driving future growth in these dynamic areas.

1.77 Tightening of global financial conditions, repeated episodes of turbulence and heightened uncertainty have adversely impacted capital flows to EMDEs, including India. Net foreign direct investment (FDI) was lower at US\$ 28.0 billion in 2022-23 relative to US\$ 38.6 billion in the previous year. Global FDI flows are slowing down in recent years, driven by emergence of new regional blocs,

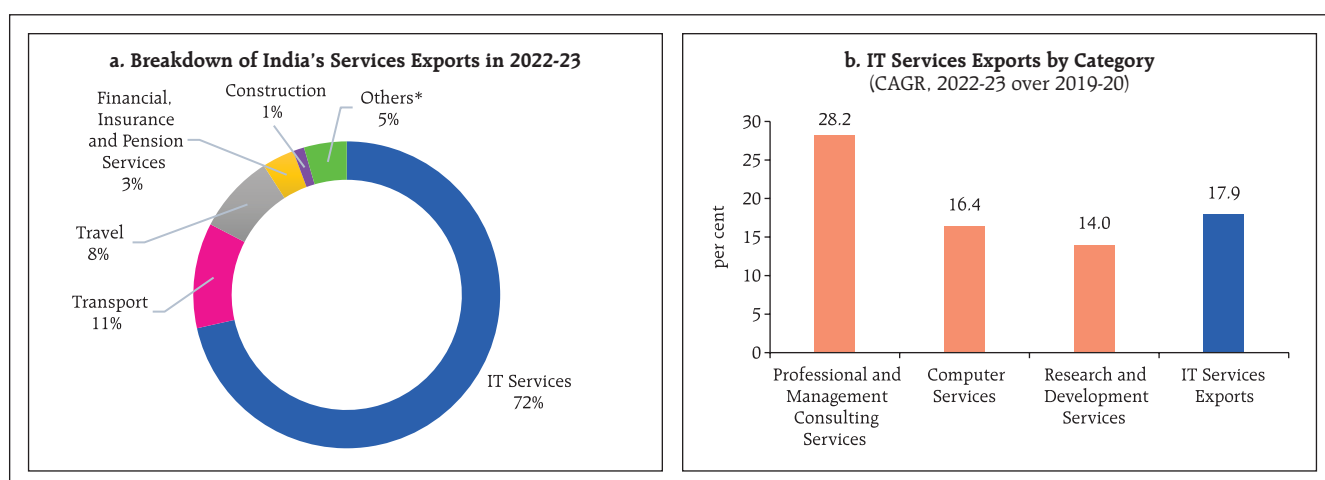
Chart 1.45: Balance of Payments



Note: 'Others' includes external assistance, rupee debt service and errors and omissions.

Source: RBI.

Chart 1.46: Services Exports



Notes: CAGR – Compound annual growth rate; *: Others include manufacturing services, maintenance and repair, use of intellectual property, recreational, government services, etc.

Source: DBIE, RBI.

friendshoring and reshoring, and geopolitical fragmentation³². Foreign portfolio investment (FPI) flows to India remained volatile and recorded net outflows of US\$ 4.8 billion during 2022-23. External commercial borrowings (ECBs) also reported net outflows. During 2023-24 so far (till June 23, 2023), net FPI inflows amounted to US\$ 10.1 billion, while net FDI and net ECB inflows amounted to US\$ 2.8 billion and US\$ 0.7 billion, respectively (Table 1.5).

1.78 Of the ECBs registered during 2022-23 (amount: US\$ 26.6 billion), 48.5 per cent were

explicitly hedged, 15.9 per cent were from FDI parent companies and 7.4 per cent were denominated in the Indian Rupee (INR). The remaining 28.2 per cent included loans that had natural hedge (*i.e.*, borrowers' business earnings in foreign currency). At end-March 2023, a major component of outstanding ECB loans remained hedged. 46 per cent of total outstanding loans remained unhedged, including loans with natural hedges (Table 1.6).

1.79 There has been a marked improvement in external vulnerability indicators. India's foreign

Table 1.5: Net Capital Flows

(US\$ billion)

Component	Financial year so far			Financial year (Apr-Mar)	
	Period	2023-24	2022-23	2022-23	2021-22
1. FDI (Net)	April	2.8	5.3	28.0	38.6
2. FPI (Net)	April-June	10.1	-14.0	-4.8	-14.1
3. ECB to India (net)	April-May	0.7	-1.9	-4.1	7.4

Note: Data on FPI for financial year so far (June 23, 2023) and corresponding period previous year and 2022-23 have been sourced from NSDL, whereas data for 2022-23 and 2021-22 are based on BoP.

Source: RBI and NSDL.

Table 1.6: Hedging of ECB loans

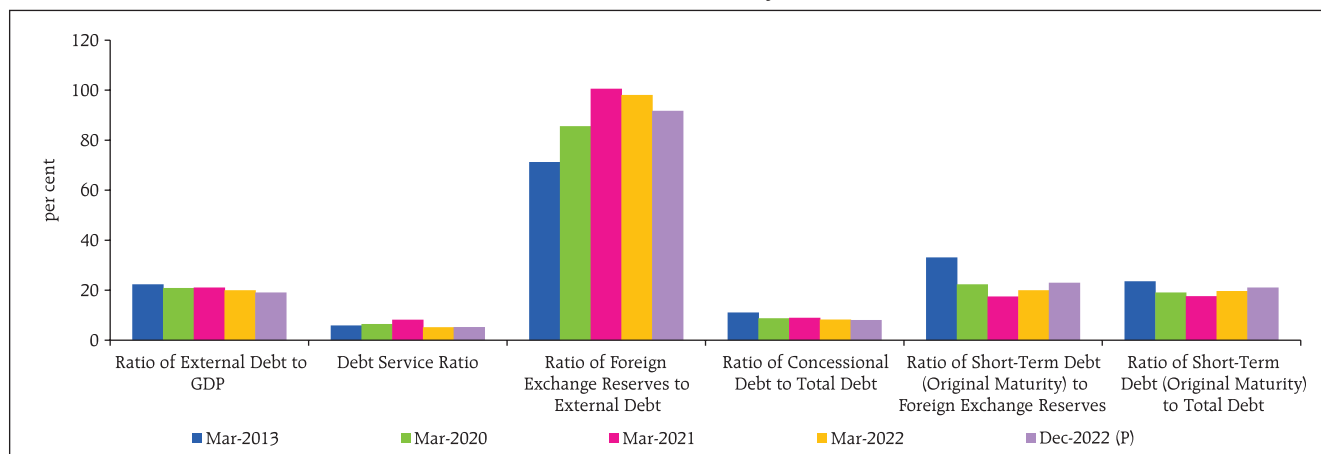
(US\$ million)

Description	Mar-2023
A. ECB – Total outstanding	1,75,797
B. ECB – INR denominated	14,835
C. ECB – FDI Companies' borrowings from foreign parent	29,439
<i>Of which:</i>	
(a) INR denominated	10,890
(b) FCY denominated	18,549
D. ECB – Non-Rupee and non-FDI [= A-B-C(b)]	1,42,413
<i>Of which:</i>	
(a) Public sector companies	53,770
(b) Private companies and others	88,643
E. Hedging details of non-Rupee non-FDI ECBs (<i>i.e.</i> , D above)	
(1) Hedging declared on registration from April 2019	47,501
<i>Of which:</i>	
(a) Public sector companies	8,306
(b) Private companies and others	39,195
(2) Other past loans reported hedged by borrowers	14,571
<i>Of which:</i>	
(c) Public sector companies	5,929
(d) Private companies and others	8,642
F. ECB – Unhedged {D-(E1+E2)}	80,341
G. Share of unhedged non-INR non-FDI ECB {(F)/(A)*100}	46

Source: RBI.

³² International Monetary Fund (2023), "World Economic Outlook: A rocky recovery", April.

Chart 1.47: External Vulnerability Indicators

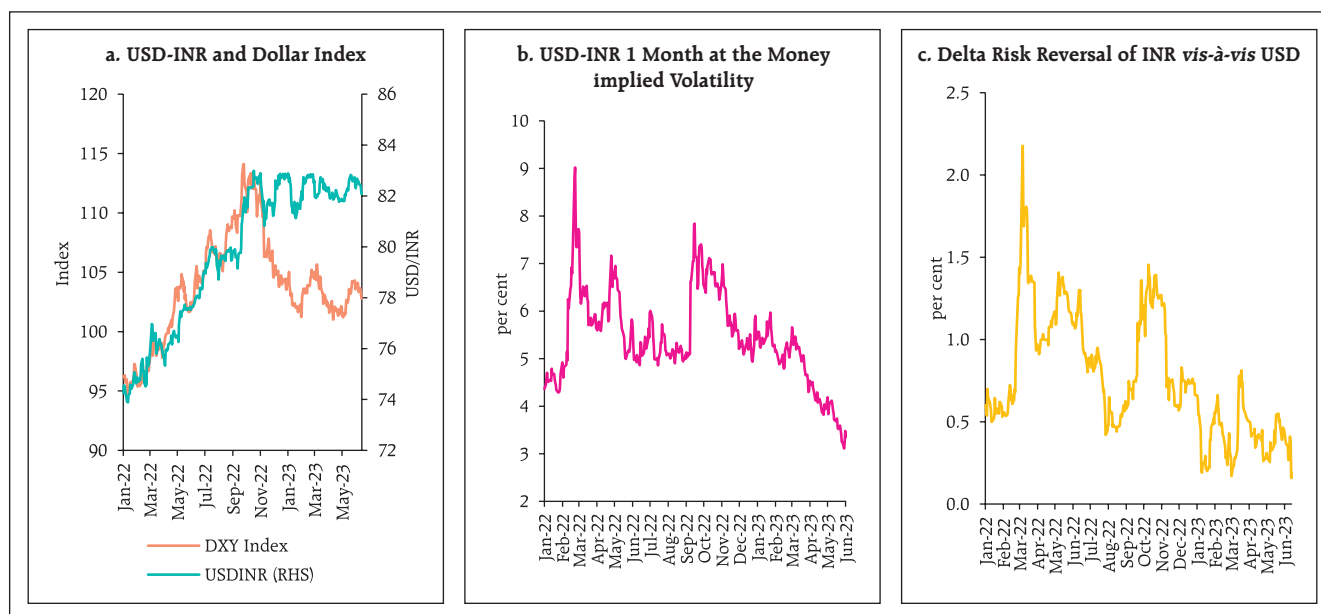


Note: In the process of normalisation, GDP in the denominator has been taken at current market price for the latest four quarters; P – Provisional.
Source: RBI.

exchange reserves stood at US\$ 596.1 billion as on June 16, 2023, which is sufficient to cover about ten months of actual imports (on a BoP basis) for 2022-23 and 97.2 per cent of total external debt. Furthermore, the external debt to GDP ratio moderated to 19.1 per cent in December 2022 from 20.0 per cent in March 2022, which augurs well for mitigating external risks and adverse effects of global spillovers (Chart 1.47).

1.80 The Indian Rupee (INR) has been trading rangebound during 2023 so far (Chart 1.48 a). Bouts of exchange rate volatility witnessed during 2022, partly driven by sharp swings in the US dollar, have tapered in recent months and since March 2023, short-term volatility is at its lowest in the last few years. The INR remains one of the most stable currencies in the world (Chart 1.48 b and c).

Chart 1.48: Foreign Exchange Market



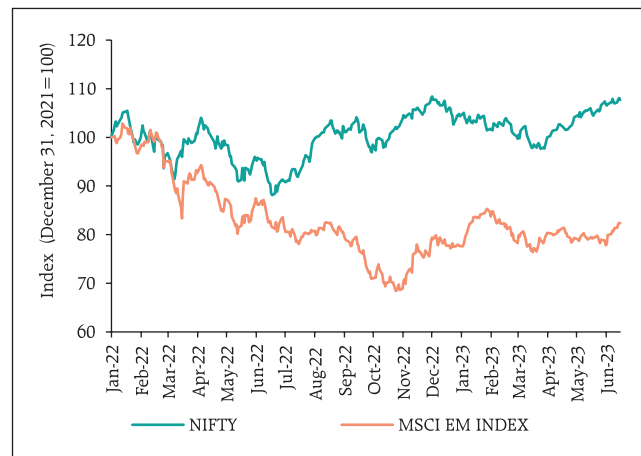
Source: RBI, Bloomberg.

I.2.6 Equity Markets

1.81 Reflecting the underlying strength of the Indian economy and improving growth prospects, the Indian equity market has remained among the stronger performers globally, despite volatile shifts in global liquidity flows and sentiments, monetary tightening and the recent geopolitical and banking sector turmoil (Chart 1.49). Earnings sentiment has improved sharply across most sectors. 182 out of 200 firms in the BSE 200 index reported profit growth of 5 per cent (y-o-y) and 23 per cent (q-o-q). There has been a sharp rebound among foreign institutional investors who have made net purchases of US\$ 11.6 billion since March 2023 (till June 23, 2023), while domestic institutional investors continue to provide support as net buyers (Chart 1.50).

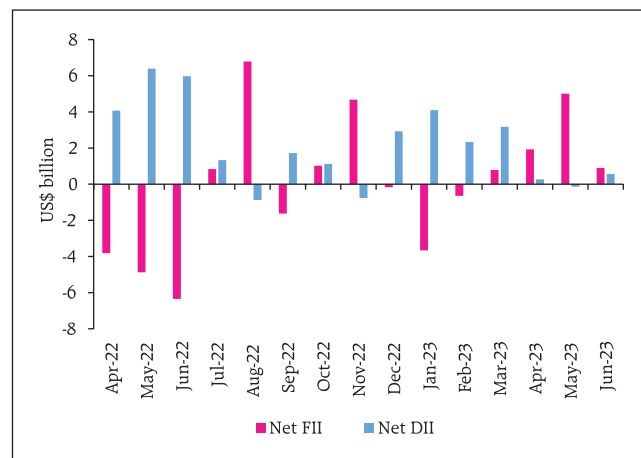
1.82 Empirical evidences suggest that the FPI flows are a major contributor to volatility spillovers in various segments of Indian financial market, largely transmitting their impact through equity market (Box 1.1).

Chart 1.49: Equity Market Performance



Source: Bloomberg.

Chart 1.50: Net FII and DII Equity Flows - Monthly



Note: As on June 13, 2023; FII – Foreign Institutional Investment; DII – Domestic Institutional Investment.

Source: NSDL.

Box 1.1: Volatility Spillovers across Markets in India

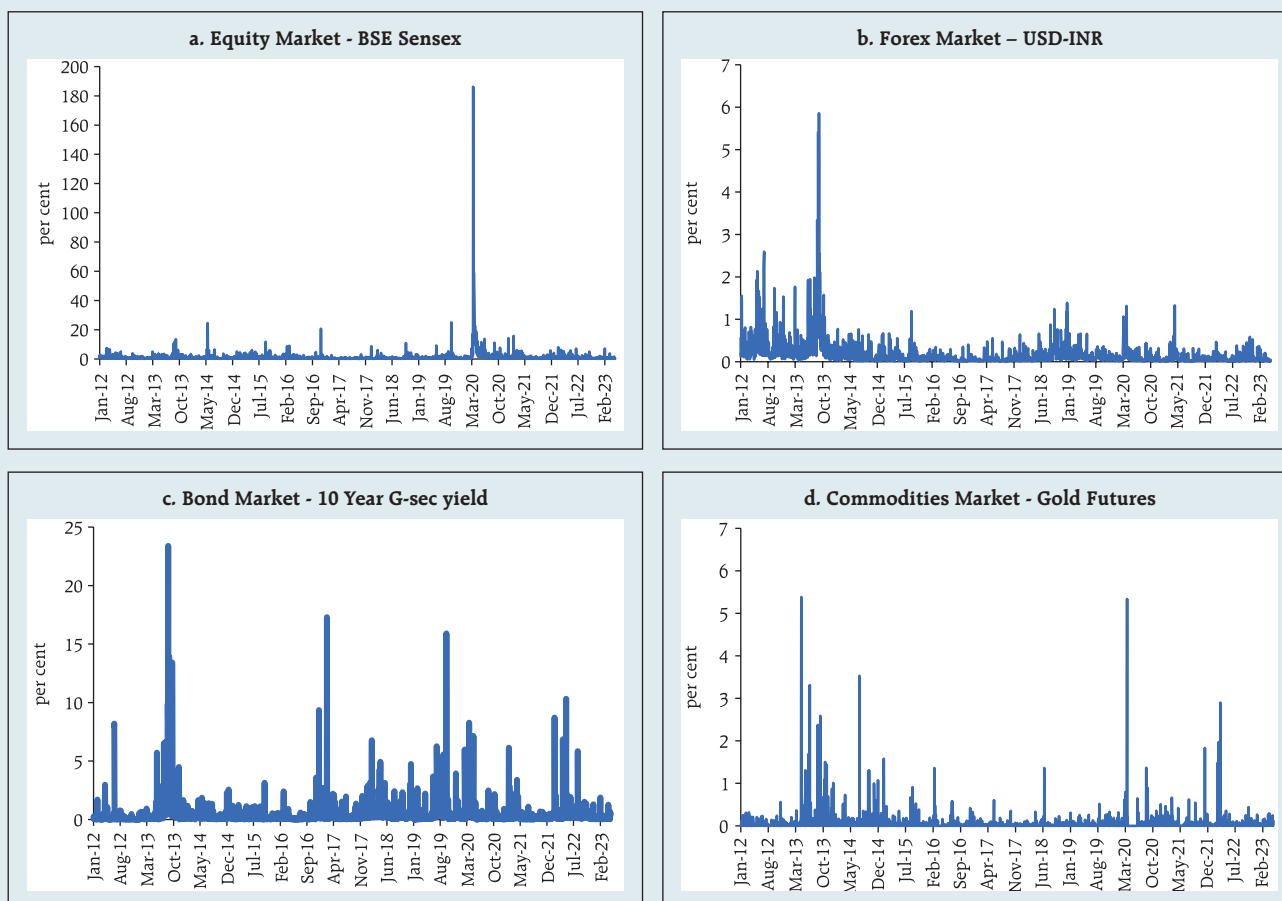
A rise in financial stress leads to higher market volatility, which propagates through multiple channels across asset markets. Indian markets are fairly integrated with overseas markets and foreign portfolio investments have emerged as a major channel of transmission of global spillovers. Measures of volatility spillovers across markets provide an early warning signal to identify emerging risks to financial stability.

Annualised standard deviations using daily data suggest that the equity market has been the most volatile, followed by the bond market. The foreign exchange

market and commodities market (proxied by gold futures market) have been comparatively less volatile (Chart 1).

A total volatility spillover index, which is reported to be better at capturing spillover dynamics than generalised auto-regressive conditional heteroskedasticity (GARCH) models (Barunik *et al*, 2015) measures both total and directional volatility spillovers in a generalised vector autoregression (VAR) framework in which forecast-error variance decompositions are invariant to variable

(Contd.)

Chart 1: Financial Market Volatilities (annualised standard deviations)

Source: Bloomberg, RBI staff calculations.

ordering (Diebold and Yilmaz, 2012). The time-varying total volatility spillover index is based on a VAR (of order 4) with 10-day forecast error variance over the sample period from January 2012 to April 2023. It investigates the channels of volatility transmission across asset markets, *i.e.*, equity market (BSE Sensex), the bond market (yields of benchmark 10-year Government of India dated securities), the foreign exchange market (USD-INR exchange rate), and the commodity market (using gold as a proxy for movement in commodities). The volatility spillover table, which provides the input-output decomposition of the total volatility spillover index, indicates that spillovers from the stock market to other market segments are the largest (17.9 per cent), and the commodity market is found to be the largest recipient of volatility spillovers from other markets (16.4 per cent) (Table 1). The total volatility spillovers across all the four markets – a distillation of the various directional volatility spillovers into a single index – is

10.5 per cent, *i.e.* the share of the volatility forecast error variance in all four asset markets that emanates from spillovers.

As financial markets evolve and absorb different shocks over a period, an average volatility spillover number does not present secular and cyclical movements over time (Diebold and Yilmaz, 2012). Volatility spillovers

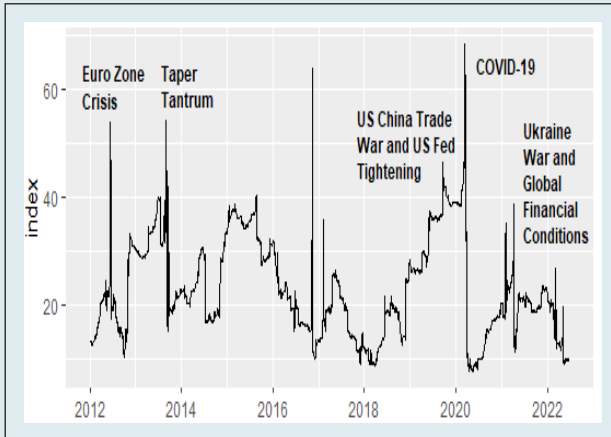
Table 1: Volatility Spillovers across Markets

	Equity	Forex	Bond	Gold	Directional from others
Equity	96.6	1.3	1.6	0.5	3.4
Forex	1.5	86.6	11.0	1.0	13.4
Bond	3.1	4.9	91.3	0.7	8.7
Gold	13.3	2.3	0.9	83.6	16.4
Directional spillover to others	17.9	8.4	13.4	2.2	Total Spillover
Directional spillover including own	114.5	95.0	104.7	85.8	Index =
					41.9*100/400
					= 10.47

Source: RBI staff calculations.

(Contd.)

Chart 2: Total Volatility Spillovers



Source: RBI staff calculations.

using 200-day rolling samples indicate interlinkages in asset markets and their vulnerability to internal and external shocks. If the volatility spillover index crosses one standard deviation above its average value (which is 32) over the sample period, contagion risk intensifies in the domestic financial market (Chart 2).

Table 2: Causal Relationship between FPI Flows and Volatility Spillovers

Null Hypotheses	F-statistic	P-value
Volatility Spillovers does not Granger cause FPI	1.28	0.18
FPI does not Granger cause Volatility Spillovers	1.87	0.01

Source: RBI staff calculations.

The impact of capital flows on volatility spillovers in domestic market suggests that net FPI flows Granger cause volatility spillovers across markets, which confirms that the equity market is the largest contributor to volatility spillovers. Volatility spillovers were, however, not found to Granger cause FPI flows (Table 2).

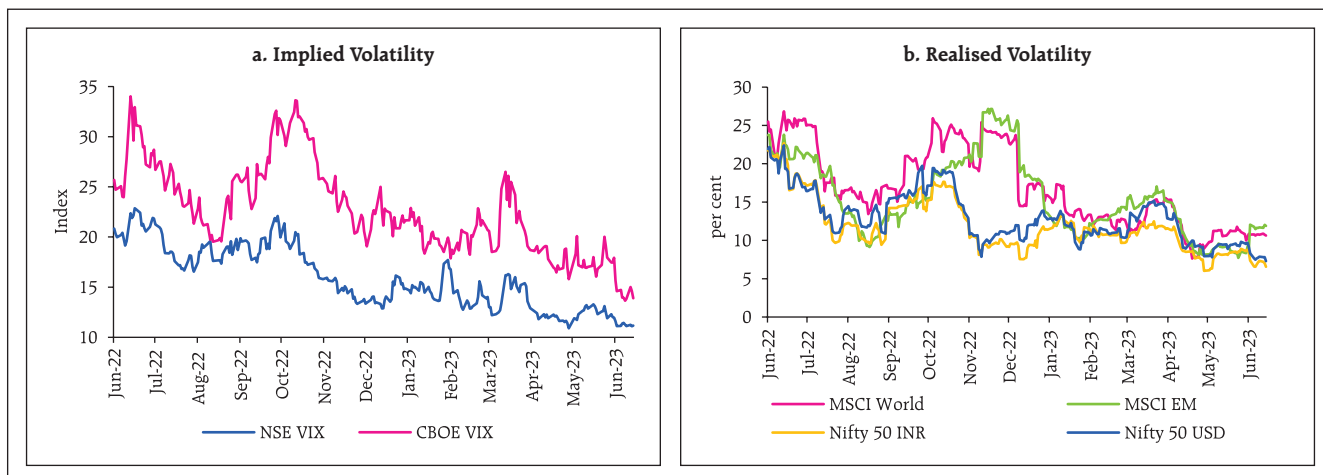
References:

1. Diebold, F. X., and Yilmaz, K. (2012), Better to Give than to Receive: Predictive Directional Measurement of Volatility Spillovers. *International Journal of Forecasting*, 28(1), 57–66.
2. Barunik, J., E. Kocenda and L. Vacha (2016), Asymmetric Connectedness on the U.S. Stock Market: Bad and Good Volatility Spillovers. *Journal of Financial Markets*, 27, 55-78.

1.83 Both implied volatility based on option prices and realised volatility have been lower than other emerging market and advanced economy

stock markets (Chart 1.51 a and b). Banking stocks, which witnessed a fall at the onset of the banking turmoil in the U.S. and Europe, recovered fully and

Chart 1.51: Stock Market Volatility



Notes: NSE VIX is a volatility index based on the NIFTY Index Option prices and Chicago Board Options Exchange's (CBOE) Volatility Index is a popular measure of the stock market's expectation of volatility based on S&P 500 index option.
Source: Refinitiv and NSE.

continue to perform in sync with the broader index (Chart 1.52).

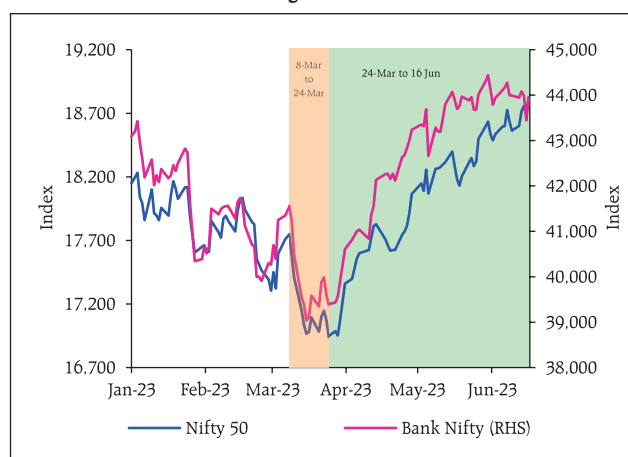
1.84 Based on both trailing and forward price-to-earnings ratio (P/E), Indian equities are at higher valuations compared to their peers in other countries (Chart 1.53).

1.2.7 Mutual Funds

1.85 The assets under management (AUM) of the domestic mutual fund (MF) industry, excluding domestic fund of funds (FoF), declined marginally by 1.2 per cent since December 31, 2022 to ₹39.4 trillion as on March 31, 2023, but increased thereafter to ₹43.2 trillion in May 2023 (Table 1.7).

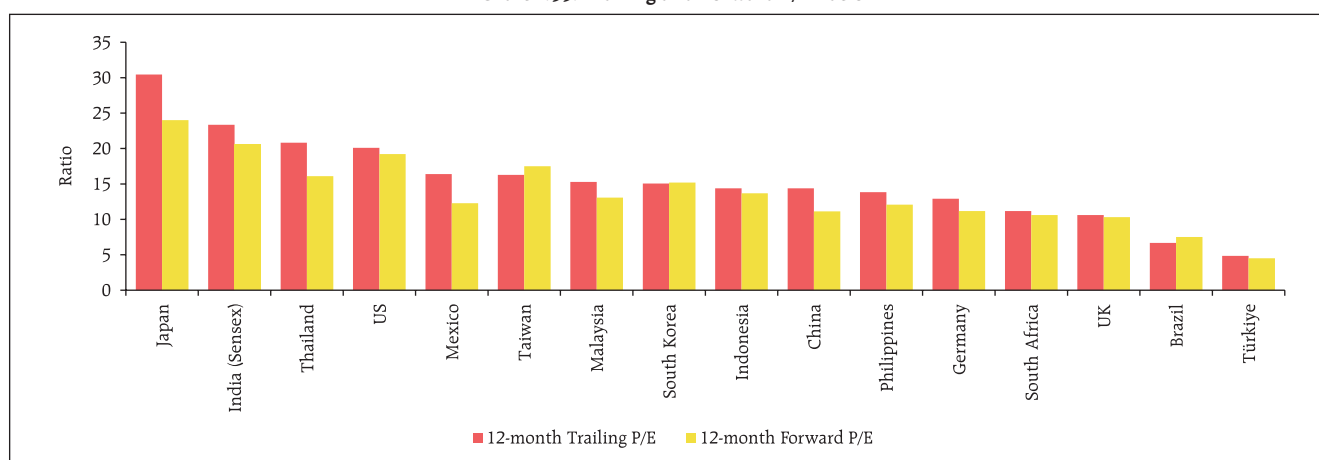
1.86 Debt-oriented schemes witnessed net redemptions to the tune of ₹1.8 lakh crore in 2022-23, largely caused by withdrawal of preferential tax treatment for investments in these funds, which

Chart 1.52: Banking Stocks and Broader Index



Source: Bloomberg.

Chart 1.53: Trailing and Forward P/E Ratio



Note: As on June 19, 2023.

Source: Bloomberg.

Table 1.7: AUM of the Domestic Mutual Fund Industry

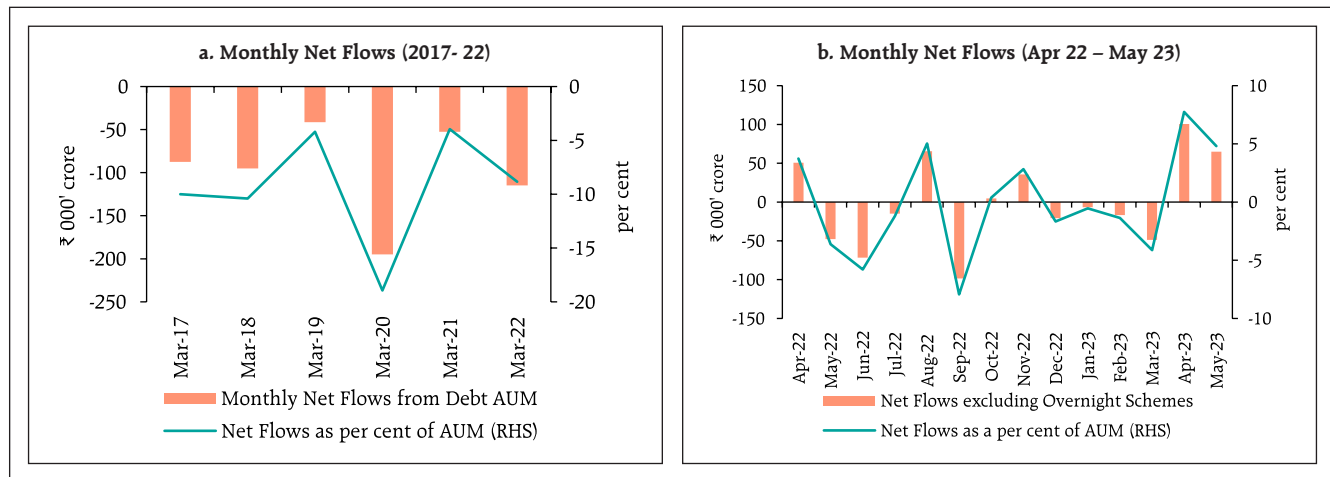
(₹ crore)

As on	B30 AUM			T30 AUM			Industry AUM		
	Equity	Non-Equity	Total	Equity	Non-Equity	Total	Equity	Non-Equity	Total
Dec 31, 2022	4,31,793	2,79,095	7,10,889	12,04,743	20,73,103	32,77,847	16,36,537	23,52,199	39,88,735
Mar 31, 2023	4,28,396	2,81,797	7,10,193	11,93,975	20,37,863	32,31,838	16,22,371	23,19,660	39,42,031
May 31, 2023	4,66,707	3,01,044	7,67,751	13,00,460	22,52,257	35,52,718	17,67,167	25,53,301	43,20,468

Note: T30 refers to the top 30 geographical locations in India and B30 refers to the locations beyond the top 30 cities.

Source: SEBI.

Chart 1.54: Monthly Net Flows of Open-Ended Debt Oriented Schemes



Source: SEBI.

brought uniformity in taxation among different fixed-income investment avenues³³ (Chart 1.54 a and b).

1.87 Both debt and equity-oriented schemes, however, witnessed a reversal of flows since Q4:2022-23 and reported net inflows in April 2023 as market sentiment improved after a positive earnings outlook (Table 1.8).

1.2.8 Banking Stability Indicator

1.88 The banking stability indicator (BSI)³⁴, which provides an assessment of the state of the domestic banking system, has improved markedly. During H2:2022-23, the soundness of the banking sector improved as capital buffers reached all-time highs. Asset quality strengthened, with multi-year lows in gross NPAs and decline in restructured assets.

Table 1.8: Trends in Resource Mobilisation by Mutual Funds

(₹ crore)

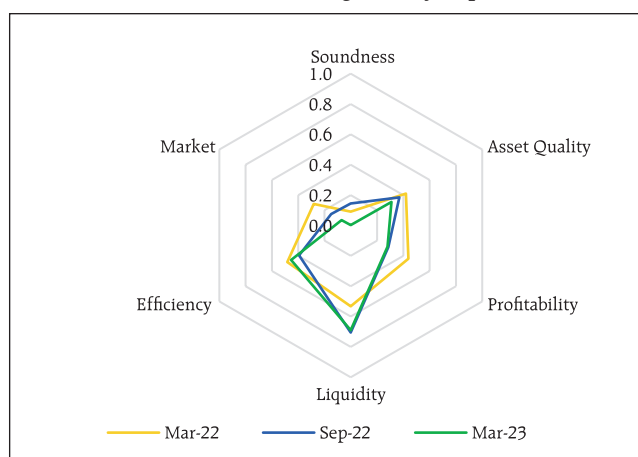
Months	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
Debt Oriented Schemes						
Net Inflows/Outflows-Debt	-20,604	-9,734	-13,199	-54,111	1,05,704	43,834
AUM-Debt	12,65,127	12,62,074	12,54,636	12,09,976	13,25,976	13,74,524
Equity Oriented Schemes						
Net Inflows/Outflows-Equity	7,280	12,472	15,657	20,190	5,275	2906
AUM-Equity	15,31,894	15,12,952	15,08,342	15,23,282	15,89,149	1661022
Total						
Net Inflows/ Outflows of Funds	4,491	11,373	9,575	-19,264	1,21,435	57,420
Total AUM	39,88,735	39,62,406	39,46,257	39,42,031	41,61,822	43,20,468

Source: SEBI.

³³ <https://egazette.nic.in/WriteReadData/2023/244830.pdf>

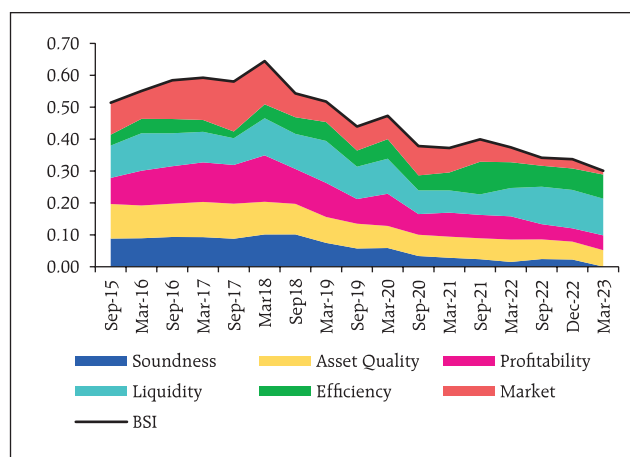
³⁴ BSI gives an overall assessment of changes in underlying conditions and risk factors that have a bearing on the stability of the banking sector (see Annex 2 for detailed methodology and the variables used).

Chart 1.55: Banking Stability Map



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

Chart 1.56: Banking Stability Indicator - Contribution of Individual Risk Factors



Note: Rise in the value of an indicator implies rise in risk level and vice versa. The width of each risk factor signifies its contribution towards aggregate risk.
Source: RBI supervisory returns and staff calculations.

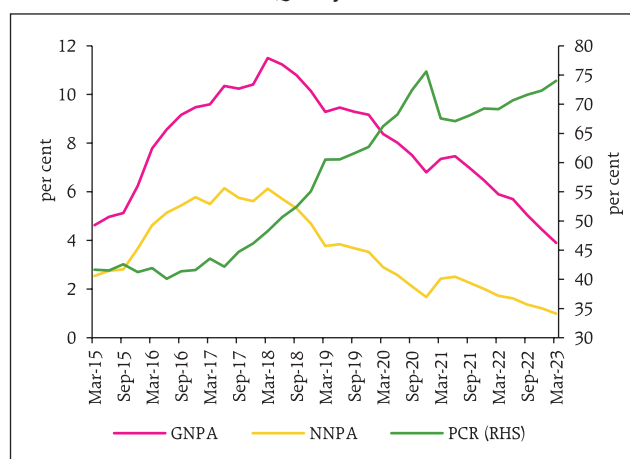
Liquidity improved as customer deposits and liquidity coverage ratio (LCR) increased. Increase in operating expenses led to marginal deterioration in efficiency. Decline in market risk-weighted assets improved the market indicator (Chart 1.55 and 1.56).

1.2.9 Banking System

1.89 The health of the Indian banking system is robust, fortified by a multi-year low non-performing loans and adequate level of capital and liquidity buffers. The system-level gross non-performing assets (GNPA) ratio and net non-performing assets (NNPA) ratio have sharply fallen from a high of 11.5 per cent and 6.1 per cent in March 2018 to 3.9 per cent and 1.0 per cent in March 2023 respectively. Alongside, the provisioning coverage ratio (PCR), which was as low as 40.1 per cent in June 2016, has improved to 74.0 per cent in March 2023 (Chart 1.57).

1.90 The banking system profitability improved with return on assets (RoA) increasing to 1.1 per cent in 2023 from a low of -0.2 per cent in 2018. This in turn helped the capital to risk-weighted assets ratio (CRAR)³⁵ to reach a record high of 17.1 per

Chart 1.57: Asset Quality Indicators – All SCBs



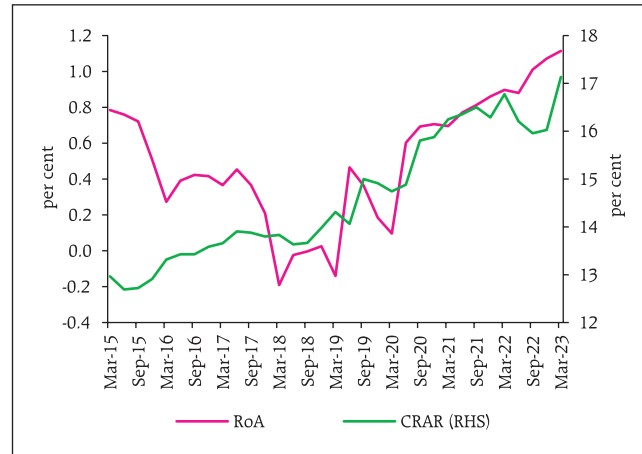
Source: RBI supervisory returns.

³⁵ Capital to risk-weighted assets ratio is the percentage of capital funds to risk-weighted assets.

cent in 2023 (Chart 1.58). Healthier balance sheets are catalysing sustained and broad-based pick-up in the momentum of credit growth, with credit flow improving to all sectors of the economy (Chart 1.59 a and b).

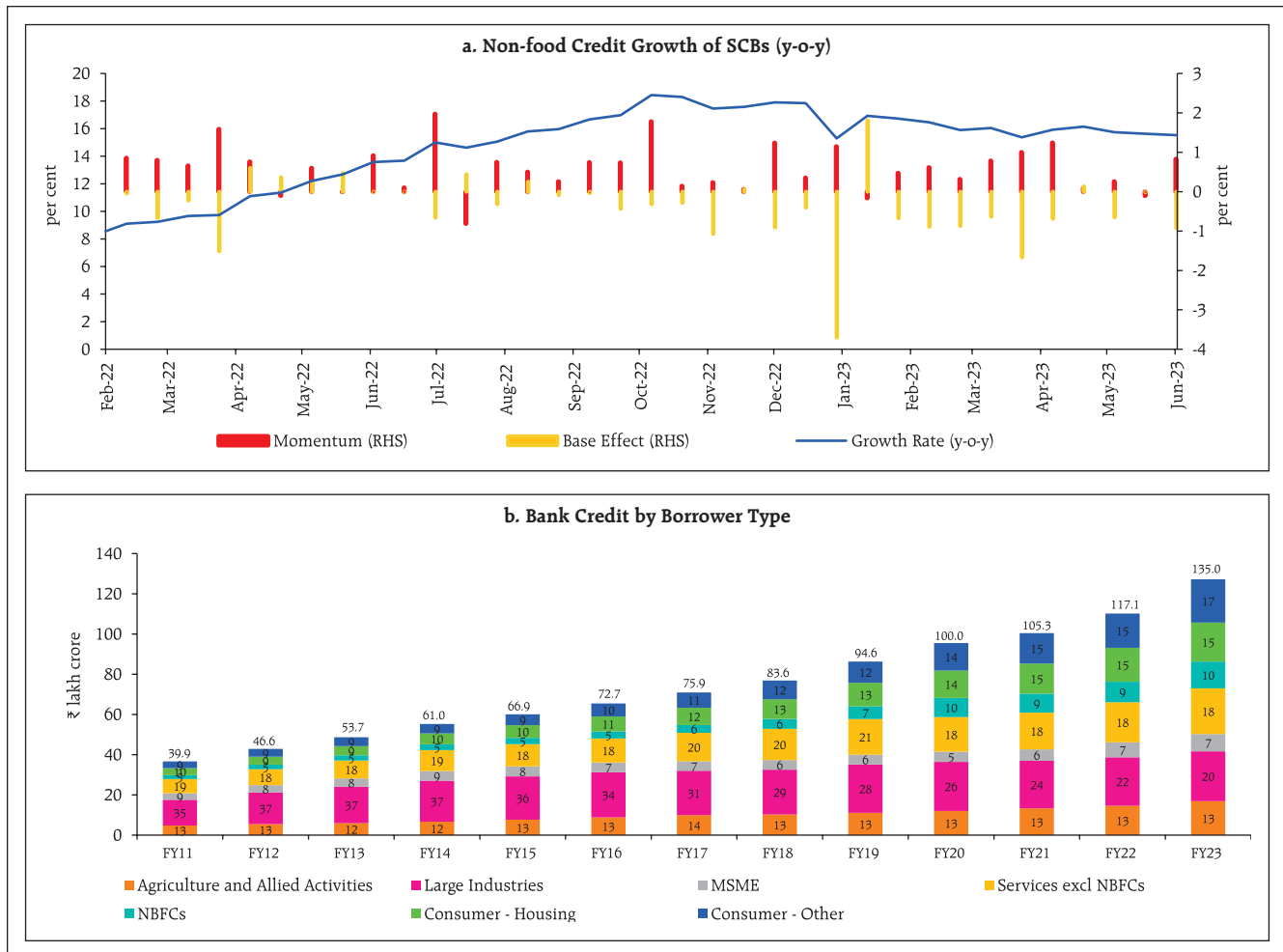
1.91 Despite the recent step up in bank credit growth, India's credit-to-GDP gap remains negative since March 2013, reflecting still muted credit

Chart 1.58: Capital Adequacy and Bank Performance



Source: RBI supervisory returns.

Chart 1.59: Bank Credit

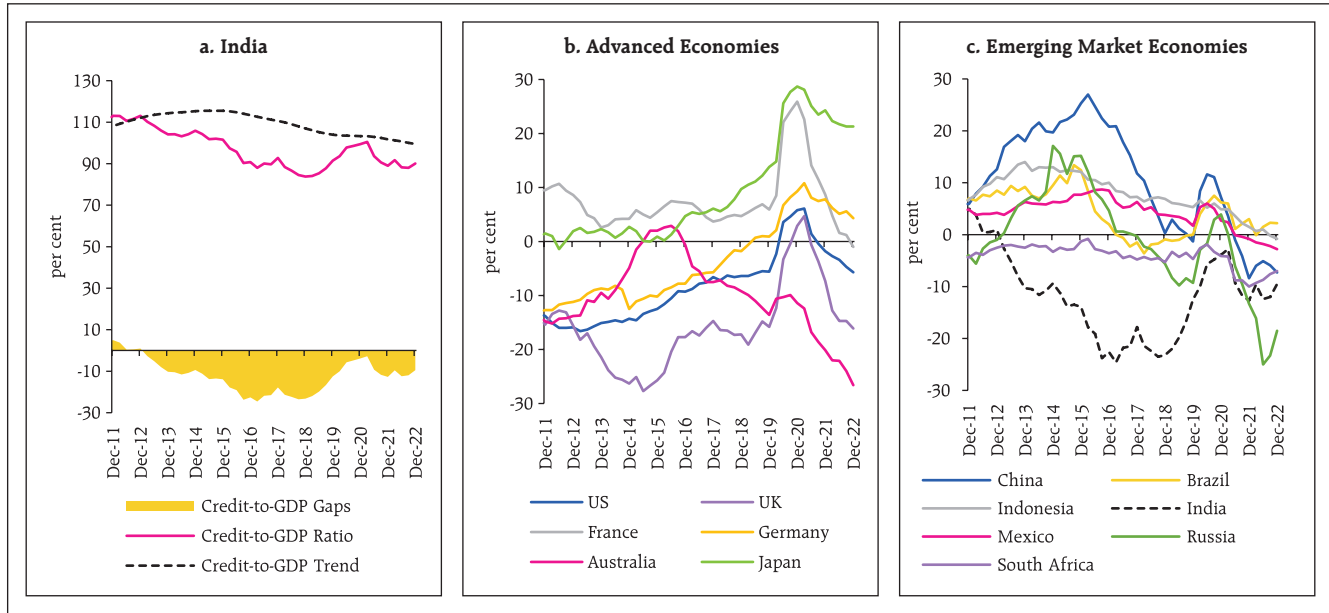


Note: (a) Sectoral data is collected from select banks and pertains to the last reporting Friday of the financial year.

(b) Gross loans and advances (number above the bar) is based on end financial year position.

Source: DBIE, RBI supervisory returns and staff calculation.

Chart 1.60: Credit to GDP Gap



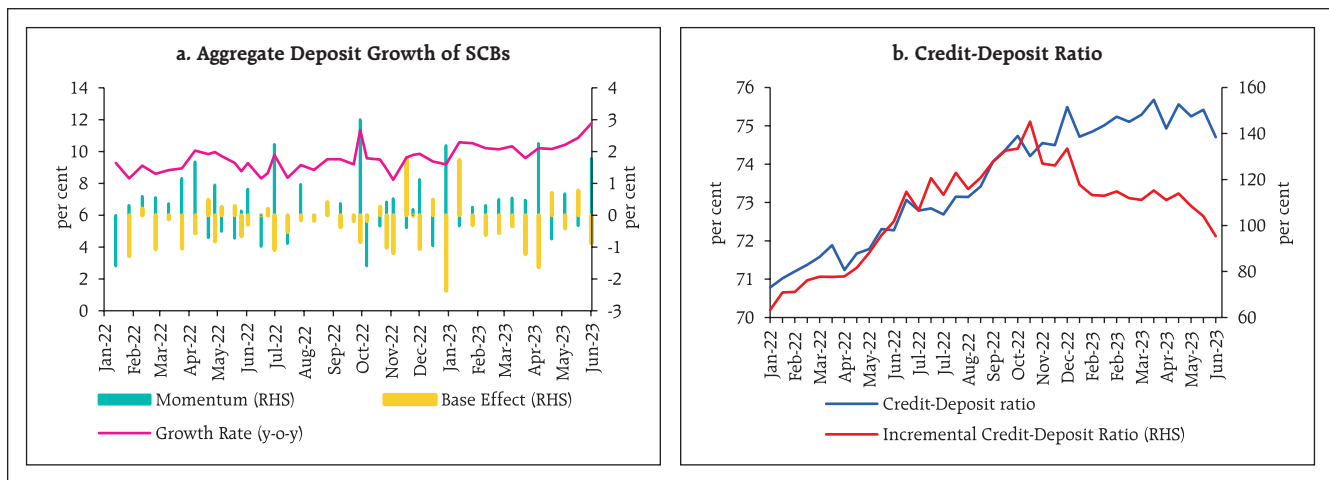
Note: Credit refers to credit from all sectors to private non-financial sector.
Source: BIS.

absorption in India relative to advanced and emerging market peers (Chart 1.60 a, b and c).

1.92 Bank deposits grew by 10.0 per cent (y-o-y) in 2022-23 and improved to 11.8 per cent in early June 2023, partly aided by the announcement of withdrawal of ₹2000 bank notes from circulation

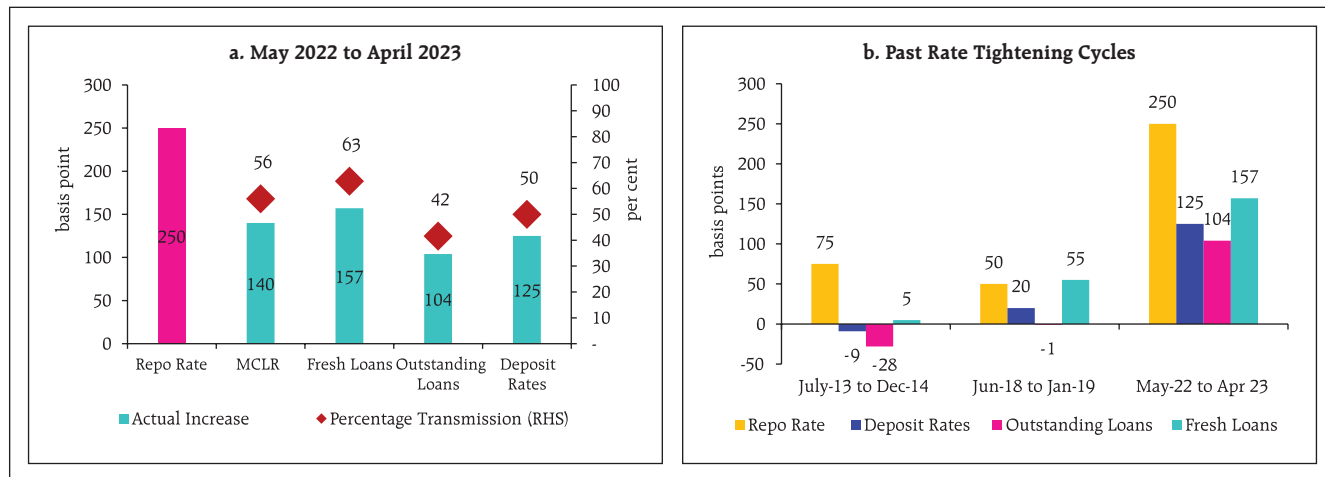
(Chart 1.61 a). Although deposits have trailed the rate of credit expansion, the structural liquidity mismatch has been narrowing and the annual incremental credit-deposit (C-D) ratio has come down from its recent peak of 141.8 per cent in November 2022 to 94.7 per cent on June 02, 2023 (Chart 1.61 b).

Chart 1.61: Deposit Growth and Credit-Deposit Ratio



Source: RBI staff calculations.

Chart 1.62: Monetary Policy Transmission to Bank Lending and Deposit Rates



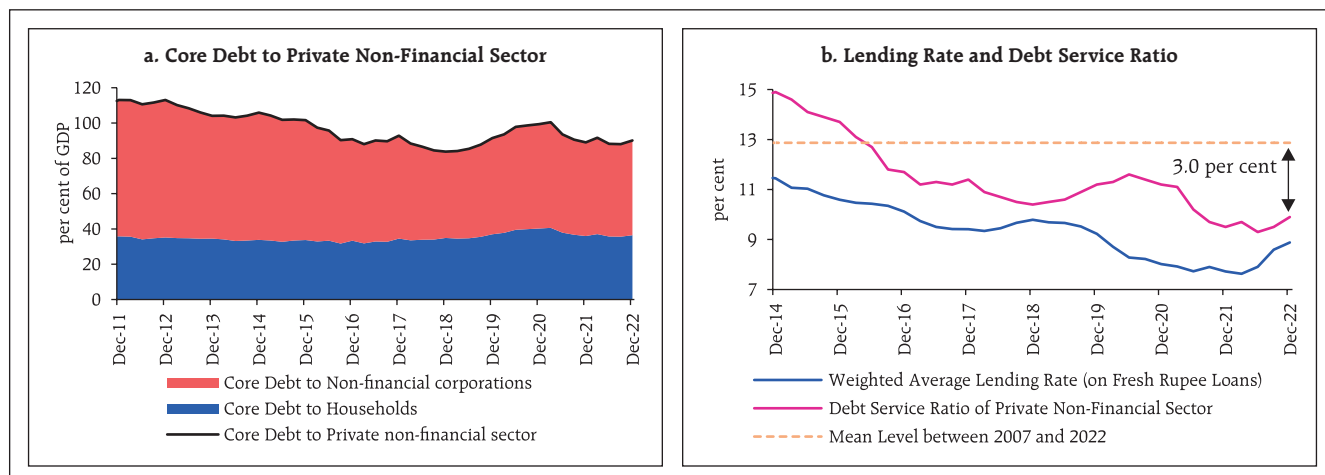
Source: RBI.

1.93 Higher non-financial sector debt can increase economy's sensitivity to monetary tightening and in turn impact banks' balance sheets. Transmission of policy repo rate since May 2022 to bank lending and deposit rates has ranged between 42 and 63 per cent. Although incomplete, monetary policy transmission has been stronger in this rate tightening cycle relative to historical experience, especially in respect of outstanding loans (Chart 1.62 a and b).

The transmission is still working its way through the system and its fuller effects will be seen in the coming months.

1.94 Core debt of private non-financial sector in India is at 90 per cent of GDP [non-financial corporate sector debt is 53.6 per cent and household is 36.4 per cent³⁶] (Chart 1.63 a). In spite of the lagged co-movement between lending rates and the debt service ratio of private non-financial sector,

Chart 1.63: Interest Rate Tightening and Corporate Debt



Note: Core debt refers to the sum of financial instruments comprising currency and deposits (which are mostly zero in the case of credit to the private non-financial sector), loans and debt securities.
Source: BIS and DBIE.

³⁶ Bank for International Settlements (2023), Credit to Non-Financial Sector, <https://www.bis.org/statistics/totcredit.htm>

the latter has declined by 3.0 percentage points from its mean level (between 2007 and 2022) (Chart 1.63 b).

1.95 The improvement in borrowers' debt servicing capacity augurs well for financial stability, alongside the deleveraging in corporate balance sheets since 2015 (Chart 1.64).

1.96 More than two-thirds of total gross advances of fourteen select banks accounting for 81 per cent of the assets of SCBs (excluding SFBs and RRBs) are linked to floating-rates (Table 1.9).

1.97 44.8 per cent of the personal loans extended by these fourteen banks are housing loans, of which 94.8 per cent are at floating rates (Table 1.10). A higher share of variable rate mortgages tends to produce adverse consequences for consumption due to faster pass through of policy rates to borrowing costs³⁷.

1.98 Retail loans grew at a compounded annual growth rate (CAGR) of 24.8 per cent from March 2021 to March 2023, almost double the CAGR of 13.8 per cent for gross advances during the same period. It formed around one-third of the total banking system's gross loans and advances. The composition of secured and unsecured advances has changed during this period, with unsecured retail loans increasing from 22.9 per cent to 25.2 per cent and secured loans declining from 77.1 per cent to 74.8 per cent. Although the GNPA ratio of retail loans at the system level was low at 1.4 per cent in March 2023, the share of special mention accounts (SMA)³⁸ was relatively high at 7.4 per cent for SCBs and it accounted for a tenth of the retail assets portfolio

Chart 1.64: Debt-to-Equity Ratio of Private Non-Financial Companies



Source: RBI.

Table 1.9: Share of Floating Rate Loans

(per cent)

	Public Sector Banks (PSBs) (8)	Private Sector Banks (PVBs) (6)	All SCBs (14)
Agriculture	91.9	40.9	79.4
Industry	83.3	80.5	82.3
Services	77.3	75.3	76.3
Personal (Retail Loans)	70.5	51.7	60.2
Others	79.1	26.4	73.9
Total Advances	79.5	61.7	72.0

Note: As on March 31, 2023; Number in parenthesis indicates number of banks covered in the analysis.

Source: Individual bank submissions.

Table 1.10: Housing Loans – Floating Rate

(per cent)

	PSBs (8)	PVBs (6)	All SCBs (14)
Housing Loan	92.9	98.0	94.8

Note: As on March 31, 2023; Number in parenthesis indicates number of banks covered in the analysis.

Source: Individual Bank Submissions.

³⁷ Ampudia, Miguel, Fiore Fiorella De, Kharroubi, Enisse and Manea, Cristina (2023), "Private debt, monetary policy tightening and aggregate demand", BIS Bulletin No 70, February.

³⁸ Special Mention Accounts is defined as:

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

Table 1.11: SMA Share of Retail Advances

		SMA-0	SMA-1	SMA-2	Total
PSBs (11)	Unsecured Retail Advances	6.8	2.4	0.7	9.8
	Secured Retail Advances	5.4	2.8	1.0	9.2
	Retail Advances	5.7	2.7	0.9	9.4
PVBs (20)	Unsecured Retail Advances	2.9	0.8	0.3	4.0
	Secured Retail Advances	3.9	1.1	0.4	5.4
	Retail Advances	3.6	1.0	0.4	5.0
FBs (8)	Unsecured Retail Advances	1.9	1.5	0.6	4.0
	Secured Retail Advances	1.0	0.5	0.1	1.5
	Retail Advances	1.4	0.9	0.3	2.6
All SCBs (39)	Unsecured Retail Advances	4.6	1.7	0.6	6.9
	Secured Retail Advances	4.7	2.0	0.7	7.4
	Retail Advances	4.7	1.9	0.7	7.3

Note: As on March 31, 2023; Numbers in parenthesis indicate number of banks considered for calculation; PSBs – Public Sector Banks; PVBs – Private Sector Banks; FBs – Foreign Banks; SCBs – Scheduled Commercial Banks.

Source: RBI Supervisory Returns.

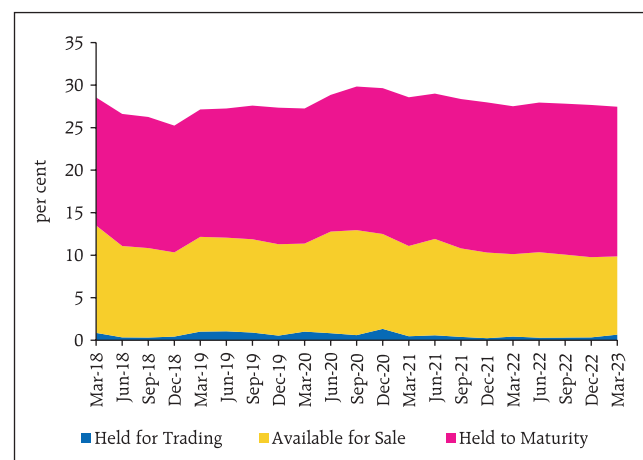
of PSBs (Table 1.11). Importantly, however, SMA 1 and SMA 2 accounts, which have higher proximity to default, have shown improvement with the total ratio of these two categories falling from 4.2 per cent in March 2021 to 2.3 per cent in March 2023. Unsecured retail loans formed only 7.9 per cent of the total banking system credit. Moreover, their asset quality has improved, with GNPA ratio declining from 3.2 per cent to 2.0 per cent during this period. Thus, notwithstanding few signs of potential stress in retail loans, they do not pose an imminent risk to systemic stability.

1.99 Recent bank failures in some AEs has brought to focus the role of interest rate risk in banks' balance sheets, especially, valuation losses in HTM portfolios, which are not marked to market. In the Indian context, the share of the HTM portfolio in the investment book has increased from 55.7 per cent in June 2020 to 64.1 per cent in March 2023³⁹ (Chart 1.65).

1.100 An assessment of unrealised losses on securities held in the HTM portfolio shows that for

Chart 1.65: Investment Portfolio of All SCBs

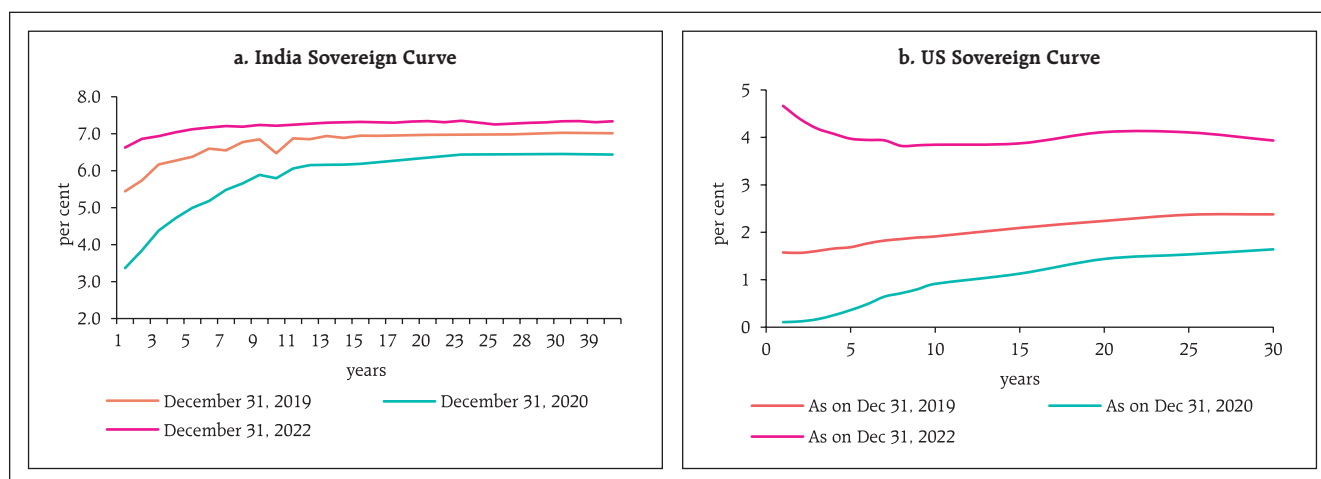
(per cent of total assets)



Source: RBI supervisory returns and staff calculations.

³⁹ Bank's investments under HTM category is limited to 25 per cent of total investments. However, it can exceed 25 per cent if (i) the excess comprises of SLR securities and (ii) total SLR in HTM does not exceed a certain percentage (currently 23 per cent) of net demand and time liabilities (NDTL).

Chart 1.66: Sovereign Yield Curve



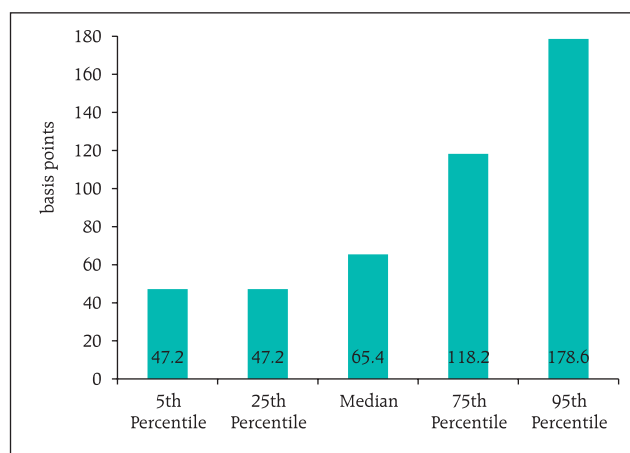
Source: Bloomberg.

the majority of banks⁴⁰, the losses are manageable and the impact on their common equity tier 1 (CET1) capital ratio is limited. Moreover, the shift in India's sovereign yield curve – downward shift in 2020 and upward shift in 2022 – has been relatively less than in major AEs (Chart 1.66 a and b), containing the impact of changes in interest rates on banks' balance sheets. In particular, the average increase in policy rates in AEs⁴¹ (excluding Japan, which continues to maintain an easy monetary policy), was 397 basis points compared to 250 basis points in India.

1.101 The median impact of unrealised losses on the CET1 ratio of select banks is 65.4 basis points (bps) with 5 per cent of the banks having a sizeable impact of 178.6 bps or more (Chart 1.67).

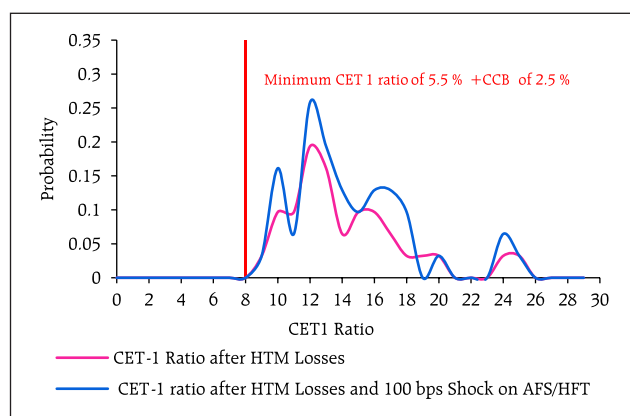
1.102 Furthermore, in a stressed scenario involving a 100 bps shock to the available for sale (AFS) and held for trading (HFT) portfolios – coupled with unrealised losses in HTM securities – there is a modest impact on banks' CET1 ratios and it is assessed that all banks would meet their CET1 ratio requirement, including the capital conservation buffer (Chart 1.68).

Chart 1.67: Impact of Unrealised HTM Losses on CET1 of Select Banks



Note: Calculations based on March 31, 2023 position.
Source: RBI Supervisory Returns and staff calculations.

Chart 1.68: Distribution of CET1 Ratios of Select Indian Banks

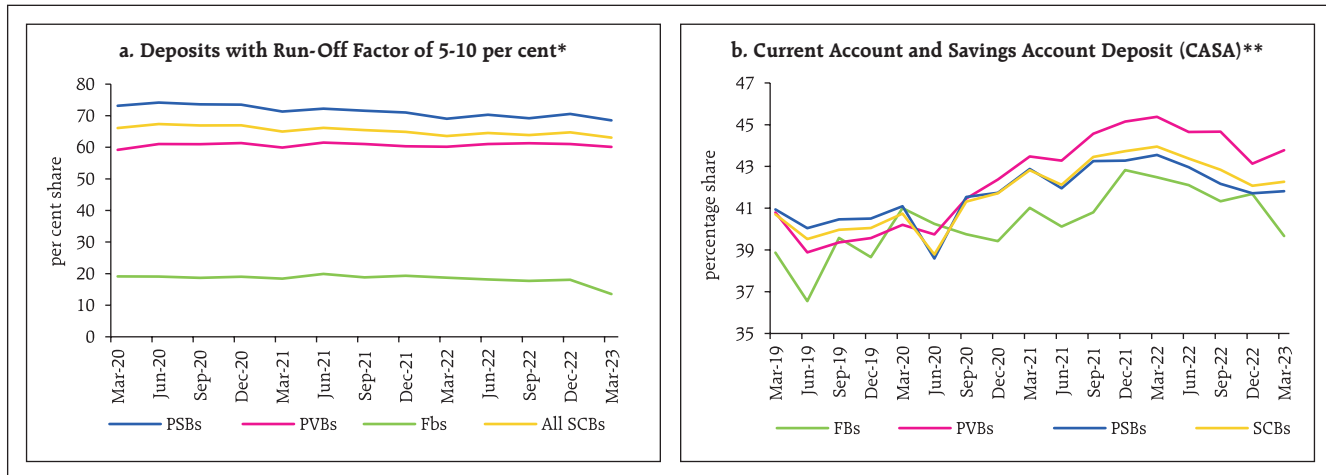


Note: Calculations based on March 31, 2023 position.
Source: RBI Supervisory Returns and staff calculations.

⁴⁰ 33 banks that account for 93.2 per cent of total banking system assets and 99.0 per cent of HTM securities held by the banking system.

⁴¹ US, UK, Euro Area, Canada, Australia, New Zealand, Norway, Sweden, and Switzerland.

Chart 1.69: Movement in Stable Deposits as a Share of Total Deposits

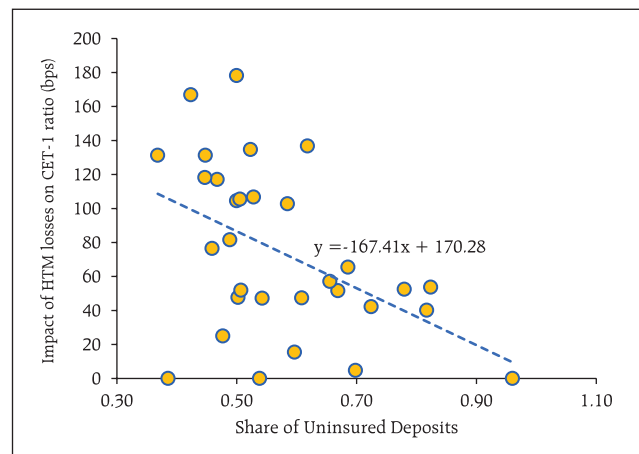


Note: *Deposits with run-off factor of 5-10 per cent considered as per LCR returns; **For Non-Residents, CASA balance is limited to demand deposits.
Source: RBI supervisory returns.

1.103 Another distinguishing feature of the recent global bank turmoil was the large share of uninsured deposits in the failed banks, which, in combination with losses on investments, triggered bank runs when deposits haemorrhaged. In the Indian context, deposits with run-off factors of 5-10 per cent form around 63.1 per cent of total deposits and current and savings accounts (CASA) constitute 42.3 per cent (Chart 1.69 a and b). Moreover, banks that have a higher share of uninsured deposits have lower HTM unrealised losses impacting their capital levels (Chart 1.70). Alongside stronger balance sheets and better corporate governance by banks, strengthening of banking regulation and supervision has contributed to better internal controls and risk management. A key plank of recent supervisory initiatives is to identify business model risks and ensure that banks do not grow at an unsustainable pace or undertake risk that is not commensurate with their risk-taking capacity.

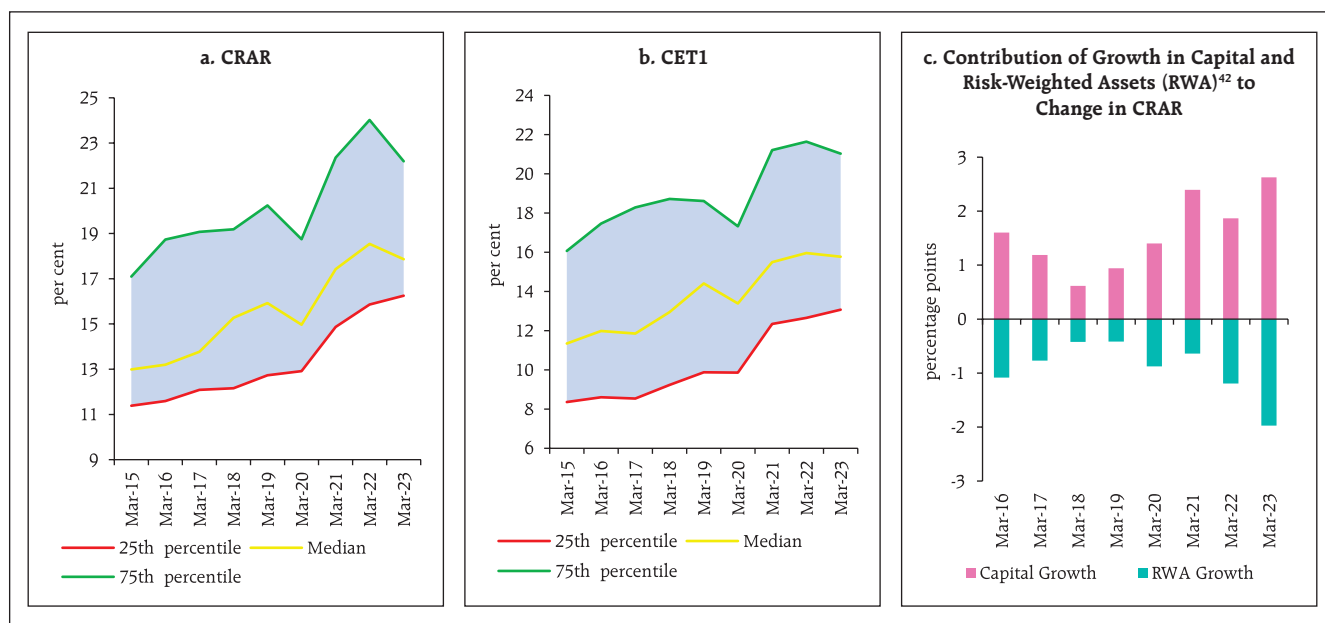
1.104 On the back of improved profitability, banks' capital grew faster than risk-weighted assets. SCBs' CRAR reached a new high of 17.1 per cent in March 2023 with the median CRAR even higher at 17.9 per cent. The CET1 ratio also reached a high of 13.9 per

Chart 1.70: Share of Uninsured Deposits vis-a-vis CET1 Ratios after Unrealised HTM Losses



Source: DICGC, RBI Supervisory Returns and staff calculations.

Chart 1.71: Capital Buffers



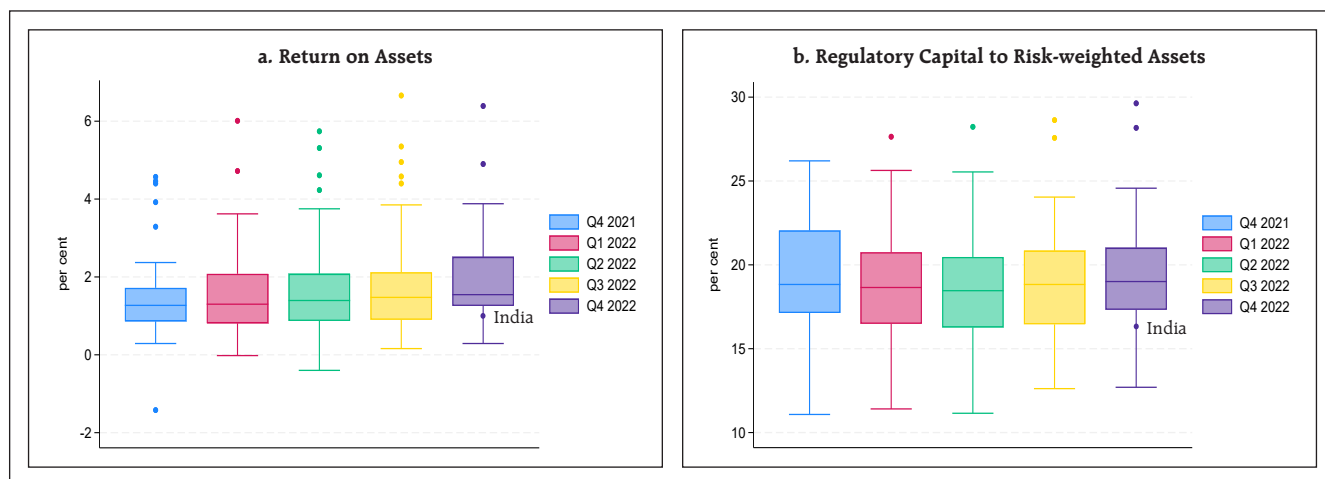
Source: RBI Supervisory Returns.

cent with the median at 15.8 per cent (Chart 1.71 a, b and c).

1.105 Despite improvement in all major indicators such as profitability, asset quality, liquidity and

solvency, Indian banks are still performing below their counterparts in other jurisdictions – they remain below first quartile for RoA and CRAR (Chart 1.72).

Chart 1.72: Profitability and Capital Position of Banks in Select Jurisdictions



Note: Based on data pertaining to 67 jurisdictions.
Source: IMF Financial Soundness Indicators.

⁴² Risk-weighted assets are calculated as per risk weights assigned to each asset (funded/ non-funded) as per prescribed guidelines.

Table 1.12: Asset Quality across NBFC Categories

		GNPA	SMA-0	SMA-1	SMA-2			GNPA ⁴³	SMA-0	SMA-1	SMA-2
NBFC-Micro Finance Institution (3.3 per cent)	Mar-21	5.4	2.3	2.2	1.0	NBFC-Infrastructure Finance Company (40.6 per cent)	Mar-21	3.9	5.2	1.9	2.4
	Jun-21	6.1	8.9	4.7	2.5		Jun-21	3.8	3.0	0.1	6.9
	Sep-21	5.8	4.4	4.0	1.5		Sep-21	3.8	1.9	0.0	10.9
	Dec-21	5.5	3.5	2.5	2.0		Dec-21	4.0	0.2	0.0	3.3
	Mar-22	5.5	1.5	1.2	1.1		Mar-22	3.4	2.5	2.2	2.1
	Jun-22	4.7	1.5	1.3	1.3		Jun-22	3.4	6.9	1.1	5.4
	Sep-22	4.6	1.1	1.4	1.1		Sep-22	3.1	2.8	0.1	8.4
	Dec-22	3.8	0.8	0.8	0.8		Dec-22	2.8	1.7	0.0	7.4
	Mar-23	2.5	0.4	0.4	8.2		Mar-23	2.5	1.4	0.1	1.2
NBFC-Factor (0.1 per cent)	Mar-21	25.0	13.7	1.7	1.7	NBFC-Infrastructure Debt Fund (1.1 per cent)	Mar-21	0.4	0.0	0.1	1.7
	Jun-21	29.2	14.2	2.2	2.7		Jun-21	0.4	0.0	0.0	0.6
	Sep-21	26.0	13.8	1.5	1.1		Sep-21	0.4	0.0	0.0	0.6
	Dec-21	27.1	13.6	2.3	0.0		Dec-21	0.8	0.6	0.1	0.0
	Mar-22	22.0	11.7	1.3	0.0		Mar-22	0.3	0.0	0.1	0.4
	Jun-22	24.4	10.7	2.9	0.4		Jun-22	0.4	0.0	0.0	0.1
	Sep-22	20.9	9.1	1.7	0.8		Sep-22	0.4	0.0	0.1	0.0
	Dec-22	20.4	11.0	1.8	1.4		Dec-22	0.7	0.0	0.0	0.0
	Mar-23	19.7	9.6	4.0	0.2		Mar-23	0.5	0.0	0.0	0.0
NBFC- Investment and Credit Company (54.9 per cent)	Mar-21	8.0	7.5	3.2	3.1	Total	Mar-21	6.1	6.3	2.6	2.7
	Jun-21	9.6	8.2	4.5	3.9		Jun-21	6.9	5.8	2.5	5.1
	Sep-21	9.0	7.2	3.9	3.3		Sep-21	6.5	4.7	2.1	6.5
	Dec-21	9.0	6.5	3.5	2.9		Dec-21	6.6	3.6	1.9	3.0
	Mar-22	7.7	5.7	3.3	2.2		Mar-22	5.8	4.1	2.7	2.1
	Jun-22	7.6	6.3	2.9	2.2		Jun-22	5.6	6.4	2.1	3.5
	Sep-22	7.2	5.5	2.8	2.1		Sep-22	5.4	4.3	1.6	4.6
	Dec-22	6.9	4.8	2.2	1.7		Dec-22	5.1	3.4	1.3	3.9
	Mar-23	4.9	4.8	2.1	1.1		Mar-23	3.8	3.2	1.2	1.4

Note: 1. Number in parenthesis indicates percentage share of each category of NBFC to total advances of NBFCs as on March 31, 2023.

2. Based on data for NBFC-D, NBFC-ND-SI and NBFC-ND (excluding Core Investment Companies) as of June 15, 2023 which are provisional.

Source: RBI Supervisory Returns.

1.2.10 Non-Banking Financial Companies (NBFCs)

1.106 Since the last issue of the FSR, the NBFC sector has witnessed a marked improvement across major soundness parameters, viz., asset quality, capital levels and liquidity. Capital levels rose, with the CRAR increasing from 26.0 per cent to 27.5 per cent between September 2022 and March 2023. The GNPA ratio

(excluding core investment companies⁴⁴) fell sharply from 5.4 per cent in September 2022 to 3.8 per cent in March 2023. SMAs, which are more vulnerable to slippage, have also contracted from 10.5 per cent of total advances in September 2022 to 5.8 per cent in March 2023 (Table 1.12). Restructuring of lending to large borrowers, however, saw a spike between September 2022 and March 2023 (Table 1.13).

Table 1.13: Asset Quality of Large Borrowers

(per cent)

	SMA-0	SMA-1	SMA-2	Restructured Assets (including NPAs restructured)
Jun-22	9.0	1.7	5.9	0.3
Sep-22	3.9	0.8	8.2	2.1
Dec-22	5.0	0.6	5.1	4.7
Mar-23	3.4	0.6	1.4	3.9

Source: RBI Supervisory Returns.

⁴³ GNPA ratio is the proportion of gross non-performing assets in gross loans and advances.

⁴⁴ A Core Investment Company (CIC) is a Non-Banking Financial Company (NBFC), which invests in shares of group companies. They do not carry out any other financial activities, including lending.

Table 1.14: Sources of Borrowing

(in per cent)

	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Dec-22	Mar-23
Debentures	23.0	22.6	22.9	23.3	22.0	21.7	21.3	20.2
Commercial Papers	3.0	3.0	3.0	3.1	2.7	2.8	2.8	2.8
Unsecured Debentures	17.6	18.2	17.8	17.7	16.3	16.0	15.7	15.9
Market Borrowings	43.5	43.7	43.8	44.1	41.0	40.5	39.8	38.8
Market Borrowings (excluding portion subscribed by banks)	39.0	38.2	38.3	38.7	35.7	34.5	34.4	33.7
Bank Borrowing as a share of total borrowings	35.6	36.2	37.6	36.6	39.6	41.3	41.4	41.2

Source: RBI Supervisory Returns.

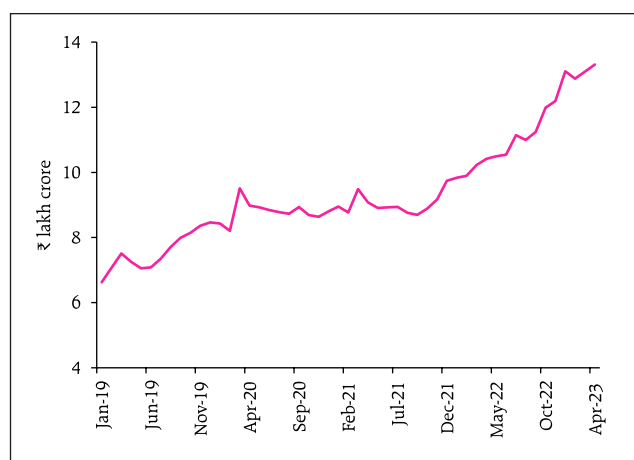
1.107 Bank borrowings remained the principal source of funds and constituted 41.2 per cent of the total borrowings of NBFCs (excluding core investment companies) (Table 1.14 and Chart 1.73).

1.108 The residual maturity of nearly two-thirds of NBFCs' borrowings has remained above one year (Chart 1.74).

1.2.11 Micro, Small and Medium Enterprises (MSME)⁴⁵ Sector

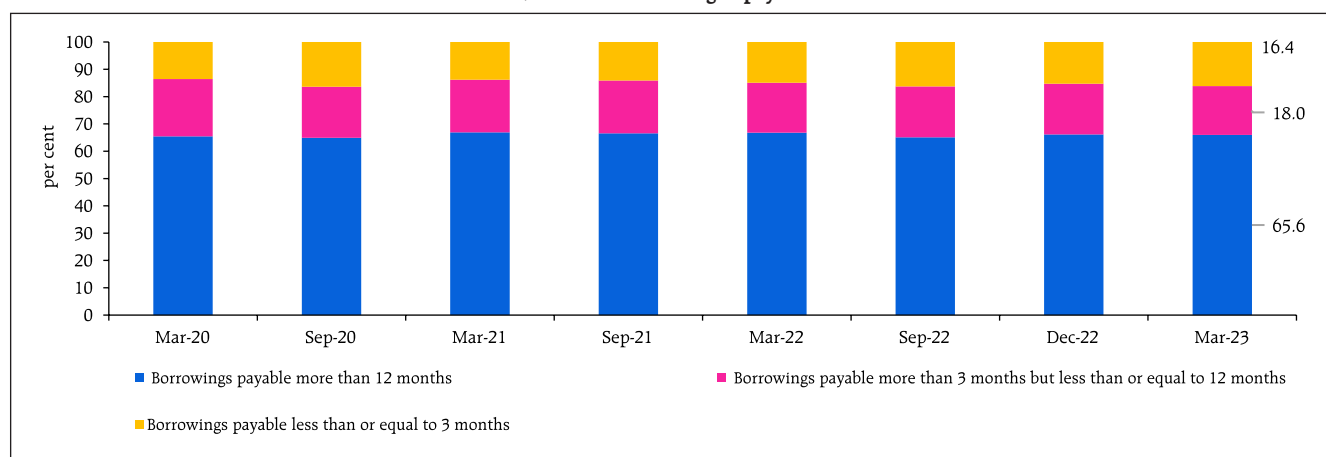
1.109 Credit to the micro, small and medium enterprises (MSME) sector continued to grow in the range of 13.8–18.9 per cent (y-o-y) during

Chart 1.73: Bank Credit to NBFCs



Source: RBI.

Chart 1.74: NBFCs Borrowing Repayment Pattern



Source: RBI Supervisory Returns.

⁴⁵ Government of India has changed the qualifying criteria and calculation methodology of investment in plant and machinery and turnover for classification of enterprises into Micro, Small and Medium in terms of Circular no RBI/2020-2021/10 FIDD.MSME & NFS.BC.No.3/06.02.31/2020-21 dated July 02, 2020 and its subsequent clarifications.

2022-23 (Chart 1.75). Overall, credit to the MSME sector has been sustained by strong institutional support, which includes the Emergency Credit Line Guarantee Scheme (ECLGS) and regulatory modifications in the definition of MSMEs.

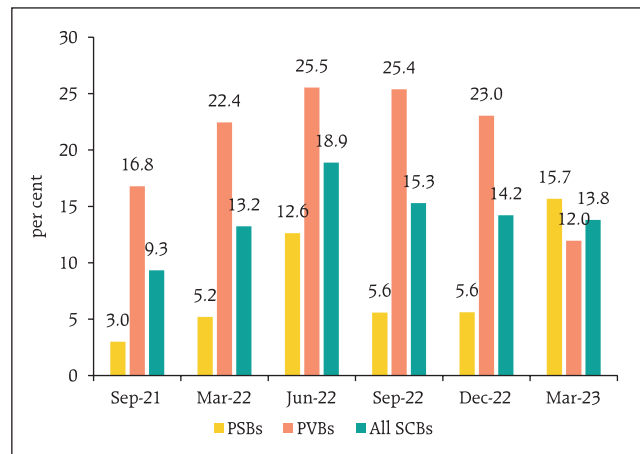
1.110 The asset quality of the MSME portfolio of SCBs improved significantly during 2022-23 with (a) the GNPA ratio declining from 9.3 per cent in March 2022 to 6.8 per cent in March 2023; (b) the GNPA ratio for advances below ₹25 crore, which are particularly vulnerable to slippage, also declining sequentially from 7.2 per cent to 6.7 per cent; and (c) SMA accounts going down from 11 per cent in March 2022 to 8.6 per cent in March 2023 (Table 1.15). Importantly, the improvement in asset quality has coincided with the expiry of regulatory forbearance and restructuring schemes introduced since 2018.

1.111 Under the ECLGS scheme, which expired on March 31, 2023, SCBs accounted for almost ninety per cent of total disburseals (₹2.91 lakh crore). Contact intensive services and traders were the major sectors availing ECLGS loans.

1.112 Disaggregated analysis of borrowers availing the ECLGS indicates that one-sixth of accounts and one-twentieth of the amount disbursed turned non-performing. Stress was predominant in the micro enterprises segment, with nearly one-fifth of borrowers and a tenth of the amount disbursed turning delinquent (Chart 1.76).

1.113 Sector-wise analysis of NPAs indicates that services and trade, which formed one third of the ECLGS disbursements, remain stressed and

Chart 1.75: MSME Sector Credit Growth



Note: P: Provisional. Due to extension of validity of old documents for MSME classification provided by Ministry of MSME, the MSME credit outstanding figures as per regulatory returns for previous quarters have been revised.

Source: RBI supervisory returns and staff calculations.

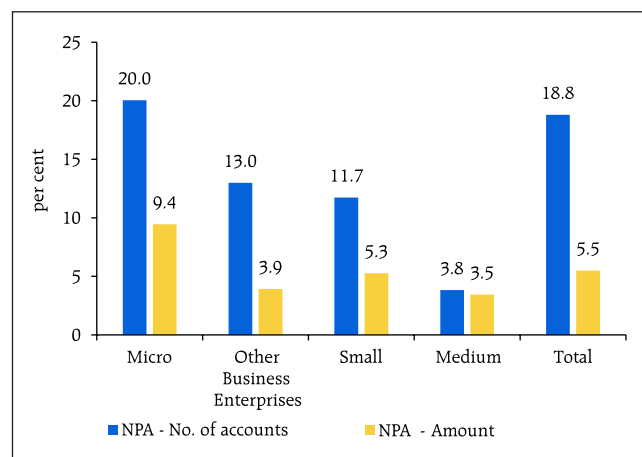
Table 1.15: MSME Asset Quality Profile

(per cent)

	PSBs + PVBs				
	0 days past due	SMA 0	SMA 1	SMA 2	GNPA
Mar-22	79.7	6.4	3.5	1.1	9.3
Jun-22	79.6	6.4	3.5	2.2	9.8
Sep-22	81.6	6.7	1.9	2.1	7.7
Dec-22	82.2	6.3	2.0	2.0	7.4
Mar-23	84.6	5.1	2.6	0.9	6.8

Source: RBI Supervisory Returns and Staff Calculations.

Chart 1.76: Unit Type-wise NPA



Note: As on March 31, 2023.

Source: National Credit Guarantee Trustee Company Limited (NCGTC).

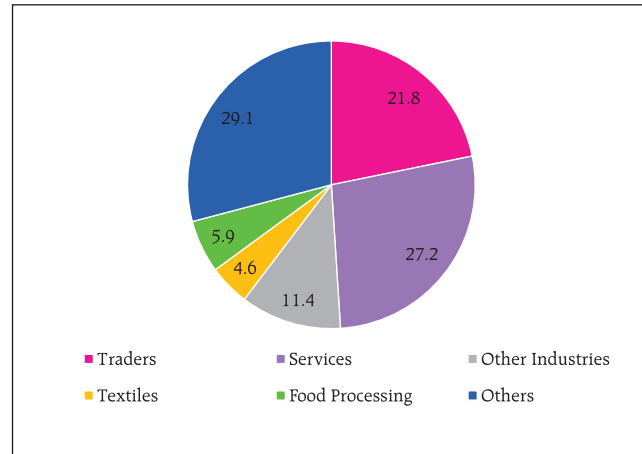
accounted for nearly half of the total delinquency under the ECLGS in these cohorts (Chart 1.77).

1.2.12 Microfinance

1.114 Credit to the microfinance sector has grown by 21.5 per cent (y-o-y) during 2022-23, with all non-SCB lenders recording double digit portfolio growth. SCBs' microfinance portfolio, which had declined sequentially during the first three quarters of the year, picked up momentum in the fourth quarter of the year. After the regulatory review of the definition for assets qualifying as microfinance asset, NBFCs have seen strong growth. NBFC-MFIs and SCBs accounted for nearly three-fourth of lending to the microfinance sector (Chart 1.78).

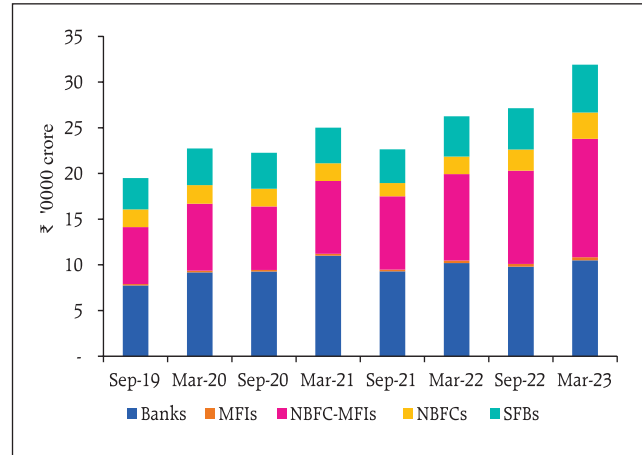
1.115 Overall delinquency in the microfinance segment, measured in terms of 90+ days past due (dpd), declined across lender cohorts. Delinquency in SCBs' microfinance portfolio is, however, still at elevated levels with a seventh of the portfolio under stress. Similarly, portfolio at risk of slippage, measured by 31-89 dpd, declined across lender categories (Chart 1.79 a and b).

Chart 1.77: ECLGS Sector-wise Share of NPA



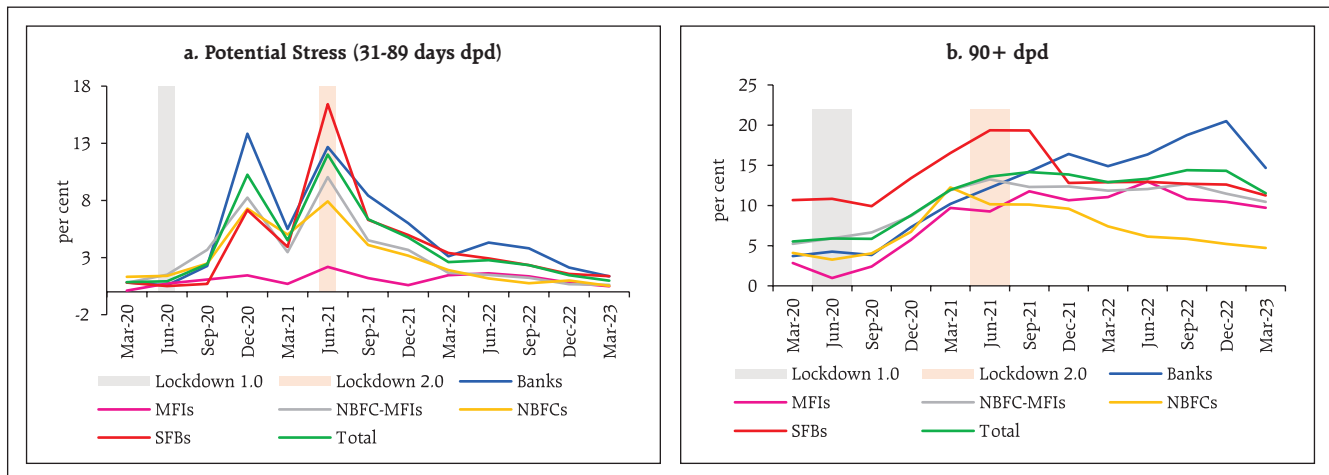
Note: As on March 31, 2023.
Source: NCGTC.

Chart 1.78: Lending to the Microfinance Segment



Source: Equifax.

Chart 1.79: Stress in the Microfinance Segment



Source: Equifax.

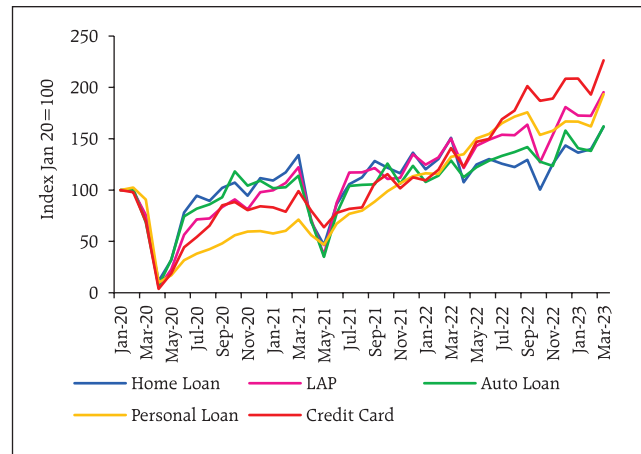
I.2.13 Consumer Credit

1.116 Consumer credit, which showed signs of moderation in Q3:2022-23, is gaining traction again with inquiry volumes across most segments growing in Q4:2022-23 (Chart 1.80).

1.117 The quality of incremental credit has improved, with the share of lower rated borrowers⁴⁶ declining at the overall industry level as well as at bank group level (Chart 1.81 a, b and c). Although lower-rated borrowers formed 45.7 per cent of originations, they represented only 33.2 per cent of the amount originated at the industry level.

1.118 The distribution by risk tier⁴⁷ shows improvement in the customer mix across all categories of lenders. On the other hand, the personal loan transition matrix showed moderation

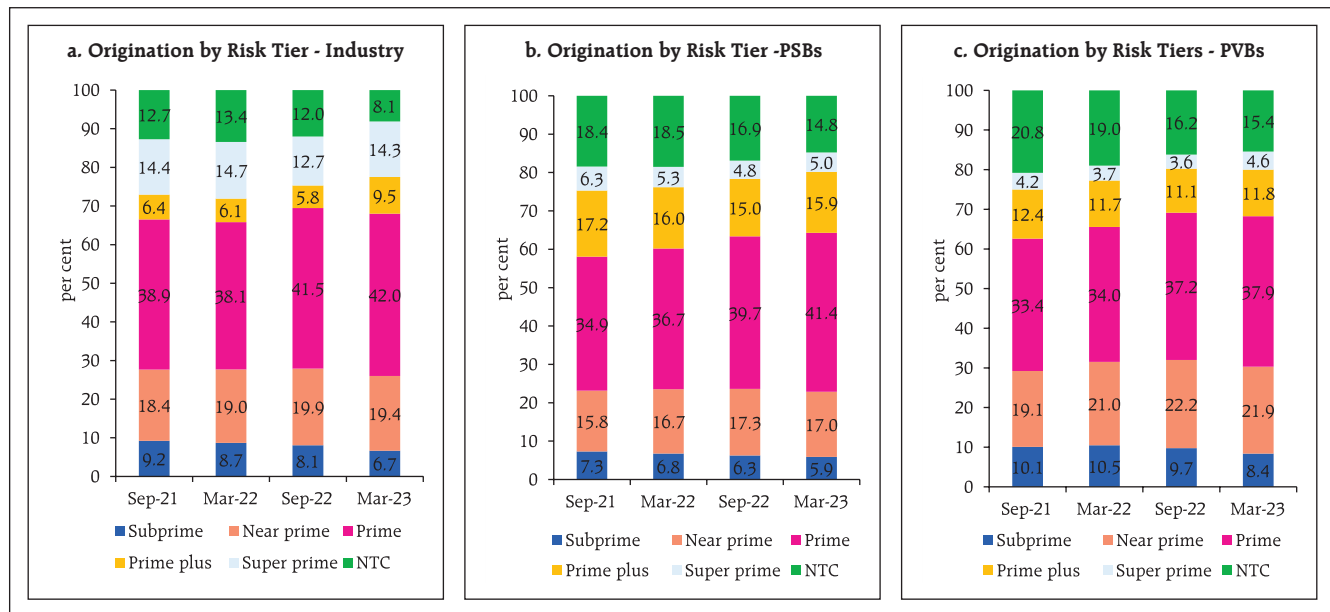
Chart 1.80: Inquiry Volumes by Product Category



Note: LAP stands for Loan against Property.
Source: TransUnion CIBIL.

in risk tiering, with downgrades from super-prime and prime-plus category exceeding upgrades in

Chart 1.81: Origination by Risk Tier



Note: NTC stands for new to credit.
Source: TransUnion CIBIL.

⁴⁶ Below prime and new to credit (NTC) borrowers.

⁴⁷ 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 SubPrime:300-680.

Table 1.16: Consumer Distribution by Risk Tier and Lender Category

(as a per cent of credit active consumers)

Score Band	Select NBFCs (24)		All NBFCs		All PSBs		All PVT Banks		Industry	
	Mar-22	Mar-23	Mar-22	Mar-23	Mar-22	Mar-23	Mar-22	Mar-23	Mar-22	Mar-23
Subprime	25.9	22.3	31.6	27.2	33.0	28.4	16.5	15.3	27.4	24.2
Near prime	23.3	25.4	23.3	24.9	26.3	26.6	15.5	16.2	22.4	22.8
Prime	35.4	37.2	32.8	35.6	26.4	27.7	34.2	35.7	30.4	32.5
Prime plus	14.0	13.3	11.3	11.0	10.9	12.0	21.9	22.6	14.3	14.7
Super prime	1.5	1.8	1.0	1.3	3.5	5.2	11.9	10.2	5.6	5.8
Total	100	100	100	100	100	100	100	100	100	100
Below Prime	49.1	47.8	54.9	52.1	59.2	55.0	32.1	31.4	49.8	46.9

Source: TransUnion CIBIL.

Table 1.17: Transition Matrix - Personal Loans (Unsecured)

(per cent)

Risk Tier as of March 2022		Risk Tier as of March 2023					Score Tier Downgrade	Score Tier Upgrade
		Subprime	Near prime	Prime	Prime Plus	Super Prime		
Risk Tier as of March 2022	Subprime	71.0	18.3	8.4	2.0	0.2	0.0	29.0
	Near prime	21.6	32.1	35.4	10.2	0.7	21.6	46.3
	Prime	8.8	16.8	47.7	24.9	1.8	25.6	26.7
	Prime plus	4.0	9.5	28.9	52.1	5.4	42.5	5.4
	Super prime	2.3	7.9	22.8	27.6	39.4	60.6	0.0

Source: TransUnion CIBIL.

sub-prime and near-prime customers (Table 1.16 and 1.17).

1.119 The proportion of portfolios at 90 dpd or beyond, which serves as a measure of impairment in consumer credit, has improved during 2022-23 across all bank cohorts (Table 1.18).

1.2.14 Housing Market

1.120 The all-India house price index (HPI)⁴⁸ recorded its highest increase over the last seventeen quarters (4.6 per cent, y-o-y) in Q4:2022-23. On a sequential (q-o-q) basis, HPI has been rising over the last one year and inched up further by 0.6 per cent during Q4.

1.121 With strong demand for houses in the post-pandemic period, the house price gap (actual less trend) is closing after a period of around three years. A positive house price gap is an early warning

Table 1.18: Delinquency Levels in Aggregate Consumer Credit across all Product Categories

(per cent)

	PSB	PVB	NBFC / HFC	FinTech
Mar-22	3.4	1.8	2.4	2.1
Apr-22	3.5	1.7	2.7	2.2
May-22	3.5	1.7	2.6	2.2
Jun-22	3.4	1.8	2.4	2.2
Jul-22	3.3	2.0	2.1	2.1
Aug-22	3.2	1.8	2.2	2.0
Sep-22	3.3	1.7	2.0	2.2
Oct-22	3.3	1.7	2.0	2.4
Nov-22	3.2	1.6	2.0	2.6
Dec-22	3.4	1.6	1.8	2.8
Jan-23	3.4	1.6	1.7	2.5
Feb-23	3.3	1.5	1.7	2.2
Mar-23	3.1	1.4	1.4	2.0

Note: Based on 90 days past due balances; Methodology for computing delinquency has been modified and accordingly previous data has been revised.

Source: TransUnion CIBIL.

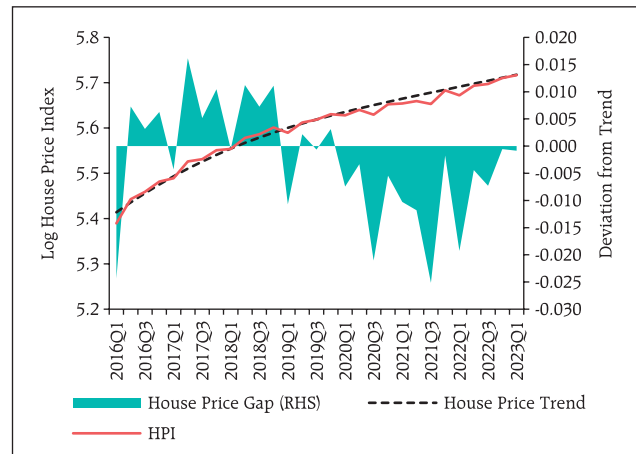
⁴⁸ House price index (base: 2010-11=100) is compiled based on transaction-level data received from the registration authorities in ten major cities (viz., Ahmedabad, Bengaluru, Chennai, Delhi, Jaipur, Kanpur, Kochi, Kolkata, Lucknow, and Mumbai).

indicator of concentration of credit and vulnerability in the housing market (Chart 1.82).

1.122 During Q4:2022-23, house sales grew by 21.6 per cent and new launches also maintained healthy growth, reflecting strength in demand by end-users as well as investors. The rise in unsold inventory resulted in an uptick in the inventory overhang in Q4:2022-23 (Chart 1.83 a and b).

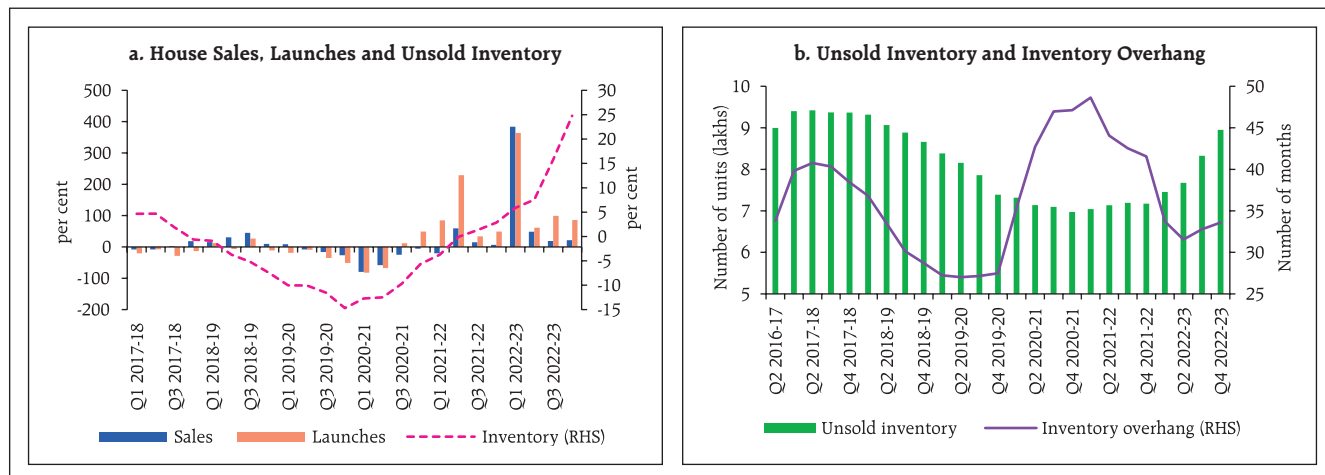
1.123 The share of residential housing loans in total loans has increased over the last eleven years to 14.2 per cent in March 2023 from 8.6 per cent in March 2012. During this period, the share of commercial real estate (CRE) in total loans has hovered between 2.0-2.9 per cent. Total exposure of the banking system to real estate stood at 16.5 per cent of total loans in March 2023. Given the secured nature of these loans and loan to value (LTV) ratio regulations,

Chart 1.82: House Price Gap*



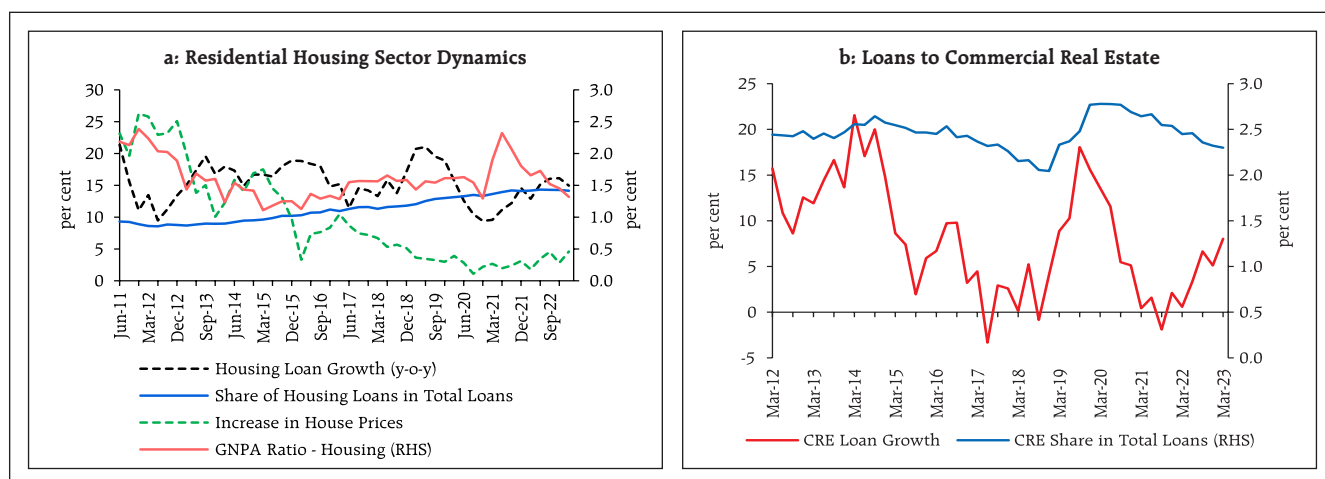
Note: * Hodrick–Prescott filter with lambda=1600.
Source: RBI Staff Calculations.

Chart 1.83: House Sales, Launches and Inventory Overhang



Source: PropTiger DataLabs.

Chart 1.84: Residential Housing and Commercial Real Estate Sector



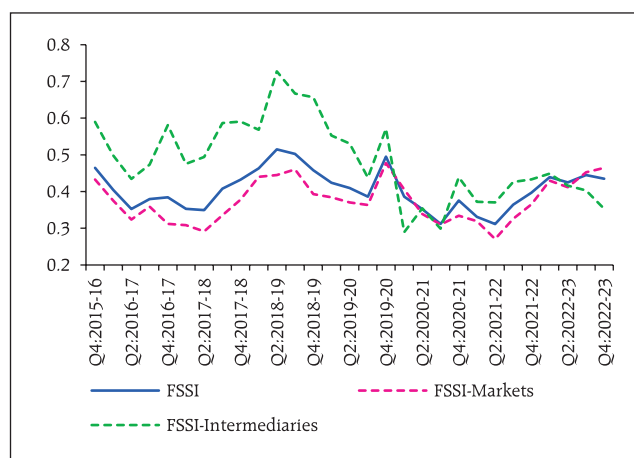
Source: RBI and Supervisory Returns.

loan defaults remain less than 2 per cent (Chart 1.84 a and b).

1.2.15 Financial System Stress Indicator⁴⁹

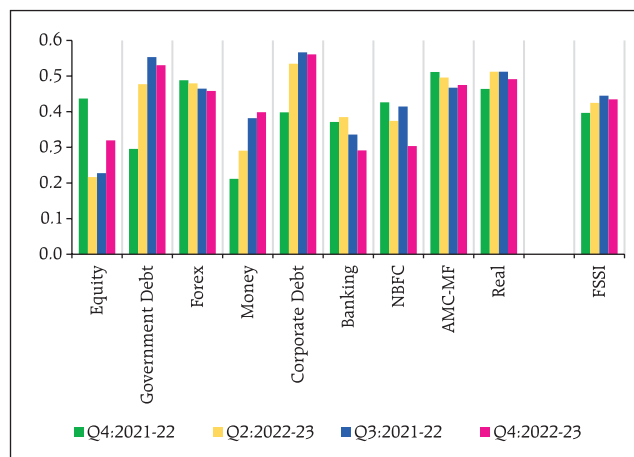
1.124 In the last issue of the FSR, the financial system stress indicator (FSSI) was presented as a monitoring tool for aggregate stress levels in the Indian financial system. The FSSI shows that the overall stress in the domestic financial system eased in Q4:2022-23 relative to Q3:2022-23, driven by general improvement in stress factors across banking and non-banking sectors. Financial market stress indicators were mixed, with equity markets witnessing stress following the banking turmoil in some of the AEs and money market risk indicators rose due to increase in spreads of commercial paper (CP) and certificates of deposit (CDs) over treasury bills and higher volatility in CP market. On the other hand, forex market indicators remained stable and bond market indicators improved as spreads and volatility reduced. Real sector indicators improved while mutual fund risk indicators rose marginally due to redemption pressures (Chart 1.85 and 1.86).

Chart 1.85: FSSI and its Broad Components



Sources: DBIE, Bloomberg, RBI Supervisory Returns and Staff Calculations

Chart 1.86: Components of FSSI



Sources: DBIE, Bloomberg, RBI Supervisory Returns and Staff Calculations

⁴⁹ See Annex-2 for detailed methodology and variables used.

1.2.16 Systemic Risk Survey

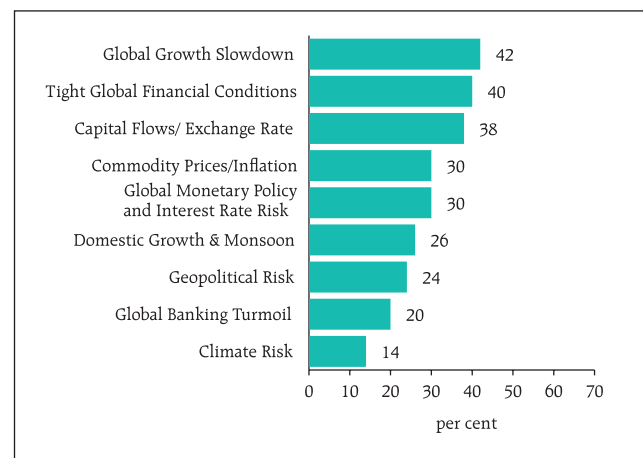
1.125 As per the systemic risk survey conducted in May 2023, risk perception across all major categories of systemic risk except institutional risk has receded. Global spillovers remained in the 'high' risk category. Financial market risk declined to the 'medium' risk category from 'high' risk. Macroeconomic risk remained in the 'medium' risk category and was perceived to have moderated.

1.126 Major drivers of global risks such as risks to global growth, commodity price risk and risk emanating from monetary tightening in AEs were perceived to have moderated. All the drivers of financial market risk were gauged to have decelerated to 'medium' risk category from the 'high' risk category in the previous survey. 54 per cent of the respondents reported that their confidence in the stability of the global financial system has declined over the last six months whereas 94 per cent of the respondents' confidence in the Indian financial system over this period either increased or remained unchanged. Following the recent banking sector turmoil in AEs, 82 per cent of the respondents strongly/moderately agreed that it has aggravated risks of global recession.

1.127 As per the survey response, global growth slowdown has emerged as the foremost financial stability risk, followed by tight global financial conditions, volatility in capital flows and rise in commodity prices (Chart 1.87).

1.128 Underscoring the resilience of the Indian banking sector, more than half of the respondents assessed that the prospects of the banking sector have improved. 77 per cent of the respondents expected either improvement in banking sector asset quality or expected it to remain unchanged over the next six months, attributable to factors such as improved corporate earnings in major sectors, improvement in credit profiles of corporates, sustained economic

Chart 1.87: Potential Risks to Financial Stability



Source: Systemic Risk Survey, May 2023.

recovery, and improved monitoring and risk assessment by banks. Around half of the respondents expected marginal to considerable improvement in credit demand over the next six months owing to factors such as public investment in the infrastructure sector, improvement in corporate lending, increase in working capital demand by corporates, increase in consumption and investment demand, pick up in domestic economy particularly manufacturing sector, and decline in inflation.

Summary and Outlook

1.129 The global economy is facing heightened uncertainty amidst moderating but still high inflation and persisting geopolitical tensions. The resilience of the global financial system is being tested by the recent banking turmoil and interaction between monetary tightening and financial sector stress. EMEs could face significant challenges if global growth decelerates faster than anticipated, financial strains re-emerge, and risk aversion increases. Policy

trade-offs are becoming more challenging although recent forceful actions by central banks provide comfort that financial stability would be preserved without conceding the fight against inflation.

1.130 Despite a challenging global macroeconomic backdrop, the Indian economy and the domestic financial system remain resilient. The health of the banking system is a positive in this environment, with improving profitability and asset quality and sufficient levels of capital and liquidity buffers.

Chapter II

Financial Institutions: Soundness and Resilience

Notwithstanding recent global financial market turbulence and acute banking stress in some jurisdictions, the Indian financial sector has remained stable and resilient, with further improvement in asset quality, capital and profitability. Macro stress tests for credit risk reveal that all banks would comply with the minimum capital requirements even under a severe stress scenario. Contagion and solvency risks have reduced.

Introduction

2.1 Since the December 2022 FSR, the Indian banking sector has expanded its balance sheet, business and profitability. Even as gross non-performing assets (GNPA) and net non-performing assets (NNPA) as ratios to gross loans and advances, of scheduled commercial banks (SCBs) declined to a decadal low, the system-level capital to risk-weighted assets ratio (CRAR) reached a new high. The net interest margin (NIM) increased further and post-tax profits recorded growth as credit expanded alongside adequate provisioning and strengthening of capital buffers. Banks' exposure to large borrowers reflected, in general, reduced concentration in gross loans, improvement in asset quality and containment of potential slippages. Within the large borrowers' cohort, however, big corporates increased their recourse to bank financing – the share of top 100 borrowers in total credit has been rising since September 2021.

2.2 As credit growth has been outpacing deposit growth, financing conditions, especially banks' cost of funds have tightened. The retail sector has been a major driver of bank credit growth in the recent period.

2.3 This chapter presents an evaluation of the soundness and resilience of financial intermediaries in India through an analysis of various key parameters such as business mix, asset quality, concentration of large borrowers, capital adequacy, earnings and profitability. Section II.1 analyses the performance of SCBs and their resilience in the context of macroeconomic shocks through stress tests and sensitivity analysis. Sections II.2 and II.3 examine the recent financial performance of urban cooperative banks (UCBs) and non-banking financial companies (NBFCs), respectively, and evaluate their resilience through stress tests. Sections II.4, II.5 and II.6 provide insights into the soundness and resilience of insurance sector, mutual funds, and clearing corporations, respectively. Section II.7 concludes with a detailed analysis of the network structure and connectivity of the Indian financial system with contagion analysis under adverse scenarios.

II.1 Scheduled Commercial Banks (SCBs)^{1 2 3 4}

2.4 Aggregate deposits growth, which had undergone a slight moderation during 2021-22 and H1:2022-23, picked up pace to reach 11.8 per cent as on June 02, 2023. This growth was mainly driven by private sector banks (PVBs) (Chart 2.1 a). In the rising

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 this exercise, SCBs include public sector banks, private sector banks and foreign banks. For CRAR projections, a sample of 46 SCBs accounting for around 98 per cent of the assets of the total banking sector, excluding regional rural banks (RRBs) and co-operative banks, have been considered.

² Due to changes in the methodology for supervisory reporting, data on sectoral/ sub-sectoral advances presented in Charts 2.1 (d), (e) and (f) may not be comparable to past periods. For these charts, FBs group comprises of six major foreign banks with an approx. 71 per cent share in total gross loans and advances of all FBs as on March 2023.

³ The analyses done in the chapter are based on the data available as of June 15, 2023, which are provisional.

⁴ Personal loans refer to loans given to individuals and consist of (a) consumer credit (b) education loan (c) loans given for creating/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



Note: Transfer of retail business of a foreign bank to a PVB has impacted the growth rates of PVBs and Foreign Banks (FBs) during H2:2022-23. Chart 2.1 (f): Vehicle/ auto loans and education loans for FBs have not been considered due to negligible amounts. **Source:** RBI supervisory returns and staff calculations.

interest rate cycle, term deposits have garnered healthy accretions at the cost of current account and savings account (CASA) deposits (Chart 2.1 b).

2.5 SCB's credit growth (y-o-y) has been accelerating since early 2022, led by both public sector banks (PSBs) and PVBs; by June 02, 2023, it reached 15.4 per cent (Chart 2.1 c). Credit for agriculture, services and personal loans grew faster than lending to the industrial sector (Chart 2.1 d and e). In particular, personal loans recorded a broad-based growth of 22.2 per cent (y-o-y) with all major segments, viz., housing, credit card receivables, vehicle/ auto loans, education loans, registering robust growth (Chart 2.1 f).

2.6 The strength of loan demand was reflected in the rising volume of new loans extended by SCBs; of which agriculture, households and working capital loans registered over 20 per cent growth (Table 2.1).

II.1.1 Asset Quality

2.7 The asset quality of SCBs continued to improve and their GNPA ratio declined to 3.9 per cent in March 2023 – a 10-year low. SCBs' NNPA ratio⁵ also improved to 1.0 per cent, a level last observed in June 2011, indicative of active and deep provisioning. In fact, SCBs' provisioning coverage

Table 2.1: Growth in New Loans by SCBs: Economic Sectors, Organisations and Account type*

(per cent)

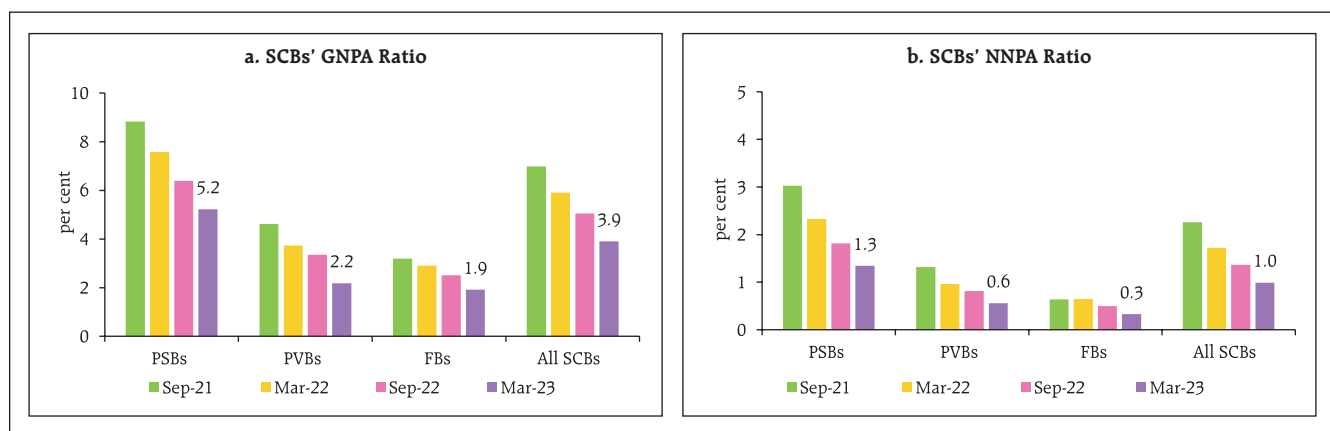
Sector	Q4:	Q1:	Q2:	Q3:	Q4:
	2021-22	2022-23	2022-23	2022-23	2022-23
	Growth (y-o-y)				
Economic sector wise					
Agriculture	26.3	68.3	26.8	16.7	27.8
Industry	13.6	22.5	27.9	4.9	6.2
Services	15.7	49.9	34.8	21.5	15.9
Personal loans	23.2	83.9	27.5	19.1	14.7
Organisation wise					
Public sector	18.5	44.7	36.9	13.0	6.6
Private corporate sector	14.6	29.3	25.6	13.6	10.4
Household sector	20.6	77.9	27.2	18.8	21.0
of which, Individuals	20.2	80.3	26.2	18.6	20.3
Other sectors	54.8	50.2	103.0	28.8	67.9
Type of Account wise					
Working capital loans	15.9	43.9	31.6	22.3	26.5
Term loans	23.5	69.0	35.3	13.5	8.9
Other types of loans	3.2	8.3	0.0	-2.2	-4.1
All new loans	18.4	49.3	30.1	15.9	14.9
New loans in total loans (Share)	17.9	15.2	16.6	16.6	17.7

Note * excluding regional rural banks (RRBs).

Source: Basic Statistical Returns -1 and RBI staff calculations.

ratio (PCR)⁶ improved to 74.0 per cent in March 2023 (Chart 2.2 a, b and c). The quarterly slippage ratio, measuring new accretions to NPAs as a share of

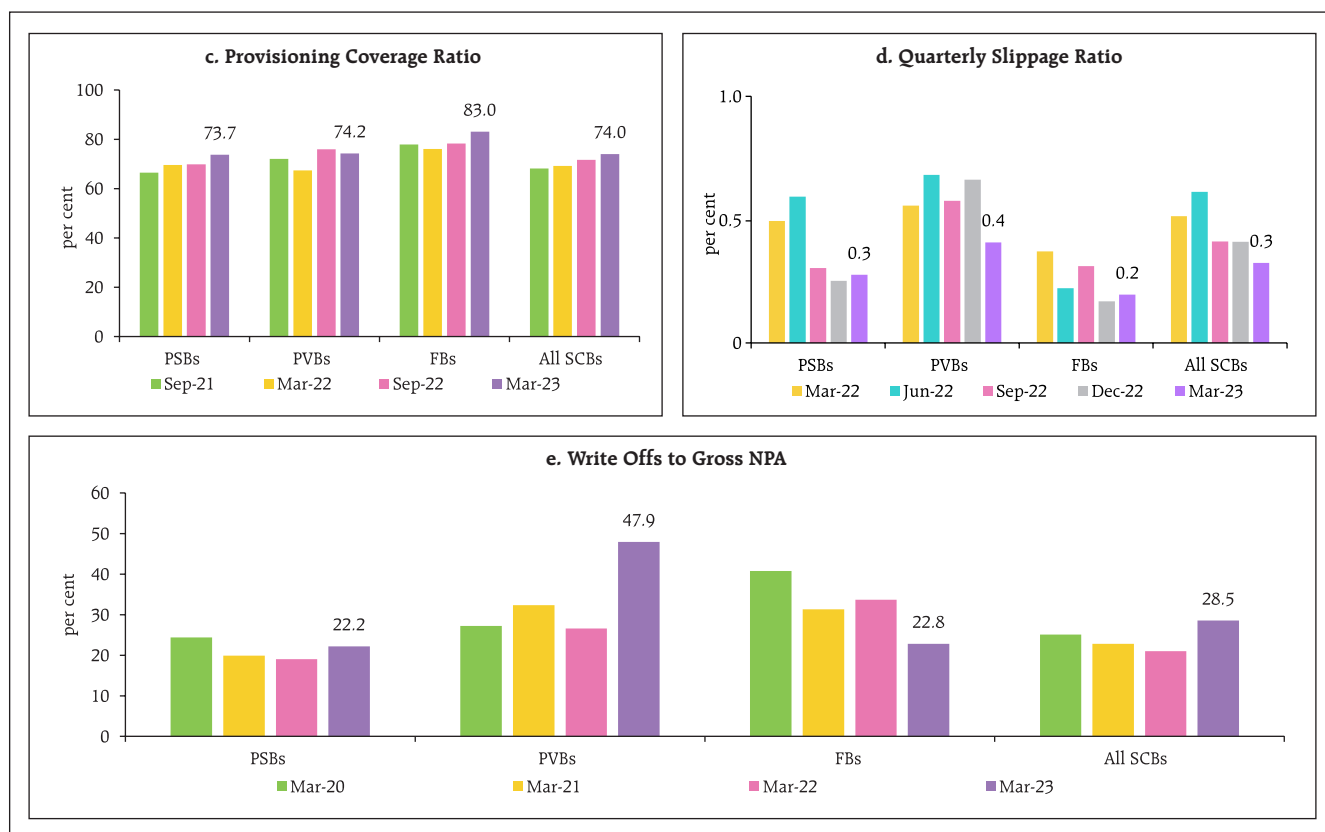
Chart 2.2: Select Asset Quality Indicators (Contd.)



⁵ NNPA ratio is the proportion of net non-performing assets in net loans and advances.

⁶ PCR is the proportion of provisions (without write-offs) held for NPAs to GNPA.

Chart 2.2: Select Asset Quality Indicators (Concl.)



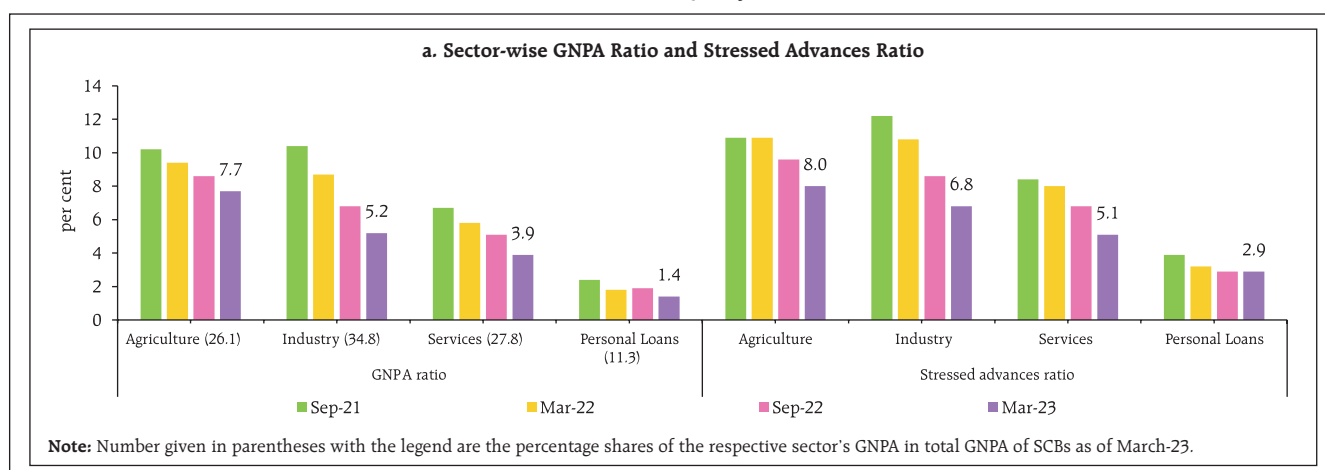
Source: RBI supervisory returns and staff calculations.

standard advances at the beginning of the quarter, moderated further (Chart 2.2 d). The write-off to GNPA ratio⁷, which had been declining consecutively through 2020-21 and 2021-22, increased in 2022-23 due to large write-offs by PVBs (Chart 2.2 e).

II.1.2 Sectoral Asset Quality

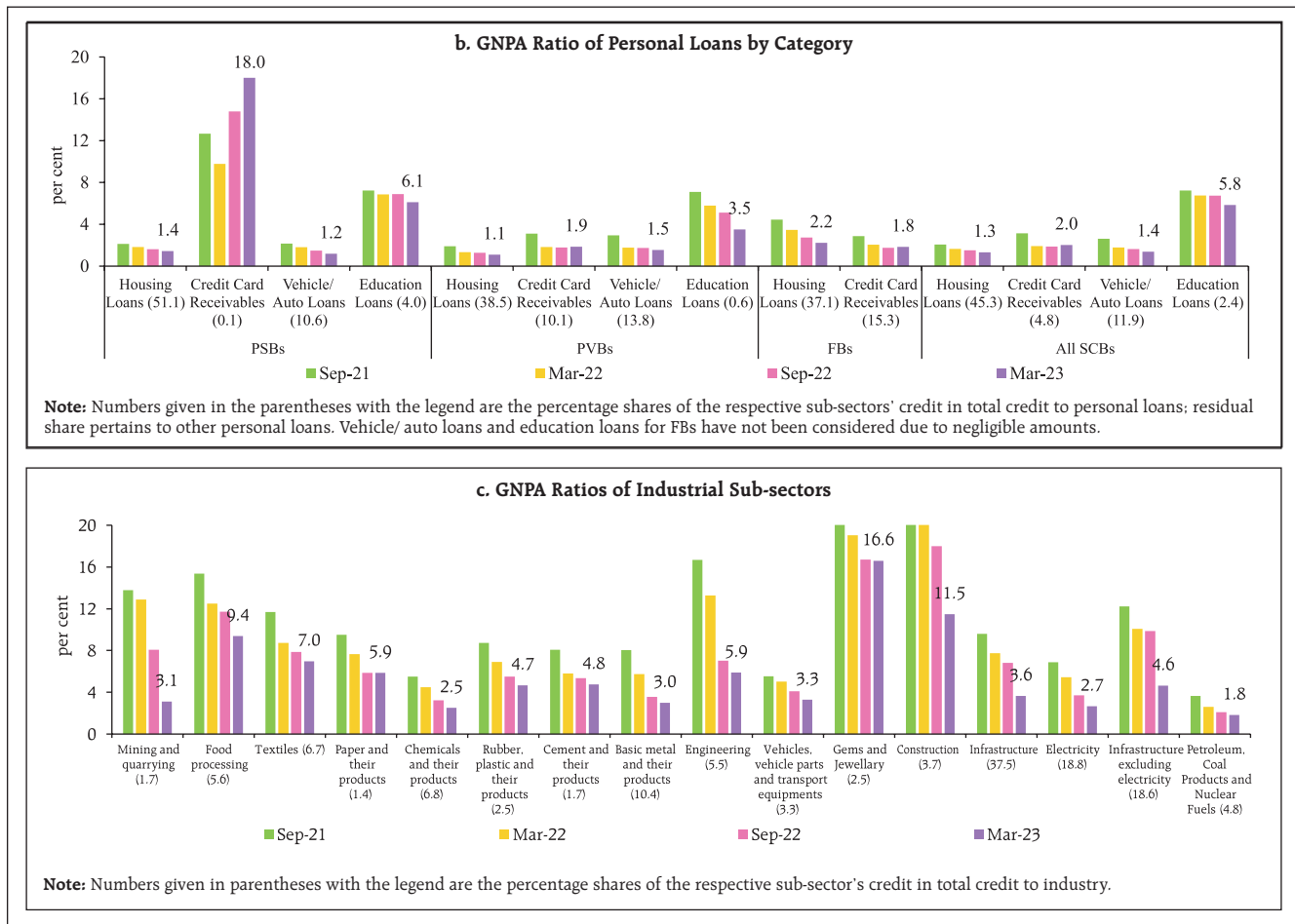
2.8 The improvement in SCBs' asset quality has been broad based, with a steady decline in the stressed advances ratio across all major sectors (Chart 2.3 a). While there has been an overall

Chart 2.3: Sectoral Asset Quality Indicators (Contd.)



⁷ Ratio of write-off (including technical/ prudential write-offs and compromise settlement) during the period to GNPA at the beginning of the period.

Chart 2.3: Sectoral Asset Quality Indicators (Concl'd.)



Source: RBI supervisory returns and staff calculations.

improvement in asset quality in respect of personal loans, impairments in the credit card receivables segment have risen marginally (Chart 2.3 b). Within the industrial sector, asset quality continued to improve across sub-sectors (Chart 2.3 c).

II.1.3 Credit Quality of Large Borrowers⁸

2.9 The share of large borrowers in gross advances of SCBs declined successively over the past three years (*viz.*, from 51.1 per cent in March 2020

to 46.4 per cent in March 2023) as retail loans grew faster than borrowings by corporates. The share of large borrowers in the GNPA of SCBs also came down substantially (*viz.*, from 75.7 per cent in March 2020 to 53.9 per cent in March 2023) (Chart 2.4 a). Asset quality in the large borrower portfolio saw significant improvement: the GNPA ratio declined from 12.2 per cent to 4.5 per cent over this period (Chart 2.4 b). Although there has been an increase in SMA-1⁹ loans during the March 2023 quarter,

⁸ 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.

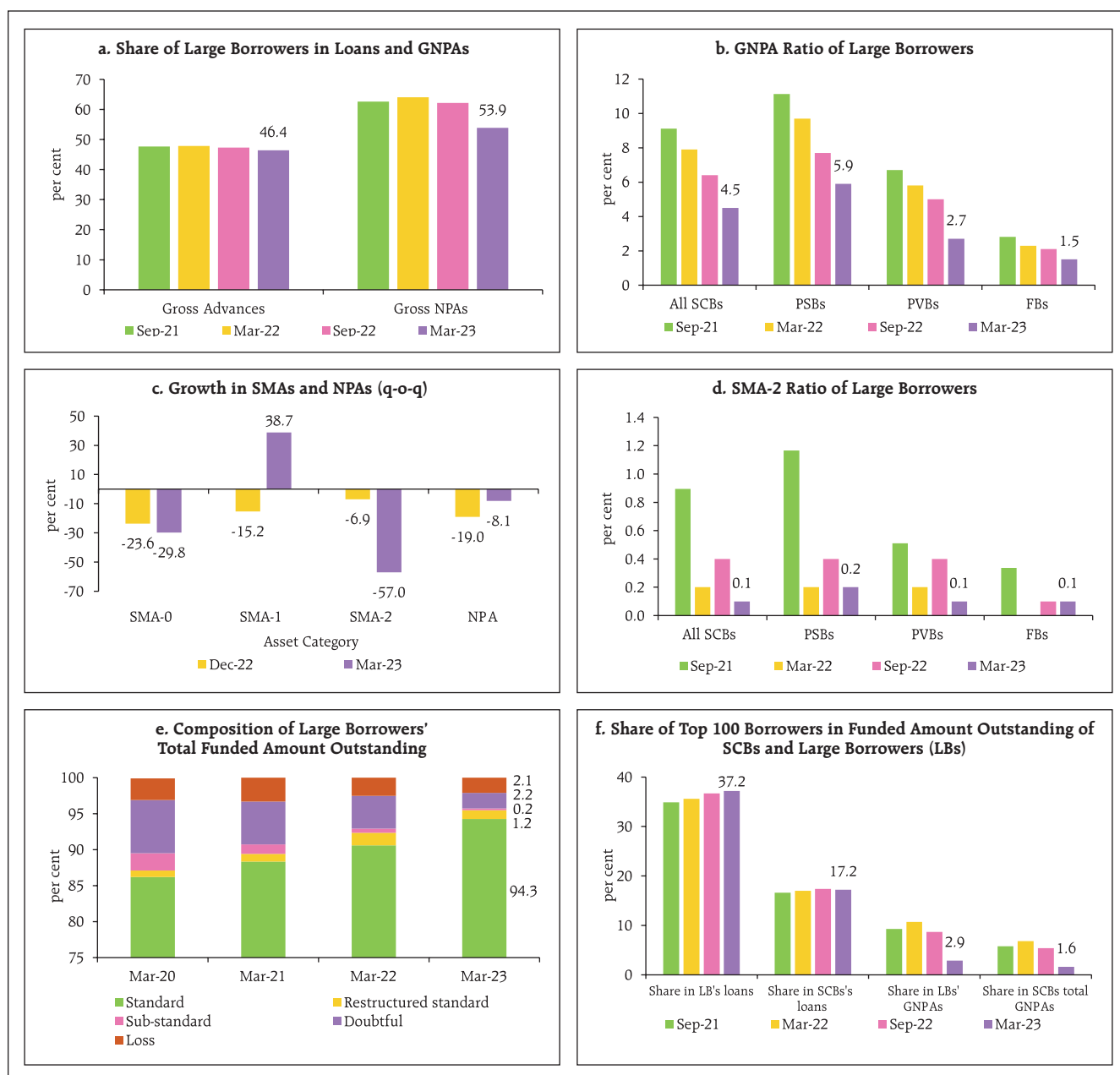
⁹ a) Loans in the nature of revolving facilities like cash credit/overdraft: if outstanding balance remains continuously in excess of the sanctioned limit or drawing power, whichever is lower, for a period of 31-60 days - SMA-1; 61-90 days - SMA-2.

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

the total stock of SMA category loans has fallen by 26.2 per cent (q-o-q) in the same period (Chart 2.4 c). Improvement in the SMA-2 ratio in March 2023 across bank groups reflected the containment of potential slippages during H2:2022-23 (Chart 2.4 d). In the large borrower accounts, the proportion of

standard assets to total funded amount outstanding improved from 86.2 per cent in March 2020 to 94.3 per cent in March 2023 with corresponding declines in NPAs (Chart 2.4 e). The asset quality of top 100 borrowers improved, with their share in SCBs' GNPA declining from 6.8 per cent as of March 2022 to 1.6 per cent as of March 2023 (Chart 2.4 f).

Chart 2.4: Select Asset Quality Indicators of Large Borrowers



Source: RBI supervisory returns and staff calculations.

II.1.4 Capital Adequacy

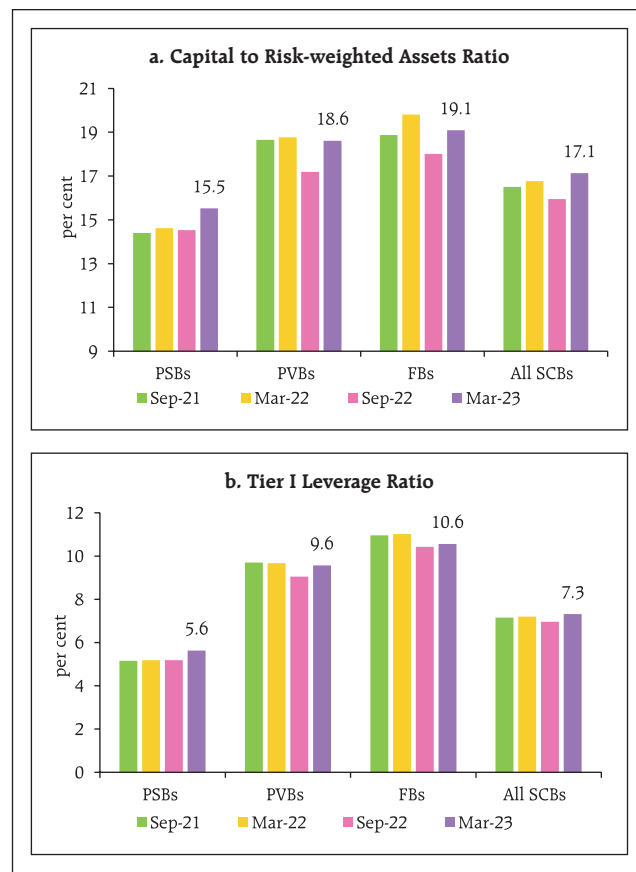
2.10 In H2:2022-23, the capital to risk-weighted assets ratio (CRAR) of SCBs improved across bank groups (Chart 2.5 a). Their Tier I leverage ratio¹⁰ also increased during H2:2022-23 as they bolstered their capital base through capitalisation of reserves due to increased profits as well as by raising fresh capital (Chart 2.5 b).

II.1.5 Earnings and Profitability

2.11 SCBs sustained the momentum in profitability as their net interest margin (NIM) continued to grow. During 2022-23, the NIM improved by 30 bps as transmission of monetary policy tightening to deposit rates lagged the pass-through to lending rates (Chart 2.6 a). SCBs' profit after tax (PAT) recorded a healthy growth of 38.4 per cent (y-o-y) during 2022-23, led by strong increase in net interest income (NII) and lowering of provisions. PAT of PSBs grew at a faster rate than that of PVBs whose operating expenses increased by 29.4 per cent (Chart 2.6 b).

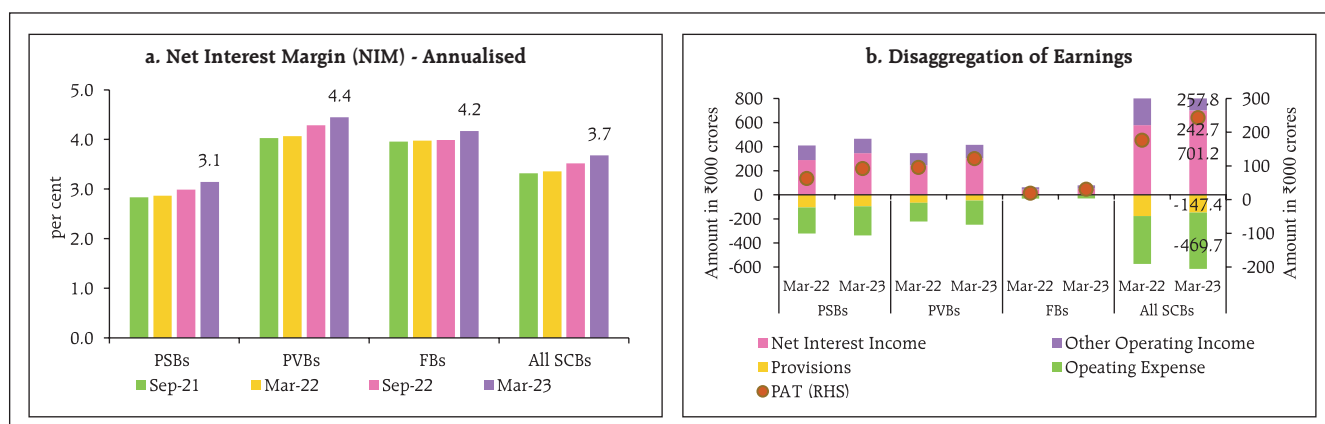
2.12 Higher profitability was also reflected in further improvement in the return on equity (RoE) and the return on assets (RoA) ratios (Chart 2.6 c and d). In response to higher interest rates, the cost of funds increased by 30 bps at the system level during

Chart 2.5: Capital Adequacy



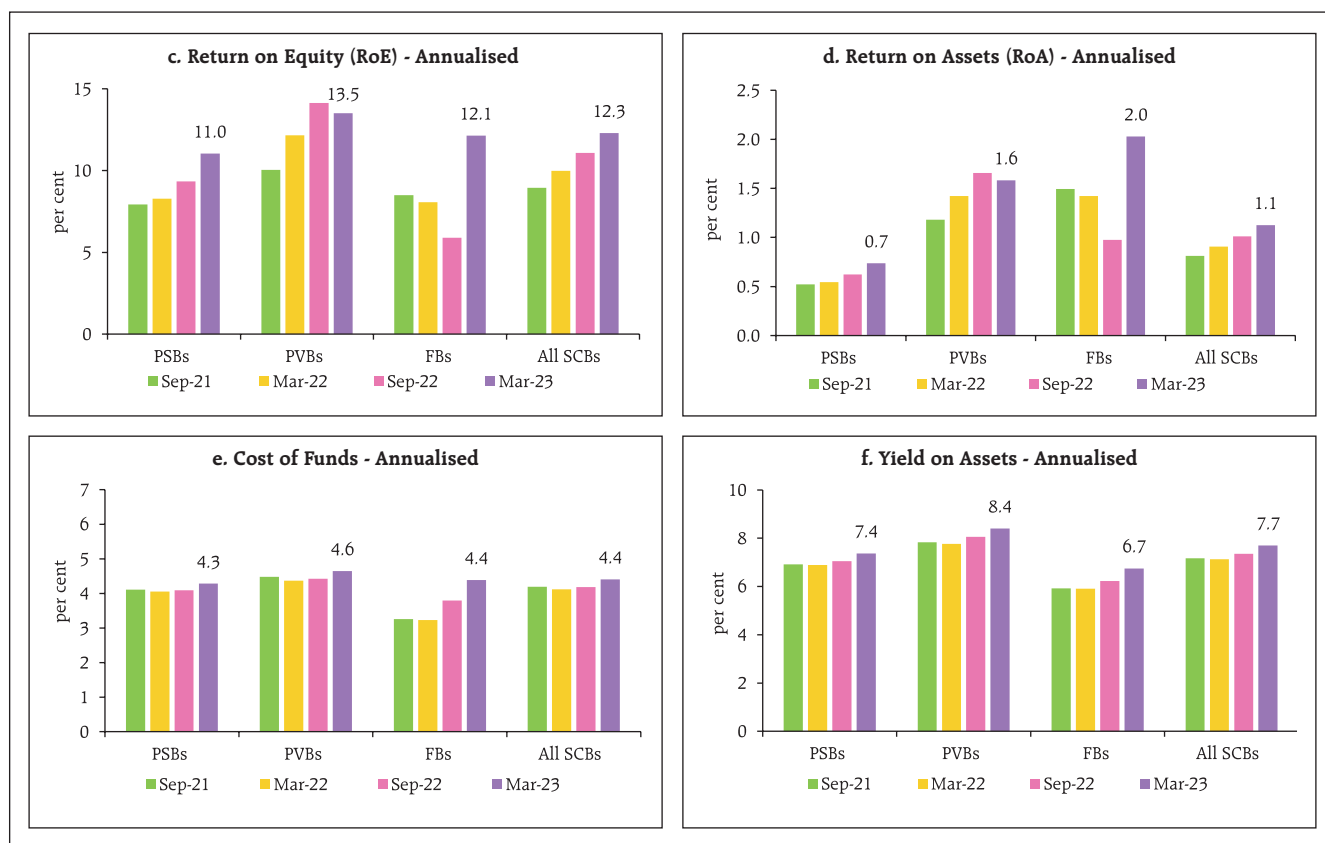
Source: RBI supervisory returns and staff calculations.

Chart 2.6: Select Performance Indicators of SCBs (Contd.)



¹⁰ Tier I leverage ratio is the ratio of Tier I capital to total exposure.

Chart 2.6: Select Performance Indicators of SCBs (Concl.)



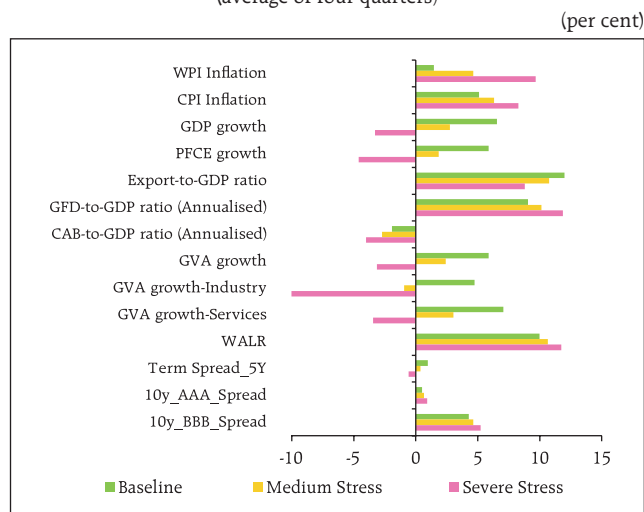
Source: RBI supervisory returns and staff calculations.

2022-23 (Chart 2.6 e). The increase in interest income improved the yield on assets (Chart 2.6 f).

II.1.6 Resilience – Macro Stress Tests

2.13 Macro stress tests are performed to assess the resilience of SCBs’ balance sheets to unforeseen shocks emanating from the macroeconomic environment. These tests attempt to assess capital ratios over a one-year horizon under a baseline and two adverse¹¹ (medium and severe) scenarios. The baseline scenario is derived from the projected values of macro variables. The medium and severe adverse scenarios are arrived at by applying 0.25 to one standard deviation (SD) shocks and 1.25 to two SD shocks, respectively, to the macroeconomic variables, increasing the shocks sequentially by 25 basis points in each quarter (Chart 2.7).

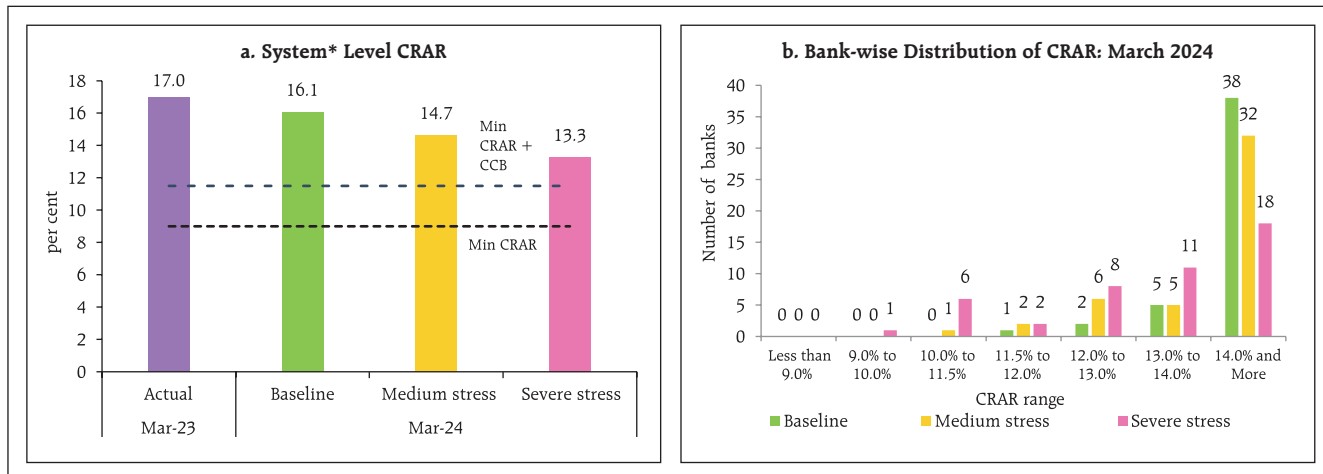
Chart 2.7: Macro Scenario Assumptions for 2023-24 (average of four quarters)



Source: RBI staff calculations.

¹¹ The adverse scenarios are stringent conservative assessments under hypothetical adverse economic conditions and model outcomes should not be interpreted as forecasts.

Chart 2.8: CRAR Projections



* For a system of 46 select banks.

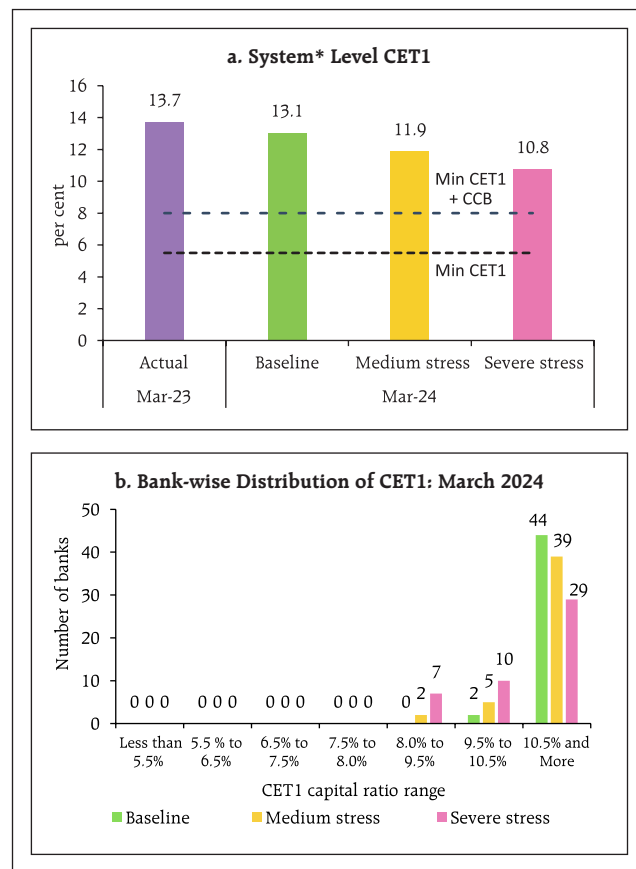
Note: The capital projection is made under a conservative assumption of minimum profit transfer to capital reserves at 25 per cent for profit making SCBs. It does not take into account any capital infusion by stakeholders.

Source: RBI supervisory returns and staff calculations.

2.14 Stress test results reveal that SCBs are well capitalised and capable of absorbing macroeconomic shocks over a one-year horizon even in the absence of any further capital infusion. Under the baseline scenario, the aggregate CRAR of 46 major banks is projected to slip from 17.0 per cent in March 2023 to 16.1 per cent by March 2024. It may go down to 14.7 per cent in the medium stress scenario and to 13.3 per cent under the severe stress scenario by March 2024, remaining above the minimum capital requirement including the capital conservation buffer (CCB) (11.5 per cent) (Chart 2.8 a). None of the 46 SCBs would breach the minimum capital requirement of 9 per cent in the next one year, even in a severely stressed situation, although 7 SCBs may fall short of the minimum capital inclusive of the CCB (Chart 2.8 b).

2.15 The common equity Tier I (CET1) capital ratio of the select 46 SCBs may decline from 13.7 per cent in March 2023 to 13.1 per cent by March 2024 under the baseline scenario (Chart 2.9 a). Even in a severely stressed macroeconomic environment, the aggregate CET1 capital ratio would deplete by 290 basis points only, which would not breach the minimum regulatory norms. Furthermore, all the banks would

Chart 2.9: Projection of CET1 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.

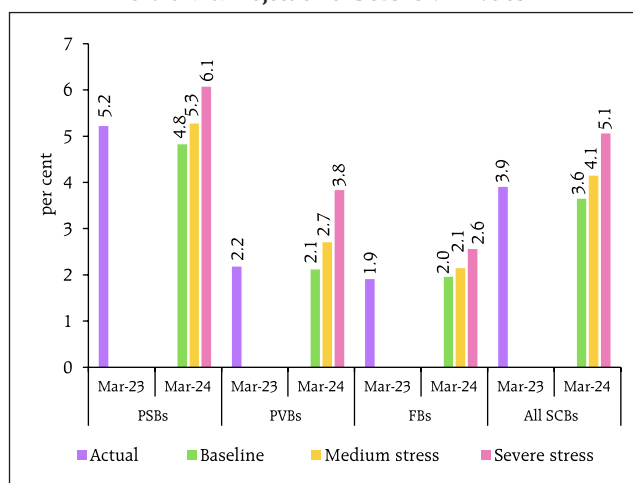
Source: RBI supervisory returns and staff calculations.

be able to meet the minimum regulatory CET1 capital ratio of 8.0 per cent (including the CCB) over the next one year under the severe stress scenario (Chart 2.9 b).

2.16 As per the stress test results, the GNPA ratio of all SCBs may improve to 3.6 per cent by March 2024 under the baseline scenario (Chart 2.10). If, however, the macroeconomic environment worsens to a medium or severe stress scenario, the ratio may rise to 4.1 per cent and 5.1 per cent, respectively. At bank group level, the GNPA ratios of PSBs may swell from 5.2 per cent in March 2023 to 6.1 per cent in March 2024 under the severe stress scenario, whereas it may go up from 2.2 per cent to 3.8 per cent for PVBs and from 1.9 per cent to 2.6 per cent for Foreign Banks (FBs).

2.17 High inflation coupled with rise in borrowing costs adversely impacts finances of households and their loan repayment capacity, which can have implications for lending banks. Identifying different measures of risks using individual home

Chart 2.10: Projection of SCBs' GNPA Ratios



Note: GNPA ratios are projected using two complementary econometric models—multivariate regression and vector autoregression (VAR); the resulting GNPA ratios are averaged.

Source: RBI supervisory returns and staff calculations.

loan data, it is found that a twin shock in the form of a simultaneous increase in inflation and lending rates can put even households with sustainable repayment capacity at risk and double the loans-at-risk (LaR) (Box 2.1).

Box 2.1: Financial Margin Framework for the Household Sector

The ratio of household debt to gross domestic product measures household indebtedness at the aggregate level and does not factor in household wealth across income groups and provides no information on distribution of debt. Accordingly, a more granular assessment of risk from household debt is warranted. The June 2022 issue of the FSR presented the results of a sensitivity analysis of the impact of a fall in housing prices on the capital of banks, using data from the Reserve Bank's quarterly residential asset price monitoring survey (RAPMS). Using the same data, indicators of the equated monthly instalment (EMI)-to-income ratio (EIR) and financial margin have been compiled and repayment capacity of households in different income buckets is evaluated to

get a more accurate insight into lenders' exposure to the household sector.

The RAPMS collects data on fresh home loans disbursed across select cities on a quarterly basis since 2009. Taking into account these data till the latest round (50th round pertaining to Q4:2022-23) collected from 11 public sector banks (PSBs) and 9 private sector banks (PVBs) covering around twenty lakh housing loan accounts and representing around 15 per cent of the active housing loan accounts and 35 per cent of the outstanding housing loan amount of the banking sector,^{12 13} it is observed that in March 2023, the largest share of home loans (more than 40 per cent) was owed by households in the top 20

(Contd.)

¹² In comparison, a similar study done by Bank Negara Malaysia covered personal loans as well, that represented about 20 per cent of the total household debt.

¹³ Source Basic Statistical Returns-1, Database on Indian Economy.

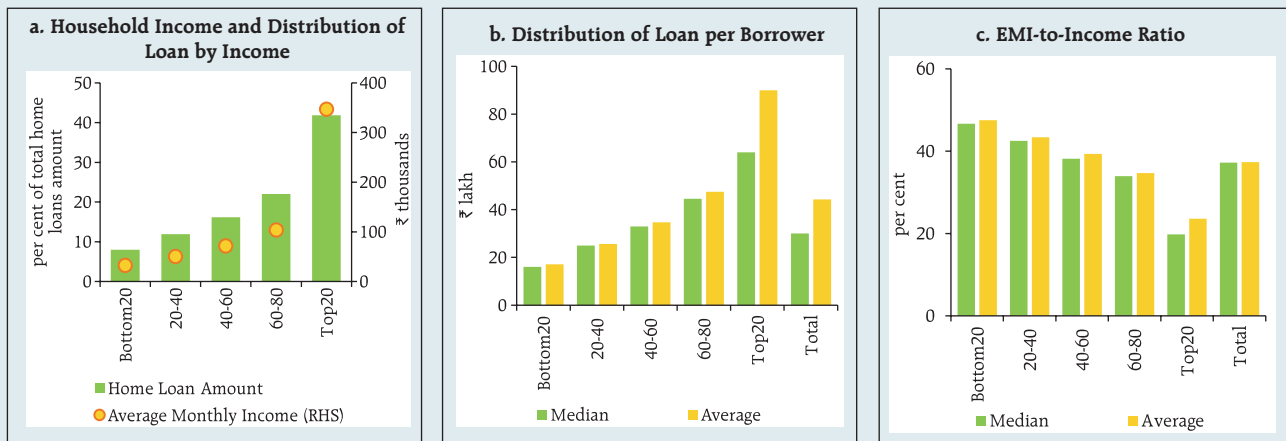
per cent income bucket¹⁴ (Chart 1a). The average income of the households in this bucket is more than 12 times of the bottom 20 per cent, while the average loan size is more than 5 times (Chart 1b). As a result, the EMI-to-net income ratio improves with income (Chart 1c). Households in the lower buckets with thinner buffers are more likely to face difficulty in servicing their debts in the event of interest rate shock and/or expenditure shock.

A household's financial margin is defined as income net of estimated taxes, EMI on the housing loan and expenditure on basic necessities (Diagram 1). Households with a negative financial margin are likely

to face acute financial difficulties and may miss out on their EMIs. A rise in interest rates or rise in prices or both further accentuates their plight. Such loans are said to be at risk – the number of such loans (in per cent) and the share of their total outstanding loan amount are termed as loan-at-risk (LaR) and debt-at-risk (DaR), respectively, which are used to measure potential risk.

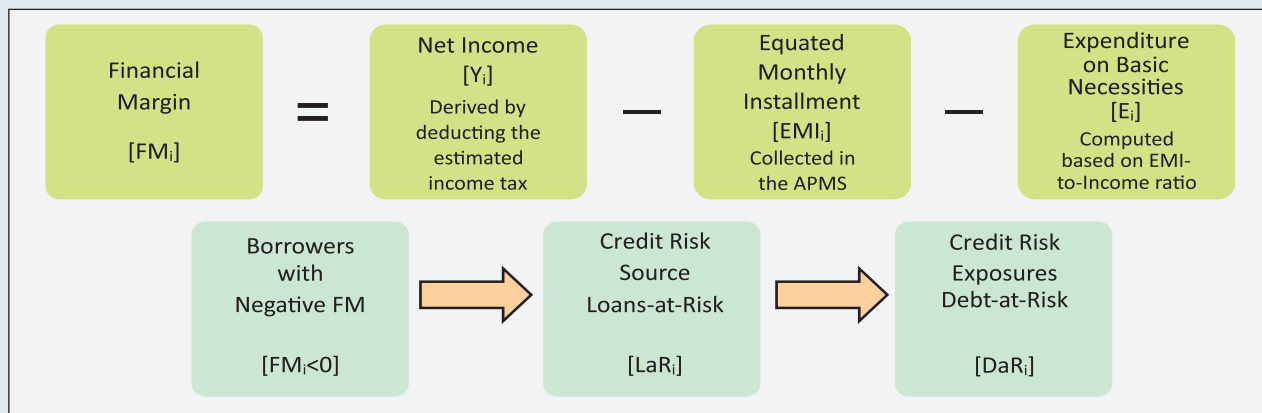
The estimate of LaR in this analysis does not include savings or liquid financial assets, which can be put to use at the time of financial crunch. This is consistent with the methodology adopted for sensitivity analysis, which assumes no room for buffers or policy intervention. Also,

Chart 1: Home Loans - Distribution



Source: RAPMS and staff calculations.

Diagram 1: Credit Risk Using Financial Margins



(Contd.)

¹⁴ Households are bucketed based on income net of tax. Only households falling in the tax bracket have been considered.
 Bottom 20 per cent group : Households with monthly income ₹20,001-₹42,000
 20-40 per cent group : Households with monthly income ₹42,001-₹60,000
 40-60 per cent group : Households with monthly income ₹60,001-₹85,000
 60-80 per cent group : Households with monthly income ₹85,001-₹1,40,000
 80-100 per cent group : Households with monthly income > ₹1,40,000

no change in salary has been taken into account (which is likely to overstate the numbers even further) and proceeds from selling the collateral (which is the property itself) is not taken into account; hence DaR is the sum of the entire principal outstanding of all the LaR.

Expenditure on Basic Necessities

It is assumed that households in same income bucket have similar spending habits, which is inversely proportional to the EIR. Households in lower buckets where basic expenditure takes up a larger part of the income will have less disposable income for their EMI. Conversely, in upper buckets, basic expenditure takes up less proportion of the net income leaving a bigger disposable income for payment of EMI. Hence, for each income bucket *i*:

$$\text{Expenditure on basic necessities}_i \propto 1/EIR_i ; i = 1 \text{ to } 5$$

Expenditure on basic necessities is calculated by using the above relationship backwards. First, the expenditure on basic necessities for the 'bottom 20' bucket is calculated as the mean of the disposable income (net income minus EMI) in that bucket. This expenditure is assumed to be the lower bound. For higher buckets, the expenditure on basic necessities is calculated by multiplying this value by the ratio of EIR of 'bottom 20' bucket to EIR of the bucket, giving us the identity:

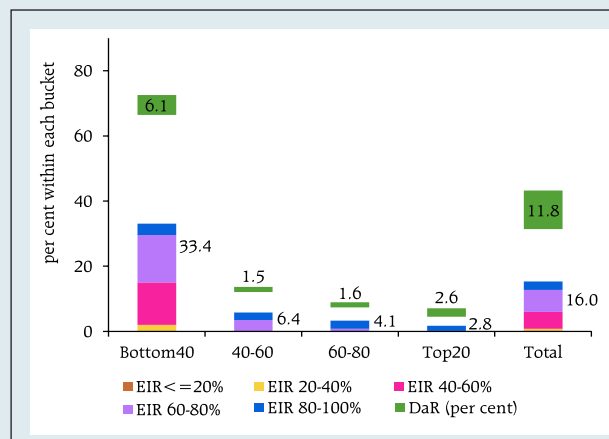
$$\text{Expenditure on basic necessities}_i = \frac{\text{mean}_{\text{bottom } 20} (\text{net income}_j - \text{EMI}_j) \times EIR_{\text{bottom } 20}}{EIR_i}$$

where *i* = 1 to 5 and *j* ∈ loan

At the outset, 16.0 per cent of the total loans covered in the analysis had negative financial margin (Chart 2). Households in the bottom 40 per cent income bucket had the highest share of borrowers with negative financial margin, i.e., around 33.4 per cent, which decreased substantially to around 6.4 per cent in the next income bucket of 40-60 per cent. The DaR for the bottom 40 per cent comes to around 6.1 per cent of the total debt. On including the 40-60 per cent bucket, it rises to 7.6 per cent of the total debt.

As expected, it is seen that households with EIR of more than 60 per cent are more at risk of a negative financial

Chart 2: Distribution of Households with Negative Financial Margin

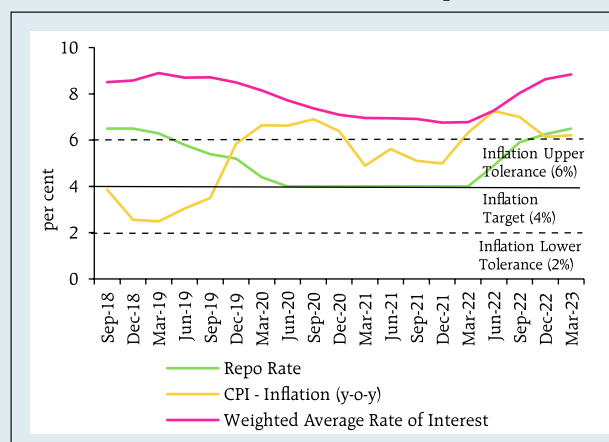


Source: RAPMS and staff calculations

margin although in the lowest income bucket, negative margins are observed in EIR levels of 40-60 per cent as well.

High inflation increases the expenditure on basic necessities, and the ensuing tightening monetary policy cycle increases the EMI, producing a significant impact on the financial margins of households. In the Indian context, inflation has been on an upward trend since December 2018, peaking at 7.3 per cent in June 2022 quarter. The repo rate, which trended downwards since the December 2018 quarter and remained stable at 4 per cent during June 2020 quarter to April 2022, has witnessed an upward swing thereafter, rising 250 basis points (bps) (Chart 3). The weighted average rate of interest¹⁵ of fresh home loans calculated for every round of the RAPMS shows that this simultaneous rise

Chart 3: Trends in Inflation and Repo Rate



Source: RAPMS and staff calculations

(Contd.)

¹⁵ Calculated as weighted average of the rates of interest with loan size as weights.

in inflation and lending rate has had a significant impact on the financial margins of households. On adjusting the expenditure on basic necessities with the current consumer price index (CPI) and recalculating the EMI using the rate of interest calculated from the latest round of the RAPMS, the number of loans with a negative financial margin almost doubled, taking the figure to 31.6 per cent (Chart 4). The increase was observed across all income buckets. Even the DaR for the bottom 40 per cent income bucket increased substantially to around 10.8 per cent of the total loan.

A noteworthy finding here is that due to the coupling effect of inflation and rate increases, even the households with sustainable levels of EIR (20-60 per cent) are at a risk of having negative margins. Another cause for concern is the significant impact it can have on banks' capital. While the capital-to-risk weighted assets ratio (CRAR) of the sample banks remained above the 9 per cent threshold when inflation and rate rise were not accounted for, CRAR of two banks with sizable housing loan portfolios fell below the threshold level.

Sensitivity analysis is conducted under three scenarios. Under scenario 1, the rate of inflation is assumed to be at the upper tolerance level of 6 per cent with a possibility of a rate hike of 25 basis points (bps). In scenario 2, the rate of inflation is 7 per cent with a rate hike of 50 bps. In the more extreme scenario 3, the rate of inflation is 7.5 per cent and rate hike is 75 bps.

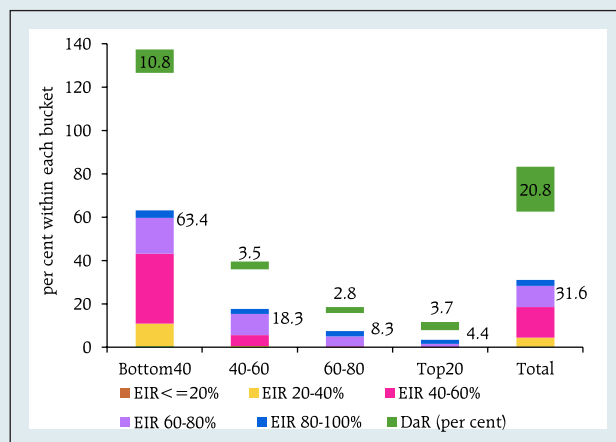
The results indicate up to 9 percentage points increase in LaR and a consequent increase of 8 percentage points in DaR under various scenarios. At an overall level, however, these losses have a marginal impact of about 80 bps on the overall CRAR of the sample banks. At an individual bank level, the impact is negligible with no additional banks failing (Chart 5).

References:

Bank Negara Malaysia (2019). Financial Stability Review 2H 2019.

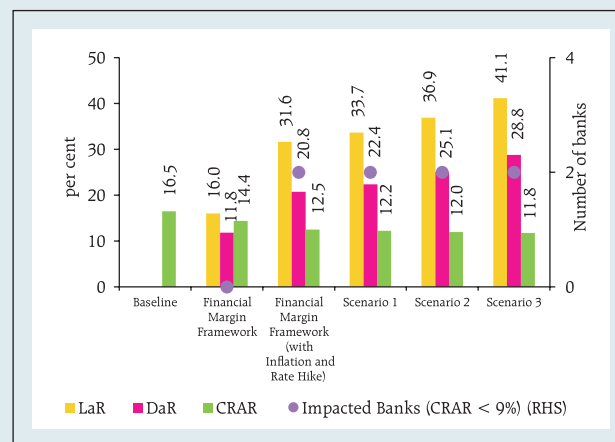
Reserve Bank of India (2022). Financial Stability Report, June 2022.

Chart 4: Distribution of Households with Negative Financial Margin- Including Inflation and Rate Hikes



Source: RAPMS and staff calculations

Chart 5: Sensitivity Analysis - Inflation and Rate Hikes



Source: RBI supervisory returns and staff calculations.

II.1.7 Sensitivity Analysis¹⁶

2.18 Top-down¹⁷ sensitivity analysis involving several single-factor shocks to assess the

vulnerabilities of SCBs to simulated credit, interest rate, equity price and liquidity risks under various stress scenarios¹⁸ is carried out in this sub-section.

¹⁶ Under macro stress tests, the shocks are in terms of adverse macroeconomic conditions, while in sensitivity analyses, shocks are applied to single factors like GNPA, 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.

¹⁷ Top-down stress tests are based on specific scenarios and on aggregate bank-wise data.

¹⁸ 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.

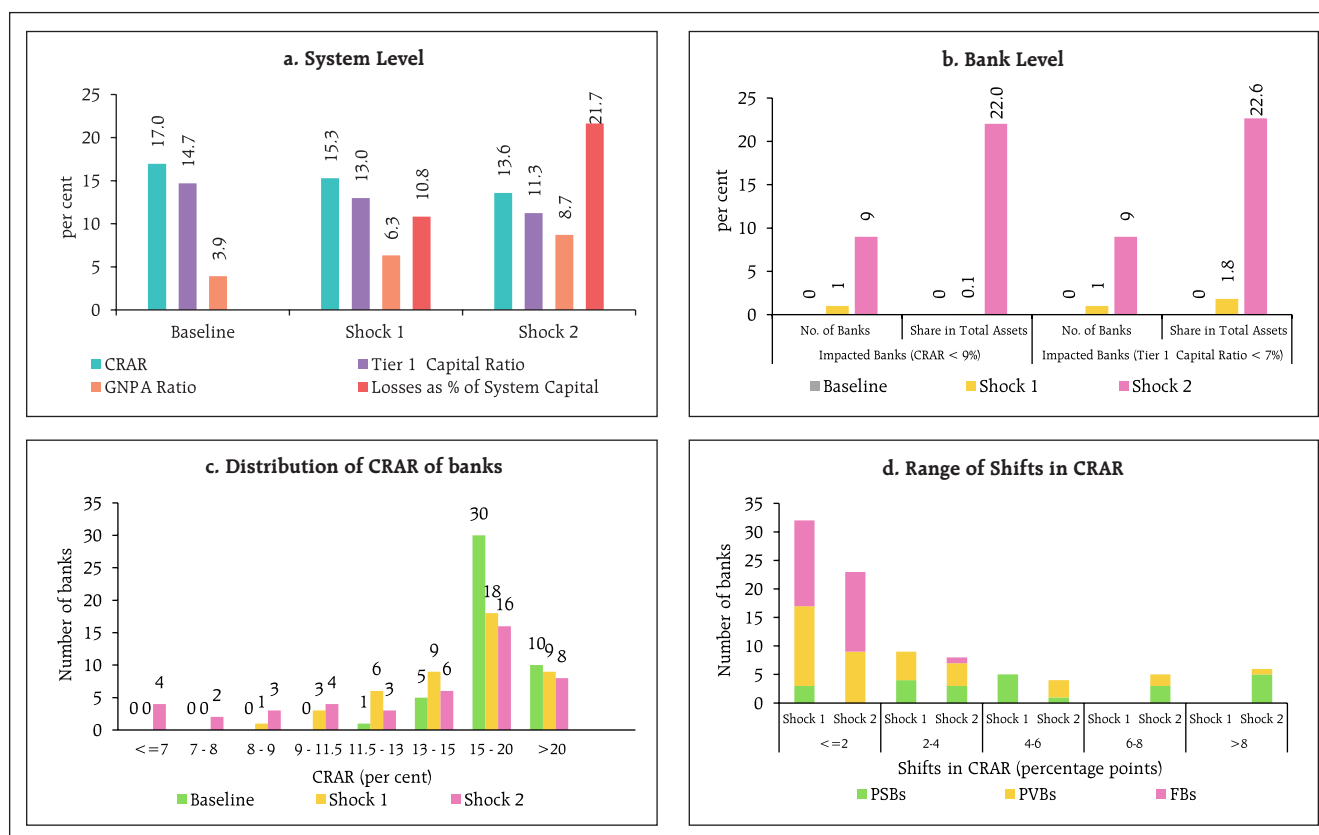
a. Credit Risk

2.19 Credit risk sensitivity has been analysed under two scenarios wherein the system-level GNPA ratio is assumed to rise from its prevailing level by (i) one SD¹⁹; and (ii) two SDs, in a quarter. Under a severe shock of two SDs (a) the aggregate GNPA ratio of 46 select SCBs moves up from 3.9 per cent to 8.7 per cent; (b) the system-level CRAR depletes by 340 bps from 17 per cent to 13.6 per cent; and (c) the Tier 1 capital ratio goes down from 14.7 per cent to 11.3 per cent, well above the respective regulatory minimum levels. The system-level capital impairment could be 21.7 per cent in this case (Chart 2.11 a). The reverse stress test shows that a shock of 6 SDs would be required to

bring down the system-level CRAR to the regulatory minimum of 9 per cent. A shock of 3.3 SDs, however, can bring down the system-level CRAR below 11.5 per cent, which is the regulatory minimum CRAR, inclusive of the CCB.

2.20 Bank-level stress test results show that under the severe (two SD) shock scenario, nine banks with a share of 22.0 per cent of SCBs' total assets may fail to maintain the regulatory minimum level of CRAR (Chart 2.11 b). In such a scenario, the CRAR would fall below 7 per cent in case of four banks (Chart 2.11 c) and six banks would record a decline of over eight percentage points in the CRAR. In general, PVBs and FBs would face lower erosion in CRAR than PSBs under both scenarios (Chart 2.11 d).

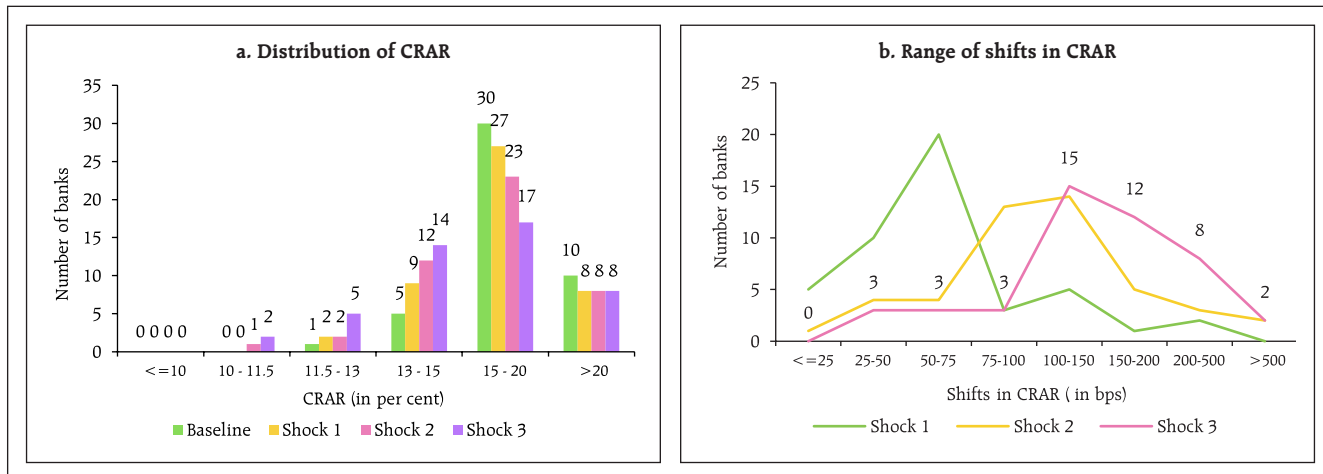
Chart 2.11: Credit Risk - Shocks and Outcomes



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.

¹⁹ The SD of the GNPA ratio is estimated by using quarterly data for the last 10 years. One SD shock approximates a 61.2 per cent increase in the level of GNPA ratio.

Chart 2.12: Credit Concentration Risk: Individual Borrowers – Exposure



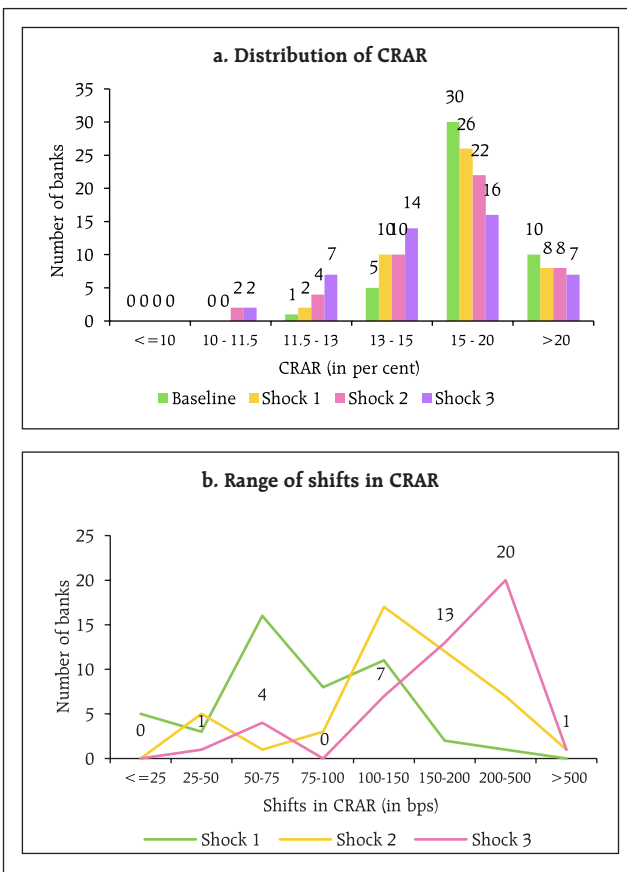
Note: For a system of select 46 SCBs.
 Shock 1: Topmost individual borrower fails to meet payment commitments.
 Shock 2: Top 2 individual borrowers fail to meet their payment commitments.
 Shock 3: Top 3 individual borrowers fail to meet their payment commitments.
Source: RBI supervisory returns and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

b. Credit Concentration Risk

2.21 Stress tests on banks' credit concentration – considering top individual borrowers according to their standard exposures – show that in the extreme scenario of the top three individual borrowers of respective banks failing to repay²⁰, no bank would face a situation of a drop in CRAR below the regulatory requirement of 9 per cent, although two banks would see a decline in CRAR below the regulatory minimum inclusive of the CCB (Chart 2.12 a). In this extreme stress case, ten banks would experience a fall of more than two percentage points in their CRARs (Chart 2.12 b).

2.22 Under the extreme scenario of the top three group borrowers in the standard category failing to repay²¹, CRARs of all banks would remain above 9 per cent, but two banks may fail to meet the regulatory minimum inclusive of the CCB (Chart 2.13 a) and one bank may face a decline of more than five percentage points in CRAR (Chart 2.13 b).

Chart 2.13: Credit Concentration Risk: Group Borrowers – Exposure

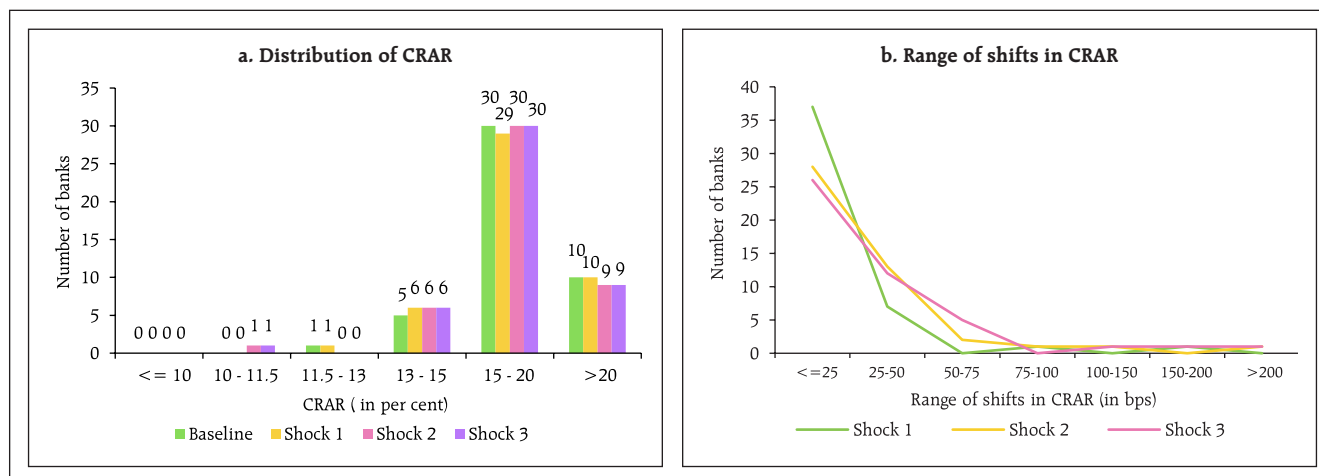


Note: For a system of select 46 SCBs.
 Shock 1: The top 1 group borrower fails to meet payment commitments.
 Shock 2: The top 2 group borrowers fail to meet payment commitments.
 Shock 3: The top 3 group borrowers fail to meet payment commitments.
Source: RBI supervisory returns and staff calculations.

²⁰ In the case of default, the borrower in the standard category is considered to move to the sub-standard category.

²¹ In the case of default, the group borrower in the standard category is considered to move to the sub-standard category.

Chart 2.14: 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.

2.23 In the extreme scenario of the top three individual stressed borrowers of respective banks failing to repay²², majority of the banks would remain resilient, with their CRARs depleting by mere 25 bps or lower (Chart 2.14 a and b).

c. Sectoral Credit Risk

2.24 Shocks applied on the basis of volatility of industry sub-sector wise GNPA ratios indicate varying magnitudes of increase in GNPA across different sub-sectors. By and large, sectoral credit risk remains muted - a two SD shock to basic metals and energy sub-sectors would reduce the system-level CRAR by merely 16 and 15 bps respectively, whereas the impact of the shocks on the rest of the sub-sectors is negligible (Table 2.2).

d. Interest Rate Risk

2.25 The market value of investments subject to fair value for the sample of SCBs under review stood

Table 2.2: Decline in System Level CRAR
 (basis points, in descending order for top 10 most sensitive sectors)

	1 SD	2 SD
Basic Metal and Metal Products (471 per cent)	9	16
Infrastructure - Energy (246 per cent)	8	15
Infrastructure - Transport (71 per cent)	3	6
All Engineering (126 per cent)	2	5
Textiles (67 per cent)	2	4
Construction (48 per cent)	1	3
Vehicles, Vehicle Parts and Transport Equipment (221 per cent)	1	2
Food Processing (35 per cent)	1	2
Infrastructure - Communication (168 per cent)	1	2
Chemicals (85 per cent)	1	2

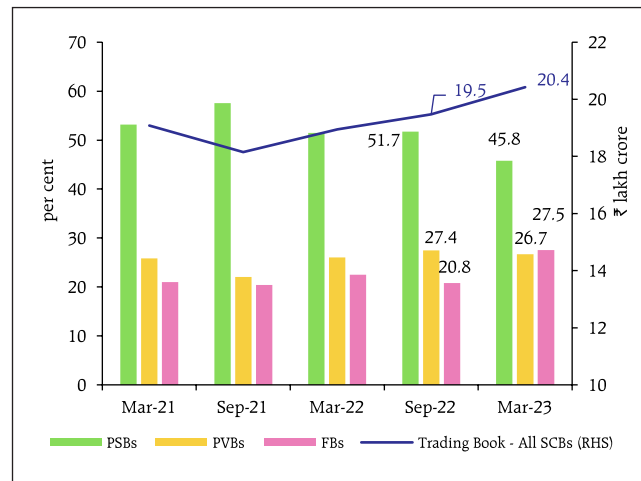
Note: For a system of select 46 SCBs.
 Numbers in parenthesis represent the growth in GNPA of that sub-sector due to 1 SD shock to the sub-sector's GNPA ratio.
Source: RBI supervisory returns and staff calculations.

²² In case of failure, the borrower in sub-standard or restructured category is considered to move to the loss category.

at ₹20.4 lakh crore in March 2023 (Chart 2.15) of which 92.5 per cent were classified as 'available for sale (AFS)' and the remaining were under the 'held for trading (HFT)' category. PSBs' share in the total trading book portfolio of SCBs has been tapering since June 2022 to reach a low of 45.8 per cent in March 2023. Concomitantly, the share of FBs has burgeoned during the same period.

2.26 The sensitivity (PV01²³) of the AFS portfolio has generally eased for PSBs in comparison with their December 2022 position, reflecting reduction in modified duration and size of the portfolio. The sensitivity for PVBs and FBs, however, has increased; in particular, FBs have shown a sharp increase in their PV01. In terms of PV01 curve positioning, the tenor-wise distribution of PSBs' portfolio indicates higher allocation in the 1-5 year and 5-10 year buckets. Around four-fifths of PSBs' AFS portfolio remains in the 1-5 year and 5-10 year buckets. PVBs have built up positions in the less than 1-year and more than 10-year buckets while paring allocations in intermediate buckets. FBs continue to prefer the more than 10-year bucket though they have also increased their holding in the 1-5 year bucket. Although PV01 exposure of FBs in the highest maturity segment remains substantial, it may not be an active contributor to risk as some positioning involves bonds held as cover for hedging derivatives (Table 2.3).

2.27 The interest rate exposure of PVBs and FBs in their HFT portfolios remained higher than that of PSBs, the latter having almost fully squared positions in March 2023 while the PVBs have decreased their sensitivity (PV01) in the HFT portfolio. Both PSBs and PVBs have built up bulk of their positions in the 1-5 year and 5-10 year buckets. FBs have increased the sensitivity of their portfolio by increasing allocation to long-duration securities (more than 10 years) (Table 2.4).

Chart 2.15: Trading Book Portfolio: Bank-group wise


Source: Individual bank submissions and staff calculations.

Table 2.3: Tenor-wise PV01 Distribution of AFS Portfolio

	Total (₹ crore)	Share (in per cent)			
		< 1 year	1-5 year	5-10 year	> 10 years
PSBs	178.7 (193.2)	8.7 (8.9)	37.3 (36.7)	45.2 (44.9)	8.7 (9.5)
PVBs	77.9 (77.5)	16.3 (13.8)	34.1 (37.7)	8.2 (13.4)	41.4 (35.1)
FBs	180.2 (141.1)	3.8 (7.2)	16.9 (15.2)	13.3 (16.7)	66.1 (60.9)

Note: Values in the parentheses indicate December 2022 figures.

Source: Individual bank submissions and staff calculations.

Table 2.4: Tenor-wise PV01 Distribution of HFT portfolio

	Total (₹ crore)	Share (in per cent)			
		< 1 year	1-5 year	5-10 year	> 10 years
PSBs	0.4 (1.5)	6.7 (0.3)	39.6 (20.6)	50.9 (75.7)	2.8 (3.4)
PVBs	13.2 (14.7)	4.0 (3.1)	45.6 (29.6)	42.6 (58.5)	7.8 (8.8)
FBs	27.4 (16.6)	5.6 (1.9)	21.2 (25.2)	11.2 (18.2)	62.0 (54.7)

Note: Values in the brackets indicate December 2022 figures.

Source: Individual bank submissions and staff calculations.

²³ PV01 is a measure of sensitivity of the absolute value of the portfolio to a one basis point change in the interest rate.

2.28 It is assessed that a parallel upward shift of 250 bps in the yield curve would reduce the system level CRAR and CET1 capital ratio by 93 bps each (Table 2.5). At a disaggregated level, six banks would face a situation in which the CRAR will fall below the regulatory minimum (including the CCB).

2.29 As on June 15, 2023 the sovereign yield curve has 'bear flattened', with the short end of the curve moving up sharply *vis-a-vis* its December 2022 position, leading to spread compression.

2.30 The longer end of the yield curve has also moved down by June 15, 2023, from its position in December 2022, facilitated in a large measure by the easing of inflation. The budget announcement of government borrowing programme for 2023-24 in line with expectations further underpinned the downward movement in long-term yields (Chart 2.16).

2.31 The yield curve contains important clues on the likely behaviour of the economy. The flattening of the yield curve and decline in curvature signals that inflation expectations are getting re-anchored after multiple shocks in 2022²⁴ (Table 2.6). In the Indian context, the curvature²⁵ of the yield curve has more information content on future macroeconomic outcomes than the slope²⁶.

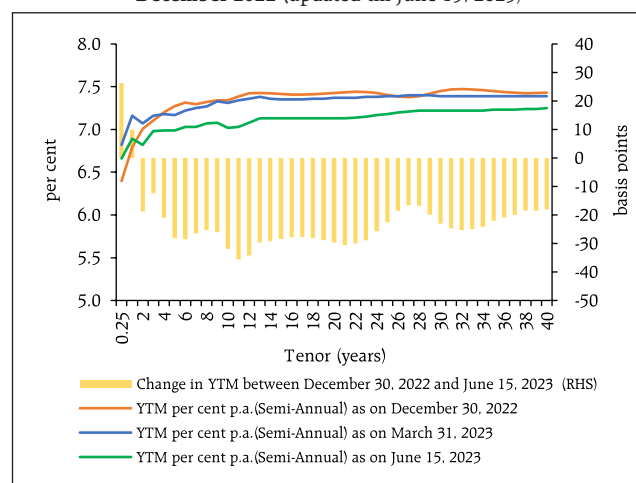
2.32 Trading profits of PSBs and PVBs declined in Q4:2022-23. Trading losses for FBs continued for the ninth consecutive quarter although they decreased from a peak in June 2022. The share of trading profits in net operating income was in single digits for PSBs and PVBs, while the trading loss reduced net operating income for FBs (Table 2.7).

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 (year)	1.9	1.5	1.6	2.3	3.8	2.9	2.3	2.7
Share in total Investments (per cent)	27.8	0.02	28.5	2.6	79.0	15.5	33.0	2.3
Reduction in CRAR/ CET1 (bps)	68		44		464		93	

Source: Individual bank submissions and staff calculations.

Chart 2.16: Yield Curves and Shift in Yields across Tenors since December 2022 (updated till June 15, 2023)



Source: FBIL.

Table 2.6: Curvature of Yield Curve

	December 30, 2022	March 31, 2023	June 15, 2023
Curvature	1.00	0.51	0.38

Source: FBIL and RBI staff calculations.

Table 2.7: OOI - Profit/(Loss) on Securities Trading - All Banks

(in ₹ crore)

	Q2:2022-23	Q3:2022-23	Q4:2022-23
PSBs	2594 (4.6)	4128 (6.8)	4084 (6.5)
PVBs	471 (0.9)	796 (1.3)	358 (0.7)
FBs	-240 (-2.6)	-778 (-8.4)	-641 (-2.8)

Note: Figures in parentheses represent OOI-Profit/(Loss) on Securities Trading as a percentage of Net Operating Income.

Source: RBI Supervisory returns.

²⁴ State of the Economy, Reserve Bank of India Bulletin, May 2023.

²⁵ The curvature is calculated as twice the 14-year yield minus the sum of 30-year and 3-month yields.

²⁶ Patra, M.D., Joice, J., Kushwaha, K.M., and I. Bhattacharyya (2022), "What is the Yield Curve telling us about the Economy?", Reserve Bank of India Bulletin, June.

2.33 PSBs preferred to pare their allocation in G-Secs and other securities eligible for holding in the HTM category while increasing their holdings in state development loans (SDLs) (Chart 2.17). PVBs increased their holding of G-Secs and other securities in the HTM category, while decreasing holding of SDLs.

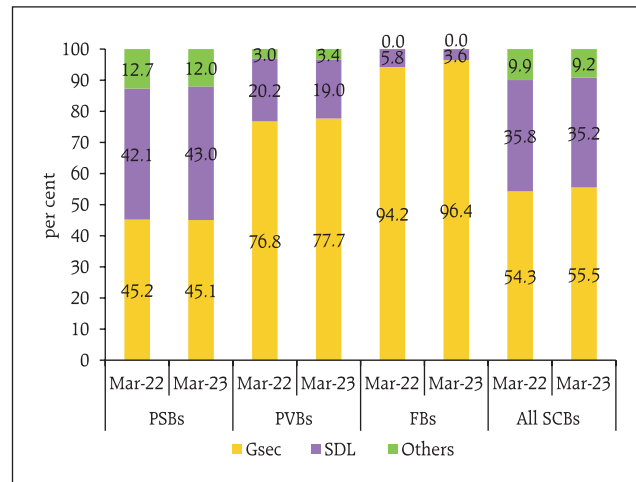
2.34 As interest rates moved up in rapid succession over the past one year, both PSBs and PVBs recorded notional losses across G-Secs and SDLs held in their HTM books. The notional loss in the HTM book of SCBs (PSBs and PVBs) was ₹71,817 crore as at end March 2023 as compared with a notional profit of ₹418 crore as at end March 2022.

2.35 The distribution of unrealised losses across PSBs and PVBs indicates a contrasting picture across bank cohorts. Unrealised losses of PSBs are largely in G-Secs although the proportion of central and state government securities held by them in the HTM portfolio are by and large equal, but for PVBs the losses were distributed largely in line with their proportion of holdings (Chart 2.18).

2.36 If a shock in the form of 250 bps parallel upward shift in the yield curve is applied, the mark-to-market impact on the HTM portfolio of banks, excluding unrealised losses would reduce the system level CRAR 343 bps. In respect of twelve banks, the CRAR would fall below the minimum regulatory requirement (including the CCB) of 11.5 per cent.

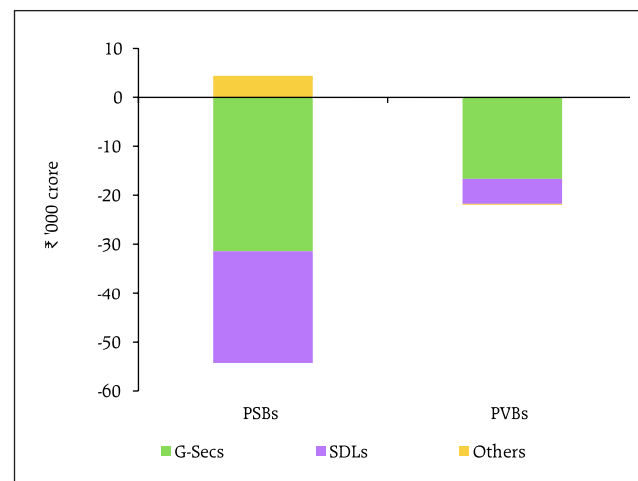
2.37 In March 2023, holdings of statutory liquidity ratio (SLR) securities by PSBs and PVBs in the HTM category amounted to 21.5 per cent and 20.0 per cent, respectively, of their net demand and time liabilities (NDTL), while it stood at 3.8 per cent for FBs. PSBs and PVBs sequentially increased their holdings of SLR securities in the HTM portfolio.

Chart 2.17: HTM Portfolio – Composition



Source: Individual bank submissions and staff calculations.

Chart 2.18: HTM Portfolio – Unrealised Gain / Loss as on March 31, 2023



Source: Individual bank submissions and staff calculations.

2.38 An assessment of the interest rate risk of banks²⁷ using Traditional Gap Analysis (TGA) and Duration Gap Analysis (DGA) is done for rate sensitive global assets, liabilities and off-balance sheet items of banks. TGA for time buckets up to one year, shows that Earnings at Risk (EAR) is positive at 10.8 per cent and 8.8 per cent of NII for PSBs and PVBs, respectively for a 200 bps increase in interest rate. The impact would be marginal for FBs and SFBs in case of a 200 bps increase in interest rate (Table 2.8). The impact of increase in interest rate on earnings is positive as the cumulative gap²⁸ at bank group level was positive as of March 2023.

2.39 DGA²⁹ reveals that PVBs' and FBs' Market Value of Equity (MVE) would reduce marginally in case of an upward movement in interest rate, while that of PSBs would be positively impacted. SFBs' MVE would be particularly weighed down by an upward movement of interest rate (Table 2.9).

e. Equity Price Risk

2.40 As banks have limited capital market exposures owing to regulatory limits, any impact of a possible significant fall in equity prices on banks' CRAR would be limited for the overall system of 46 banks. Under scenarios of 25 per cent, 35 per cent and 55 per cent drop in equity prices, the system level CRAR would reduce by 21 bps, 29 bps and 45 bps, respectively (Chart 2.19).

f. Liquidity Risk

2.41 Liquidity risk analysis aims to capture the impact of any possible run on deposits and increased demand for unutilised portions of sanctioned / committed / guaranteed credit lines. In an extreme scenario of sudden and unexpected withdrawals

Table 2.8: Earnings at Risk - Traditional Gap Analysis - All Banks

Bank Group	Earnings at Risk (till one year) as percentage of NII	
	100 bps increase	200 bps increase
PSBs	5.4	10.8
PVBs	4.4	8.8
FBs	0.7	1.5
SFBs	1.1	2.2

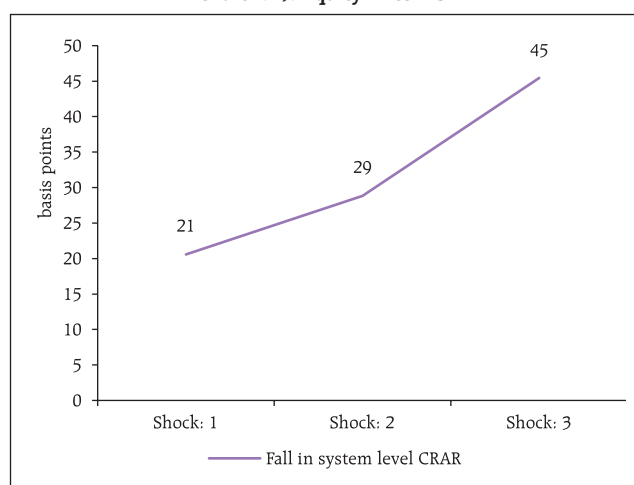
Source: RBI Supervisory returns and staff calculations.

Table 2.9: Market Value of Equity - Duration Gap Analysis - All Banks

Bank Group	Market Value of Equity as percentage of Equity	
	100 bps increase	200 bps increase
PSBs	1.0	2.0
PVBs	-0.5	-1.0
FBs	-0.9	-1.9
SFBs	-4.6	-9.2

Source: RBI Supervisory returns and staff calculations.

Chart 2.19: 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.

²⁷ In terms of circular on "Guidelines on Banks' Asset Liability Management Framework – Interest Rate Risk" dated November 04, 2010.

²⁸ Gap refers to Rate Sensitive Assets (RSA) minus Rate Sensitive Liabilities (RSL). Advances, HTM investments, swaps/forex swaps, reverse repos are major contributors to RSA whereas deposits, swaps /forex swaps and repos are observed to be the main elements under RSL.

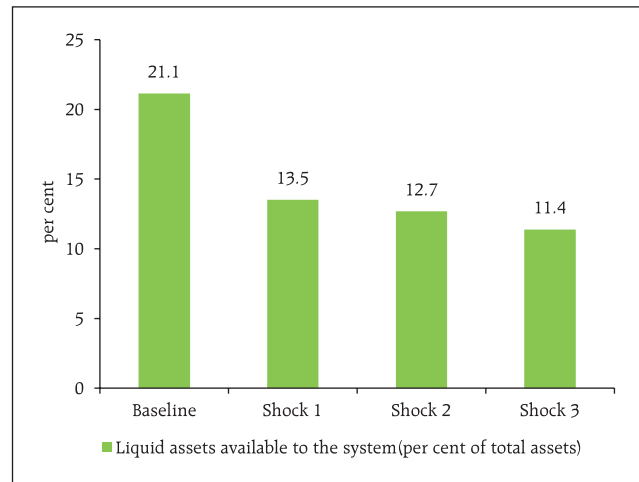
²⁹ The DGA involves bucketing of all RSA and RSL as per residual maturity/ re-pricing dates in various time bands and computing the Modified Duration Gap (MDG).

of around 15 per cent of un-insured deposits along with the utilisation of 75 per cent of unutilised portion of committed credit lines, liquid assets³⁰ at the system-level would decrease from 21.1 per cent of total assets to 11.4 per cent (Chart 2.20).

II.1.8 Bottom-up stress tests - Credit, Market and Liquidity Risk

2.42 A suite of bottom-up stress tests (sensitivity analyses) for select banks³¹ for end March 2023 position affirmed the resilience of banks to multiple types and magnitude of shocks, broadly in line with the top-down stress test results. All the sample banks covered meet the regulatory minimum capital requirements under diverse shock scenarios. Under a credit risk shock of 50 per cent rise in NPAs as well as under the impact of an interest rate shock of a parallel upward shift in the sovereign yield curve by 2.5 percentage points on the banking book, two banks may breach the regulatory minimum CRAR inclusive of the CCB (Chart 2.21).

Chart 2.20: Liquidity Risk – Shocks and Outcomes

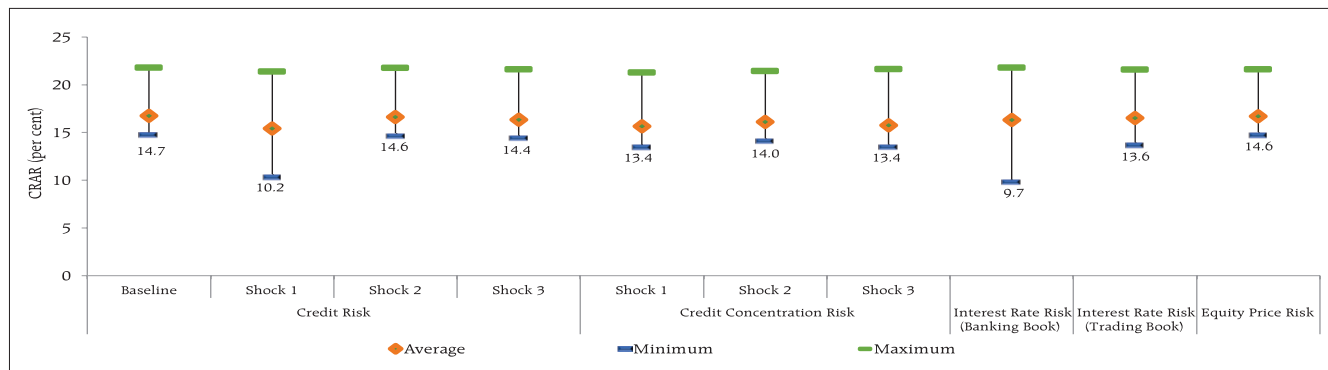


Note: Liquidity shocks include a demand for 75 per cent of the committed credit lines (comprising unutilised portions of sanctioned working capital limits as well as credit commitments) and withdrawal of a portion of un-insured deposits as given below:

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

Source: RBI supervisory returns and staff calculations.

Chart 2.21: Bottom-up stress tests: Credit and Market Risks – Impact on CRAR



Credit Risk: Gross Credit	Shock1	NPAs increase by 50 per cent
	Shock2	30 per cent of restructured assets become NPAs
	Shock3	5 percentage points increase in NPAs in each top 5 sector / industry
Credit Risk: Concentration	Shock1	The top three individual borrowers default into sub-standard category
	Shock2	The largest group defaults into sub-standard category
	Shock3	The largest borrower of each of top five industries/ sectors defaults into sub-standard category
Interest Rate Risk – Banking Book	Shock	Parallel upward shift in INR yield curve by 2.5 percentage points
Interest Rate Risk – Trading Book	Shock	Parallel upward shift in INR yield curve by 2.5 percentage points
Equity Price Risk	Shock	Equity price index drops by 40 per cent

Source: Select banks (Bottom-up stress tests).

³⁰ Liquid assets were computed as cash reserves in excess of required CRR, excess SLR investments, SLR investments at 2 per cent of NDTL (under MSF) (following the Circular DOR.RET.REC.73/12.01.001/2021-22 dated December 10, 2021) and additional SLR investments at 16 per cent of NDTL (following the Circular DOR.LRG.REC.No.19/21.04.098/2022-23 dated April 18, 2022).

³¹ Stress tests on various shocks were conducted by a sample of 22 select banks.

2.43 The bottom-up stress test for liquidity risk reveals that liquid assets ratios³² of all the sample banks would remain positive under different shock scenarios, emphasising the adequacy of their high quality liquid assets (HQLAs) to withstand any plausible liquidity pressure from sudden and unexpected withdrawal of deposits. Under the scenarios of (i) a 10 per cent deposit run-off in 1-2 days and (ii) a 3 per cent deposit run-off daily for five consecutive days, the average liquid asset ratios of the select banks would drop from 24.1 per cent to 17.7 per cent and 14.1 per cent, respectively (Chart 2.22).

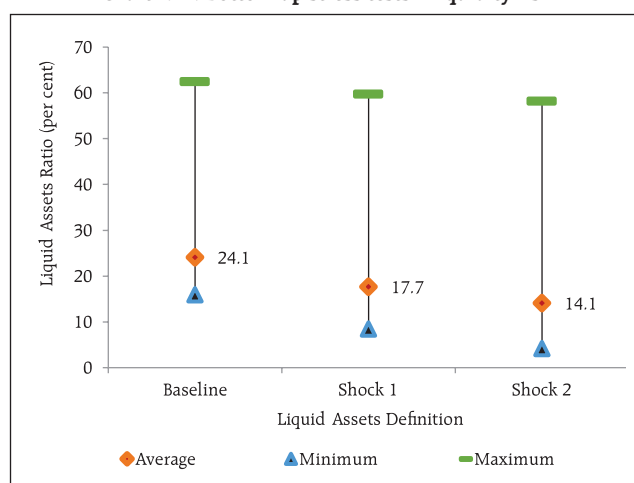
II.1.9 Bottom-up Stress Tests: Derivatives Portfolio

2.44 A series of bottom-up stress tests (sensitivity analyses) are undertaken on derivative portfolios of select banks³³ with the reference date of March 31, 2023. Four separate shocks on interest and foreign exchange rates are simulated. While the shocks on interest rates range from 100 to 250 basis points, shocks of 20 per cent appreciation/ depreciation are assumed in the case of foreign exchange rates. The stress tests are carried out as individual shocks on a stand-alone basis.

2.45 Most of the FBs have significantly negative net MTM positions (as a proportion to CET1 capital) in March 2023, whereas the impact is, by and large, muted for PSBs and PVBs. For the overall system, the extent of negative MTM position increased slightly in Q4:2022-23 (Chart 2.23).

2.46 On an average, the derivative portfolios of the sample banks are positioned to gain from an interest rate rise and *vice versa*. Potential MTM gains from a rise in interest rates increased in March 2023 relative to September 2022. Contrary to interest rate shocks, sample banks are positioned to make

Chart 2.22: Bottom-up stress tests - Liquidity risk



Liquid Assets Definitions

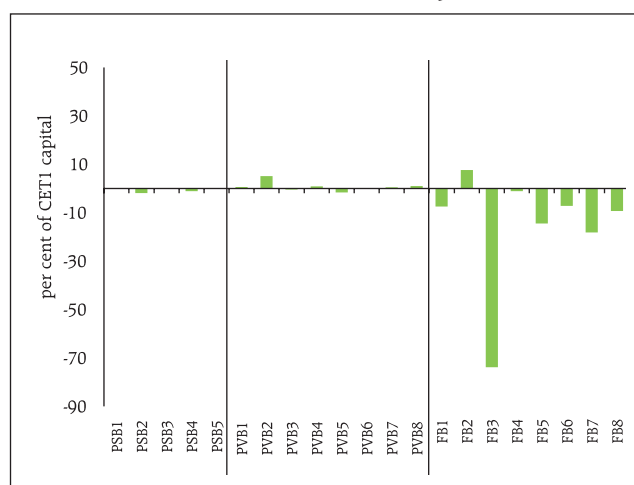
1	High Quality Liquid Assets (HQLAs) as per Liquidity Coverage Ratio (LCR) guidelines.
---	--

Liquidity Shocks

Shock1	10 per cent deposits withdrawal (cumulative) during a short period (say 1 or 2 days)
Shock2	3 per cent deposits withdrawal (each day) within 5 days

Source: Select banks (Bottom-up stress tests).

Chart 2.23: MTM of Total Derivatives Portfolio of Select Banks – March 2023



Note: PSB: Public sector bank, PVB: Private sector bank, FB: Foreign bank.

Source: Sample banks (Bottom-up stress tests on derivatives portfolio).

³² Liquid Assets Ratio = $\frac{\text{Liquid Assets}}{\text{Total Assets}} \times 100$.

³³ Stress tests on derivatives portfolios were conducted by a sample of 21 banks, constituting the major active authorised dealers and interest rate swap counterparties. Details of test scenarios are given in Annex 2.

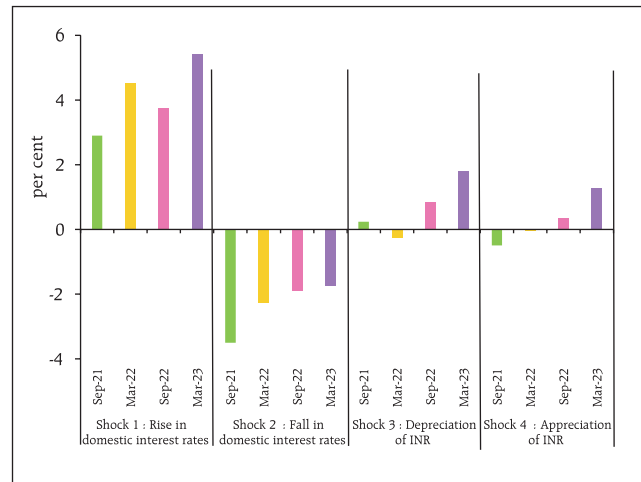
gains from foreign exchange rate shocks (for both appreciation and depreciation) – which is similar to the position in September 2022, except that the potential gains have increased (Chart 2.24).

II.2 Primary (Urban) Cooperative Banks³⁴

2.47 Credit growth (y-o-y) of primary urban cooperative banks (UCBs)³⁵ increased from 3.4 per cent in September 2022 to 5.7 per cent in March 2023 (Chart 2.25 a). Both scheduled UCBs (SUCBs) and non-scheduled UCBs (NSUCBs) contributed to this pick-up, with their credit growth reaching 6.7 per cent and 4.9 per cent, respectively. Priority sector lending (PSL) by both SUCBs and NSUCBs stood at around 65 per cent of their outstanding credit on March 31, 2023 (Chart 2.25 b). The dates to achieve PSL targets of minimum 60, 65 and 75 per cent have been extended upto March 31, 2024, March 31, 2025 and March 31, 2026 respectively³⁶.

2.48 The Reserve Bank has adopted a four-tiered regulatory framework for categorisation of UCBs³⁷, given the heterogeneity in the sector. In March 2023, Tier 4 UCBs (having deposits more than ₹10,000 crore) had a share of 24.2 per cent in total gross loans of UCBs as against a share of 14.5 per cent for Tier 1 UCBs, 27.5 per cent for Tier 2 UCBs and 33.7 per cent for Tier 3 UCBs.

Chart 2.24: Impact of Shocks on Derivatives Portfolio of Select Banks
(change in net MTM on application of a shock)
(per cent to total capital funds)



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

2.49 The CRAR of UCBs improved marginally in H2:2022-23 to reach 16.5 per cent in March 2023. The CRAR of SUCBs remained stable at around 15 per cent and that of NSUCBs improved from 17.1 per cent to 17.8 per cent (Chart 2.25 c). The tier-wise CRAR of UCBs stands well above the minimum regulatory requirement³⁸, which came into effect from March 31, 2023 (Chart 2.25 d).

³⁴ Data are provisional and based on off-site surveillance (OSS) returns. The data from March 2022 onwards excludes one UCB, which was amalgamated with an SFB.

³⁵ Based on common sample of 1457 UCBs covering over 90 per cent of gross loans extended by UCBs.

³⁶ Priority Sector Lending (PSL) targets / sub-targets and contribution against shortfall in achievement of PSL targets – Primary (Urban) Co-operative Banks (UCBs) - Extension of time (Circular DOR.CRE.REC.18/07.10.002/2023-24 dated June 08, 2023).

³⁷ Revised Regulatory Framework - Categorisation of Urban Co-operative Banks (UCBs) for Regulatory Purposes (Circular DOR. REG. No.84/07.01.000/2022-23 dated December 01, 2022).

The UCBs have been categorised into the following four tiers for regulatory purposes:

Tier 1 - All unit UCBs and salary earners' UCBs (irrespective of deposit size), and all other UCBs having deposits up to ₹100 crore;

Tier 2 - UCBs with deposits more than ₹100 crore and up to ₹1000 crore;

Tier 3 - UCBs with deposits more than ₹1000 crore and up to ₹10,000 crore;

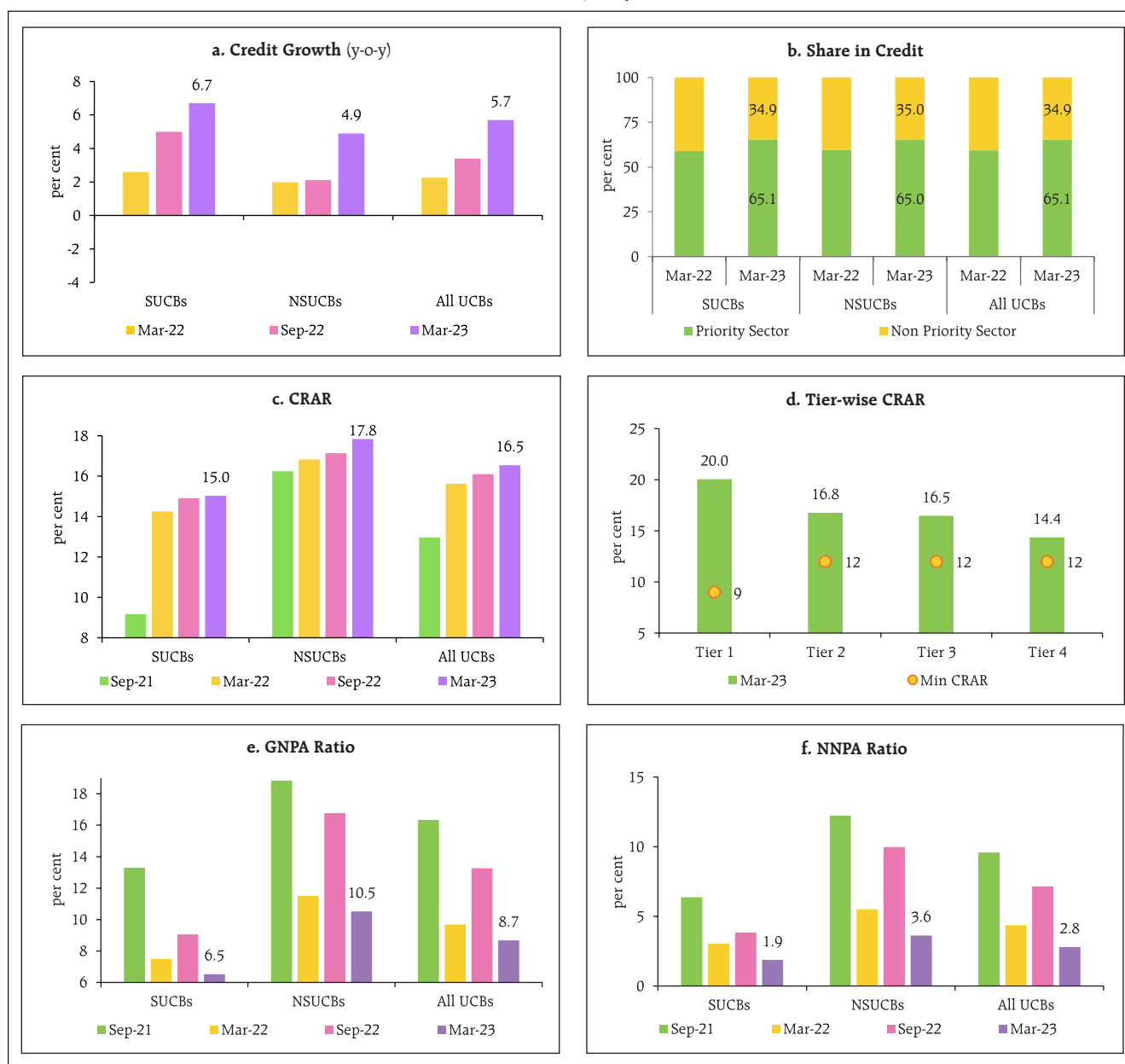
Tier 4 - UCBs with deposits more than ₹10,000 crore.

³⁸ Revised Regulatory Framework for Urban Co-operative Banks (UCBs) – Net Worth and Capital Adequacy (circular DOR.CAP.REC.No.86/09.18.201/2022-23 dated December 01, 2022 and DOR.CAP.REC. No.109/09.18.201/2022-23 dated March 28, 2023).

2.50 After a deterioration in H1:2022-23, GNPA and NNPA ratios of UCBs have improved for both SUCBs and NSUCBs in March 2023 (Charts 2.25 e and f). There was an improvement in the provisioning coverage ratio (PCR) of NSUCBs and SUCBs (Chart 2.25 g). Tier 4 UCBs had the best asset quality with the lowest GNPA ratio and NNPA ratio (Chart 2.25 h).

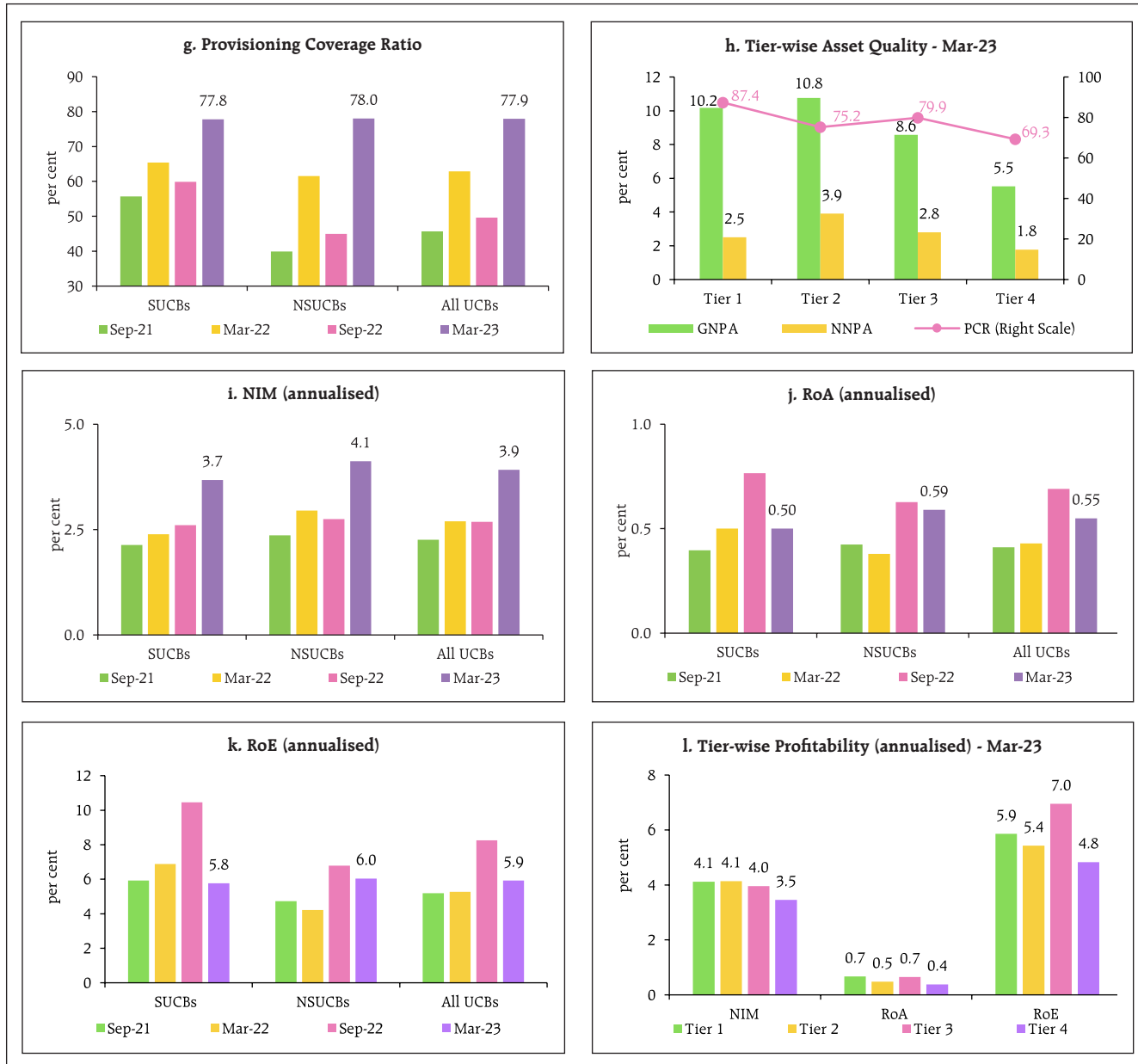
2.51 Profitability of UCBs in terms of RoA and RoE ratios lost pace in H2:2022-23 even as their NIMs increased in March 2023 (Chart 2.25 i, j and k). Tier 2 UCBs had the highest NIM while Tier 1 and Tier 3 UCBs had the highest RoA and RoE, respectively (Chart 2.25 l). Tier 4 UCBs lagged in all profitability parameters.

Chart 2.25: Credit Profile and Asset Quality Indicators of UCBs (Contd.)



Source: RBI supervisory returns and staff calculations.

Chart 2.25: Credit Profile and Asset Quality Indicators of UCBs (Concl'd.)



Source: RBI supervisory returns and staff calculations.

II.2.1 Stress Testing

2.52 Stress tests were conducted on a select set of larger UCBs³⁹ to assess 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 positions as on March 2023.

2.53 The results show that (a) in almost all the five parameters tested, a few UCBs failed even in the baseline scenario; (b) the impact of credit default

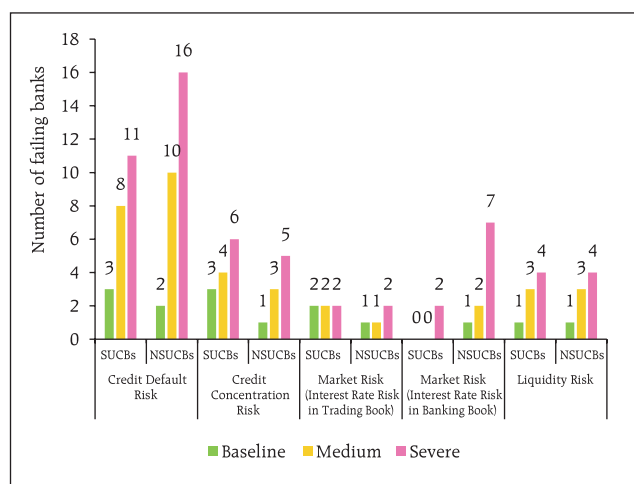
³⁹ The stress test is conducted with reference to the financial position of March 2023 for select 100 UCBs (43 SUCBs, 57 NSUCBs) with asset size of more than ₹1,000 crore, excluding three banks under the Reserve Bank's All Inclusive Directions (AID). These 100 UCBs together cover 57 per cent of the total assets of the UCB sector as on March 2023. The detailed methodology used for stress test is given in Annex 2.

risk is higher than other types of risk in all the three scenarios; (c) the impact of a shock to the trading book is low and (d) resilience has improved in general as compared with the position half a year ago (Chart 2.26). Under a severe stress scenario, the consolidated CRAR of SUCBs and NSUCBs diminishes by 194 bps and 345 bps, respectively, for credit default risk and by 341 bps and 320 bps, respectively, for credit concentration risk. Similarly, consolidated net interest income (NII) of SUCBs and NSUCBs declines by around 8.0 per cent and 11.5 per cent, respectively, under the severe stress scenario for interest rate risk in the banking book. Under all the three scenarios, the system level impact on CRAR is below 65 bps for interest rate risk on the trading book and the system level liquidity mismatch remains positive (no liquidity gap) for liquidity risk.

II.3 Non-Banking Financial Companies (NBFCs)⁴⁰

2.54 After reaching double digits in September 2022, annual growth of credit disbursed by NBFCs sustained pace, with personal loans rising by 31.3 per cent and loans to industry by 12.7 per cent (y-o-y) in March 2023 (Chart 2.27). The personal loans portfolio of NBFCs grew the most during the last four-year period {compound annual growth rate (CAGR) being more than 30 per cent} resulting in increase of its share in total loan portfolio to 31.2 per cent in March 2023. As per the activity-based classification, the largest two categories, namely, investment and credit company (NBFC-ICC) and infrastructure finance company (NBFC-IFC), with shares of 54 per cent and 40 per cent, respectively, in outstanding credit registered double digit credit growth in March 2023. Micro finance institutions (NBFC-MFIs) have maintained robust credit growth over the past two years (with a CAGR 27.6 per cent).

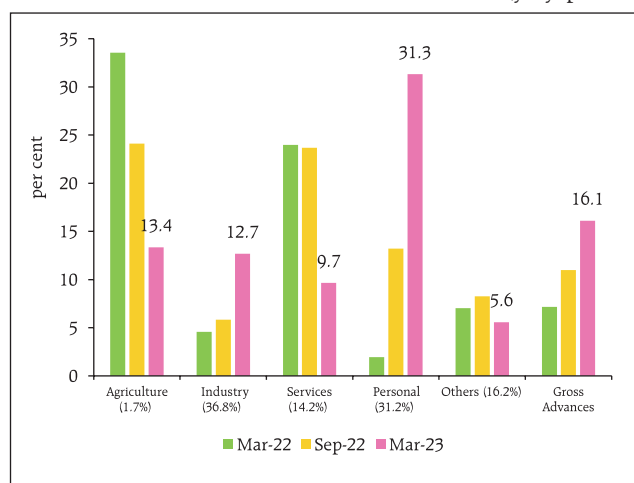
Chart 2.26: Stress Test of UCBs



Source: RBI supervisory returns and staff calculations.

Chart 2.27: Sectoral Credit Growth of NBFCs

(y-o-y; per cent)



Note: Figures in bracket represent sectoral shares in outstanding loans in Mar-23.
Source: RBI supervisory returns and staff calculations.

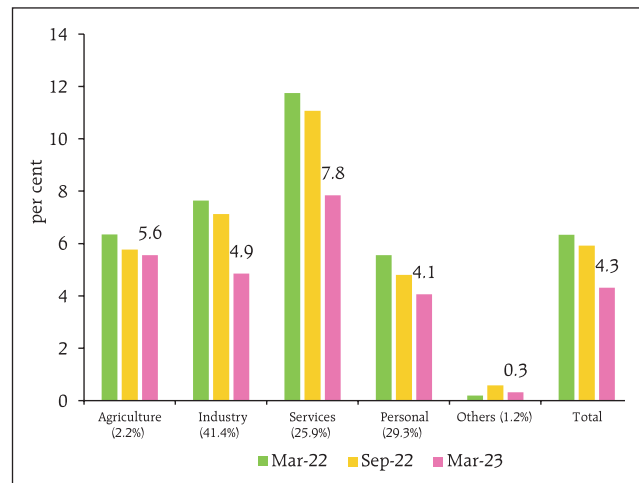
⁴⁰ The analyses done in this section are based on deposit taking and non-deposit taking systemically important NBFCs' (including CICs) data available as of June 15, 2023 which are provisional.

2.55 The GNPA ratio of NBFCs continued to decline during H2:2022-23, with industry and services each registering more than two percentage points reduction (Chart 2.28). Public sector NBFCs (with a share of 44 per cent in outstanding credit) had low GNPA ratios (2.8 per cent) relative to their private counterparts (credit share 56 per cent and GNPA ratio 5.5 per cent). The aggregate NNPA ratio of NBFCs ebbed further to 1.3 per cent, with the provisioning coverage ratio (PCR) increasing to 70.4 per cent in March 2023 (Chart 2.29)

2.56 The capital position of NBFCs remained robust, with CRAR at 27.5 per cent in March 2023, much above the minimum requirement of 15 per cent. The RoA recouped gradually to reach 3.3 per cent by end 2022-23 (Chart 2.30).

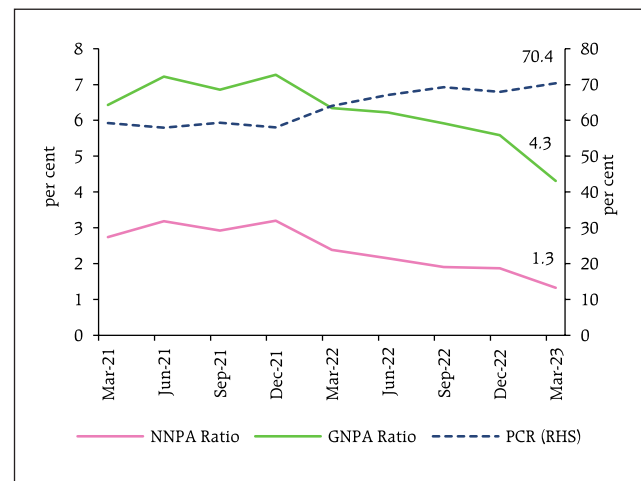
2.57 Share capital, reserves and surplus of NBFCs increased over the years, contributed mostly by capital reserves and balances in profit and loss accounts. On the other hand, their share of total borrowings in total funds reduced from 66.4 per cent in March 2020 to 62.3 per cent in March 2023 mostly due to lower issuance of debentures by NBFCs than other sources of funds during the period. Around two-thirds of borrowings were long-term (more than one year) in nature. NBFCs' borrowing from banks increased in 2022-23 (Table 2.10).

Chart 2.28: Sectoral GNPA ratio of NBFCs



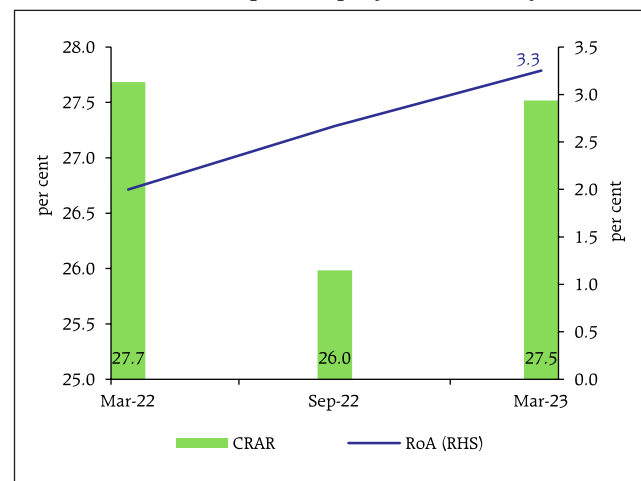
Note: Figures in brackets represent sectoral shares in GNPA in Mar-23.
Source: RBI supervisory returns and staff calculations.

Chart 2.29: Asset Quality of NBFCs



Source: RBI supervisory returns and staff calculations.

Chart 2.30: Capital Adequacy and Profitability



Source: RBI supervisory returns and staff calculations.

Table 2.10: NBFCs' Sources of Funds

Item Description	(per cent)			
	Mar-20	Mar-21	Mar-22	Mar-23
1. Share Capital, Reserves and Surplus	24.2	26.5	29.1	28.5
2. Total Borrowings	66.4	63.3	60.9	62.3
<i>Of which:</i>				
2(i) Borrowing from banks	20.3	19.9	20.4	22.0
2(ii) CPs subscribed by banks	0.5	0.4	0.4	0.3
2(iii) Debentures subscribed by banks	2.5	3.0	2.8	2.8
Total from banks [2(i) + 2(ii) + 2(iii)]	23.2	23.3	23.6	25.2
3. Others	9.3	10.2	10.0	9.2
Total	100.0	100.0	100.0	100.0

Source: RBI supervisory returns and staff calculations.

2.58 NBFCs in the Upper Layer (NBFC-UL) recorded healthy growth in 2022-23, with robust capital positions and improved GNPA ratios (Table 2.11).

II.3.1 Stress Test⁴¹ - Credit Risk

2.59 System level stress tests for assessing the resilience of the NBFC sector to credit risk shocks were conducted for a sample of 135⁴² large NBFCs. The tests were carried out under a baseline and two stress scenarios – medium and high risk, with increases in the slippage ratio by 1 SD and 2 SDs, respectively. The capital adequacy ratio of the sample NBFCs in March 2023 stood at 25.0 per cent and the GNPA ratio at 3.4 per cent. The baseline scenario is projected for one year ahead, based on assumptions of business continuing under usual conditions.

2.60 Under the baseline scenario, the one-year ahead GNPA ratio is assessed at 4.1 per cent and CRAR at 24.4 per cent. Under a medium risk shock of 1 SD increase in the slippage ratio, the GNPA ratio increases to 5.5 per cent and the resultant income loss and additional provisional requirements reduce the CRAR by 60 bps relative to the baseline. Under the high-risk shock of 2 SDs, the capital adequacy ratio of the sector declines by 90 bps relative to the baseline to 23.5 per cent. The number of NBFCs that would fail to meet the minimum regulatory capital requirement of 15 per cent increases from three under the baseline scenario to five under medium and severe stress scenarios, respectively (Chart 2.31).

II.3.2 Stress Test - Liquidity Risk

2.61 The resilience of the NBFC sector to liquidity shocks has been assessed by capturing the impact of a combination of assumed increase in cash outflows

Table 2.11: Select indicators of NBFC-Upper Layer*

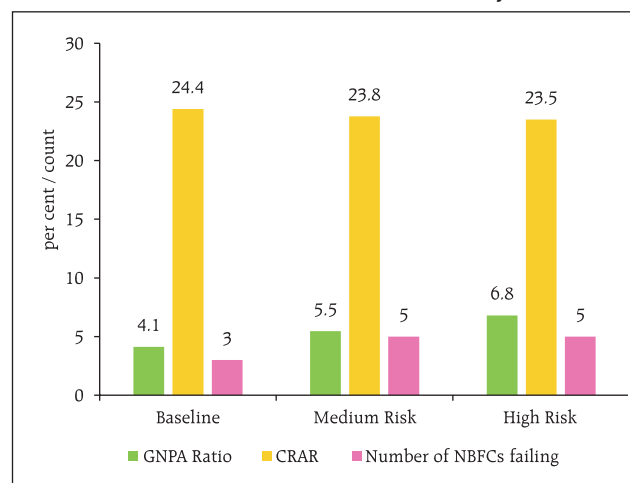
Parameter	Mar-22	Sep-22	Mar-23
Growth rate of assets (y-o-y)	11.8	14.1	15.6
Growth rate of credit (y-o-y)	11.2	16.4	18.8
CRAR**	22.9	22.3	22.2
GNPA ratio	4.5	4.2	3.7

(per cent)

Note: * includes all 16 NBFCs/ HFCs; ** excludes the CIC, which is in the upper layer.

Source: RBI supervisory returns and staff calculations.

Chart 2.31: Credit Risk Stress Tests for NBFCs - System Level



Source: RBI supervisory returns and staff calculations.

⁴¹ The detailed methodology used for stress tests for NBFCs is given in Annex 2.

⁴² The sample comprised of 9 NBFCs in Upper Layer and 126 NBFCs in Middle Layer with total advances of ₹17.36 lakh crore as of March 2023, which forms around 91 per cent of total advances of non-Government NBFCs in the sector. The sample for stress test excluded Government NBFCs, companies presently under resolution and investment focused companies.

and decrease in cash inflows⁴³. The baseline scenario uses the projected outflows and inflows as of March 2023. One baseline and two stress scenarios are applied – a medium risk scenario involving 5 per cent contraction in inflows and 5 per cent rise in outflows; and a high-risk scenario entailing a shock of 10 per cent decline in inflows and 10 per cent surge in outflows. The results indicate that the number of NBFCs, which would face negative cumulative mismatch in liquidity over the next one year in the baseline, medium and high-risk scenarios stood at 7 (representing 1.2 per cent of asset size of the sample), 24 (11.3 per cent) and 24 (11.3 per cent), respectively (Table 2.12).

II.4 Insurance Sector

2.62 The solvency ratio of an insurance company assesses its ability to meet obligations towards policyholders by reflecting the level of its assets over and above its liabilities. As the insurance liabilities involve estimations about the future experience of contingent events, a higher solvency ratio implies a higher resilience of the insurer to withstand the uncertainties of the future. The minimum solvency ratio requirement prescribed by Insurance Regulatory and Development Authority of India (IRDAI) for Indian insurance companies is 150 per cent.

2.63 Solvency ratio for life insurance companies has been above the prescribed threshold for both public sector and private sector at an aggregate level (Table 2.13). Solvency ratio for public sector non-life insurance companies is sub-optimal with three of the four PSU insurers having solvency ratio below the baseline prescription (Table 2.14).

Table 2.12: 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 per cent	2 (0.1)	2 (0.1)	2 (0.1)
Between 20 and 50 per cent	0 (0.0)	1 (0.1)	5 (1.1)
20 per cent and below	5 (1.1)	21 (11.1)	17 (10.1)

Note: Figures in parenthesis represent percentage share in asset size of the sample.

Source: RBI supervisory returns and staff calculations.

Table 2.13: Solvency Ratio of Life Insurance Sector

(per cent)

	Public Sector	Private Sector	Industry
Mar-22	185	228	194
Jun-22	189	228	200
Sep-22	188	232	199
Dec-22	185	235	197

Source: IRDAI.

Table 2.14: Solvency Ratio of Non-Life Insurance Sector

(per cent)

	PSU Insurers	Private Insurers	Stand Alone Health Insurers	Specialised Insurers	Total General Insurers
Mar-22	93	220	171	542	173
Jun-22	94	230	184	571	180
Sep-22	68	227	189	548	168
Dec-22	62	225	212	612	169

Source: IRDAI.

⁴³ Stress testing based on liquidity risk was performed on a sample of 207 NBFCs – which includes 10 NBFCs in Upper Layer, 180 NBFCs in Middle Layer and 17 NBFCs in Base Layer. The total asset size of the sample was ₹25.42 lakh crore, comprising 81.7 per cent of total assets of non-government NBFCs in the sector.

II.5 Stress testing of Mutual Funds

2.64 As mandated by the SEBI, the stress testing of all open-ended debt schemes (except overnight schemes) is carried out by asset management companies (AMCs) every month to evaluate the impact of various risk parameters, viz., interest rate risk, credit risk, liquidity risk and redemption risk faced by such schemes on their net asset values (NAVs).

2.65 The stress testing analysis carried out for all open-ended debt schemes (except overnight funds, gilt funds and gilt funds with 10-year constant duration) by all mutual funds for March 2023 revealed stress (credit risk, interest rate risk, liquidity risk) in the case of 14 mutual funds. In terms of schemes, however, only 24 out of a total of 295 schemes exhibited stress. The assets under management (AUM) of the open-ended debt schemes, which were found to have experienced stress, amounted to ₹1.08 lakh crore, as against the total AUM of ₹10.95 lakh crore for all schemes for which the stress testing was conducted (Table 2.15). The AUM of the open-ended debt schemes, which experienced stress on account of liquidity risk, interest rate risk and credit risk amounted to ₹0.87 lakh crore, ₹0.64 lakh crore and ₹0.14 lakh crore, respectively (Chart 2.32).

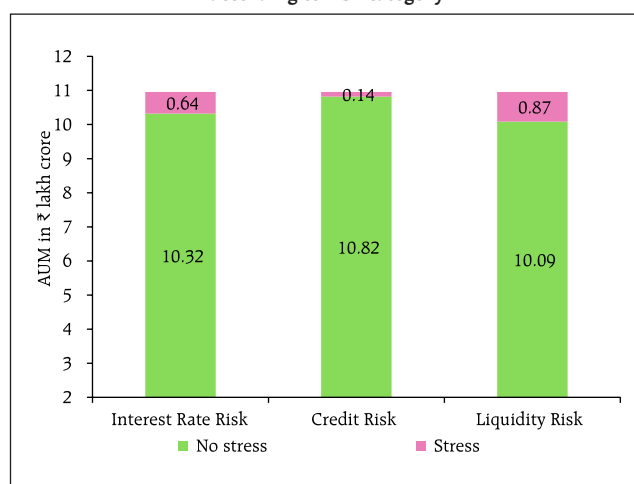
2.66 Furthermore, as a part of liquidity risk management for open-ended debt schemes, two types of liquidity ratios, viz., (i) redemption at risk (LR-RaR), which represents likely outflows at a given confidence interval, and (ii) conditional redemption at risk (LR-CRaR), which represents the behaviour of the tail at the given confidence interval, are being used. All the AMCs have been mandated to maintain these liquidity ratios (LR-RaR and LR-CRaR) above the threshold limits, which are derived from scheme type, scheme asset composition and potential outflows (modelled from investor concentration in the scheme). Mutual funds are required to carry

Table 2.15: Stress Testing of Open-Ended Debt Schemes of Mutual Funds – Summary Findings
As of March 2023

Particulars	Stress	No Stress	Total
No. of AMCs	14	29	43
No. of Schemes	24	271	295
AUM (₹ crore)	1,08,299	9,87,424	10,95,723

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

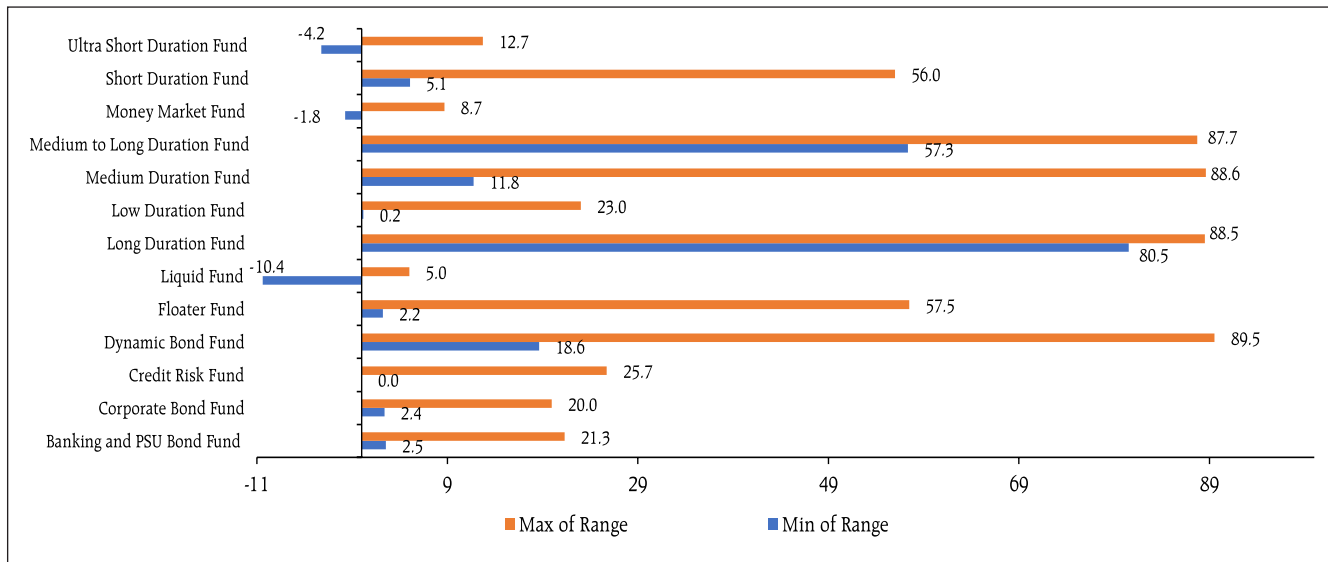
Chart 2.32: Stress Testing of Mutual Funds- Distribution of AUM according to risk category



Source: AMFI.

Chart 2.33: Range {Surplus (+)/ Deficit (-)} of LR-RaR Maintained by AMCs over AMFI Prescribed Limits

(per cent)



Note: Data pertains to Top 10 AMCs based on AUM as on March 31, 2023.

Source: SEBI.

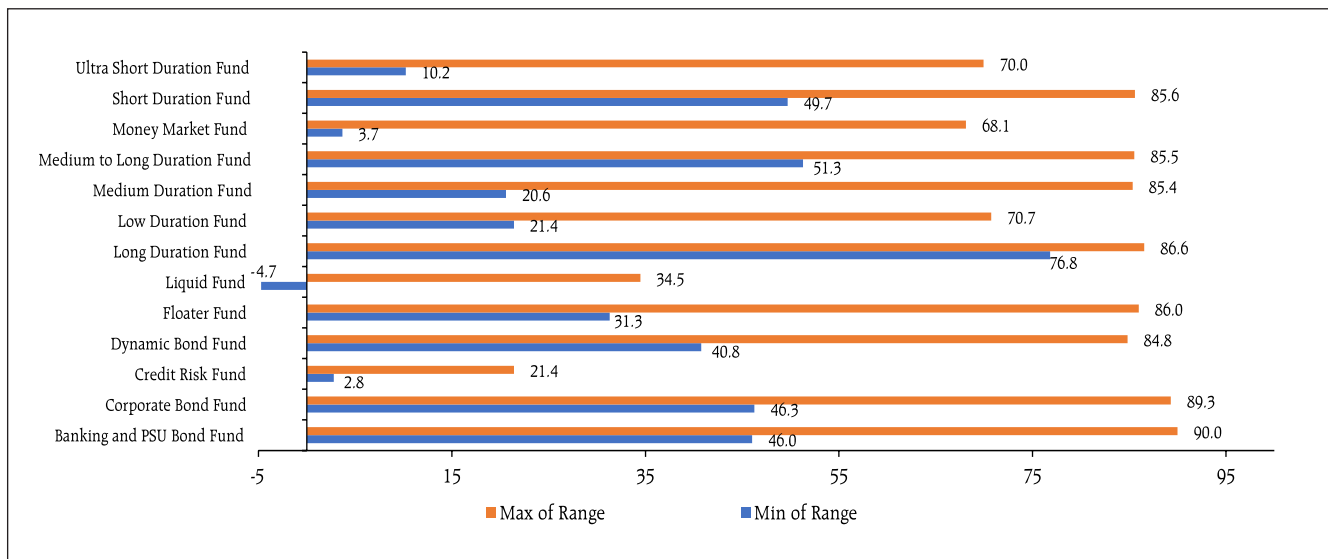
out backtesting of these liquidity ratios for all open-ended debt schemes (except overnight funds, gilt funds and gilt funds with 10-year constant duration) on a monthly basis.

2.67 The LR-RaR and LR-CRaR computed by top 10 mutual funds (based on AUM) for 13 categories

of open-ended debt schemes for April 2023 were well above the respective threshold limits for most of the mutual funds. In the few instances, in which the ratios were below the threshold limits, they were addressed by the respective AMCs in a timely manner (Chart 2.33 and Chart 2.34).

Chart 2.34: Range {Surplus (+)/ Deficit (-)} of LR-CRaR Maintained by AMCs over AMFI Prescribed Limits

(per cent)



Note: Data pertains to Top 10 AMCs based on AUM as on March 31, 2023.

Source: SEBI.

II.6 Stress Testing Analysis at Clearing Corporations

2.68 Stress testing is carried out at clearing corporations (CCs) to determine the minimum required corpus (MRC) of the core settlement guarantee fund (SGF). The segment-wise MRC is determined on a monthly basis using stress testing. For determining the MRC for cash and equity derivatives segment, the CC calculates the credit exposure arising out of a presumed simultaneous default of top two clearing members (CMs). The credit exposure for each CM is determined by assessing the close out loss arising out of closing open positions (under stress testing scenarios) and the net pay in/ pay out requirement of the CM against the required margins and other mandatory deposits of the CM. Further, MRC of the month is determined as average of all daily worst case loss scenarios for the month. The actual MRC for any given month is determined as the higher of the MRC for the month and the MRC arrived at any time in the past.

2.69 Based on the stress testing analysis during the period November 2022 – March 2023, it is observed that though the monthly calculated amounts of MRC (cash segment) at a major clearing corporation on the basis of changes in credit exposures of CMs varied, the actual MRC requirement (cash segment) remained the same during the same period in line with the SEBI's stipulation. The MRC requirement in the equity derivatives segment increased during the period (Table 2.16).

II.7 Interconnectedness

2.70 A financial system can be visualised as a network with financial institutions as nodes and bilateral exposures as links joining these nodes. These links could be in the form of loans to, investments in, or deposits with each other, which act as a source of funding, liquidity, investment and risk diversification. While these links enable efficiency gains and risk diversification, they can become conduits of risk transmission in case of a crisis. Understanding the nuances in propagation of risk through networks is useful for devising appropriate policy responses for safeguarding financial and macroeconomic stability.

Table 2.16: Minimum Required Corpus of Core SGF Based on Stress Testing Analysis at a major Clearing Corporation

(Amount in ₹ crore)

Segments	November 2022	December 2022	January 2023	February 2023	March 2023
Average Stress Test Loss					
Cash Market	348	146	219	146	85
Equity Derivatives Segment	1,385	1,408	1,830	2,214	2,275
Total	1,733	1,553	2,050	2,360	2,360
Minimum Required Corpus (MRC)					
Cash Market	348	348	348	348	348
Equity Derivatives Segment	1,385	1,408	1,830	2,214	2,275
Actual MRC requirement	1,733	1,756	2,178	2,561	2,623

Source: SEBI.

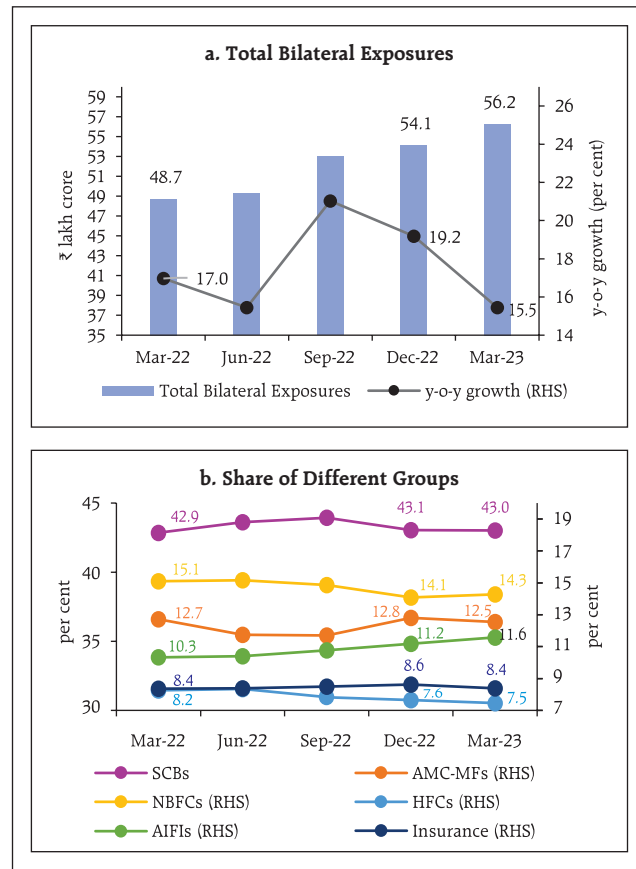
II.7.1 Financial System Network^{44 45}

2.71 The total outstanding bilateral exposures⁴⁶ among the entities in the Indian financial system continued to grow during the half-year ended March 2023. A major part of the surge emanated from higher funding requirements of all India financial institutions (AIFIs), SCBs and NBFCs (Chart 2.35 a). The increase during H2:2022-23 was primarily driven by increasing exposure of asset management company-mutual funds (AMC-MFs) and AIFIs to SCBs.

2.72 SCBs continued to have the largest bilateral exposures in the Indian financial system, although their share declined from 43.9 per cent in September 2022 to 43.0 per cent in March 2023. SCBs' share as fund provider to the system reduced during 2022-23, whereas their share in borrowing from entities (including other SCBs) increased. The factors leading to SCBs increasingly relying on borrowing from the market include credit growth outpacing deposit expansion and lower surplus liquidity at system level. On a sequential basis, the shares of NBFCs and AIFIs increased, while the shares of AMC-MFs, insurance companies and HFCs declined (Chart 2.35 b).

2.73 In terms of inter-sectoral exposures⁴⁷, AMC-MFs, insurance companies and PSBs were the biggest fund providers in the system, whereas NBFCs and PVBs were the largest receivers of funds, followed

Chart 2.35: Bilateral Exposures between Entities in the Financial System



Note: Exposures between entities of the same group are included.
Source: RBI supervisory returns and staff calculations.

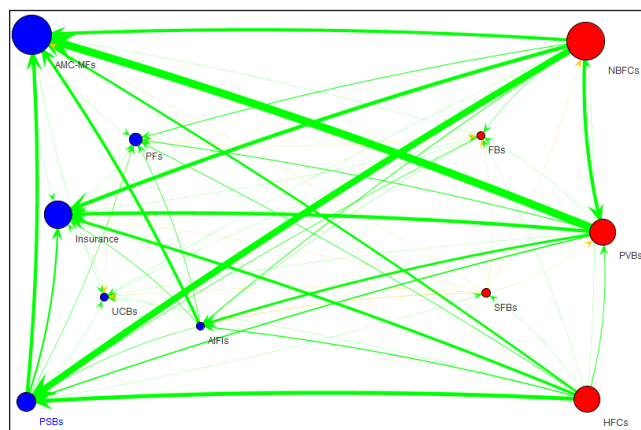
⁴⁴ The network model used in the analysis had been developed by Professor Sheri Markose (University of Essex) and Dr.Simone Giansante (Bath University) in collaboration with the Financial Stability Department, Reserve Bank of India.

⁴⁵ Analysis presented here and in the subsequent part is based on data of 230 entities from the following eight sectors: SCBs, scheduled UCBs (SUCBs), AMC-MFs, NBFCs, HFCs, insurance companies, pension funds and AIFIs. These 230 entities covered include 78 SCBs; 12 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 95 per cent of assets of the sector); 18 HFCs (which represent more than 95 per cent of total HFC asset); 10 PFs and 5 AIFIs (NABARD, EXIM, NHB, SIDBI and NaBFID).

⁴⁶ Includes exposures between entities of the same group. Exposures are outstanding position as on March 31, 2023 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 Clearing Corporation of India Limited).

⁴⁷ Inter-sectoral exposures do not include transactions among entities of the same sector in the financial system.

Chart 2.36: Network Plot of the Financial System - March 2023



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: RBI supervisory returns and staff calculations.

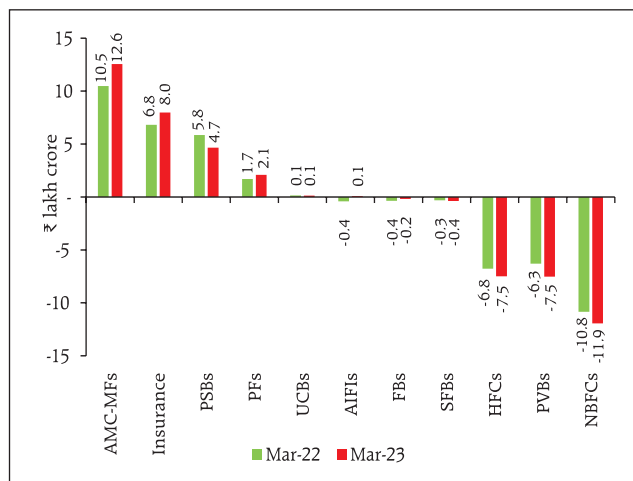
by HFCs. Among bank groups, PSBs and UCBs had net receivable positions *vis-à-vis* the entire financial sector whereas FBs, PVBs and SFBs had net payable positions (Chart 2.36).

2.74 The trend of the net receivables/payables position from March 2022 to March 2023 indicates that the declining share of PSBs in providing fund to the borrowing institutions in the system (primarily NBFCs, PVBs and HFCs) was being taken over by AMC-MFs and insurance companies (Chart 2.37).

a. Inter-Bank Market

2.75 Inter-bank exposures accounted for 3.1 per cent of the total assets of the banking system in March 2023, with fund-based exposure constituting the major part (2.4 per cent). In absolute terms, the fund-based⁴⁸ and non-fund-based exposures⁴⁹ varied sequentially (Chart 2.38).

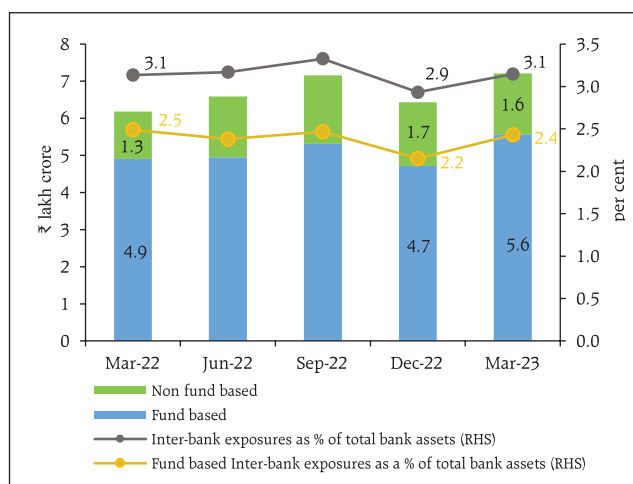
Chart 2.37: Net Receivables (+ve) / Payables (-ve) by Institutions



Note: Receivables and payable do not include transactions among entities of the same group.

Source: RBI supervisory returns and staff calculations.

Chart 2.38: Inter-Bank Market



Source: RBI supervisory returns and staff calculations.

⁴⁸ 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.

⁴⁹ 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).

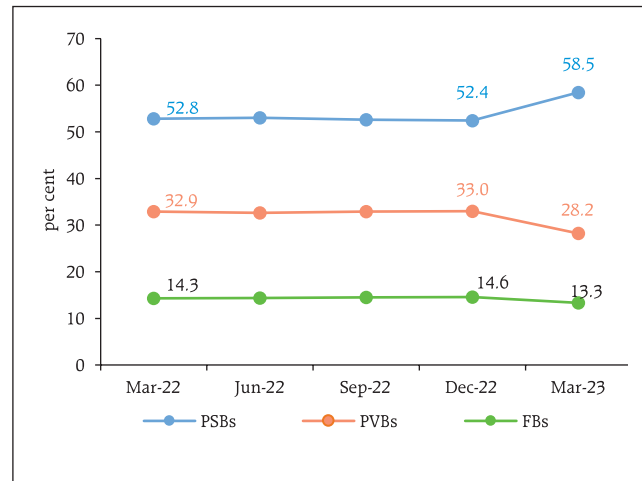
2.76 The rise in borrowing and lending by PSBs and lower lending by PVBs in the inter-bank markets contributed to an increase in the share of PSBs and a decline in the share of PVBs during Q4:2022-23 (Chart 2.39).

2.77 About 75 per cent of the fund-based inter-bank market was short-term (ST) in nature, in which ST deposits and ST loans constituted over 75 per cent, followed by certificates of deposit (CDs) and call money market exposure. Although long-term (LT) loans predominated in LT fund-based inter-bank exposures, their share declined during the latest quarter (Chart 2.40).

b. Inter-Bank Market: Network Structure and Connectivity

2.78 The inter-bank market typically has a core-periphery network structure^{50 51}. As of end-March 2023, four banks were in the inner-most core and eight banks in the mid-core circle. The four banks in

Chart 2.39: Different Bank Groups in the Inter-Bank Market - March 2023



Source: RBI supervisory returns and staff calculations.

Chart 2.40: Composition of Fund based Inter-Bank Market

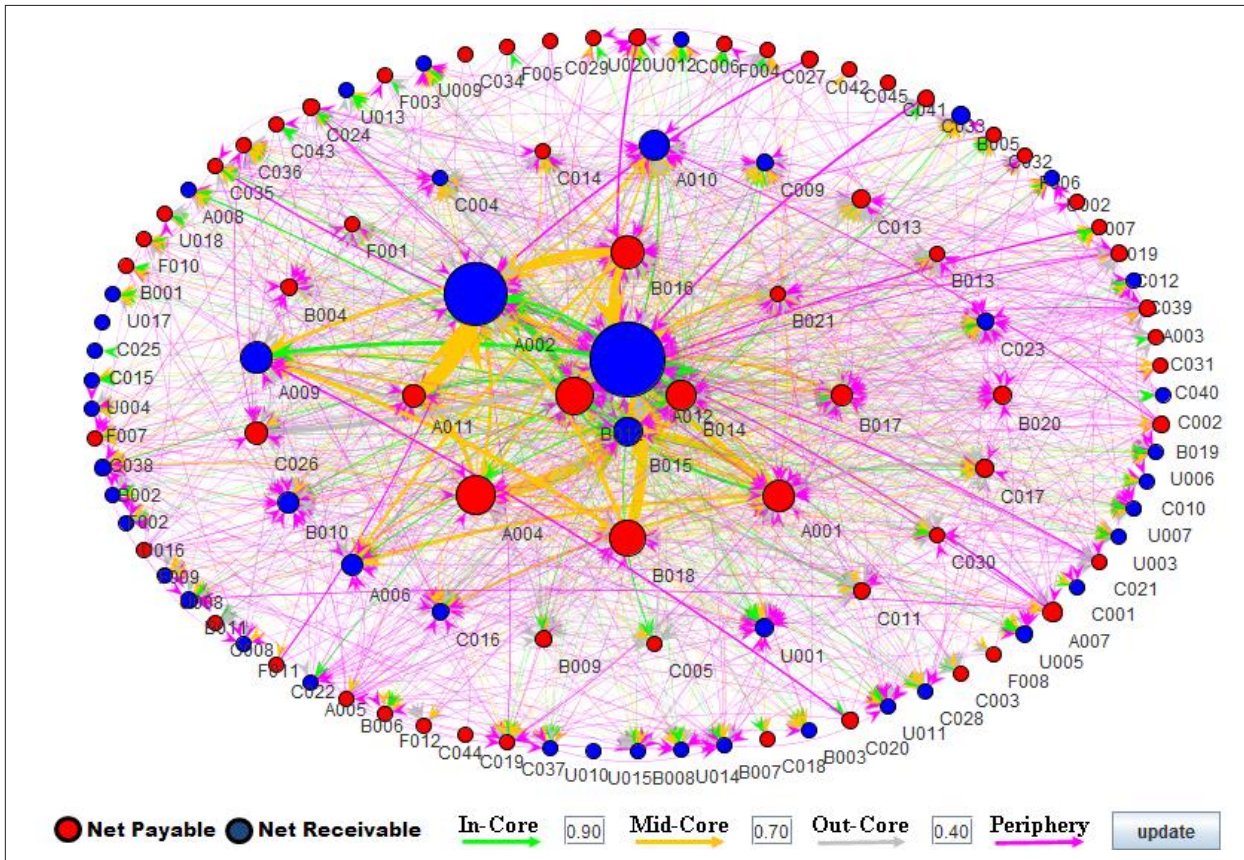


Source: RBI supervisory returns and staff calculations.

⁵⁰ 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.

⁵¹ 78 SCBs, 12 SFBs and 20 SUCBs were considered for this analysis.

Chart 2.41: Network Structure of the Indian Banking System (SCBs + SFBs + SUCBs) – March 2023

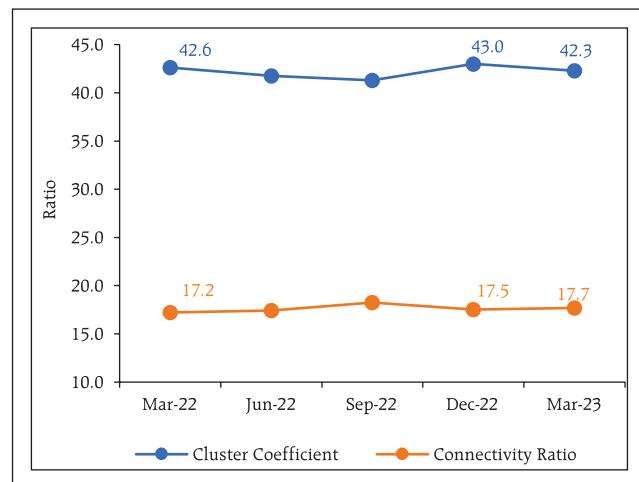


Source: RBI supervisory returns and staff calculations.

the inner-most core included one large public and three private sector banks. The banks in the mid-core were PSBs and PVBs. Most of the old PVBs along with FBs, SUCBs and SFBs formed the periphery (Chart 2.41).

2.79 The degree of interconnectedness in the banking system (SCBs), as measured by the connectivity ratio⁵², reduced during H2:2022-23 partly due to inclusion of an additional foreign bank in the analysis and reduction in number of net payable connections of PVBs. Further, the cluster coefficient⁵³ also varied marginally during the period from March 2022 to March 2023 (Chart 2.42).

Chart 2.42: Connectivity Statistics of the Banking System (SCBs)



Source: RBI supervisory returns and staff calculations.

⁵² The Connectivity ratio measures the actual number of links between the nodes relative to all possible links in a complete network.

⁵³ 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.

c. Exposure of AMC-MFs

2.80 Gross receivables of AMC-MFs stood at ₹13.29 lakh crore whereas their gross payables were ₹0.73 lakh crore as at end-March 2023. SCBs continued to be the major recipients of their funding, followed by NBFCs, AIFIs and HFCs (Chart 2.43 a).

2.81 In the asset composition of AMC-MFs, the share of equity holdings continued to maintain a dominant position while the share of CDs and CPs increased on a y-o-y basis (Chart 2.43 b).

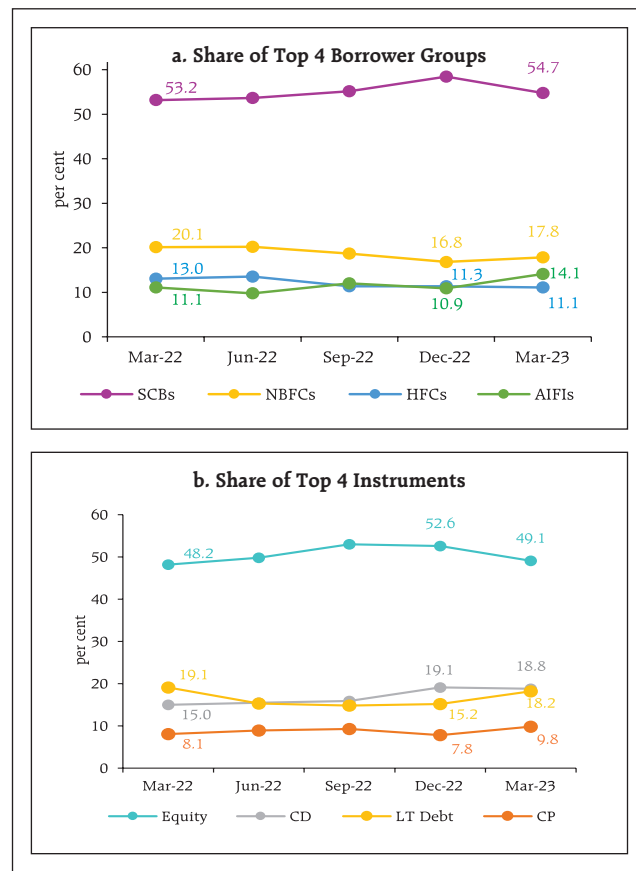
d. Exposure of Insurance Companies

2.82 Gross receivables of insurance companies stood at ₹8.49 lakh crore and gross payables at ₹0.50 lakh crore in March 2023. SCBs (primarily PVBs) were the largest recipients of their funds, followed by NBFCs and HFCs. Insurance companies hold over 90 per cent of their assets in the form of LT debt and equity (Chart 2.44 a and b).

e. Exposure to NBFCs

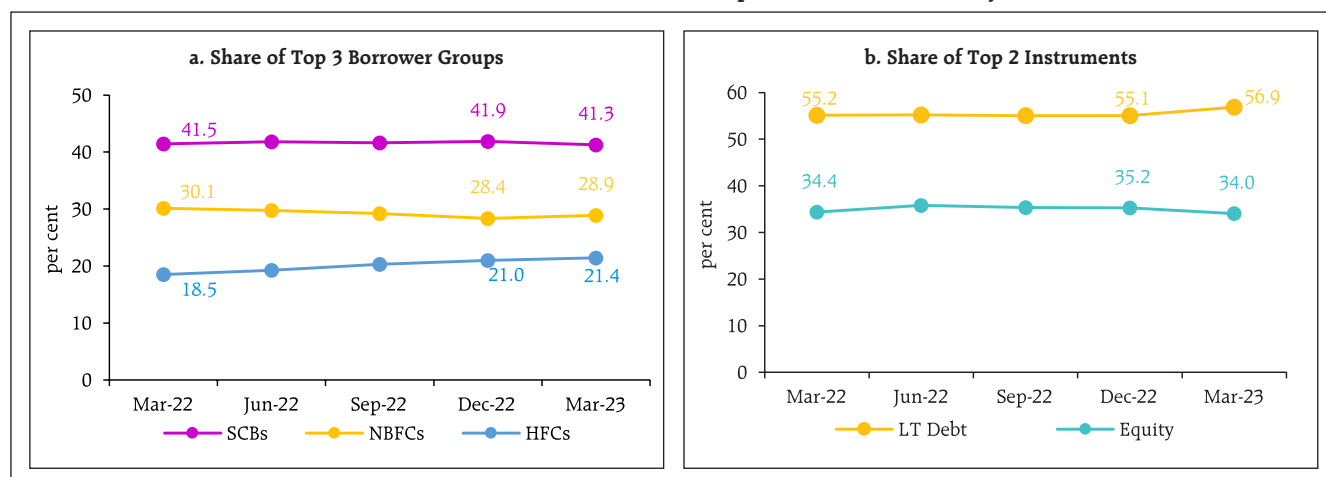
2.83 NBFCs were the largest net borrowers of funds from the financial system, with gross payables of ₹13.68 lakh crore and gross receivables of ₹1.74 lakh crore as at end-March 2023. Their largest exposure was in terms of their borrowings from SCBs, although it came down in Q4:2022-23.

Chart 2.43: Gross Receivables of AMC-MFs from the Financial System



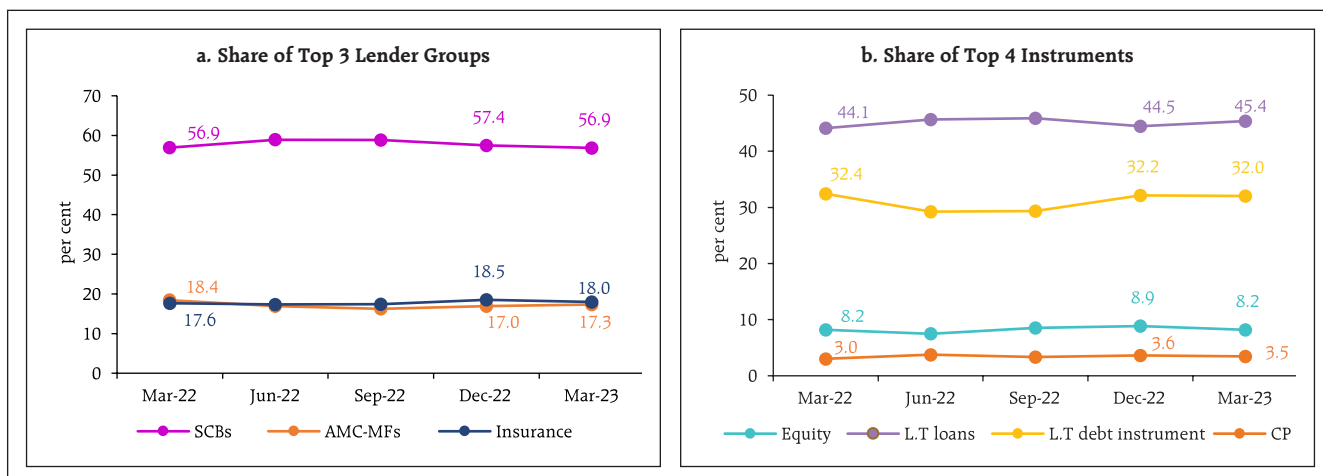
Source: RBI supervisory returns and staff calculations.

Chart 2.44: Gross Receivables of Insurance Companies from the Financial System



Source: RBI supervisory returns and staff calculations.

Chart 2.45: Gross Payables of NBFCs to the Financial System



Source: RBI supervisory returns and staff calculations.

whereas their borrowings from AMC-MFs increased (Chart 2.45 a). Instrument wise, more than 75 per cent of payables of NBFCs were in the form of LT Loans and LT debt instruments, followed by equity capital (Chart 2.45 b).

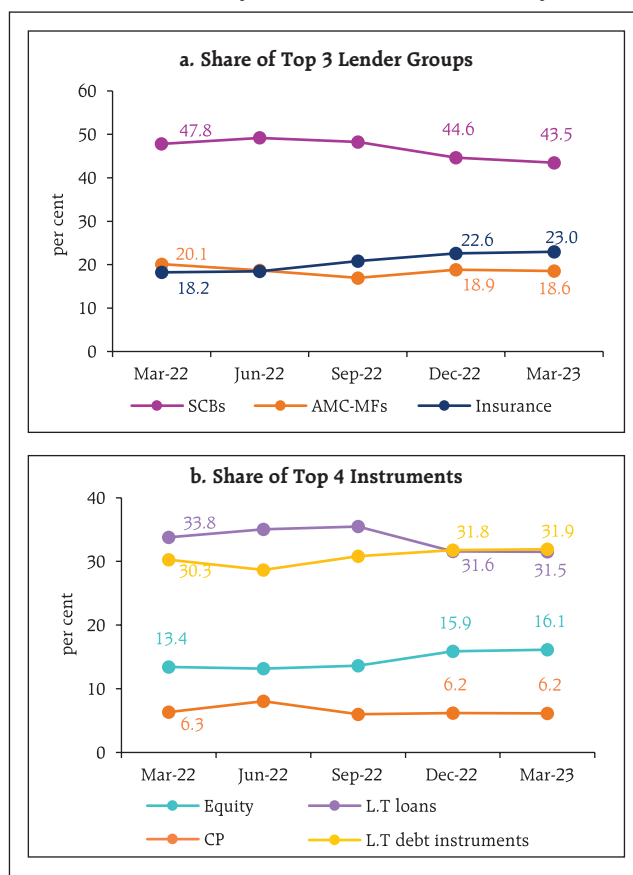
f. Exposure to HFCs

2.84 HFCs remained net borrowers and had gross payables of ₹7.93 lakh crore against gross receivables of ₹0.44 lakh crore at end-March 2023. As in the case of NBFCs, the declining share of SCBs funding to HFCs during H2:2022-23 is attributed to AMC-MFs and insurance companies (Chart 2.46 a). Over 60 per cent of HFCs' resource mobilisation was through LT loans and LT debt instruments. (Chart 2.46 b).

g. Exposure of AIFIs

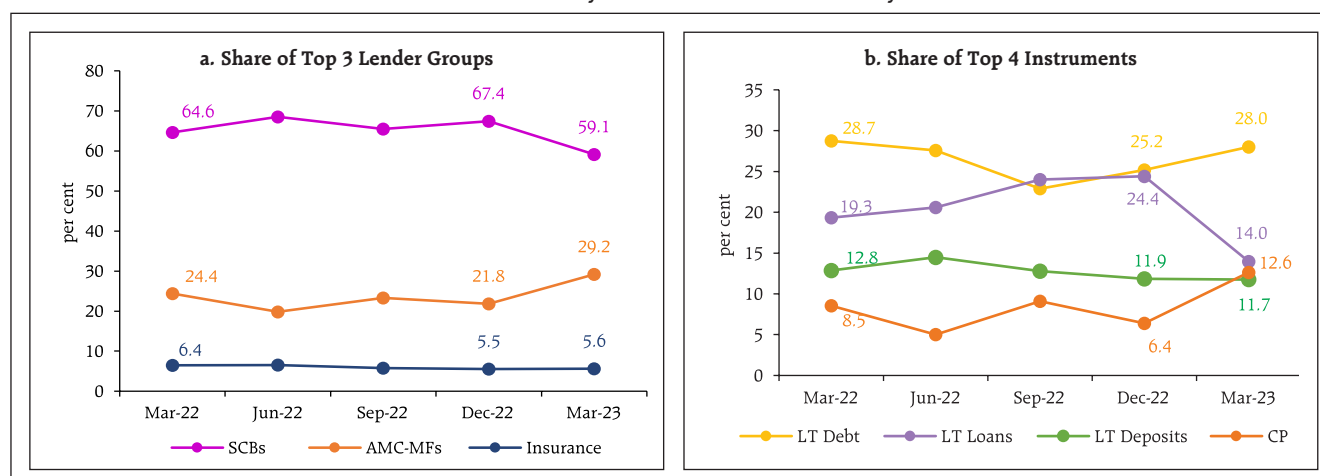
2.85 AIFIs were net provider of funds to the financial system, with their gross payables and gross receivables being ₹6.43 lakh crore and ₹6.52 lakh crore, respectively, in March 2023. They raised funds mainly from SCBs (primarily PVBs), AMC-MFs and insurance companies; their borrowings from PVBs declined due to decrease in long-term loans

Chart 2.46: Gross Payables of HFCs to the Financial System



Source: RBI supervisory returns and staff calculations.

Chart 2.47: Gross Payables of AIFIs to the Financial System



Source: RBI supervisory returns and staff calculations.

(Chart 2.47 a). Given their nature of operations, LT Loans, LT debt and LT deposits remained their preferred instruments for raising funds but the combined share of these instruments has declined to 53.7 per cent from 60.9 per cent a year ago (Chart 2.47 b).

II.7.2 Contagion Analysis

2.86 Contagion analysis uses network technology to estimate the systemic importance of different banks. The failure of a bank, which is systemically important leads to greater solvency and liquidity losses for the banking system, which, in turn, depends on the initial capital and liquidity position of banks along with 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 Solvency⁵⁴- Liquidity⁵⁵ Contagion Losses for SCBs due to Bank Failure

2.87 A contagion analysis of the banking network based on the end-March 2023 position indicates that if the bank with the maximum capacity to

cause contagion losses fails, it will cause a solvency loss of 2.22 per cent (as compared to 2.49 per cent in September 2022) of total Tier 1 capital of SCBs and liquidity loss of 0.25 per cent (as compared to 0.31 per cent in September 2022) 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 decreased in March 2023 *vis-à-vis* September 2022 and would not lead to failure of any additional bank (Table 2.17).

Table 2.17: Contagion Losses due to Bank Failure – March 2023

Name of Bank	Solvency Losses as per cent of Tier 1 Capital of the Banking System	Liquidity Losses as per cent of HQLA	Number of Bank defaulting due to solvency	Number of Bank defaulting due to Liquidity
Bank 1	2.22	0.25	0	0
Bank 2	1.85	0.11	0	0
Bank 3	1.82	0.10	0	0
Bank 4	1.34	0.03	0	0
Bank 5	1.34	0.07	0	0

Note: Top five 'Trigger banks' have been selected on the basis of solvency losses caused to the banking system.

Source: RBI supervisory returns and staff calculations.

⁵⁴ 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.

⁵⁵ 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.

b. Solvency Contagion losses for SCBs due to NBFC/HFC failure

2.88 As noted earlier, NBFCs and HFCs are the largest borrowers of funds from the financial system. A substantial part of their funding comes from banks. Therefore, failure of any NBFC or HFC will act as a solvency shock to their lenders, which can spread through contagion.

2.89 By end-March 2023, idiosyncratic failure of the NBFC with the maximum capacity to cause solvency losses to the banking system would have knocked off 2.51 per cent (2.63 per cent in September 2022) of the latter's total Tier 1 capital but it would not have led to failure of any bank as funding from banks to NBFCs/HFCs has come down and banks are also better capitalised. Similarly, failure of the HFC with the maximum capacity to cause solvency losses to the banking system would have knocked off 4.42 per cent (5.90 per cent in September 2022) of the latter's total Tier 1 capital but without failure of any bank (Tables 2.18 and 2.19).

c. Solvency Contagion Impact⁵⁶ after Macroeconomic Shocks to SCBs

2.90 Any contagion from failure of a bank is likely to get magnified if macroeconomic shocks result in distress to the banking system. In such a situation, similar shocks may cause some SCBs to fail the solvency criterion, which then acts as a trigger for further solvency losses.

2.91 In the previous iteration, the shock was applied to the entity that could cause the maximum solvency contagion losses. In another iteration, in which the initial impact of such a shock on an individual bank's capital is taken from the macro stress tests⁵⁷, the initial capital loss due

Table 2.18: Contagion Losses due to NBFC Failure – March 2023

Name	Solvency Losses as per cent of Tier 1 Capital of the Banking System	Number of Banks Defaulting due to solvency
NBFC 1	2.51	0
NBFC 2	2.07	0
NBFC 3	1.85	0
NBFC 4	1.56	0
NBFC 5	1.40	0

Note: Only Private NBFCs are considered. 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 2.19: Contagion Losses due to HFC Failure – March 2023

Name	Solvency Losses as per cent of Tier 1 Capital of the Banking System	Number of Banks Defaulting due to solvency
HFC 1	4.42	0
HFC 2	4.36	0
HFC 3	1.58	0
HFC 4	1.22	0
HFC 5	0.91	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.

⁵⁶ Failure Criterion for both PSBs and PVBs has been taken as Tier 1 CRAR falling below 7 per cent.

⁵⁷ 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 March 2024 with respect to the actual value in March 2023) were applied to the March 2023 capital position assuming proportionally similar balance sheet structures for both March 2023 and March 2024.

(b) Bilateral exposures between financial entities are assumed to be similar for March 2023 and March 2024.

to macroeconomic shocks stood at 4.65 per cent, 12.12 per cent and 19.38 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 2.48 a and b).

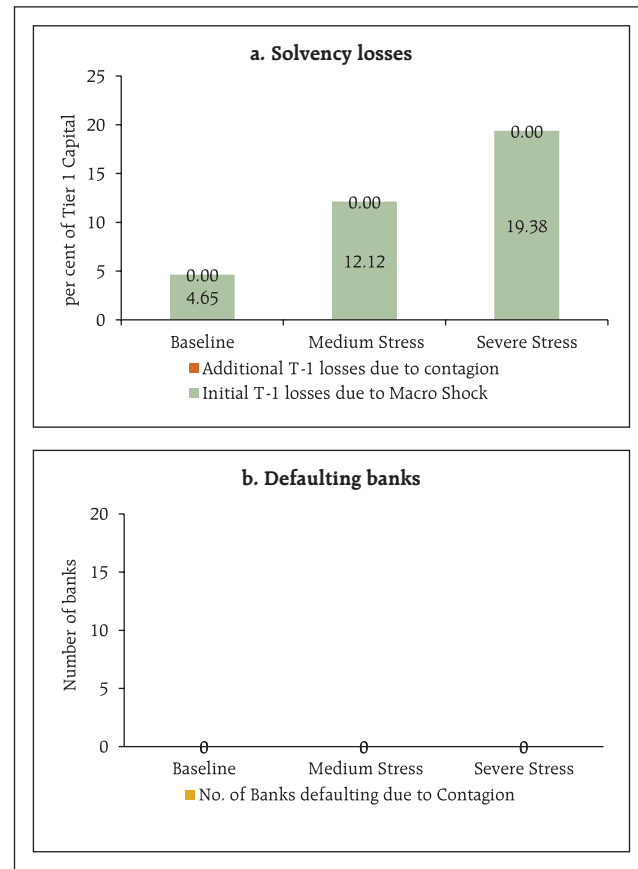
Summary and Outlook

2.92 Stable financial conditions, balance sheet strength and return to profitability on the back of surge in net interest income (NII) has enabled the Indian banking system to support the growing credit needs of the economy. Capital position and asset quality of SCBs, UCBs and NBFCs have improved further during H2:2022-23. Though credit growth has outpaced the rise in deposits over the last one year, both are growing in double digits.

2.93 Macro stress tests indicate that SCBs have sufficient capital buffers to withstand moderate to severe adverse macroeconomic circumstances, though some individual banks may fall short of minimum capital requirements (including the CCB), under a severe stress scenario. An extreme scenario of a 250 bps upward movement in the yield curve may bring down the CRAR of a few banks below the regulatory minimum level. Network analysis indicates that contagion risks and consequent additional solvency losses have reduced since the last issue of the FSR. There would be no additional solvency losses to the banking system from contagion due to macroeconomic shocks.

2.94 As global financial conditions and the geopolitical situation remain highly uncertain, the Indian financial system needs to adopt a nimble and pre-emptive approach to ward off any signs of incipient stress that appear in early warning indicators, maintain soundness and public confidence and meet the financing requirements of India's developmental aspirations.

Chart 2.48: Contagion Impact of Macroeconomic Shocks (Solvency Contagion)



Source: RBI supervisory returns and staff calculations.

Chapter III

Regulatory Initiatives in the Financial Sector

Global regulatory initiatives continue to focus on safeguarding financial stability, improving resilience of banks and non-bank financial intermediaries, managing digital innovation, addressing climate-related financial risks and full and consistent implementation of Basel III regulatory reforms. Domestic regulatory efforts aim to improve financial sector soundness and efficiency, deepen financial markets, strengthen cyber resilience and supervision. The Financial Stability and Development Council (FSDC) and its Sub-Committee remain vigilant and committed to improve operational dynamism, preserve stability and enhance inclusivity of the Indian financial system.

Introduction

3.1 The recent banking turmoil in some of the AEs has put post-GFC financial reforms to test. Global regulatory efforts are focussed on addressing banking system fragility and vulnerabilities associated with high debt levels, fragile market liquidity, tightening of financial conditions, and liquidity and leverage issues in non-bank financial intermediaries (NBFIs)¹. Risks associated with digital finance, cyber security and climate change are other major focus areas.

3.2 Against this backdrop, this chapter reviews the recent regulatory initiatives undertaken globally and in India to improve the resilience and efficiency of the financial system.

III.1 Global Regulatory Developments and Assessments

3.3 Rapid and forceful responses by regulators in the affected economies to the recent bank failures helped to maintain financial stability and limit spillovers. Yet, concerns remain about build up of vulnerabilities in the financial system as the impact of monetary tightening gets exacerbated by idiosyncratic risks such as concentrated business

models, presence of wholesale and uninsured deposits, poor risk management and governance².

III.1.1 Deposit Stability

3.4 The report³ of the Federal Deposit Insurance Corporation (FDIC) on the options for deposit insurance reform observed that bank failures were largely caused by convergence of rapid asset growth in banks funded by uninsured deposits, exposure to unrealised losses in their securities portfolio and business models concentrated on providing services to digital asset firms. It highlighted the contribution of technological developments in quickening information dissemination and consequently, faster depositor runs. Three options to reform the deposit insurance system are offered: (a) limited coverage, which maintains the current structure of finite deposit insurance limit; (b) unlimited coverage of all deposits; and (c) targeted coverage, which allows different levels of deposit insurance coverage across different types of accounts and focusses on higher coverage for business payment accounts. It identifies the third option (*viz.*, targeted coverage) as having the greatest potential to mitigate undesirable consequences related to cost of coverage.

¹ FSB (2023), "FSB Chair's letter to G20 Finance Ministers and Central Bank Governors", April.

² Federal Reserve (2023), "Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank", April.

³ FDIC (2023), "Options for Deposit Insurance Reform", May.

III.1.2 Markets and Financial Stability

3.5 The report of the Advisory Scientific Committee (ASC) of the European Systemic Risk Board (ESRB)⁴ observed that the enhanced lender of last resort (LOLR) and market maker of last resort (MMLR) functions of central banks can achieve the stabilisation of financial markets, but moral hazard issues remain a major deterrent. The report presented a set of attributes for effective enhanced LOLR and MMLR functions, including (a) supporting only financial markets that are deemed essential; (b) developing continuous capacity to price securities that could be accepted as collateral in a lending operation or be purchased outright; (c) offering pricing that would be unattractive in normal times to control moral hazard; (d) lending only to regulated and supervised entities to ensure solvency; and (e) exiting quickly when market liquidity has been restored.

3.6 The report⁵ of the Committee on the Global Financial System (CGFS) (Bank for International Settlements) highlighted the effect of central bank asset purchases (APs) in terms of reduced bond yields, improved liquidity conditions and averting a destabilising loop of downward spirals and fire sales. For EMEs, the motivation for APs was limited to addressing market dysfunction whereas in AEs, the policy objective included implementing an expansionary policy stance when policy rates were constrained by the effective lower bound (ELB). The impact of APs operates through multiple channels like signaling, liquidity and portfolio rebalancing with their relative importance differing across time and economies. The liquidity channel becomes important when market conditions are stressed. The

signaling channel indicates the policy stance that impacts financial conditions but is less important than the portfolio rebalancing channel, especially in countries with policy rates above the effective lower bound. The report also observed that APs can have side effects, including cross-country spillovers, suppression of risk premia, losses on balance sheets for central banks and low bond market liquidity.

3.7 In its report⁶ on financial stability aspects of commodity markets, the Financial Stability Board (FSB) observed that commodity traders are connected to the core financial system through a range of physical and derivatives markets, where banks are a major source of credit and liquidity funding for the segment and provide clearing services. Juxtaposition of concentration and interlinkages in the commodities sector along with large and leveraged commodity traders, less standardised margining practices and opacity in over-the-counter (OTC) markets could propagate losses in the event of stress. This highlights the risk of demand for funding liquidity that commodity market players may face in the event of higher margin calls by central clearing counterparties (CCPs). Continuous monitoring of developments in commodity markets to manage sudden increases in margin on derivatives position and identifying data gaps inhibiting the assessment of vulnerabilities for quantifying the transmission channels for financial stability assume critical importance in this regard.

3.8 The International Organization of Securities Commissions (IOSCO) revised its September 2011 principles for the regulation and supervision of commodity derivatives market (Principles)⁷ to address volatility and developments in commodity markets.

⁴ ESRB (2023), "Stabilising financial markets: lending and market making as a last resort", January.

⁵ CGFS/ BIS (2023), "Central bank asset purchases in response to the Covid-19 crisis", March.

⁶ FSB (2023), "The financial stability aspects of commodities markets", February.

⁷ IOSCO (2023), "Principles for the Regulation and Supervision of Commodity Derivatives Markets", January.

The revised Principles are directed to support price discovery and hedging functions, improve market surveillance, address manipulation and abusive trading schemes and strengthen enforcement powers of trading venues. It is recommended that authorities may provide alternative delivery points for physically settled commodity derivatives to mitigate the stress around delivery point failure during extraordinary disruptions. To manage excessive price volatility, authorities may impose suspension or cancellation of trades in disorderly market conditions. The Principles suggest implementing maximum price fluctuations and position limits to mitigate price volatility and provide time for market participants to arrange necessary financing. A new principle (Principle on unexpected disruptions in the market) has been added to guide the regulators in the scenario of extreme price volatility due to extraordinary disruptions such as pandemics and wars. It aims to maintain orderly markets, safeguard investors' interest and discourage higher risk-taking by market participants. Acknowledging the differences in structure and practices of the underlying spot market and market participants, the report has suggested implementing the principles with due consideration to the jurisdictional specificities of the underlying market.

III.1.3 Decentralised Finance and Financial Stability

3.9 The FSB report on the financial stability risks of decentralised finance (DeFi)⁸ highlights the vulnerabilities and rising interconnectedness

of crypto-based DeFi with centralised crypto-asset trading, lending and borrowing platforms. DeFi inherits and even amplifies existing TradFi vulnerabilities such as operational fragilities, liquidity and maturity mismatches, leverage, and interconnectedness. The amplification of known vulnerabilities comes from novel technological features such as smart contracts and blockchain, the high degree of structural interlinkages and from non-compliance with existing regulatory requirements. Due to pseudonymity, financial intermediation in DeFi largely rests on the use of collateral and leverage. The use of leverage leads to procyclicality and can trigger sharp adjustments in prices that have knock-on effects on other market participants. The report suggests that FSB's crypto-asset monitoring framework should be complemented with DeFi-specific indicators of vulnerabilities. Furthermore, the growth of tokenisation of real assets could increase interconnections of crypto-asset markets and DeFi with the broader financial system and the real economy.

3.10 The European Union has passed the first comprehensive legislation on Markets in Crypto Assets (MICA)⁹, a broad framework which covers the issuance, trading and disclosure requirements for crypto-assets¹⁰. The regulation mainly covers three types of crypto-assets, namely asset-referenced tokens (ART)¹¹, electronic money tokens (EMT)¹², and other crypto-assets like utility tokens¹³ not covered by existing law. MICA has excluded central

⁸ FSB (2023), "The financial stability risks of Decentralised Finance", February.

⁹ EU (2023), "Regulations on markets in crypto-assets (MICA)", May.

¹⁰ 'crypto-asset' means a digital representation of value or rights which may be transferred and stored electronically, using distributed ledger technology or similar technology.

¹¹ 'asset-referenced token' means a type of crypto-asset that purports to maintain a stable value by referring to the value of several fiat currencies that are legal tender, one or several commodities or one or several crypto-assets, or a combination of such assets.

¹² 'electronic money token' or 'e-money token' means a type of crypto-asset the main purpose of which is to be used as a means of exchange and that purports to maintain a stable value by referring to the value of a fiat currency that is legal tender.

¹³ 'utility token' means a type of crypto-asset which is intended to provide digital access to a good or service, available on DLT, and is only accepted by the issuer of that token.

bank digital currencies (CBDC) and non-fungible tokens (NFT) from its purview, except where NFTs fall under existing crypto-asset categories. MICA has set rules for crypto-asset issuers and crypto-asset service providers (CASPs), including consumer protection rules for the issuance, trading, exchange, custody of crypto-assets and creating a market abuse regime for prohibiting market manipulation and insider dealing. The framework aims to support market integrity and financial stability by regulating public offers of crypto-assets. Major CASPs will be required to disclose their energy consumption to reduce carbon footprints. The framework is expected to provide regulatory clarity, create safeguards and set standards for the use of blockchain technology.

III.1.4 Financial Stability Implications of Stablecoins – An EMDE Perspective

3.11 The previous issues of the Financial Stability Report have highlighted the inherent volatility associated with crypto-assets, the collapse of stablecoins and the potential risks to financial stability. It is globally reckoned that crypto assets are speculative instruments which fail to meet key requirements to be termed as money. The stablecoin category of crypto-assets has been exposed to episodes of collapse and redemption pressures in recent times. It is also recognised that private tokenised money which circulate as bearer instruments may entail departures in their relative exchange values away from par in violation of the "singleness of money" (*i.e.*, monetary exchange is not subject to fluctuating exchange rates between different forms of money)¹⁴. Their purported benefits in terms of financial inclusion, cheaper and faster payments and cross-border remittances are, however, yet to be realised.

3.12 The pull factors for crypto-assets, which are inevitably denominated in convertible currencies, lack application of full anti-money laundering (AML)/ countering the financing of terrorism (CFT) standards and have features that facilitate anonymity and bypass controls. The associated risks are serious and include:

- (i) reserve assets of stablecoins generally comprise of investments denominated in select freely convertible foreign currency, which would be destabilising for EMDEs through currency substitution;
- (ii) their large scale adoption would lead to cryptoisation (*i.e.*, greater use of crypto-assets as a substitute of fiat currency and traditional financial assets) of an economy, which could lead to major currency mismatch risks¹⁵ on the balance sheets of banks, firms, and households;
- (iii) it would limit an EMDE central bank's ability to effectively control domestic interest rate and liquidity condition to meet its macroeconomic policy objectives;
- (iv) the decentralised, borderless, and pseudonymous characteristics of crypto-assets being transacted without involving regulated financial intermediaries for identifying remitter/beneficiary/nature of transactions, make them potentially attractive instruments to circumvent capital flow management measures¹⁶, which have serious financial stability risks, especially in periods of capital flow volatility and negative spillovers;
- (v) as an alternative to domestic financial system, the crypto ecosystem will hinder banks' ability to mobilise deposits in fiat currency and, in turn, credit creation, where any loss of customer

¹⁴ Garratt, Rodney, and Shin, Hyun Song (2023), "Stablecoins versus tokenised deposits: Implications for the singleness of money", BIS Bulletin No 73, April.

¹⁵ IMF (2021), "Global Financial Stability Report", October.

¹⁶ IMF (2022), "FinTech Note – Capital Flow Management Measures in the Digital Age: Challenges of Crypto-Assets", May.

relationships can undermine the credit risk assessment¹⁷; and

- (vi) peer-to-peer transfer (domestic or cross-border) to un-hosted/self-hosted wallets are difficult to track, and the rise of anonymity-enhanced cryptocurrencies (for e.g., privacy coins, mixers, decentralised platforms and exchanges) increase obfuscation of identity and financial flows, which in turn, give rise to increased potential of money laundering and terrorism financing risks.

3.13 Though the market capitalisation of stablecoins is relatively small (nearly US\$ 130 billion in June 2023¹⁸) when compared to the traditional financial system, there is a possibility of continued growth and interconnectedness, giving rise to financial stability risk concerns and negative spillover risks, which may be difficult to contain once the systemic exposure crosses a threshold. The lack of authenticated data and inherent data gaps in the crypto ecosystem impede a proper assessment of financial stability risks.

3.14 Three policy responses (ban, contain or regulate) have been offered to address the risks posed to consumers, investors, market integrity, financial stability and also specific risks posed to EMDEs with respect to monetary sovereignty and 'cryptoisation'¹⁹. A globally coordinated approach is warranted to analyse risks posed to EMDEs *vis-à-vis* AEs, especially on macroeconomic challenges (losing monetary control; local currency volatility), development challenges (weaker capacity to address AML/ CFT risks) and cross border challenges (oversight). In this context, under India's G20

presidency, one of the priorities is to create a framework for global regulation of unbacked crypto-assets, stablecoins and DeFi, by considering both macroeconomic and regulatory perspectives to address the full range of risks posed by crypto-assets, including risks specific to EMDEs.

III.1.5 Cyber Risk and Financial Stability

3.15 In its report on advancing macroprudential tools for cyber resilience²⁰, the European Systemic Risk Board (ESRB) highlights the heightened cyber threat environment and encourages authorities to pilot system-wide cyber resilience scenario testing (CyRST), which can complement other analytical tools to deepen their understanding of the associated risks. The report advocates use of the systemic impact tolerance objective (SITO) – the point at which the tolerance of disruption of the financial system is deemed to be breached to assess coordination and action capabilities. ESRB will identify key economic functions where disruptions have cross border implications and also analyse operational policy tools that are most effective in responding to a system-wide cyber incident and identifying gaps across operational and financial policy tools. The report also assesses the efficacy of financial policy tools like capital buffers, deposit insurance, recovery and resolution framework, moratorium powers and central bank liquidity provisions in the event of a cyber incident.

3.16 The FSB report on cyber incident reporting (CIR)²¹ has focused on measures to address impediments in achieving greater convergence, enhancing the cyber lexicon and setting up a common format for incident reporting exchange (FIRE). Recognising that a one-size-fits-all approach

¹⁷ IMF (2021), "Global Financial Stability Report", October.

¹⁸ As on June 26, 2023 (<https://www.coingecko.com/en/categories/stablecoins>).

¹⁹ Aquilina, Matteo, Frost, Jon and Schrimpf, Andreas (2023), "Addressing the risks in Crypto: Laying out the options", BIS Bulletin No 66, January.

²⁰ ESRB (2023), "Advancing macroprudential tools for cyber resilience", February.

²¹ FSB (2023), "Recommendations to achieve greater convergence in cyber incident reporting", April.

is not feasible, FSB has provided recommendations to address issues on collection of cyber incident information including defining objectives, improving cross-border interoperability, identifying common data requirements and standardised reporting formats, selecting reporting triggers and addressing gaps in cyber incident response capabilities. It observes that triggers, reporting windows and guidelines adopted by financial authorities should be consistent with their legal and regulatory framework. The report stresses on inclusion of severe but plausible cyber scenarios and stress test in the organisational playbook, effective log management and forensic capabilities, sharing information and pooling knowledge in collective defence of financial sector for effective incident detection and reporting.

III.2 Domestic Regulatory Developments

3.17 Since the publication of the December 2022 issue of the FSR, the Financial Stability and Development Council (FSDC), chaired by Union Finance Minister, met once on May 08, 2023. The Council deliberated upon the need for expeditious formulation and implementation of the policy and legislative reform measures required to further develop the financial sector and increase the access of financial services to the people.

3.18 The FSDC committed to maintaining constant vigil by all regulators to enhance financial sector stability, reduce compliance burden on regulated entities (REs), monitor debt levels of corporates and households in India, simplification and streamlining of know-your-customer (KYC) framework to meet the needs of Digital India, improve seamless experience for retail investors in government

securities, introduction of Bimakrit Bharat – a unique value proposition to take insurance to last mile and resolve inter-regulatory issues relating to Gujarat International Finance Tec-City - International Financial Services Centre (GIFT-IFSC).

III.3 Initiatives by Regulators/Authorities

3.19 The financial sector regulators undertook several initiatives to improve the resilience of the Indian financial system (Annex 3).

III.3.1 Climate Risk and Sustainable Finance

3.20 The Reserve Bank released a framework for acceptance of Green Deposits²² for REs to foster and develop green finance ecosystem in the country. The framework aims to encourage more REs to offer green deposits to customers, protect depositors' interest, address greenwashing²³ concerns and help augment the flow of credit to green activities/projects. REs shall put in place a Board approved financing framework (FF) for effective allocation of green deposits covering eligible green activities/projects. The following sectors, adopted from the Government of India's 'Framework for Sovereign Green Bonds', published in November 2022, have been identified as green activities/projects for allocation of proceeds by REs: (i) renewable energy; (ii) energy efficiency; (iii) clean transportation; (iv) climate change adaptation; (v) sustainable water and waste management; (vi) pollution prevention and control; (vii) green buildings; (viii) sustainable management of living natural resources and land use; and (ix) terrestrial and aquatic biodiversity conservation. REs shall annually undertake the impact assessment and third-party verification and the reports shall be placed on their website.

²² "Green deposit" would be interest-bearing deposit, received by the RE for a fixed period and the proceeds of which are earmarked for being allocated towards green finance.

²³ "Greenwashing" means the practice of marketing products/services as green, when in fact they do not meet requirements to be defined as green activities/projects.

III.3.2 Governance, Measurement and Management of Interest Rate Risk in Banking Book (IRRBB)²⁴ - Final Guidelines

3.21 Excessive IRRBB can pose significant risk to banks' current capital base and/ or future earnings, if not managed appropriately. The Reserve Bank's final guidelines on IRRBB require banks to measure, monitor and disclose their IRRBB in terms of potential change in economic value of equity (Δ EVE) and net interest income (Δ NI), computed on the basis of a set of prescribed interest rate shock scenarios. Banks should have a clearly defined Board approved risk appetite statement, articulated in terms of the risk to both economic value and earnings, which lays down policies and procedures for limiting and controlling IRRBB. Banks should also develop and implement an effective stress testing framework for IRRBB as part of their broader risk management and governance processes. Furthermore, banks should perform qualitative and quantitative reverse stress tests to identify interest rate scenarios that could severely threaten their capital and earnings.

3.22 Banks, which generate an EVE decline of more than 15 per cent of their Tier 1 capital under any one of the six prescribed interest rate shock scenarios, shall be identified as outliers with undue IRRBB exposure. These outlier banks shall be required to take one or more of the following actions as determined during the Reserve Bank's supervisory review and evaluation process (SREP): (a) raise additional capital; (b) reduce IRRBB exposures (e.g., by hedging); (c) set constraints on the internal risk parameters used by the bank; and/ or (d) improve the risk management framework. The extant instructions on interest rate risk management, which require banks to undertake traditional gap analysis (TGA) and Duration Gap Analysis (DGA),

shall be phased out post implementation of the new guidelines.

III.3.3 Guidelines on Default Loss Guarantee (DLG) in Digital Lending

3.23 Certain business practices of NBFCs could create new risks as, under DLG agreements entered into by some NBFCs with Digital Lending Apps (DLAs)/ Fintech companies, up to 100 per cent of the credit risk was borne by the latter due to the First Loss Default Guarantee (FLDG) provided to the former. Under such arrangements, the DLAs effectively lent their own funds to borrowers using the license of an NBFC who did not share any risk but were getting a guaranteed yield in return. Proliferation of such instances could inflate the risks associated with unregulated lending as well as delay the process of identification of stress in specific sectors/ portfolios.

3.24 Considering the need to strike a balance between prudence and innovation, the Reserve Bank issued instructions permitting DLG arrangements with suitable regulatory guardrails. DLG arrangements involve lending service providers (LSPs) offering to bear default losses on a loan portfolio up to a pre-determined percentage of the portfolio where the RE has an outsourcing agreement with such LSPs. REs shall ensure that total amount of DLG cover on any such portfolio shall not exceed five per cent of the amount of that loan portfolio and the same can be offered only in the form of cash, fixed deposit or bank guarantee. Further, REs shall put in place a Board approved policy before entering into any DLG arrangement. Any DLG arrangement shall not act as a substitute for credit appraisal requirements. Also, in order to promote transparency, REs are required to ensure disclosure of DLG on the website of LSPs.

²⁴ Interest rate risk in banking book (IRRBB) refers to the current or prospective risk to banks' capital and earnings arising from adverse movements in interest rates that affect its banking book positions.

III.3.4 Master Direction on Outsourcing of Information Technology (IT) Services

3.25 The Reserve Bank issued master direction on outsourcing of IT services to third parties to ensure effective management of financial, operational and reputational risks with the underlying principle that outsourcing arrangements neither diminish REs ability to fulfil obligations to customers nor impede effective supervision by the Reserve Bank.

3.26 The directions require REs to ensure that the service provider employs the same high standard of care in performing the services as would have been employed by the RE. Outsourcing should neither impede nor interfere with the ability of the RE to effectively oversee and manage the activities of the service provider located in India or abroad. REs shall evaluate the need for outsourcing of IT services based on a comprehensive assessment of attendant benefits, risks and availability of commensurate processes to manage those risks. Each RE shall also put in place a comprehensive Board approved outsourcing policy and a risk management framework. The directions also mandate REs to require service providers to develop and establish a robust business continuity plan (BCP) and disaster recovery plan (DRP), besides putting in place a management structure to monitor and control the outsourced IT activities. The directions also specify provisions pertaining to cross-border outsourcing, exit strategy, risk management, evaluation and engagement of the service providers. They also envisage a robust grievance redressal mechanism wherein the responsibility for redressal of customers' grievances related to outsourced services shall rest with the RE.

III.3.5 Master Direction on Acquisition and Holding of Shares or Voting rights in Banking Companies

3.27 The Reserve Bank released the guidelines on acquisition and holding of shares or voting rights in banking companies with the intent of ensuring that the ultimate ownership and control of banking companies are well-diversified and their major shareholders are 'fit and proper' on a continuing basis. The guidelines that are applicable to all banking companies, including local area banks, small finance banks and payments banks operating in India²⁵ stipulate that any person who intends to make an acquisition which is likely to result in major shareholding *i.e.*, an "aggregate holding" of five per cent or more of the paid-up share capital or voting rights in a banking company²⁶, is required to seek an advance approval of the Reserve Bank. On receipt of the reference from the Reserve Bank, the board of directors of the banking company shall deliberate on the proposed acquisition and assess the 'fit and proper' status of the person. The guidelines limit the shareholding to 10 per cent for non-promoters and 26 per cent for promoters, subject to certain conditions.

3.28 A banking company shall continuously monitor that its major shareholders²⁷ and applicants are 'fit and proper' on an ongoing basis. Subsequent to such acquisition, if the aggregate holding falls below five per cent at any point in time, the person will be required to seek fresh approval from the Reserve Bank if the person intends to again raise the aggregate holding to five per cent or more of the paid-up share capital or total voting rights of the banking company. The guidelines also clarified the concept of 'indirect holding' of shares/voting rights in banks with an illustrative list of such holdings.

²⁵ These directions are not applicable to foreign banks [operating either through branch mode or Wholly Owned Subsidiary (WOS) mode].

²⁶ Shall be computed assuming that all the instruments (including convertible instruments) issued/to be issued to the person have been converted into shares (with applicable voting rights) and deemed to be included in the paid-up share capital or total voting rights of the banking company.

²⁷ Major shareholders include promoter(s) with major shareholding.

III.3.6 Framework for Compromise Settlements and Technical Write-offs²⁸

3.29 With a view to provide further impetus to resolution of stressed assets in the system, the framework on compromise settlements and technical write-offs was issued by the Reserve Bank. The framework provides clarity on the definition of technical write-off and a broad guidance on the process to be followed by REs while carrying out technical write-off. Further, it lays down guidance on important process-related matters covering board oversight, delegation of power, reporting mechanism and a cooling period for normal cases of compromise settlements. The penal measures currently applicable to borrowers classified as fraud or wilful defaulter shall, however, remain in cases where banks enter into compromise settlements with such borrowers.

III.3.7 Applicability of State Money Lenders Acts and State Microfinance Acts on NBFCs

3.30 Non-banking Financial Companies (NBFCs) are registered and regulated by the Reserve Bank under the Reserve Bank of India Act, 1934.

3.31 Legislations in some states (*viz.*, State Money Lenders Acts and State Microfinance Acts) extended their applicability to include the oversight and functioning of NBFCs which are registered and regulated by the Reserve Bank. Any duality of regulation and potentially discordant compliance requirements can disincentivise the NBFCs from operating in the state. In turn, this may drive vulnerable borrowers to informal sources for meeting their credit requirements, thus rendering them vulnerable to unfair practices. Moreover, this can also reverse the efforts of the Government and the

Reserve Bank towards furthering financial inclusion. In case of major defaults by borrowers of NBFCs and, in turn, by NBFCs on loans from their upstream lenders, including banks, the risk of contagion spreading is high. In this context, the High Court of the State of Telangana in its judgement dated February 14, 2023 has held that NBFCs (registered under the Reserve Bank of India Act, 1934 and regulated by the Reserve Bank) operating in the states of Telangana and Andhra Pradesh would be excluded from the purview of the Telangana Microfinance Act and Andhra Pradesh (AP) Microfinance Act, respectively. Earlier, in its judgement dated May 10, 2022 the Supreme Court held that State Money Lenders Act will have no application to NBFCs registered under the RBI Act and regulated by the Reserve Bank. The clarity provided by these judgements on regulatory authority for NBFCs operating in a state bodes well for the financial intermediation in the country.

III.3.8 Single Settlement for Three Cheque Truncation System Grids

3.32 Currently, the cheque truncation system (CTS) architecture comprises of three regional grids – northern, southern and western. Each grid provides clearing services to banks under its respective jurisdiction. The Payments Vision 2025²⁹ envisages migration from the current architecture of the three regional grids to a National Grid for CTS. This is expected to improve cost effectiveness and make the related operations simpler for banks and also provide the benefit of CTS clearing for outstation cheques. As a first step, single settlement for three CTS grids has been put in place from March 1, 2023. This has enhanced liquidity efficiency of the CTS and reduced the risk of default by participants.

²⁸ Read with FAQs issued on June 20, 2023.

²⁹ RBI (2022), "Payments Vision 2025 - Department of Payment and Settlement Systems", June.

III.3.9 Ringfencing India's Payment Systems

3.33 The removal of certain banks from the international card schemes and financial messaging networks since the onset of the Russia-Ukraine conflict has highlighted the necessity to have a robust domestic payments infrastructure to effectively manage the risks of disruption/ discontinuity of operations and dependence on international payment system operators/ service providers. The domestic card network, viz., RuPay was implemented in 2012 to ensure availability of country's own card network with global acceptance. The Reserve Bank's guidelines³⁰ on mandatory storage of payments data within India are also aimed at safeguarding data and protecting customer interests.

3.34 The Indian Financial Network (INFINET), a membership-only Closed User Group (CUG) network comprising the Reserve Bank, member banks and financial institutions, is the communication backbone whereas the Structured Financial Messaging System (SFMS), the Indian standard for domestic financial messaging is the mainstay for messaging in interbank financial transactions and centralised payment systems, viz., Real Time Gross Settlement (RTGS) and National Electronics Funds Transfer (NEFT). The National Payments Corporation of India (NPCI) operated payment systems are implemented by using domestic messaging solutions with final settlement in RTGS.

3.35 For cross-border payments, India is seeking to extend/ leverage its domestic payment systems through bilateral interlinkages with other countries interested to establish such inter-linkages. The Fast Payment System interlinking between unified payments interface (UPI) and PayNow (Singapore) in February 2023 has created digital infrastructure for instant digital payments and funds transfer between the two countries. Further, quick response (QR) code based acceptance of UPI has been facilitated in Bhutan, Singapore, and United Arab Emirates for merchant payments. On similar lines, expansion

of the framework of INFINET and SFMS, to provide financial messaging platform in other jurisdictions, is required to moderate the dependence on international financial messaging platforms. These initiatives could provide alternative cross-border payment channels in the countries that adopt SFMS, INFINET and interlink with India's payment systems. Some of the targets proposed under the Payment Vision 2025 are aimed to protect the critical payment system operations while ensuring business continuity in the event of unforeseen adverse scenarios.

III.3.10 Customer Protection

3.36 The number of complaints received by the Offices of the Reserve Bank of India Ombudsman (ORBIOs) under the 'Reserve Bank – Integrated Ombudsman Scheme (RB-IOS), 2021' indicates that the complaints relating to loans and advances, mobile/ electronic banking and credit cards constituted nearly 60 per cent of the total complaints received during Q3 and Q4 of 2022-23 (Table 3.1).

Table 3.1: Category of Complaints Received under the RB-IOS, 2021

Sr. No.	Grounds of Complaint	RB-IOS (Oct-Dec 2022)		RB-IOS (Jan-Mar 2023)	
		Number	Share in per cent	Number	Share in per cent
1	Loans and Advances and Non-adherence to FPC	15,874	24.3	15,558	24.5
2	Mobile / Electronic Banking	12,978	19.9	13,064	20.6
3	Credit Card	9,803	15.0	9,510	15.0
4	Opening/Operation of Deposit accounts	9,373	14.4	8,441	13.3
5	ATM/CDM/Debit card	8,161	12.5	6,773	10.7
6	Other products and services	5,775	8.9	6,703	10.6
7	Pension	1,106	1.7	901	1.4
8	Para-Banking	737	1.1	741	1.2
9	Remittance and Collection of instruments	795	1.2	715	1.1
10	Others	665	1.0	1,087	1.7
Total		65,267	100.0	63,493	100.0

Source: Reserve Bank of India.

³⁰ Press Release – "Storage of Payment System Data" - RBI/2017-18/153 - DPSS.CO.OD No.2785/06.08.005/2017-2018.

Complaints relating to deposit accounts, automatic teller/ cash deposit machines and debit cards also had a large share in the number of complaints.

3.37 With increasing usage of technology for availing financial services and upward adjustment in the benchmark lending rates of banks, complaints related to loans and advances, non-adherence to the Fair Practices Code and mobile/electronic banking related issues need to be addressed swiftly and holistically by REs at their end, to further enhance consumers' confidence in the financial system.

III.3.11 Enforcement

3.38 During December 2022 - May 2023, the Reserve Bank undertook enforcement action against 122 REs (five public sector banks; two private sector banks; hundred co-operative banks; two foreign banks; one small finance bank; three regional rural banks; eight non-banking financial companies and one housing finance company) and imposed an

aggregate penalty of ₹26.34 crore for non-compliance with/ contravention of statutory provisions and/ or directions issued by the Reserve Bank.

III.4 Other Developments

III.4.1 Deposit Insurance

3.39 The Deposit Insurance and Credit Guarantee Corporation (DICGC) extends insurance cover to depositors of all the banks operating in India. As on March 31, 2023 the number of registered insured banks was 2,026, comprising 139 commercial banks {including forty three regional rural banks (RRBs), two local area banks (LABs), six payment banks and twelve small finance banks (SFBs)} and 1,887 co-operative banks. With the present deposit insurance limit of ₹5 lakh, 98.1 per cent of the total number of deposit accounts (300 crore) and 46.3 per cent of assessable deposits (₹181.14 lakh crore) were insured (Table 3.2).

3.40 The insured deposits ratio (*i.e.*, the ratio of insured deposits to assessable deposits) was higher

Table 3.2: Coverage of Deposits

(Amount in ₹ crore and Number of Accounts in crore)

Sr. No.	Item	Mar 31, 2022	Sep 30, 2022	Mar 31, 2023	Percentage Variation	
					(5) over (4)	(5) over (3)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(A)	Number of Registered Banks	2,058	2,034	2,026	-	-
(B)	Total Number of Accounts	262	272	300	10.2	14.5
(C)	Number of Fully Protected Accounts	257	267	294	10.3	14.7
(D)	Percentage (C) / (B)	97.9	98.0	98.1	-	-
(E)	Total Assessable Deposits	1,65,49,630	1,75,09,830	1,81,14,550	3.5	9.5
(F)	Insured Deposits	81,10,431	80,95,264	83,89,470	3.6	3.4
(G)	Percentage (F) / (E)	49.0	46.2	46.3	-	-

Note: Reference dates of the figures relate to the dates of the previous half-year.

Source: DICGC.

Table 3.3: Bank Group-wise Deposit Protection Coverage (As on March 31, 2023)

(₹ crore)

Bank Groups	No. of Insured Banks	Insured Deposits (ID)	Assessable Deposits (AD)	ID / AD (per cent)
(1)	(2)	(3)	(4)	(5)
I. Commercial Banks	139	77,00,667	1,70,53,688	45.2
i) Public Sector Banks	12	51,32,083	1,00,01,096	51.3
ii) Private Sector Banks	21	20,11,253	54,94,669	36.6
iii) Foreign Banks	43	63,387	8,85,929	7.2
iv) Small Finance Banks	12	56,129	1,39,142	40.3
v) Payment Banks	6	9,791	9,842	99.5
vi) Regional Rural Banks	43	4,27,216	5,21,921	81.9
vii) Local Area Banks	2	808	1,089	74.2
II. Cooperative Banks	1,887	6,88,803	10,60,862	64.9
i) Urban Cooperative Banks	1,502	3,62,101	5,21,203	69.5
ii) State Cooperative Banks	33	62,256	1,36,208	45.7
iii) District Central Cooperative Banks	352	2,64,446	4,03,451	65.5
Total	2,026	83,89,470	1,81,14,550	46.3

Note: Reference dates of the figures relate to the dates of previous half-year.

Source: DICGC.

for cooperative banks (64.9 per cent) followed by commercial banks (45.2 per cent) (Table 3.3). Within commercial banks, PSBs had a much higher insured deposit ratio *vis-à-vis* PVBs, indicating concentration of larger-sized deposits with the latter.

3.41 Deposit insurance premium received by the DICGC grew by 9.7 per cent (y-o-y) to ₹21,381 crore during 2022-23, of which the share of commercial banks was 94 per cent (Table 3.4).

3.42 The Deposit Insurance Fund (DIF) with the DICGC is primarily built out of the premia paid by insured banks, recoveries from settled claims and investment incomes, net of income tax. DIF recorded a 15.5 per cent increase during 2022-23 to reach ₹1.70 lakh crore on March 31, 2023. The reserve ratio (*i.e.*, ratio of DIF to insured deposits) increased to 2.02 per cent from 1.81 per cent a year ago (Table 3.5).

3.43 In case of liquidated banks and banks under the Reserve Bank's All Inclusive Directions (AIDs), the DICGC settled claims amounting to ₹751.8 crore during 2022-23. The recovery of claims increased

Table 3.4: Deposit Insurance Premium

(in ₹ crore)

Period	Commercial Banks	Co-operative Banks	Total
2021-22	18,247.5	1,242.4	19,489.9
H1	8,939.1	621.6	9,560.7
H2	9,308.4	620.8	9,929.2
2022-23	20,104.2	1,277.0	21,381.1
H1	9,872.1	640.7	10,512.8
H2	10,232.1	636.3	10,868.3

Source: DICGC.

Table 3.5: Deposit Insurance Fund and Reserve Ratio

As on	Deposit Insurance Fund (₹ crore)	Reserve Ratio (per cent)
March 31, 2022	1,46,842	1.81
September 30, 2022	1,55,459	1.92
March 31, 2023	1,69,602	2.02

Source: DICGC.

substantially to ₹882.8 crore in 2022-23 from ₹399.0 crore in 2021-22. (Table 3.6).

III.4.2 Corporate Insolvency Resolution Process (CIRP)

3.44 Since provisions relating to the CIRP came into force in December 2016, a total of 6,571 CIRPs have commenced by March 2023, of which, 4,515 CIRPs (69 per cent) have been closed (Table 3.7). Of the closed CIRPs, 21 per cent have been closed on appeal or review or settled, 19 per cent have been withdrawn, 45 per cent have ended in orders for

Table 3.6: Deposit Insurance Claims and Recovery

(in ₹ crore)

Period	Claims Settled	Recovery of Claims
2021-22	8,516.6 (3457.4)	399.0 (0.0)
H1	370.7 (NA)	267.4 (NA)
H2	8,145.9* (3457.4)	131.6 (0.0)
2022-23	751.8 (646.0)	882.8 (233.2)
H1	479.8 (397.9)	77.4 (6.3)
H2	272.0 (248.1)	805.4 (226.9)

Note: 1. Figures in parentheses relate to banks under All Inclusive Directions (AID).

2. * Includes ₹1.69 Cr expeditious settlement of claims.

3. NA – Not Applicable.

Source: DICGC.

Table 3.7: Corporate Insolvency Resolution Process

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	707	94	0	19	91	539
2018 – 19	539	1157	155	97	77	305	1062
2019 – 20	1062	1988	344	217	134	540	1815
2020 – 21	1815	537	89	162	121	350	1630
2021 – 22	1630	890	115	177	147	344	1737
April – Jun, 2022	1737	365	39	64	39	96	1864
Jul – Sep, 2022	1864	260	49	53	45	103	1874
Oct – Dec, 2022	1874	283	33	35	34	80	1975
Jan – Mar, 2023	1975	347	40	43	62	121	2056
Total	NA	6571	959	848	678	2030	2056

Note: 1. These CIRPs are in respect of 6346 CDs.

2. The data excludes 1 CD which moved directly from BIFR to resolution.

3. The data includes Dewan Housing Finance Corporation Limited data, Srei Equipment Finance Limited, Srei Infrastructure Finance Limited and Reliance Capital Ltd, wherein the application filed by the Reserve Bank was admitted under section 227 read with Financial Service Provider Rules (FiSP Rules) of the Code.

Source: National Company Law Tribunal (NCLT) and filing by IPs.

liquidation and the remaining 15 per cent have ended in approval of resolution plans (Table 3.8).

3.45 A stakeholder-wise analysis of the CIRPs that were closed as on March 31, 2023 indicates that of the CIRPs initiated by operational creditors (OCs), 53 per cent were closed on appeal, review, settled or withdrawal (Table 3.9). Such closures accounted for 72 per cent of all such closures.

3.46 Till March 31, 2023 678 CIRPs have ended in resolution. Realisation by financial creditors (FCs) under resolution plans in comparison to liquidation value was 169 per cent, while the realisation by them was 32 per cent in comparison to their claims. Importantly, out of the 678 corporate debtors (CDs) rescued through resolution plans, 249 were either pending before the erstwhile Board for Industrial and Financial Reconstruction (BIFR) or were defunct.

Table 3.8: Sectoral Distribution of CIRPs as on March 31, 2023

Sector	No. of CIRPs						Ongoing
	Admitted	Closed				Total	
		Appeal/ Review/ Settled	Withdrawal under Section 12 A	Approval of Resolution Plan	Commencement of Liquidation		
Manufacturing	2552	334	335	340	852	1861	691
Food, Beverages and Tobacco Products	335	37	42	41	112	232	103
Chemicals and Chemical Products	268	42	43	37	77	199	69
Electrical Machinery and Apparatus	186	23	18	11	78	130	56
Fabricated Metal Products	134	17	25	15	44	101	33
Machinery and Equipment	281	50	46	26	88	210	71
Textiles, Leather and Apparel Products	433	53	58	46	166	323	110
Wood, Rubber, Plastic and Paper Products	299	36	42	45	96	219	80
Basic Metals	432	51	34	92	137	314	118
Others	184	25	27	27	54	133	51
Real Estate, Renting and Business Activities	1385	260	207	85	365	917	468
Real Estate Activities	373	81	46	18	49	194	179
Computer and related activities	189	25	34	9	69	137	52
Research and Development	8	2	2	1	0	5	3
Other Business Activities	815	152	125	57	247	581	234
Construction	745	132	108	73	143	456	289
Wholesale and Retail Trade	650	81	61	47	265	454	196
Hotels and Restaurants	141	24	22	17	35	98	43
Electricity and Others	196	25	12	35	66	138	58
Transport, Storage and Communications	178	20	21	14	74	129	49
Others	724	83	82	67	230	462	262
Total	6571	959	848	678	2030	4515	2056

Source: Insolvency and Bankruptcy Board of India (IBBI).

Table 3.9: Outcome of CIRPs, Initiated Stakeholder-wise as on March 31, 2023

Outcome	Description	CIRPs initiated by			
		Financial Creditor	Operational Creditor	Corporate Debtor	Total
Status of CIRPs	Closure by Appeal/Review/Settled	264	688	7	959
	Closure by Withdrawal u/s 12A	232	609	7	848
	Closure by Approval of Resolution Plan #	380	241	56	677
	Closure by Commencement of Liquidation	927	896	207	2030
	Ongoing	1109	831	113	2053
	Total	2912	3265	390	6567
CIRPs yielding Resolution Plans	Realisation by FCs as per cent of Liquidation Value	182.2	125.8	147.5	168.0
	Realisation by FCs as per cent of their Claims	34.3	17.6	18.3	31.8
	Average time taken for Closure of CIRP (days)	613	632	541	614
CIRPs yielding Liquidations	Liquidation Value as per cent of Claims	6.4	9.1	8.6	7.0
	Average time taken for Closure of CIRP (days)	476	450	390	456

Note: # This excludes data in respect of FiSPs admitted under section 227 read with FiSP Rules of the Code.

Source: IBBI.

3.47 45 per cent of the CIRPs which were closed yielded orders for liquidation as compared to 15 per cent ending up with a resolution plan. The remaining 40 per cent were settled. The economic value in most of these CDs has been almost completely eroded even before they were admitted into CIRP. The average value of the assets of these CDs was nearly 7 per cent of the outstanding debt amount. (Table 3.10).

3.48 The primary objective of the Insolvency and Bankruptcy Code (IBC), 2016 (the Code) is to provide relief to CDs in distress. The Code has rescued 678 CDs till March 2023 through resolution plans, one third of which were in deep distress. Further, it has referred 2,030 CDs for liquidation, three-fourth of which were sick or defunct. The rescued CDs had assets valued at ₹ 1.69 lakh crore, while the CDs referred for liquidation had assets valued at ₹ 0.64 lakh crore, when they were admitted to the CIRP. Thus, in value terms, more than 72 per cent of distressed assets were rescued. Till March 31, 2023, 25,107 applications for initiation of CIRPs of CDs having underlying default of ₹ 8.81 lakh crore were disposed of before their admission into CIRP.

3.49 The realisable value of the assets available with the 678 rescued CDs when they entered the CIRP was only ₹ 1.69 lakh crore, though they owed ₹ 8.95 lakh crore to creditors. The resolution plans realised ₹ 2.85 lakh crore, which is 68 per cent more than the liquidation value of these CDs (*i.e.*, the creditors recovered 168 per cent of the realisable value of the CDs' assets, whereas under other recovery option or liquidation, they would have recovered at best the realisable value of assets less minus the cost of recovery/liquidation; the additional recovery can be

Table 3.10: CIRPs Ending with Orders for Liquidation till March 31, 2023

State of Corporate Debtor at the Commencement of CIRP	No. of CIRPs initiated by			
	Financial Creditor	Operational Creditor	Corporate Debtor	Total
Either in BIFR or Non-functional or both	685	703	160	1548
Resolution Value > Liquidation Value	120	70	39	229
Resolution Value ≤ Liquidation Value*	802	725	166	1693

Note: 1. There were 110 CIRPs, where CDs were in BIFR or non-functional but had resolution value higher than liquidation value.
2. *Includes cases where no resolution plans were received and cases where liquidation value is zero or not estimated.
3. Data of 08 CIRPs is awaited.

Source: IBBI.

considered as a bonus from the IBC process). Though realisation is incidental under the Code, financial creditors recovered 34.3 per cent of their claims which only reflects the extent of value erosion by the time the CDs entered CIRP. Nevertheless, it is the highest among all options available to creditors for recovery. On an average, resolution plans are yielding around 84 per cent of fair value of the CDs. These realisations are exclusive of realisations that would arise from value of equity holdings post-resolution, resolution of personal guarantors to CDs and from disposal of applications for avoidance transactions.

3.50 The 2,030 CDs, which ended up with orders for liquidation, had an aggregate claim of ₹ 9.20 lakh crore and their ground assets valued were at only ₹ 0.64 lakh crore. Till March 2023, 520 CDs, which have been completely liquidated, had total claims of ₹ 1.18 lakh crore, but their assets were valued at ₹ 5,168 crore. Nearly ₹ 4,638 crore were realised through liquidation of these companies. The Code endeavours to close the various processes at the earliest and prescribes timelines for some of them. The 678 CIRPs, which have yielded resolution plans by the end of March 2023, took an average 512 days {after excluding the time excluded by the adjudicating authority (AA)} for conclusion of the process. Similarly, the 2,030 CIRPs, which ended up in orders for liquidation, took an average 456 days for conclusion. 520 liquidation processes, which were closed by submission of final reports, took an average of 531 days for closure. Similarly, 1,024 voluntary liquidation processes, which have been closed by submission of final reports, took an average of 411 days for closure.

III.4.3 Cybersecurity Risks and their potential impact on Financial Stability

3.51 Rising dependence on technology for financial services has increased the potential threat

from cybersecurity risks to the financial sector. Financial entities' response to cyberattacks may not be effective, resulting in long duration of non-availability of systems, thereby affecting the ability of the NBFC to service its customers for a long period. Given the evolving nature of cyber risks and interconnectedness of the financial sector entities, cyber security incidents in NBFCs and UCBs could also make a dent on the trust of customers. Data leakage can give rise to concerns on protection of financial data, where remediation measures become challenging if the cause remains unidentified.

3.52 As regards cyber frauds on customers, the Reserve Bank has issued guidelines for further strengthening of banks' IT systems (e.g., Master Direction on Digital Payment Security Controls, 2021) and implementing robust fraud prevention and detection measures, including monitoring of transactions and customer behaviour, to detect and prevent instances of fund losses through cyber frauds.

3.53 Some of the initiatives undertaken by the SEBI to tackle cyber risks in the securities market include monitoring the vulnerability assessment and penetration testing (VAPT) by the regulated entities, conduct of VAPT and cyber audits of REs by the SEBI, deployment of cyber incidents reporting portal, issuance of frameworks for adoption of cloud services, cyber security and cyber resilience, active participation in Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) of the Government of India and conduct of quarterly cyber security table top exercise in collaboration with Indian Computer Emergency Response Team (CERT-IN).

III.4.4 Developments in International Financial Services Centres (IFSC)

3.54 The International Financial Services Centres Authority (IFSCA) has brought in an internationally

aligned regulatory regime for, *inter alia*, banking, capital markets, fund management, insurance, bullion exchange, fintech, aircraft and ship leasing. The GIFT-IFSC has been witnessing strong growth momentum, with the international and domestic financial services industry gravitating to this jurisdiction which is treated as a non-resident zone under the Foreign Exchange Management Regulations. The total banking asset size of IFSC banking units (IBU) stood at US\$ 38 billion. The cumulative banking transactions undertaken by IBUs crossed US\$ 422.6 billion till March 2023. Additionally, the cumulative OTC derivatives transactions including non-deliverable forwards (NDFs) crossed US\$ 535 billion.

3.55 The IFSCA banking regulations were amended, which allowed a global administrative office (GAO) to be setup in IFSC. The GAO can undertake activities such as management, administration, coordination as well as support services from IFSC without the need of opening a banking unit.

3.56 The IFSCA (Finance Company) Regulations have enabled specific activities in the IFSC which include undertaking leasing of aircrafts, ships, and other equipment notified by IFSCA, setting up of Global and Regional Treasury Centers and International Trade Finance Services Platform (ITFS). As of March 2023, 21 Aircraft Lessors are registered as Finance Company. ITFS platform is first of its kind of international platform which would connect entities across the globe with the advantage of enabling price discovery through transparent auction process and funds from financiers across the globe. There are four entities registered as Finance Company within IFSC for the purpose of operating ITFS platforms.

3.57 The capital market ecosystem in GIFT-IFSC comprises two international stock exchanges offering 20+ hours of trading in various product categories including index, stock, currency, and commodity

derivatives. The average daily turnover on the stock exchanges stood at US\$ 29.5 billion (notional value) during March 2023 and the cumulative debt listed at GIFT-IFSC stock exchanges as on March 31, 2023 was US\$ 50.65 billion, including US\$ 9.25 billion of debt listing related to environment, social and governance (ESG) bonds.

3.58 As on March 31, 2023 four entities had been registered by IFSCA as a bullion trading member (Bullion TM), five as bullion trading and clearing member (Bullion TMCM), two as bullion professional clearing member (Bullion PCM) and one as bullion trading member cum self-clearing member. Further, 84 'Qualified Jewellers' had been notified by IFSCA till March 31, 2023. The asset management ecosystem is growing rapidly and consists of 60 fund management entities and 50 funds with US\$ 12.6 billion of committed investment, eight portfolio managers and six investment advisors as on March 31, 2023. Currently, the insurance ecosystem in the IFSC comprises of 23 entities, including six IFSC Insurance Offices (IIOs) and 17 IFSC Insurance Intermediary Offices (IIIOs). Under the IFSCA fintech entity framework, 22 entities have been issued limited use authorisation (sandbox) and four entities have been issued authorisation as on March 31, 2023.

III.4.5 Climate Change Initiatives by SEBI

3.59 SEBI had mandated ESG related disclosures for the top 100 listed entities (by market capitalisation) since 2012 (later extended to top 1,000 entities) as per the business responsibility report (BRR) which was replaced with the business responsibility and sustainability report (BRSR) in 2021. BRSR disclosures include environment risks, environment related disclosures {viz., greenhouse gas (GHG) emissions, air pollutant emissions, energy consumption, biodiversity, waste generated and waste management practices}. BRSR allows cross-

referencing of disclosures made on internationally accepted reporting frameworks through interoperability of reporting.

3.60 The SEBI has also introduced BRSR Core which is intended to enhance the reliability of ESG disclosures and will be applicable to the top 150 listed entities (by market capitalisation) from 2023-24 and gradually extended to the top 1,000 listed entities by 2026-27.

3.61 In 2017, the SEBI had introduced the concept of "green debt securities" to address increasing demand for sustainable finance. The framework was revised after extensive public consultation and inclusion of views from international bodies {viz., the International Capital Market Association (ICMA) the Climate Bond Initiative and the London Stock Exchange} by aligning it with the green bond principles (GBPs) of the ICMA, which are recognised by IOSCO. The framework also introduced the concepts of (a) blue bonds (related to water management and marine sector); (b) yellow bonds (related to solar energy); and (c) transition bonds (for entities moving from carbon intensive to carbon neutral projects), as subcategories of green debt securities.

3.62 Transition bonds provide funding for migrating to a more sustainable form of operations in line with India's Intended Nationally Determined Contributions (INDCs). The SEBI has given guidelines to avoid the occurrence of greenwashing which prescribe that an issuer shall utilise the funds only for the purposes for which funds were raised, issuers shall not cherry pick data while making disclosures and issuers shall not use any misleading labels.

III.4.6 Insurance

3.63 The Indian insurance industry, encompassing both life and general (including health) insurance, has registered a compound annual growth rate of 10.3 per cent during the last 10 years. The total premium income for life insurance industry has

consistently increased over the years. Factors such as increasing disposable income, rising awareness on the need for insurance and evolving customer preferences have contributed to the industry's growth. During 2022-23, the total premium income of life insurers registered a robust growth of 12.8 per cent amounting to ₹ 7.81 lakh crore (provisional) from ₹ 6.93 lakh crore in 2021-22.

3.64 During 2022-23, the total premium underwritten by general and health insurers at ₹ 2.57 lakh crore (provisional) recorded a robust growth of 16.4 per cent. Amongst the segments of general insurance business, the health insurance segment grew by 23 per cent followed by motor insurance with 15 per cent.

3.65 The Insurance Regulatory and Development Authority of India (IRDAI) has shifted its focus towards ensuring "Insurance for all by 2047" by making insurance more accessible, affordable, and customised, thereby enhancing the overall insurance penetration in the country. To promote ease of doing business and reduction in compliance burden, the IRDAI has brought in a number of reforms which include, *inter alia*, (a) extending 'Use and File' procedure for all the health and general insurance products and most of the life insurance products; (b) simplifying the process of registration of insurance companies, raising investment threshold for individual investors and specifying indicative criteria for determination of 'Fit and proper' status of investors and promoters; (c) increasing the period for considering state/ central government dues for calculation of solvency margin and reduction of solvency factor related to crop insurance; (d) revising factor for calculation of solvency for Unit Linked Business (without guarantees) and Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY); (e) increasing the roles and responsibilities of Appointed Actuaries; (f) increasing the threshold for companies to raise other forms of capital (*viz.*, subordinated

debt and/or preference shares); (g) increasing the experimentation period of regulatory sandbox to test innovative products; (h) increasing the maximum limit of tie-ups for corporate agents and insurance marketing firms with insurers; (i) revamping the guidelines for cross-border reinsurers; and (j) revising expenses of management (EoM) and commission limits for insurers.

III.4.7 Pension Funds

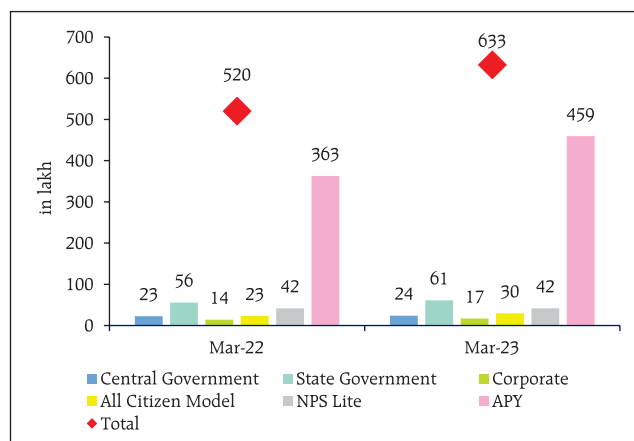
3.66 The number of subscribers under the National Pension System (NPS) and the Atal Pension Yojana (APY) increased by 21.6 per cent (y-o-y) during 2022-23, whereas the assets under management (AUM) recorded 22.0 per cent growth (Chart 3.1 and 3.2). NPS and APY have both continued to progress in terms of the total number of subscribers and AUM. The number of subscribers under NPS and APY altogether has reached 6.32 crore and AUM touched ₹ 8.98 lakh crore as at end-March 2023.

3.67 APY enrolled more than 1.19 crore new subscribers during 2022-23 as compared to 99 lakhs in the previous year. The scheme has 4.59 crore subscribers with an AUM of ₹ 0.27 lakh crore as on March 31, 2023. The total enrolments under APY crossed the 5.20 crore mark. Out of the total enrolments during the latest year, around 45 per cent were female. Also, 45 per cent of the total subscribers were between the age of 18-25 years.

Summary and Outlook

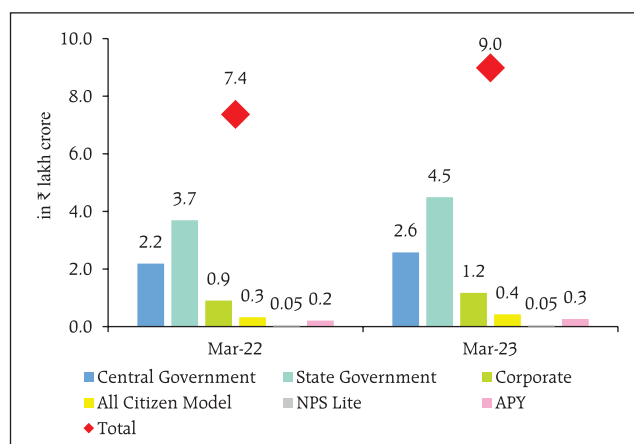
3.68 The recent banking turmoil has reaffirmed the importance of prudent regulatory standards, strong supervision and sound corporate governance and risk management practices by financial institutions for the stability of the financial system. In addition to banking system stability, international regulatory efforts are focused on addressing existing and emerging vulnerabilities such as high levels of debt, liquidity and leverage issues in NBFIs, climate

Chart 3.1: NPS and APY Subscribers – Sector-wise



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

Chart 3.2: NPS and APY AUM – Sector-wise



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

change, disruptive innovations like crypto-assets and DeFi, cyber threats and financial fragmentation.

3.69 Domestic regulatory initiatives continue to focus on improving efficiency and resilience of the financial system through sound regulatory practices and strong supervision. Improving access to finance, reducing regulatory costs, promoting responsible innovation and deepening financial markets remain key regulatory priorities. Regulators remain alert to evolving changes in the regulatory landscape. Through robust regulation, supervision and surveillance, they aim to safeguard financial stability and support economic growth.

Annexure 1

Systemic Risk Survey

In the 24th round of the Systemic Risk Survey, risk perception from global, macroeconomic and financial market categories of systemic risk receded. Global spillovers remained in the 'high' risk category. Financial market risk declined from 'high' to 'medium' risk category. Macroeconomic risk remained in the 'medium' risk category and was perceived to have moderated. Going forward, respondents' perception of risk to financial stability included: tightness of global financial conditions; global growth slowdown; rise in commodity prices; reversal of capital flows; increase in climate risks and geo-political risks.

The 24th round of the Reserve Bank's Systemic Risk Survey (SRS) was conducted in May 2023 to capture the perceptions of experts, including market participants and academicians, on major risks faced by the Indian financial system. In addition to its regular format, this round of the survey also tries to capture the risk of global recession from the recent banking sector turmoil in key advanced economies.

The feedback from 50 respondents is encapsulated below:

- Risk perception across global, macroeconomic and financial market categories of systemic risk receded whereas it recorded a marginal uptick for institutional risks. Risks from global spillovers remained in the 'high' risk category. Financial market risks declined from 'high' risk to the 'medium' risk category. Macroeconomic risks remained in the 'medium' category, and were perceived to have moderated (Figure 1).
- Major drivers of global risks such as risks to global growth, commodity price risk and risk emanating from monetary tightening in advanced economies were perceived to have declined (Figure 2).
- All the drivers of financial market risk, i.e., foreign exchange rate risk, equity price volatility, interest rate risk and liquidity risk were gauged to have decelerated from 'high' to 'medium' risk category (Figure 2).

Figure 1: Systemic Risk Survey: Major Risk Groups

Major Risk Groups	November- 2022	May-23	Change in Risk Perception ¹
A. Global Risks	6.9	6.2	Decline
B. Macroeconomic Risks	5.4	5.3	Decline
C. Financial Market Risks	6.5	5.8	Decline
D. Institutional Risks	5.3	5.4	Increase

Source: Systemic Risk Survey (November 2022 and May 2023).

Note:

Risk Category

Above 8-10	Above 6-8	Above 4-6	Above 2-4	0-2
Very high	High	Medium	Low	Very low

¹ The risk perception, as it emanates from the systemic risk survey conducted at different time periods (on a half-yearly basis in May and November), may shift from one risk category to the other, which is reflected by the change in colour. However, within the same risk category (that is, boxes with the same colour), the risk perception may also increase/decrease or remain the same, the shift being indicated accordingly through average numeric values.

Figure 2: Systemic Risk Survey: Risks Identified

Risk items		November 2022	May 2023	Change in Risk Perception
A. Global Risks	Global Growth	7.6	7.1	Decline
	Funding Risk (External Borrowings)	5.9	5.6	Decline
	Commodity Price Risk (including Crude Oil Prices)	6.9	5.7	Decline
	Banking Turmoil	NA	6.1	NA
	Monetary Tightening in Advanced Economies	7.9	6.5	Decline
B. Macroeconomic Risks	Domestic Growth	5.7	5.3	Decline
	Domestic Inflation	6.4	4.9	Decline
	Current Account Deficit	6.7	4.8	Decline
	Capital Inflows/ Outflows (Reversal of FIIs, Slowdown in FDI)	6.4	5.7	Decline
	Fiscal Deficit	5.5	5.3	Decline
	Corporate Sector Risk	5.2	4.8	Decline
	Real Estate Prices	4.9	5.0	Increase
	Consumption Demand	NA	5.5	NA
	Investment Growth	NA	5.6	NA
	Household Savings	5.4	5.2	Decline
	Climate Risks	5.9	6.3	Increase
C. Financial Market Risks	Foreign Exchange Rate Risk	6.6	5.6	Decline
	Equity Price Volatility	6.5	5.8	Decline
	Interest Rate Risk	6.5	5.9	Decline
	Liquidity Risk	6.2	5.8	Decline
D. Institutional Risks	Asset Quality Deterioration	5.4	5.1	Decline
	Banks' Exposure to Interest Rate Risk	NA	5.5	NA
	Cyber Risk	6.5	6.0	Decline
	Operational Risk	5.6	5.3	Decline
	Profitability	NA	5.0	NA

Note: NA – Not Available.

Source: Systemic Risk Survey (November 2022 and May 2023).

Note:

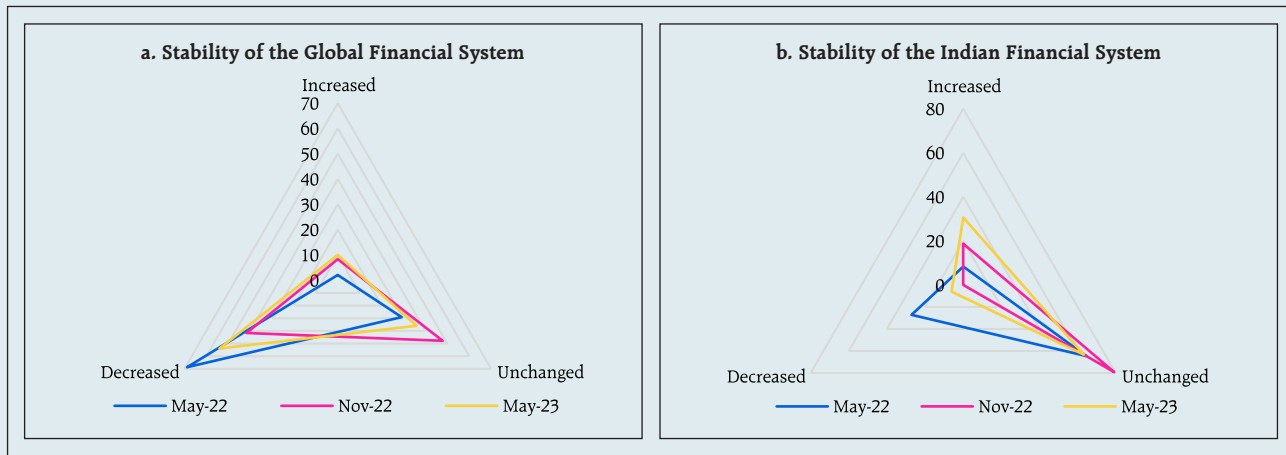
Risk Category

Above 8-10	Above 6-8	Above 4-6	Above 2-4	0-2
Very high	High	Medium	Low	Very low

- Decline in risk perception on domestic growth and inflation, fiscal deficit, current account deficit, and capital flows resulted in moderation in overall macroeconomic risks. However, macroeconomic risk resulting from climate change was perceived to have amplified (Figure 2).
- Cyber risk, a major institutional risk declined from 'high' risk category to 'medium' risk category.
- 54 per cent of the respondents reported that their confidence in the stability of the global financial system has declined over the last six months (Chart 1 a). In contrast, 94 per cent of the respondents placed similar or higher confidence in the Indian financial system (Chart 1 b).

Chart 1: Confidence in the Stability of the Financial System

(share of respondents, per cent)



- Around three-fourths of the respondents expected some impact or a limited impact on the Indian economy from global spillovers (Chart 2).
- More than 50 per cent of the respondents assessed that the prospects of the Indian banking sector have improved marginally or considerably and another 35 per cent of the respondents expected it to remain unchanged over a one-year horizon (Chart 3).
- 43 per cent of the respondents expected marginal to considerable improvement in asset quality of the Indian banking sector over the next six months, and another 34 per cent expected it to remain unchanged. Improved corporate earnings in major sectors, improvement in credit profile of corporates, prospects of economic recovery, and improved monitoring and risk assessment by banks were considered as contributing factors (Chart 4 a).
- A majority (53 per cent) of the respondents expected marginal to considerable improvement in credit demand and another 12 per cent of the respondents expected it to remain unchanged over the next six months, owing to factors, such as, public investment in the infrastructure sector, improvement in

Chart 2: Expectation of Instability in Global Financial System Affecting Indian Economy

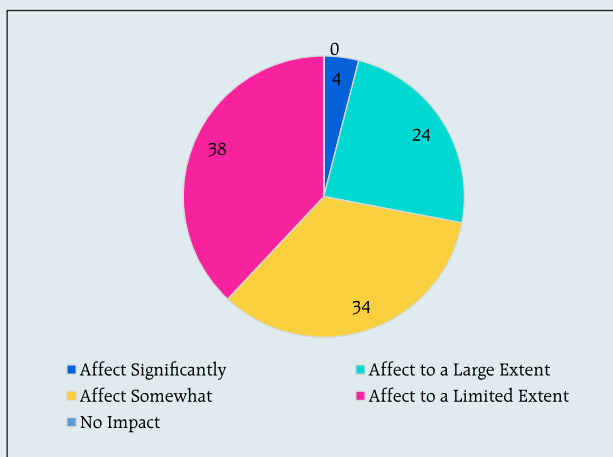


Chart 3: Prospects of Indian Banking Sector - Next One Year

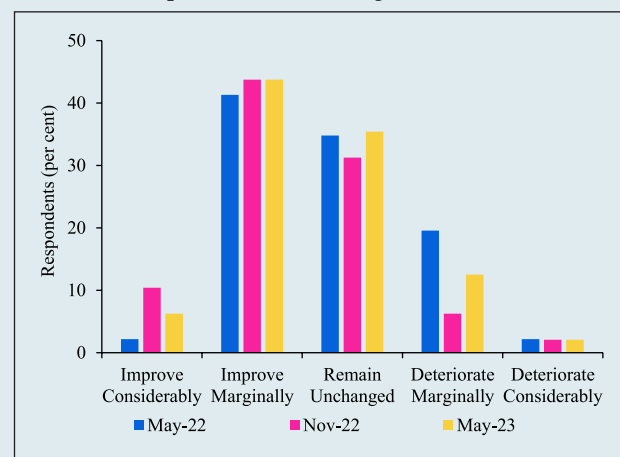
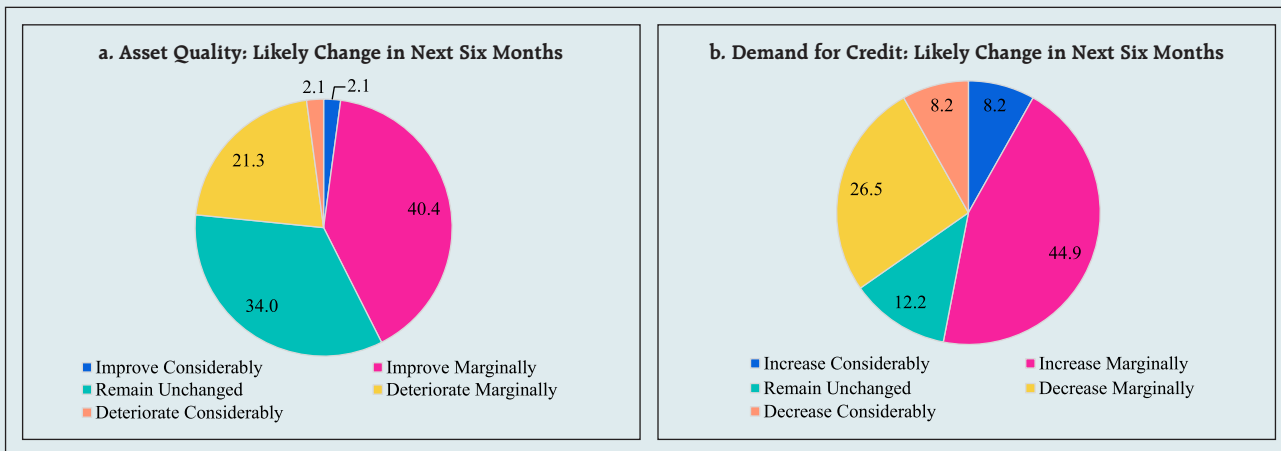


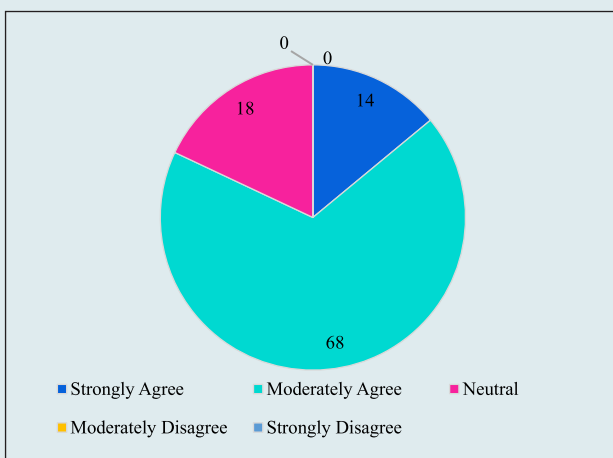
Chart 4: Indian Banking Sector – Outlook



corporate lending, increase in working capital demand by corporates, increase in consumption and investment demand, pick up in domestic economy particularly manufacturing sector, and decline in inflation (Chart 4 b).

- 82.0 per cent of the respondents either strongly or moderately agreed that the recent banking sector turmoil in advanced economies has aggravated risks to global recession (Chart 5).

Chart 5: Risk of Global Recession due to Banking Sector Turmoil in Advanced Economies



Risks to Financial Stability

Going forward, respondents identified the following major risks to financial stability:

- Global growth slowdown;
- Tightness of financial conditions and interest rate risk;
- Rise in commodity (including oil) prices;
- Slowdown in FDI flows and reversal of FII flows;
- Geo-political risk; and
- Increase in climate risk.

Annex 2

Methodologies

2.1 Scheduled Commercial Banks

(a) 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 six composite indices represent risk in six dimensions - soundness, asset-quality, profitability, liquidity, efficiency and sensitivity to market risk. Each composite index is a relative measure of risk during the sample period used for its construction, where a higher value would mean higher risk in that dimension.

The financial ratios used for constructing each composite index are given in Table 1. Each financial ratio is first normalised for the sample period using the following formula:

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

where X_t is the value of the ratio at time t . If a variable is negatively related to risk, then normalisation is done using $1 - Y_t$. Composite index of each dimension is then calculated as a simple average of the normalised ratios in that dimension. Finally, the banking stability indicator is constructed as a simple average of these six composite indices. Thus, each composite index or the overall banking stability indicator takes values between zero and one.

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

Dimension	Ratios			
Soundness	CRAR #	Nonperforming loans net of provisions to capital	Tier 1 capital to assets #	
Asset-Quality	Gross NPAs to Total Advances	Provisions to nonperforming loans #	Sub-Standard Advances to Gross NPAs #	Restructured Standard Advances to Standard Advances
Profitability	Return on Assets #	Net Interest Margin #	Growth in Profit Before Tax #	Interest margin to gross income #
Liquidity	Liquid Assets to Total Assets #	Liquidity Coverage Ratio #	Customer Deposits to Total Assets #	Non-Bank Advances to Customer-Deposits
Efficiency	Cost to Income	Business (Credit + Deposits) to Staff Expenses #	Staff Expenses to Total Expenses	
Sensitivity to market risk	RWA (market risk) to capital	Trading income to gross income		

Note: # Negatively related to risk.

(b) Macro stress testing

Macro-stress test ascertains the resilience of banks against macroeconomic shocks by assessing the impact of macro shocks on capital adequacy of a set of major scheduled commercial banks (46 banks presently). Macro-stress test attempts to project capital ratios over a one-year horizon, under a baseline and two adverse (medium and severe) scenarios. The macro-stress test framework consists of (i) designing the macro scenarios, (ii) projection of GNPA ratios, (iii) projection of profit after tax (PAT), (iv) projection of sectoral probability of default (PD) and (v) projection of capital ratios.

I. Designing Macro Scenarios

Macro scenarios are designed using several macroeconomic and macrofinancial variables such as real and nominal GDP growth, CPI (combined) inflation, WPI inflation, Current account balance-to-GDP ratio ($\frac{CAB}{GDP}$), Gross fiscal deficit-to-GDP ratio ($\frac{GFD}{GDP}$), Export-to-GDP ratio ($\frac{EX}{GDP}$), Weighted average lending rate (WALR), 10-year and 5-year AAA / BBB Corporate bond spread, 10-year and 5-year term spread, NIFTY-50 growth, Real effective exchange rate (REER), Oil price growth, bank-group wise WALR, Interest coverage ratio (ICR), Net profit-to-sales, Operating profit-to-sales, House price-to-income ratio, Private Final Consumption Expenditure (PFCE) growth, Credit growth, Sectoral GVA growth etc. The baseline scenario is derived from the projected values of macro variables. The medium and severe adverse scenarios have been obtained by applying 0.25 to one standard deviation (SD) shocks and 1.25 to two SD shocks, respectively, to the macro variables, increasing the shocks sequentially by 25 basis points in each quarter.

II. Projection of GNPA ratios

GNPA ratios are projected for each of the three bank groups, viz, public sector banks (PSBs), private sector banks (PVBs) and foreign banks (FBs). Natural logs of GNPA ratios of these bank-groups are modelled using two complementary econometric models, viz; (i) Autoregressive distributed lag (ADL) model and (ii) Vector auto regression (VAR) model. The values projected based on both these models are averaged to arrive at the final projections of GNPA ratios for each bank-group. The natural logs of GNPA ratios of each bank group are modelled as follows:

II.1 Public Sector Banks

II.1a ADL Model

$$LGNPA_t = \alpha_1 + \beta_1 LGNPA_{t-1} - \beta_2 \Delta NGDP_{t-3} + \beta_3 RWALR_PSB_{t-1} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-1} + \beta_5 5y_BBB_Spread_{t-1} - \beta_6 ICR_{t-2} + \beta_7 Dummy1 - \beta_8 Dummy2$$

where, $\alpha_1, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ and $\beta_8 > 0$

II.1b VAR Model

Log GNPA ratio of PSBs along with the macro variables, viz, Nominal GDP growth and 5-year BBB bond spread are modelled using VAR model of order 1.

II.2 Private Sector Banks

II.2a ADL Model

$$LGNPA_t = \alpha_1 + \beta_1 LGNPA_{t-1} - \beta_2 \Delta GDP_{t-3} + \beta_3 RWALR_PVB_{t-1} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-3} + \beta_5 10y_BBB_Spread_{t-3} - \beta_6 \left(\frac{Operating\ Profit}{Sales} \right)_{t-1} - \beta_7 \Delta NIFTY_{t-3}$$

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

II.2b VAR Model

Log GNPA ratio of PVBs along with the macro variables, viz, RWALR of PVBs, 10-year BBB bond spread, Operating profit-to-sales ratio and NIFTY 50 annual growth are modelled using VAR model of order 1.

II.3 Foreign Banks

II.3a ADL Model

$$LGNPA_t = \alpha_1 + \beta_1 LGNPA_{t-1} - \beta_2 \Delta GDP_{t-3} + \beta_3 \Delta Oil_{t-1} + \beta_4 WALR_FB_{t-2} - \beta_5 \left(\frac{Exp}{GDP} \right)_{t-2} + \beta_6 10y_BBB_Spread_{t-2} - \beta_7 ICR_{t-3} + \beta_8 Dummy1 - \beta_9 Dummy2$$

where, $\alpha_1, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ and $\beta_9 > 0$

II.3b VAR Model

Log GNPA ratio of FBs along with the macro variables, viz, WALR of FBs, Exports-to-GDP ratio, Oil price growth and CPI inflation are modelled using VAR model of order 1.

II.4 All SCBs

The system-level GNPA ratios are projected by aggregating the bank-group level projections using weighted average with gross loans and advances as weights. The projections are done under the baseline and adverse scenarios.

III. Projection of PAT

The components of PAT such as, net interest income (NII), other operating income (OOI), operating expenses (OE) and provisions are projected for each of the bank-groups using the following models.

III.1 Public Sector Banks

III.1.1 Projection of Net Interest Income (NII)

NII is the difference between interest income and interest expense. The ratio of NII to total average assets of PSBs is modelled using the following ADL and VAR models and the projected values based on these models are averaged to arrive at the final projections.

III.1.1a ADL Model

$$NII_t = -\alpha_1 + \beta_1 NII_{t-1} + \beta_2 5y_TermSpread_{t-1} + \beta_3 \Delta NGDP_{t-4} + \beta_4 \left(\frac{Exp}{GDP} \right)_{t-1} + \beta_5 Spread_PSB_t - \beta_6 GNPA_PSB_{t-1}$$

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

Here, 5y_TermSpread is the difference between 5-year G-Sec yield and 3-month T-Bill rate. Spread_PSB is the difference between average interest rate earned by interest earning assets and average interest paid on interest bearing liabilities of PSBs.

III.1.1b VAR Model

NII-to-total average assets ratio is modelled using VAR model of order 1 together with the variables, viz, incremental GNPA ratio of PSBs, NIFTY 50 annual growth rate, 5-year term spread, and incremental interest rate spread of PSBs.

III.1.2 Projection of Other Operating Income (OOI)

The ratio of OOI to total average assets is modelled using the following ADL model:

$$OOI_t = \alpha_1 + \beta_1 OOI_{t-1} + \beta_2 10y_AAASpread_{t-1} + \beta_3 \Delta GDP_{t-2} + \beta_4 \left(\frac{CAB}{GDP}\right)_{t-1}$$

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

III.1.3 Projection of Operating Expense (OE)

The y-o-y growth of OE is modelled using the following ADL model:

$$OE_t = \alpha_1 + \beta_1 OE_{t-1} + \beta_2 OE_{t-2} - \beta_3 OE_{t-3} + \beta_4 \Delta CPI_{t-1}$$

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

III.1.4 Projection of Provisions

The ratio of Provisions to gross loans and advances is modelled using the following ADL and VAR models and the projected values based on these models are averaged to arrive at the final projections.

III.1.4a ADL Model

$$Provisions_t = \beta_1 Provisions_{t-1} + \beta_2 GNPA_PSB_{t-1} - \beta_3 \Delta GDP_{t-2} + \beta_4 \left(\frac{GFD}{GDP}\right)_{t-3}$$

where, $\beta_1, \beta_2, \beta_3$ and $\beta_4 > 0$

III.1.4b VAR Model

Provisions-to- gross loans and advances ratio is modelled using VAR model of order 2 along with the variables, viz, GNPA ratio of PSBs, 5-year term spread and gross fiscal deficit.

III.2 Private Sector Banks**III.2.1 Projection of Net Interest Income**

The ratio of NII to total average assets for PVBs is modelled using the following ADL and VAR models and the projected values based on these models are averaged to arrive at the final projections.

III.2.1a ADL Model

$$NII_t = \alpha_1 + \beta_1 NII_{t-1} + \beta_2 5y_TermSpread_{t-1} + \beta_3 \left(\frac{Exp}{GDP}\right)_{t-1} + \beta_4 Spread_PVB_t - \beta_5 GNPA_PVB_{t-1}$$

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

Spread_PVB is the difference between average interest rate earned by interest earning assets and average interest paid on interest bearing liabilities of PVBs.

III.2.1b VAR Model

NII-to-total average assets ratios are modelled using VAR model of order 1 along with the variables, viz, GNPA ratio of PVBs, NIFTY 50 annual growth rate and interest rate spread of PVBs.

III.2.2 Projection of Other Operating Income

The ratio of OOI to total average assets is modelled using the following ADL model:

$$OOI_t = \alpha_1 + \beta_1 OOI_{t-1} + \beta_2 \Delta GDP_{t-2} + \beta_3 \left(\frac{CAB}{GDP} \right)_{t-1}$$

where, $\alpha_1, \beta_1, \beta_2$ and $\beta_3 > 0$

III.2.3 Projection of Operating Expense

The y-o-y growth of OE is modelled using the following ADL model:

$$OE_t = \alpha_1 + \beta_1 OE_{t-1} + \beta_2 OE_{t-2} + \beta_3 OE_{t-3} - \beta_4 OE_{t-4} + \beta_5 \Delta WPI_{t-1}$$

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

III.2.4 Projection of Provisions

The ratio of Provisions to gross loans and advances of PVBs is modelled using the following ADL and VAR models and the projected values based on these models are averaged to arrive at the final projections.

III.2.4a ADL Model

$$Provisions_t = -\alpha_1 + \beta_1 Provisions_{t-1} + \beta_2 GNPA_{PVB_{t-1}} - \beta_3 \Delta GDP_{t-2} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-1}$$

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

III.2.4b VAR Model

Provisions-to- gross loans and advances ratio is modelled using VAR model of order 1 together with the variables, viz, GNPA ratio of PVBs, exports-to-GDP ratio and 5-year term spread.

III.3 Foreign Banks**III.3.1 Projection of Net Interest Income**

The ratio of NII to total average assets for FBs is modelled using the following ADL and VAR models and the projected values based on these models are averaged to arrive at the final projections.

III.3.1a ADL Model

$$NII_t = \alpha_1 + \beta_1 NII_{t-1} + \beta_2 \Delta NGDP_{t-2} - \beta_3 REER_{t-3} + \beta_4 Spread_{FB_t} - \beta_5 GNPA_{FB_{t-1}}$$

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

Spread_FB is the difference between average interest rate earned by interest earning assets and average interest paid on interest bearing liabilities of FBs.

III.3.1b VAR Model

NII-to-total average assets ratios are modelled using VAR model of order 2 along with the variables, viz, GNPA ratio of FBs and interest rate spread of FBs.

III.3.2 Projection of Other Operating Income

The ratio of OOI to total average assets is modelled using the following ADL model:

$$OOI_t = \alpha_1 + \beta_1 OOI_{t-1} + \beta_2 \Delta GDP_{t-2} + \beta_3 \left(\frac{Exp}{GDP} \right)_{t-2}$$

where, $\alpha_1, \beta_1, \beta_2$ and $\beta_3 > 0$

III.3.3 Projection of Operating Expense

The y-o-y growth of OE is modelled using the following ADL model:

$$OE_t = \alpha_1 + \beta_1 OE_{t-1} + \beta_2 OE_{t-2} + \beta_3 \Delta WPI_{t-1}$$

where, $\alpha_1, \beta_1, \beta_2$ and $\beta_3 > 0$

III.3.4 Projection of Provisions

The ratio of Provisions to gross loans and advances of FBs is modelled using the following ADL and VAR models and the projected values based on these models are averaged to arrive at the final projections.

III.3.4a ADL Model

$$Provisions_t = -\alpha_1 + \beta_1 Provisions_{t-1} + \beta_2 GNPA_{FB_{t-1}} - \beta_3 \Delta GDP_{t-1} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-1}$$

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

III.3.4b VAR Model

Provisions-to- gross loans and advances ratios are modelled using VAR model of order 1 together with the variables, viz, GNPA ratio of FBs and GDP growth.

Projection of PAT for each bank group are derived from the projected values of its components using the following identity:

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

Projection of PAT is made under the baseline and adverse scenarios. The applicable income tax is assumed as 35 per cent of profit before tax, which is based on the past trend of ratio of income tax to profit before tax.

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

- For each bank-group, components of PAT are projected under baseline and adverse scenarios.
- Share of components of PAT of each bank (except income tax) in their respective bank-group is calculated.

- For each bank, a component of PAT (except income tax) is projected by applying that bank's share in the component of PAT on the projected value of that component in the respective bank-group.
- Finally, bank-wise PAT is projected by appropriately applying the aforesaid identity on the projected values of components derived in the previous step.

IV. Projection of Sectoral PDs

Sectoral PDs of 18 sectors/ sub-sectors (Table 2) are modelled using ADL models and projected for four quarters ahead under assumed baseline as well as adverse scenarios.

Table 2: List of selected sectors/ sub-sectors

Sr. No.	Sector	Sr. No.	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	Services
7	Food Processing	16	Retail-Housing
8	Gems and Jewellery	17	Retail-Others
9	Infrastructure	18	Others

The ADL models for sectoral PD projections are as follows:

1. Engineering

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GVA(Industry)_{t-3} + \beta_4 RWALR_{t-1} - \beta_5 \left(\frac{CAB}{GDP} \right)_{t-1} + \beta_6 REER_{t-1} + \beta_7 Dummy_t$$

where, $\alpha, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and $\beta_7 > 0$

2. Automobile

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

where, $\alpha, \beta_1, \beta_2, \beta_3$ and $\beta_4 > 0$

3. Cement

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

where, $\alpha, \beta_1, \beta_2, \beta_3$ and $\beta_4 > 0$

4. Chemicals and Chemical Products

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GVA(Industry)_{t-3} + \beta_4 WALR_{t-1} + \beta_5 REER_{t-2} + \beta_6 Dummy_t$$

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

5. *Construction*

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GDP_{t-3} + \beta_4 RWALR_{t-1} - \beta_5 \left(\frac{Exp}{GDP} \right)_{t-1} + \beta_6 REER_{t-3} + \beta_7 Dummy_t$$

where, $\alpha, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and $\beta_7 > 0$

6. *Textiles*

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GDP_{t-3} + \beta_4 \Delta REER_{t-2} - \beta_5 \Delta NIFTY50_{t-1} + \beta_6 Dummy_t$$

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

7. *Food Processing*

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta REER_t - \beta_3 \left(\frac{Exp}{GDP} \right)_{t-3} - \beta_4 ICR_{t-1} + \beta_5 \Delta WPI_{t-1} + \beta_6 Dummy_t$$

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

8. *Gems and Jewellery*

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-4} - \beta_3 \Delta GDP_{t-1} + \beta_4 REER_{t-1} - \beta_5 \left(\frac{Exp}{GDP} \right)_{t-3} + \beta_6 RWALR_{t-2}$$

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

9. *Infrastructure*

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-4} - \beta_3 \Delta GDP_{t-2} + \beta_4 REER_{t-2} + \beta_5 RWALR_{t-3} + \beta_6 Dummy_t$$

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

10. *Basic Metal*

$$PD_t = \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GVA(Industry)_{t-3} + \beta_4 REER_{t-3} - \beta_5 \left(\frac{Exp}{GDP} \right)_{t-1} + \beta_6 \Delta WALR_t + \beta_7 Dummy_t$$

where, $\alpha, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and $\beta_7 > 0$

11. *Mining & Quarrying*

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GVA(Mining)_{t-2} + \beta_3 REER_{t-2} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-2} - \beta_5 \Delta Credit_{t-1}$$

where, $\alpha, \beta_1, \beta_2, \beta_3, \beta_4$ and $\beta_5 > 0$

12. *Paper & Paper products*

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

where, $\alpha, \beta_1, \beta_2, \beta_3, \beta_4$ and $\beta_5 > 0$

13. *Petroleum and Petroleum Products*

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta Oilprice_{t-1} - \beta_3 \Delta Credit_{t-2} + \beta_4 RWALR_{t-4} - \beta_5 \Delta PFCE_{t-2}$$

where, $\alpha, \beta_1, \beta_2, \beta_3, \beta_4$ and $\beta_5 > 0$

14. *Agriculture*

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

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

15. Services

$$PD_t = \alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GVA(\text{Services})_{t-2} - \beta_3 \left(\frac{\text{Exp}}{\text{GDP}} \right)_{t-2} - \beta_4 \Delta \text{NIFTY50}_{t-1}$$

where, $\alpha, \beta_1, \beta_2, \beta_3$ and $\beta_4 > 0$

16. Retail Loan- Housing

$$PD_t = -\alpha + \beta_1 PD_{t-1} + \beta_2 (\text{House price. to. Income})_{t-1} - \beta_3 \text{NGDP}_{t-4} + \beta_4 \Delta \text{WALR}_t$$

where, $\alpha, \beta_1, \beta_2, \beta_3$ and $\beta_4 > 0$

17. Retail Loan- Other than Housing

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \text{RWALR}_{t-3} + \beta_3 \Delta \text{CPI}_{t-3}$$

where, α, β_1, β_2 and $\beta_3 > 0$

18. Other Sectors

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-3} - \beta_3 \Delta GVA(\text{Industry})_{t-4} + \beta_4 \text{RWALR}_{t-1} - \beta_5 \left(\frac{\text{CAB}}{\text{GDP}} \right)_{t-4}$$

where, $\alpha, \beta_1, \beta_2, \beta_3, \beta_4$ and $\beta_5 > 0$

V. Projection of Capital Ratios

Capital projections are made for each of the 46 banks under baseline and adverse stress scenarios. Capital projections are made by estimating risk-weighted assets (RWAs) using internal rating based (IRB) formula and under the conservative assumption that only 25 per cent of PAT would be transferred to capital funds in the subsequent period, as per the minimum regulatory requirements.

The formulae used for projection of CRAR and Common Equity Tier 1 (CET1) capital ratio are given below:

$$\text{CRAR}_{t+1} = \frac{\text{Total Capital}_t + 0.25 * \text{PAT}_{t+1}}{\text{RWA}(\text{credit risk})_{t+1} + \text{RWA}(\text{others})_{t+1}}$$

$$\text{CET1 Capital Ratio}_{t+1} = \frac{\text{CET1}_t + 0.25 * \text{PAT}_{t+1}}{\text{RWA}(\text{credit risk})_{t+1} + \text{RWA}(\text{others})_{t+1}}$$

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

IRB Formula: Bank-wise RWAs for credit risk were estimated using the following IRB formula:

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

where, EAD_i is exposure at default of a bank in the sector i ($i=1,2,\dots,n$).

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

Capital requirement (K_i)

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

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

The aforesaid IRB formula requires three major inputs, viz, sectoral PD , EAD and LGD . Here, annual slippage of the sectors are assumed as proxies of sectoral PD s. PD of a particular sector is assumed as the same for each of the 46 selected banks. EAD of a bank for a particular sector is considered as the total outstanding loan (net of NPAs) of the bank in that sector. LGD is assumed as 60 per cent (broadly as per the RBI guidelines on 'Capital Adequacy - The IRB Approach to Calculate Capital Requirement for Credit Risk') under the baseline scenario, 65 per cent under medium stress scenario and 70 per cent under the severe stress scenario.

Using these formulae, assumptions and inputs, the capital ratio of each bank is estimated. The differences between IRB-based capital ratios estimated for the latest quarter and those of the ensuing quarters projected under the baseline scenario and the incremental change in the ratios from baseline to adverse scenarios are appropriately applied on the latest observed capital ratios (under Standardised Approach) to arrive at the final capital ratio projections.

(c) 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.

I. 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 GNPA 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 GNPA 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 GNPA calculated under a stress scenario. As a result of the assumed increase in GNPA, loss of income on the additional GNPA 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.

II. Sectoral credit 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 GNPA's under the assumed shocks were considered to fall into sub-standard category only. As a result of the assumed increase in GNPA's, loss of income on the additional GNPA's 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.

III. 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) and HTM portfolio, 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 (HFT + AFS) or overall (HTM) based on the applied shocks. The resultant losses/gains were used to derive the impacted CRAR.

Interest rate risk of banks refers to the risk to a bank's capital and earnings arising from adverse movements in interest rates that affect bank's books. The impact on earning is measured using the Traditional Gap Analysis (TGA) and capital impact is measured by Duration Gap Analysis (DGA). The focus of TGA is to measure the level of a bank's exposure to interest rate risk in terms of the sensitivity of its net interest income (NII) to interest rate movements over one year horizon. It involves bucketing of all Rate-Sensitive Assets (RSA), Rate-Sensitive Liabilities (RSL), and off-balance sheet items as per residual maturity/ re-pricing date, in various time bands and computing Earnings at Risk (EAR) i.e., loss of income under different interest rate scenarios over a time horizon of one year. Advances, HTM investments, swaps forex swaps, reverse repos are major share contributors to RSA whereas deposits, swaps /forex swaps and repos are the main elements under RSL. The DGA involves bucketing of all RSA and RSL as per residual maturity/ re-pricing dates in various time bands and computing the Modified Duration Gap (MDG) to estimate the impact on the Market value of Equity. MDG is calculated with the following formula: $MDG = [MDA - MDL * (RSL / RSA)]$, where MDA and MDL are the weighted averages of the Modified Duration (MD) of items of RSA and RSL, respectively. Thereafter, change in Market Value of Equity (MVE) is computed as $\Delta E / E = -[MDG]*RSA* \Delta i / E$, where Δi is change in interest rate and E is equity (i.e. net worth).

IV. 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.

V. 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.

(d) 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 21 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).

Table 3: Shocks for sensitivity analysis

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

Domestic interest rates		
Shock 2	Overnight	-2.5 percentage points
	Up to 1yr	-1.5 percentage points
	Above 1yr	-1.0 percentage points

Exchange rates		
Shock 3	USD/INR	+20 per cent

Exchange rates		
Shock 4	USD/INR	-20 per cent

(e) Bottom-up stress testing: Credit, Market and Liquidity Risks

Bottom-up sensitivity analyses for credit, market and liquidity risks were performed by 22 select scheduled commercial bank. A set of common scenarios and shock sizes were provided to the select banks. The tests were conducted using March 2023 data. Banks used their own methodologies for calculating losses in each case.

2.2 Primary (Urban) Co-operative Banks**Single factor sensitivity analysis – Stress testing**

Stress testing of UCBs was conducted with reference to the reported position as of March 2023. The banks were subjected to baseline, medium and severe stress scenarios in the areas of credit risk, market risk and liquidity risk as follows:

I. 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 2022 of the UCB sector as a whole. The annual growth rate was calculated separately for each NPA class (sub-standard, Doubtful 1 (D1), Doubtful 2(D2), Doubtful 3 (D3) and loss assets). This annual growth rate formed the baseline stress scenario, which was further stressed by applying shocks of 1.5 SD and 2.5 SD to generate medium and severe stress scenarios for each category separately. These were further adjusted bank wise based on their NPA divergence level.
- Based on the above methodology, the annual NPA growth rate matrix arrived at under the three stress scenarios are as below.

(per cent)

	Increase in Substandard Assets	Increase in D1 assets	Increase in D2 assets	Increase in D3 assets	Increase in Loss assets
Baseline Stress	23.38	18.41	16.72	14.58	32.12
Medium Stress	64.52	47.58	40.84	50.77	176.56
Severe Stress	91.94	67.03	56.92	74.90	272.86

II. 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.

III. Interest Rate Risk in Trading Book

- The duration analysis approach was adopted for analysing 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 banks (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 100 bps, 150 bps and 250 bps were assumed under the three stress scenarios and provisioning impact on CRAR was assessed.

IV. Interest Rate Risk in Banking Book

- The Banking Book of UCBs was subjected to interest rate shocks of 100 bps, 150 bps and 250 bps under three stress scenarios and impact on Net Interest Income was arrived at.

V. 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.

While the inflows are stressed uniformly at 5 per cent under all the stress scenarios, outflows are stressed based on respective bank's past ten years' (2013-22) negative deposit growth recorded for short term (3 months) during the similar period of the year (March-June here). Since UCBs are primarily dependent on deposits as major source of funds, negative growth in deposits is considered as representation of stressed outflows. Further, three months period is considered as representation of 1-28 days' bucket as this is the closest short-term period for which deposits data is available for all the banks given all the banks submit quarterly returns. The average negative deposit growth rate for ten years is considered as baseline scenario, which is further stressed by 1.5 SD (covering 87 per cent of sample used to calculate negative deposit growth) and 2.5 SD (covering around 98 per cent of sample used to calculate negative deposit growth) to generate medium and severe stress scenarios for outflows.

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 Non-Banking Financial Companies (NBFCs)

Single factor sensitivity analysis- Stress Testing

Credit and liquidity risk stress tests for NBFCs have been performed under baseline, medium and high risk scenarios.

I. Credit risk

Methodology for assessing the resilience of NBFC sector to shocks in credit risk had been revised in June 2022 to enhance the model's accuracy in predicting CRAR under baseline and two stress scenarios. Based on the revised model, assets, advances to total assets ratio, EBPT to total assets ratio, risk weight density and slippage ratio were projected over next one year time period. Thereafter, new slippages, provisions, EBPT, risk-weighted assets and capital were calculated for the baseline scenario. For the medium and high risk scenarios, slippages under baseline scenario was increased by 1 SD and 2 SD and accordingly new capital and CRAR were calculated.

II. 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 2023 over the next one year were considered for calculating the liquidity mismatch under baseline scenario. Outflows and inflows of the sample NBFCs were applied a shock of 5 per cent and 10 per cent 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:

- I. *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 $\frac{K}{N(N-1)}$.
- II. *Cluster coefficient*: Clustering in networks measures how interconnected each node is. Specifically, there should be an increased probability that two of a node's neighbours (banks' counterparties in case of a financial network) are neighbours to each other also. A high clustering coefficient for the network corresponds with high local interconnectedness prevailing in the system. For each bank with k_i neighbours the total number of all possible directed links between them is given by $k_i(k_i-1)$. Let E_i denote the actual number of links between agent i's k_i neighbours, viz, those of i's k_i neighbours who are also neighbours. The clustering coefficient C_i for bank i is given by the identity:

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

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

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

- III. *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.

IV. *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).

(a) 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 D_q , $q=1,2, \dots$. 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.

(b) Liquidity contagion analysis

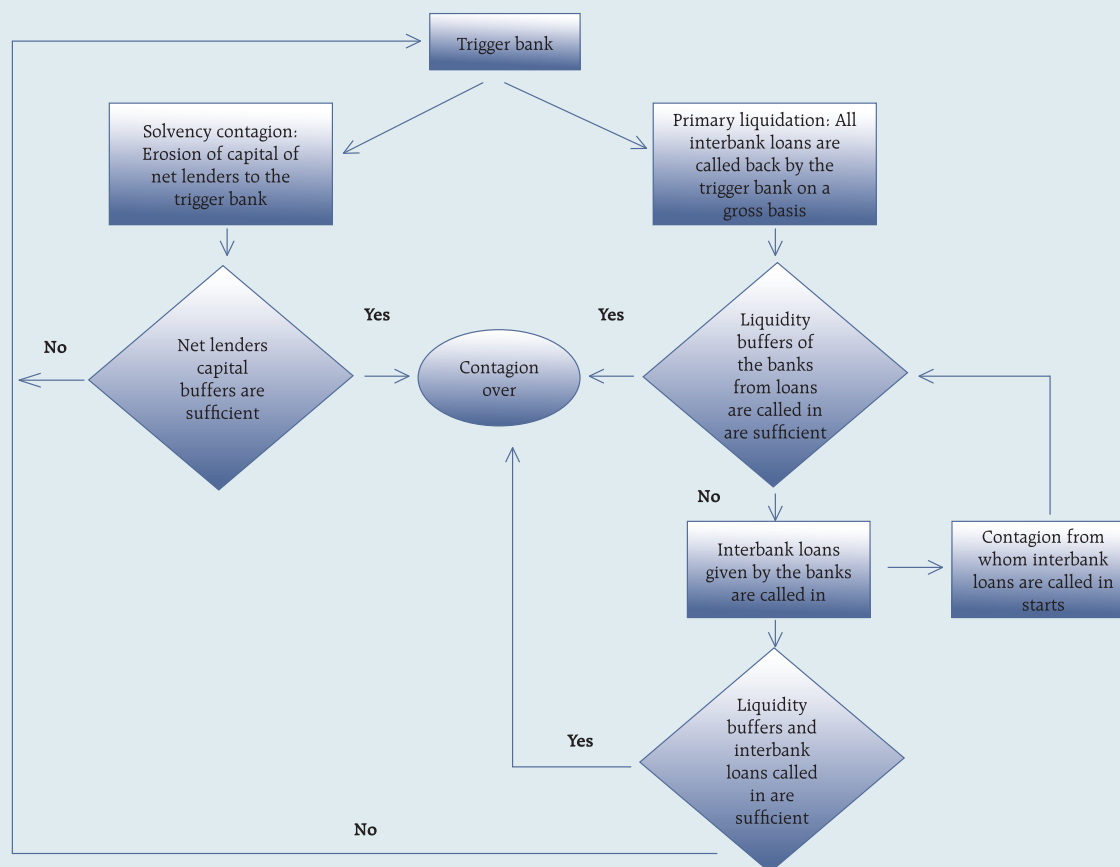
While the solvency contagion analysis assesses potential loss to the system owing to failure of a net borrower, liquidity contagion estimates potential loss to the system due to the failure of a net lender. The analysis is conducted on gross exposures between banks. The exposures include fund based and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

(c) 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 crystallise 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.

2.5 Financial System Stress Indicator (FSSI)

FSSI is compiled using risk factors spread across five financial market segments (equity, forex, money, government debt and corporate debt), three financial intermediary segments (banks, NBFCs and AMC-MFs) as well as real sector (Table 4). FSSI lies between zero and unity, with higher value indicating more stress. For its construction, the risk factors pertaining to each component segment are first normalised using min-max method and thereafter aggregated based on simple average into a sub-indicator 'y_i' representing the ith market/ sector. Finally, the composite FSSI is obtained as,

$$FSSI_t = \sum_{i=1}^9 w_i y_{it}$$

where the weight 'w_i' of each sub-indicator 'y_i' is determined from its sample standard deviation 's_i', as,

$$w_i = \frac{1/s_i}{\sum_{i=1}^9 (1/s_i)}$$

Table 4: Risk factors constituting each component of FSSI

Equity Market	<ol style="list-style-type: none"> 1. Difference between NIFTY 50 monthly returns and its maximum over a two-year rolling window 2. NIFTY 50 Market capitalisation-to-GDP ratio 3. NSE-VIX Index 4. Net Equity FPI flows
Government Debt Market	<ol style="list-style-type: none"> 5. Realised volatility in 10-year G-Sec yield 6. Term Spread: Spread between 10-year G-Sec yield and 3-month T-Bill rate 7. Increase in the 10-year G-Sec yield compared to the minimum over a two-year rolling window 8. Net Debt FPI flows
Forex Market	<ol style="list-style-type: none"> 9. Difference between rupee dollar exchange rate and its maximum over a two-year rolling window. 10. m-o-m appreciation/depreciation of rupee dollar exchange rate 11. GARCH (1,1) volatility of rupee dollar exchange rate 12. Difference between 3-month forward premia and its historical maximum.
Money/Short Term Market	<ol style="list-style-type: none"> 13. Spread between weighted average call rate and weighted average market repo rate 14. Spread between 3-month CD rate and 3-month T-Bill rate 15. Spread between 3-month non-NBFC CP rate and 3-month T-Bill rate 16. Realised volatility of 3-month CP rate 17. Spread between 3-month OIS rate and 3-month T-Bill rate
Corporate Bond Market	<ol style="list-style-type: none"> 18. Yield spread between 3-year AAA corporate bonds and 3-year G-Sec 19. Difference between 3-year BBB and 3-year AAA corporate bond yield 20. Difference between 3-year BBB corporate bond yield and its maximum

Banking Sector	SCBs	21. CRAR (SCBs) 22. RoA (SCBs) 23. LCR (SCBs) 24. Cost-to-Income (SCBs) 25. Stressed Assets Ratio (SCBs) 26. Banking Beta: $\text{cov}(r,m)/\text{var}(m)$, over 2-year moving window. $r = \text{Bank NIFTY y-o-y}$, $m = \text{NIFTY 50 y-o-y}$
	UCBs	27. GNPA ratio (UCBs) 28. CRAR (UCBs) 29. RoA (UCBs)
NBFC Sector		30. GNPA ratio 31. CRAR 32. RoA 33. Spread between 3-month NBFC CP rate and 3-month T-Bill rate
AMC-MF Sector		34. Mutual fund redemptions: y-o-y 35. Mutual fund net inflows
Real Sector		36. GDP growth 37. CPI inflation 38. Current account balance as a share of GDP 39. Gross fiscal deficit as a share of GDP

Annex 3

Important Regulatory Measures

1. Reserve Bank of India (RBI)

Date	Regulation	Rationale
December 01, 2022	<p>Revised Regulatory Framework - Categorisation of Urban Co-operative Banks (UCBs) for Regulatory Purposes: It has been decided to replace the existing two-tiered regulatory framework for categorisation of UCBs with the following four-tiered framework:</p> <p>Tier 1 - All unit UCBs and salary earners' UCBs (irrespective of deposit size), and all other UCBs having deposits up to ₹100 crore;</p> <p>Tier 2 - UCBs with deposits more than ₹100 crore and up to ₹1000 crore;</p> <p>Tier 3 - UCBs with deposits more than ₹1000 crore and up to ₹10,000 crore; and</p> <p>Tier 4 - UCBs with deposits more than ₹10,000 crore.</p> <p>If a UCB transits to a higher Tier on account of increase in deposits in any year, it may be provided a glide path of up to a maximum of three years, to comply with higher regulatory requirements.</p>	To balance the spirit of mutuality and co-operation more prevalent in banks of smaller sizes and those with limited area of operation <i>vis-à-vis</i> the growth ambitions of the large-sized UCBs to spread their area of operation and undertake more complex business activities.
December 01, 2022	<p>Revised Regulatory Framework for UCBs – Net Worth and Capital Adequacy: (a) minimum net worth of ₹2 crore for Tier 1 UCBs operating in single district and ₹5 crore for all other UCBs (of all tiers). UCBs, which currently do not meet the minimum net worth requirement, shall achieve at least 50 per cent of the applicable minimum net worth on or before March 31, 2026 and the entire stipulated minimum net worth on or before March 31, 2028; (b) Tier 1 UCBs shall maintain, as hitherto, a minimum CRAR of 9 per cent of RWAs on an ongoing basis. Tier 2 to 4 UCBs shall maintain a minimum CRAR of 12 per cent of RWAs on an ongoing basis. UCBs, which do not currently meet the revised CRAR of 12 per cent of</p>	To strengthen the financial resilience and capital structure of UCBs and enhance their ability to fund their growth.

Date	Regulation	Rationale
	<p>RWAs, shall achieve the CRAR of at least 10 per cent by March 31, 2024, 11 per cent by March 31, 2025, and 12 per cent by March 31, 2026; and (c) revaluation reserves may be reckoned as Tier 1 capital at a discount of 55 per cent subject to certain qualifying parameters. These guidelines were made applicable from March 31, 2023.</p>	
December 01, 2022	<p>Review of norms for classification of UCBs as Financially Sound and Well Managed (FSWM): It has been decided to revise the criteria for UCBs to be classified as FSWM. The revised criteria applicable with immediate effect include:</p> <ul style="list-style-type: none"> (i) the CRAR shall be at least one percentage point above the minimum CRAR applicable to an UCB as on the reference date; (ii) net NPA of not more than three per cent; (iii) net profit for at least three out of the preceding four years subject to it not having incurred a net loss in the immediate preceding year; (iv) no default in the maintenance of CRR / SLR during the preceding financial year; (v) sound internal control system with at least two professional directors on the Board; (vi) fully implemented core banking solution (CBS); and (vii) No monetary penalty should have been imposed on the bank for violation of RBI directives/guidelines during the latest two financial years. <p>The process of deciding the eligibility for being classified as a FSWM UCB may be carried out by UCBs themselves as per the revised criteria based on the assessed financials and findings of RBI inspection report or audited financial statements, whichever is latest. The Board approved resolution for the same should be passed on to the concerned Regional Office of Department of Supervision, Reserve Bank of India within 15 calendar days from the date of passing the resolution.</p>	<p>To ensure a financially sound and stable co-operative sector, select UCBs are termed as FSWM subject to fulfilment of certain parameters.</p>

Date	Regulation	Rationale
December 01, 2022	<p>Operations of subsidiaries and branches of Indian banks and All India Financial Institutions (AIFIs) in foreign jurisdictions and in International Financial Services Centers (IFSCs) - Compliance with statutory/regulatory norms: The foreign branches/foreign subsidiaries of Indian banks/AIFIs and the branches/subsidiaries of Indian banks/AIFIs operating in IFSCs can deal in financial products, including structured financial products which are not available or are not permitted by the Reserve Bank in the domestic market without prior approval of Reserve Bank, subject to compliance with specified conditions of these directions and those prescribed by the host regulator.</p>	<p>To allow foreign branches/foreign subsidiaries of Indian banks and AIFIs to deal in financial derivative products which are not specifically permitted in the Indian domestic market subject to certain conditions and to specify the applicability of these instructions to IFSCs in India.</p>
December 08, 2022	<p>Review of SLR holdings in HTM category: At present, banks have been granted a special dispensation of enhanced held to maturity (HTM) limit of 23 per cent of net demand and time liabilities (NDTL), for statutory liquidity ratio (SLR) eligible securities acquired between September 01, 2020 and March 31, 2023, until March 31, 2023. On a review, it has been decided to further extend the special dispensation of enhanced HTM limit of 23 per cent of NDTL up to March 31, 2024 and allow banks to include securities acquired between September 01, 2020 and March 31, 2024 under the enhanced limit. The enhanced HTM limit of 23 per cent shall be restored to 19.5 percent in a phased manner, beginning from the quarter ending June 30, 2024 till March 31, 2025.</p>	<p>To enable banks to better manage their investment portfolios.</p>
December 12, 2022	<p>Hedging of Gold Price Risk in Overseas Market: Resident entities in India have been permitted to hedge their gold price risk on recognised exchanges in the IFSC by the International Financial Services Centres Authority.</p>	<p>To provide greater flexibility for resident entities to hedge the price risk of their gold exposures efficiently.</p>

Date	Regulation	Rationale
December 13, 2022	<p>Reserve Bank of India (Financial Statements - Presentation and Disclosures) Directions, 2021 - Disclosure of material items: Under the extant direction for commercial banks, in case any item under the sub-head 'Miscellaneous Income' under the head 'Schedule 14 – Other Income' exceeds one per cent of total income, particulars shall be given in the notes to accounts. Similar instructions exist in case of sub-head 'Other expenditure' under the head 'Schedule 16 -Operating Expenses'. It has now been decided that banks shall also disclose the particulars of all such items in the notes to accounts wherever any item under the 'Schedule 5(IV) - Other Liabilities and Provisions – Others (including provisions)' or 'Schedule 11(VI) – Other Assets – Others' exceeds one per cent of the total assets. Payments Banks shall also be required to disclose particulars of all such items in the notes to accounts, wherever any item under the 'Schedule 14(I) - Other Income – Commission, Exchange and Brokerage' exceeds one per cent of the total income.</p>	To ensure greater transparency in the financial statements of banks.
December 26, 2022	<p>Central Payments Fraud Information Registry - Migration of Reporting to DAKSH: The Reserve Bank had operationalised the Central Payments Fraud Information Registry (CPFIR) in March 2020 with reporting of payment frauds by SCBs and non-bank prepaid payment instrument (PPI) issuers. The fraud reporting module has been migrated to DAKSH – Reserve Bank's Advanced Supervisory Monitoring System, effective January 01, 2023.</p>	To streamline reporting, enhance efficiency and automate the payments fraud management process.
December 30, 2022	<p>Revised Regulatory Framework - Individual Housing Loans - Revised Limits for UCBs: The limits on housing loans sanctioned by UCBs to an individual borrower were reclassified as ₹60 lakh for Tier-1 UCBs and ₹140 lakh for UCBs categorised in Tier-2 to Tier-4.</p>	To align the individual housing loan limits with the four-tiered regulatory framework for UCBs.

Date	Regulation	Rationale
January 16, 2023	<p>Reserve Bank of India (Acquisition and Holding of Shares or Voting Rights in Banking Companies) Directions, 2023: These directions include limits on permissible shareholding by different categories of shareholders, introduction of reporting requirements for encumbrance of shares by promoters, and strengthening of arrangements for continuous monitoring of the 'fit & proper' status of major shareholding of a banking company.</p>	<p>To ensure that the ultimate ownership and control of banking companies are well diversified and the major shareholders of banking companies are 'fit and proper' on a continuing basis.</p>
January 23, 2023	<p>'Fully Accessible Route' for Investment by Non-residents in Government Securities – Inclusion of Sovereign Green Bonds: Under the Fully Accessible Route (FAR), certain specified categories of Central Government securities are opened fully for non-resident investors without any restrictions, apart from being available to domestic investors as well. It has now been decided to also designate all Sovereign Green Bonds issued by the Government in the fiscal year 2022-23 as 'specified securities' under the FAR.</p>	<p>To facilitate the mobilisation of resources for green infrastructure in India.</p>
February 10, 2023	<p>Issuance of Prepaid Payment Instruments (PPIs) to Foreign Nationals / Non-Resident Indians (NRIs) visiting India: It has been decided to allow access to Unified Payments Interface (UPI) to foreign nationals and NRIs visiting India. To start with, this facility was extended to travellers from the G-20 countries at select international airports for their merchant payments {Peer-to-merchant (P2M)} while they are in the country. Going forward, this will be enabled across all entry points in the country.</p>	<p>To provide UPI access for merchant payments to inbound travellers to India.</p>
February 17, 2023	<p>Governance, Measurement and Management of Interest Rate Risk in Banking Book (IRRBB): These guidelines require banks to measure, monitor, and disclose their exposure to IRRBB in terms of potential change in Economic Value of Equity (ΔEVE) and Net Interest Income (ΔNII), computed based on a set of prescribed interest rate shock scenarios.</p>	<p>To measure, monitor, and disclose banks' exposure to IRRBB.</p>

Date	Regulation	Rationale
February 20, 2023	<p>Reserve Bank of India (Financial Statements - Presentation and Disclosures) Directions, 2021 - Applicability to State and Central Cooperative Banks: The Reserve Bank of India (Financial Statements - Presentation and Disclosures) Directions, 2021, ('Master Direction") was issued on August 30, 2021, and initially applied to all commercial banks and Urban Co-operative Banks (UCBs). In consultation with the National Bank for Agriculture and Rural Development, relevant portions of this Master Direction have now been made applicable to State Cooperative Banks and Central Cooperative Banks (together referred to as 'Rural Co-operative Banks' or 'RCBs') vide circular dated February 20, 2023.</p>	<p>To ensure comparability in the accounting and disclosure practices followed across the banking sector.</p>
February 20, 2023	<p>Implementation of Indian Accounting Standards (Ind AS): Ind AS implementing Asset Reconstruction Companies (ARCs), shall reduce following amount from the net owned funds for calculation of capital adequacy ratio and amount available for dividend: (a) management fee recognised during the planning period that remains unrealised beyond 180 days from the date of expiry of the planning period, (b) management fee recognised after the expiry of the planning period that remains unrealised beyond 180 days of such recognition, and (c) any unrealised management fees, notwithstanding the period for which it has remained unrealised, where the net asset value of the security receipts has fallen below 50 per cent of the face value. ARCs shall also disclose information related to ageing of unrealised management fees in the prescribed format in their notes to accounts.</p>	<p>To address the prudential concerns relating to continued recognition of unrealised management fees by ARCs.</p>
March 06, 2023	<p>Digital Payments Awareness Week 2023 – Launch of Mission "Har Payment Digital": The Reserve Bank launched the Mission 'Har Payment Digital' with the campaign theme "Digital Payment Apnao, Auro ko bhi Sikhao" (Adopt digital payments and</p>	<p>To widen the reach and enhance adoption of digital payments.</p>

Date	Regulation	Rationale
	<p>also teach others) during the Digital Payments Awareness Week (DPAW) from March 6 to 12, 2023. In observance of 75 years of Independence, the Reserve Bank also initiated the '75 Digital Villages' programme, under which, payment system operators (PSOs) would adopt 75 villages across the country and convert them into digital payment enabled villages.</p>	
April 10, 2023	<p>Master Direction on Outsourcing of Information Technology (IT) Services: To ensure effective management of financial, operational and reputational risks originating from outsourcing of IT services by REs, directions are given regarding risk management framework for IT outsourcing, managing concentration risk, periodic risk assessment and outsourcing to foreign service providers.</p>	<p>To ensure that outsourcing arrangements neither diminish REs ability to fulfil its obligations to customers nor impede effective supervision by the RBI.</p>
April 11, 2023	<p>Framework for acceptance of Green Deposits: The framework outlines the prerequisite for establishing a Board approved policy covering all aspects in detail for the issuance and allocation of green deposits. It provides a list of sectors in which REs shall be required to allocate the proceeds raised through green deposits. Furthermore, it mandates an annual third-party verification/assurance and impact assessment of the funds raised through green deposits by REs. Extant guidelines shall be followed by the REs while deciding the tenor, size, interest rates and other terms and conditions, as applicable to the REs, while issuing the green deposits.</p>	<p>To encourage REs to offer green deposits to customers, protect interest of the depositors, aid customers to achieve their sustainability agenda, address greenwashing concerns and help augment the flow of credit to green activities/projects.</p>

Date	Regulation	Rationale																												
April 24, 2023	<p>Provisioning for Standard Assets by primary (Urban) Co-operative banks- revised norms under four-tiered regulatory framework: The provisioning norms have been revised as follows-</p> <table border="1"> <thead> <tr> <th rowspan="2">Sl. No.</th> <th rowspan="2">Category of Standard Asset</th> <th colspan="3">Rate of Provisioning (per cent)</th> </tr> <tr> <th>Tier II</th> <th>Tier I</th> <th>Revised (for all Tiers under four-tiered regulatory framework)</th> </tr> </thead> <tbody> <tr> <td>(a)</td> <td>Direct advances to Agriculture and SME sectors</td> <td>0.25</td> <td>0.25</td> <td>0.25</td> </tr> <tr> <td>(b)</td> <td>Commercial Real Estate (CRE) sector</td> <td>1.00</td> <td>1.00</td> <td>1.00</td> </tr> <tr> <td>(c)</td> <td>Commercial Real Estate- Residential Housing Sector (CRE-RH)</td> <td>0.75</td> <td>0.75</td> <td>0.75</td> </tr> <tr> <td>(d)</td> <td>All other loans and advances not included above</td> <td>0.40</td> <td>0.25</td> <td>0.40</td> </tr> </tbody> </table> <p>The erstwhile Tier I UCBs, which are currently maintaining standard asset provision of 0.25 per cent on 'all other loans and advances not included above' as specified in table above, are permitted to achieve the provisioning requirement of 0.40 per cent on such advances in a staggered manner by March 31, 2025.</p>	Sl. No.	Category of Standard Asset	Rate of Provisioning (per cent)			Tier II	Tier I	Revised (for all Tiers under four-tiered regulatory framework)	(a)	Direct advances to Agriculture and SME sectors	0.25	0.25	0.25	(b)	Commercial Real Estate (CRE) sector	1.00	1.00	1.00	(c)	Commercial Real Estate- Residential Housing Sector (CRE-RH)	0.75	0.75	0.75	(d)	All other loans and advances not included above	0.40	0.25	0.40	To harmonise the provisioning norms for standard assets applicable to all categories of UCBs.
Sl. No.	Category of Standard Asset			Rate of Provisioning (per cent)																										
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April 26, 2023	<p>Remittances to IFSCs under the Liberalised Remittance Scheme (LRS): On a review, it has been decided that resident individuals may open foreign currency account (FCA) in IFSCs, for making the permissible investments under LRS. Further, the condition of repatriating any funds lying idle in the account for a period up to 15 days from the date of its receipt is also withdrawn with immediate effect.</p>	To align the LRS for IFSCs set up under the IFSC Act, 2019 <i>vis-à-vis</i> other foreign jurisdictions.																												
June 06, 2023	<p>Risk Management and Inter-Bank Dealings - Non-deliverable derivative contracts (NDDCs): It has been decided to permit AD Cat-I banks operating IFSC Banking Units (IBUs) to offer INR NDDCs to resident non-retail users for the purpose of hedging. These banks will have the flexibility of settling their NDDC transactions with non-residents and with each other in foreign currency or in INR while transactions with residents will be mandatorily settled in INR.</p>	To develop the onshore INR NDDC market and provide residents with the flexibility to efficiently design their hedging programmes.																												

Date	Regulation	Rationale
June 07, 2023	<p>Expanding the Scope of Trade Receivables Discounting System (TReDS): Insurance companies are now permitted to participate as "fourth participant" in TReDS enabling financiers to hedge default risks, subject to the specified conditions. All entities / institutions eligible to undertake factoring business under the Factoring Regulation Act are now permitted to participate as financiers in TReDS adding to the availability of financiers on TReDS platforms. Also, secondary market operations are now enabled on TReDS platforms providing financiers the option to offload their existing portfolio to other financiers within the same TReDS platform, if required. TReDS platform operators shall now be permitted to undertake settlement of all Factoring Units – financed/ discounted or otherwise – using the NACH mechanism used for TReDS.</p>	<p>To provide further impetus to TReDS platforms by expanding its scope of activities and help MSMEs in improving their cash flows.</p>
June 08, 2023	<p>Reserve Bank of India (Call, Notice and Term Money Markets) Directions, 2021-Review: On a review, it has been decided that SCBs (excluding small finance banks and payment banks) may set their own limits for borrowing in Call and Notice Money Markets. As in the case of Term Money Market borrowing, SCBs shall put in place internal board approved limits for borrowing through Call and Notice Money Markets within the prudential limits for inter-bank liabilities prescribed by the Reserve Bank.</p>	<p>To provide greater flexibility to SCBs to manage their money market borrowings.</p>
June 08, 2023	<p>Priority Sector Lending (PSL) targets / sub-targets and contribution against shortfall in achievement of PSL targets – Primary (Urban) Co-operative Banks (UCBs) - Extension of time: The phase-in-time for UCBs for achievement of the PSL target and sub-target for weaker sections has been extended by two years <i>i.e.</i> upto March 31, 2026. UCBs would be required to contribute to the funds with NABARD/NHB/SIDBI/Mudra towards PSL shortfalls with effect from March 31, 2023. Any contribution made in the meantime by a UCB for shortfalls pertaining to FY 2020-21 and/or 2021-22 can be utilised to offset shortfalls for FY 2022-23. Further, excess deposits will be refunded after offsetting the PSL shortfall for FY 2022-23.</p>	<p>To ease the implementation challenges faced by the UCBs.</p>

Date	Regulation	Rationale
June 08, 2023	<p>Rationalisation of Branch Authorisation Policy for Urban Co-operative Banks (UCBs): The general permission of branch expansion in the approved area of operation will be available to UCBs in all Tiers (except Salary Earners' Banks) which comply with applicable Financially Sound and Well Managed (FSWM) criteria. The eligible UCBs are permitted to open new branches up to 10 per cent of the number of full-fledged branches (at the end of previous financial year) in a financial year, subject to a maximum of five branches without having the need to take permission from Reserve Bank of India.</p>	<p>To rationalise the process of branch opening and to enable the UCBs to tap growth opportunities in the sector.</p>
June 08, 2023	<p>Framework for Compromise Settlements and Technical Write-offs: The framework for compromise settlements and technical write-offs lays down the process to be followed for all compromise settlements and technical write-offs. In respect of compromise settlements, the policy shall, <i>inter alia</i>, contain provisions relating to permissible sacrifice for various categories of exposures while arriving at the settlement amount, after prudently reckoning the current realisable value of security/ collateral, where available. REs may undertake compromise settlements or technical write-offs in respect of accounts categorised as wilful defaulters or fraud without prejudice to the criminal proceeding underway against such debtors.</p>	<p>To provide further impetus to resolution of stressed assets in the system as well as to rationalise and harmonise the instructions across all REs.</p>
June 08, 2023	<p>Guidelines on Default Loss Guarantee (DLG) in Digital Lending: DLG arrangements between Regulated Entities (REs) and Lending Service Providers (LSPs) or between two REs are permitted subject to the stipulated guidelines. RE shall ensure that total amount of DLG cover on any outstanding portfolio shall not exceed five per cent of the amount of that loan portfolio and the same shall be in the form of cash, fixed deposit or bank guarantee.</p>	<p>To support the development of digital lending ecosystem.</p>

2. Securities and Exchange Board of India (SEBI)

Date	Regulation	Rationale
November 09, 2022	Discontinuation of policy framework for unlisted Infrastructure investment trusts.	To enhance disclosure of information and activities to public and remove the arbitrage opportunity with the listed InvITs.
November 11, 2022	Handling of clients' securities by Trading Members/Clearing Members.	To further streamline the process of handling of unpaid securities by stock brokers and mitigate the possible misuse of unpaid securities.
November 25, 2022	Framework to address the 'technical glitches' in Stock Brokers' Electronic Trading Systems.	To deal with the technical glitches occurring in the trading systems of stock brokers.
November 29, 2022	Introduction of credit risk based single issuer limit for investment by mutual fund schemes in debt and money market instruments.	To avoid inconsistency in investment by mutual funds in debt instruments of an issuer, irrespective of the scheme being actively or passively managed.
November 30, 2022	Net settlement of cash segment and Futures and Options (F&O) segment upon expiry of stock derivatives.	To mitigate systemic risk arising if an 'Out of the Money (OTM)' option suddenly turns 'In the Money (ITM)' on the expiry day, which poses the obligation on such ITM option holder to bring in the cash or securities to honour the physical settlement.
December 09, 2022	Foreign Investment in Alternative Investment Funds (AIFs).	To ensure that the money coming through the AIF structure is in compliance with applicable laws.
December 16, 2022	Performance Benchmarking and Reporting of Performance by Portfolio Managers.	To help investors assess the performance of a Portfolio Manager.
December 16, 2022	Applicability of SEBI Circular on Principles of Financial Market Infrastructures (PFMIs) to AMC Repo Clearing Limited.	To ensure compliance by AMC Repo Clearing Limited with the PFMIs published by the Committee on Payments and Settlement Systems (CPSS) and the IOSCO.

Date	Regulation	Rationale
December 30, 2022	Introduction of Investor Risk Reduction Access (IRRA) Platform in case of Disruption of Trading Services Provided by the Trading Member.	To enable investors with open positions who are at risk of non-availability of avenues to close their positions, particularly if markets are volatile, in the event of glitches in trading members' systems.
January 10, 2023	Introduction of Futures Contracts on Corporate Bond Indices.	To enhance liquidity in the corporate bond market and also to provide opportunity to the investors to hedge their positions.
February 06, 2023	Enhanced Obligations and Responsibilities of Qualified Stock Brokers	To mitigate the risk of failure of large stock brokers, which can cause disruption in the services provided to their investors causing widespread impact in the securities market
March 23, 2023	E-wallet Investments in Mutual Funds.	To boost the security in mutual fund industry, full Know Your Customer (KYC) compliant e-wallet (as per RBI norms) are permitted for investment in mutual funds within the umbrella limit of Rs. 50,000 (both e-wallet and/or cash).
March 29, 2023	Cyber Security and Cyber Resilience Framework for Portfolio Managers.	To provide essential facilities and services and perform critical functions in the securities market.
April 13, 2023	Contribution by Eligible Issuers of Debt Securities to the Settlement Guarantee Fund of the Limited Purpose Clearing Corporation (LPCC) for Repo Transactions in Debt Securities.	To strengthen the risk management system of the LPCC and to ensure that the corpus of the fund is adequate to meet the contingencies arising on account of failure of settlement commitments.

Date	Regulation	Rationale
April 25, 2023	Bank Guarantees created out of Clients' Funds	To prevent the risk of the creation of bank guarantees out of clients' funds by stock brokers and clearing members.

3. Insurance Regulatory and Development Authority of India (IRDAI)

Date	Regulation	Rationale
January 13, 2023	Circular on Sovereign Green Bonds (SGrBs)- Classification and Categorisation: Investment in Sovereign Green Bonds has been categorised as "Investment in Infrastructure" and shall be classified as "Central Government Securities".	To enable de-concentration and diversification of the infrastructure investment portfolio of the insurers and to encourage insurers to actively participate in sustainable development.
March 31, 2023	Guidance Note - Board policy of the insurer on the commission structure: Consequent to the notification of Payment of Commission regulations 2023, a "Guidance note - Board policy of the insurer on the commission structure" was issued.	To provide key elements of the Board policy on commission structures for intermediaries.
March 31, 2023	Circular - Payment of Distribution Fees to Motor Insurance Service Provider (MISP): It stipulates that the distribution fees payable to MISP shall be as per Board approved policy towards payment of commission by the insurer.	To withdraw extant instructions relating to maximum distribution fees payable to the MISP.
March 31, 2023	'Use and File' Procedure	To enable dynamism as well as speed to market insurance products.
April 24, 2023	IRDAI Information and Cyber Security Guidelines, 2023	To enable the insurance industry to further strengthen their defences as well as the related governance mechanism to deal with emerging cyber threats.
April 24, 2023	Master Circular on Registration of Indian Insurance Company	To specify various forms pertaining to Registration Regulations.

Date	Regulation	Rationale
May 04, 2023	Instructions to stop the facility of repayment of loans through Credit Cards	To stop the facility of repayment of loans taken against life insurance policy through credit cards.
May 15, 2023	Modification of Surety Insurance Guidelines: The following modifications are made to the Surety Insurance Guidelines- (a) the mandate of maintaining 1.25 times of the control level of solvency is dispensed with and the Insurers shall maintain the solvency requirements as specified by the Authority from time to time and (b) the stipulation regarding the limit of guarantee that it shall not exceed 30 percent of the contract value has been removed.	To help the insurance industry in releasing capital as maintenance of additional solvency reserve just because an insurer is underwriting surety contracts is considered not prudent. Also, the Surety Contracts are now made available to the extent of the requirements of varying markets.

4. Pension Fund Regulatory and Development Authority (PFRDA)

Date	Regulation	Rationale
November 14, 2022	Parallel Processing of Exit and Annuity Components for the Benefit of the National Pension System (NPS) Subscribers	To simplify the process of issuing an Annuity by considering the NPS withdrawal form as the Annuity Proposal.
November 18, 2022	Change in Investment Guidelines - 2021 for NPS Schemes [Other than Govt. Sector {Central Government (CG) and State Government (SG)}, Corporate CG, NPS Lite and Atal Pension Yojana (APY)] and Change in Investment Guidelines – 2021 for NPS Schemes (Applicable to Scheme CG, Scheme SG, Corporate CG and NPS Lite schemes of NPS and APY) : For investment in debt instruments issued by InvIT/REIT, the limit has been increased from 10 per cent to 15 per cent of the total outstanding debt instruments issued by a single InvIT/REIT issuer (for all sectors) and the exposure norms shall not apply to any of the schemes under the private sector (scheme E/C/G) till the scheme AUM reaches ₹ 5 crore and to scheme A till the scheme AUM reaches ₹ 15 crore.	To increase the limit for investment in debt instruments issued by InvIT/REIT and change the exposure norms for schemes under the private sector.

Date	Regulation	Rationale
November 18, 2022	Change in Operational Guidelines for National Pension Scheme Tier II – Tax Saver Scheme, 2020 (NPS - TTS)	To revise the investment limit for investment in money market instruments from 10 per cent to 20 per cent of the scheme corpus.
November 22, 2022	NPS Digital Onboarding through Central KYC (CKYC): The PFRDA has provided prospective subscribers another option for opening NPS Account through CKYC and the process is online and paperless.	To empower NPS subscribers/ financial investors to complete their KYC only once for interacting with multiple service providers across the financial sector under the ambit of various Regulators Management Services CRA (CCRA).
November 30, 2022	e-NPS Government offers ease and convenience in account opening for the subscribers: PFRDA has enabled e-NPS for the benefit of government sector subscribers and the associated nodal offices.	To provide the opportunity for the employees of the government sector and empower them to open NPS account with ease and a lot of convenience in a paperless mode.
December 09, 2022	NPS Prosperity Planner (NPP) for Adequacy in Retirement Income Planning: With NPP, the subscribers would be able to estimate the projected Retirement Income (Annuity) as per the Annuity options based on their existing contribution under NPS. NPP provides the tool for higher Retirement Income through an Accelerated Contribution plan in the residual period until retirement duly considering inflation and the projected cost of living expenses. .	To assist, empower and handhold the subscribers to plan for adequacy in retirement income.
January 04, 2023	Online Claim Processing by Intermediaries using Technology - Aadhaar and Video-based Customer Identification Process (VCIP): It has been decided to allow the intermediaries to use technological intervention by using VCIP as an added due diligence mechanism for verification of the nominee/claimant/legal heir while processing the withdrawal claims in case of death of NPS subscribers.	To augment the existing due diligence efforts undertaken by the intermediaries and enabling faster processing of withdrawal claims.

Date	Regulation	Rationale
January 10, 2023	Empowering APY Subscribers with ease of Aadhaar Seeding - Launch of Seeding Convenience through Central Record Keeping Agency (CRA) Portal and Mobile App	To provide the facility of Aadhaar seeding for the benefit of Subscribers through the CRA portal and NPS Mobile app "APY and NPS Lite".
January 12, 2023	Independent Bank Account Verification and Name/PAN Matching for enhanced due diligence using PRAN-PAN-VPA(UPI) using NPCI Framework: PFRDA has launched an advanced mode of bank account verification of the subscribers (PRAN-PAN- VPA(UPI)) with elegant features where the joint holder details, Permanent Account Number (PAN) and UPI IDs {Virtual Payment Address (VPI)} are verified through NPCI and matched with Permanent Retirement Account Number (PRAN).	To eliminate errors in pay out process, facilitate matching of PAN seeded in PRAN and bank account and enable successful and timely processing of withdrawal request of subscriber who is the joint holder in bank account.
January 23, 2023	KYC / Anti-Money Laundering (AML) / Combating the Financing of Terrorism (CFT) Guidelines	In line with the requirements of the Prevention of Money Laundering Act, 2002 as per Regulation 15 of the PFRDA (Point of Presence) Regulations, 2018 guidelines for KYC/AML/CFT have been issued.
February 07, 2023	Minimum Timelines for Maximum Subscribers' benefits - Reduction in Turn Around Time to perform various activities from T+4 to T+2	To reduce the timelines of various transactions for providing better subscriber experience.
February 07, 2023	Reinvestment of Returned and Unsuccessful Transaction amount into the same PRAN and Ease of reclaiming the amount by Subscriber through My Withdrawal Module (MWM): In instances where the corpus of the subscribers could not be credited into their Savings Bank account because of incorrect bank account details, the subscribers can reclaim this 'withdrawn but unclaimed' amount in the prescribed format through the nodal officers, Points of Presence (POP), APY service providers, Central Record Keeping Agencies (CRAs) and NPS Trust (NPST). Further, to ease the process of reclaiming such amount, PFRDA through its CRAs will build a subscribers' digital MWM interface. Post-building the MWM, the amount which lies beyond one month without transferring to the beneficiary's bank account shall be reinvested in the same PRAN.	To benefit subscribers by enabling their 'withdrawn but unclaimed' amount which does not earn any investment returns to be reinvested in the same PRAN.

Date	Regulation	Rationale
February 22, 2023	Mandatory upload of Withdrawal/ KYC documents to enable Parallel Processing of Exit and Annuity for the benefit of NPS Subscribers.	To benefit subscribers by aiding timely payment of annuity income.
March 16, 2023	Financial Information (FI) types for balances under National Pension System (NPS): To ensure secured and seamless movement of data across financial institutions among financial sector regulators under different IT systems, a set of core technical specifications for the participants of the account aggregators (AA) ecosystem are framed by the Reserve Bank Information Technology Private Limited (ReBIT) for which PFRDA has issued FI types for Balances under NPS, published on ReBIT website under AA framework.	To specify the FI types that will be the basis of information exchanges regarding balances under NPS that could be requested by a financial information user (FIU) through AA from CRAs.
March 20, 2023	Advisory on "Digital Safety Practices to be followed by Govt Nodal offices to access technological platform/system provided by Central Record keeping Agencies" under NPS architecture: To enable the Nodal offices to fulfil their function/role in the CRA system, the Nodal offices have been provided with separate maker-checker login IDs to access the CRA system so that any single user is not able to unilaterally execute the transaction. Further, all the nodal offices/officers in the Central Government Sector (including autonomous bodies) are advised to follow the digital safety practices under the NPS architecture as per the advisory while accessing the CRA system.	To provide ease of transacting through post-pandemic digital/technological tools/enhancement, together with security and safeguarding the interest of the NPS subscriber against digital threats and frauds.
March 23, 2023	Linking of PAN with Aadhaar: All existing subscribers are required to ensure linking of their PAN with Aadhaar number by March 31, 2023 for continual and smooth transactions and to avoid consequences of non-compliance, as such NPS accounts would be considered non-KYC compliant, and there could be restrictions on NPS transactions until the PAN and Aadhaar are linked.	To comply with the Central Board of Direct Taxes (CBDT) circular No. 7 of 2022 dated March 30, 2022.

6. Insolvency and Bankruptcy Board of India (IBBI)

Date	Regulation	Rationale
November 2, 2022	Circular on 'Annual Compliance Certificate for Insolvency Professional Agencies': The circular was issued in consequence of amendments in the IBBI (Model Bye-Laws and Governing Board of Insolvency Professional Agencies) Regulations, 2016.	To issue a revised format of Annual Compliance Certificate for Insolvency Professional Agencies (IPAs) for submission to the Board.
November 9, 2022	Circular on 'Review of Regulations': The Board conducted an exercise to review existing regulations and circulars to determine circulars that already found place in existing regulations pertaining to service providers.	The Board issued a fresh circular whereby it rescinded eleven of its earlier issued circulars.
November 22, 2022	Notification of Companies (Registered Valuers and Valuation) Amendment Rules, 2022	The amendments, <i>inter alia</i> , provide that no partnership entity or company shall be eligible to be a registered valuer (RV) if it is not a member of a registered valuer organisation (RVO). Further, the new rule stipulates that these entities should not be registered with more than one RVO at a given point of time.
November 24, 2022	Circular on 'Payment of fees to the IBBI'	Circular was issued to all IPAs, Insolvency Professional Entities (IPEs) and Insolvency Professionals (IPs) conveying strict compliance on their part with respect to revision of existing fee structure, and introduction of a regulatory fee, payable by them to the Board.
December 10, 2022	Report on Enterprise Group Insolvency: The second part of the Report of the Cross Border Insolvency Rules/Regulations Committee, pertaining to enterprise group insolvency, based on the UNCITRAL Model Law on group insolvency, was made available in the public domain.	The Committee has made recommendations in the context of the IBC to operationalise the group insolvency part.

Date	Regulation	Rationale
December 21, 2022	Circular on 'Proforma for reporting liquidator's decision(s) different from the advice of Stakeholders' Consultation Committee (SCC)'	To provide the proforma for reporting the liquidator's decisions different from the advice given by the SCC for the purpose of filing of the same on the electronic platform of the Board, under regulation 31A (10) of IBBI (Liquidation Process) Regulations, 2016.
March 4, 2023	Circular regarding serving of copy of applications to the Board: The format for serving a copy of the application for initiation of CIRP to the Board was revised.	To ensure filing of authentic information and further enable the Board to share this information with the Information Utilities (IU) efficiently.
June 16, 2023	Circular regarding application to initiate CIRP under sections 7 and 9 along with record of default issued by IU: In continuation of NCLT's order dated 3rd April, 2023, a circular was issued by the IBBI, advising applicants to append record of default issued by IU along with the application filed under section 7 or 9 of the Code.	To facilitate effective hearing of cases and expedite admission of CIRP applications.

7. International Financial Services Centres Authority (IFSCA)

Date	Regulation	Rationale
November 16, 2022	Guidelines for Business Continuity Plan (BCP) and Disaster Recovery (DR) for Market Infrastructure Institutions (MIIs)	To provide essential facilities and perform systemically critical functions relating to trading, clearing and settlement in securities market during any unforeseen circumstance, as part of the operational risk management.

Date	Regulation	Rationale
December 21, 2022	Circular on Distribution of Capital Market Products and Services: The framework includes measures relating to distribution of Capital Market Products to include a wide bouquet of securities as covered under the Securities Contracts (Regulation) Act, 1956 and Capital Market Services, which includes portfolio management services and investment advisory services. A comprehensive code of conduct has been prescribed to ensure distributors maintain high standards of integrity, disclosure, diligence, promptitude and fairness in their dealings with clients.	To prescribe a regulatory framework for distribution of Capital Market Products and services under IFSCA (Capital Market Intermediaries) Regulations, 2021.
January 13, 2023	IFSCA (Insurance Products and Pricing) Regulations, 2022: The regulations provide a framework for designing and pricing of insurance products by IFSC Insurance Offices (IIOs).	To ensure that IIOs have put in place effective internal systems and controls to identify and mitigate product related risks/issues and protect the interest of the policyholders while designing and pricing such insurance products.
January 13, 2023	IFSCA (Investment by IIO) Regulations, 2022: The regulations, <i>inter alia</i> , provide for manners and processes of investment of assets of the IIOs, in various global jurisdictions, including India. The proposed regulations also provide for various matrices, guidance, and limitations on investments.	To put in place the regulatory framework and processes related to investment of assets by an IIO.
January 13, 2023	IFSCA (Manner of Payment and Receipt of Premium) Regulations, 2022	To put in place the regulations regarding manner of payment of premium for insurance policy, assumption of risk, receipt or refund of premium and other terms and conditions, in accordance with Section 64 VB of the Insurance Act, 1938, for carrying on the insurance business in the IFSC.

Date	Regulation	Rationale
January 13, 2023	IFSCA (Maintenance of Insurance Records and Submission of Requisite Information for Investigation and Inspection) Regulations, 2022	To specify minimum information required to be maintained by an IIO and an IFSCA Insurance Intermediary Office (IIIO) for the purposes of investigation and inspection.
January 13, 2023	IFSCA (Appointed Actuary) Regulations, 2022: The regulations, <i>inter alia</i> , provide for appointment of Appointed Actuary, his powers, duties and obligations.	To lay down the regulatory framework for the persons who are authorised to perform the roles and discharge the functions of 'Appointed Actuary' for the IIOs.
January 18, 2023	Disclosures by Fund Management Entities for Environmental, Social or Governance (ESG) Schemes: The framework prescribed by IFSCA is principle-based and largely aligned with international best practices. The initial disclosures for ESG schemes in offer document/placement memorandum include name of scheme, its investment objectives and strategy and disclosure of risks and risk management practices <i>etc.</i>	To lay down standards and practices (including guidance) for Fund Management Entities launching and managing ESG schemes.
March 01, 2023	Circular prescribing net worth for bullion exchange and bullion clearing corporation: This circular was issued to increase the net worth requirements of Bullion Exchange and Bullion Clearing Corporation in a gradual manner to ensure that their net worth is sufficient to accommodate the technological advancements in trading platforms and the nature and expected growth of their business including the leveraged products they may offer.	To ensure that Bullion Exchange and Bullion Clearing Corporation's net worth captures the risks they face.
March 03, 2023	Circular on Guidelines for execution of block deals on the Bullion Exchange: To facilitate execution of block deals, the Bullion Exchange is being permitted to provide a separate trading window for this purpose. A trade, with a minimum quantity of 100 kgs of gold, executed through a single transaction on separate trading window of the Bullion Exchange will constitute a "block deal" and only non-individual participants shall be permitted to execute block deals.	To enable a mechanism for execution of large trades in gold in a single transaction without putting either the buyer or the seller in a disadvantageous position.

Date	Regulation	Rationale
March 22, 2023	Amendment to the Circular- 'Framework for Ship Lease' : This amendment has enabled Voyage Charters, Contract of Affreightments, employment in shipping pools and all other legal commercial transactions for employment of ships by ship leasing entities in IFSC. In addition to the above, 'Asset Management Support Services' has been extended to 'group entities' of lessor in IFSC instead of limiting it only to the wholly owned subsidiary (ies) of the lessor and its branch set up in IFSCs in India.	To enable voyage charter and other commercial transactions for employment of ships, as permissible activities under operating lease.
April 06, 2023	Addendum to Framework for enabling Ancillary services at IFSCs	To enable Voice broking services to entities in IFSCs or from outside India in relation to their business of banking and Ship broking for permitted activities under "IFSCA Framework of Ship Leasing"
April 11, 2023	Notification of 'Aviation training simulation devices' as a financial product in IFSC	To specify an operating lease (including a hybrid of operating and financial lease, in respect of 'Aviation training simulation devices') as a financial product.
April 13, 2023	IFSCA (Fund Management) (Amendment) Regulations, 2023	To specify where the funds of a client availing portfolio management services (other than those availing only advisory services) may be maintained.
April 13, 2023	IFSCA (Re-Insurance) Regulations 2023	To provide a framework for oversight and control of inward and outward arrangement of re-insurance business by the IIOs.
April 20, 2023	IFSCA (Assets, Liabilities, and Solvency Margin and Abstract of Actuarial Report for Life Insurance Business) Regulations, 2023	To specify the requirements related to capital, solvency and submission of abstract of actuarial report by an IIO for undertaking life insurance business.
April 20, 2023	IFSCA (Assets, Liabilities, and Solvency Margin of General, Health and Re-insurance business) Regulations, 2023	To specify the requirements related to capital and solvency for undertaking general, health, or re-insurance business by IIOs.