

Financial Stability Report

Issue No. 26



Reserve Bank of India
December 2022

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Foreword

This issue of the Financial Stability Report (FSR) comes at a very critical juncture when the cumulative impact of the extraordinary shocks to the entire world over the last three years is still working its way through across countries. The international economic order stands challenged; financial markets are in turmoil due to monetary tightening in most parts of the world; food and energy supplies and prices are under strain; debt distress is staring at many emerging market and developing economies; and every economy is grappling with multiple challenges.

Amidst such global shocks and challenges, the Indian economy presents a picture of resilience. Financial stability has been maintained. Domestic financial markets have remained stable and fully functional. The banking system is sound and well-capitalised. The non-banking financial sector has also withstood these challenges. Stress test results presented in this issue of the FSR indicate that banks would be able to withstand even severe stress conditions, should they materialise. Furthermore, in spite of formidable global headwinds, India's external accounts remain well-cushioned and viable.

Going forward, core issues of management of climate change, dealing with unanticipated and fresh shocks, if any, further strengthening the buffers of our financial system, harnessing fintech innovations and deepening financial inclusion will continue to receive priority attention from regulators and policy makers.

In 2023, India is well positioned to play a leading role in the world stage as part of its G20 presidency. The biggest challenge for G20 as a group is to reignite the efficacy of multilateralism.

On the domestic front, we recognise the destabilising potential of global risks, even as we draw strength from the robust macroeconomic fundamentals of the Indian economy. The Reserve Bank and the other financial regulators remain vigilant and in readiness to ensure the stability and soundness of our financial system through appropriate interventions, whenever necessary, in the best interest of the Indian economy.

Shaktikanta Das

Governor

December 29, 2022

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List of Select Abbreviations

AA	Account Aggregator	CIR	Cyber Incident Reporting
AEs	Advanced Economies	CIRP	Corporate Insolvency Resolution Process
AFA	Additional Factor of Authentication	CMs	Clearing Members
AFS	Available for Sale	CPs	Commercial Papers
AID	All Inclusive Direction	CPI	Consumer Price Index
AIFs	Alternative Investment Funds	CRAR	Capital to Risk-Weighted Assets Ratio
AIFIs	All-India Financial Institutions	CRAs	Credit Rating Agencies
AMC	Asset Management Companies	CRILC	Central Repository of Information on Large Credits
AMFI	Association of Mutual Funds in India	CY	Calendar Year
AML	Anti Money Laundering	DeFi	Decentralised Finance
APY	Atal Pension Yojana	DGA	Duration Gap Analysis
ARC	Asset Reconstruction Companies	DICGC	Deposit Insurance and Credit Guarantee Corporation
AUM	Assets Under Management	DIF	Deposit Insurance Fund
BEER	Bond-Equity-Earnings-Yield Ratio	DIIs	Domestic Institutional Investors
BIFR	Board for Industrial and Financial Reconstruction	DPD	Days Past Due
BIS	Bank for International Settlements	DLA	Digital Lending App
BoE	Bank of England	EAR	Earnings At Risk
BoP	Balance of Payments	ECBs	External Commercial Borrowings
BSI	Banking Stability Indicator	ECLGS	Emergency Credit Line Guarantee Scheme
CAD	Current Account Deficit	EMDEs	Emerging Market and Developing Economies
CASA	Current Account and Savings Account	EMEs	Emerging Market Economies
CBDs	Central Bank Digital Currencies	ESG	Environmental, Social, and Governance
CCs	Clearing Corporations	ESMA	European Securities and Market Authority
CCB	Capital Conservation Buffer	FAO	Food and Agricultural Organisation
CCPs	Central Counterparties	FBIL	Financial Benchmark India Pvt Ltd
CD	Certificate of Deposit	FBs	Foreign Banks
CDSL	Central Depository Services Limited		
CET1	Common Equity Tier 1		
CFT	Combating of Financing of Terrorism		
CIC	Credit Information Companies		

Abbreviations

FCE	Foreign Currency Exposure	IEA	International Energy Agency
FCNR(B)	Foreign currency non-resident (bank)	IFs	Innovation Facilitators
FDI	Foreign Direct Investment	IFR	Investment Fluctuation Reserve
FIIIs	Foreign Institutional Investors	IFSC	International Financial Service Centre
FIP	Financial Information Provider		
FIRE	Format for Incident Reporting Exchange	IFSCA	International Financial Services Centres Authority
FMI	Financial Market Infrastructure	IM	Initial Margin
FoF	Fund-of-Funds	IMF	International Monetary Fund
FPI	Foreign Portfolio Investment	InvITs	Infrastructure Investment Trusts
FSB	Financial Stability Board	IO	Internal Ombudsman
FSDC	Financial Stability & Development Council	IORS	Inter-Operable Regulatory Sandbox
		IOSCO	International Organisation of Securities Commissions
FSDC-SC	Sub Committee of the Financial Stability and Development Council	IRB	Internal Rating Based
FSR	Financial Stability Report	IRDAI	Insurance Regulatory and Development Authority of India
FSSI	Financial System Stress Indicator		
FSWM	Financially Sound and Well Managed	IRRBB	Interest Rate Risk in Banking Book
FY	Financial Year	JPY	Japanese Yen
GDP	Gross Domestic Product	KYC	Know Your Customer
GFC	Global Financial Crisis	LABs	Local Area Banks
GFD	Gross Fiscal Deficit	LCR	Liquidity Coverage Ratio
GIFT	Gujarat International Finance Tec-City	LOS	Loan Origination System
GNPA	Gross Non-Performing Asset	LSP	Lending Service Provider
GSDP	Gross State Domestic Product	LT	Long-term
GST	Goods and Services Tax	LTV	Loan-to-Value
GSTN	Goods and Services Tax Network	MHP	Minimum Holding Period
HFCs	Housing Finance Companies	MRC	Minimum Required Corpus
HFT	Held for Trading	MSME	Micro, Small and Medium Enterprises
HPI	House Price Index		
HQLAs	High Quality Liquid Assets	MTM	Mark-To-Market
HTM	Held-to-Maturity	MVE	Market Value of Equity
IBC	Insolvency and Bankruptcy Code	NaBFID	National Bank for Financing Infrastructure and Development
ICR	Interest Coverage Ratio	NBFC	Non-Banking Financial Company

NBFC-BL	NBFC - Base Layer	PAT	Profit After Tax
NBFC-ML	NBFC - Middle Layer	PCR	Provisioning Coverage Ratio
NBFC-TL	NBFC - Top Layer	PCM	Professional Clearing Member
NBFC-UL	NBFC - Upper Layer	PD	Probability of Default
NBFIs	Non-Banking Financial Intermediaries	P/E	Price-to-Earning
NCD	Non-Convertible Debentures	PE	Private Equity
NCGTC	National Credit Guarantee Trustee Company Ltd	PFMI	Principles for Financial Market Infrastructures
NCLT	National Company Law Tribunal	PFRDA	Pension Fund Regulatory and Development Authority
NDSI	Non-Deposit Taking Systemically Important	PLI	Production Linked Investment
NDTL	Net Demand & Time Liabilities	PMI	Purchasing Managers' Indices
NII	Net Interest Income	PoS	Point of Sale
NIM	Net Interest Margin	PSBs	Public Sector Banks
NNPA	Net Non performing Assets	PSUs	Public Sector Undertakings
NOF	Net Owned Funds	PVBs	Private Sector Banks
NPA	Non-Performing Asset	RB-IOs	Reserve Bank - Integrated Ombudsman Scheme
NPS	National Pension System	REITs	Real Estate Investment Trusts
NRIs	Non-resident Indians	REs	Regulated Entities
NSDL	National Securities Depository Limited	RoA	Return on Asset
NSE	National Stock Exchange	RoE	Return on Equity
NSO	National Statistical Office	RRA	Regulations Review Authority
NSUCBs	Non-Scheduled Urban Cooperative Banks	RRBs	Regional Rural Banks
OEFs	Open-Ended Investment Funds	RSA	Rate-Sensitive Assets
OECD	Organisation for Economic Co-operation and Development	RSL	Rate-Sensitive Liabilities
OFS	Offer for Sale	RWA	Risk-Weighted Assets
OIS	Overnight Indexed Swap	SCBs	Scheduled Commercial Banks
OOI	Other Operating Income	SD	Standard Deviation
OTC	Over-the-Counter	SDLs	State Development Loans
P2M	Person-to-Merchant	SEBI	Securities and Exchange Board of India
P2P	Person-to-Person	SFBs	Small Finance Banks
		SGF	Settlement Guarantee Fund

Abbreviations

SIPs	Systematic Investment Plans	TPI	Transmission Protection Instrument
SLR	Statutory Liquidity Ratio	UCB	Urban Cooperative Bank
SMA	Special Mention Accounts	UFCE	Unhedged Foreign Currency Exposure
SPDs	Standalone Primary Dealers		
SRS	Systemic Risk Survey	UPI	Unified Payment Interface
SUCBs	Scheduled Urban Cooperative Banks	VAR	Vector Auto Regression
TAT	Turn Around time	VC	Venture Capital
T-Bills	Treasury Bills	VM	Variable Margin
TGA	Traditional Gap Analysis	WB	World Bank

Overview

The Financial Stability Report (FSR) is a semi-annual publication. With inputs from all the financial sector regulators, it reflects the overall evaluation of the Sub Committee of the Financial Stability and Development Council on risks to the stability of the Indian financial system.

Macrofinancial Risks

The global economy is facing formidable headwinds with recessionary risks looming large. The interaction of multiple shocks has resulted in tightening of financial conditions and heightened volatility in financial markets. For emerging market economies (EMEs), the challenges are even harsher as they encounter global spillovers, debt fragility, currency volatility and capital outflows.

Domestic Economy and Markets

The Indian economy is confronting strong global headwinds. Yet, sound macroeconomic fundamentals and healthy financial and non-financial sector balance sheets are providing strength and resilience and engendering financial system stability. Inflation, though elevated, is retreating in response to front-loaded monetary policy actions and supply side interventions.

In the financial sector, buoyant demand for bank credit and early signs of a revival in investment cycle are benefiting from improved asset quality, a return to profitability and resilient capital and liquidity buffers. These strengths are helping the financial system weather external spillovers, tightening global financial conditions and high volatility in financial markets.

Financial Institutions: Soundness and Resilience

Capital positions of scheduled commercial banks (SCBs) remained strong in September 2022. The Capital to Risk Weighted Assets Ratio (CRAR) and

Common Equity Tier 1 (CET1) ratio of SCBs stood at 16.0 per cent and 13.0 per cent, respectively. Their gross non-performing assets (GNPA) ratio have been steadily trending down to a seven-year low of 5.0 per cent in September 2022, while net non-performing assets (NNPA) have dropped to ten-year low of 1.3 per cent of total assets. The provisioning coverage ratio (PCR) has been increasing steadily since March 2021 to 71.5 per cent. The profit after tax of SCBs registered a growth of 40.7 per cent in H1:2022-23, led by strong growth in net interest income and a reduction in provisions.

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 16.1 per cent in September 2022 while that of NBFCs stood at 27.4 per cent. The consolidated 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 are stable. SCBs continued to have the largest bilateral exposures in the Indian financial system, which reached pre-pandemic levels in September 2022. 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

Globally, the focus of prudential regulation is on protecting the financial system from spillover effects of synchronised monetary tightening by central banks amidst a highly uncertain economic

environment. Enhancing the resilience of non-bank financial intermediaries (NBFIs) and assessing climate-related financial risks are among the key priorities. On the domestic front, the emphasis remains on improving the resilience of the financial system and fostering a conducive credit environment that supports a sustainable economic recovery and preserves financial stability.

Assessment of Systemic Risk

The Reserve Bank's latest Systemic Risk Survey (SRS) showed that global spillovers, financial market and general risks have increased, while macroeconomic risks have moderated. No change

is perceived in institutional risks. Monetary tightening in advanced economies, tightening of financial conditions, geopolitical risks, global growth uncertainty and growing risks from private cryptocurrencies and climate change are cited as the major contributors to rise in global, financial market and general risks. The majority of the respondents saw further improvement in credit prospects for the Indian economy and remained confident about the stability of the Indian banking sector. Nearly ninety per cent of the respondents assessed that the prospects of the Indian banking sector are likely to improve or remain unchanged over a one-year horizon.

Chapter I

Macrofinancial Risks

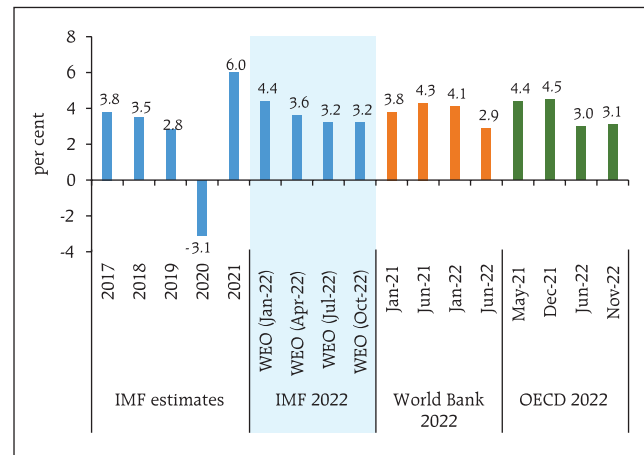
Amid economic, financial and political shocks, global macrofinancial risks have increased and the outlook is highly uncertain. Despite international spillovers and a challenging global environment, the Indian economy is navigating a path of recovery. In the Indian financial system, healthier balance sheets are enabling a robust recovery of credit flows even as profitability is improving.

Introduction

1.1 Since the June 2022 issue of the Financial Stability Report (FSR), the global economic outlook has deteriorated further. Risks to financial stability have become accentuated as central banks have aggressively front-loaded monetary policy tightening synchronously across countries and have given hawkish forward guidance. International organisations, including the International Monetary Fund (IMF), the World Bank (WB) and the Organisation for Economic Co-operation and Development (OECD) have downgraded their global growth projections relative to their previous revisions (Chart 1.1).

1.2 The outlook for 2023 is even bleaker, with global growth expected to fall to 2.7 per cent, with both advanced economies (AEs) and emerging market and developing economies (EMDEs) forecast to experience significant output slowdown. Global trade volume is also expected to decelerate from

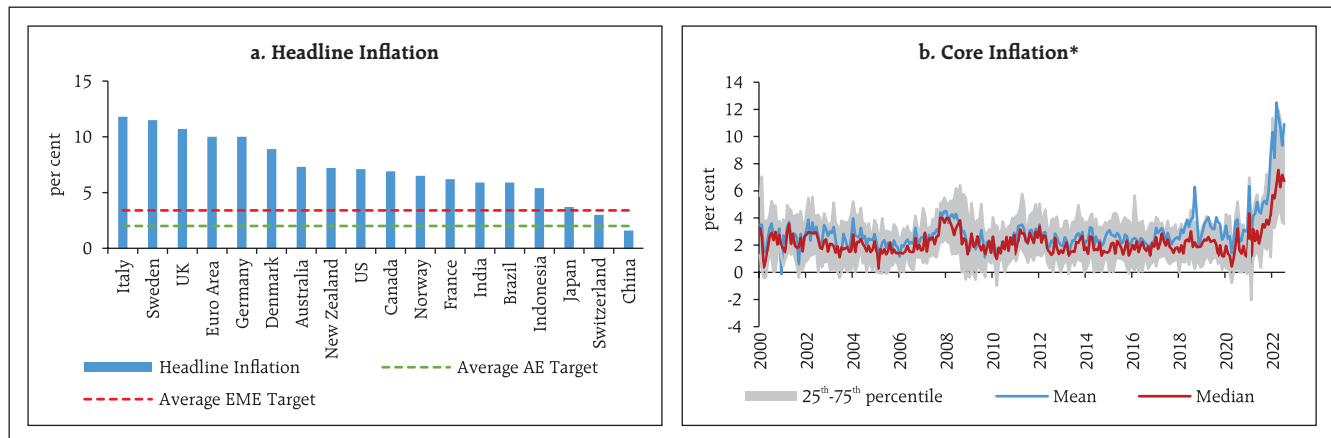
Chart 1.1: Global Growth Forecasts



Source: IMF, World Bank, OECD.

10.1 per cent in 2021 to 4.3 per cent in 2022, with EMDEs bearing the brunt. Inflation is forecast to rise to 8.8 per cent in 2022, with both headline and core inflation staying well above targets in AEs and EMDEs (Chart 1.2 a and b).

Chart 1.2: Inflation



Note: * 35 countries representing 81 per cent of world's GDP at purchasing power parity (PPP).
Source: Bloomberg and IMF.

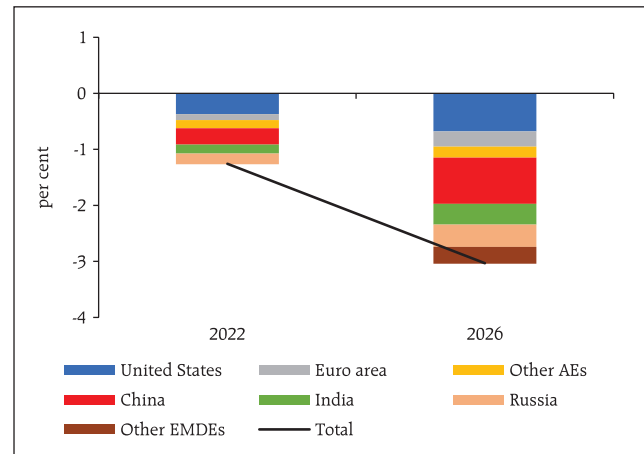
1.3 The uncertainty surrounding the outlook is at exceptionally elevated levels. According to the IMF, there is a 25 per cent chance of global growth falling below 2.0 per cent in 2023.

1.4 For EMDEs and especially, frontier economies, limited policy space and vulnerability to external shocks due to rising debt distress translate into daunting challenges in managing elevated levels of food and energy prices, shortages of key food and energy staples, emergence of different coronavirus variants, especially in countries where vaccination rates are low, currency depreciation, and surge in capital outflows in a period of rising borrowing costs. The scars from these shocks are likely to be long lasting, with persistent output losses and reduced economic potential (Chart 1.3).

1.5 The Indian economy has been consolidating a recovery interrupted by waves of the pandemic on the back of a robust revival of agriculture and services, stable corporate performance, in spite of the incidence of rising input costs, business and consumer optimism, and supported by a sound financial system. This innate resilience has helped the economy to withstand extraordinary external shocks, especially prolonged geo-political hostilities. Nevertheless, it remains vulnerable to formidable global headwinds, which act as a drag on the domestic economic recovery.

1.6 Real gross domestic product (GDP) growth is placed at 9.7 per cent (y-o-y) in H1:2022-23 (13.7 per cent and 4.7 per cent in H1 and H2 of 2021-22, respectively). This improvement is driven by personal consumption and gross fixed capital formation, which offset the negative contribution of net exports. The strengthening of the recovery in Q3:2022-23 is reflected in high-frequency indicators, especially those relating to the contact intensive sectors. India's purchasing managers' indices (PMI) for both manufacturing and services outperformed regional and global indices in October and November.

Chart 1.3: Impact of Shocks of 2022*



Note: * Percentage point deviation from pre-shock growth forecasts.
Source: IMF.

Similarly, other indicators such as motor vehicle registration, passenger traffic, consumption of steel, cement and petroleum point to improvement in domestic economic activity.

1.7 On the other hand, the slowdown in global growth and the stronger US dollar (USD) are exacerbating pressures on net exports. India's merchandise exports after falling to a 20-month low in October 2022, have recovered moderately. The rising share of services exports and robust inflows of remittances provide an offset to the widening merchandise trade deficit. The steady net inflows of foreign direct investment and the resumption of portfolio flows since July 2022 indicate that the CAD will be comfortably financed.

1.8 Headline consumer price index (CPI) inflation after remaining above the upper tolerance band of the inflation target range since January 2022, has moderated. While this outcome reflects a series of shocks to food and energy prices, the persistence and broadening of core inflation may continue to exert pressure on inflation going forward. Front-loaded monetary policy actions are expected to bring inflation into the tolerance band and closer to the target while anchoring inflation expectations.

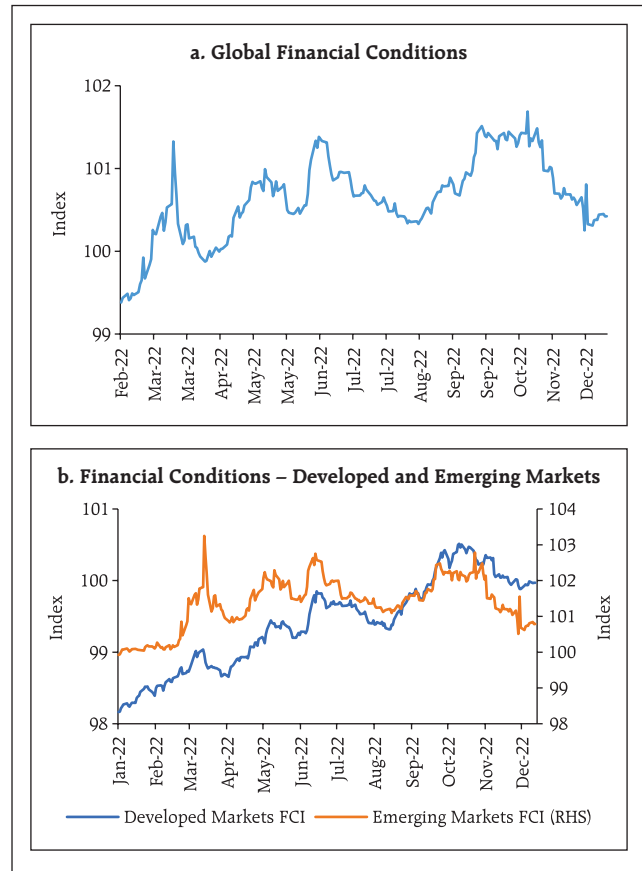
1.1 Global Backdrop

1.1.1 Macrofinancial Development and Outlook

1.9 Global financial conditions have tightened substantially in the wake of monetary policy actions by central banks and elevated levels of uncertainty (Chart 1.4 a and b). Recently, however, the financial conditions have moderated.

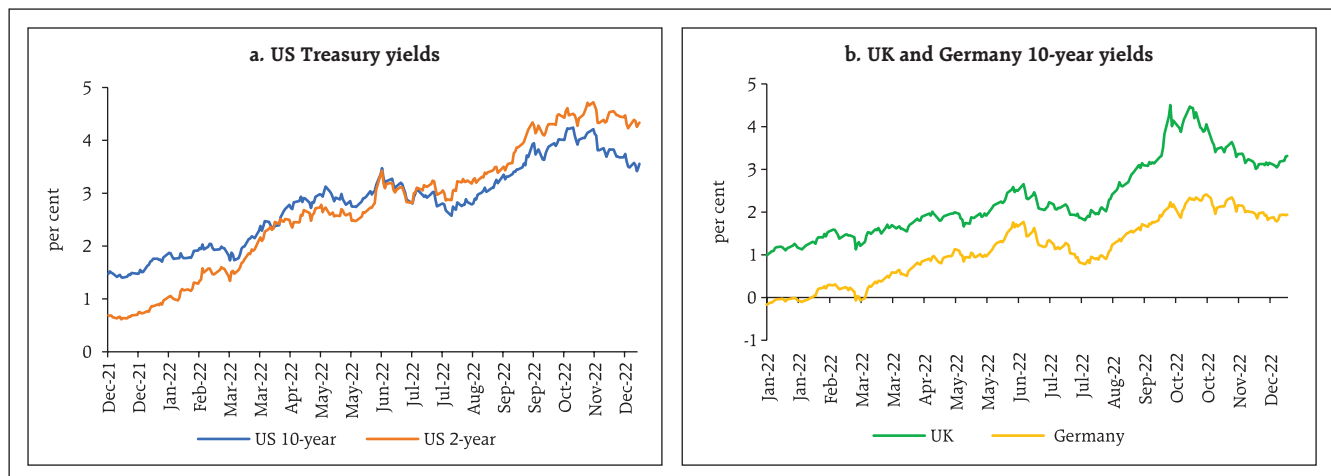
1.10 With central banks emphasising their resolve to restore price stability, nominal yields on sovereign bonds have risen sharply (Chart 1.5 a). In the United States (US), the treasury yield curve has inverted since July 2022, with 2-year and 10-year treasury yields rising by 348 basis points (bps) and 197 bps, respectively (as on December 14, 2022) since end-December 2021. Yields on sovereign bonds in both the Euro area and the United Kingdom (UK) also surged (Chart 1.5 b).

Chart 1.4: Financial Conditions



Source: Goldman Sachs.

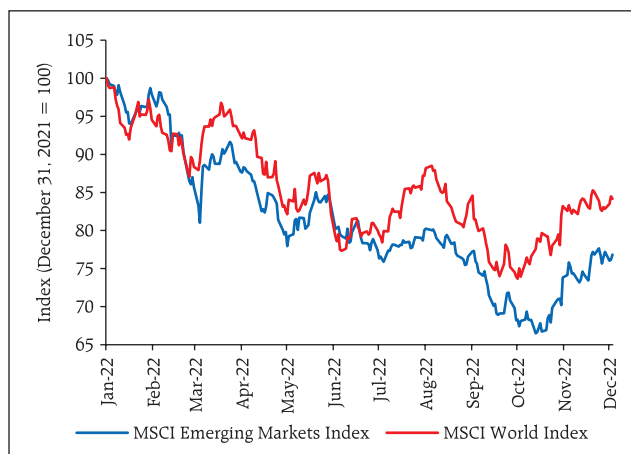
Chart 1.5: Increase in Government Bond Yields



Source: Bloomberg.

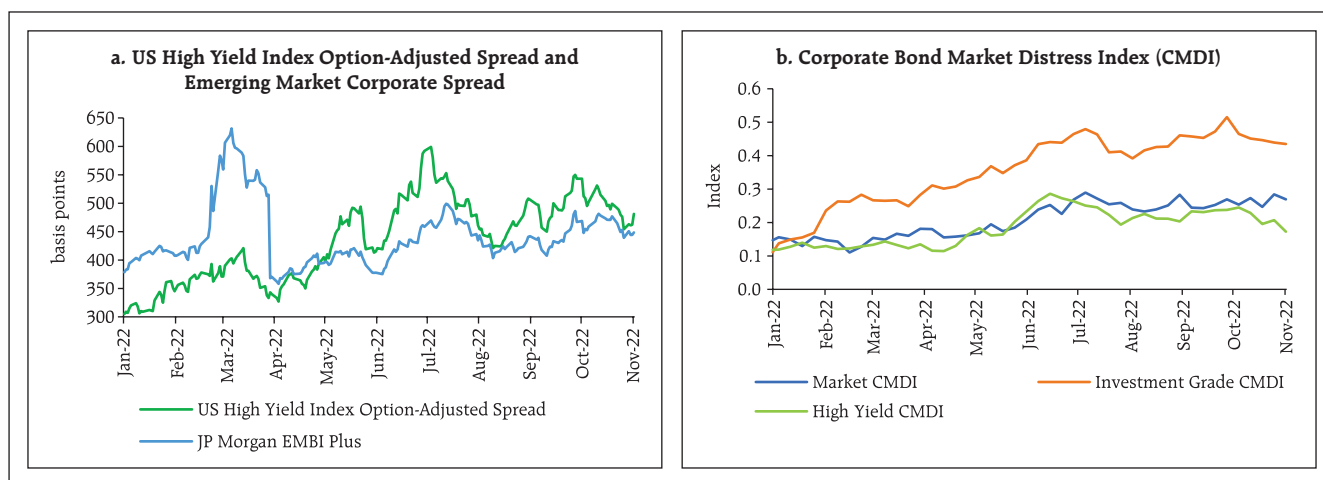
1.11 Equities have fallen sharply (Chart 1.6). Corporate bond spreads have materially widened and distress in the corporate bond market is on the rise, especially down the rating scale (Chart 1.7 a and b). The tightening of financial conditions has resulted in negative returns for almost all asset classes (Table 1.1).

Chart 1.6: Equity Market Decline



Source: Bloomberg.

Chart 1.7: Corporate Bond Market



Note: EMBI stands for Emerging Markets Bond Index.

Source: Federal Reserve Bank of St Louis, FRED, JP Morgan and New York Federal Reserve.

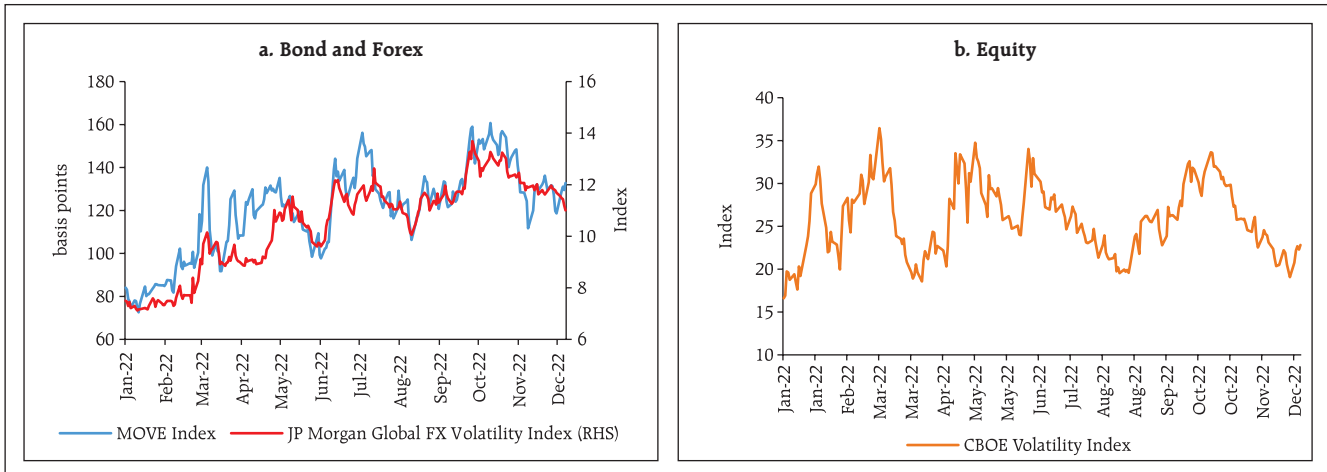
Table 1.1: Asset Returns

Return (per cent)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 (YTD)
Bloomberg US Aggregate Long TR Index	24.0	-12.9	9.4	29.9	3.6	-12.7	25.1	-1.2	1.3	8.5	-1.8	14.8	17.7	-4.6	-24.4
Bloomberg US Aggregate TR Index	5.2	5.9	6.5	7.8	4.2	-2.0	6.0	0.5	2.6	3.5	0.0	8.7	7.5	-1.5	-11.0
Bloomberg Global Aggregate	4.8	6.9	5.5	5.6	4.3	-2.6	0.6	-3.2	2.1	7.4	-1.2	6.8	9.2	-4.7	-14.4
JP Morgan GBI-EM Global Core	-5.9	21.7	15.4	-2.0	17.5	-8.3	-5.2	-14.3	10.0	14.7	-6.9	10.1	3.5	-9.2	-10.4
NASDAQ Composite Index	-40.5	43.9	16.9	-1.8	15.9	38.3	13.4	5.7	7.5	28.2	-3.9	35.2	43.6	21.4	-28.6
S&P 500 Index	-38.5	23.5	12.8	-0.0	13.4	29.6	11.4	-0.7	9.5	19.4	-6.2	28.9	16.3	26.9	-16.2
Oil	-53.5	77.9	15.1	8.2	-7.1	7.2	-45.9	-30.5	45.0	12.5	-24.8	34.5	-20.5	55.0	2.8
Gold	3.5	27.6	28.7	10.1	6.4	-27.7	-0.3	-11.4	8.0	13.5	-1.6	18.7	24.3	-3.4	-1.1
MSCI EM Index	-54.5	74.5	16.4	-20.4	15.1	-5.0	-4.6	-17.0	8.6	34.3	-16.6	15.4	15.8	-4.6	-21.0
MSCI World Index	-42.1	27.0	9.6	-7.6	13.2	24.1	2.9	-2.7	5.3	20.1	-10.4	25.2	14.1	20.1	-16.3

Note: Updated on December 14, 2022.

Source: Bloomberg.

Chart 1.8: Financial Market Volatility



Note: MOVE Index tracks US fixed income market volatility. FX Volatility Index measures the implied volatility of currency markets. CBOE Volatility Index measures the implied volatility of the S&P 500 market.

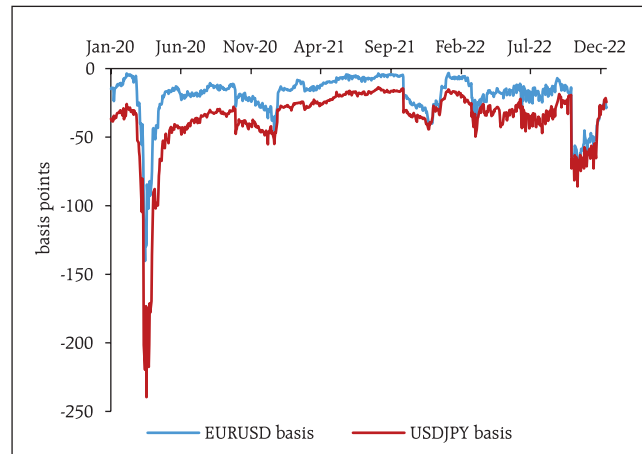
Source: Bloomberg and JP Morgan.

1.12 In tandem, volatility across market segments has risen (Chart 1.8 a and b). Signs of stress in short-term dollar funding markets have also emerged, with cross-currency basis swap spreads for the Japanese Yen (JPY) and the Euro widening to their highest levels since the March 2020 turmoil in financial markets with the onset of the pandemic. Basis swap spreads, however, have narrowed in recent period (Chart 1.9).

1.13 The impact of tightening of financial conditions is also reflected in the sharp rise in real yields on 30-year US treasury and 30-year fixed-rate mortgages (Chart 1.10).

1.14 Financial conditions are interacting with pre-existing vulnerabilities and amplifying market dysfunction. In turn, this is forcing central banks into conflicting positions of having to intervene to ease liquidity strains to preserve financial stability, whilst maintaining a tight monetary policy stance. In the UK, the gilt market witnessed excessive volatility due to the announcement of fiscal measures to support the economy, which raised concerns about unfunded borrowings and fiscal health. As highly leveraged pension funds faced mark-to-market losses and large-scale sell-offs became imminent with material risks to financial stability, the Bank of

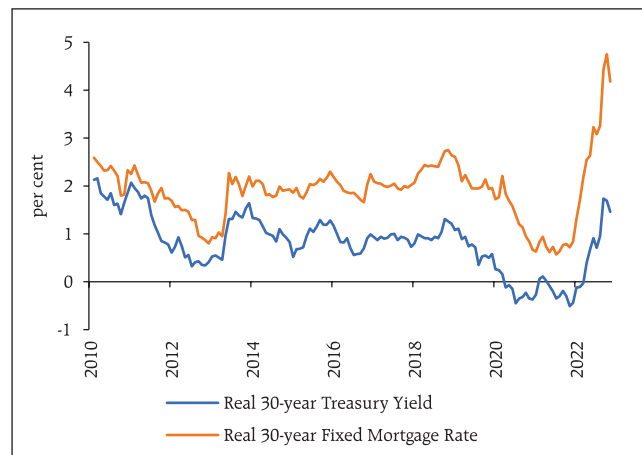
Chart 1.9: FX-implied Dollar Funding Spreads



Note: Basis indicates the difference between interest rate implicit in swapping one currency to obtain another *vis-à-vis* the interest rate of directly borrowing the currency (more negative = more expensive USD funding).

Source: Bloomberg.

Chart 1.10: U.S. Long-term Rates



Source: Federal Reserve Bank of St Louis, FRED.

England (BoE) had to undertake targeted purchases of long-term government bonds for a temporary period. Meanwhile, the European Central Bank announced the establishment of a transmission protection instrument (TPI) to mitigate sovereign bond fragmentation risk in member states and ensure effective transmission of monetary policy. In this phase of monetary policy tightening and liquidity normalisation, the need for central banks to effectively communicate the distinction between operations aimed at preserving financial stability and those that signal the broad direction of monetary policy has become challenging.

1.15 Against the backdrop of growing uncertainty about the economic outlook, the tightening of global financial conditions, the upsurge in market volatility and sporadic sell-offs in asset markets have heightened macro-financial risks globally. Future shocks, if any, may exacerbate existing financial system vulnerabilities.

1.1.2 Other Global Macrofinancial Risks

1.16 With financial conditions continuing to tighten and the economic outlook uncertain, the balance of macrofinancial risks is skewed to the downside. Debt stress, monetary tightening risks to financial stability, currency volatility, turmoil in crypto assets market and growth of open-ended funds are some of the major risks that can potentially undermine global financial stability.

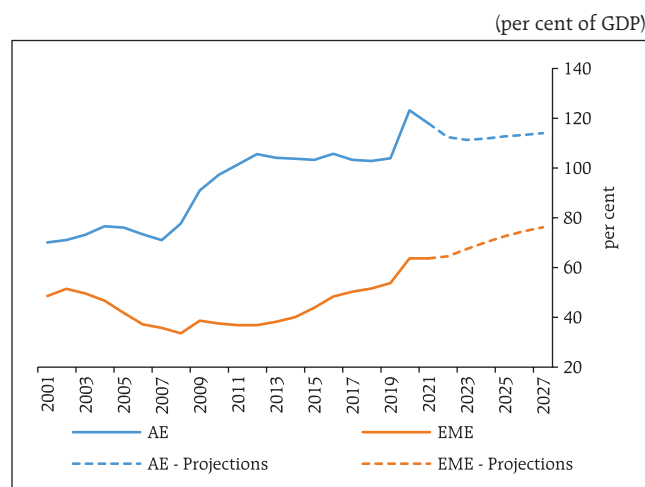
A. Debt Stress

1.17 According to the IMF, global debt after witnessing the largest one-year increase of 29 percentage points of GDP in 2020, fell 10 percentage points of GDP in 2021¹. Global debt to GDP ratio, however, remained 19 percentage points above

pre-pandemic levels. In USD terms, global debt has risen steadily and now stands at a record-high of US \$235 trillion. As central banks raise interest rates to combat inflation, raising borrowing costs for both the public and private sectors, high debt vulnerabilities need to be managed. Debt distress is particularly worrisome in low-income emerging nations where pandemic scars are more pronounced and sovereign spreads are sharply rising.

1.18 The cost-of-living crisis in several countries has brought the focus of attention on the limited fiscal policy space available to prevent or mitigate resulting welfare losses in view of elevated debt levels and rapidly rising borrowing costs. According to the IMF, global government debt² is projected at 91 per cent of GDP in 2022, 7.5 per cent above the pre-pandemic level (Chart 1.11). Going forward, fiscal deficits are projected to reach 3.6 per cent of GDP in AEs and 6.2 per cent in emerging market economies (EMEs), 1.1 and 2.2 percentage

Chart 1.11: General Government Debt



Note: AE refers to Advanced Economies and EME refers to Emerging Market Economies.

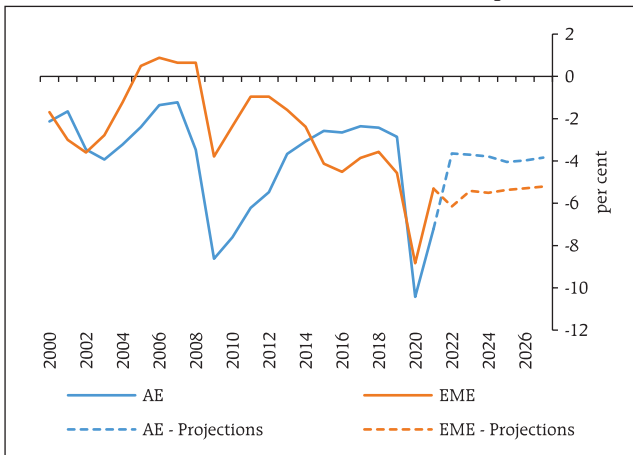
Source: IMF.

¹ IMF (2022), Global Debt Database.

² Excluding China.

Chart 1.12: General Government Balance

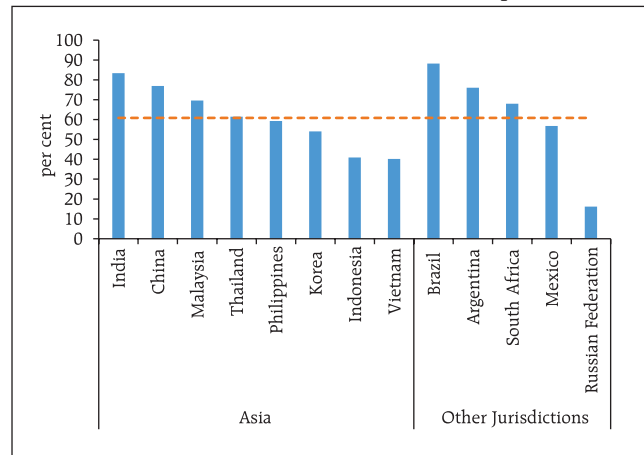
(per cent of GDP)



Note: AE refers to Advanced Economies and EME refers to Emerging Market Economies.
Source: IMF.

Chart 1.13: EMEs General Government Debt in 2022

(per cent of GDP)

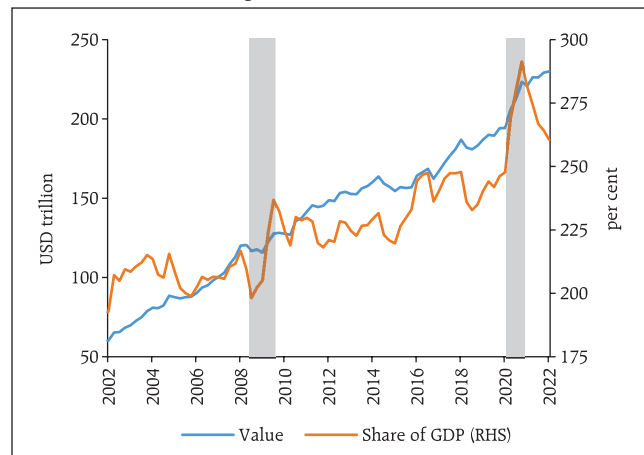


Note: Dotted line represents the average general government debt.
Source: IMF.

points, respectively, above their 2017-19 average (Chart 1.12 and 1.13).

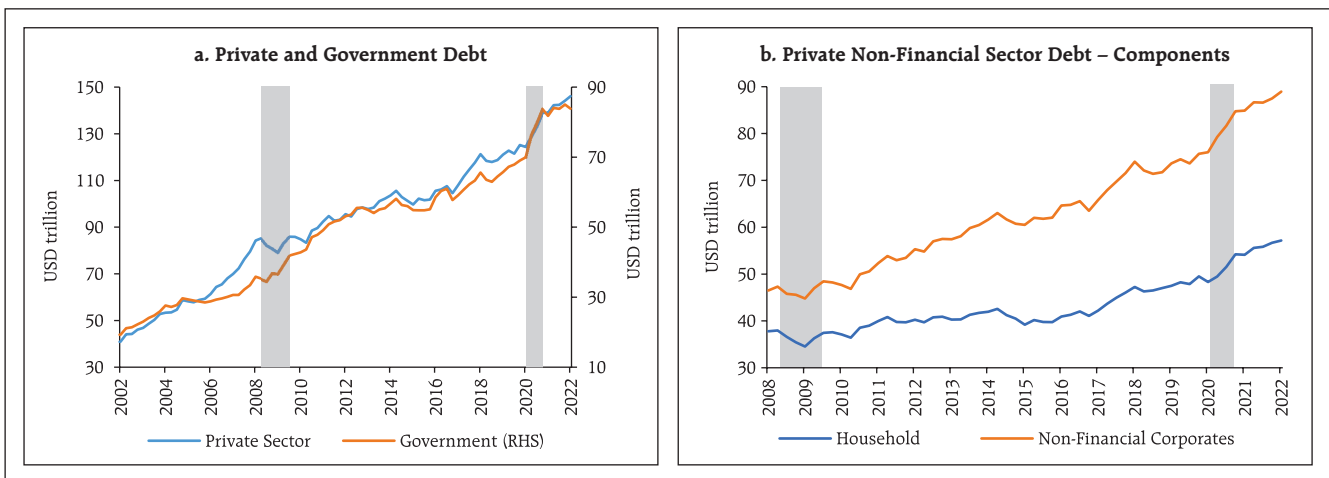
1.19 At the same time, market value of non-financial sector debt (governments, non-financial corporates and households) had reached very high levels during the COVID-19 pandemic (Chart 1.14), emerging as a source of vulnerability, especially in a tightening monetary policy cycle (Chart 1.15). In many economies, private-sector debt is more than

Chart 1.14: Rising Global Non-Financial Sector Debt



Source: Bank for International Settlements (BIS).

Chart 1.15: Global Non-Financial Sector Debt Comparison



Source: BIS.

government debt (Table 1.2). AEs have a higher share of non-financial sector debt (Chart 1.16). According to the Financial Stability Board (FSB), debt servicing may become a problem if average interest rates rose at the same rate as they did during the Global Financial Crisis (GFC) and incomes decline by 3 per cent³. For many EMEs with debt levels already at distressed levels, the pressure is likely to intensify even further as their currencies depreciate against the USD and borrowing costs rise.

B. Monetary Tightening Risks to Financial Stability

1.20 The aggressive tightening of monetary policy is likely to continue over the next one year (Chart 1.17 and 1.18). The current tightening phase has two characteristics that stand out historically. First, it is the most synchronised in the previous 50

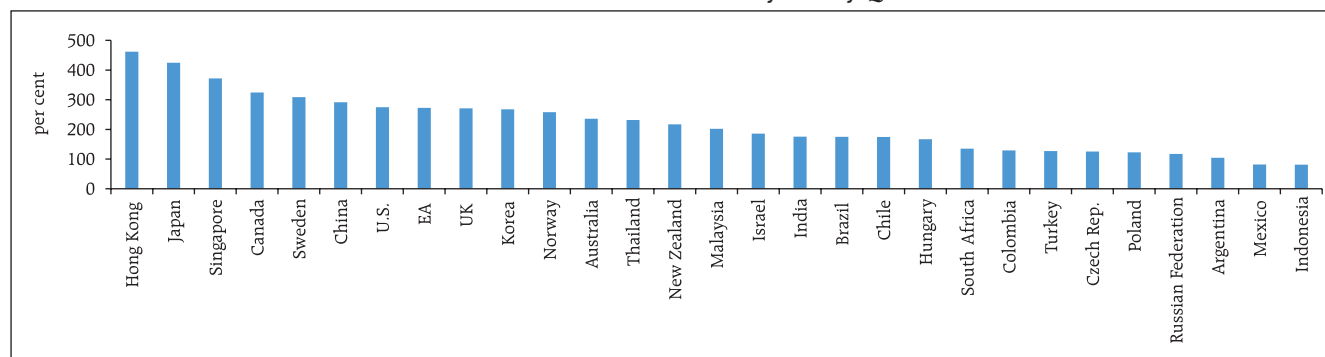
Table 1.2: Global Non-Financial Sector Debt Q1:2022

per cent of GDP

	Total Non-Financial Sector	Government	Private	Private	
				Household	Non-Financial Corporates
Global	261	95	166	65	101
Developed	281	114	167	74	93
US	275	117	158	77	81
Euro Area	273	103	169	59	110
UK	271	118	153	85	68
Japan	425	238	186	69	117
Emerging	230	67	163	51	113
China	292	73	218	61	157
India	176	85	91	37	54
Korea	268	47	221	105	115
Russia	118	17	100	22	79
Turkey	127	41	86	13	73
South Africa	135	69	66	34	32
Brazil	175	90	85	34	51
Mexico	82	42	41	16	24

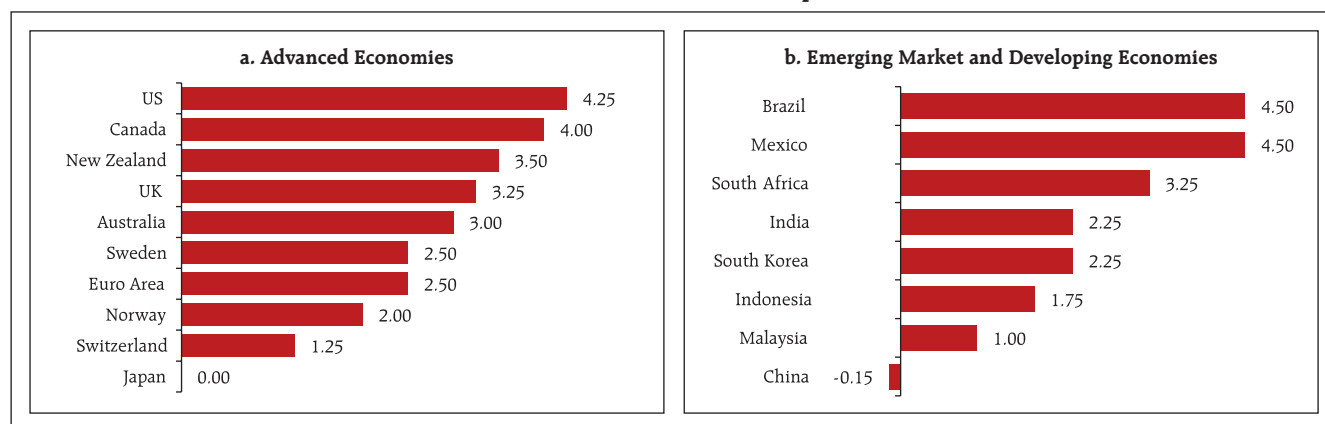
Source: BIS.

Chart 1.16: Non-Financial Sector Debt by Country, Q1:2022



Source: BIS.

Chart 1.17: Central Bank Rate Hikes (per cent)

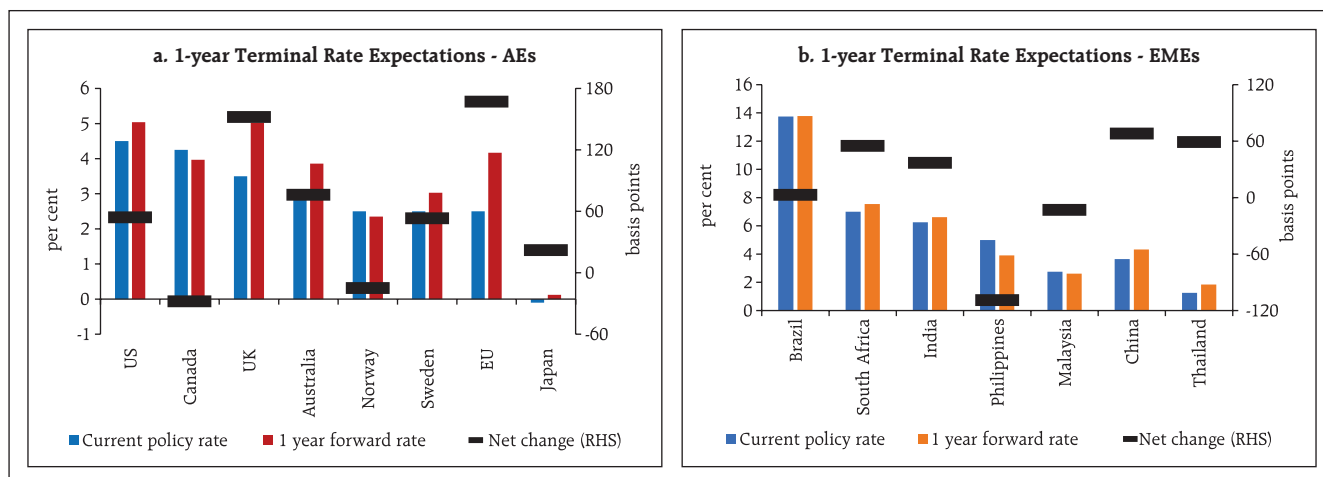


Note: As on December 15, 2022.

Source: Bloomberg.

³ Financial Stability Board (2022), "2022 H2 Vulnerabilities Assessment", August.

Chart 1.18: 1-year Terminal Rate Expectations



Note: As on December 15, 2022

Source: Bloomberg.

years. Second, policy rate increases are happening twice as quickly as they did previously. The front-loaded and faster-than-usual pace of tightening has consequences for financial stability as it is interacting with financial system vulnerabilities through multiple channels.

1.21 Riskier assets often sell-off when financial conditions tighten in response to interest rate hikes by central banks leading to market dislocation and obstruction to the flow of credit to the real economy. With non-banking financial institutions expanding their footprint, markets have become more vulnerable to such episodes, as was witnessed in the March 2020 market turmoil. Second, in recent years, there has been a substantial rise in debt levels among both private borrowers and governments, with attendant debt servicing costs. This is more pronounced for EMs with dollar-denominated debt, which gets amplified by the sharp appreciation of the USD. Third, in many economies, the ratio of housing prices to incomes are substantially higher than in past tightening cycles. Finally, financial stability may also be endangered by tightening financial conditions

and ensuing losses to financial institutions due to deterioration in asset quality, which could prompt them to reduce risk and tighten lending standards. This, in turn, could hinder economic growth.

1.22 Calibrating the pace and size of monetary tightening is a challenge as central banks respond to evolving domestic challenges, which reflect country-specific variations. The impact on financial conditions has been quick and sizable, with the potential to amplify pre-existing vulnerabilities in the financial system and pose risks to financial stability. While the fortification of bank balance sheets as part of the post-GFC regulatory reforms has improved their resilience, hidden leverages as revealed in the case of pension funds in the UK may overwhelm these buffers and endanger systemic stability in an interconnected financial system where banks are counterparties to non-bank financial intermediaries. Quantitative tightening by central banks may exacerbate liquidity strains. Monetary tightening will also impact central bank balance sheets. As they raise interest rates rapidly, they may incur losses as interest rates they pay on their liabilities continue to rise, while rates earned

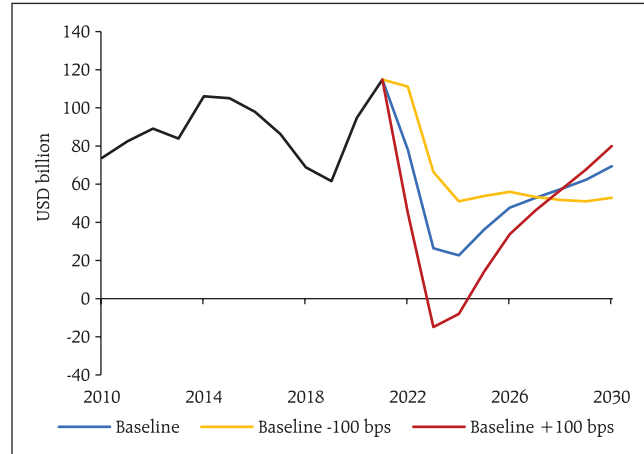
on their assets (securities) remain relatively fixed (Chart 1.19). The implication of likely losses for central banks has multiple dimensions in terms of their ability to conduct independent monetary policy, transfer surpluses to the Government and losses, if any, to the taxpayer⁴.

C. Currency Volatility

1.23 Large exchange rate fluctuations have been triggered by global shocks and spillovers, and monetary policy actions to keep inflation under control. The USD, in particular, has strengthened sharply against currencies of both advanced and emerging market economies (Chart 1.20 a and b).

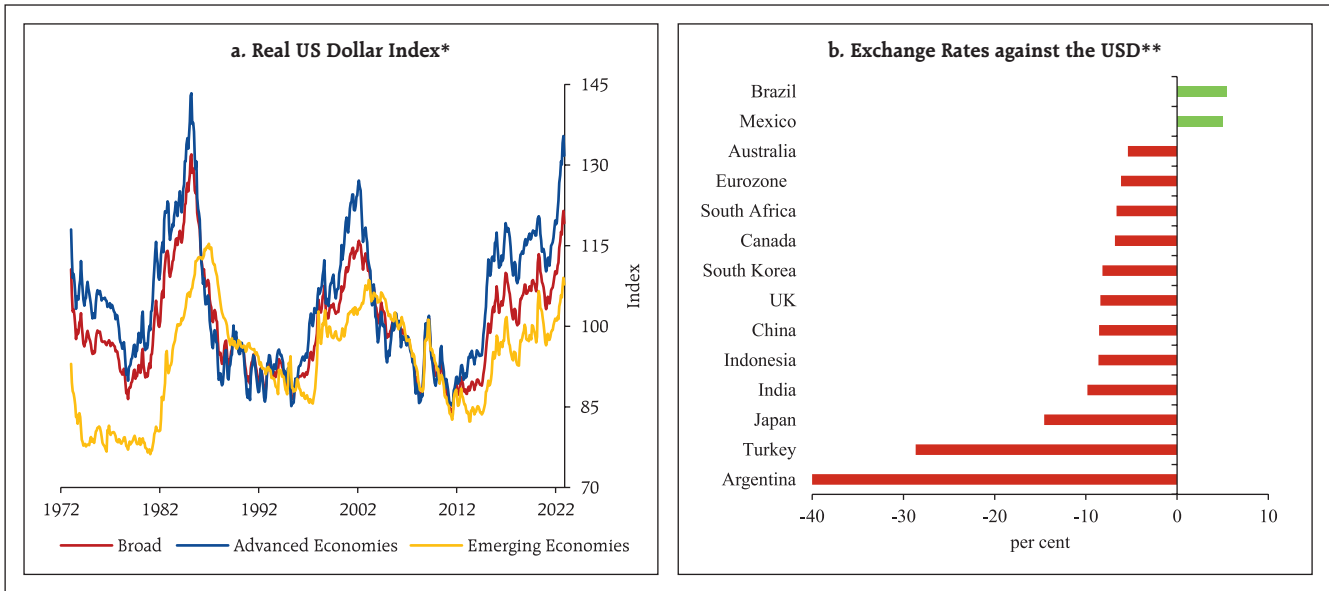
1.24 Changes in terms of trade have been a major driver of recent exchange rate movements. Countries that have experienced worsening terms of trade, especially those that are heavily dependent on energy imports, have also seen larger depreciations

Chart 1.19: Federal Reserve System Open Market Account (SOMA) - Projected Net Income



Source: Federal Reserve Bank of New York, Open Market Operations 2021 Annual Report.

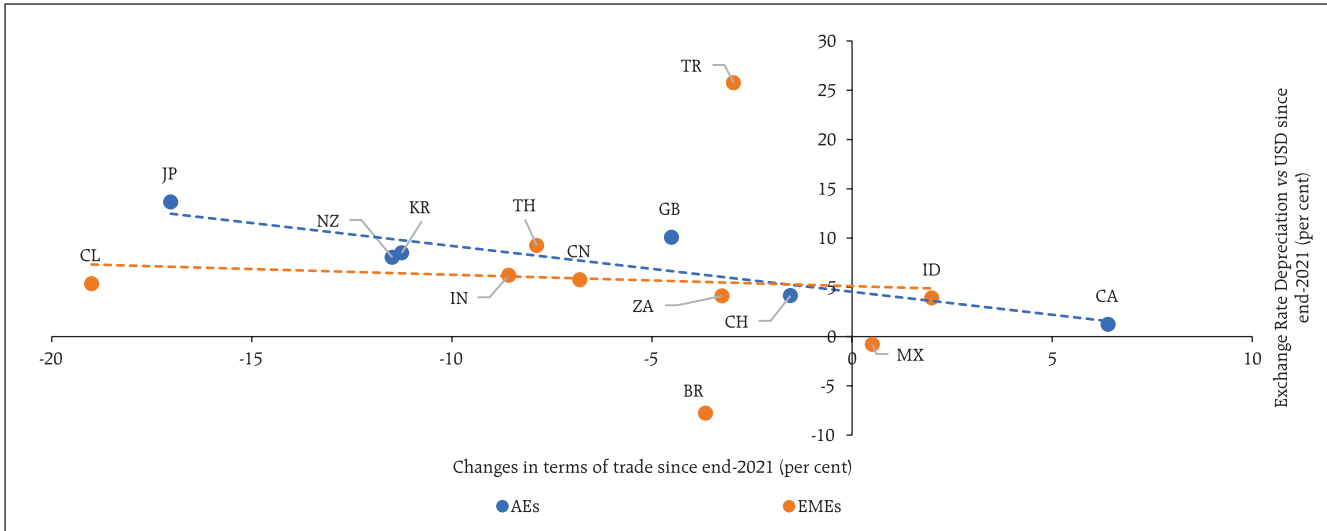
Chart 1.20: USD Appreciation



Note: *Monthly average of Federal Reserve Board trade-weighted real US dollar index based on trade in goods and services. An increase indicates appreciation of the USD. ** Changes from December 31, 2021 to December 14, 2022 of nominal bilateral exchange rates against the USD. Source: Federal Reserve Bank of St Louis, FRED, Bloomberg.

⁴ English, William B., Kohn, Donald (2022), "What if the Federal Reserve books losses because of its quantitative easing?", Brookings, June.

Chart 1.21: Terms of Trade and Exchange Rate Depreciation



Note: JP = Japan, GB = United Kingdom, KR = South Korea, NZ = New Zealand, CA = Canada, CH = Switzerland, CN = China, TH = Thailand, ID = Indonesia, IN = India, ZA = South Africa, MX = Mexico, BR = Brazil, CL = Chile, TR = Turkey.

Source: IMF and Bloomberg.

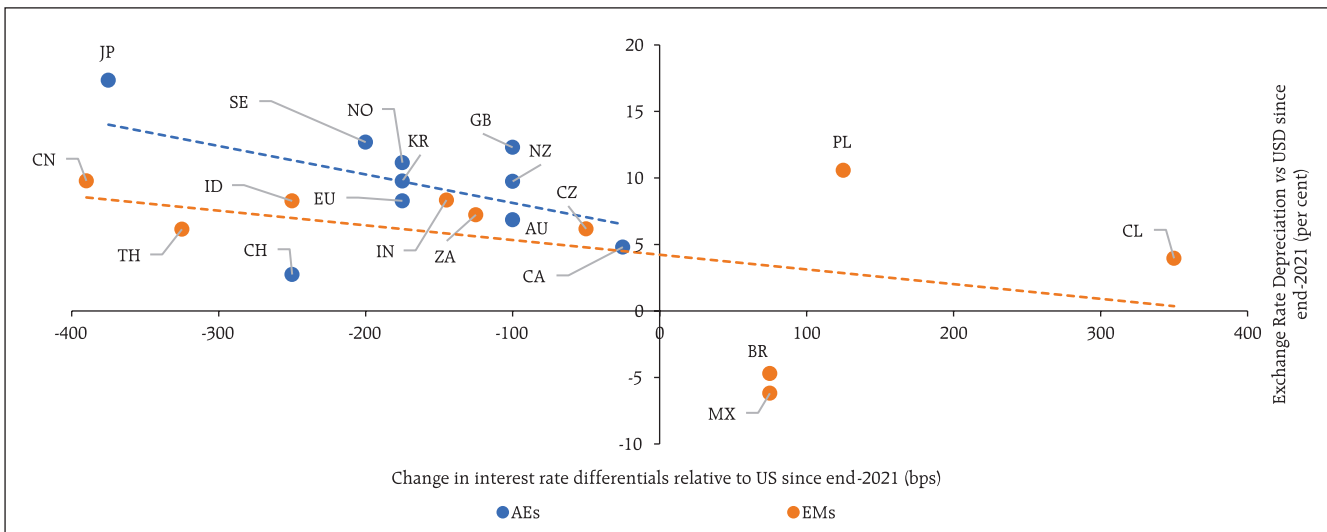
of their currencies than commodity exporters (Chart 1.21). This has coincided with an improvement in the U.S. terms of trade as it has become a net exporter of energy.

important driver influencing currency movements. Larger depreciations against the USD have typically been correlated with policy rate differentials *vis-à-vis* the US (Chart 1.22).

1.25 The divergent pace of monetary policy tightening across nations has been another

1.26 The impact of a stronger USD on global economic conditions has been significant⁵, as

Chart 1.22: Policy Rate Changes and Exchange Rate Depreciation

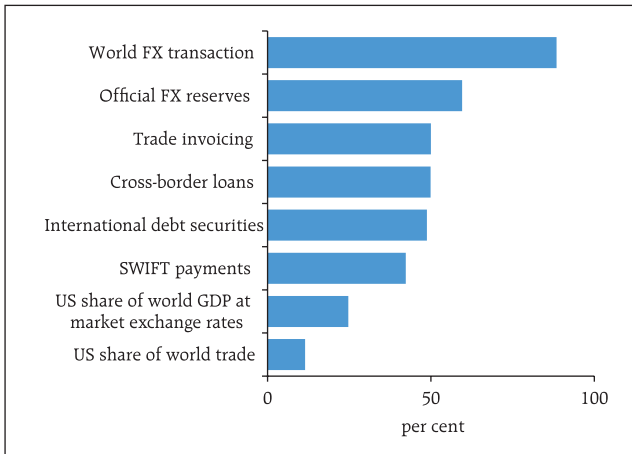


Note: JP = Japan, SE = Sweden, NO = Norway, GB = United Kingdom, KR = South Korea, NZ = New Zealand, EU = Eurozone, CA = Canada, AU = Australia, CH = Switzerland, CN = China, TH = Thailand, ID = Indonesia, IN = India, ZA = South Africa, MX = Mexico, BR = Brazil, PL = Poland, CL = Chile, TR = Turkey.

Source: Bloomberg.

⁵ Damiano, Sandri, Hofmann, Boris, and Mehrotra, Aaron (2022), "Global exchange rate adjustments: drivers, impacts and policy implications", BIS Bulletin No 62, November.

Chart 1.23: USD's share in Global Transactions and Assets



Source: BIS Quarterly Review, December 2022.

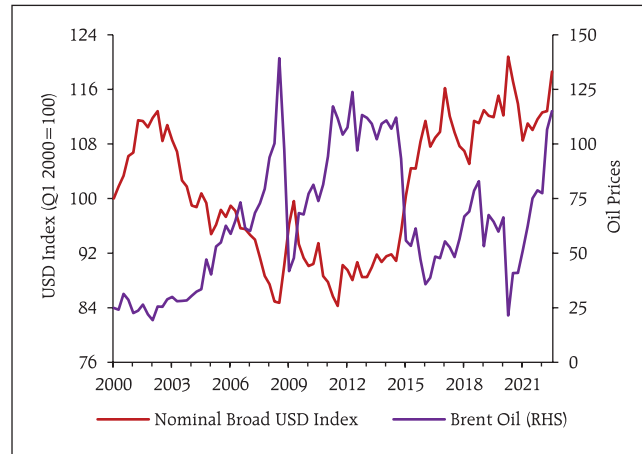
it is the most widely used currency in terms of trade invoicing and financing, funding currency in global capital markets and cross-border payments (Chart 1.23). The 2022 Bank for International Settlements (BIS) Triennial Survey of Foreign Exchange and Over-the-counter (OTC) Derivatives Markets shows continued dominance of the USD in global currency trade, with the USD on one side of 88 per cent of all trades.

1.27 An increase in the value of the USD also tends to increase inflation by driving up import prices particularly of commodities which are invoiced in the USD. In fact, in a departure from past episodes, elevated commodity prices have coincided with USD appreciation (Chart 1.24).

1.28 Commodity prices have risen considerably more in local currencies. This has compounded the inflationary effects of rising commodity prices, with second order effects on prices and wages (Chart 1.25). A stronger USD also tightens trade credit conditions and strains global value chains⁶.

1.29 From EMEs' perspective, a stronger USD has led to capital outflows and increased debt servicing

Chart 1.24: USD and Oil Prices



Note: Federal Reserve Board trade-weighted nominal dollar index, broad group of major US trading partners, based on trade in goods and services. An increase indicates appreciation of the USD.

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

Chart 1.25: Increase in Oil Prices in Domestic Currency*



Note: * Percentage change from December 31, 2020 to December 14, 2022.

Source: Bloomberg.

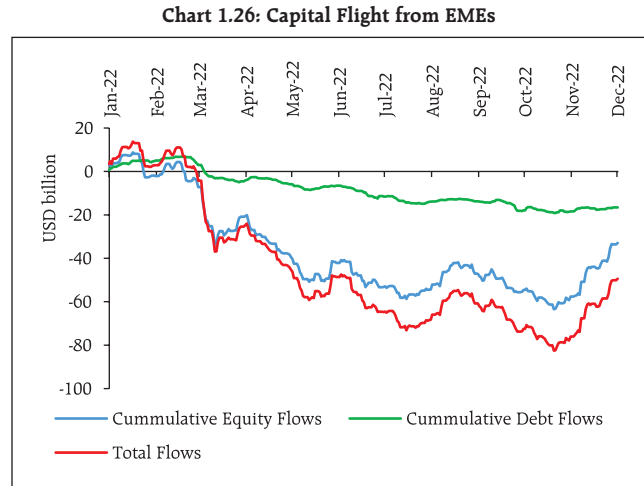
⁶ Bruno, V and H S Shin (2021): "Dollars and exports: The effects of currency strength on international trade", VoxEU, 27 July, cepr.org/voxeu/columns/dollars-and-exports-effects-currency-strength-international-trade

costs on dollar-denominated debt (Chart 1.26). Historically, economic downturns in EMEs are associated with USD appreciation shocks in view of less developed and shallow financial markets and weak balance sheets⁷.

1.30 The BIS in its December 2022 quarterly review estimates that US \$80 trillion of dollar debt is "missing" in the sense that they form FX swaps, forwards and currency swaps, which are reported off-balance sheet⁸. Out of this stunning size of missing dollar obligations, banks' exposure was US \$52 trillion and that of non-banks was half of that, US \$26 trillion. Moreover, this US \$26 trillion debt is probably held by firms outside the U.S. and for whom the USD is a foreign currency. The BIS review also highlights that according to new data from the 2022 BIS Triennial Survey, settlement risk is present in roughly a third of deliverable FX turnover, which may have systemic consequences.

D. Banking Sector Resilience

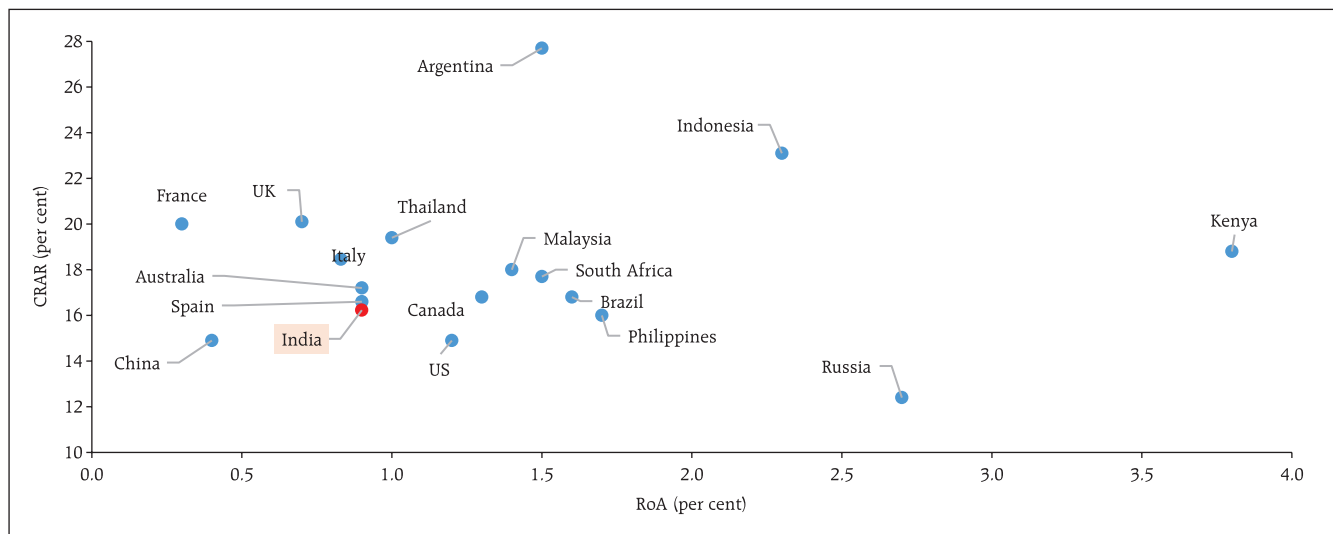
1.31 Despite a hostile global financial environment, the banking system has remained resilient with adequate capital buffers and moderate levels of non-



Source: IIF.

performing loans. An improvement in profitability in H1:2022 was driven by higher net interest income, given that the initial impact of rising interest rates on investment portfolios was limited. Marked-to-market losses may, however, have exacerbated in H2:2022 (Chart 1.27).

Chart 1.27: Profitability and Capital of Banks



Source: Financial Soundness Indicators, IMF.

⁷ Obstfeld, Maurice and Zhou, Haonan (2022), "The Global Dollar Cycle". Brooking Papers on Economic Activity, August.

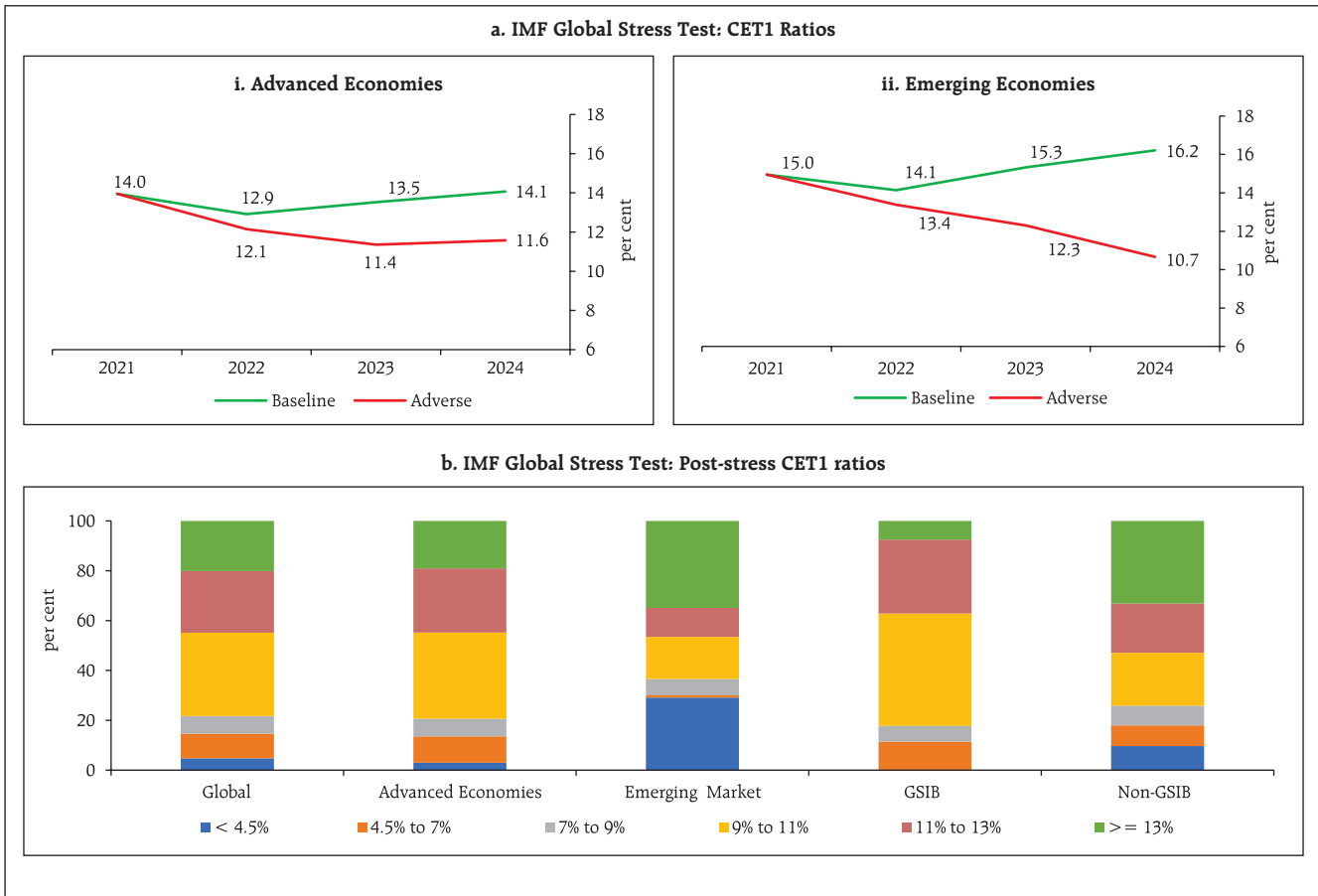
⁸ BIS (2022), "BIS Quarterly Review", December.

1.32 A stress test conducted by the IMF for banks in 29 economies - 24 AEs and 5 EMEs, including India – with combined banking sector assets accounting for 70 per cent of global banking assets suggests that, at the aggregate level, the global banking sector generally remains resilient to pandemic shocks. Their common equity tier 1 (CET1) capital ratios will decline by 2.5 percentage points for AE banks and 5.5 percentage points for EME banks under a severe downturn scenario (Chart 1.28 a). Most banks in AEs would remain resilient but up to 29 per cent of EME banks could breach the minimum capital requirements (CET1 ratio below the 4.5 per cent)⁹ (Chart 1.28 b).

E. Climate Finance

1.33 Climate risks are rising across the globe as drought, flooding, summer heat waves and harsh winters are increasing in severity and becoming more frequent in both southern and northern hemisphere. Economies are coordinating and working towards an ambitious plan that accelerates both mitigation and adaptation efforts to combat the threat of climate change. A key plank of these efforts is to scale up climate financing in coming years for mitigation finance, *i.e.*, reducing greenhouse gas emissions, and adaptation finance, which is needed to adapt to adverse effects of climate change. Since two-thirds

Chart 1.28: IMF Global Bank Stress Test



Source: IMF.

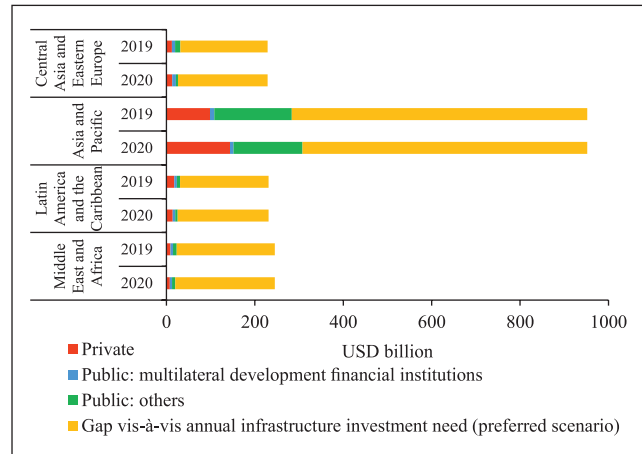
⁹ IMF (2022), "The Global Bank Stress Test, Monetary & Capital Markets Departmental Paper", September.

of worldwide greenhouse gas emissions come from EMDEs, and many of them are extremely vulnerable to climate risks, their need for climate financing is substantial.

1.34 According to the International Energy Agency (IEA), EMDEs must expand their investments in clean energy to US \$1 trillion annually by 2030, if they are to remain on course to reach net-zero greenhouse gas emissions by 2050¹⁰. Furthermore, their estimated annual adaptation financing need ranges from US \$160 billion to US \$340 billion by 2030 and US \$315 billion to US \$565 billion by 2050, with adaptation finance gap in these economies five to ten times more than existing global adaptation finance flows¹¹. In the face of significant climate finance needs, underinvestment could increase financial stability risks by increasing exposure to climate-related financial risks (Charts 1.29 and 1.30).

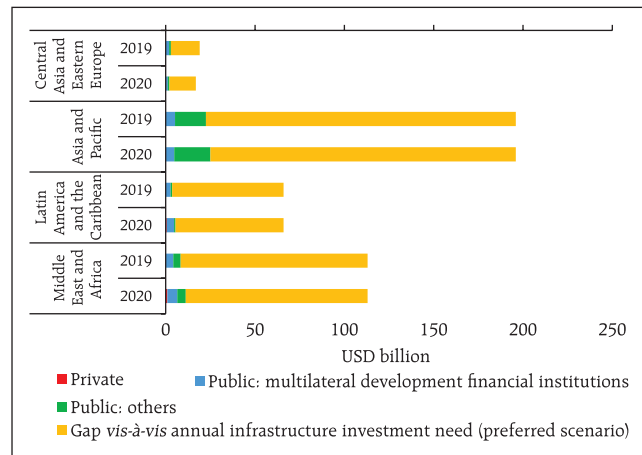
1.35 With public finance at stretched levels in the wake of the pandemic, private finance is key to meeting climate financing needs in EMDEs. Scaling up private climate finance, however, faces many challenges. Lack of depth in domestic capital markets, low returns, information asymmetry about investment benefits in the absence of data and disclosures, and higher credit risk are some of the main reasons deterring investor interest. Though environmental, social, and governance (ESG) investment is growing, low ESG scores of firms in EMDEs compared to their counterparts in AEs are hampering allocation of institutional funds to EMDE assets¹² (Charts 1.31 and 1.32).

Chart 1.29: Global Climate Finance Flows in Mitigation



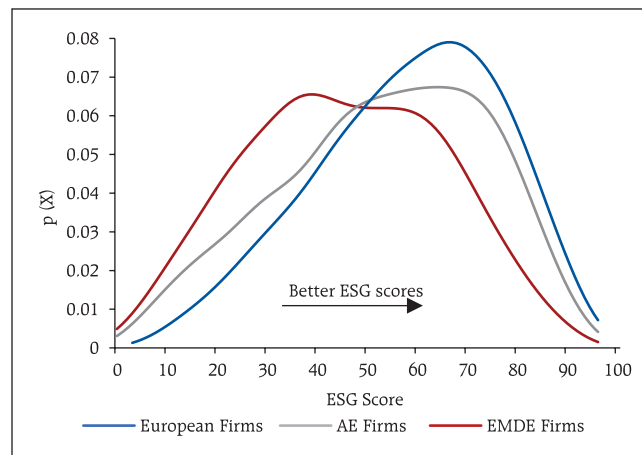
Source: IMF

Chart 1.30: Global Climate Finance Flows in Adaptation



Source: IMF

Chart 1.31: Smoothed Distribution Function of ESG Score (Probability)



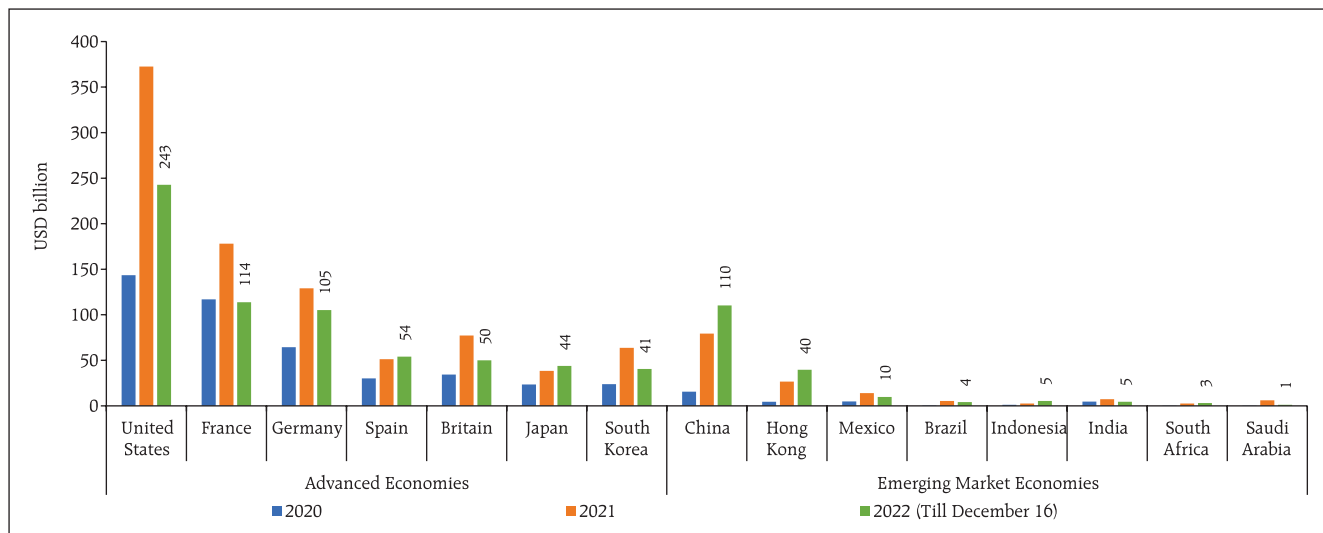
Source: IMF

¹⁰ International Energy Agency (2021), "Financing Clean Energy Transitions in Emerging and Developing Economies." World Energy Investment 2021 Special Report, Paris.

¹¹ United Nations Environment Programme (2022), "Adaptation Gap Report 2022: Too Little, Too Slow – Climate adaptation failure puts world at risk", November.

¹² IMF (2022), "Global Financial Stability Report — Navigating the High-Inflation Environment". October.

Chart 1.32: ESG Debt Issued



Source: Bloomberg.

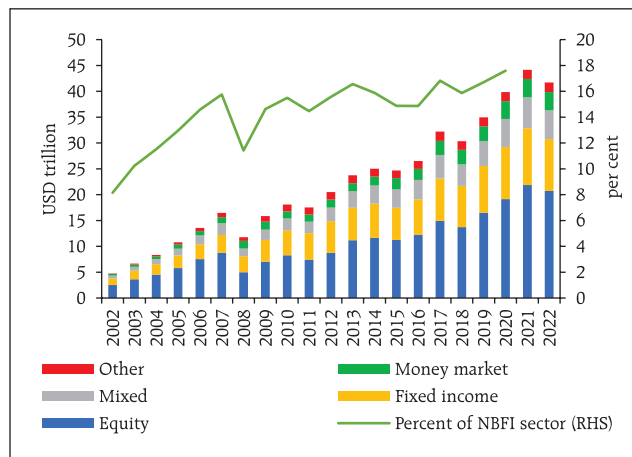
1.36 To reduce the mismatch between supply and demand for climate finance in EMDEs, both public and private sectors have important roles to play. The private sector needs to develop innovative financing instruments. According to the IMF, outcome-based instruments such as sustainability-linked bonds will be particularly suitable for EMDEs as they can be linked to emission reduction targets. Similarly, de-risking private investments by using blended finance that combines public and private funds can also be used to scale up private capital¹³.

F. Open-ended Investment Funds¹⁴

1.37 Open-ended investment funds (OEFs) have grown rapidly since the GFC, with their total net assets at US \$41 trillion in Q1:2022, representing almost a fifth of the assets in the non-bank financial sector¹⁵ (Chart 1.33).

1.38 The expansion of the OEF sector reflects the growing shift in financial intermediation away from banks and toward non-bank financial institutions. Tightening of banking regulations post-GFC and

Chart 1.33: Total Net Assets and Share of the Non-bank Financial Intermediation Sector, Q1:2002–Q1:2022



Source: IMF.

¹³ Ibid.

¹⁴ Open-ended Investment Funds are mutual funds that can issue or redeem shares daily at a price set at the end of the trading day.

¹⁵ IMF (2022). "Global Financial Stability Report — Navigating the High-Inflation Environment". October.

deleveraging of bank balance sheets have also contributed to this shift. Their increasing importance in the functioning of asset markets poses potential financial stability risks through amplification of volatility and fire-sales, especially when market liquidity declines. OEFs faced massive redemption pressures in the March 2020 market turmoil when financial conditions tightened (Chart 1.34). This, in turn, led to asset market dysfunction and substantial reduction in liquidity, forcing central banks to intervene to restore normal market functioning.

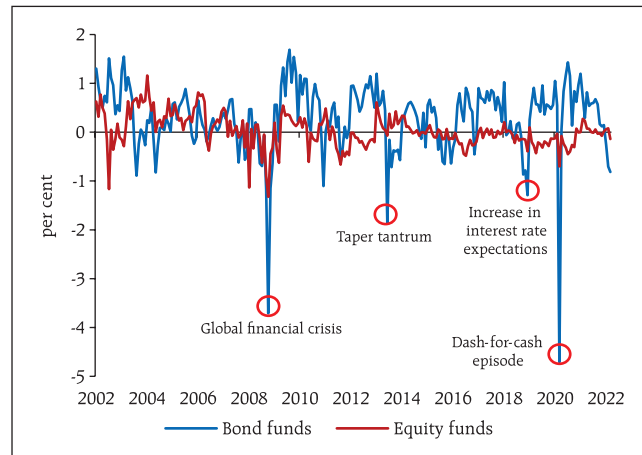
1.39 Financial stability risks arising from non-bank financial institutions warrant policy solutions that reduce vulnerabilities *ex ante* by lowering the risk of investor runs. Their global operations and potential adverse cross-border spillover effects also necessitate greater international regulatory coordination.

G. Crypto Assets Market, Stablecoins and Decentralised Finance (DeFi)

1.40 The collapse and bankruptcy of the crypto exchange FTX and subsequent sell-off in crypto assets market have highlighted the inherent vulnerabilities in the crypto ecosystem. Recently, Binance, the largest crypto exchange has also prohibited withdrawals of stablecoins on its platform. The implosion of FTX was preceded by failure of TerraUSD/Luna, an algorithmic stablecoin, a run on Celsius, a crypto lender, and bankruptcy of Three Arrows Capital, a cryptocurrency hedge fund.

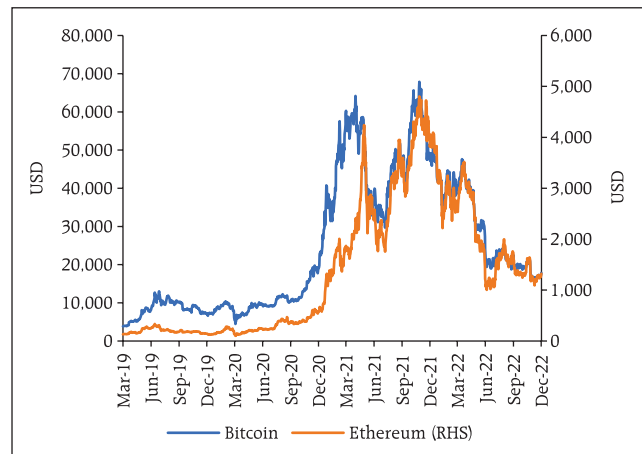
1.41 The turmoil has provided several insights¹⁶. First, crypto assets are highly volatile. The price of Bitcoin has decreased by 74 per cent (as on December 14, 2022) from its peak in November 2021. Other crypto assets have also experienced similar falls in prices and heightened volatility (Chart 1.35 and Table 1.3).

Chart 1.34: OEF Monthly Net Flows, Q1:2002–Q1:2022
(per cent of Lagged Total Net Assets)



Source: IMF.

Chart 1.35: Daily Prices of Select Crypto Assets



Note: Updated on December 14, 2022.

Source: Bloomberg.

Table 1.3: Key Cryptocurrency Prices and Indices

	Current Market Cap (USD)	Current Price (USD)	Q-o-Q change (per cent)	Y-o-Y change (per cent)
Bitcoin	342.9 Bn	17826.8	(12.4)	(62.4)
Ethereum	159.4 Bn	1323.1	(17.4)	(65.3)
DeFi Index	38.3 Mn	68.2	(19.1)	(70.2)

Note: Updated on December 14, 2022.

Source: Bloomberg and CoinMarketCap.

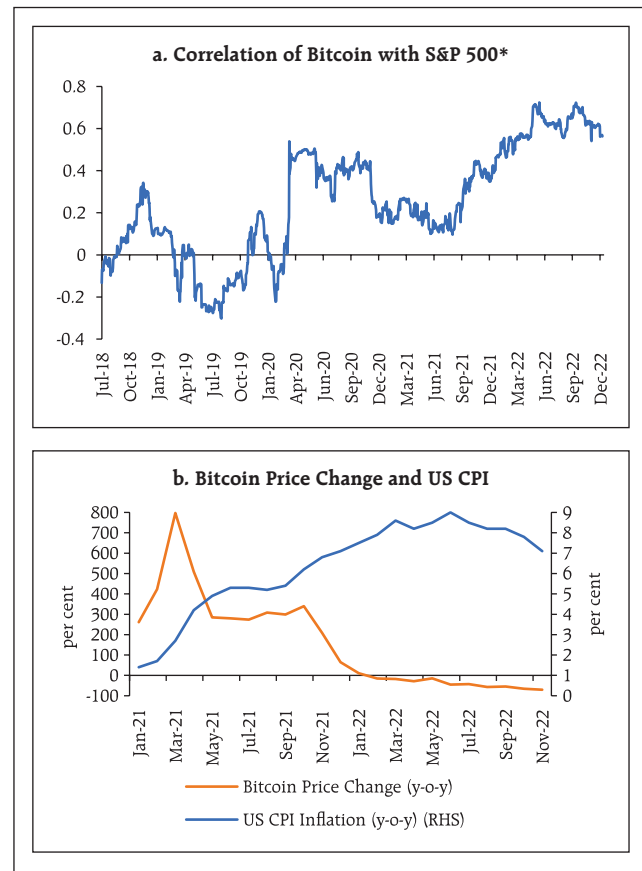
¹⁶ Brainard, Lael (2022), "Crypto Assets and Decentralized Finance through a Financial Stability Lens", Bank of England Conference, London, July.

1.42 In addition, crypto assets also exhibit high correlations with equities. Furthermore, contrary to claims that they are an alternative source of value due to inflation hedging benefits¹⁷, crypto assets value has fallen even as inflation rose (Chart 1.36 a and b).

1.43 Second, the collapse of TerraUSD/Luna is a reminder of how so-called stablecoins that promise to maintain a stable value relative to fiat currency are subject to classic confidence runs. Finally, failure of FTX and Celsius reveals that crypto exchanges and trading platforms were carrying out different functions such as lending, brokerage, clearing and settlement that have different risks without appropriate governance structures. This exposed them to credit, market and liquidity risks disproportionate to what was necessary to discharge their essential functions¹⁸. Leverage is a constant theme across the crypto ecosystem, making failures rapid and losses huge and sudden. A recent BIS study notes that rising prices of crypto assets is a major driver of crypto adoption, especially among younger segment of the population.¹⁹

1.44 Although crypto assets market remains volatile, there have not yet been any spillovers onto the stability of the formal financial system. The accumulated experience, however, suggests that they form an unstable ecosystem and there is growing evidence that they remain highly concentrated and interconnected. To address potential future financial stability risks and to protect consumers and investors, it is important to arrive at a common approach to crypto assets. In this context, various options are being considered internationally. One option is to apply the same-risk-same-regulatory-outcome principle and subject

Chart 1.36: Bitcoin vis-à-vis Equity and Inflation



Note: * 60 days rolling correlation of daily returns.
Source: Bloomberg.

them to the same regulation applicable to traditional financial intermediaries and exchanges. Another option is to prohibit crypto assets since their real-life use cases are next to negligible. The challenge is that different countries have different legal systems and individual rights vis-à-vis state powers. A third option is to let it implode and make it systemically irrelevant as the underlying instability and riskiness will ultimately prevent the sector from growing²⁰. The third option, however, is fraught with risks as the sector may become more interconnected with mainstream finance and divert financing away from traditional finance with broader effect on the real

¹⁷ BIS (2022), "Banking in the shadow of Bitcoin? The institutional adoption of cryptocurrencies", May.

¹⁸ Cunliffe, Jon (2022), "Reflections on DeFi, digital currencies and regulation", Bank of England, November.

¹⁹ Raphael Auer, Giulio Cornelli, Sebastian Doerr, Jon Frost and Leonardo Gambacorta (2022), "Crypto trading and Bitcoin prices: evidence from a new database of retail adoption", BIS Working Papers No 1049, November.

²⁰ Cecchetti, Stephen and Schoenholtz, Kim, "Let crypto burn", Financial Times, November 17, 2022.

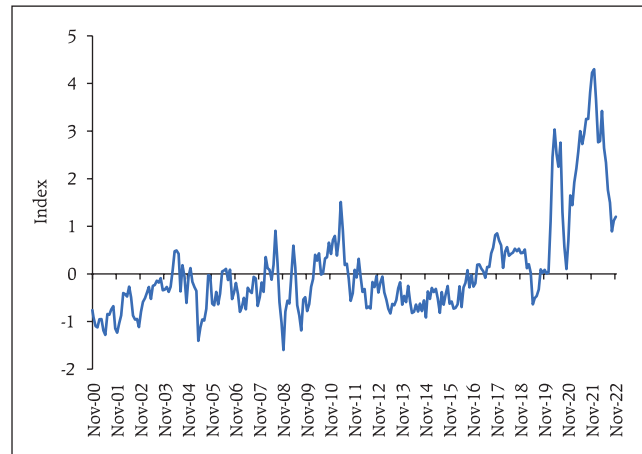
economy. Regulating new technology and business models after they have grown to a systemic level is challenging. To promote responsible innovation and to mitigate financial stability risks in crypto ecosystem, it is vital for policymakers to design an appropriate policy approach. In this context, under India's G20 presidency, one of the priorities is to develop a framework for global regulation, including the possibility of prohibition, of unbacked crypto assets, stablecoins and DeFi.

H. Commodity Markets

1.45 Improved supply conditions and slowing global demand since the release of the last FSR in June 2022 has brought down global prices of non-energy commodities below their pre-Russia-Ukraine war levels and energy prices have also moderated after August 2022. Concomitantly, there has been a fall in freight rates and easing of supply-side bottlenecks (Chart 1.37).

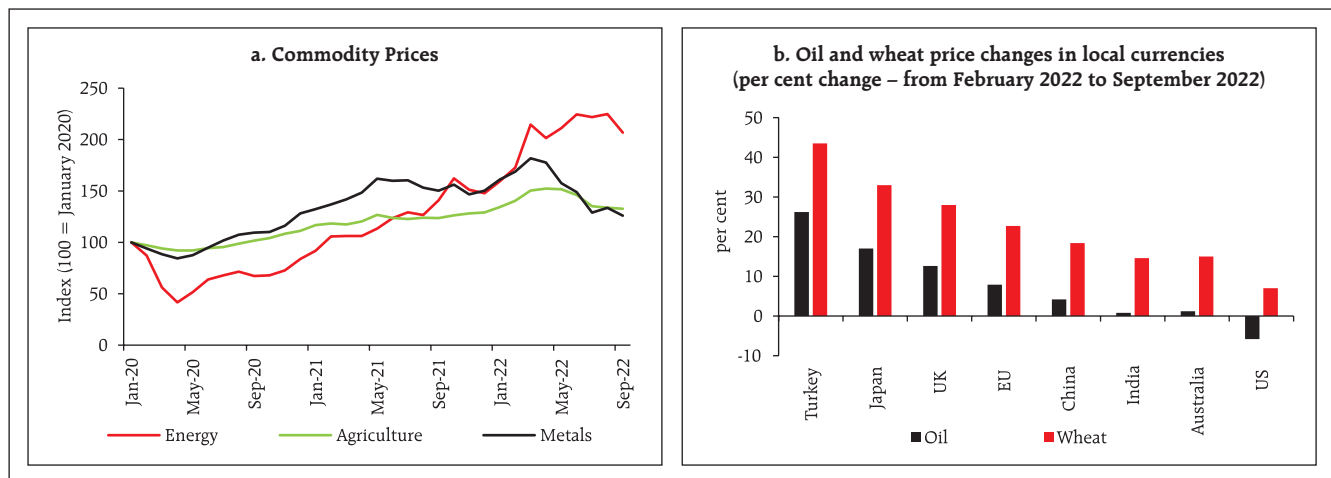
1.46 In many economies, however, currency depreciations have kept commodity prices in local-currency term at still elevated levels and much above their averages over the last five years (Chart 1.38 a and b). For poorer economies, this is a double blow as commodity-driven inflation is likely to precipitate a humanitarian crisis.

Chart 1.37: Global Supply Chain Pressure Index



Source: Federal Reserve Bank of New York.

Chart 1.38: Commodity Prices



Source: World Bank.

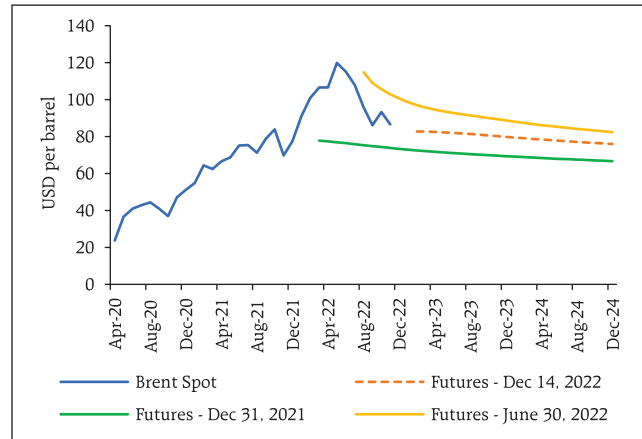
1.47 After expected increases of 60 per cent in 2022²¹, energy prices are projected to fall in 2023 and 2024 driven by slower global growth, weaker demand for natural gas and climate transition (Chart 1.39). Nevertheless, they are expected to remain volatile in view of geopolitical stresses and lower strategic reserves in many countries, with second-order effects such as increased electricity and transportation expenses.

1.48 The food price index of the Food and Agriculture Organisation (FAO) recorded a sequential (m-o-m) decline for the eighth successive month in November 2022 (Chart 1.40). It is projected to fall further in 2023, supported by a higher-than-anticipated global wheat harvest, stable rice market supply, and the restart of grain exports from Ukraine²². There are, however, downside risks to this forecast as the war may continue to disrupt supplies and adverse weather patterns may emerge. According to the World Bank, over 200 million people are expected to experience acute food insecurity in 2022.

1.49 Financialisation of commodities (Chart 1.41) has increased the linkages between commodity traders, banks and central counterparties (CCPs). The share of derivatives activity and intermediation is clustered among large commodity firms and concentration is also rising for banks that provide short-term credit to commodities traders and clearing services, with financial stability implications.

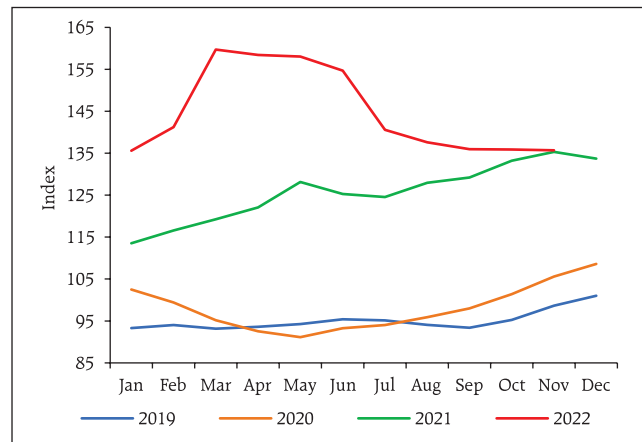
1.50 Banks' exposure to leveraged commodities traders can increase their lending and intraday exposures in times of stress, due to demand for liquidity, to meet margin calls. In case they are unwilling to meet demand for credit, commodities traders would be forced to unwind their positions, which would exacerbate market volatility. Moreover, banks' role as CCP clearing members will make it difficult for commodities firms to hedge in

Chart 1.39: Brent Price - Spot and Futures



Source: Bloomberg.

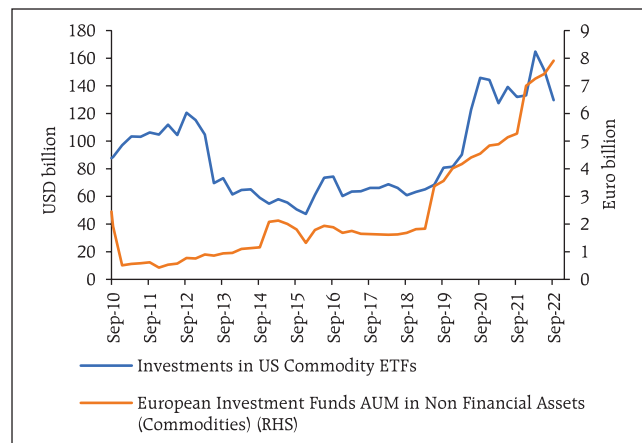
Chart 1.40: FAO Food Price Index



Note: The FAO Food Price Index is a measure of the monthly change in international prices of a basket of food commodities. It consists of the average of five commodity group price indices weighted by the average export shares of each of the groups over 2014-2016.

Source: Food and Agriculture Organisation of the United Nations.

Chart 1.41: Investment in Commodity Linked Investment Funds



Source: Federal Reserve Bank of St Louis, FRED and European Central Bank.

²¹ World Bank Group (2022). Commodity Markets Outlook: Pandemic, war, recession: Drivers of aluminium and copper prices, October, World Bank, Washington, DC.

²² Ibid.

derivatives markets and to post margins at CCPs. As few firms dominate commodities derivatives markets, disruption in any of the larger firm/s could increase volatility and lower market liquidity for commodities derivatives.

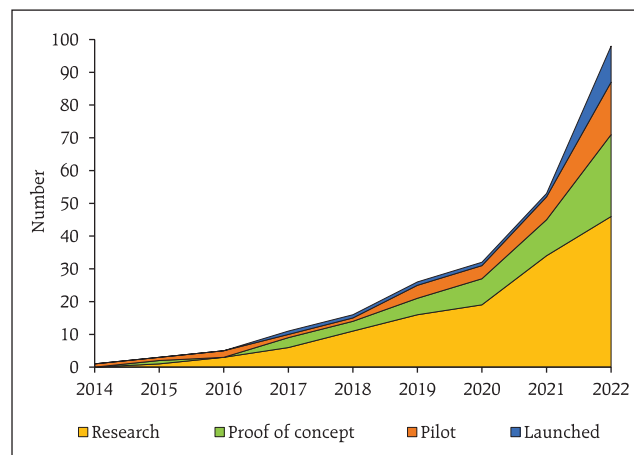
I. Central Bank Digital Currencies

1.51 Accelerated digitalisation, supported by technological innovation, and spread of private-sector digital ventures, have led to the proliferation of initiatives to launch central bank digital currencies (CBDCs) (Chart 1.42). The experiments from front-runners to subsequent movers are offering valuable lessons about challenges to the introduction of CBDC.

1.52 CBDCs have financial stability and monetary policy implications. There is still animated debate around potential impact of a CBDC on banking (dis) intermediation. Four key factors are important²³. First, depending upon market power of banks in deposit markets, the entry of a CBDC that directly competes with bank deposits may result in higher deposit rates. Second, the effect of CBDC on bank disintermediation will depend on the interest rate offered on CBDCs, which, if high enough, can cause bank disintermediation. The market power of banks will determine the direction of intermediation when rates are in an intermediate range. Third, a CBDC would have negligible effect on intermediation if banks can replace any lost retail deposits with wholesale funding, which is especially important for larger banks. Finally, the degree of bank disintermediation may be limited by restrictions placed on the amount of CBDC that users may hold, transact, or earn interest on.

1.53 There are a few lessons emerging from CBDC experiments so far²⁴. First, in introducing a CBDC, it is necessary to balance trade-offs between several objectives while choosing the appropriate technology. These trade-offs consist of design choices

Chart 1.42: Number of CBDCs under various stages



Source: CBDC Tracker.

including centralised versus decentralised ledger systems; choice between privacy and compliance; and stability and innovation. Second, developing a successful CBDC is more challenging than initially thought of, as two opposing forces are at play: being "too successful" and driving away private payment options or "being not successful enough" and failing to generate enough demand²⁵. Finally, private-public collaborations for CBDCs may be essential as it will help in putting in place appropriate governance for the division of labour, costs, and authority.

1.54 More international cooperation and experience sharing is necessary to ensure interoperability of CBDCs, establish global standards, enhance cross-border usage and better understand consequent macrofinancial implications.

1.2 Domestic Macrofinancial Risks

1.55 The resilience of the domestic financial system is being reflected in healthy balance sheet of banks, stronger capital levels of non-bank financial companies (NBFCs) and robust growth in assets under management (AUM) of domestic mutual funds. Despite significant global spillovers, asset quality, profitability, capital and liquidity buffers

²³ Federal Reserve Board (2022), "The Macroeconomic Implications of CBDC: A Review of the Literature", October.

²⁴ Rhee, Chang Yong (2022), "Central bank digital currency: what we have learned from a recent hands-on experiment", Governor of the Bank of Korea, September.

²⁵ Panetta, Fabio (2022), "A digital euro that serves the needs of the public: striking the right balance", Member of the Executive Board of the ECB, March.

in the Indian banking system provide comfort. Gross non-performing assets (GNPA) of banks have maintained a declining trend. The ratio of GNPA to gross advances fell from 5.9 per cent in March 2022 to 5.7 per cent in June 2022 and further to 5.0 per cent in September 2022, which has facilitated broad based expansion in bank credit. Lending by NBFCs is also on the rise.

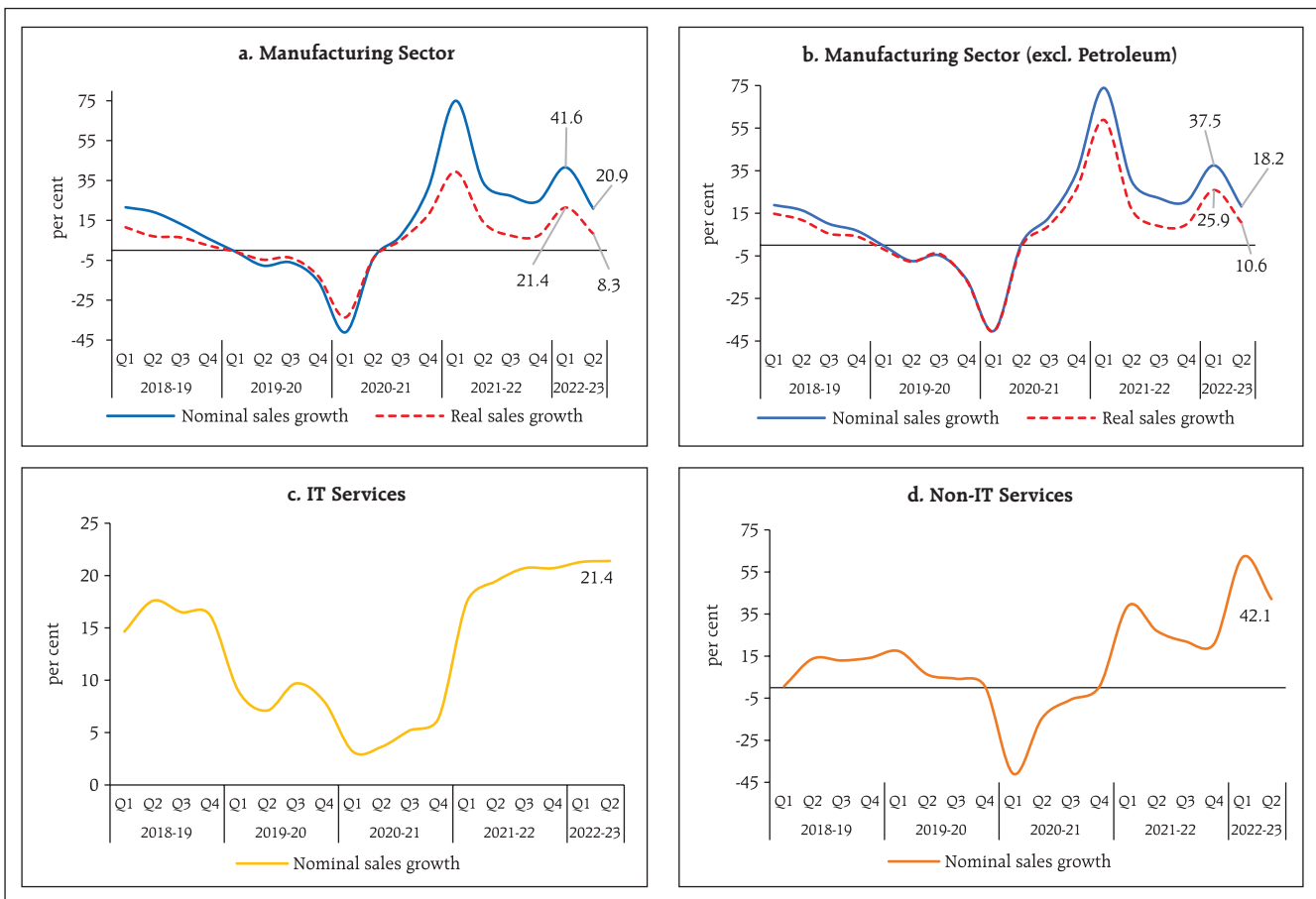
1.2.1 Corporate Sector

1.56 Private non-financial companies recorded strong sales growth during H1:2022-23, driven by steady recovery in demand conditions as well as the rise in prices especially for petroleum companies.

Both nominal and real sales growth (y-o-y) exceeded their pre-pandemic two-year average levels (Chart 1.43 a and b). In the services sector, information technology (IT) companies sustained a broadening growth trajectory, and non-IT services companies recorded robust sales growth (Chart 1.43 c and d).

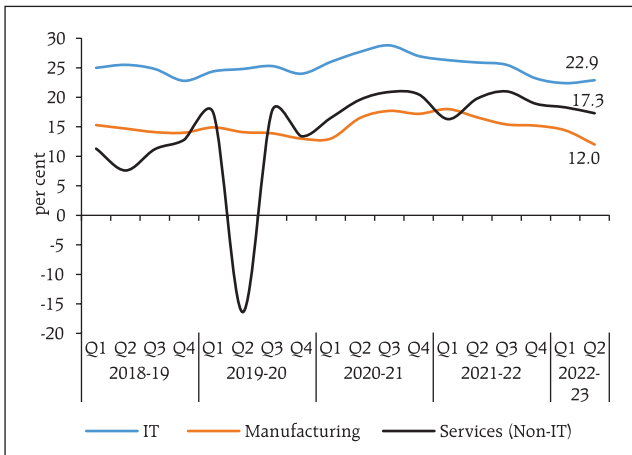
1.57 In Q2:2022-23, there appears to be a loss of momentum in corporate earnings, mainly due to rising expenditure boosted by input costs outpacing revenue growth, an increase in interest payments and other expenses. While the operating profit margin moderated for non-IT services companies, it remained steady for IT companies even as staff cost

Chart 1.43: Nominal and Real Sales Growth of Listed Private Non-Financial Companies



Note: Sample of 2,740 listed private non-financial companies used for Q2:2022-23.
Source: Capitaline and RBI staff calculations.

Chart 1.44: Operating Profit Margin of Listed Private Non-Financial Companies



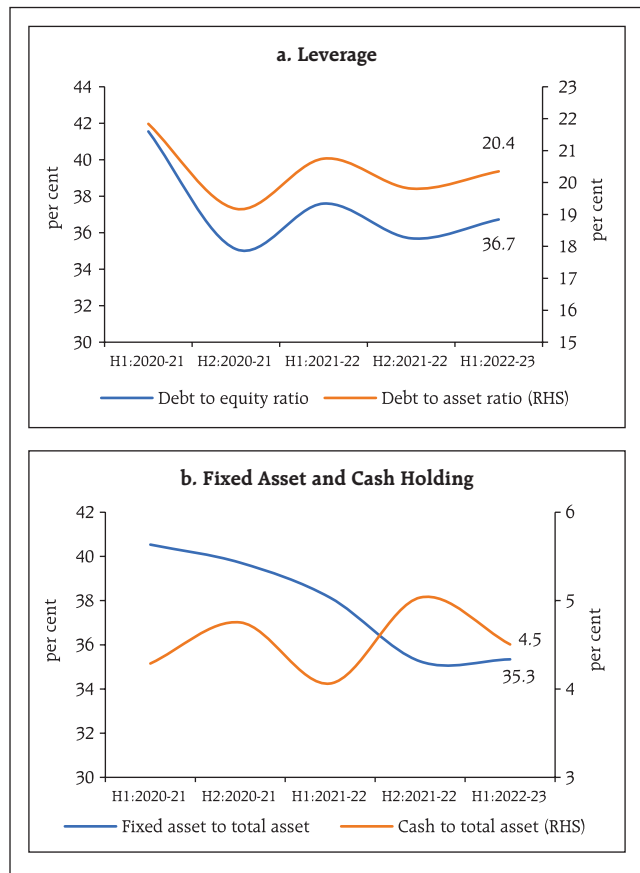
Note: Sample of 2,740 listed private non-financial companies used for Q2:2022-23.
Source: Capitaline and RBI staff calculations.

of the latter rose by 24.1 per cent during Q2:2022-23 (Chart 1.44).

1.58 Corporate sector leverage, as reflected in debt-to-equity and debt-to-asset ratios, have been increasing gradually from pandemic lows (Chart 1.45 a). The share of cash holdings (including balances with banks and highly liquid investments) in total assets declined during H1:2022-23 but remains well above its pre-pandemic level (Chart 1.45 b). On the other hand, the share of fixed assets in total assets remained subdued and at the level observed during H2:2021-22, awaiting the upturn of a new private investment cycle.

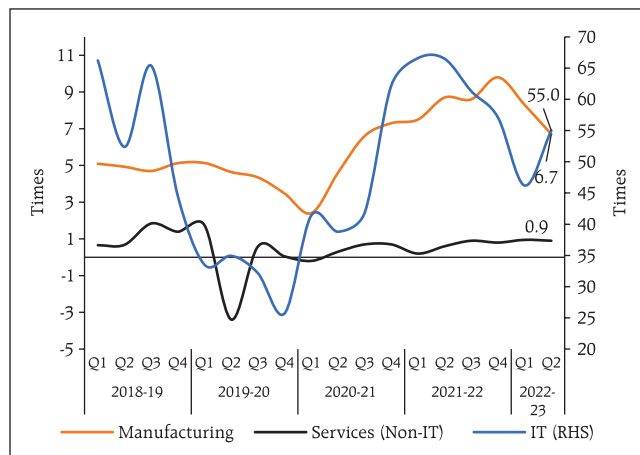
1.59 Debt serviceability, as measured by interest coverage ratio (ICR)²⁶, remained well above one for both manufacturing and IT firms, while it stood marginally lower than unity for non-IT services firms (Chart 1.46).

Chart 1.45: Select Ratios of Listed Private Manufacturing Companies



Sources: Capitaline and RBI staff calculations.

Chart 1.46: Debt Serviceability of Listed Private Non-Financial Companies



Note: Data is based on 2,740 common listed private non-financial companies used for Q2:2022-23.

Sources: Capitaline and RBI staff calculations.

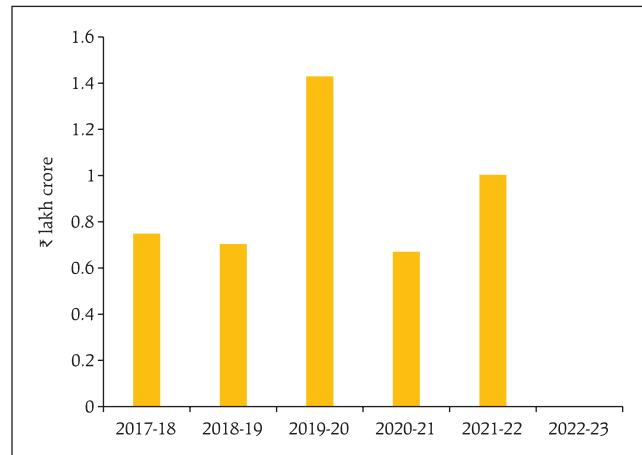
²⁶ ICR (i.e., ratio of earnings before interest and taxes to interest expenses) is a measure of debt servicing capacity of a company. The minimum value for a viable ICR is 1.

1.60 With moderation in overseas issuances and declining investments by private equity (PE) / venture capital (VC), the financing needs of the corporate sector are increasingly being met through domestic resources. (Chart 1.47 and 1.48). As funds raised from the primary segment of domestic equity markets declined during FY 2022-23, reliance on bank credit for funding regular operations and capacity expansion is increasing.

1.2.2 Money Markets, Government Securities and Corporate Bond Markets

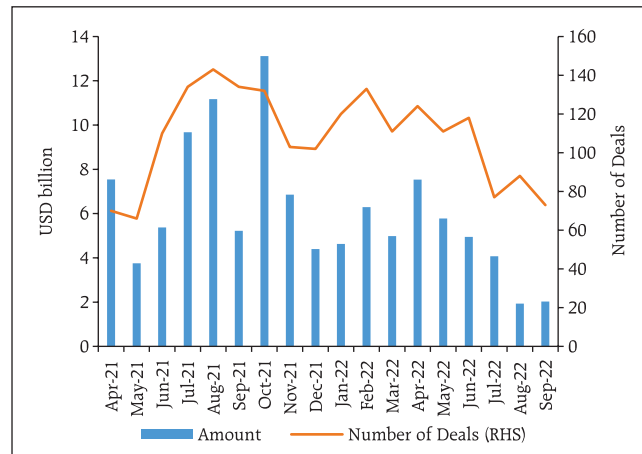
1.61 Domestic financial conditions have tightened in response to the focus of the monetary policy stance on withdrawal of accommodation to ensure that inflation remains within the target going forward, while supporting growth. Money market rates and short-term bond yields have hardened in tandem with policy rate increases. The passthrough to long-term rates has improved but remains incomplete (Chart 1.49). The average daily absorption under the liquidity adjustment facility (LAF) has declined from ₹7.8 lakh crore in April 2022 to ₹3.8 lakh crore in June-July 2022 and further to ₹1.4 lakh crore in

Chart 1.47: Amount Raised by Indian Corporates through Overseas Capital Market Offerings



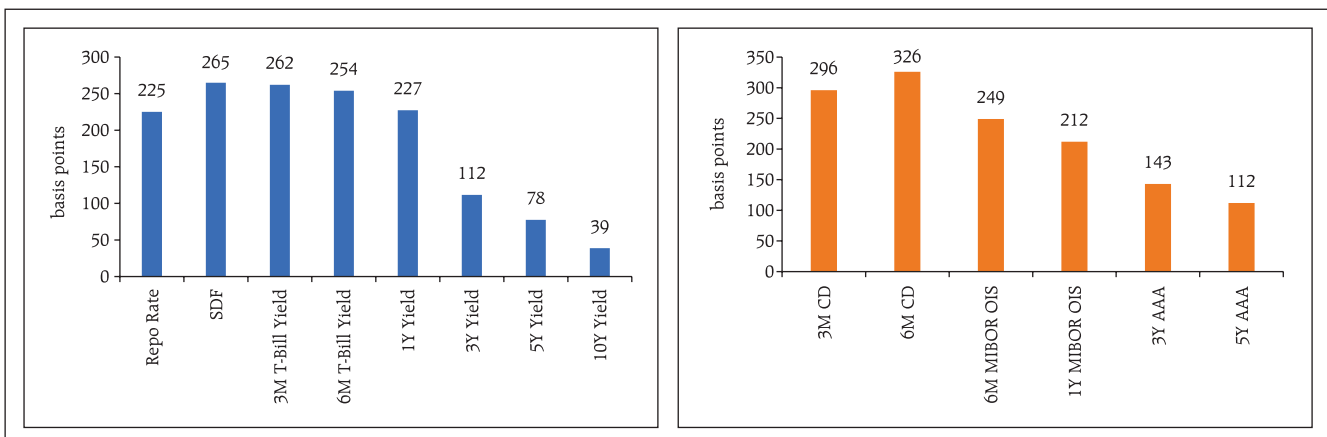
Source: Prime Database.

Chart 1.48: PE/VC Investments in India



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

Chart 1.49: Tighter Market Conditions (interest rate changes since March 31, 2022*)



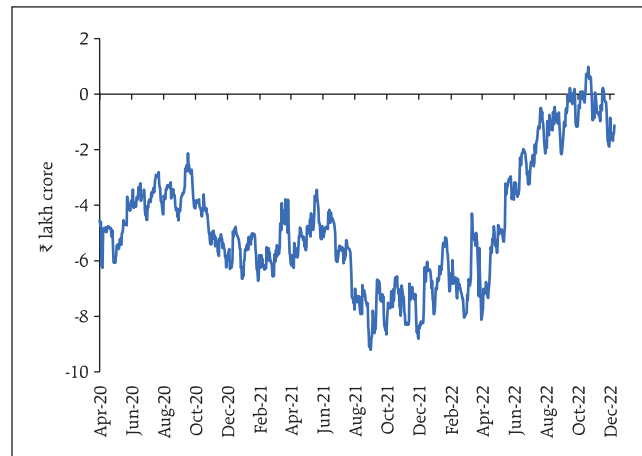
Note: * Up to December 14, 2022.
Sources: RBI, FBIL and Bloomberg.

November 2022 (Chart 1.50). Day-to-day movements in government cash balances also influence the intermittent changes in liquidity conditions, including on some days when the overnight rates breach the repo rate.

1.62 The government securities (G-sec) yield curve flattened (Chart 1.51 a and b) as the short-end of the yield curve rose substantially in response to monetary policy actions while the long-end of the curve rose at a much lower pace as pressures from augmented supplies of paper eased and a stable inflation and growth outlook has taken hold. The net G-sec supply is expected at around ₹ 4.8 lakh crore in H2:2022-23 *vis-à-vis* ₹ 2.9 lakh crore a year ago.

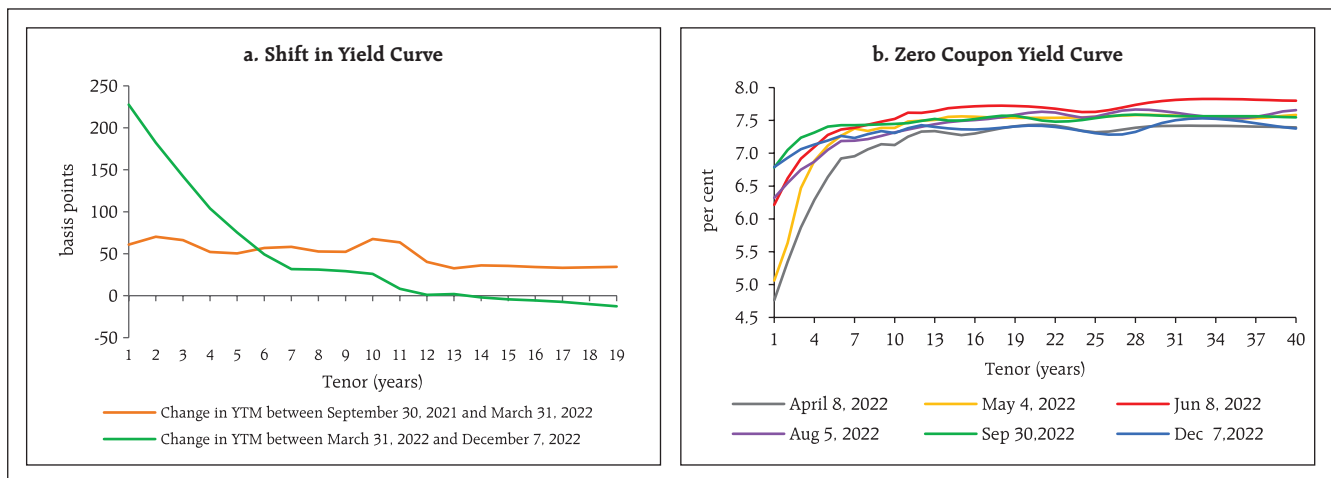
1.63 In line with the increase in policy rates and sovereign yields, corporate bond yields have also risen, and spreads have widened for lower-rated bonds (AA and BBB-). Among

Chart 1.50: Banking System Liquidity Tightened



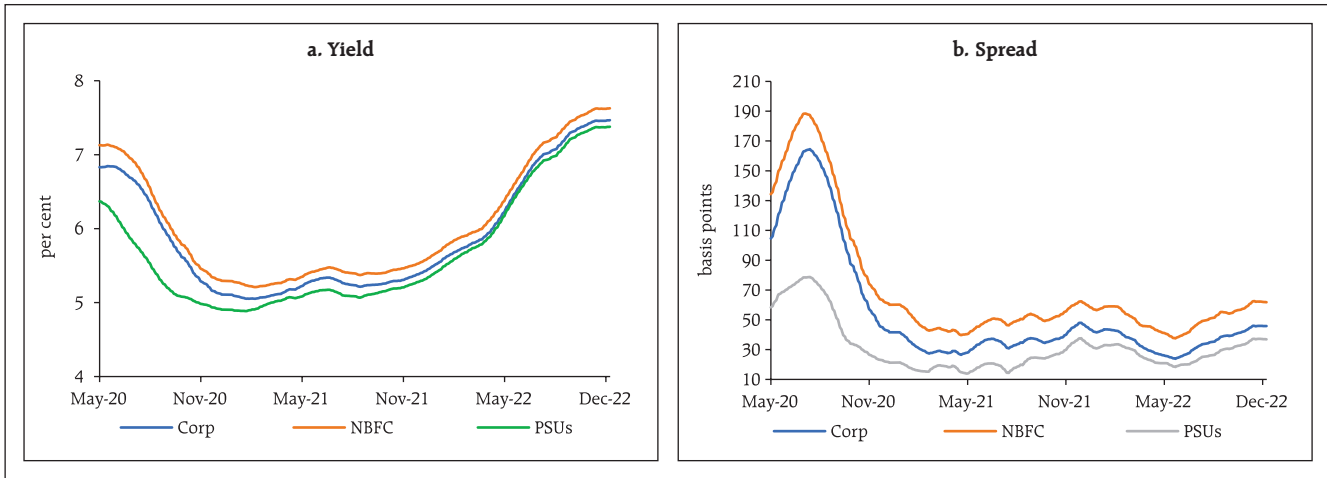
Note: +ve/-ve represents injection/ absorption of liquidity.
Source: RBI.

Chart 1.51: Yield Curve Flattened



Source: Bloomberg.

Chart 1.52: AAA - 3 Year Corporate Bond Yield and Spread (3 Month Rolling Average)



Source: Bloomberg.

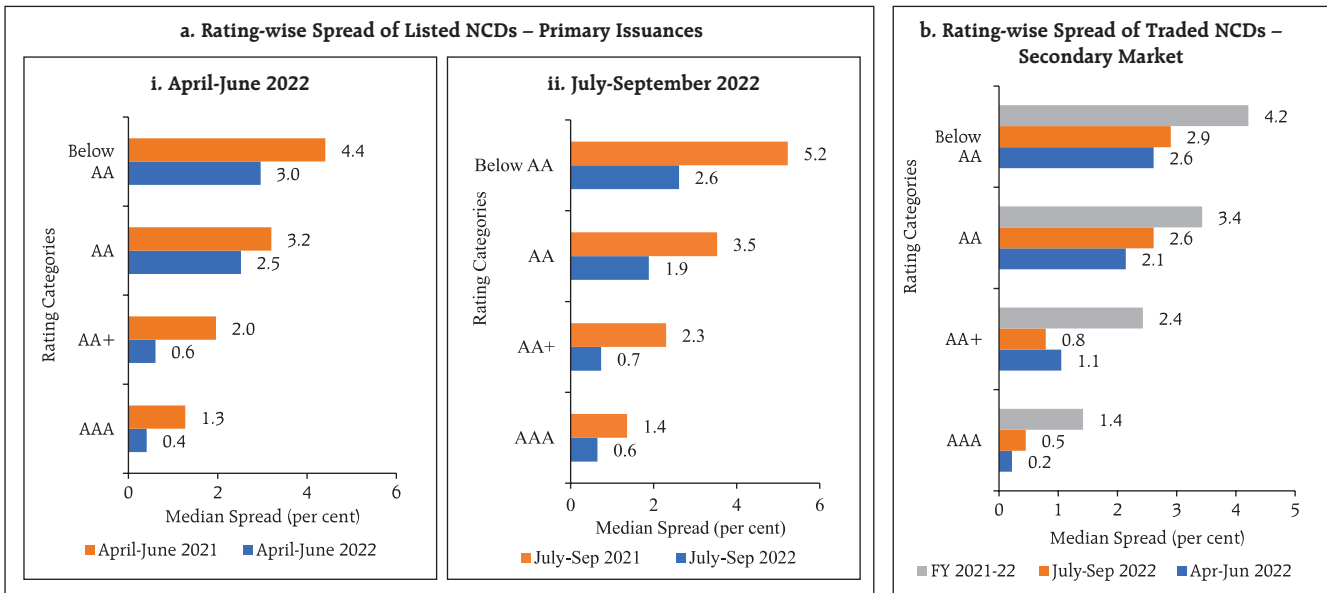
institutions, spreads of bonds issued by NBFCs and non-financial corporates rose moderately (Chart 1.52 a and b).

1.64 A comparison of rating-wise median yield spreads of listed non-convertible debentures (NCDs) at the time of primary issuance and in secondary market trading showed that the spread over benchmark yield of 3-year G-sec narrowed across all

rating categories during the first half of 2022-23 on a year-on-year basis (Charts 1.53 a and b). The median yield spread of traded NCDs, however, rose for all rating categories except AA+ during Q2:2022-23 compared to Q1:2022-23.

1.65 Private placement continues to dominate corporate bond issuances. NBFCs, Housing Finance Companies (HFCs) and Public-Sector Undertakings

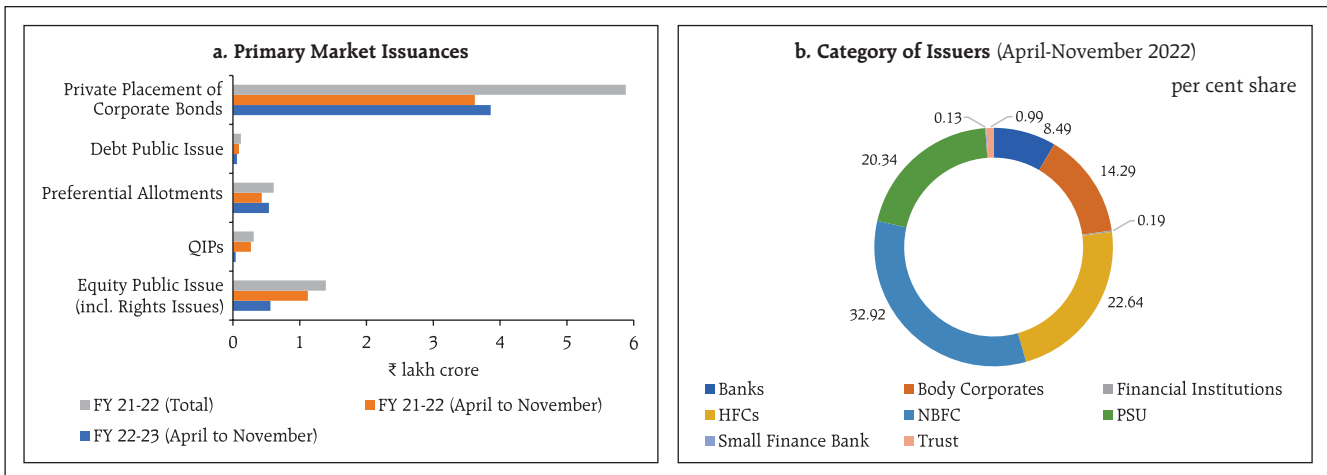
Chart 1.53: Spread of Listed NCDs – Primary and Secondary Market



Source: NSDL, CDSL.

Source: NSE, BSE.

Chart 1.54: Resource Mobilisation from Primary Market and Category-wise Issuers of Corporate Bonds



Source: SEBI, NSDL and CDSL.

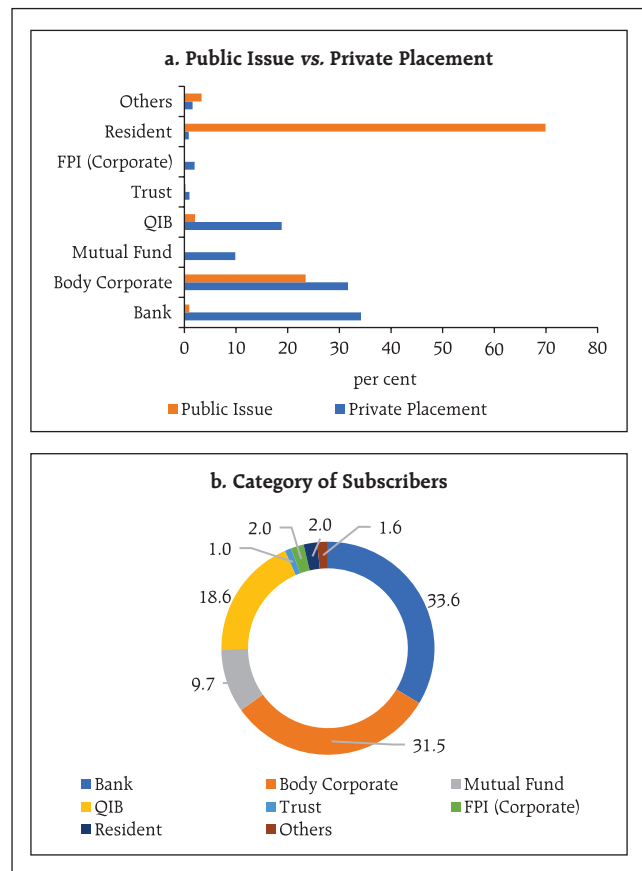
(PSUs) accounted for 73 per cent of the total listed bonds / debentures. (Chart 1.54).

1.66 Of the total public issuances of corporate bonds, 70 per cent were subscribed by residents (Chart 1.55a). Nearly two thirds were privately placed with banks and body corporates (Chart 1.55b).

1.2.3 Government Finance

1.67 Reverting to its path on fiscal consolidation, the Union government aims to bring down gross fiscal deficit (GFD) to 6.4 per cent of GDP in 2022-23 from 6.7 per cent in the previous year (Table 1.4). During the current year so far (up to October 2022), the GFD has been contained at 45.6 per cent of budget estimates for the full year on the back of buoyant tax collections, even as growth in capital expenditure remained robust. Goods and Services Tax (GST) collections surpassed ₹1.4 lakh

Chart 1.55: Category-wise Subscribers of Corporate Bonds (April - November 2022)



Note: *Others include AIFs, CMs, FIs, FIIs, Foreign Nationals, FPI (Individuals), HUFs, NRIs and Others

Source: NSDL, CDSL.

Table 1.4: Central Government Finances - Key Deficit Indicators
(per cent of GDP at current market prices)

Item	2020-21	2021-22 (PA)	2022-23 (BE)
Revenue Deficit	7.3	4.4	3.8
Gross Fiscal Deficit	9.2	6.7	6.4
Primary Deficit	5.7	3.3	2.8

Note: PA: Provisional accounts; BE: Budget estimates.

Source: Union Budget, 2022-23; and Controller General of Accounts (CGA).

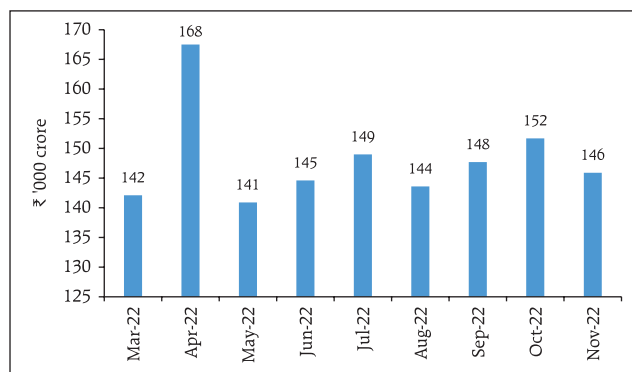
crore for the ninth consecutive month and stood at ₹1.46 lakh crore in November 2022 (Chart 1.56).

1.68 Interest payments of the central government, which amounted to 3.4 per cent of GDP in 2021-22, are slated to rise to 3.6 per cent of GDP in 2022-23 (BE). During April-October 2022-23, interest payments increased by 19.9 per cent (y-o-y), surpassing the growth in revenue receipts²⁷ of 7.1 per cent. During 2022-23 so far (till October 2022), the weighted average yield of G-sec issuances was 7.31 per cent, which was 103 bps higher than in 2021-22 (6.28 per cent).

1.69 Despite the increase in the debt to GDP ratio {increase from 48.9 per cent in 2018-19 to 60.2 per cent in 2022-23 (BE) for the central government}, higher redemption pressures (Chart 1.57 a and b) and rise in yields, the interest rate-growth rate differential (r-g) remains favourable due to higher nominal growth vis-a-vis nominal interest rate, easing any intertemporal budget constraint in servicing debt.

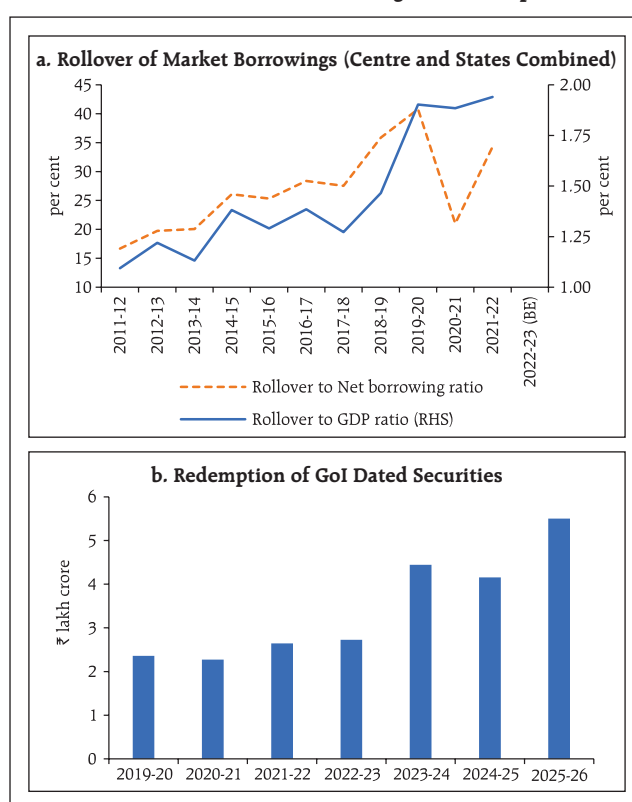
1.70 State governments' finances improved in 2021-22 as they budgeted to regain the fiscal space lost during the pandemic. In 2021-22, their combined gross fiscal deficit ratio was much lower at 2.7 per cent of gross state domestic product (GSDP) than the revised estimate of 3.6 per cent. This has been achieved on the back of higher-than-expected growth in both tax and non-tax revenues, even as expenditure remained robust. For 2022-23, states have budgeted for a consolidated GFD-GSDP ratio of 3.3 per cent, which lies within the indicative target of 4 per cent²⁸ set by the 15th Finance Commission (Table 1.5).

Chart 1.56: Monthly GST Collection



Source: Press Information Bureau (PIB).

Chart 1.57: Government Borrowings and Redemption



Source: RBI.

Table 1.5: States' Key Deficit Indicators

Deficit Indicator	(As per cent of GSDP)			
	2020-21	2021-22 (RE)	2021-22 (PA)	2022-23 (BE)
Revenue Deficit	1.8	0.9	0.4	0.4
Gross Fiscal Deficit	3.8	3.6	2.7	3.3
Primary Deficit	2.0	1.9	1.1	1.5

Note: PA: Provisional accounts; BE: Budget estimates; RE: Revised estimates.

Data pertains to 29 States/ UTs.

Source: Budget document of State governments.

²⁷ Revenue receipts comprise tax and non-tax revenues.

²⁸ The borrowing space of 0.5 per cent of the GSDP out of the total net borrowing ceiling is tied to the power sector reforms undertaken by the States.

1.71 Notwithstanding the gains from fiscal consolidation, there are concerns about rising subsidies announced by many states. The 15th Finance Commission's report has also flagged the issue of rising share of subsidies in some of the states' revenue expenditures (FC-XV Report)²⁹. After contracting in 2019-20, states' expenditure on subsidies has grown by 12.9 per cent and 11.2 per cent during 2020-21 and 2021-22, respectively. Commensurately, the share of subsidies in their total revenue expenditure has also risen from 7.8 per cent in 2019-20 to 8.2 per cent in 2021-22. The rising expenditure on non-merit subsidies may raise the share of committed expenditure in states' spending, constraining the fiscal space available for developmental and capital spending.

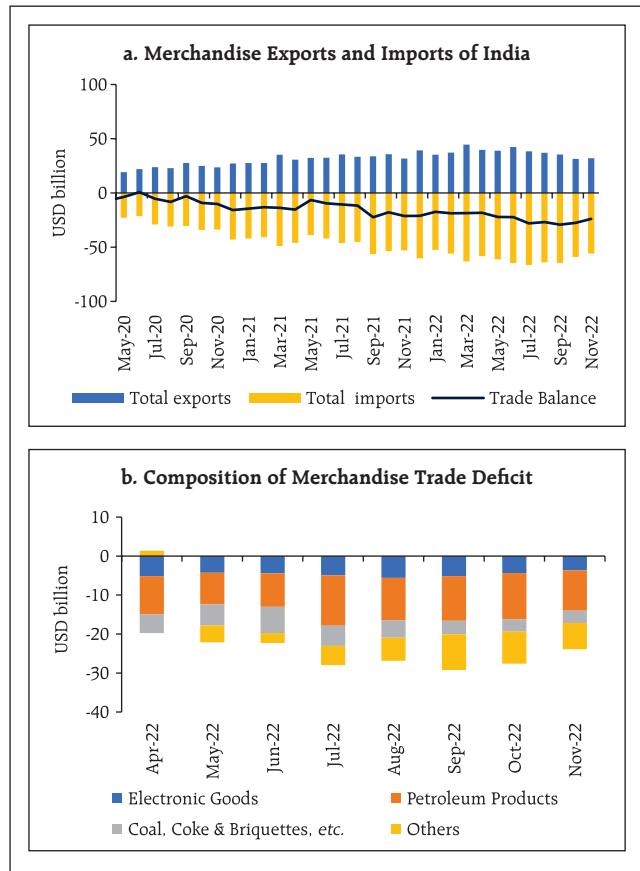
1.2.4 External Sector Developments and Foreign Exchange Markets

1.72 India's external sector is facing strong global headwinds from rising risks of global slowdown, still elevated commodity prices and volatility in capital flows. While the moderation in external demand has pulled merchandise exports into contraction in October 2022, the terms of trade shock has kept imports on a rising scale.

1.73 This resulted in a widening of the merchandise trade deficit to US \$198.3 billion during April-November 2022 as compared with US \$115.4 billion in the corresponding period last year. Despite some reversal in commodity prices alongside a fall in global freight rates from historic highs, the worsening outlook for exports may continue to exercise pressure on trade and current account balance (Chart 1.58 a and b).

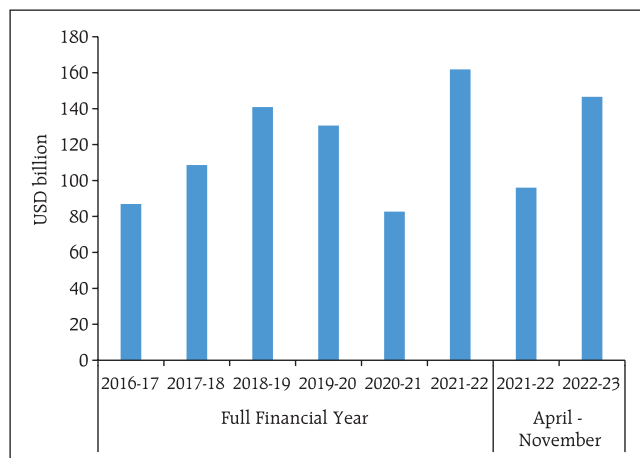
1.74 The rising oil import bill which reflects a structural dependence on imported energy has limited the scope of policy manoeuvrability (Chart 1.59). India's share in global crude oil consumption has increased from 3.0 per cent in 2000

Chart 1.58: Merchandise Exports, Imports and Trade Balance



Source: DGCI&S and Ministry of Commerce and Industry.

Chart 1.59: India's Oil Import Bill



Note: Data for 2020-21 are revised and for 2021-22 are provisional.
Source: Directorate General of Commercial Intelligence and Statistics (DGCI&S).

²⁹ Finance Commission India (2020), "Finance Commission in COVID Times: Report for 2021-26. Volume-IV The States", October.

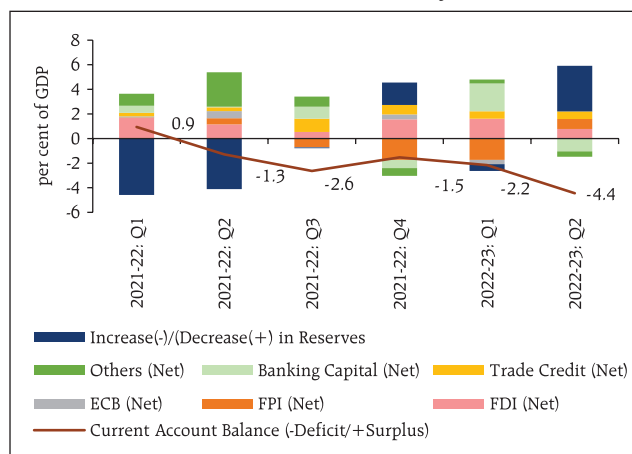
to 3.8 per cent in 2010 and further to 5.2 per cent in 2021³⁰. In fact, of the increase in global petroleum demand by 2 million barrels per day in 2022, one-fifth is accounted for by India. India is a price taker in respect of crude oil, and the recent depreciation of the Indian Rupee (INR) against the USD – the currency of denomination of international crude oil prices – has amplified the pressure on imports.

1.75 India's CAD widened to 4.4 per cent of GDP in Q2:2022-23 from 2.2 per cent of GDP in the previous quarter and 1.2 per cent in 2021-22. The rise in CAD was primarily on account of the widening of merchandise trade deficit reflecting the impact of slowing global demand on exports, even as growth in services exports and remittances remained robust.

1.76 Net capital flows led by foreign portfolio investment (FPI) (US \$6.5 billion), foreign direct investment (FDI) (US \$6.4 billion) and trade credit (US \$5.1 billion) fell short of the funding requirements of CAD, resulting in a depletion of foreign exchange reserves to the tune of US \$30.4 billion on a balance of payments (BoP) basis during Q2:2022-23 (Chart 1.60). During Q3:2022-23 (up to December 16, 2022), foreign exchange reserves increased by US \$30.8 billion from US \$532.7 billion as on September 30, 2022.

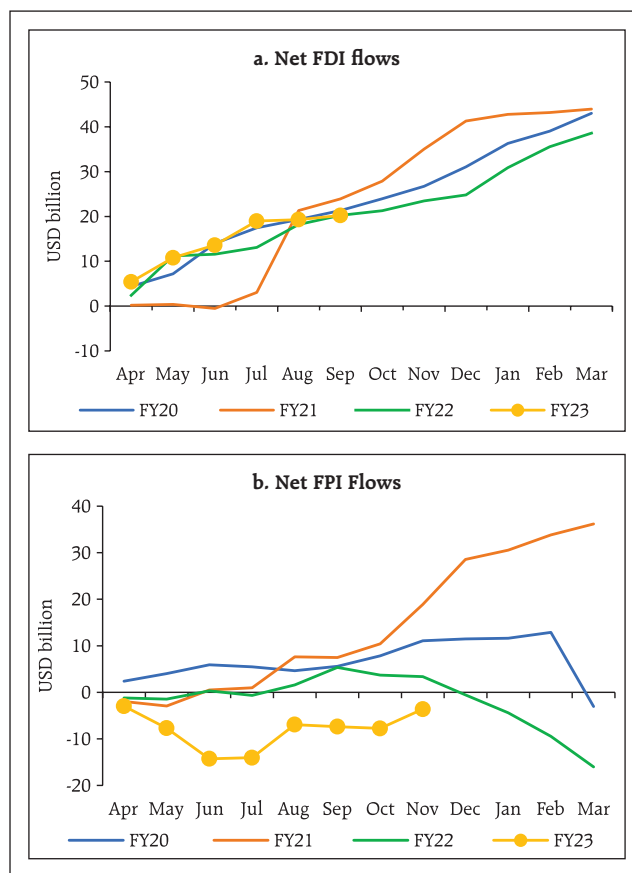
1.77 During 2022-23 so far, net FDI at US \$22.7 billion remains above its level a year ago. FPI inflows amounted to US \$11.6 billion in July-December (till December 14, 2022) and narrowed the net outflows for the financial year so far to US \$2.7 billion due to heavy outflows during April-June 2022 (Chart 1.61 a and b and Table 1.6). Net inflows from external commercial borrowings (ECBs) turned negative on account of repayments while non-resident deposits picked up from their levels a year ago.

Chart 1.60: India's Balance of Payments



Source: RBI.

Chart 1.61: Cumulative FDI and FPI Flows



Sources: RBI and NSDL.

³⁰ British Petroleum (2022), "Statistical review of world energy", July.

Table 1.6: Net Capital Flows

(USD billion)

Component	Fiscal year so far			Financial year (Apr-Mar)	
	Period	2022-23	2021-22	2021-22	2020-21
1. FDI (Net)	Apr-Oct	22.7	21.3	38.6	44.0
2. FPI (Net)	Apr-Nov	-3.2	2.7	-14.1	38.7
2a Equity	Apr-Nov	-3.3	-1.8	-15.6	38.8
2b Debt	Apr-Nov	0.2	4.5	1.5	-0.1
3. ECB to India (net)	Apr-Nov	-5.9	4.2	7.4	0.2
4. Non-Resident Deposits (net)	Apr-Oct	4.9	3.3	3.2	7.4

Note: Data on FPI for 2022-23 (Apr-Nov) and corresponding period previous year have been sourced from NSDL, whereas data for 2021-22 and 2020-21 are based on BoP.

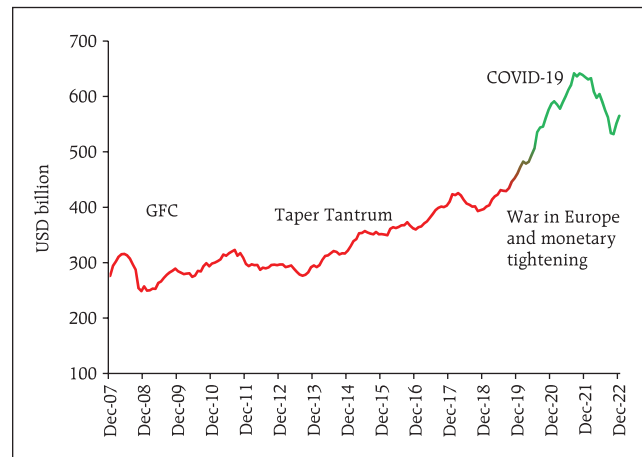
Source: RBI and NSDL.

1.78 India's foreign exchange reserves amounted to US \$563.5 billion as on December 16, 2022, providing strong buffers against global spillovers (Chart 1.62).

1.79 Of the decline in reserves by US \$75 billion in 2022-23 (as on end-September, 2022), about 66.0 per cent can be attributed to valuation losses as the USD strengthened and yields on treasuries and other sovereign bonds rose (Chart 1.63 a and b).

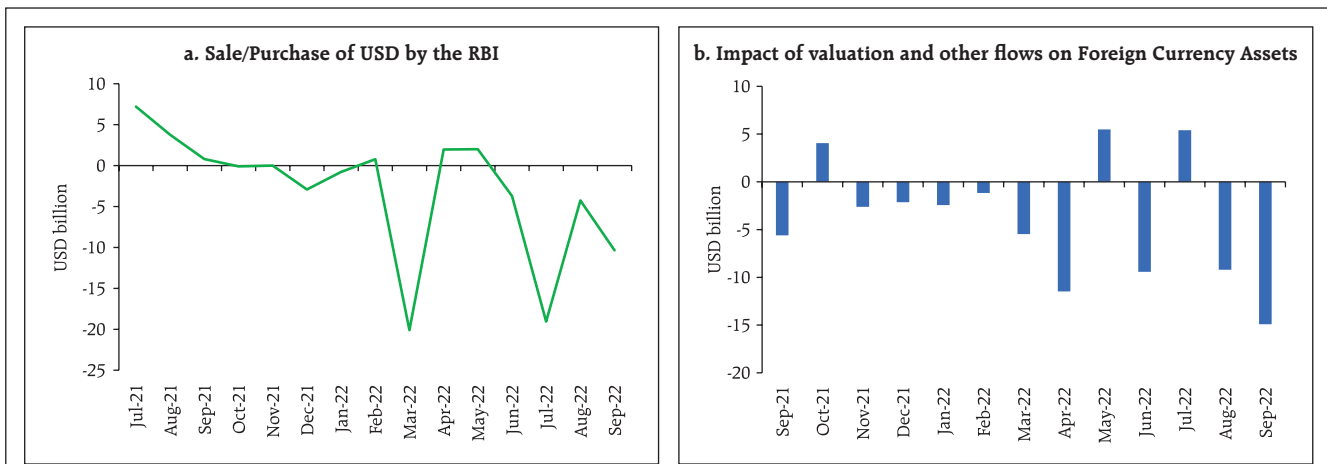
1.80 India's external debt stood at US \$610.5 billion at end-September 2022, with short-term debt (on residual maturity basis) constituting 45.0 per cent. Over time, the share of dollar-denominated debt has been falling, while that of rupee-denominated

Chart 1.62: Foreign Exchange Reserves of India: Long-Term Trend



Source: RBI.

Chart 1.63: Intervention and Impact of Valuation and Flows on Foreign Currency Assets



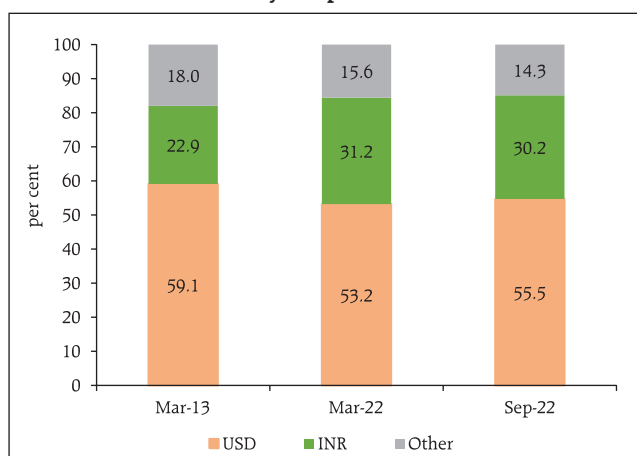
Note: (+) Implies Purchase including purchase leg under swaps and outright forwards. (-) Implies Sales including sale leg under swaps and outright forwards.

Source: RBI.

Note: Impact of valuation and other flows is calculated by deducting intervention for the month from net change in FCA during the month. Other flows include earnings from interest, discount and other miscellaneous items.

Source: RBI.

Chart 1.64: Currency Composition of External Debt



Sources: RBI and the Ministry of Finance, Government of India.

debt has gone up (Chart 1.64), highlighting the diversification underway.

1.81 Among capital flows, the weighted average maturity of ECBs in H1:2022-23 elongated to 5.6 years (4.9 years in H1:2021-22), reflecting lower roll-over risk. ECBs are primarily denominated in four major currencies, viz., USD (81.4 per cent), Euro (4.5 per cent), JPY (4.4 per cent) and the INR (8.7 per cent). A predominant component of ECB loans is hedged, while some part is guaranteed by the Government of India and a portion of the unhedged ECBs retain natural hedges where the borrower's earnings are in foreign currency (Table 1.7).

1.82 During CY:2022 (up to December 14), the INR depreciated by 10.0 per cent against the USD, 4.2 per cent against the Euro, 1.7 per cent against the Pound sterling and 1.3 per cent against the Chinese yuan but appreciated by 6.0 per cent against the Japanese yen. Meanwhile, the US dollar index has appreciated by 8.5 per cent (Chart 1.65).

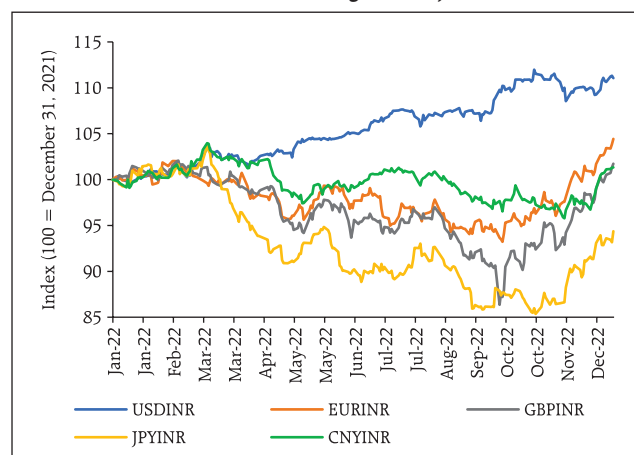
Table 1.7: ECB Loans

(USD million)

Description	(As on Sep-2022)
A. ECB – Total outstanding	173,487
B. ECB – INR denominated	15,109
C. ECB – FDI Companies' borrowings from foreign parent	28,426
Of which:	
(a) INR denominated	10,790
(b) FCY denominated	17,636
D. ECB – Non-Rupee and non-FDI [= A-B-C(b)]	140,742
Of which:	
(a) Public sector companies	53,163
(b) Private companies and others	87,580
E. Hedging details of non-Rupee non-FDI ECBs (i.e., D above)	61,589
(1) Hedging declared on registration from April 2019	44,695
Of which:	
(a) Public sector companies	8,800
(b) Private companies and others	35,895
(2) Other past loans reported hedged by borrowers	17,164
Of which:	
(c) Public sector companies	6,786
(d) Private companies and others	10,378
F. ECB – Unhedged {D-(E1+E2)}	78,884
G. Share of unhedged non-INR non-FDI ECB $\{(F)/(A)*100\}$	45

Source: RBI.

Chart 1.65: INR Movement against Major Currencies



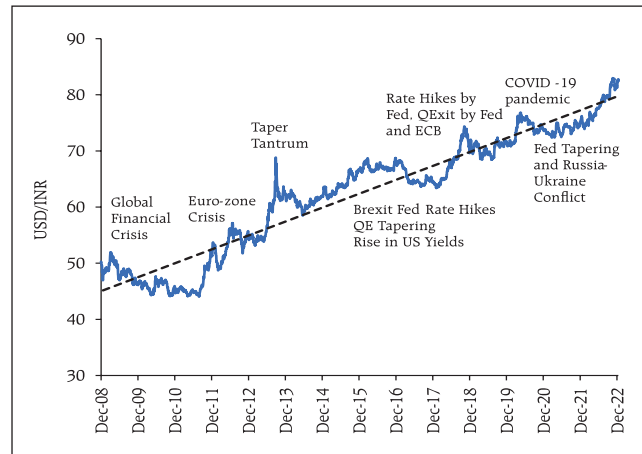
Sources: Refinitiv, FBIL.

1.83 Since mid-October the INR has recovered from the bouts of volatility experienced in the earlier part of the year and has been trading close to its long-term trend (Chart 1.66).

1.84 Notwithstanding the intermittent corrections due to excessive volatility in global financial markets, the INR remains stable relative to peers (Charts 1.67 a and b).

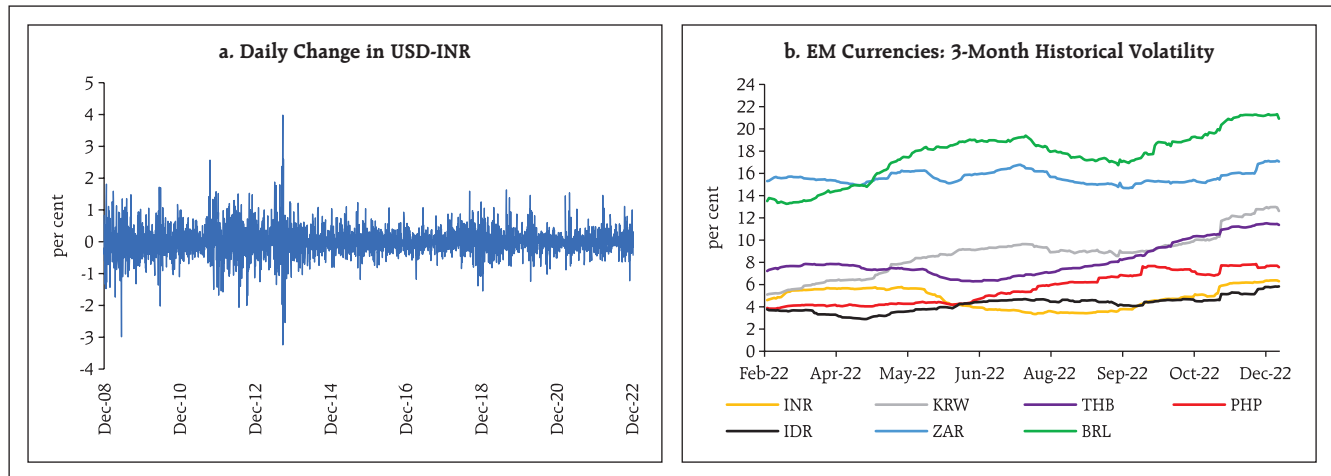
1.85 Measures of volatility, such as the 1-month at-the-money implied volatility of the USD-INR option and Risk reversal³¹, which rose sharply as the war in Ukraine began, have subsequently declined (Chart 1.68 a and b).

Chart 1.66: USD-INR Long Term Trend



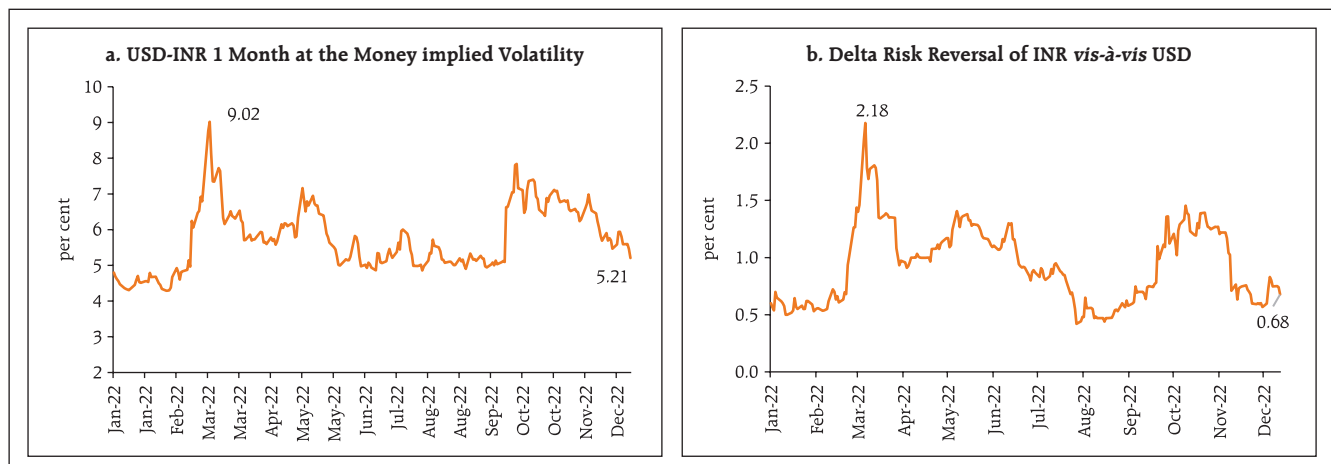
Note: Dotted line indicates long-term trend of the USD-INR exchange rate.
Source: Bloomberg.

Chart 1.67: Exchange Rate Volatility



Source: Bloomberg.

Chart 1.68: USD-INR Implied Volatility



Source: Bloomberg.

³¹ Risk Reversal is a measure of the difference between the implied volatilities of out-of-the money call and put options. A positive risk reversal indicates that the volatility of calls is greater than the volatility of similar puts, implying that more market participants are expecting a rise in the USDINR exchange rate.

1.86 Forward premia have softened across tenors. The one-year forward premium, which reflects hedging costs for firms, declined from 4.6 per cent at end-December 2021 to 3.0 per cent at end-June 2022 and further to 2.0 per cent as on December 14, 2022 (Chart 1.69).

1.2.5 Equity Markets

1.87 Volatile shifts in risk sentiment in response to global spillovers have battered equities in major markets worldwide. During CY:2022 so far (December 14, 2022), the S&P 500 index fell by 16.4 per cent, the DAX 40 index by 9.0 per cent and the MSCI Emerging Market index by 21.0 per cent. In stark contrast, the Nifty 50 index rose by 8.5 per cent on the back of strong domestic fundamentals, strong sales growth by domestic companies, the resumption of portfolio investments from abroad and continued support from domestic institutional investors (Chart 1.70 a and b).

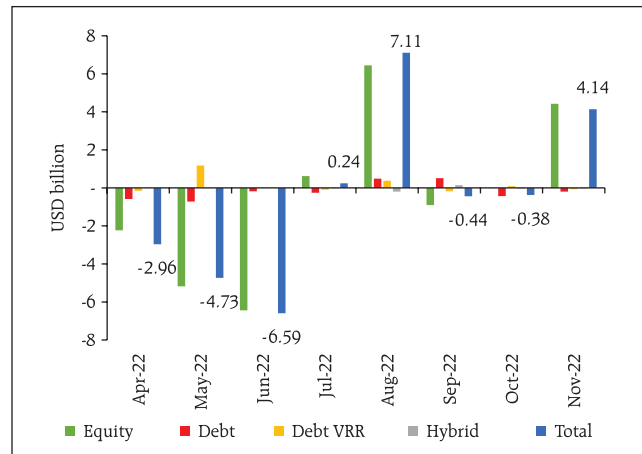
1.88 During April-June 2022, accentuated risk-off sentiments in response to global geopolitical and financial developments had triggered large scale FPI outflows. With the return of renewed appetite for Indian assets, FPIs brought in US \$11.6 billion into Indian equities during July-December (up to December 14, 2022) reducing cumulative net outflows during the financial year to US \$2.7

Chart 1.69: Forward Premia Curve



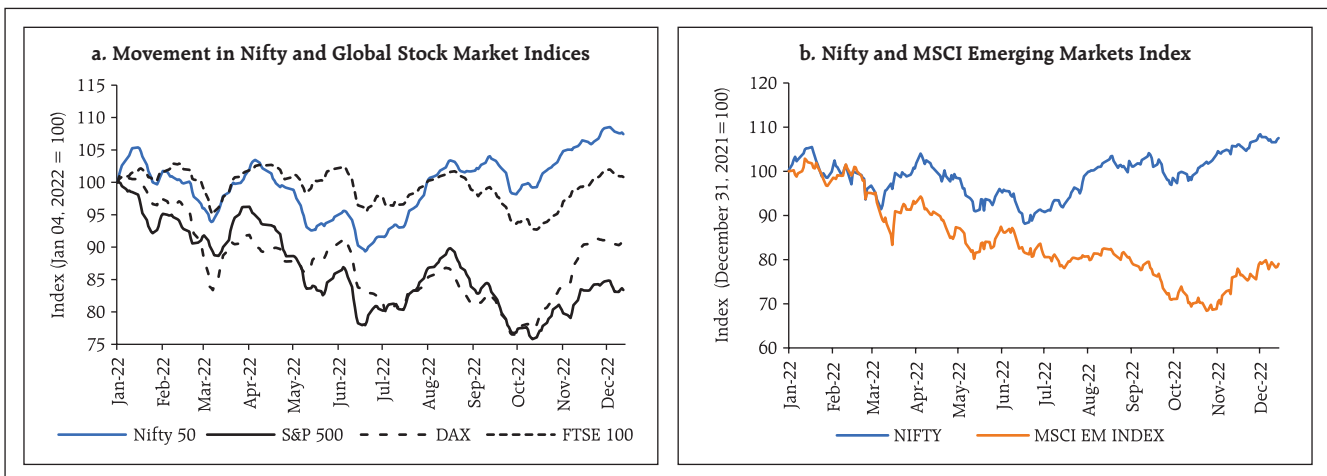
Source: Bloomberg.

Chart 1.71: Monthly FPI Flows



Source: NSDL.

Chart 1.70: Equity Market Movements



Source: Bloomberg.

billion (Chart 1.71). Volatile FPI flows may have been one of the factors causing wide swings in market conditions, with the volatility index – NSE VIX, moving in a range of 16 to 32 during CY:2022, as against its normal period average of around 15.7 (five-year pre-COVID average between January 2015 to December 2019).

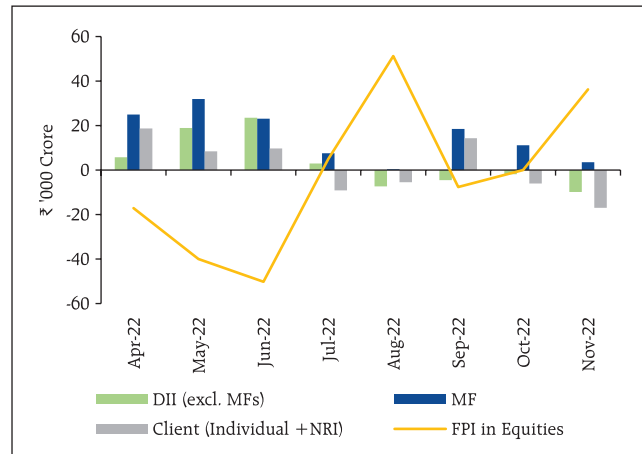
1.89 Inflows from domestic institutional investors (banks, mutual funds, insurance companies and National Pension System) counterbalanced the impact of FPI movements. During 2022-23 (up to November 2022), net domestic institutional investment (DII) inflows (excluding mutual funds) stood at ₹27,578 crore. The positive trend in mutual funds' net investment in equities continued as they invested ₹1.21 lakh crore in 2022-23 (till November 2022), following on from their net investment of ₹1.90 lakh crore in 2021-22 (Chart 1.72). The offsetting nature of DII makes Indian equity markets relatively less susceptible to large scale and volatile movements driven by FPI flows.

1.90 Taken together, the sum of FPI and net DII (including mutual funds) increased from ₹0.84 lakh crore in 2019-20 to ₹1.23 lakh crore in 2021-22. During 2022-23 (up to November 2022) the combined net investment of FPI and DII stood at ₹1,25,984 crore (Chart 1.73).

1.91 Total net investment by individual investors including clients and Non-Resident Indians (NRIs), declined to ₹13,551 crore during April-November 2022-23 from ₹59,992 crore a year ago (Chart 1.74).

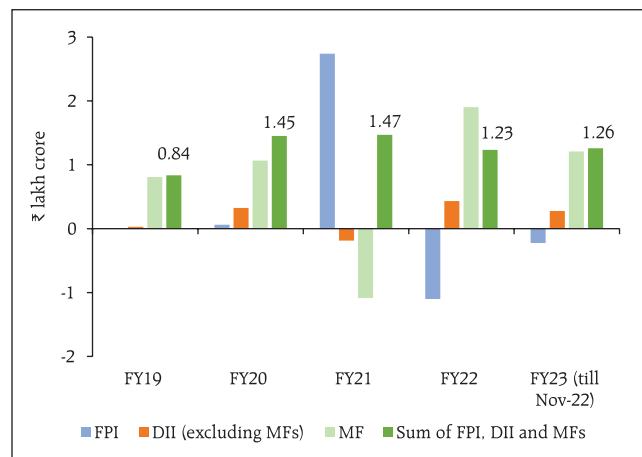
1.92 Total demat accounts (as reported by the depositories NSDL and CDSL)³² went up from 3.95

Chart 1.72: FPI and DII Flows – FY2022-23



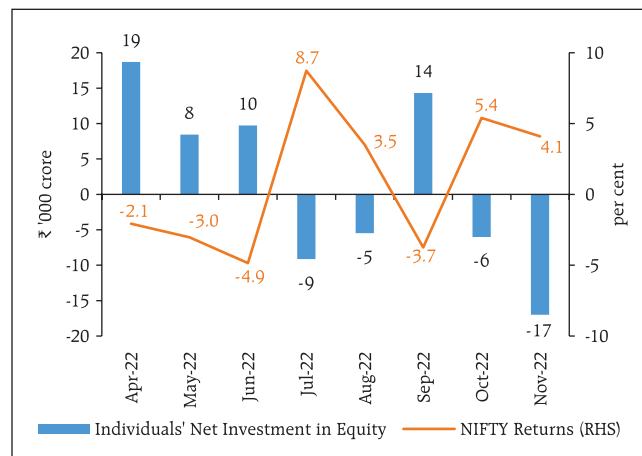
Sources: NSDL, NSE and BSE.

Chart 1.73: FPI and DII Flows – From FY2018-19 to FY2022-23



Sources: NSDL, NSE and BSE.

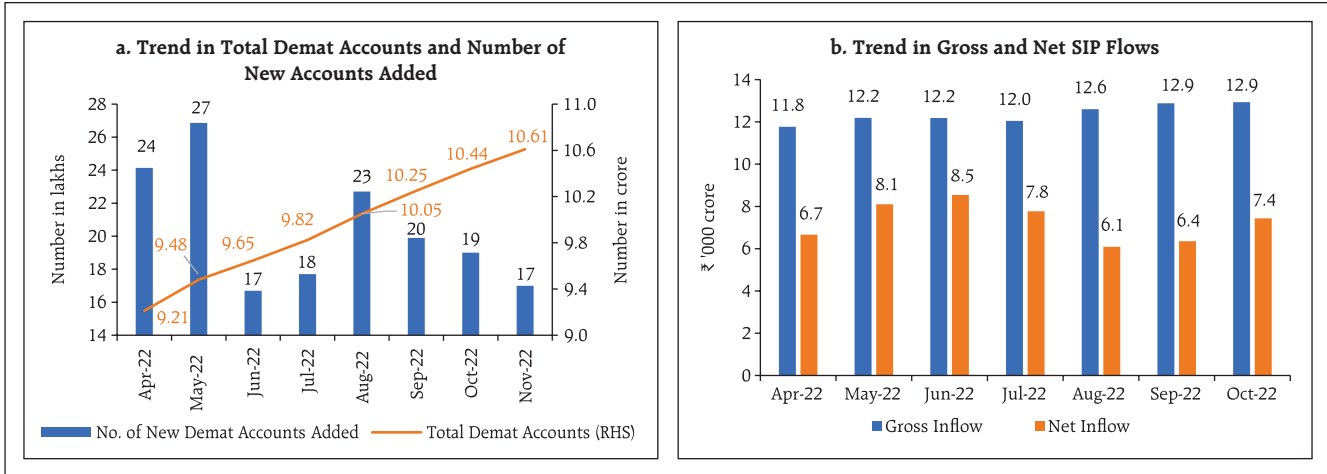
Chart 1.74: Individuals' Net investment and Nifty 50 Returns



Source: NSDL, CDSL, NSE, BSE.

³² NSDL - National Securities Depository Limited; CDSL - Central Depository Services (India) Limited.

Chart 1.75: Trend in Demat Accounts and SIP Flows



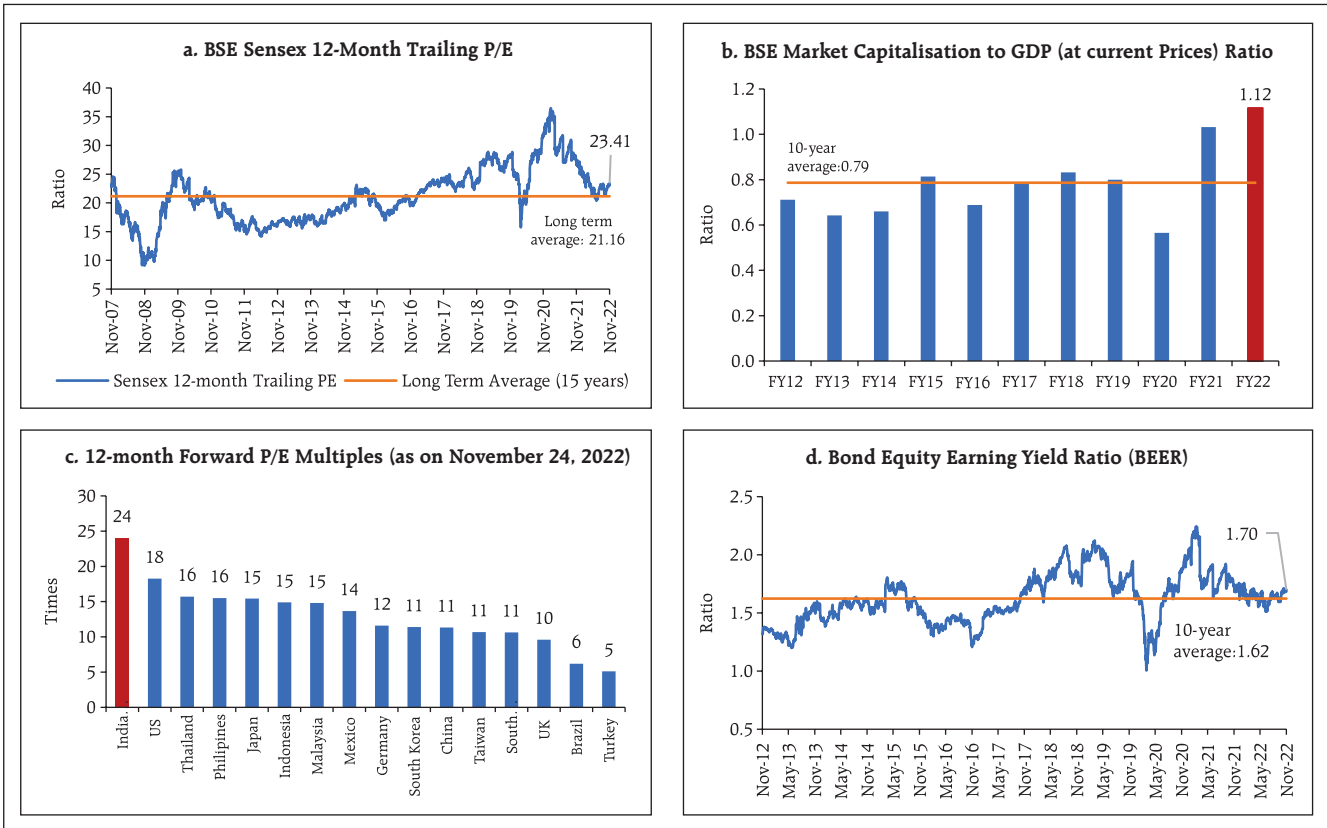
Source: NSDL, CDSL.

Source: SEBI.

crore in January 2020 to 10.61 crore in November 2022. There has also been a steady increase in inflows into mutual funds through systemic investment plans (SIPs) (Chart 1.75 a and b).

1.93 While India’s macroeconomic prospects and earnings forecast are stronger than those of the rest of the world, Indian equity market valuations are still high (Chart 1.76). Both the 12-month trailing price-

Chart 1.76: Equity Market Valuation Indicators



Note: GDP for 2022-23 is based on 2nd advance estimates. Source: Bloomberg, MOSPI, RBI Staff Calculations.

Table 1.8: Assets under Management 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
Jun 30, 2022	3,62,090	2,56,628	6,18,718	10,33,835	19,11,537	29,45,372	13,95,925	21,68,165	35,64,090
Oct 31, 2022	4,29,988	2,80,964	7,10,952	12,04,642	20,34,729	32,39,371	16,34,630	23,15,693	39,50,323
Nov 30, 2022	4,40,174	2,83,568	7,23,742	12,29,866	20,83,953	33,13,819	16,70,040	23,67,521	40,37,561

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

Source: SEBI.

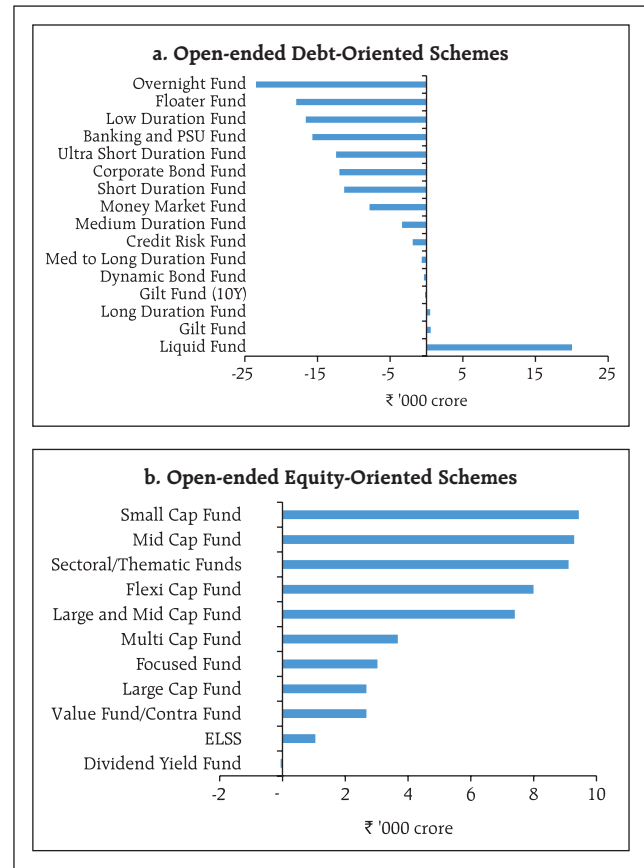
to-earnings (P/E) ratio and market capitalisation to GDP are above their long-term historical averages. The 12-month forward P/E is among the highest relative to both AEs and EMEs.

1.2.6 Mutual Funds

1.94 AUM of the domestic mutual fund industry, excluding domestic fund of funds (FoF), went up by 13.3 per cent between June-November 2022 to a high of ₹40.4 trillion. The AUM of cities that are beyond the top 30, i.e., B30 cities³³ also witnessed a rise of 19 per cent during the same period, led by increased awareness about mutual funds and ease of transactions through digitisation (Table 1.8).

1.95 There was a 21.1 per cent rise in the AUM of equity-oriented schemes across all categories. Exchange traded funds and index funds also witnessed sizable net inflows. Open-ended debt-oriented schemes barring liquid funds, gilt funds and long duration funds witnessed net outflows (Table 1.9 and Chart 1.77 a and b).

Chart 1.77: Scheme-wise Mutual Fund Net Inflows



Source: SEBI.

Table 1.9: Trends in Resource Mobilisation by Mutual Funds

₹ crore

Months	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22
Debt Oriented Schemes						
Net Inflow/ Outflow of Funds	-96,301	5,487	50,576	-66,630	-2,820	7,030
Assets under Management	12,51,614	12,64,664	13,23,006	12,60,182	12,63,380	12,79,026
Equity Oriented Schemes						
Net Inflow/ Outflow of Funds	15,480	8,883	5,942	14,077	9,253	2,224
Assets under Management	12,92,390	14,22,446	14,84,950	14,70,743	15,29,344	15,65,102
Total						
Net Inflow/ Outflow of Funds	-69,853	23,605	65,077	-41,404	14,047	13,264
Assets under Management	35,64,090	37,74,803	39,33,878	38,42,351	39,50,323	40,37,561

Source: SEBI.

³³ B30 refers to the locations beyond the top 30 cities.

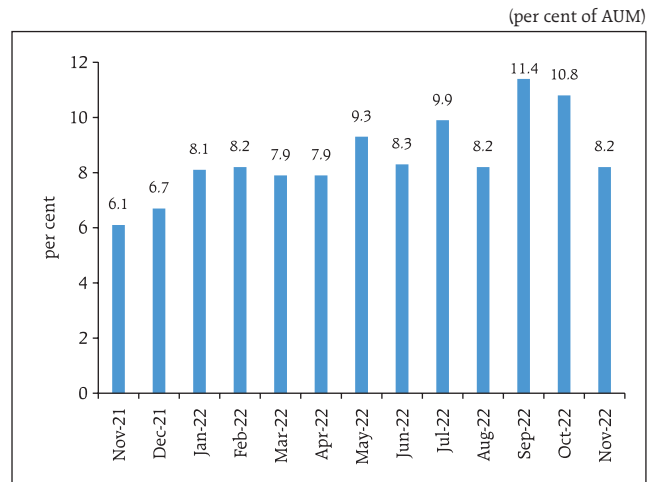
1.96 Reflecting risk averse sentiment among investors and their preference for short term liquidity, the share of AUM of overnight mutual funds in the total AUM of open-ended debt schemes has risen from 6.1 per cent in November 2021 to 8.2 per cent in November 2022 (Chart 1.78).

1.97 Open-ended debt funds are susceptible to liquidity shocks and can potentially amplify market stress. To mitigate the risk and to enhance the risk management framework for mutual funds, the Securities and Exchange Board of India (SEBI) has prescribed various norms for asset management companies (AMCs) with respect to holding of liquid assets in open-ended debt schemes and has mandated stress testing of such schemes. Moreover, with a view to ensure fairness in treatment of investors in mutual fund schemes, particularly during market dislocation, the SEBI has introduced a swing pricing framework for open-ended debt-oriented mutual fund schemes, which enables them to change their net asset values in accordance with the activities of redeeming investors, so that they cover trading costs.

1.98 Though the average liquid asset holdings, comprising cash, government securities, treasury bills and repo in government securities by open-ended debt schemes (except overnight funds, liquid funds, gilt funds and gilt funds with 10-year constant duration) went down to 29.8 per cent of AUM of open-ended debt schemes at the end of November 2022 from 34.7 per cent a year ago, they remain significantly higher than the minimum 10 per cent prescribed by the SEBI (Chart 1.79).

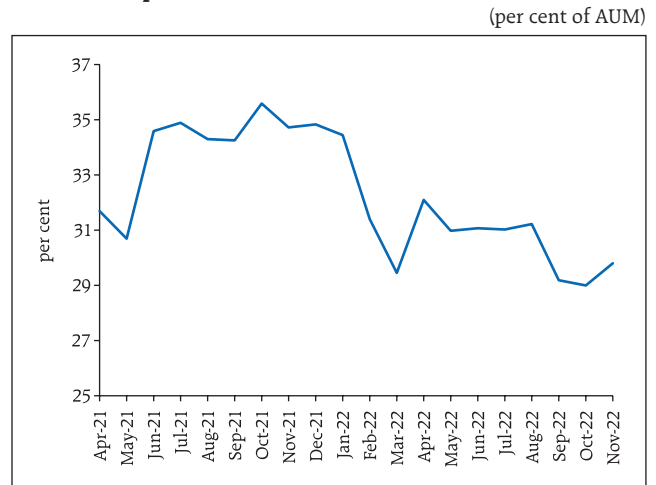
1.99 Disaggregated analysis shows that a similar tendency is observed in respect of open-ended debt schemes that invest in debt and money market instruments with Macaulay duration of less than twelve months. Both corporate bond funds that invest primarily in AAA-rated corporate bonds and banking, and PSU funds that predominantly invest in debt instruments of banks, public sector

Chart 1.78: Share of Overnight Mutual Funds in Total Open-ended Debt Schemes



Source: SEBI.

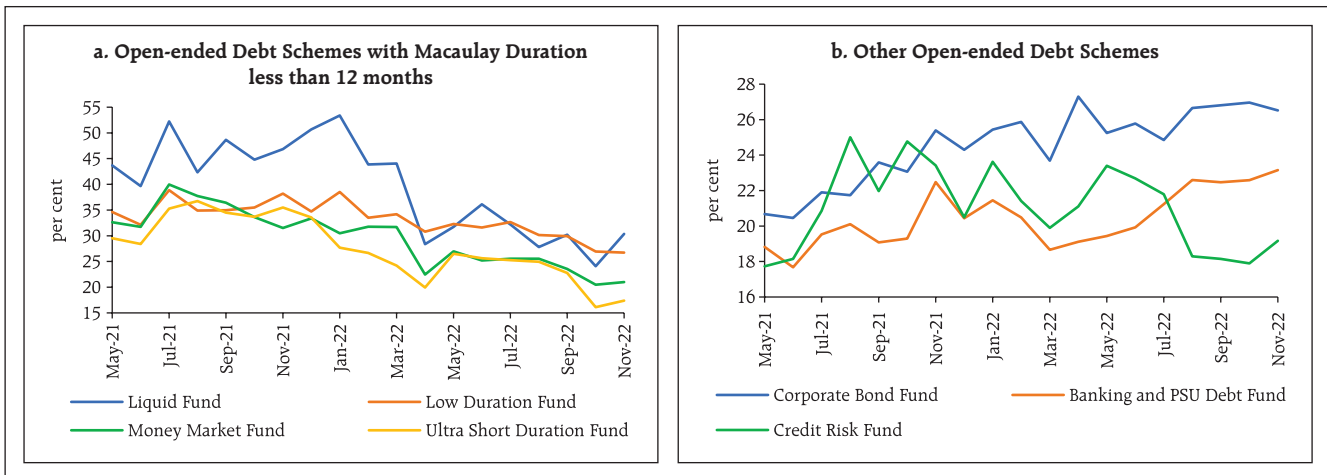
Chart 1.79: Share of Liquid Assets Holdings by Open-ended Debt Schemes of Mutual Funds



Note: Data based on top 10 AMCs

Source: SEBI.

Chart 1.80: Scheme-wise Analysis of Share of Liquid Assets Holdings by Open-ended Debt Schemes of Mutual Funds

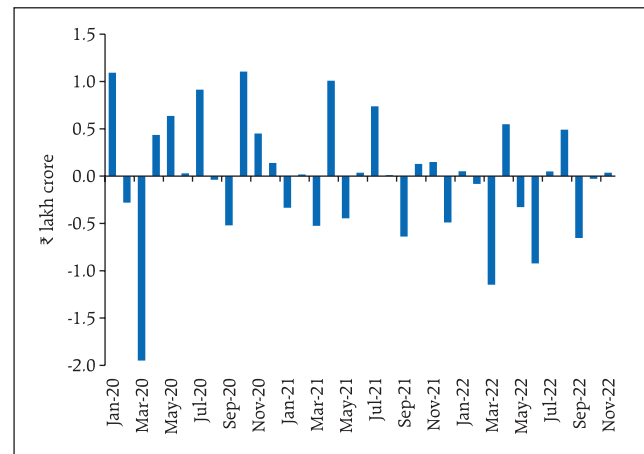


Note: Data based on Top 10 AMCs.
Source: SEBI.

undertakings and public financial institutions experienced an increase in liquid asset holdings (Chart 1.80 a and b).

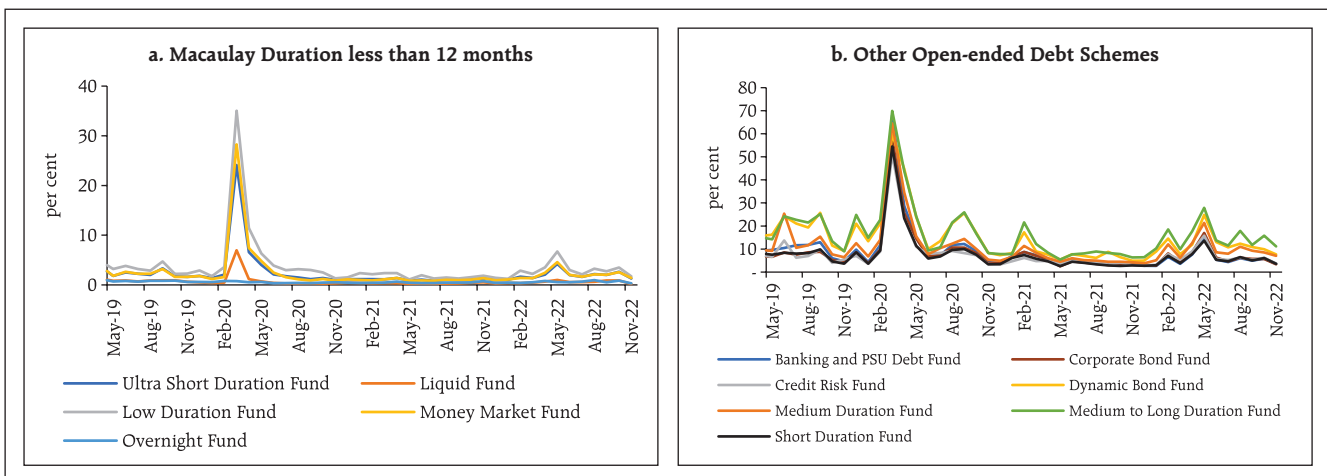
1.100 Regulatory measures taken by the SEBI since the March 2020 market turmoil have ensured that open-ended debt schemes did not face similar prolonged liquidity stress or volatility in response to extreme events (Chart 1.81 and Chart 1.82 a and b). On the role of open-ended funds in amplifying stress in asset markets as one of the important financial stability risks, appropriate guardrails have been set up to protect these entities from stress and to ensure adequate liquidity.

Chart 1.81: Monthly Net Flows of Open-ended Debt Schemes of Mutual Funds



Source: SEBI.

Chart 1.82: Monthly Volatility of Open-ended Debt Schemes of Mutual Funds



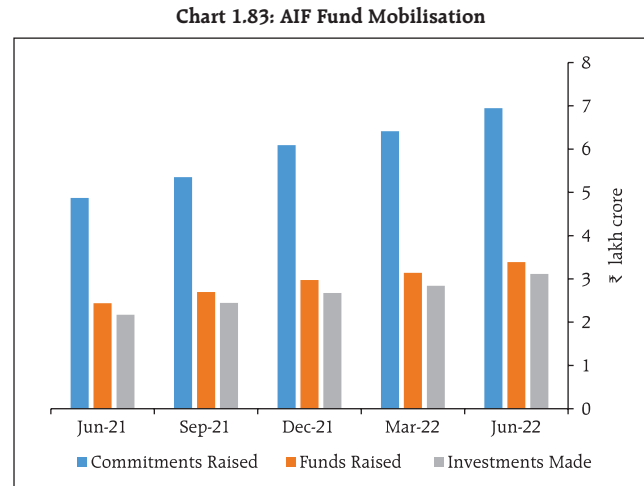
Note: Data based on median of monthly volatility of top 10 AMCs.
Source: SEBI.

1.2.7 Alternative Investment Funds

1.101 Funds mobilisation by alternative investment funds (AIFs) has increased consistently over the years in terms of both commitments raised and investments made. The cumulative investments made by Category-I, Category-II and Category-III AIFs³⁴ increased by 8.3 per cent, 10.5 per cent and 7.1 per cent, respectively, in Q1:2022-23 (Chart 1.83).

1.102 AIFs offer relatively higher return to their investors through investments in assets that are less correlated with traditional investments like traded stocks and bonds. They deploy bulk of their funds in unlisted equities and debt instruments, including securitised products (Chart 1.84).

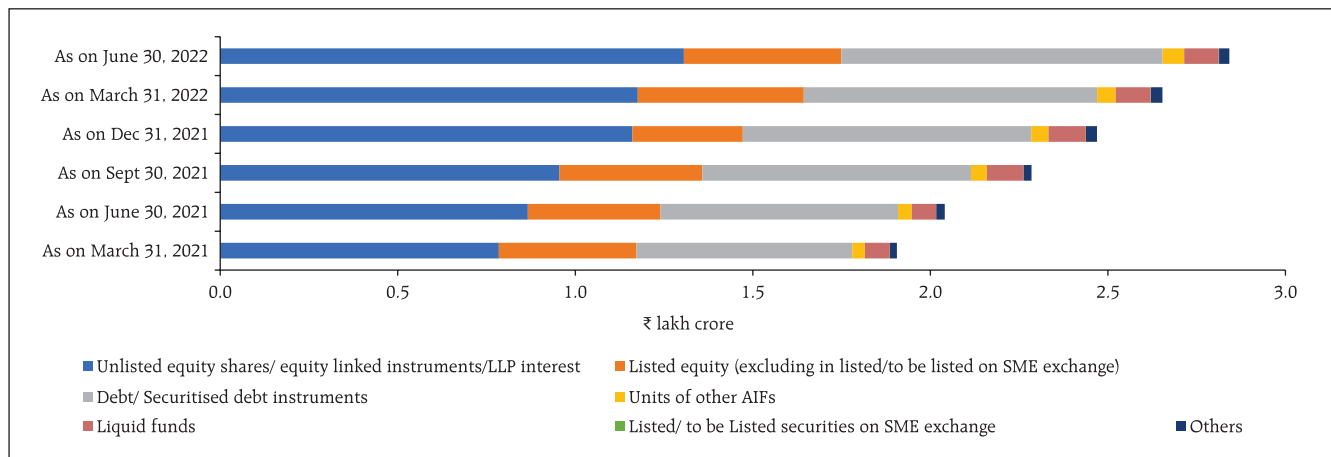
1.103 The AIF ecosystem has been consolidating in the country on the back of increasing investor interest and simultaneous development of a robust regulatory framework. Their activities need close monitoring across venture capital funds, SME funds, real estate funds, private equity funds, funds for distressed assets and hedge funds. Their remuneration policies, extent of financial leverage



Source: SEBI.

and risk management practices can potentially pose systemic risks. In this context, the SEBI has recently amended the SEBI (AIF) Regulations, 2012, to ensure that the assets and liabilities of each scheme are segregated and ringfenced from those of other schemes. Furthermore, bank accounts and securities accounts of each scheme are also segregated and ringfenced from those of other schemes.

Chart 1.84: Instrument-wise Deployment of Funds by AIFs



Source: SEBI.

³⁴ Category I AIF: AIFs which invest in start-up or early stage ventures or social ventures or SMEs or infrastructure or other sectors or areas which the government or regulators consider as socially or economically desirable and shall include venture capital funds, SME Funds, social impact funds, infrastructure funds, special situation funds and such other Alternative Investment Funds as may be specified.

Category II AIFs: AIFs which do not fall in Category I and III and which do not undertake leverage or borrowing other than to meet day-to-day operational requirements and as permitted in the SEBI AIF Regulations, such as real estate funds, private equity funds, funds for distressed assets, etc.

Category III AIFs: AIFs which employ diverse or complex trading strategies and may employ leverage including through investment in listed or unlisted derivatives such as hedge funds, PIPE Funds, etc.

1.2.8 Central Counterparties (CCPs)

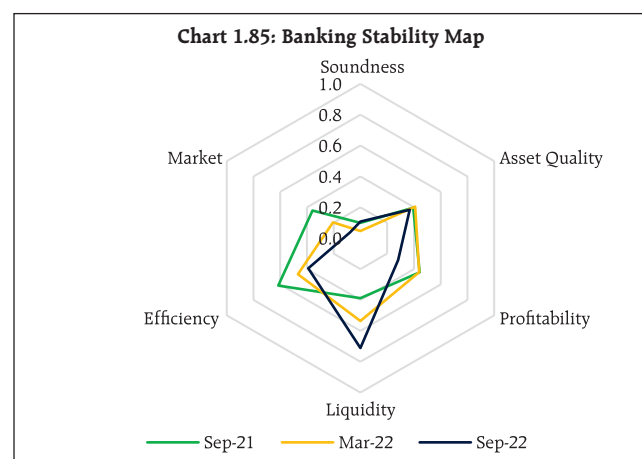
1.104 After the global financial crisis of 2007-09, regulators across most jurisdictions formulated regulations to implement robust standards for derivatives regulation. It is also seen that the legislations governing financial market infrastructures (FMIs), like CCPs, enacted in some advanced jurisdictions have incorporated provisions that give them an extra-territorial reach. Such regulations, if implemented by all jurisdictions, can create a parallel maze of laws with overlapping requirements or restrictions and show a lack of trust in the capabilities and quality of oversight exercised by the host regulators. Such unilateral actions can lead to disruption in local markets and undermine domestic financial stability.

1.105 Moreover, such actions will hamper the ability of banks and custodians to participate in forex, government securities, equities, debt and derivative markets where local mandates of compulsory central clearing will be militated, leading to disruption in markets and adverse impact on business interests of these entities. Potential inefficiencies get introduced in the system with a possible domino effect when liquidity gets 'trapped' on the back of gross settlement of large positions. With the withdrawal of CCP recognition, once a large bank moves from a direct participant to an indirect one, it also introduces an element of systemic risk as the concerned large bank operates without access to central bank funding windows. Disruptions can lead to instability in market conduct, as also impact the clearing members by way of higher capital requirements, increased margin requirements, enhanced credit risk and lack of multilateral netting benefit. This will result in reinventing the wheel as consensus was built in developing Principles for Financial Market Infrastructures (PFMIs), which are standards accrued out of painstaking efforts and brought out by the global standard setting bodies.

1.106 To prevent the possible implications and resolve the logjam, there has been continuous engagement and positive dialogue between the relevant stakeholders {including the European Securities and Markets Authority (ESMA) and the European Commission}. The discussions still continue, so as to arrive at a mutually acceptable arrangement, which duly recognises the territorial independence of the host regulator. In the undesirable event of a possible market disruption, however, remedial measures by way of possible alternate arrangements are under deliberation with the entities likely to be impacted.

1.2.9 Banking Stability Indicator

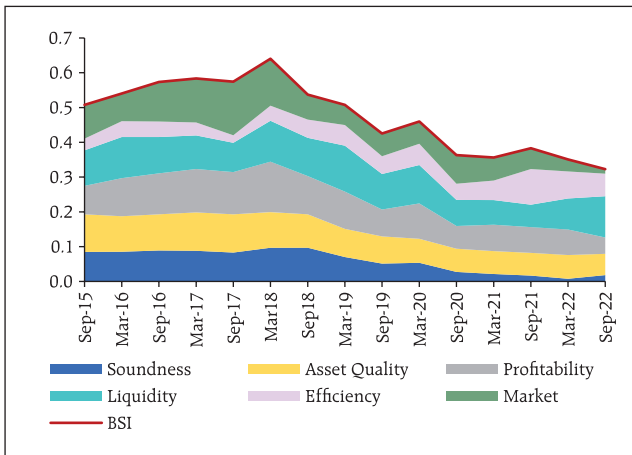
1.107 The state of the banking system is reflected in the banking stability indicator (BSI)³⁵. During H1:2022-23, an increase in profitability driven by rising net interest margin and an upgrade in asset quality and efficiency ratios contributed to improvement in the BSI. Although there was some weakening in soundness as measured by capital ratios and liquidity risk in terms of the liquidity coverage ratio (LCR), the banking system has sufficient capital and liquidity buffers relative to the regulatory minimum (Chart 1.85 and 1.86).



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

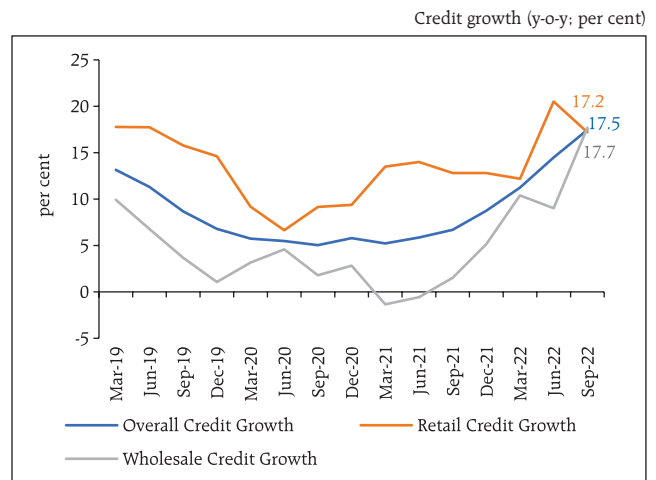
³⁵ BSI gives an overall assessment of changes in underlying conditions and risk factors that have a bearing on the stability of the banking sector.

Chart 1.86: 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.

Chart 1.87: Credit Growth – SCBs



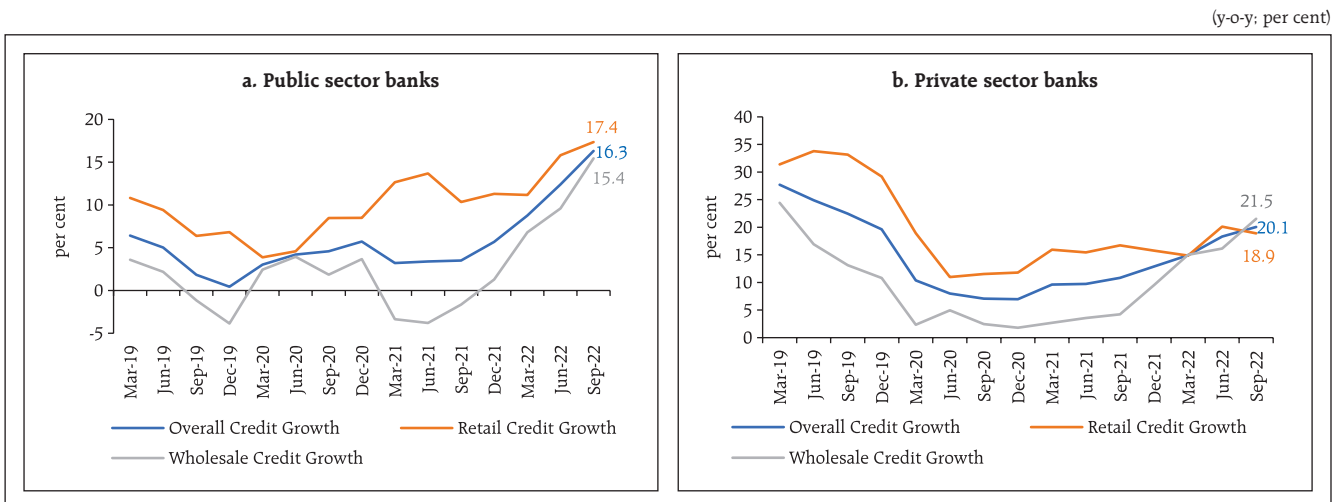
Note: SCBs here include PSBs, PVBs and FBs.
Source: RBI supervisory returns, CRILC and staff calculations.

1.2.10 Banking System

1.108 After remaining in single digits for three years, bank credit growth (y-o-y) by scheduled commercial banks (SCBs) reached a high of 17.5 per cent in September 2022, a rate last recorded in December 2011. Retail credit has been recording relatively high growth in recent years but wholesale credit³⁶

has turned a corner with a growth (y-o-y) of 17.7 per cent (Chart 1.87). Notably, loan books of public sector banks (PSBs) grew at their fastest pace since September 2013. Lending by private sector banks (PVBs), on the other hand, continued to outpace that of PSB counterparts (Chart 1.88 a and b).

Chart 1.88: Credit Growth – Bank Group wise



Source: RBI supervisory returns, CRILC and staff calculations.

³⁶ Wholesale loans comprise gross loans and advances of the banking sector wherein aggregate funded exposure of the obligor is ₹5 crore or more and Retail loans comprise gross loans and advances of the banking sector wherein aggregate exposure of the obligor is less than ₹5 crore.

Table 1.10: Growth in Wholesale Credit
(y-o-y; per cent)

	PSU				Non-PSU			
	Mar-21	Sep-21	Mar-22	Sep-22	Mar-21	Sep-21	Mar-22	Sep-22
PSB	5.4	11.9	15.1	22.6	-9.0	-9.1	0.0	9.7
PVB	60.0	20.1	9.0	20.2	-6.1	-1.2	13.5	20.6
PSB+PVB	11.7	13.1	14.1	22.2	-7.7	-6.0	5.4	14.2

Source: RBI supervisory returns and staff calculations.

1.109 A granular analysis of bank credit to companies³⁷, which accounts for 86 per cent of total funded amounts extended to wholesale borrowers³⁸, indicates that government owned companies (PSUs) remained at the vanguard of credit growth during the COVID-19 period. In more recent years, the pace of lending to private (non-PSU) companies has picked up (Table 1.10). The rise was also accompanied by a shift in funding away from market borrowings (9.1 per cent; y-o-y) (Table 1.11).

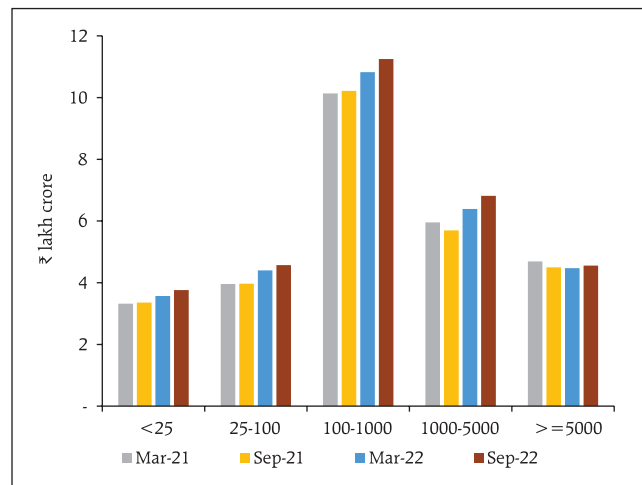
1.110 Size-wise disaggregation of wholesale credit to private non-financial companies indicates robust growth in loans up to ₹5,000 crore, especially for the ₹1,000-5,000 crore bucket. Growth in larger sized loans (>₹ 5000 crore bucket), however, remained tepid (Chart 1.89). Long-term ratings also show an improving profile (Chart 1.90).

Table 1.11: Aggregate Mobilisation of Funds
₹ lakh crore

Outstanding Amount (Quarter-End)	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22
Commercial Paper (CP)	345	362	364	371	352	401
Corporate Bonds	3254	3406	3613	3701	4017	4030
ECB	1242	1210	1238	1285	1350	1414
Wholesale Borrowings	5582	5410	5507	5492	6079	6747
Total	10423	10388	10722	10849	11798	12592

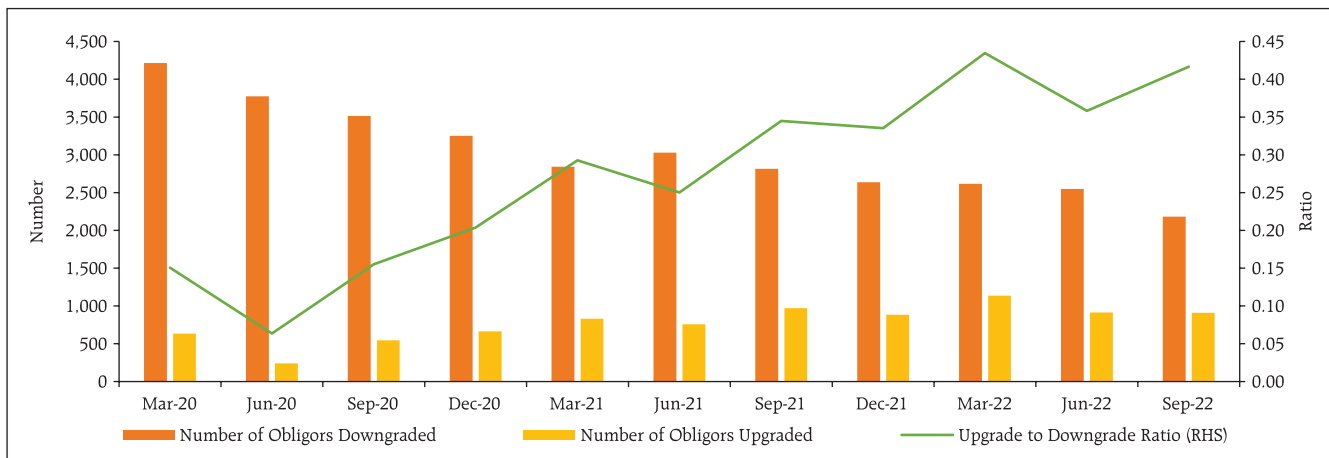
Source: RBI, SEBI and NSDL.

Chart 1.89: Exposure Distribution of Non-PSU Non-Financial Obligor



Source: CRILC and RBI staff calculations.

Chart 1.90: Long-term Ratings



Source: Prime Database.

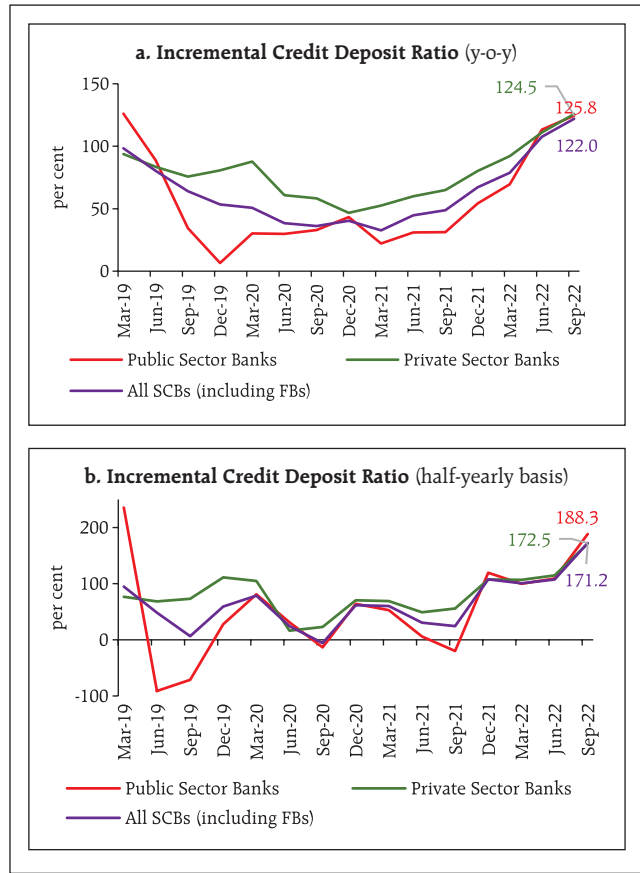
³⁷ Organisations other than cooperatives, partnerships, trusts and societies.

³⁸ Gross loans and advances of the banking sector wherein aggregate exposure of the obligor is ₹5 crore and above.

1.111 The incremental credit-deposit (CD) ratio rose sharply both on annual (122.0 per cent, y-o-y) and half-yearly basis (172.5 per cent; September 2022 over March 2022) (Chart 1.91 a and b). The current high credit growth, however, is on a low base of the previous couple of years. Moreover, accumulation of deposits in the past few years has enabled banks to fund the growing credit demand.

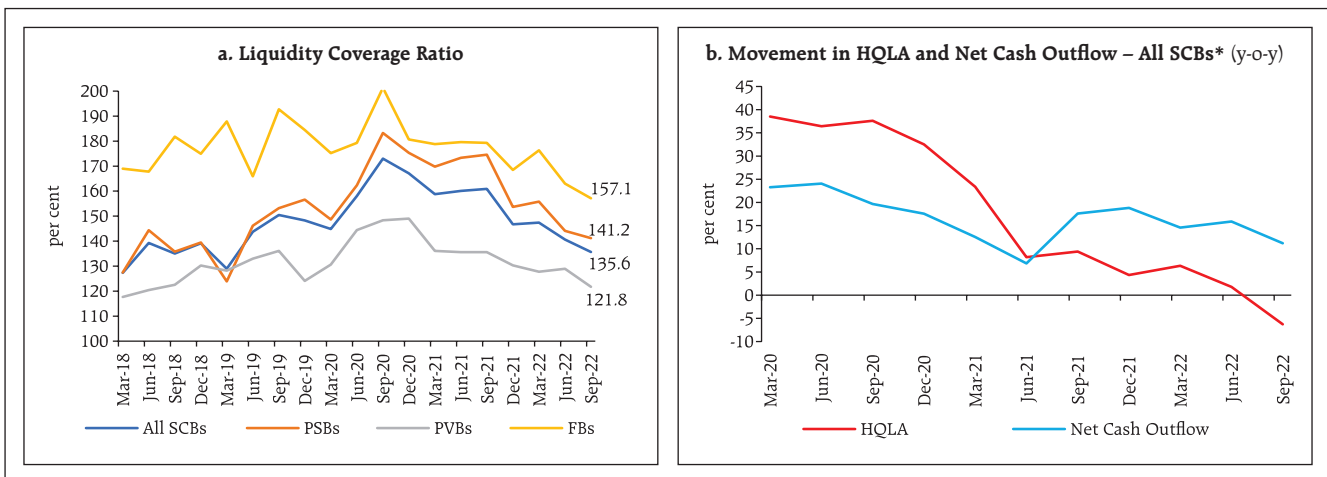
1.112 Banks have also been drawing down their high-quality-liquid assets (HQLAs) to fund credit growth. This brought down the overall LCR from a high of 173.0 per cent in September 2020 to 135.6 per cent, which remains comfortably above the regulatory prescription of 100 per cent. The LCR of PVBs has fallen more than that of PSBs and foreign banks (FBs) (Chart 1.92 a and b).

Chart 1.91: Incremental Credit Deposit Ratio



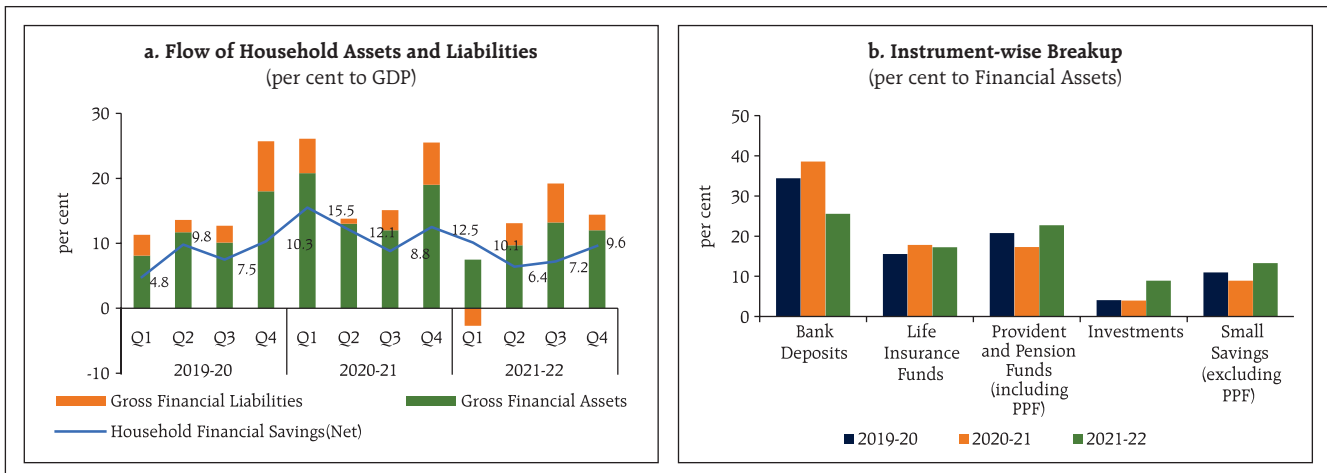
Source: RBI supervisory returns and staff calculations.

Chart 1.92: Movement in Liquidity Coverage Ratio and its Components



Source: RBI supervisory returns and staff calculations.

Chart 1.93: Household Financial Savings in India



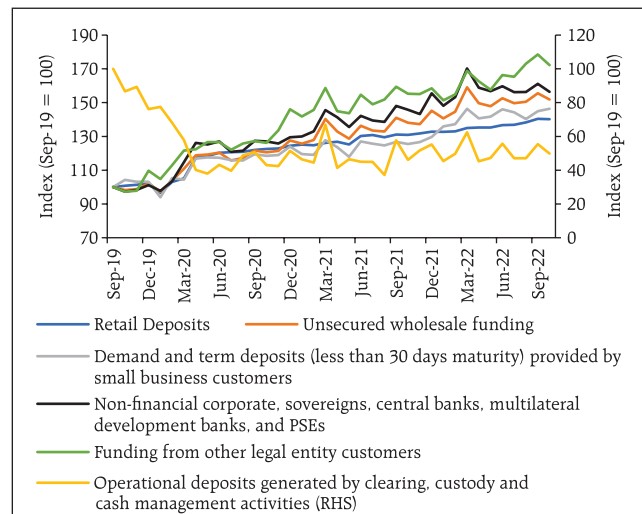
Source: Reserve Bank of India

1.113 A study of household financial savings indicates that there has been some diversification away from bank deposits to small savings, provident funds and other investment avenues during 2021-22 in search of returns (Chart 1.93 a and b).

1.114 Consequently, banks have been sourcing funds from other legal entity customers (e.g., MFs, insurance companies), non-financial corporates and public-sector undertakings, which have higher run-off factors than for retail deposits (Chart 1.94 and 1.95). This may impede banks flexibility to create lendable resources out of certain types of liabilities as they necessitate maintaining higher levels of HQLAs.

1.115 Level-1 assets, which essentially consist of government securities, dominate HQLAs, whereas retails deposits with run-off factors ranging from

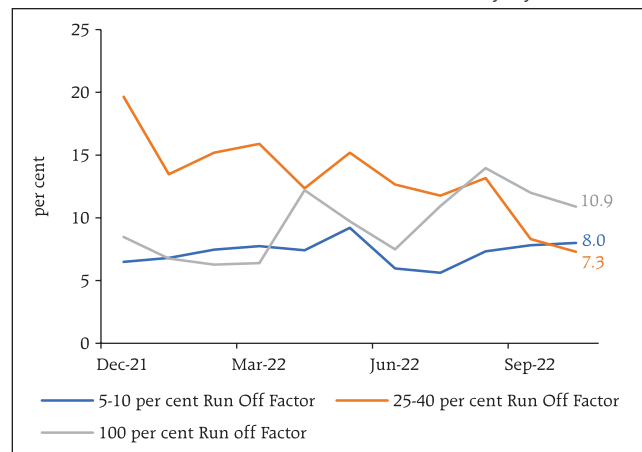
Chart 1.94: Components of Net Cash Outflow – All SCBs



Note: All SCBs include PSB and PVB.

Source: RBI supervisory returns and staff calculations.

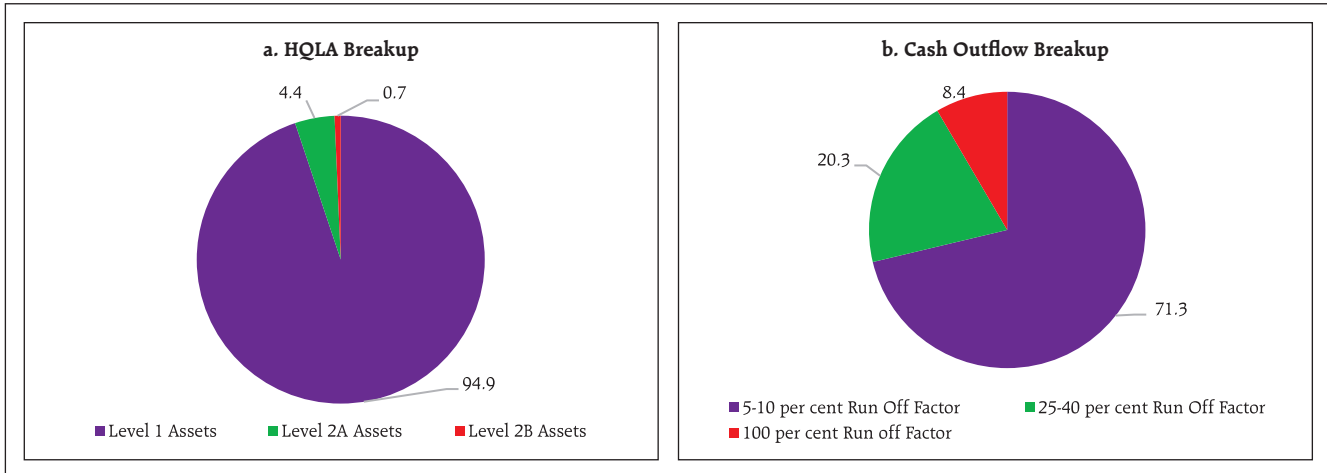
Chart 1.95: Movement in Run-off Factor (y-o-y)



Source: RBI supervisory returns and staff calculations

Chart 1.96: HQLA and Cash Outflow – Share of Components
(As on October 31, 2022)

(per cent)



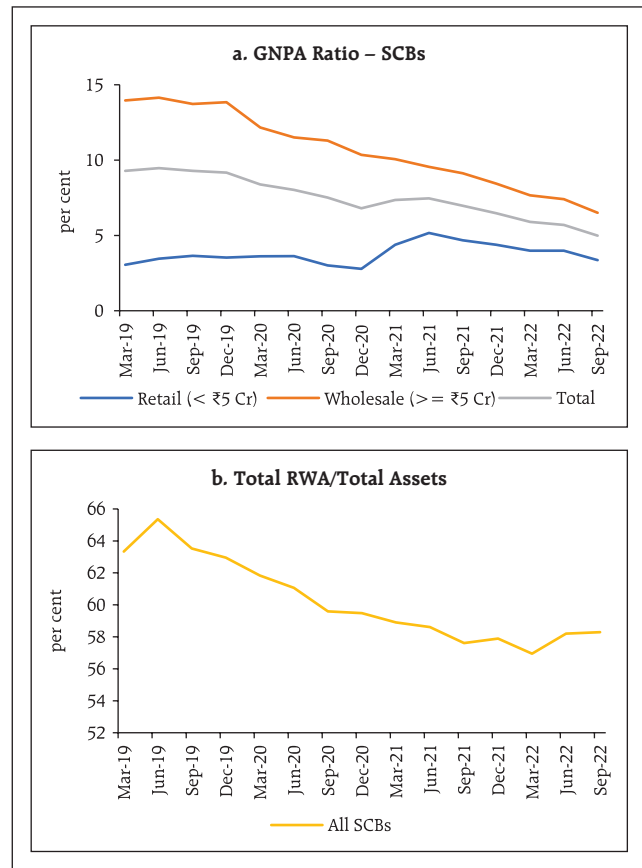
Source: Reserve Bank of India.

5-10 per cent account for the major share of net outflows (Chart 1.96 a and b).

1.116 Asset quality of the banking system continued to improve: the gross non-performing asset (GNPA) ratio declined sequentially for wholesale advances and for retail loans (Chart 1.97 a). In line with the acceleration in credit growth, risk-weighted assets (RWAs) have grown, which indicates improvement in banks' risk appetite on better economic prospects (Chart 1.97 b).

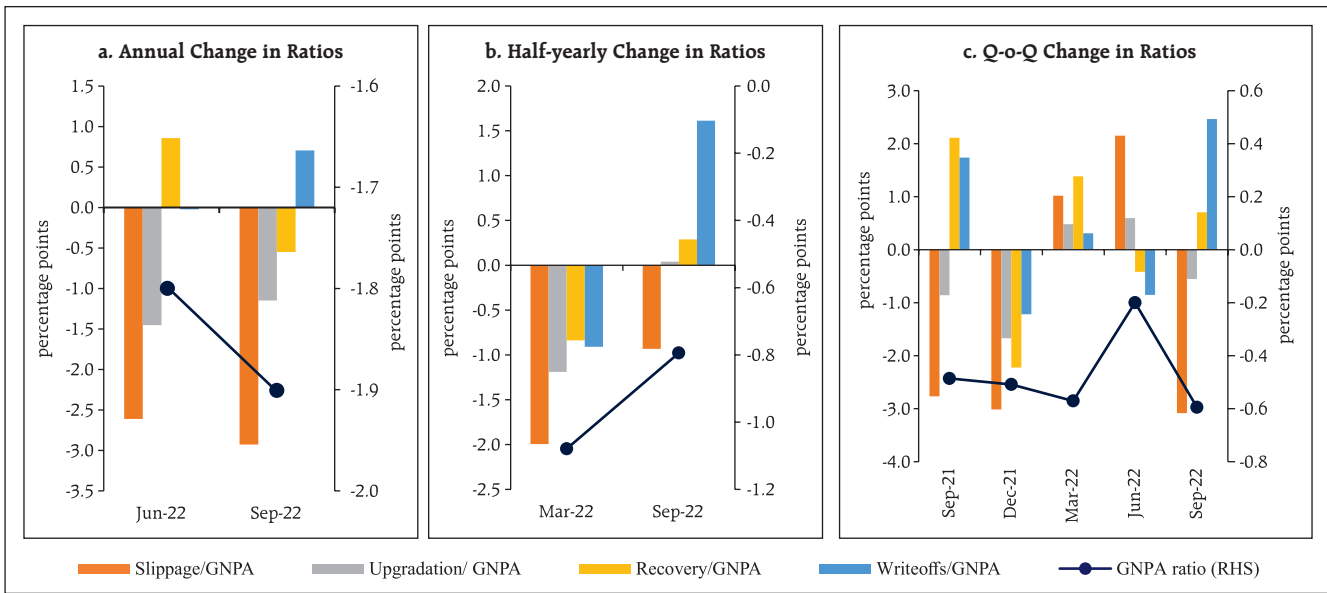
1.117 The GNPA ratio stood at 5.0 per cent in September 2022, down from 5.7 per cent a quarter ago. Reduction in slippages or fresh accretions to NPAs was a major contributor to the reduction in

Chart 1.97: Asset Quality and Risk Weights



Source: RBI supervisory returns and staff calculations.

Chart 1.98: GNPA Movements



Source: RBI supervisory returns and staff calculations.

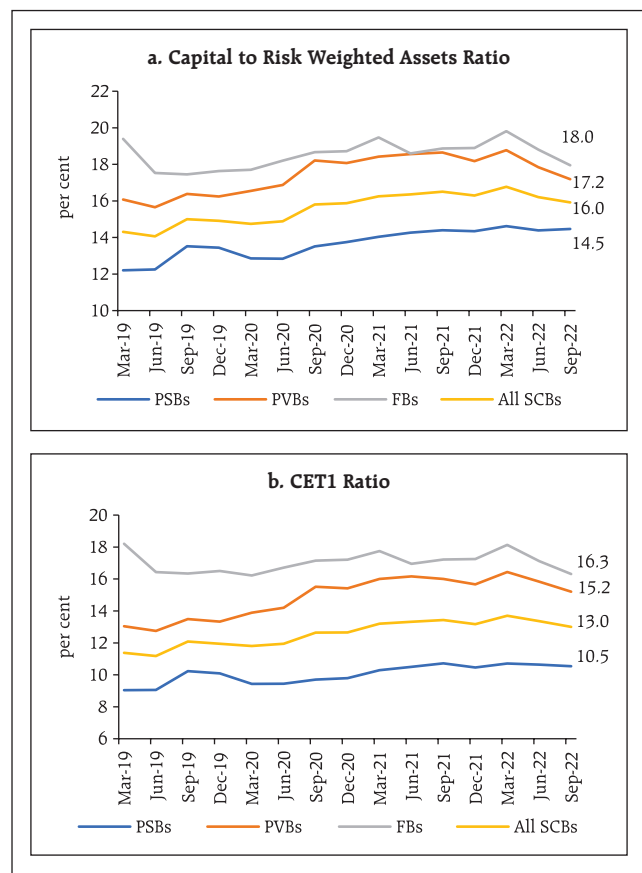
overall NPAs (Chart 1.98 a, b and c). The declining tendency in the GNPA ratio is likely to continue - under the baseline scenario of the stress testing framework, it is projected to fall further to 4.9 per cent in September 2023.

1.118 With the rise in risk-weighted assets, capital levels have reduced: both CRAR and CET1 ratios have declined, though they remain well above regulatory requirements (Chart 1.99 a and b).

1.2.11 Non-Banking Financial Companies (NBFCs)

1.119 NBFCs sector has recovered strongly in the wake of the second wave of COVID-19, with asset quality showing a continuous improvement. The GNPA ratio of the sector (excluding core investment companies) fell from 6.9 per cent in June 2021 to 5.1 per cent in September 2022. Special mention accounts (SMAs), however, increased from 8.5 per cent of total advances in December 2021 to 10.8 per cent in September 2022. Pockets of stress are observed in select NBFC cohorts, viz., NBFC-Investment and Credit Companies (GNPA ratio of 6.9 per cent) and NBFC-Factor (GNPA ratio of 6.8

Chart 1.99: Capital Adequacy



Source: RBI supervisory returns and staff calculations.

Table 1.12: Asset Quality Ratios across NBFC Categories

(per cent)

		GNPA	SMA-0	SMA-1	SMA-2			GNPA	SMA-0	SMA-1	SMA-2
NBFC – Micro Finance Company (2.6%)	Mar-21	5.4	2.3	1.7	1.0	NBFC – Infrastructure Finance Company (42.4%)	Mar-21	3.9	5.2	1.9	2.4
	Jun-21	6.1	8.8	4.4	2.4		Jun-21	3.8	3.0	0.1	6.9
	Sep-21	5.9	4.4	2.2	1.4		Sep-21	3.8	1.9	0.0	10.9
	Dec-21	5.7	2.4	2.1	1.4		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	4.8	1.7	1.4	1.4		Jun-22	3.4	6.9	1.1	5.4
	Sep-22	4.7	1.4	1.6	1.8		Sep-22	3.1	2.8	0.1	8.4
NBFC - Factor (0.1%)	Mar-21	25.0	13.7	1.7	1.7	NBFC – Infrastructure Debt Fund (1.1 %)	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	9.5	13.3	3.6	0.5		Jun-22	0.4	0.0	0.0	0.1
	Sep-22	6.8	10.7	2.1	0.9		Sep-22	0.4	0.0	0.1	0.0
NBFC – Investment and Credit Company (53.7 %)	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	6.6	3.5	2.9		Dec-21	6.6	3.6	1.9	3.0
	Mar-22	7.7	5.8	3.3	2.2		Mar-22	5.7	4.2	2.7	2.1
	Jun-22	7.1	6.3	3.0	2.2		Jun-22	5.4	6.4	2.1	3.5
	Sep-22	6.9	5.9	2.8	2.2		Sep-22	5.1	4.4	1.6	4.8

Note: 1. Number in parenthesis indicates percentage share of each category of NBFC to total advances of NBFCs as on September 30, 2022.
2. Based on data for NBFC-D, NBFC-ND-SI and NBFC-ND (excluding Core Investment Companies) as of November 28, 2022 which are provisional.

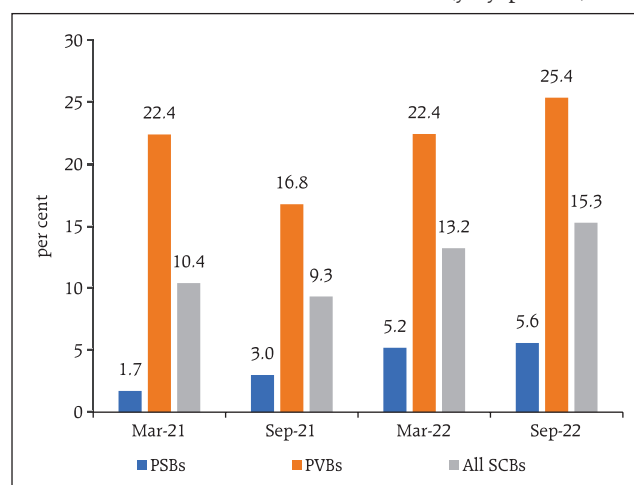
Source: RBI Supervisory Returns.

per cent) (Table 1.12). The revised clarification with respect to asset classification, which came into effect from October 1, 2022, mandates that all NBFCs are required to collect the entire arrears to upgrade an NPA. Asset classification would start exactly from the overdue date, unlike the present practice of starting 90 days from the end of the month in which the account becomes overdue. These regulatory refinements could impact the sector's assessment of asset quality in the near term.

1.2.12 Credit flows to the MSME Sector

1.120 The micro, small and medium enterprise (MSME) sector, which was buffeted by the pandemic, turned around in H2:2021-22 and sustained this momentum in H1:2022-23. Lending by PVBs grew strongly, whereas PSBs recorded a relatively moderate growth (Chart 1.100). Sustained credit growth to this sector could be attributed to credit extended under the Emergency Credit Line Guarantee Scheme (ECLGS), broad-based recovery in domestic demand,

Chart 1.100: MSME Sector Credit Growth (y-o-y: per cent)



Note: 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 1.13: MSME Restructuring Schemes ⁴¹

Bank Group	Outstanding Balance in Restructured Account (₹ crore) as on	
	March 31, 2022	September 30, 2022
PSBs	77,338	78,117
PVBs	28,767	29,068
FBS	624	675
All SCBs	1,06,728	1,07,859
Percentage share in MSME Portfolio	5.31	5.21

Note: Data as reported by PSBs, PVBs and four major foreign banks

Source: RBI supervisory returns and staff calculations.

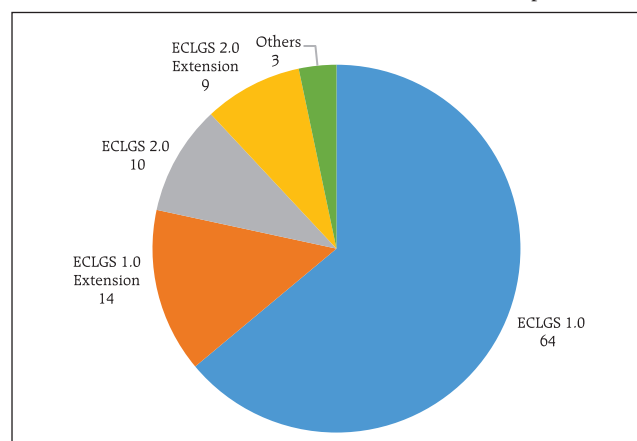
higher working capital requirements and regulatory modifications in the definition of MSMEs³⁹.

1.121 The overall GNPA ratio (PSBs and PVBs) in the MSME sector fell from 9.3 per cent in March 2022 to 7.7 per cent in September 2022. Asset quality of advances below ₹25 crore, which are usually vulnerable to asset quality concerns, improved in September 2022 *vis-à-vis* March 2022. Regulatory forbearance and restructuring schemes introduced since 2018 came to an end. As on September 30, 2022, the share of restructured loans in the MSME portfolio of SCBs stood at 5.21 per cent compared to 5.31 per cent as on March 31, 2022⁴⁰ (Table 1.13).

1.122 The ECLGS was pivotal in providing support and additional liquidity for business entities to tide over COVID-19. Under the ECLGS, an amount of ₹2.82 lakh crore has been disbursed till September 30, 2022, of which SCBs have disbursed ₹2.46 lakh crore, with predominant share of disbursals under the ECLGS 1.0 (Chart 1.101). The major sectors availing the ECLGS were services and traders, which were among the most impacted by the pandemic (Chart 1.102).

Chart 1.101: ECLGS Guarantee Disbursed

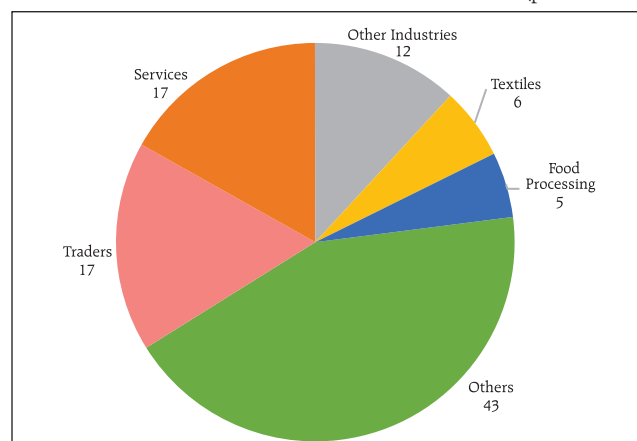
(per cent share)



Source: NCGTC.

Chart 1.102: Sector-wise ECLGS Guarantee

(per cent share)



Source: NCGTC.

³⁹ 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 2, 2020 and its subsequent clarifications.

⁴⁰ MSME loans restructured under May 2021 scheme stood at 2.3 per cent of total MSME advances at end-September 2022.

⁴¹ MSME accounts restructured in terms of:

1. Circular DBR.No.BP.BC.18/21.04.048/2018-19 dated January 01, 2019 on "Micro, Small and Medium Enterprises (MSME) sector – Restructuring of Advances"
2. Circular DOR.No.BP.BC.34/21.04.048/2019-20 dated February 11, 2020 on "Micro, Small and Medium Enterprises (MSME) sector – Restructuring of Advances"
3. Circular DOR.No.BP.BC/4/21.04.048/2020-21 dated August 06, 2020 on "Micro, Small and Medium Enterprises (MSME) sector – Restructuring of Advances"
4. Circular DOR.STR.REC.12/21.04.048/2021-22 dated May 05, 2021, read with circular DOR.STR.REC.21/21.04.048/2021-22 June 4, 2021, on "Resolution Framework 2.0 – Resolution of Covid-19 related stress of Micro, Small and Medium Enterprises (MSMEs).

1.123 PVBs utilised the ECLGS more than PSBs, with the amount disbursed to repeat borrowers of PVBs almost double that of PSBs (Chart 1.103 a and b, Table 1.14).

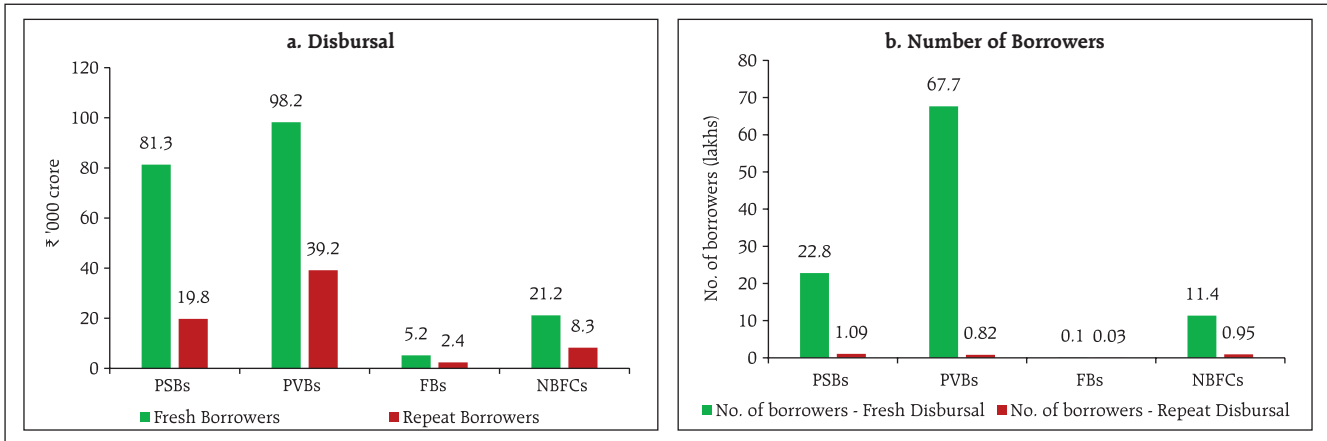
1.124 Disaggregated analysis of borrowers availing the ECLGS indicates that majority of the smaller borrowers belonged to the micro enterprises category (Chart 1.104 a). On the other hand, in terms of quantum of disbursement, about a third was availed by businesses other than micro, small and medium enterprises, indicating the broad nature of stress related to the pandemic (Chart 1.104 b).

Table 1.14: Average Ticket Size of ECLGS Borrowers

Category of Lending Institution	Borrower Type	Average Ticket Size (in ₹ lakh)
PSB	Fresh Borrowers	3.6
	Repeat Borrowers	18.2
PVB	Fresh Borrowers	1.5
	Repeat Borrowers	47.5
FB	Fresh Borrowers	57.4
	Repeat Borrowers	80.3
NBFC	Fresh Borrowers	1.9
	Repeat Borrowers	8.7

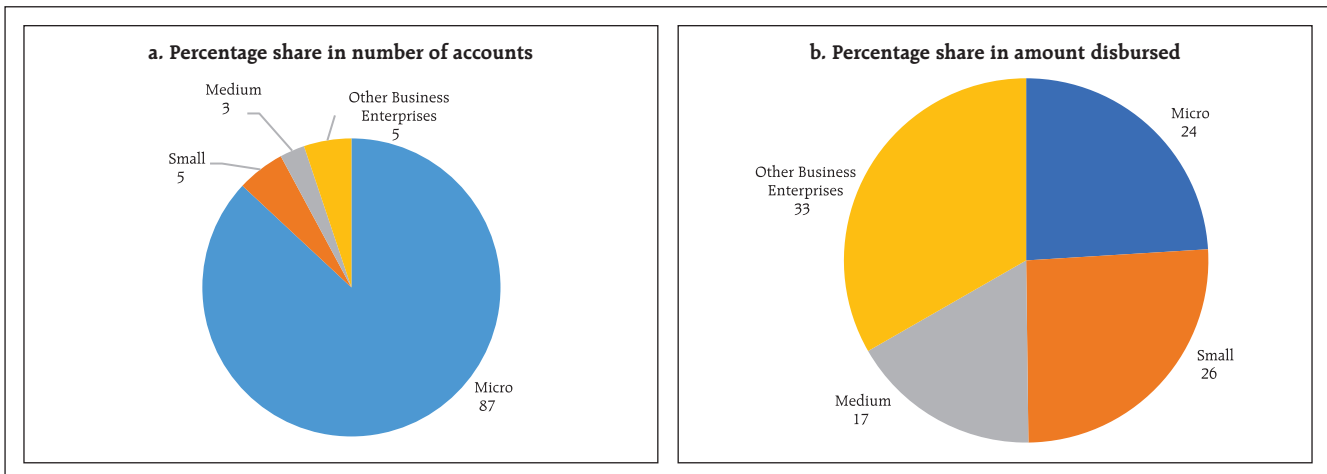
Source: NCGTC.

Chart 1.103: Bank Group-wise ECLGS Guarantee



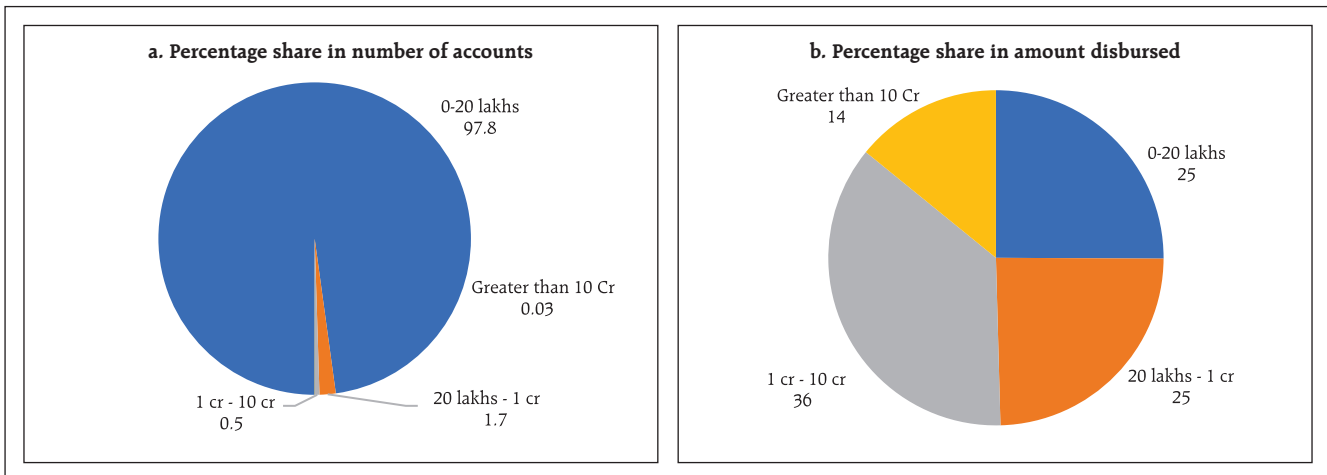
Source: NCGTC.

Chart 1.104: Borrower Category-wise ECLGS Guarantee



Source: NCGTC.

Chart 1.105: Amount-wise ECLGS Guarantee



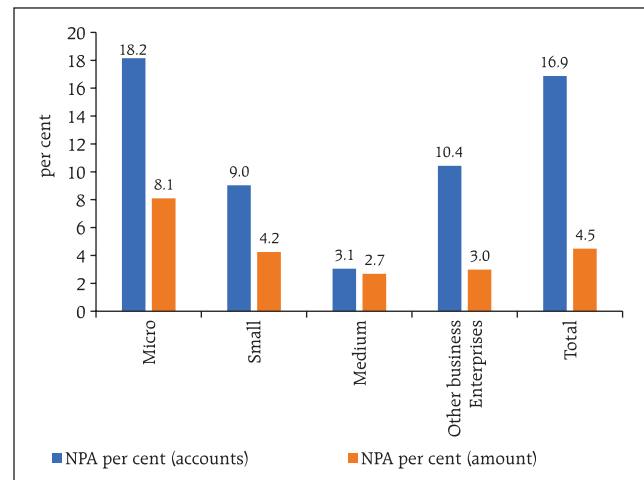
Source: NCGTC.

1.125 A similar picture emerges when disbursements are bucketed as per loan size (Chart 1.105 a and b).

1.126 The September 2022 position of the ECLGS lending indicates that distress continues in the MSME sector, with one-sixth of accounts that availed funds under the ECLGS turning NPA (Chart 1.106).

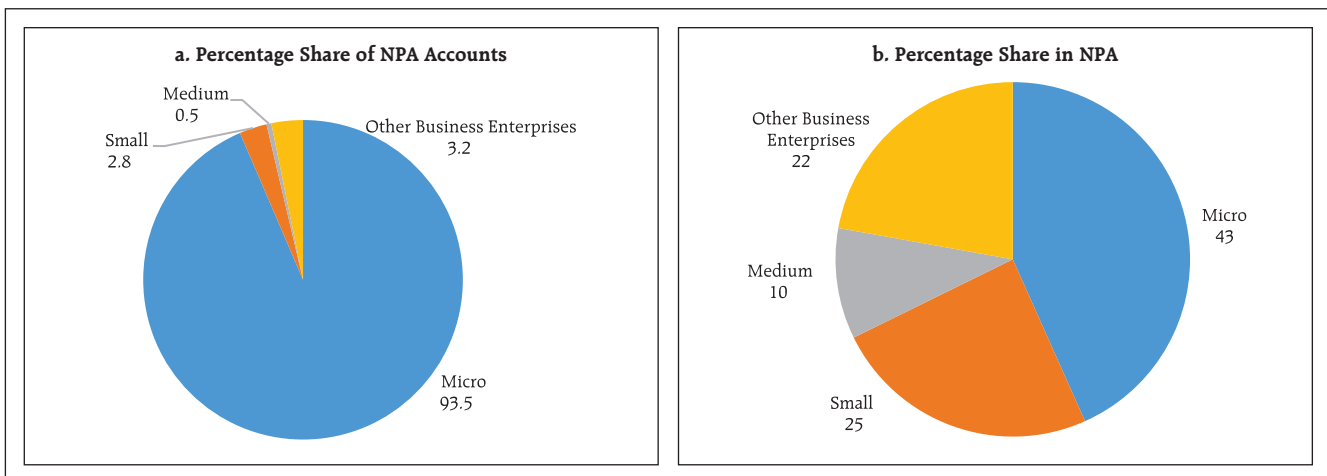
1.127 Even though the micro enterprises segment availed a quarter of loans disbursed under the ECLGS, their share in overall NPAs stood much higher (Chart 1.107 a and b).

Chart 1.106: Unit Type-wise NPA



Source: NCGTC.

Chart 1.107: Borrower Category-wise NPA



Source: NCGTC.

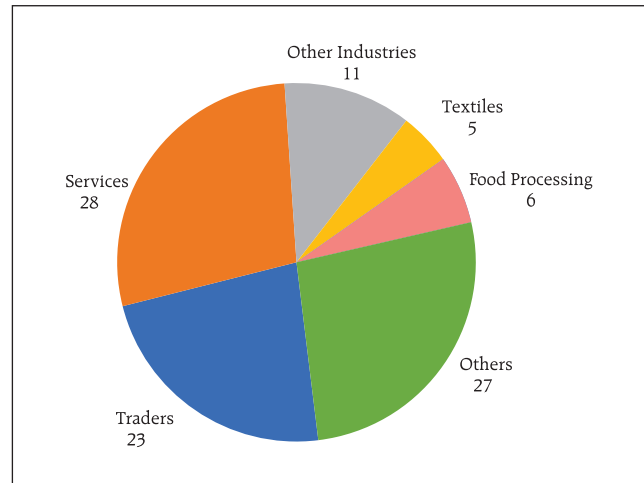
1.128 Sector-wise analysis of NPAs indicate that services and trade, which formed one-third of the ECLGS disbursements, remain stressed with little more than half of the total delinquency under the ECLGS (Chart 1.108).

1.2.13 Microfinance Segment

1.129 Credit to the microfinance sector is growing at a steady pace, with all types of lenders recording stable loan growth. NBFCs, which were permitted to extend microfinance loans up to 25 per cent of their assets from their earlier limit of 10 per cent under the revised regulations⁴², saw robust growth, with their share in new loans more than doubling on a y-o-y basis. (Chart 1.109 a, b and c).

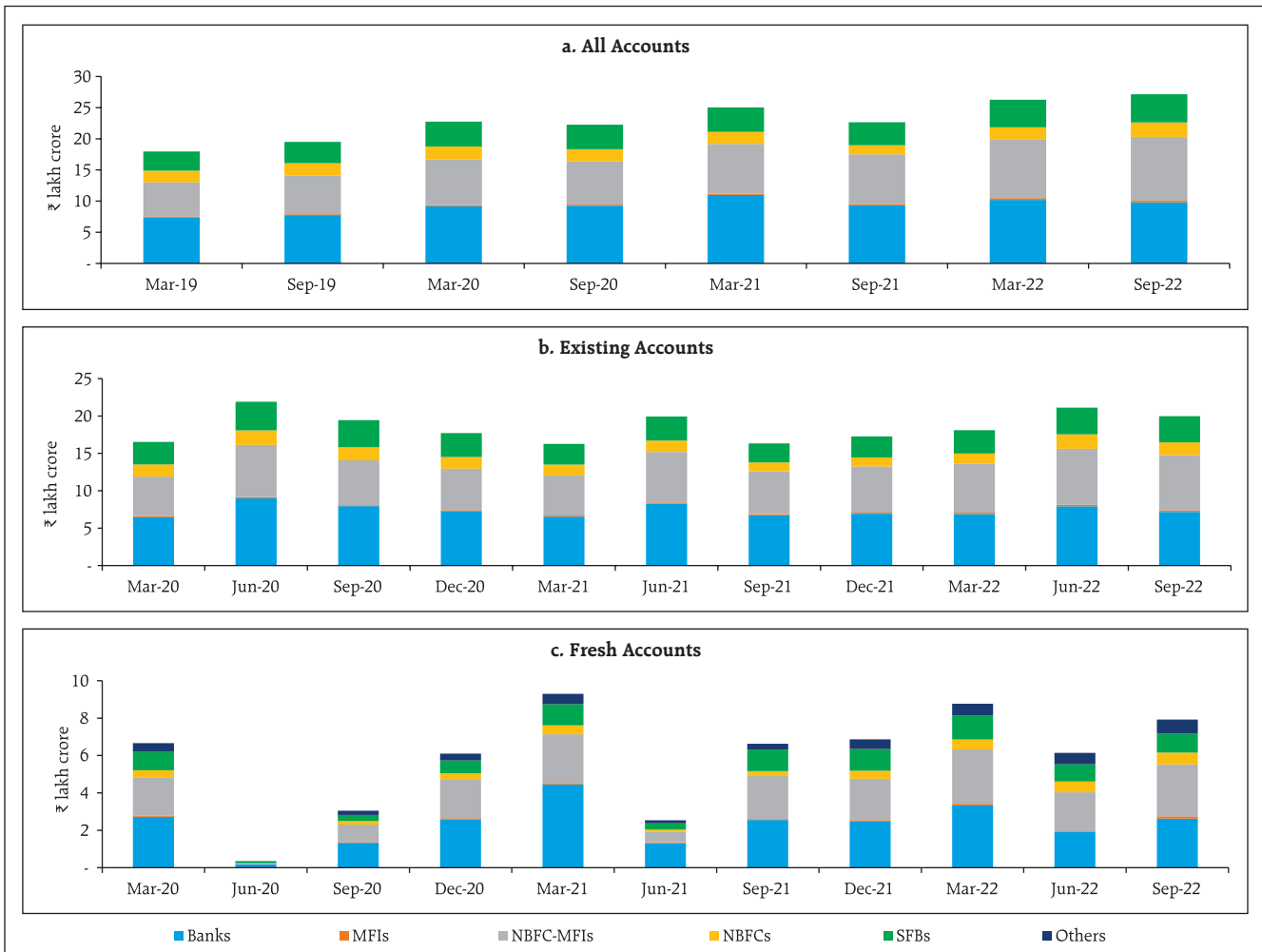
Chart 1.108: ECLGS Sector-wise Share of NPA

(per cent)



Source: NCGTC.

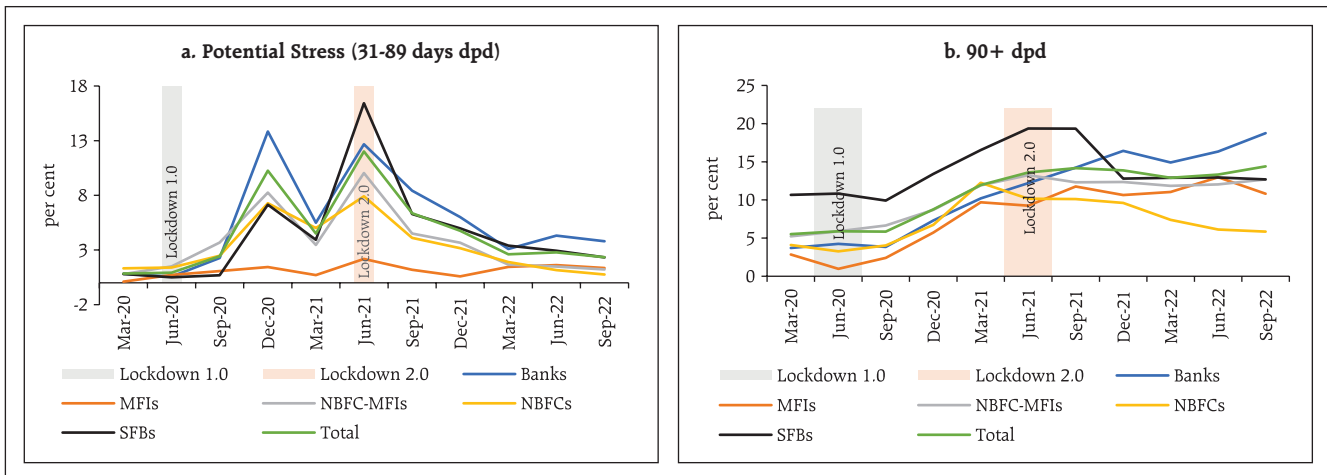
Chart 1.109: Lending to the Microfinance Segment



Source: Equifax.

⁴² RBI vide circular dated March 14, 2022 has liberalised/ reviewed the definition for assets qualifying as a micro finance asset.

Chart 1.110: Stress in the Microfinance Segment



Source: Equifax.

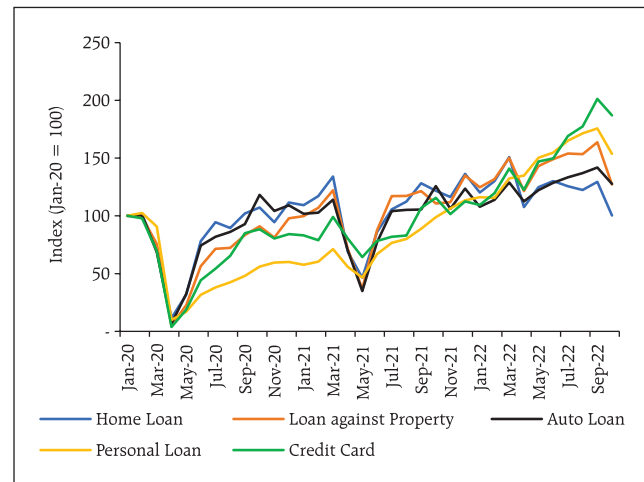
1.130 Overall delinquency in the microfinance segment, measured in terms of 90+ days past due (dpd) increased, led by banks. For other types of lenders, impairment has either moderated or declined. Similarly, credit at risk of slippage, measured by 30+dpd, fell for all categories of lenders (Chart 1.110 a and b).

1.2.14 Consumer Credit

1.131 Consumer credit, which has been the major driver of bank credit in recent years is showing signs of moderation based on inquiry volumes⁴³, with the volume of inquiries for all categories of loans falling in October 2022 although they remain above pre-pandemic levels (Chart 1.111).

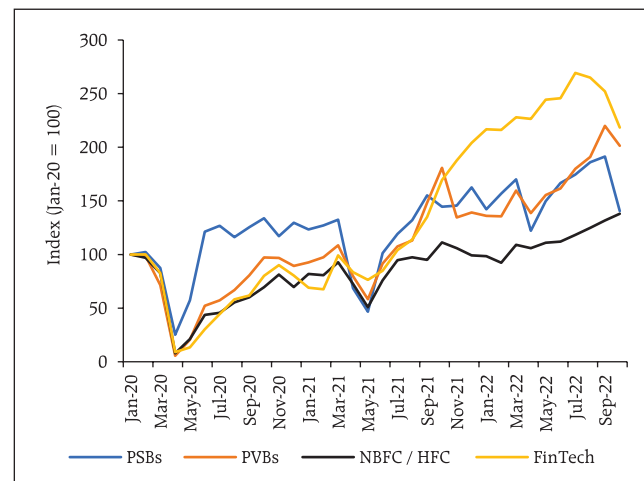
1.132 FinTech platforms, which have experienced robust inquiry volumes since the second wave of the pandemic, also saw growth stabilising (Chart 1.112).

Chart 1.111: Inquiry Volumes by Product Category



Source: TransUnion CIBIL.

Chart 1.112: Inquiry Volumes by Lender Category



Source: TransUnion CIBIL.

⁴³ A credit inquiry is created when any borrower applies for a loan and permits the lender to pull their credit record. Inquiries are among the first credit market measures to change in credit record data in response to changes in economic activity.

1.133 Inquiry volumes by risk tier show that loan demand from prime and below prime consumers has increased at a faster pace than that from higher-rated consumers (Chart 1.113).

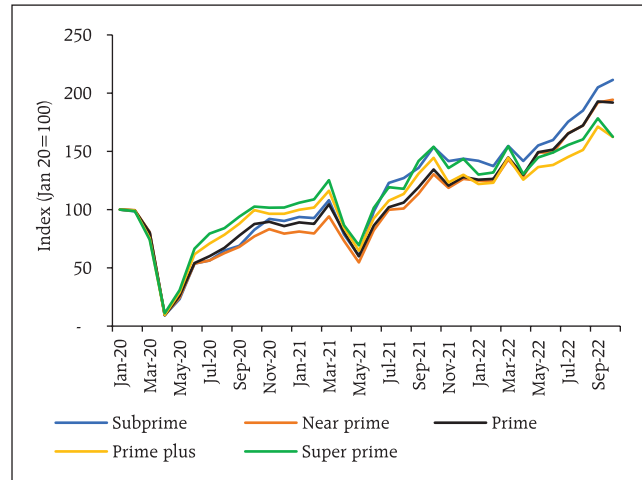
1.134 The quality of incremental credit has improved, with the share of lower rated borrowers⁴⁴ declining at the overall industry level. Alongside, PSBs' origination profile has also improved (Chart 1.114 a, b and c).

1.135 Impairment in consumer credit, measured in terms of the proportion of the portfolio at 90 days past due or beyond, has also shown improvement, with delinquency levels across lenders stabilising at lower levels (Table 1.15). The increase in policy rates and impact of pass through on overall asset quality, however, requires closer monitoring, specifically for mortgages.

1.2.15 Housing Market

1.136 As central banks around the globe aggressively tighten monetary policy, rising mortgage rates and tighter lending standards could weigh on house prices in 2023. Housing prices have already started

Chart 1.113: Inquiry Volumes by Risk Tier



Source: TransUnion CIBIL.

Table 1.15: Delinquency Levels in Aggregate Consumer Credit across all Product Categories

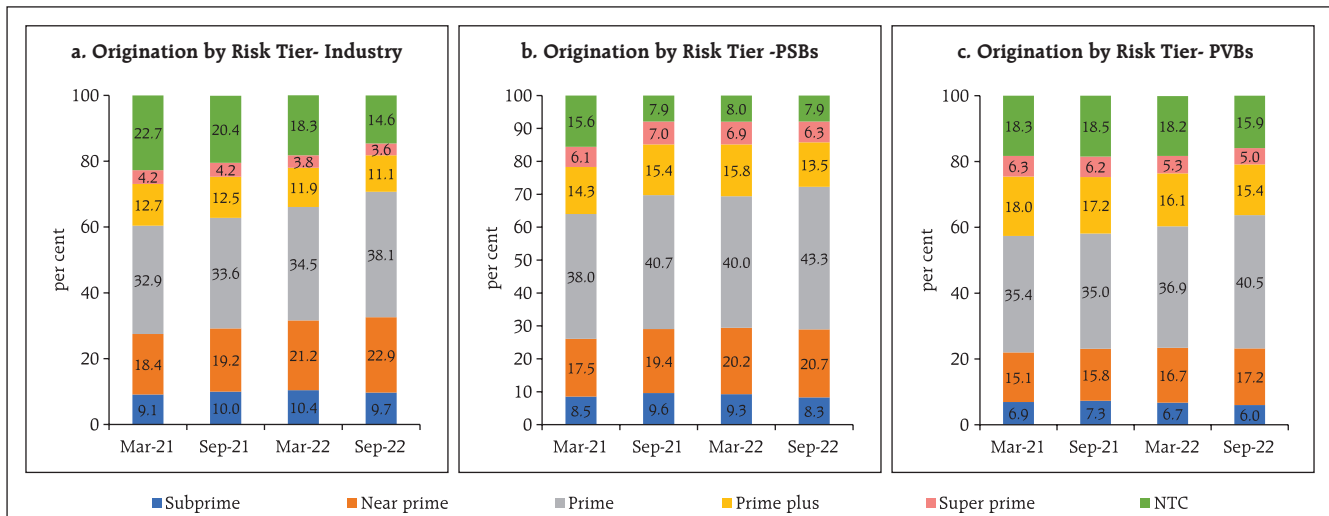
(per cent)

	PSB	PVB	NBFC / HFC	FinTech
Sep-21	4.8	2.4	3.6	4.6
Oct-21	5.1	2.1	3.9	4.1
Nov-21	5.0	2.0	3.4	4.0
Dec-21	4.8	2.1	3.2	3.2
Jan-22	4.9	2.3	3.2	3.1
Feb-22	4.7	2.0	3.0	2.6
Mar-22	4.5	1.7	2.3	2.2
Apr-22	4.6	1.4	2.6	2.2
May-22	4.6	1.5	2.5	2.1
Jun-22	4.5	1.6	2.2	2.0
Jul-22	4.5	1.9	2.1	2.0
Aug-22	4.4	1.7	2.1	2.0
Sep-22	4.3	1.5	1.8	2.0

Note: based on 90 days past due balances.

Source: TransUnion CIBIL.

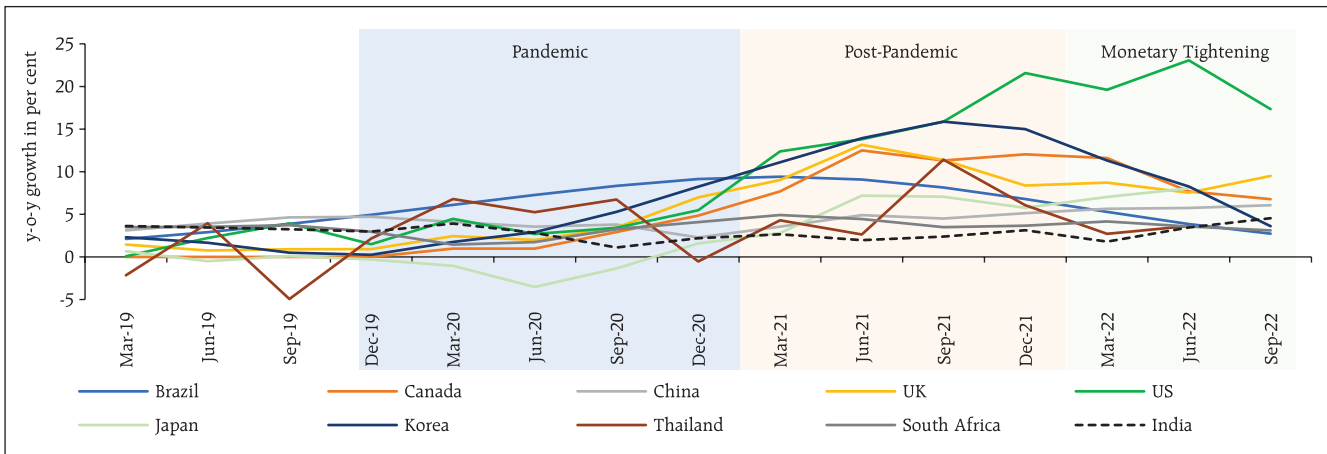
Chart 1.114: Origination by Risk Tier



Source: TransUnion CIBIL.

⁴⁴ Below prime and new to credit (NTC) borrowers.

Chart 1.115: Movement in House Prices



Source: Bank for International Settlements and DBIE, RBI.

decelerating in major advanced and emerging economies (Chart 1.115).

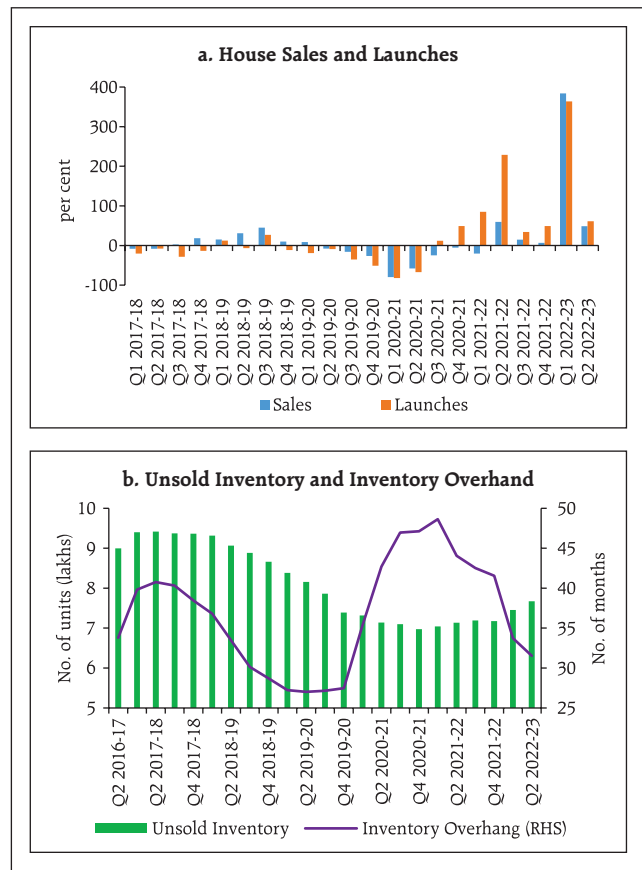
1.137 The all-India house price index (HPI) increased by 4.5 per cent (y-o-y) in Q2:2022-23 from 3.5 per cent (y-o-y) in the previous quarter. On a sequential basis, house prices recorded marginal increase of 0.4 per cent.

1.138 A recovery in housing prices was reflected in an upturn in housing market activity in H1:2022-23 in the form of a preference for investment in real estate and residential units. As a result, housing sales have increased, and new launches have further expanded, reflecting stable housing demand for both investment and end-uses (Chart 1.116 a). Overall, the decline in unsold inventory and strong sales momentum resulted in lowering of inventory overhang although it varies across house sizes (Chart 1.116 b).

1.2.16 Financial System Stress Indicator

1.139 The FSR regularly publishes a banking stability map to assess the stability of the banking sector. In order to expand the coverage to other segments of the financial sector, an attempt has been made to compile a single comprehensive indicator called the financial system stress indicator (FSSI) to monitor the aggregate stress level in the Indian financial system. FSSI aims to (a) help identifying periods of

Chart 1.116: House Sales, Launches and Inventory Overhang



Source: PropTiger Datalabs.

stress; (b) assess the intensity and duration of stress in the financial system; and (c) gauge the ability of

financial markets and intermediaries to withstand shocks and imbalances (Box 1.1).

Box 1.1: Financial System Stress Indicator

The Financial System Stress Indicator (FSSI) features risk factors pertaining to five financial market segments - equity, foreign exchange, money, government debt and corporate debt markets and three groups of financial intermediary segments - banks, NBFCs and AMC-MFs (Chatterjee *et. al*, 2017, Hollo *et. al*, 2012 and Louzis *et. al*, 2012). It also features a real sector component encompassing select real sector variables that have a bearing on financial stability due to their strong interlinkages with financial sector. In all, 39 risk factors spread across nine markets/sectors are considered (Table 1). Risk factors are normalised by the min-max method⁴⁵ by converting into variables which are unit-free, measured on an ordinal scale between zero and unity. The transformed risk factors for each market/sector are aggregated using equal weights into a sub-indicator 'y_i' representing the ith market/ sector.

The composite FSSI is computed by aggregating the sub-indicators again based on the equal-variance weighted average method, where the weight 'w_i' of each sub-indicator 'y_i' is inversely proportional to its sample standard deviation 's_i', and is determined as,

$$w_i = \frac{1/s_i}{\sum_{i=1}^9 (1/s_i)}$$

The composite FSSI is obtained as,

$$FSSI_t = \sum_{i=1}^9 w_i y_{it}$$

Higher value of FSSI would indicate more stress.

Empirical estimates indicate that FSSI has tracked major stress events which impacted the Indian financial system in the past. The intensity of financial stress was the highest during the taper tantrum in 2013, followed by the global financial crisis period. In more recent times, heightened stress can be observed during the collapse of M/s Infrastructure Leasing and Financial Services (ILFS) Ltd in 2018 as well as during the first wave of the COVID-19 pandemic in 2020 (Chart 1).

The onset of the Russia-Ukraine war triggered a spurt in systemic financial stress, although at a level milder than that witnessed during the first wave of the pandemic. Financial institutions such as banks and NBFCs as well as AMC-MFs remain resilient.

Table 1: Risk factors constituting each component of FSSI

Equity Market	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	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	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	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	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. $r = \text{Bank NIFTY } y\text{-o-y}$, $m = \text{NIFTY } 50 \text{ } y\text{-o-y}$
	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

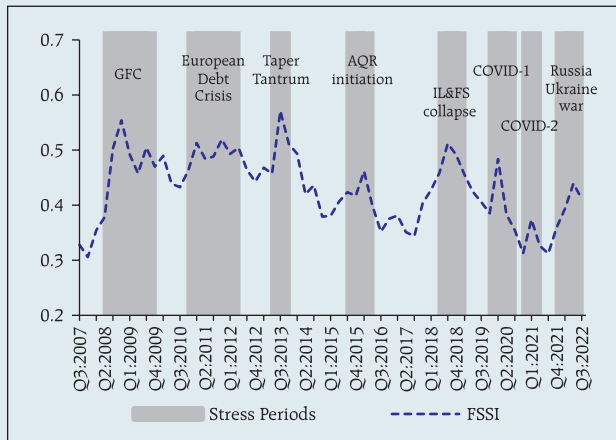
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⁴⁵ The min-max method normalises each indicator (X) into an index score (I) using the formula:

$$I = (X - X_{\min}) / (X_{\max} - X_{\min})$$

where X_{max} and X_{min} are maximum and minimum admissible values, respectively, of X.

Chart 1: Financial System Stress Indicator



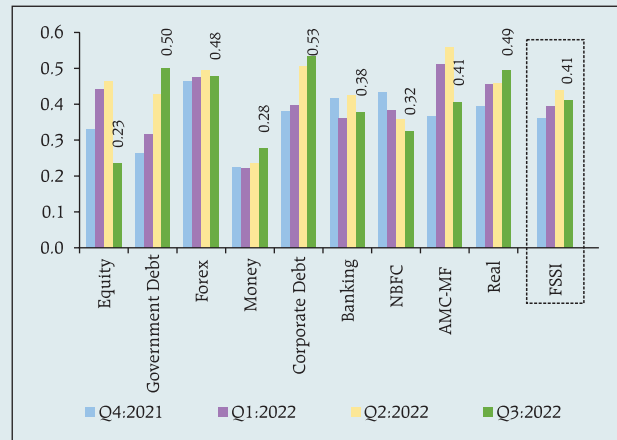
Source: Database on Indian Economy, Bloomberg, CEIC, RBI supervisory returns and staff calculations.

In the government and corporate bond markets; stress increased during September 2022. Stress in the forex market was arrested but stress in the real sector became accentuated. Stress in equity market remained subdued and in the money market, stress was mild (Chart 2).

References:

1. Chatterjee, S., Chiu, C. W. J., Hacıoglu Hoke, S., and Duprey, T. (2017). A financial stress index for the

Chart 2: Financial System Stress Indicator- Components



Source: Database on Indian Economy, Bloomberg, CEIC, RBI supervisory returns and staff calculations.

United Kingdom. Working Paper No. 697, Bank of England.

2. Hollo, D., Kremer, M., and Lo Duca, M. (2012). CISS - A composite indicator of systemic stress in the financial system.
3. Louzis, D. P., and Vouldis, A. T. (2012). A methodology for constructing a financial systemic stress index: An application to Greece. *Economic Modelling*, 29(4), 1228-1241.

1.2.17 Systemic Risk Survey⁴⁶

1.140 In the latest round of the Systemic Risk Survey, risks from global spillovers and financial market volatility rose further and remained in the 'high' risk category. Respondents cited monetary policy tightening in advanced economies, geopolitical risks, global growth uncertainty and funding risk as the major drivers of global risks. The rise in financial market risk was due to tightening of financial conditions. Institutional risks and general risks remained in the 'medium' risk category, though respondents mentioned risks from crypto assets and climate change are on the rise. Macroeconomic uncertainty moderated and remained in the 'medium' risk category. A decline in risk perception about domestic inflation, capital outflows, fiscal deficit and

sovereign credit rating resulted in moderation in overall macroeconomic risks. Despite global headwinds posing risks to domestic macro-financial conditions, the impact of external sector developments remained moderate as more than half of the respondents perceived it to have medium impact. Almost all surveyed respondents expect medium to very high probability of a global recession in 2023.

1.141 According to more than half of the respondents, the stability of the Indian banking sector remains intact and prospects over a one-year horizon have improved. Around three-fourth of the respondents expect either marginal improvement in banking sector asset quality over the next six months or it to remain unchanged. Nearly two-thirds of respondents perceive improvement in credit prospects over the

⁴⁶ The details are given in Annexure 1.

next six months on the back of recovery in economic activity, rising demand for credit by corporates, an upturn in the investment cycle, strengthening of business sentiments, increased demand for working capital loans, higher public investment in the infrastructure sector and export promoting

production linked incentive (PLI) scheme by the Government.

1.142 Over the years, the Systemic Risk Survey (SRS) respondents' qualitative views on systemic risks have worked well as proxies to gauge risk perceptions about the macrofinancial system (Box 1.2).

Box 1.2: Systemic risk surveys and Macrofinancial Trends

The Reserve Bank's bi-annual systemic risk survey (SRS) captures the qualitative perceptions of market participants and other stakeholders on key sources of systemic risk to the Indian financial system emanating from both global and domestic macro-financial developments. 22 rounds of SRS have been conducted since it was first introduced during October-November 2011.

The SRS respondents' qualitative views on systemic risks are proxies for sentiments (or risk perceptions) in the macro-financial system and, by aggregating their responses in various SRS rounds, this exercise juxtaposes systemic risk indicators against relevant macro-financial indicators to gauge their economic significance.

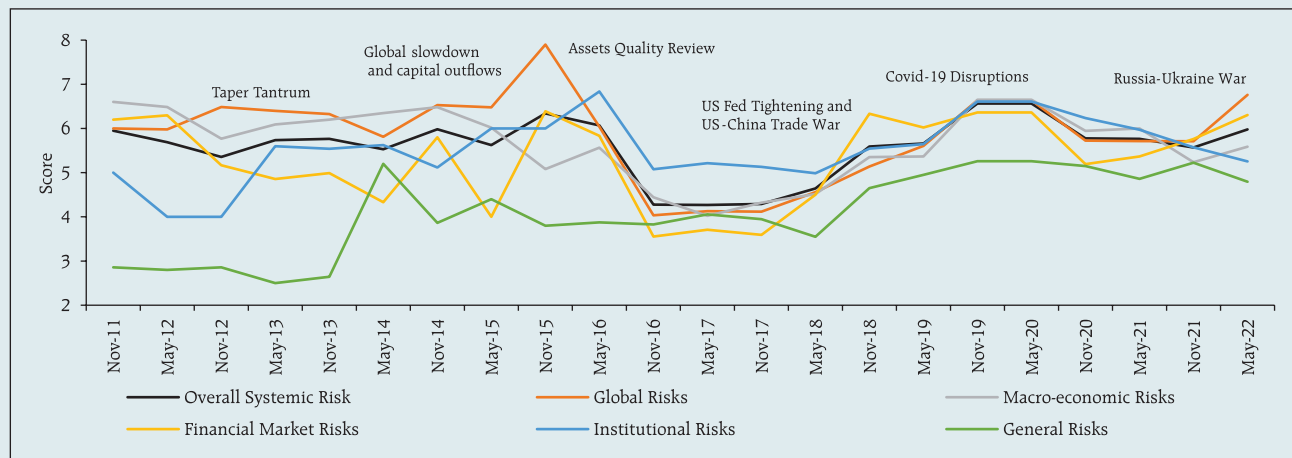
The long-term movements in the SRS responses underscore the role of global shocks in firming up respondents' perceptions of systemic risks in India. Global risks, macroeconomic risks and financial market

risks have strong correlation and concordance, especially since 2016 (Chart 1).

At the disaggregated level, global and macroeconomic risks contributed around half of aggregate systemic risks. The rising influence of global factors on domestic financial market conditions is reflected in increasing synchrony in the movements between financial market risks and global risk (correlation coefficient of 0.65). Based on a concordance index⁴⁷ of direction (Harding and Pagan, 2002), aggregate systemic risk is found to have strong concordance with macroeconomic risks (0.81), followed by global risks (0.76) and financial market risks (0.67).

Aggregate systemic risk, which is an average of five risk groups, exhibited a positive correlation (0.53) with other risk indicators, such as, India VIX and to a lesser extent, with the volatility index of the Chicago Board Options Exchange (CBOE), reflecting its value as

Chart 1: Sources of Systemic Risk



Source: Authors' calculations using various rounds of Systemic Risk Survey data.

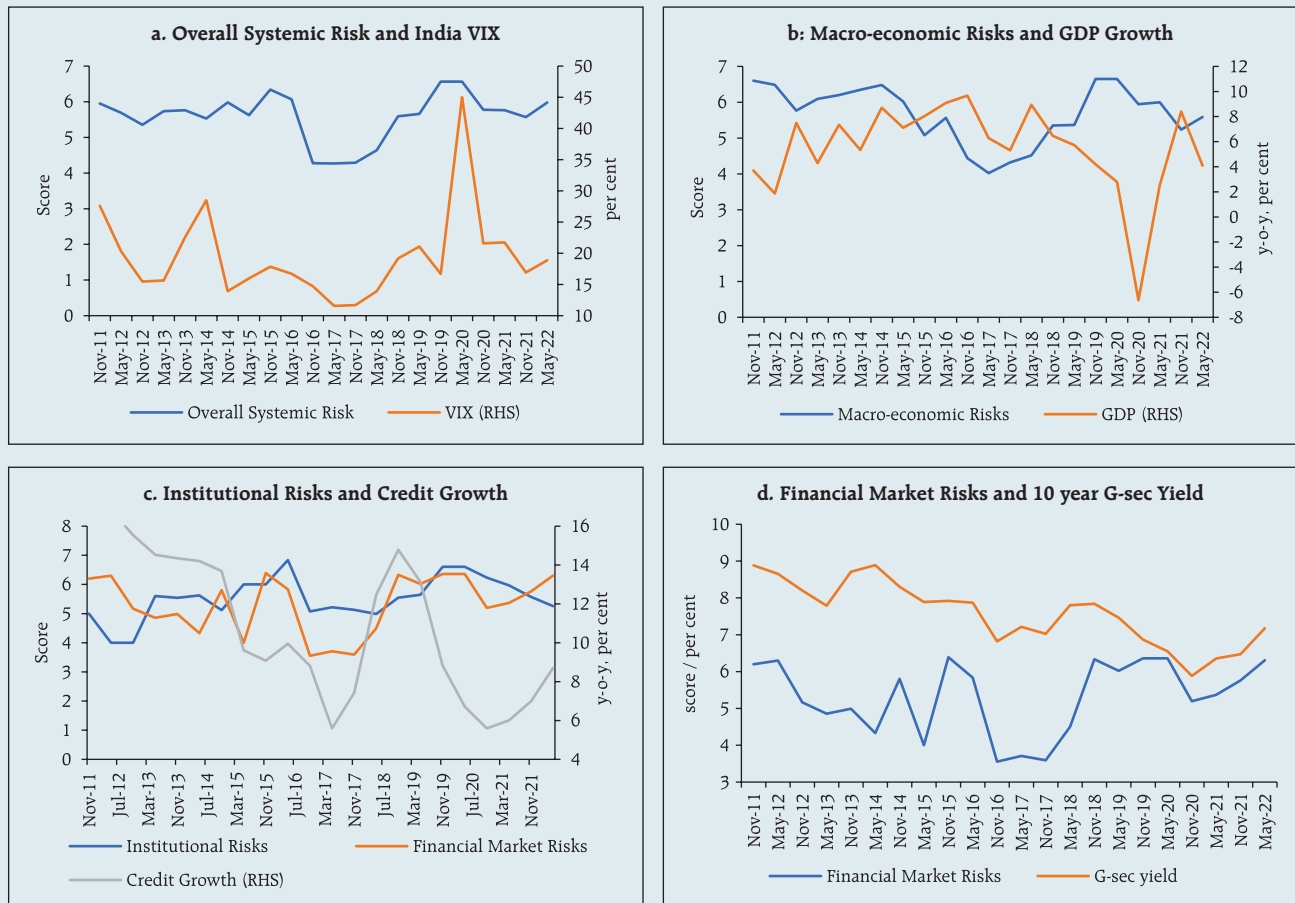
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⁴⁷ Degree of concordance

$$c_{ij} = T^{-1} \{ \sum_{t=1}^T (s_{i,t} \cdot s_{j,t}) + (i - s_{i,t}) \cdot (i - s_{j,t}) \}$$

where $S_{i,t}$ is a series taking the value unity when series x_i is in expansion and zero when it is in contraction. Series $S_{j,t}$ has been defined in a similar manner.

Chart 2: Systemic Risks and Financial Indicators



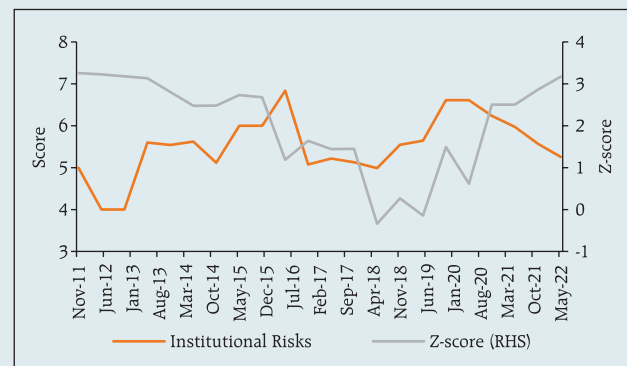
Source: Compiled from survey data from the previous SRS rounds, RBI and CEIC database

an alternative indicator for capturing financial market uncertainty (Chart 2a). Macroeconomic risks are found to be negatively correlated (-0.37) with GDP growth (Chart 2b).

Bank credit growth is negatively correlated (-0.55) with institutional risks, with the concordance index of 0.48. Bank credit growth has a weak positive correlation and high concordance (0.81) with financial market risks, which may be attributable to the substitution effect between bank lending and debt instruments during stressed financial market conditions (Chart 2c). Although the correlation between G-sec yields and financial market risk perceptions is weak (0.06), concordance in direction between the two is found to be high as they move together 81 per cent of the time in response to common influence such as inflation, and global and domestic liquidity conditions (Chart 2d).

Banking sector steadiness is assessed through the Z-score⁴⁸; a higher value implies a lower probability of default/insolvency and vice versa. The Z-score is found

Chart 3: Institutional Risk and Banking Sector Steadiness



(Contd.)

⁴⁸ Z-score captures the probability of default of a country's banking system, which is estimated as (return on assets + (equity capital/assets))/ s.d. (ROA); where, s.d. is the standard deviation of return on assets.

to be negatively correlated (-0.28) with institutional risk perception, with the concordance index at 0.43 (Chart 3).

In sum, SRS respondents' feedback indicates that global systemic shocks remain the major drivers of systemic risks in India. Global risks, macroeconomic risks and financial market risks record strong co-movements.

References

1. Harding, Don, and Adrian Pagan (2002), "A Comparison of two Business Cycle Dating Methods," *Journal of Economic Dynamics and Control*: 27, 1681-690.
2. Reserve Bank of India: Financial Stability Report (various issues).

Summary and Outlook

1.143 Risks are tilted to the downside for the global economy, with financial stability implications. EMEs face even greater risks as they confront rising borrowing costs, debt distress, elevated levels of inflation, volatile commodity prices, currency depreciation and capital outflows. Preserving macroeconomic stability in this challenging environment will require safeguarding the domestic economy and the financial system through actions that mitigate build-up of vulnerabilities and help smooth financial market adjustments.

1.144 Despite this challenging global environment and ensuing headwinds, the Indian economy and the domestic financial system remain resilient. The banking system is stable on the back of improving profitability and asset quality, with adequate levels of capital and liquidity buffers. Prudential regulations and improving domestic economic prospects have shored up the financials of the non-banking sector. Domestic financial markets remain choppy due to heightened uncertainty and volatility in global markets. Preserving macroeconomic and financial stability in the current environment assumes importance to support the recovery, ensure financial stability and bolster India's long-term potential.

Chapter II

Financial Institutions: Soundness and Resilience

The Indian financial sector has remained resilient building on the consolidation of the banking sector's balance sheet, the ongoing reduction in bad loans and the buffering of risk absorbing capacity. Macro stress tests indicate that all banks would meet the regulatory minimum capital requirements even in a severe stress scenario. Stress tests indicate that some non-banking financial companies may be vulnerable to liquidity shocks. Contagion risks and consequent additional solvency losses remain limited.

Introduction

2.1 The combination of regulatory measures undertaken to cushion banks since the onset of the pandemic and banks' own efforts in augmenting their capital base and reducing non-performing loans appear to have fortified their balance sheets. A fresh lending cycle underway since H2:2021-22 gained further traction during H1:2022-23 as credit growth reached double digits and became broad based across sectors. Banks have managed their exposure to large borrowers well, with granularisation of loan books and reduction in asset impairment.

2.2 This chapter presents an evaluation of the soundness and resilience of financial intermediaries in India by analysing their recent performance on key parameters. Section II.1 presents an assessment of business mix, asset quality, capital adequacy, earnings and profitability of SCBs and evaluates their resilience against macroeconomic shocks through stress test 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 stress test their resilience. Sections II.4, II.5 and II.6 provide insights into the soundness and resilience of

insurance, mutual funds, and clearing corporations, respectively. The concluding Section II.7 provides a detailed analysis of the network structure and connectivity of the Indian financial system and presents the results of contagion analysis under adverse scenarios.

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

2.3 Aggregate deposits recorded some moderation, growing at 9.4 per cent as on December 16, 2022. Current account and savings account (CASA) growth moderated whereas term deposits attracted accretions in response to rising interest rates (Chart 2.1 a and b).

2.4 SCBs' credit growth (y-o-y), which started picking up during H2:2021-22, sustained its momentum and gathered pace to touch a decadal high of 17.4 per cent as on December 16, 2022, a level last observed during 2011. The increase has been broad-based across geography, economic sectors, population groups, organisations, type of accounts and bank groups (Table 2.1 a and b).

2.5 PVBs continued to record much higher credit growth than PSBs (Chart 2.1 c). The share of services and personal loans³ in total advances inched up

¹ Analyses are mainly based on 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 The analyses in the chapter are based on the data available as of November 24, 2022, which are provisional.

³ Personal loans refer to loans given to individual 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



Source: RBI supervisory returns and staff calculations.

Table 2.1 a: Credit Share and Growth* – September 2022

(per cent)

Sector		Share in total credit	Credit Growth (y-o-y)
Organisa-tional Sector	Public Sector	16.7	15.6
	Private Corporates	26.3	14.7
	Households - Individual	44.4	19.6
	Households – Others	10.1	18.0
	Other sectors	2.5	52.0
Type of Account	Working capital loans	32.7	16.5
	Term loans	64.0	19.5
	Other Type of loans	3.3	7.0
Population Group	Rural	7.6	12.8
	Semi-urban	13.2	17.5
	Urban	16.8	20.3
	Metropolitan	62.4	18.2
Geographical Region	Northern	21.2	14.8
	North-Eastern	1.1	17.4
	Eastern	7.1	17.7
	Central	8.9	19.7
	Western	33.2	22.1
	Southern	28.5	15.6

Note: * excluding regional rural banks (RRBs).

Source: Basic Statistical Returns – 1 and staff calculations.

(Chart 2.1 d) with credit growth outpacing growth in agriculture and industry advances (Chart 2.1 e). Within personal loans segment, credit growth became broad based with credit card receivables and vehicle/ auto loans growing over 20 per cent (Chart 2.1 f).

II.1.1 Asset Quality

2.6 The GNPA⁴ ratio of SCBs continued to decline and stood at a seven-year low of 5.0 per cent in September 2022. The net non-performing assets (NNPA)⁵ ratio stood at a ten-year low of 1.3 per cent, wherein PVBs' NNPA ratio was below 1 per cent (Chart 2.2 a and b). The quarterly slippage ratio, which had been rising since December 2021, cooled off

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

(per cent)

Sector	Q2:	Q3:	Q4:	Q1:	Q2:
	2021-22	2021-22	2021-22	2022-23	2022-23
Growth (y-o-y)					
Economic sector wise					
Agriculture	5.7	22.4	26.3	68.3	26.8
Industry	5.6	19.6	13.6	22.5	27.9
Services	3.3	20.0	15.7	49.9	34.8
Personal loans	36.8	17.5	23.2	83.9	27.5
Organisation wise					
Public sector	-0.1	23.8	18.5	44.7	36.9
Private corporate sector	12.2	17.4	14.6	29.3	25.6
Household sector	17.7	19.4	20.6	77.9	27.2
of which, Individuals	26.7	18.4	20.2	80.3	26.2
Other sectors	-9.0	36.0	54.8	50.2	103.0
Type of Account wise					
Working capital loans	4.3	18.8	15.9	43.9	31.6
Term loans	14.0	20.2	23.5	69.0	35.3
Other types of loans	33.9	24.6	3.2	8.3	0.0
All new loans	11.2	20.0	18.4	49.3	30.1
New loans in total loans (Share)	15.1	16.8	17.9	15.2	16.6

Note * excluding regional rural banks (RRBs).

Source: Basic Statistical Returns – 1 and staff calculations.

during Q2:2022-23, with considerable improvement recorded by PSBs (Chart 2.2 c). The provisioning coverage ratio (PCR)⁶ has been increasing steadily since March 2021, and reached 71.5 per cent in September 2022. The PCRs of PVBs and FBs exceeded 75 per cent (Chart 2.2 d). Meanwhile, the write-offs to GNPA ratio⁷ increased during H1:2022-23 on an annualised basis, after declining for two consecutive years (Chart 2.2 e).

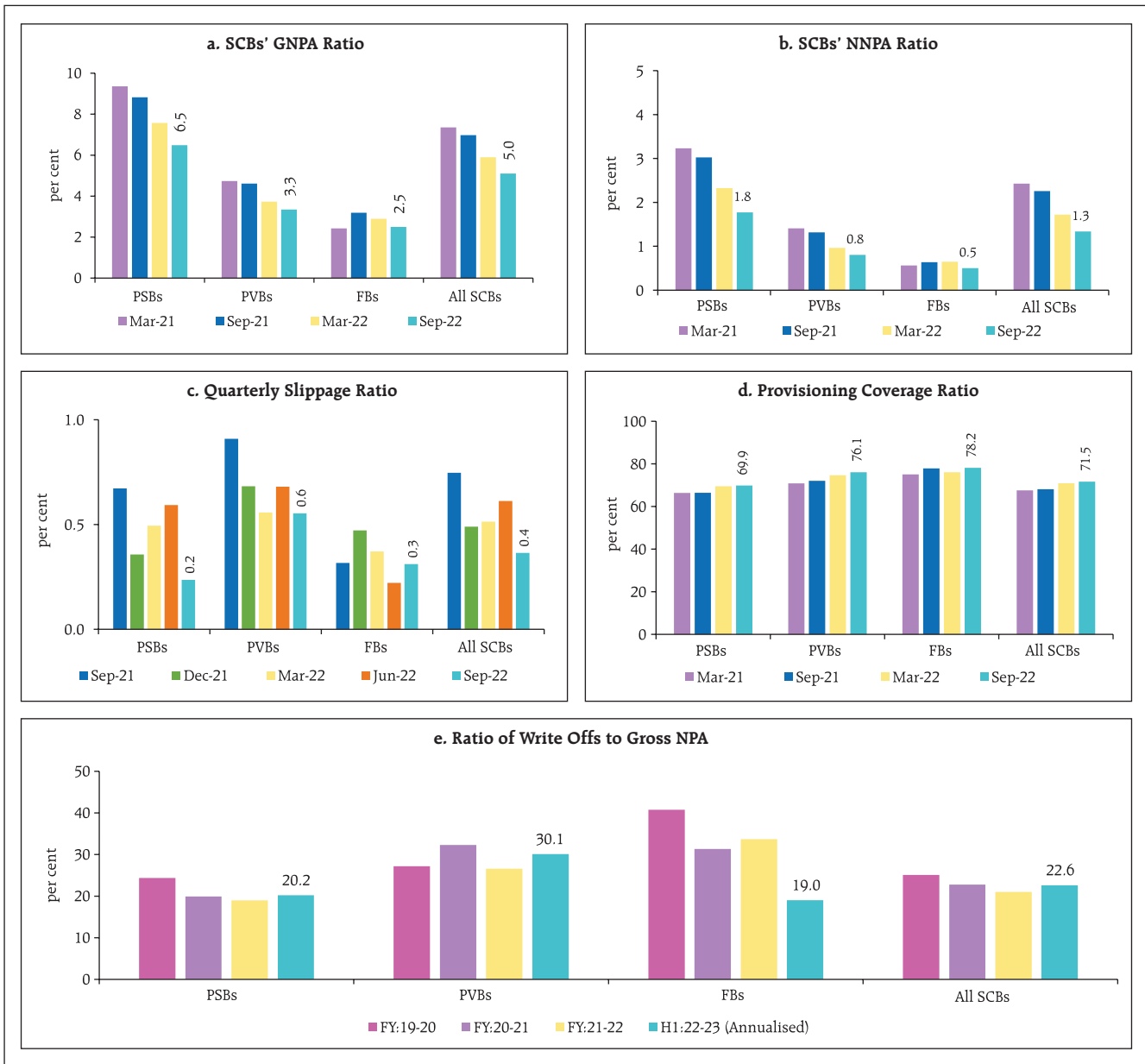
⁴ GNPA ratio is the proportion of gross non-performing assets in gross loans and advances.

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 GNPA to GNPA.

⁷ Write-off ratio is the ratio of write-off during the period to GNPA at the beginning of the period.

Chart 2.2: Select Asset Quality Indicators



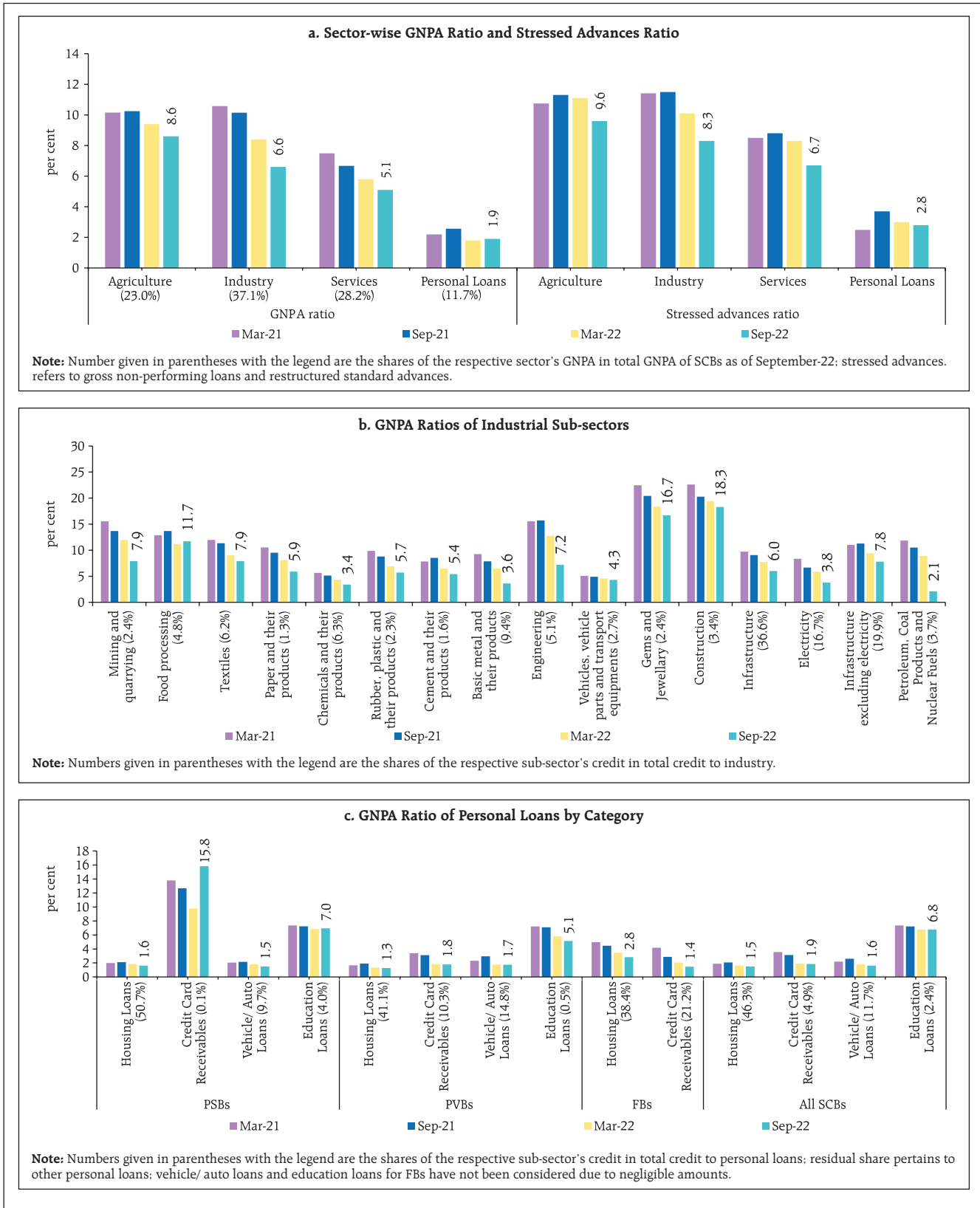
Source: RBI supervisory returns and staff calculations.

II.1.2 Sectoral Asset Quality

2.7 SCBs' asset quality continued to improve across most sectors (Chart 2.3 a). Improvement in the GNPA ratio in respect of the industrial sector

also continued, although it remained elevated for gems and jewellery and construction sub-sectors (Chart 2.3 b). The asset quality of the personal loans segment improved during H1:2022-23, especially for housing and vehicle loans (Chart 2.3 c).

Chart 2.3: Sectoral Asset Quality Indicators



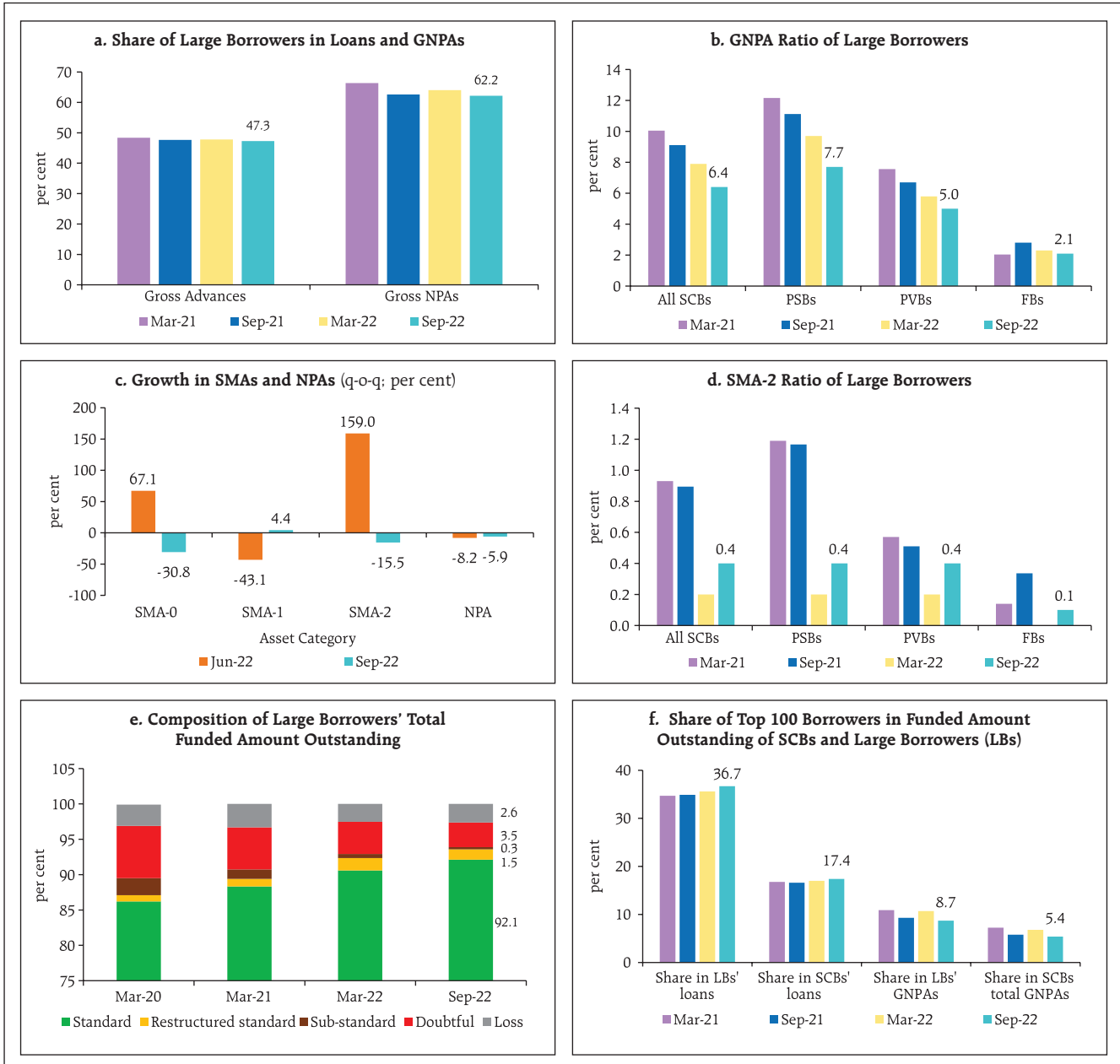
Source: RBI supervisory returns and staff calculations.

II.1.3 Credit Quality of Large Borrowers⁸

2.8 The share of large borrowers in gross advances of SCBs has been on a declining path and their share in total GNPA has come down

to 62.2 per cent in September 2022 from 75.6 per cent two years earlier (Chart 2.4 a). The GNPA ratio of large borrowers continued to improve and stood at 6.4 per cent in September 2022 from over 10 per cent in March 2021 (Chart 2.4 b).

Chart 2.4: Select Asset Quality Indicators of Large Borrowers



Source: RBI supervisory returns and staff calculations.

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.

SMA-0 and SMA-2⁹ loans of large borrowers had increased during Q1:2022-23, but it moderated in the latest quarter, implying containment of fresh slippages (Chart 2.4 c). The SMA-2 ratio recorded some increase but remained contained at 0.4 per cent in September 2022 (Chart 2.4 d). In the large borrower accounts, the proportion of standard assets in the total funded amount outstanding improved considerably from 86.2 per cent in March 2020 to 92.1 per cent in September 2022 with corresponding declines in NPAs. While there was an increase in the share of restructured standard advances from March 2020 to March 2022, the same have moderated during H1:2022-23 (Chart 2.4 e).

2.9 The share of top 100 large borrowers in the total loan book of SCBs continued to rise and stood at 17.4 per cent in September 2022, signalling fresh borrowing by large corporates. The asset quality of top 100 borrowers also improved considerably, as their share in SCBs' GNPA declined from 6.8 per cent in March 2022 to 5.4 per cent in September 2022 (Chart 2.4 f).

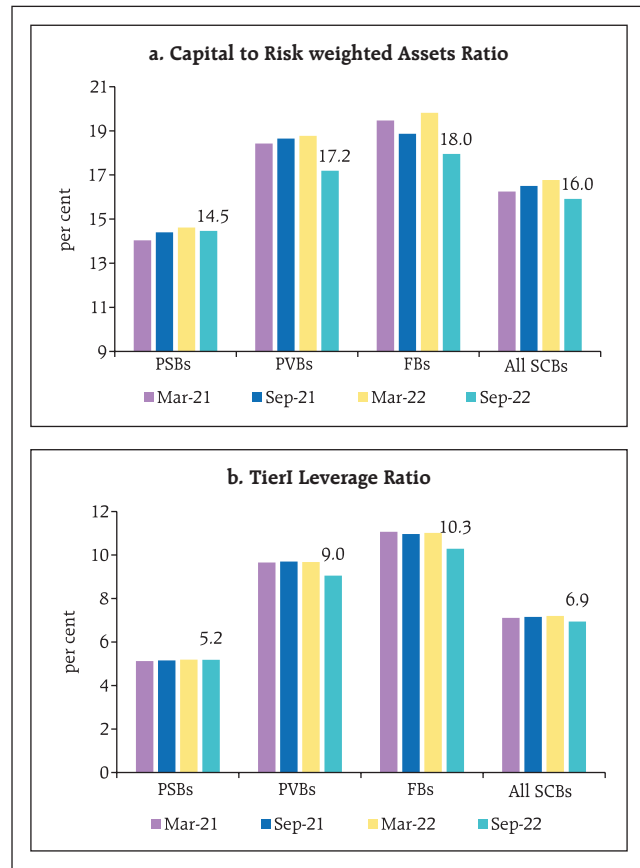
II.1.4 Capital Adequacy

2.10 The capital to risk weighted assets ratio (CRAR) of SCBs declined by 77 bps from March 2022 level on account of increase in risk weighted assets (RWAs) as lending activity picked up during H1:2022-23 (Chart 2.5 a). The system level Tier I leverage ratio¹⁰ remained stable (Chart 2.5 b).

II.1.5 Earnings and Profitability

2.11 At the system level, the net interest margin (NIM) witnessed an improvement of 20 bps between September 2021 and September 2022, reflecting a faster rate of increase in loan rates *vis-à-vis* deposit rates in a rising interest rate scenario as well as

Chart 2.5: Capital Adequacy



Source: RBI supervisory returns and staff calculations.

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.

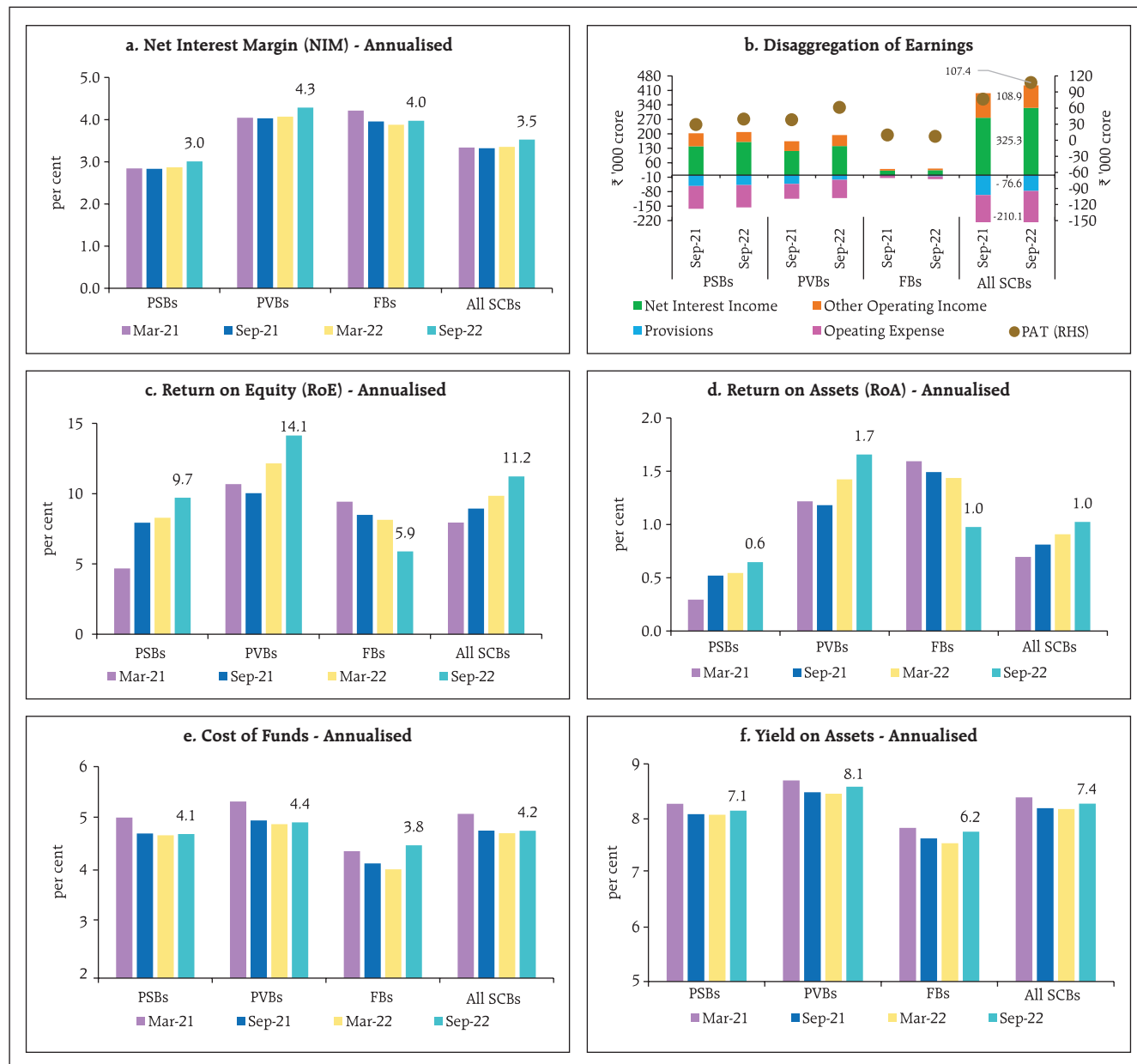
b) Loans other than revolving facilities: if principal or interest payment or any other amount wholly or partly overdue remains outstanding up to 30 days - SMA-0; 31-60 days - SMA-1; 61-90 days - SMA-2.

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

reduction in credit costs (Chart 2.6 a). Profit after tax (PAT) grew 40.7 per cent in September 2022, led by strong growth in net interest income (NII) and significant lowering of provisions. For the quarter ended September 2022, the PAT of PVBs grew by 60.7 per cent (y-o-y) as NII registered double digit growth and provisions almost halved (Chart 2.6 b).

2.12 Return on equity (RoE) and return on assets (RoA) continued to improve to reach 11.2 per cent and 1.0 per cent, respectively, in September 2022 (Chart 2.6 c and d). After declining continuously over the last two years, the cost of funds increased and yield on assets improved (Charts 2.6 e and f). An analysis of the impact of rising G-sec yield

Chart 2.6: Select Performance Indicators of SCBs



Source: RBI supervisory returns and staff calculations.

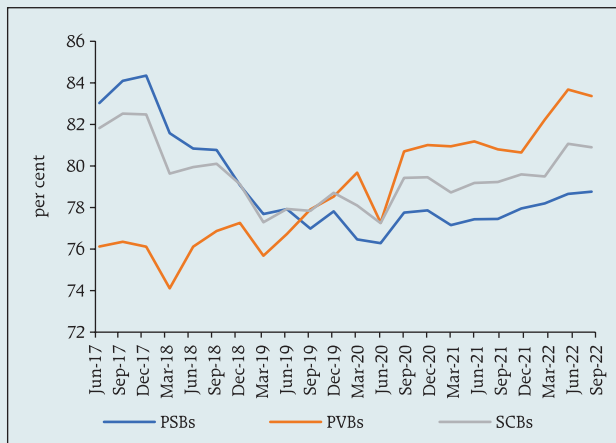
on bank profitability in India suggests that the financial intermediation channel helps banks to

attain higher profit even during an upward interest rate cycle (Box 2.1).

Box 2.1: Gilt Valuations and Bank Profitability

Government securities (G-secs), including Treasury Bills (T-Bills) and State Development Loans (SDLs), amounted to about 81 per cent of the investment portfolio of scheduled commercial banks (SCBs) in September 2022 (Chart 1). Historically, public sector banks (PSBs) have maintained higher investments in G-secs than private sector banks (PVBs).

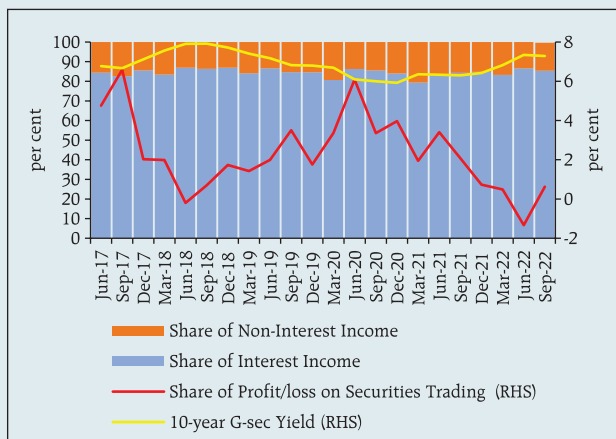
Chart 1: Investment in Statutory Liquidity Ratio (SLR) Securities
(as per cent of total investment)



Source: RBI supervisory returns and staff calculations.

In a monetary policy tightening cycle, rising yields impact trading income adversely on account of valuation losses. Banks' trading income has in fact recorded large swings during the last five years (Chart 2).

Chart 2: Components of Banks' Earnings and G-Sec Yields



Source: RBI supervisory returns and staff calculations.

The effect of movements in yields differs across banks and also depends on the use of risk management techniques by banks to hedge interest rate risk in their trading book through derivatives. Banks' net interest margins (NIMs) are also impacted by the slope¹¹ of the yield curve - a steeper slope will mean a larger margin and higher profits for banks. The level and slope of yield curve affect the NIM and trading income in opposite directions, which is consistent with banks hedging interest rate risk (Alessandri and Nelson, 2015; Borio et al, 2017).

In order to assess the impact of rising yields on bank profitability in India, a fixed effects panel data regression model covering 42 banks (PSBs and PVBs) for the period

Table 1: Panel Regression – G-Sec Yield and Bank Profitability

	Trading income/ total income	NIM	Operating Profit/Total Assets
1	2	3	4
NIM (-1)		0.487*** (0.019)	
T-bill (-1)	-1.015*** (0.137)	0.019** (0.009)	0.013*** (0.004)
Slope (-1)	-1.968*** (0.178)	0.015 (0.014)	
GNPA Ratio		-0.008*** (0.002)	-0.004*** (0.001)
CASA/total deposits		0.008*** (0.002)	0.003*** (0.001)
Cost-income ratio		-0.004*** (0.001)	-0.009*** (0.001)
Spread		0.396*** (0.016)	0.013*** (0.001)
Liquid assets/total assets		-0.007*** (0.002)	-0.002 (0.001)
CPI inflation	-0.017 (0.057)	0.012*** (0.004)	0.003 (0.002)
Leverage ratio	0.223** (0.106)		0.009** (0.004)
Covid dummy	1.171*** (0.275)		-0.004 (0.011)
Merger dummy		0.198*** (0.054)	0.057*** (0.008)
Constant	9.314*** (1.297)	0.433*** (0.116)	0.462*** (0.079)
Observations	880	1.122	880
Number of bank	42	42	42
R-squared	0.164	0.818	0.544
Bank Fixed Effect	Yes	Yes	Yes

Note: Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

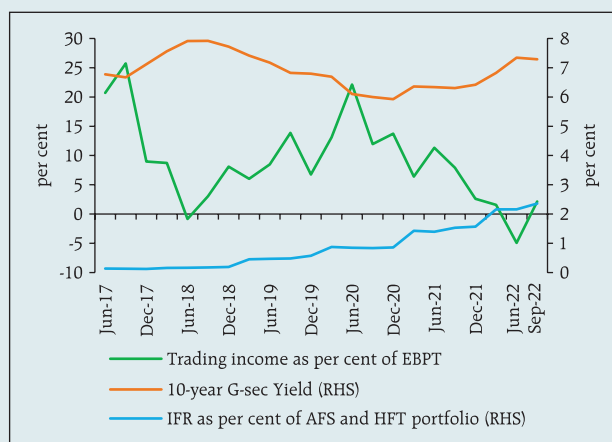
(Contd.)

¹¹ Difference between long term yield and short-term yield of similar kind of security.

Q1:2015-16 to Q1:2022-23 was used (Table 1). Short-term yields and the slope of the yield curve are found to have a negative impact on trading income, reflecting the mark to market losses in the bond portfolio of banks, but the impact on NIMs is positive. Overall, it is found that interest income and other non-interest income (such as, fee and commission, underwriting, income from forex operations) can partly offset treasury losses in a rising interest rate scenario.

Countercyclical macroprudential tools such as the investment fluctuation reserve (IFR) created by transferring the gains realised on sale of investments during easing interest rate cycle, act as a shock absorber in a tightening phase. The IFR guidelines were revised in April 2018 under which banks were advised to transfer net profit on sale of investment to the IFR, until it reaches at least two per cent of the Held for Trading (HFT) and Available for Sale (AFS) portfolios and, where feasible, this should be achieved within a period of three years. The banking system's IFR reached 2.2 per cent of HFT + AFS portfolios in March 2022 (Chart 3). This has helped banks to absorb the losses associated with the rise in G-sec yields in Q1:2022-23 and resultant treasury losses, to the tune of 4.9 per cent of their operating profit. However, banks reported positive trading income to the tune of 2.1 per cent of operating profit as G-sec yield plateaued in Q2:2022-23.

Chart 3: IFR & Treasury Profits: SCBs



Note: EBPT- Earning before Provisioning and Taxes.

Source: Supervisory Returns and RBI staff calculations.

Central banks are confronting elevated inflation by tightening monetary conditions, which leaves banks exposed to fluctuations in G-sec yields but the countercyclical IFR is expected to provide a buffer against valuation losses in their investment portfolio.

References

1. Alessandri, P. and B. D. Nelson (2015). Simple Banking: Profitability and the Yield Curve. *Journal of Money, Credit and Banking*, 47(1), 143–175.
2. Borio, C., L. Gambacorta, and B. Hofmann (2017). The Influence of Monetary Policy on Bank Profitability. *International Finance*, 20(1):48-63.

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 adverse¹² (medium and severe) scenarios. The baseline scenario is derived from the forecasted 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

¹² The adverse scenarios are stringent conservative assessments under hypothetical adverse economic conditions and model outcomes should not be interpreted as forecasts. They are indicative of the possible economic impairment latent in banks' portfolios, with implications for capital planning.

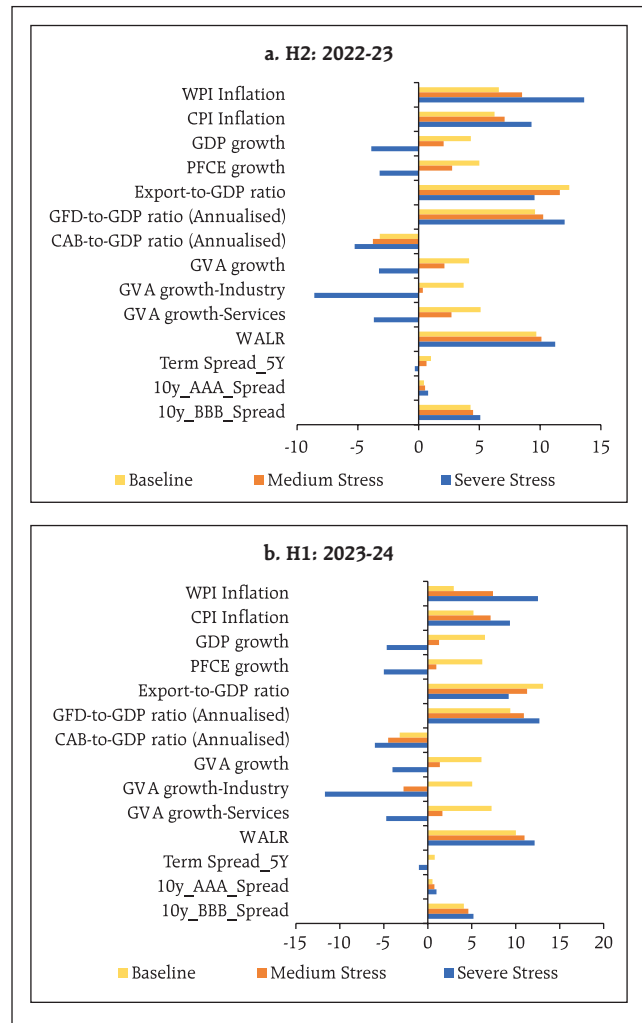
variables, increasing the shocks sequentially by 25 basis points in each quarter (Chart 2.7).

2.14 Stress test results reveal that SCBs are well capitalised and capable of absorbing macroeconomic shocks even in the absence of any further capital infusion by stakeholders. Under the baseline scenario, the aggregate CRAR of 46 major banks is projected to slip from 15.8 per cent in September 2022 to 14.9 per cent by September 2023. It may go down to 14.0 per cent in the medium stress scenario and to 13.1 per cent under the severe stress scenario by September 2023, but it stays well above the minimum capital requirement, including capital conservation buffer (CCB) requirements (11.5 per cent) (Chart 2.8 a). None of the 46 SCBs would breach the regulatory minimum capital requirement of 9 per cent in the next one year, even in a severely stressed situation, although 9 SCBs may fall short of the minimum capital inclusive of CCB (Chart 2.8 b).

2.15 The CET1 capital ratio of the select 46 SCBs may decline from 12.8 per cent in September 2022 to 12.1 per cent by September 2023 under the baseline

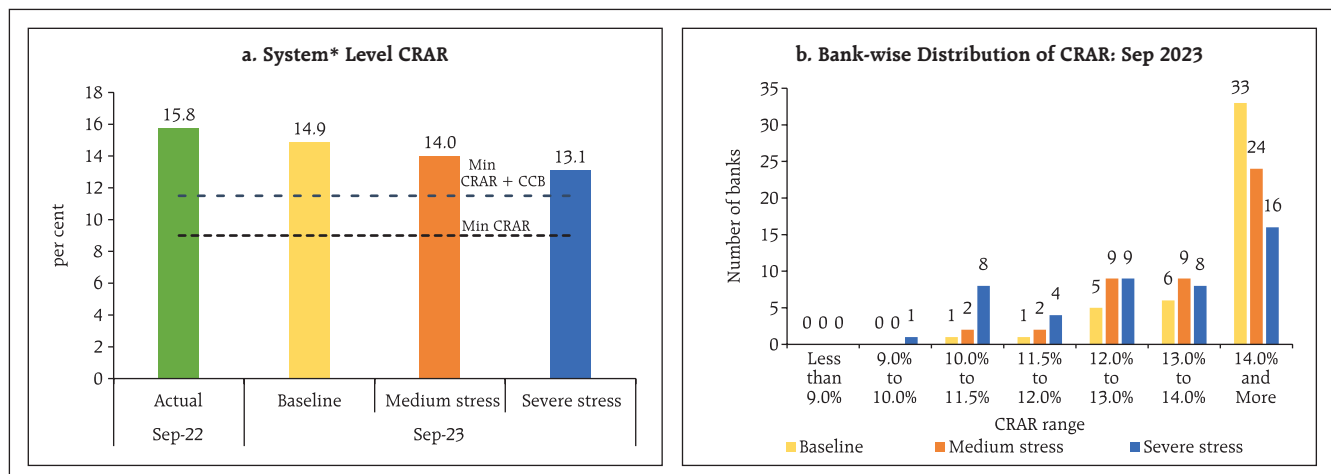
Chart 2.7: Macro Scenario Assumptions

(per cent)



Source: RBI staff calculations.

Chart 2.8: CRAR Projections

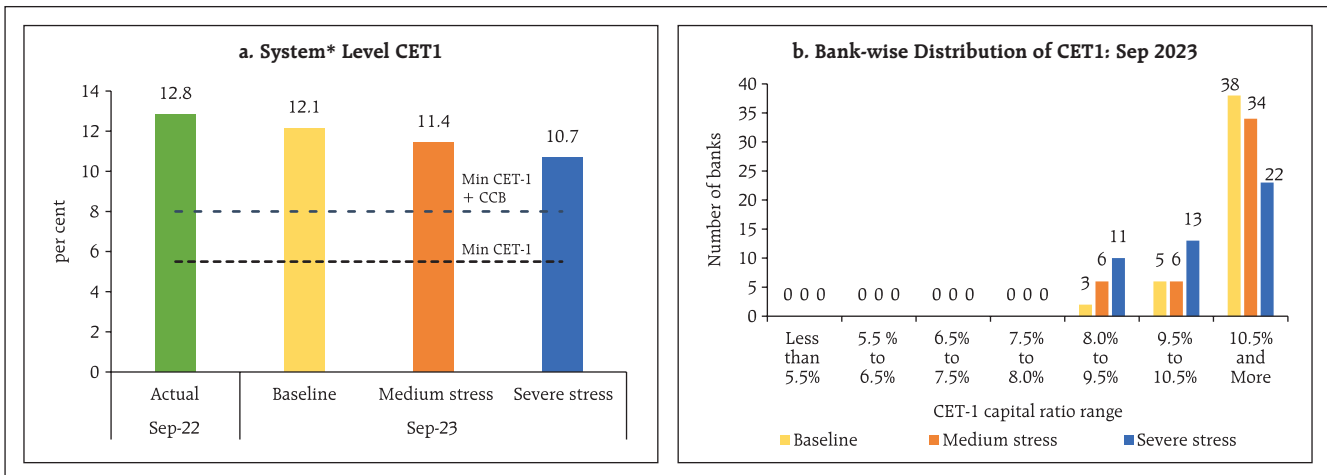


* For a system of 46 select banks.

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: Reserve Bank's supervisory returns and staff calculations.

Chart 2.9: Projection of CET1 Capital Ratio



* For a system of 46 select banks.

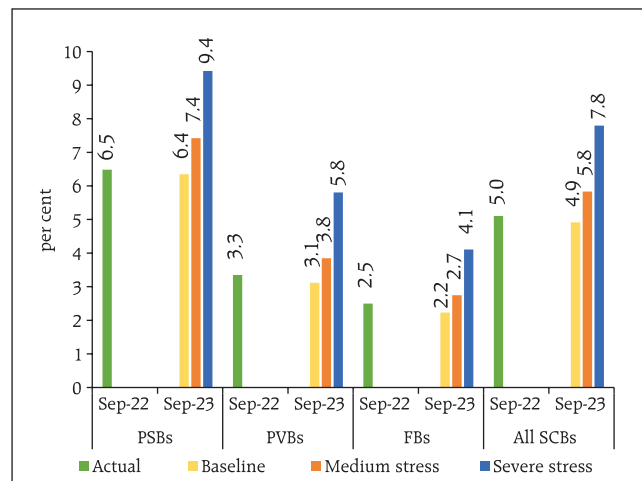
Note: The capital projection is made under a conservative assumption of minimum profit transfer to capital reserves at 25 per cent for profit making SCBs. It does not take into account any capital infusion by stakeholders.

Source: The Reserve Bank’s supervisory returns and staff calculations.

scenario (Chart 2.9 a). Even in a severely stressed macroeconomic environment, the aggregate CET1 capital ratio would deplete only by 210 basis points, which would not breach the minimum regulatory norms. Furthermore, all the banks would be able to meet the minimum regulatory CET1 ratio plus CCB of 8.0 per cent over the next one year under all the three scenarios (Chart 2.9 b).

2.16 The decrease in slippage, increase in write-offs and the continuous improvement in loan growth brought the GNPA ratio further down to 5.0 per cent in September 2022. Under the assumption of no further regulatory reliefs as well as without taking the potential impact of stressed asset purchases by National Asset Reconstruction Company Limited (NARCL) into account, stress tests indicate that the GNPA ratio of all SCBs may improve from 5.0 per cent in September 2022 to 4.9 per cent by September 2023, under the baseline scenario (Chart 2.10). If the macroeconomic environment worsens to a medium or severe stress scenario, the ratio may rise to 5.8 per cent and 7.8 per cent, respectively. At the bank group level, the GNPA ratios of PSBs may swell from 6.5 per cent in September 2022 to 9.4 per cent in September 2023, whereas it would go up from 3.3 per cent to 5.8 per cent for PVBs and from 2.5 per cent to 4.1 per cent for FBs, under the severe stress scenario.

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: Reserve Bank’s supervisory returns and staff calculations.

II.1.7 Sensitivity Analysis¹³

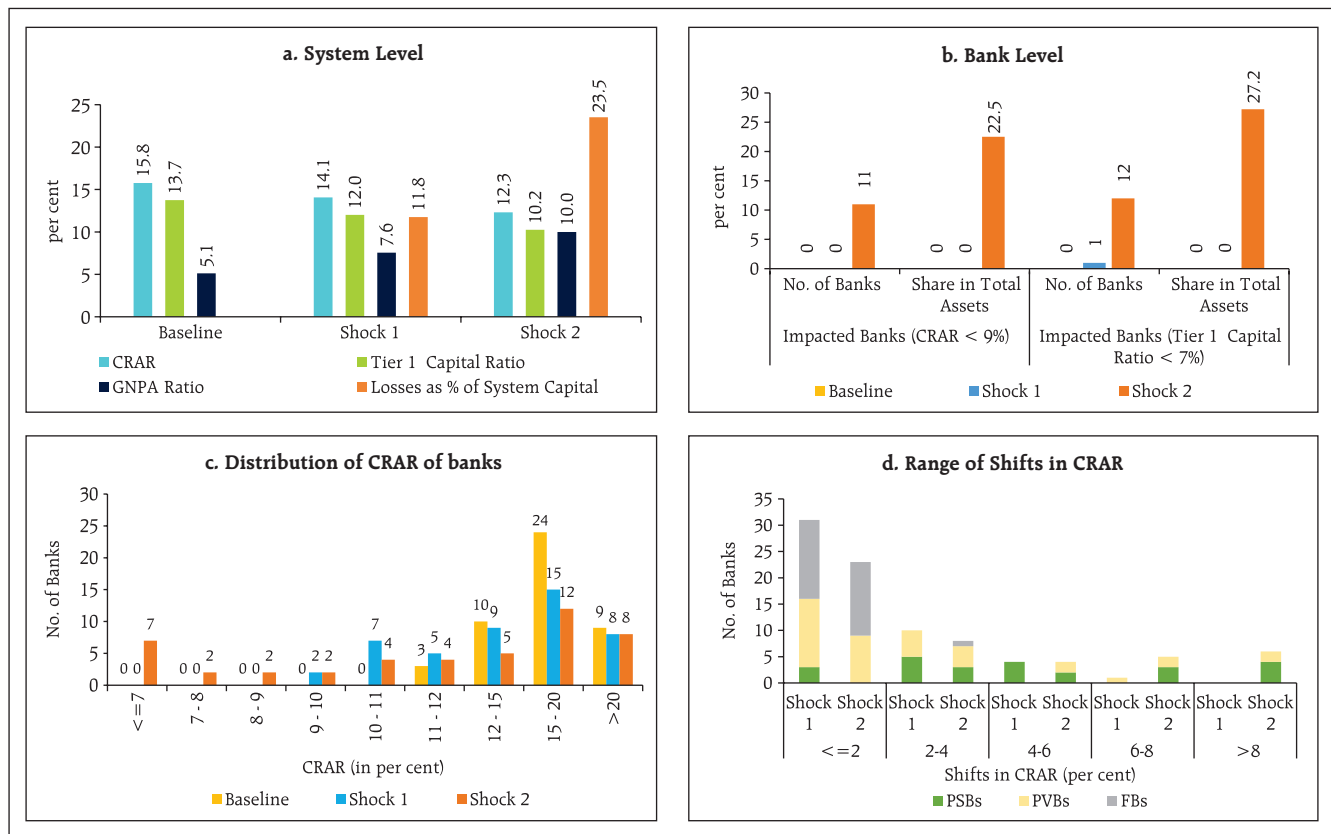
2.17 Top-down¹⁴ sensitivity analysis involving several single-factor shocks to simulate credit, interest rate, equity price and liquidity risks under various stress scenarios¹⁵ were carried out to assess the vulnerabilities of SCBs based on their operations up to September 2022.

a. Credit Risk

2.18 Credit risk sensitivity has been analysed under two scenarios wherein the system-level GNPA ratio is

assumed to rise by (i) one SD¹⁶ and (ii) two SDs from its prevailing level in a quarter. Under a severe shock of two SDs in which the aggregate GNPA ratio of 46 select SCBs moves up from 5.1 per cent to 10.0 per cent, the system-level CRAR would deplete by 350 bps from 15.8 per cent to 12.3 per cent and the Tier I capital ratio from 13.7 per cent to 10.2 per cent, but would remain well above the regulatory minimum. The system-level capital impairment could be 23.5 per cent in this case (Chart 2.11 a). The reverse stress test shows that it requires a shock of 4.4 SD to

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.

¹³ 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-wise data.

¹⁴ Top-down stress tests are based on specific scenarios and on aggregate bank-wise data.

¹⁵ 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.

¹⁶ The SD of the GNPA ratio is estimated by using quarterly data for the last 10 years. One SD shock approximates a 47.7 per cent increase in the level of GNPA ratio.

bring down the system-level CRAR to the regulatory minimum of 9 per cent. However, a shock of 2.5 SD can bring down the system-level CRAR below the regulatory minimum CRAR inclusive of the CCB, which totals 11.5 per cent.

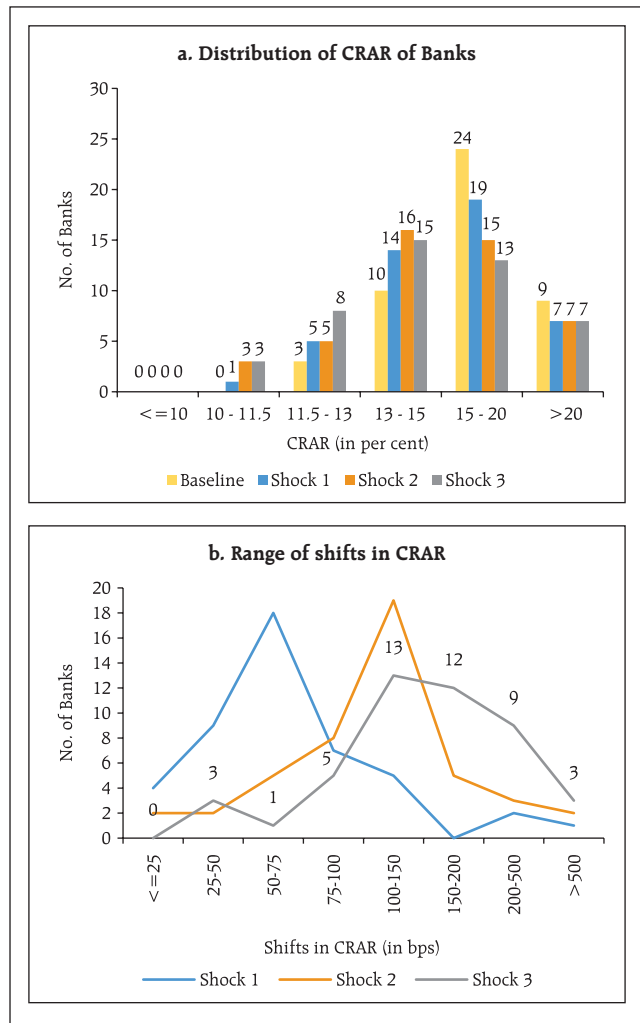
2.19 Bank-level stress test results show that under the severe (two SD) shock scenario, 11 banks with 22.5 per cent share in SCBs' total assets may fail to maintain the regulatory minimum level of CRAR (Chart 2.11 b). In such a scenario, the CRAR would fall below 7 per cent in case of seven banks (Chart 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).

b. Credit Concentration Risk

2.20 Stress tests on banks' credit concentration – considering top individual borrowers according to their standard exposures – showed that in the extreme scenario of the top three individual borrowers of respective banks failing to repay¹⁷, no bank will face a drop in CRAR below the regulatory requirement of 9 per cent, although three banks would see a decline in CRAR below 11.5 per cent - the regulatory minimum inclusive of CCB (Chart 2.12 a). In this case, twelve banks would experience a fall of more than two percentage points in their CRARs (Chart 2.12 b).

2.21 Under the extreme scenario of the top three group borrowers in the standard category failing to repay¹⁸, CRARs of all banks would remain above 9 per cent, but five banks may fail to meet the

Chart 2.12: Credit Concentration Risk: Individual Borrowers – Exposure

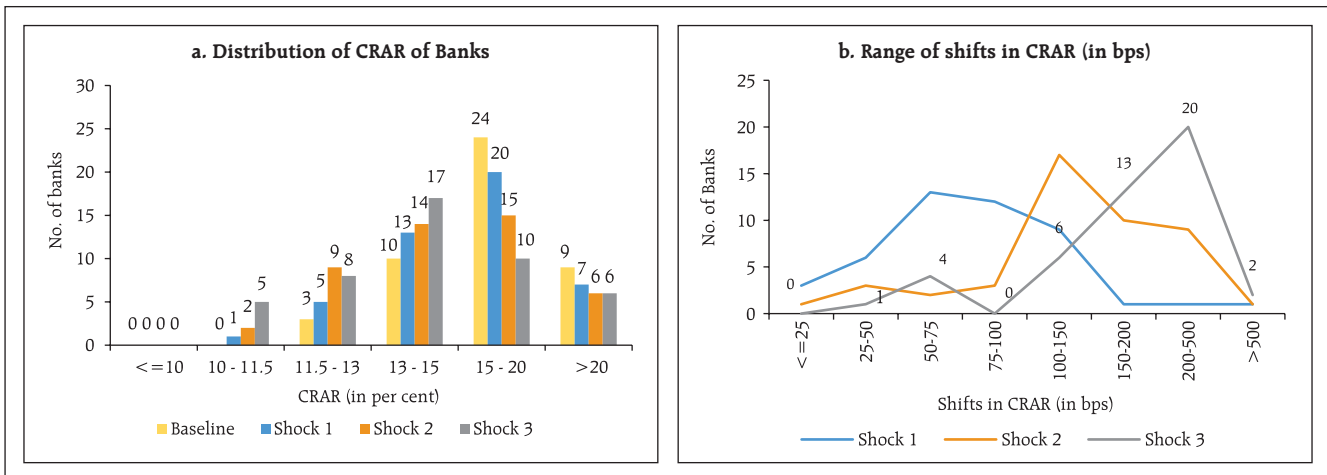


Note: For a system of select 46 SCBs.
 Shock 1: Topmost individual borrower fails to meet payment commitments.
 Shock 2: Top 2 individual borrowers fail to meet their payment commitments.
 Shock 3: Top 3 individual borrowers fail to meet their payment commitments.
Source: Reserve Bank's supervisory returns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

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

¹⁸ In the case of default, the group borrower in the standard category is considered to move to the sub-standard category.

Chart 2.13: Credit Concentration Risk: Group Borrowers – Exposure

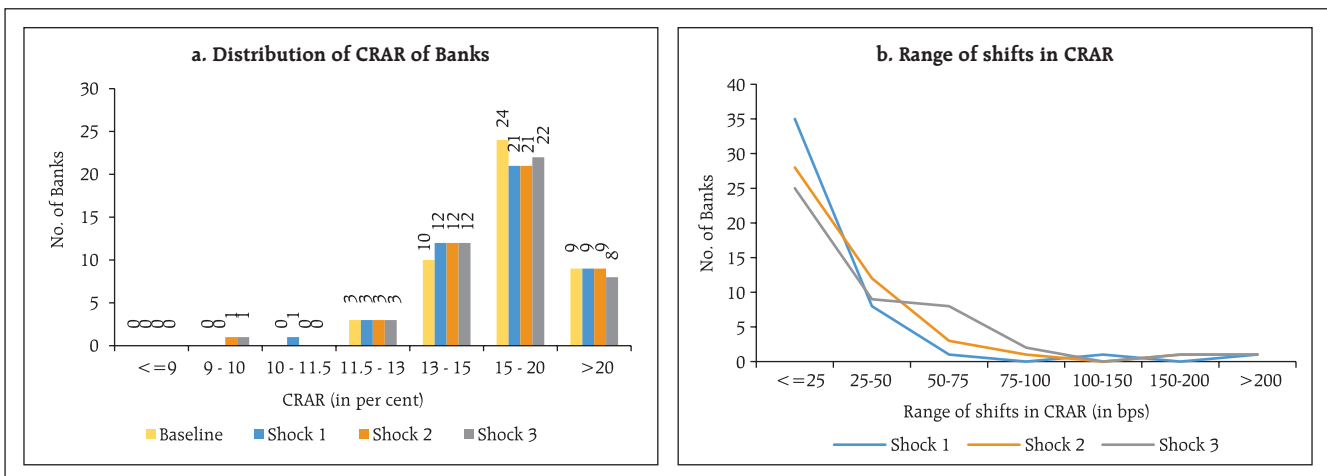


Note: For a system of select 46 SCBs
 Shock 1: The top 1 group borrower fails to meet payment commitments
 Shock 2: The top 2 group borrowers fail to meet payment commitments
 Shock 3: The top 3 group borrowers fail to meet payment commitments
Source: Reserve Bank’s supervisory returns and staff calculations.

regulatory minimum inclusive of CCB (Chart 2.13 a) and two banks may face a decline of more than five percentage points in CRARs (Chart 2.13 b).

2.22 In the extreme scenario of the top three individual stressed borrowers of respective banks failing to repay¹⁹, the majority of the banks would remain resilient, with their CRARs depleting by mere 25 bps or lower (Chart 2.14).

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: Reserve Bank’s supervisory returns and staff calculations.

¹⁹ In case of failure, the borrower in sub-standard or restructured category is considered to move to the loss category.

c. Sectoral Credit Risk

2.23 Shocks applied on the basis of volatility of industry sub-sector wise GNPA ratio indicate varying magnitudes of increases in banks' GNPA in different sub-sectors. A two SD shock to metals and energy sub-sectors reduces the system-level CRAR by 16 bps (Table 2.2).

d. Interest Rate Risk

2.24 The market value of investments subject to fair value stood at ₹19.5 lakh crore in September 2022 for the sample of SCBs under review (Chart 2.15). 95.7 per cent of these investments were classified as 'available for sale (AFS)' and the remaining were under the 'held for trading (HFT)' category. The share of PSBs, which hold more than half of the total trading book portfolio of SCBs, has increased marginally in H1:2022-23.

2.25 The sensitivity (PV01²⁰) of the AFS portfolio decreased for PSBs vis-à-vis the June 2022 position whereas it increased for PVBs and FBs. In terms of PV01 curve positioning, the tenor-wise distribution of PSBs' portfolio indicated higher allocation in the 5-10 year bucket and in the more than 10-year bucket, compared to June 2022. Around four-fifth of PSBs' AFS portfolio are in the 1-5 year and 5-10 year buckets. Similarly, PVBs have built up their position in the more than 10-year bucket and 5-10 year bucket, while paring allocations in less than 1 year and 1-5 year buckets. FBs continue to prefer the more than 10-year bucket, while concomitantly increasing their holding in other buckets. 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).

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

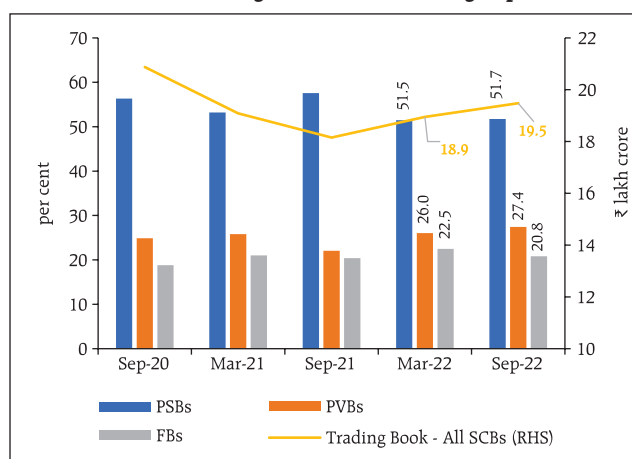
	1 SD	2 SD
Basic Metal and Metal Products (389%)	9	16
Infrastructure - Energy (172%)	8	16
Infrastructure - Transport (48%)	3	6
Construction (30%)	2	5
Food Processing (28%)	2	4
Infrastructure - Communication (104%)	1	3
Gems and Jewellery (33%)	1	2
Cement and Cement Products (95%)	1	2
Petroleum (non-infra), Coal Products (non-mining) and Nuclear Fuels (203%)	1	2
Mining and Quarrying (93%)	1	2

Note: For a system of select 46 banks.

Numbers in parentheses 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.

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 (in ₹ crore)	Share (in per cent)			
		< 1 year	1-5 year	5-10 year	> 10 years
PSBs	191.9 (219.5)	8.6 (14.5)	36.9 (40.1)	46.9 (38.6)	7.7 (6.9)
PVBs	63.0 (55.1)	20.1 (32.5)	42.9 (43.5)	12.5 (7.6)	24.5 (16.4)
FBs	138.6 (132.1)	4.1 (3.7)	17.4 (17.4)	17.9 (15.3)	60.6 (63.5)

Note: Values in the parentheses indicate June 2022 figures.

Source: Individual bank submissions and staff calculations.

²⁰ PV01 is a measure of sensitivity of the absolute value of the portfolio to a one basis point change in the interest rate.

2.26 As on December 7, 2022 the sovereign yield curve has flattened with the short end of the curve moving up sharply relative to June 2022. Concomitantly, the systemic surplus liquidity has come down from ₹6.35 lakh crore as on April 1, 2022 to ₹1.62 lakh crore as of December 7, 2022.

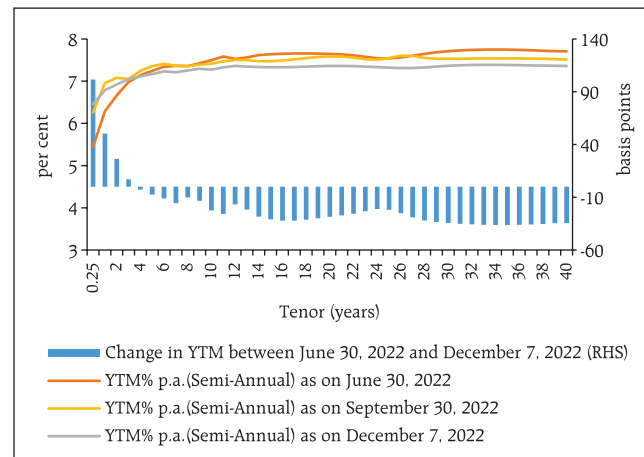
2.27 Nevertheless, the yield curve has moved down on December 7, 2022 as compared to its position in September 2022, facilitated in large measure by the easing of inflation and the prospect of subdued government borrowing in the wake of robust tax revenues (Chart 2.16).

2.28 Trading profits of PSBs and PVBs returned to positive territory in Q2:2022-23 after reporting losses in Q1:2022-23. Although trading losses continued for the seventh consecutive quarter for FBs, it has reduced from March 2022 levels. The share of trading profits in net operating income was miniscule for PSBs and PVBs, while it dampened net operating income for FBs (Table 2.4).

2.29 In the HFT portfolio, the interest rate exposure of PVBs and FBs remained higher than that of PSBs, but all three bank groups converged in their trading strategies and interest rate outlook. PSBs have initiated a net positive position in their HFT books in Q2:2022-23 after having a fully squared position in June 2022. PVBs and FBs have decreased their sensitivity (PV01) in the HFT portfolio. PSBs have built up their long positions in the 5-10 year bucket relative to their short position in the same bucket during June quarter. They have pared their positions in the less than 1 year and 1-5 year buckets. PVBs and FBs have built up positions in the 1-5 year and more than 10-year buckets while reducing their position in the 5-10 year bucket (Table 2.5).

2.30 It is assessed that a parallel upward shift of 250 bps in the yield curve would reduce the system level CRAR by 73 bps. Analogously, the system level

Chart 2.16: Yield Curves and Shift in Yields across Tenors since June 2022



Source: FIBIL.

Table 2.4: Other Operating Income (OOI) - Profit/(Loss) on Securities Trading

(in ₹ crore)

	Q2: 2021-22	Q3: 2021-22	Q4: 2021-22	Q1: 2022-23	Q2: 2022-23
PSBs	5765 (13.9)	3023 (6.4)	2457 (4.3)	-3465 (-8.0)	2376 (2.4)
PVBs	1996 (4.4)	573 (1.2)	1162 (2.3)	-643 (-1.3)	471 (0.4)
FBs	-204 (-2.6)	-874 (-11.2)	-1668 (-13.9)	-903 (-9.5)	-233 (-1.3)

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

Source: RBI Supervisory Returns.

Table 2.5: Tenor-wise PV01 Distribution of HFT portfolio

	Total (₹ crore)	Share (in per cent)			
		< 1 year	1-5 year	5-10 year	> 10 years
PSBs	1.5 (0.0)	2.4 (148.6)	5.0 (192.7)	86.1 (-215.1)	6.4 (-26.2)
PVBs	15.0 (24.5)	1.2 (4.7)	22.6 (3.2)	44.4 (92.3)	31.7 (-0.2)
FBs	8.3 (9.8)	8.4 (6.8)	34.4 (21.3)	31.9 (54.2)	25.3 (17.7)

Note: Values in the brackets indicate June 2022 figures.

Source: Individual bank submissions and staff calculations.

CET1 capital would decline by 76 bps (Table 2.6). At a disaggregated level, no bank would face a situation in which the CRAR and CET1 ratios fall below the regulatory minimum, although a few foreign banks could face substantial erosion in their capital in a stressed scenario.

2.31 PSBs preferred to pare their allocation in G-secs and increased their holdings of SDLs and other securities eligible for holding in the HTM category (Chart 2.17). PVBs increased their holding of G-secs and SDLs, while decreasing the holding of other securities in the HTM category.

2.32 Unrealised losses of PSBs were largely in G-sec, although the proportion of central and state government securities held by them in the HTM portfolio were, by and large, equal. PVBs' losses were largely distributed in proportion of their holdings (Chart 2.18). For a 250 bps parallel upward shift of the yield curve, the impact on the HTM portfolio of banks, if marked to market, would cause the system level CRAR to reduce by 307 bps.

2.33 In September 2022, holding of statutory liquidity ratio (SLR) securities by PSBs and PVBs in the HTM category amounted to 21.4 per cent and 19.9 per cent, respectively, of their net demand and time liabilities (NDTL), while it stood at 2.9 per cent for FBs. The expected paring of HTM book by banks as credit growth started to gather pace has not materialised. In fact, PSBs and PVBs have increased their HTM book *albeit* marginally.

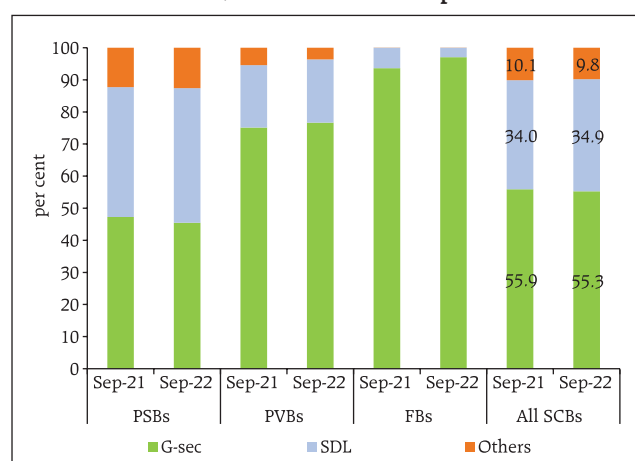
2.34 An assessment of the interest rate risk in banking book²¹ (IRRBB) using Traditional Gap Analysis (TGA), for time buckets up to one year, shows that Earnings at Risk (EAR) would be impacted by a little above 10 per cent of NII for PSBs and PVBs and marginally for FBs and small finance banks (SFBs) in

Table 2.6: 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	4.0	1.3	3.7	3.8	2.1	2.1	2.9
Share in total Investments (per cent)	30.3	0.1	30.5	1.4	86.1	7.9	35.2	1.2
Reduction in CRAR (bps)	67		34		280		73	
Reduction in CET1 Capital (bps)	70		35		286		76	

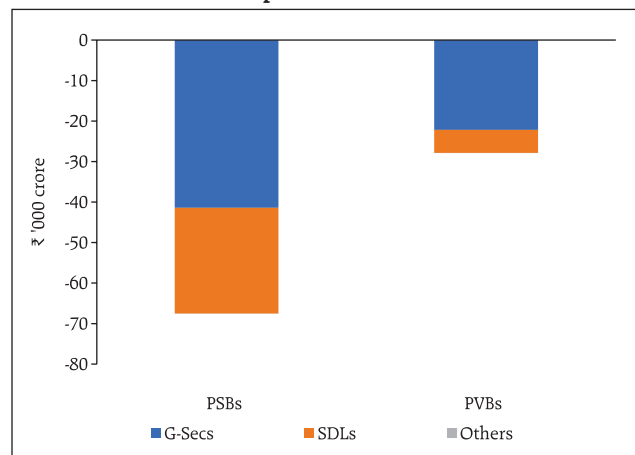
Source: Individual bank submissions and staff calculations.

Chart 2.17: HTM Portfolio – Composition



Source: Individual bank submissions and staff calculations.

Chart 2.18: HTM Portfolio – Unrealised Gain / Loss as on September 30, 2022



Source: Individual bank submissions and staff calculations.

²¹ Advances, HTM investments, swaps/forex swaps and reverse repos are considered as Rate Sensitive Assets (RSAs) whereas deposits, swap/forex swaps and repos are treated as Rate Sensitive Liabilities (RSLs) for assessing Interest Rate Risk in banking book.

case of a 200 bps increase in interest rate (Table 2.7). The impact is positive for increase in interest rate as the cumulative gap²² at bank group level was positive as of September 2022.

2.35 IRRBB analysis using Duration Gap Analysis (DGA)²³ reveals that PVBs' and FBs' Market Value of Equity (MVE) would reduce marginally by 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 2.8).

e. Equity Price Risk

2.36 An analysis of the possible impact of a significant fall in equity prices on banks' CRAR indicates that equity price risk is benign for the 46 banks under study due to the banks' limited capital market exposures owing to regulatory limits. Under scenarios of 25 per cent, 35 per cent and 55 per cent drops in equity prices, the system level CRAR would reduce by 22 bps, 30 bps and 48 bps, respectively (Chart 2.19).

f. Liquidity Risk

2.37 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. Accordingly, the stress scenarios assume increased withdrawals of un-insured deposits²⁴ and a simultaneous increase in usage of the unutilised portions of sanctioned working capital limits as well as utilisation of credit commitments and guarantees extended by banks to their customers.

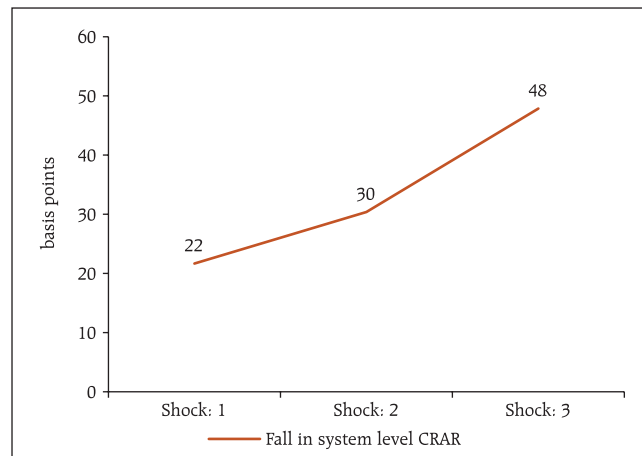
Table 2.7: Earnings at Risk (EAR) - Traditional Gap Analysis (TGA)

Bank Group	Earnings at Risk (till one year) as percentage of NII	
	100 bps increase	200 bps increase
PSBs	5.7	11.3
PVBs	5.1	10.2
FBs	1.9	3.8
SFBs	0.7	1.4

Table 2.8: Market Value of Equity (MVE) – Duration Gap Analysis (DGA)

Bank Group	Market Value of Equity (MVE) as percentage of Equity	
	100 bps increase	200 bps increase
PSBs	1.0	2.0
PVBs	-0.3	-0.5
FBs	-1.9	-3.9
SFBs	-5.7	-11.3

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: Reserve Bank's supervisory returns and staff calculations.

²² Rate Sensitive Assets (RSA) minus Rate Sensitive Liabilities (RSL)

²³ The DGA method 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).

²⁴ Un-insured deposits are estimated to be about 51 per cent of total deposits, based on ₹5 lakh deposit insurance limit (Source: DICGC Annual Report, 2021-22).

2.38 In an extreme scenario of sudden and unexpected withdrawals 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 assets²⁵ at the system level will decrease to 12.2 per cent of total assets from 21.4 per cent (Chart 2.20).

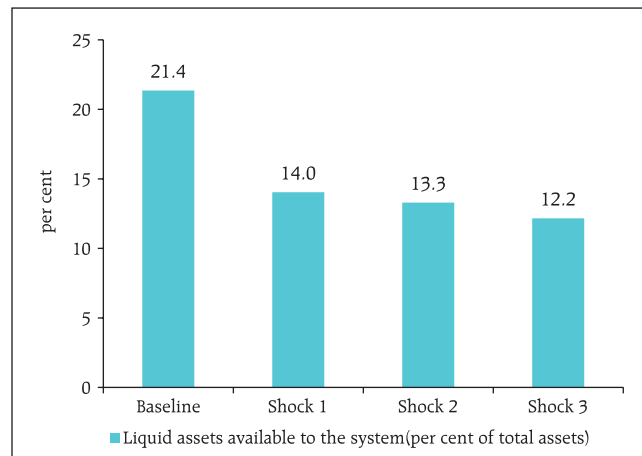
II.1.8 Bottom-up Stress Tests: Derivatives Portfolio

2.39 A series of bottom-up stress tests (sensitivity analyses) on derivative portfolios have been conducted for select banks²⁶ with the reference date of September 30, 2022. The derivative portfolios of the banks in the sample are subjected to four separate shocks on interest and foreign exchange rates. While the shocks on interest rates ranged from 100 to 250 basis points, in case of foreign exchange rates, shocks of 20 per cent appreciation/ depreciation are assumed. The stress tests are carried out for individual shocks on a stand-alone basis.

2.40 Most of the FBs maintain significantly negative net mark-to-market (MTM) position as a proportion to CET1 capital in September 2022. The MTM impact is, by and large, muted for PSBs and PVBs. For the overall system, the negative MTM position has reduced in Q2:2022-23 despite a significant increase in credit equivalent (Chart 2.21).

2.41 At an average level, 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 reduced in September 2022 as compared to the position in March 2022. The sampled banks are positioned to make subdued

Chart 2.20: Liquidity Risk – Shocks and Outcomes

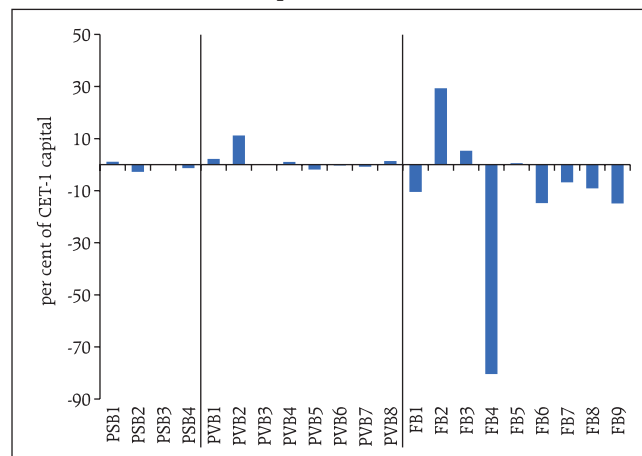


Note: Liquidity shocks included a demand for 75 per cent of the committed credit lines (comprising unutilised portions of sanctioned working capital limits as well as credit commitments) and withdrawal of a portion of un-insured deposits as given below:

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

Source: Reserve Bank’s supervisory returns and staff calculations.

Chart 2.21: MTM of Total Derivatives Portfolio of Select Banks – September 2022



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

²⁵ HQLAs were computed as cash reserves in excess of required CRR, excess SLR investments, SLR investments at 3 per cent of NDTL (under MSF) (following the Circular DOR.BC.36/12.01.001/2020-21 dated February 5, 2021) and additional SLR investments at 15 per cent of NDTL (following the Circular DOR.BP.BC.No.65/21.04.098/2019-20 dated April 17, 2020).

²⁶ Stress tests on derivatives portfolios were conducted for 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.

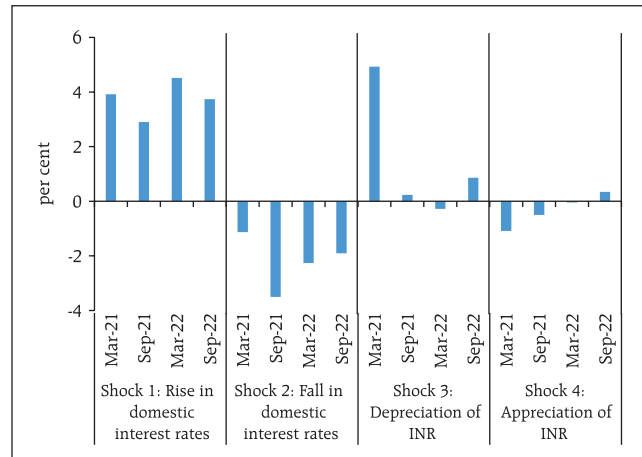
gains from both the foreign exchange rate shocks (Chart 2.22).

II.2 Primary (Urban) Cooperative Banks²⁷

2.42 Credit growth of primary (urban) cooperative banks (UCBs) has picked up moderately²⁸ (Chart 2.23 a). Both scheduled UCBs (SUCBs) and non-scheduled UCBs (NSUCBs), have already attained the March 31, 2023 target²⁹ of priority sector lending of minimum 60 per cent of their outstanding credit (Chart 2.23 b). The CRAR of UCBs improved further in H1:2022-23 to reach 16.1 per cent in September 2022. The CRAR of SUCBs improved from 14.3 per cent to 14.9 per cent and of NSUCBs from 16.8 per cent to 17.1 per cent (Chart 2.23 c).

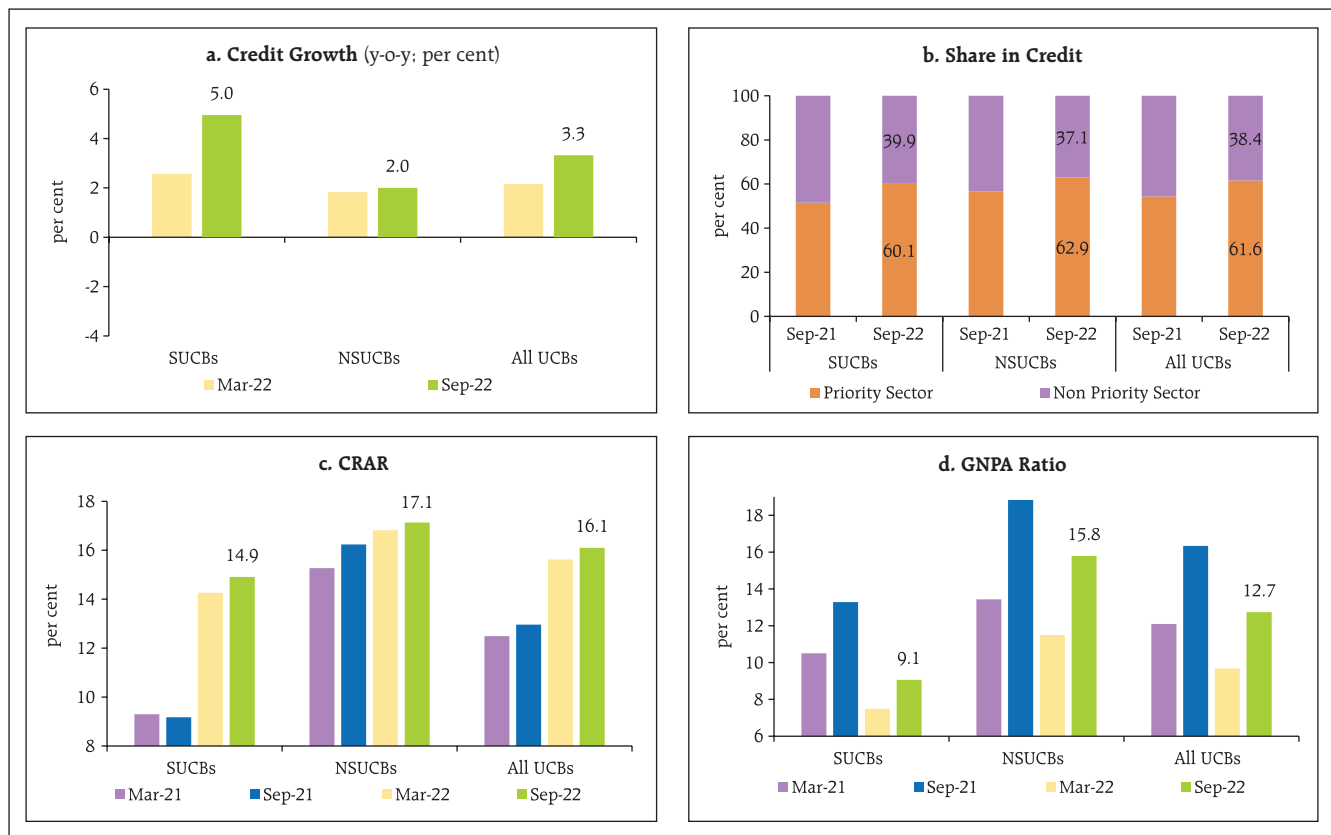
Chart 2.22: Impact of Shocks on Derivatives Portfolio of Select Banks
(change in net MTM on application of a shock)

(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).

Chart 2.23: Credit Profile and Asset Quality Indicators of UCBs (Contd.)



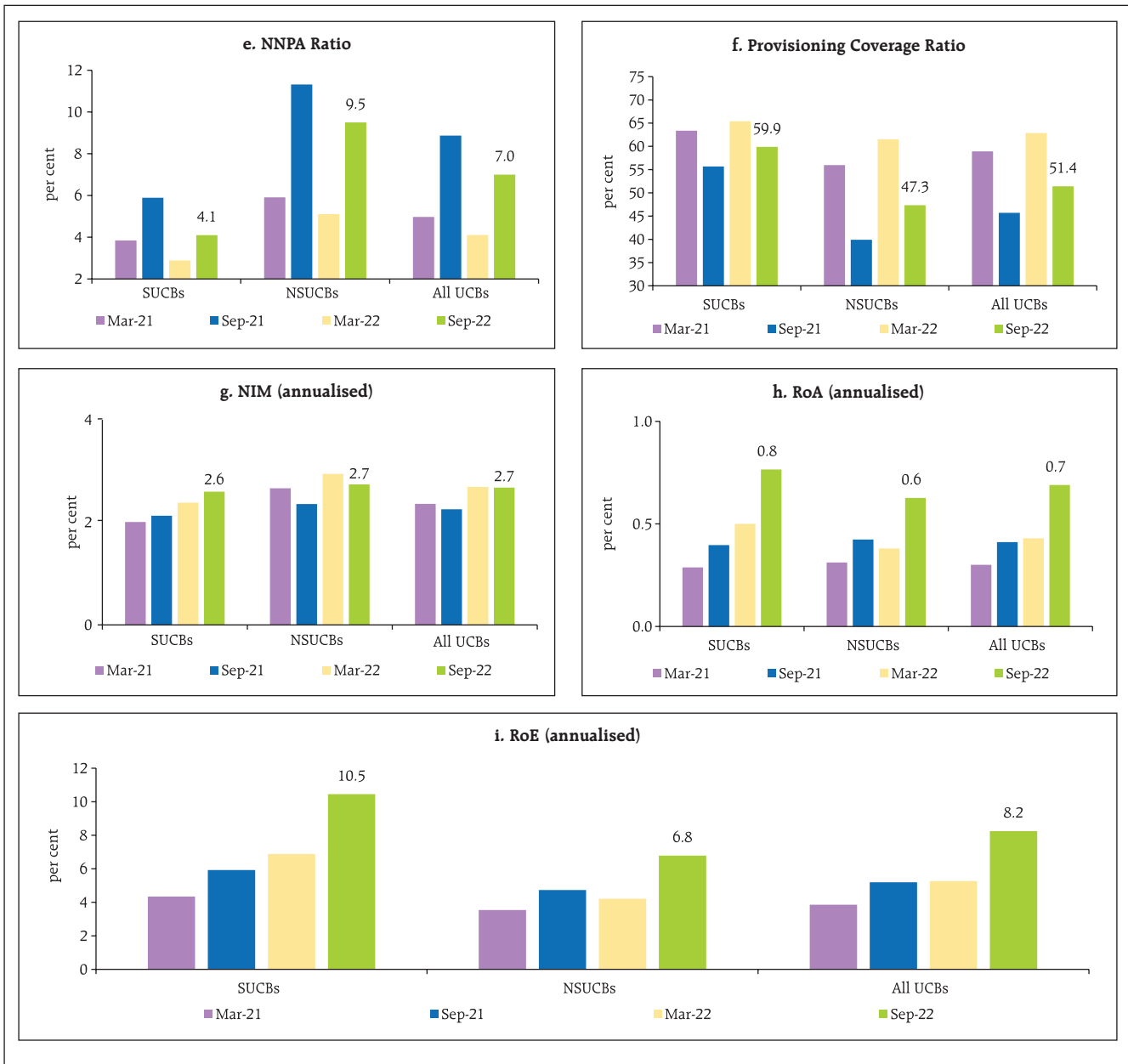
Source: RBI supervisory returns and staff calculations.

²⁷ 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. The data for September 2022 are yet to be received from some UCBs and hence may undergo change on the receipt of data.

²⁸ Based on common sample of 1486 UCBs.

²⁹ Master Directions – Priority Sector Lending (PSL) – Targets and Classification (Master Directions FIDD.CO.Plan.BC.5/04.09.01/2020-21)

Chart 2.23: Credit Profile and Asset Quality Indicators of UCBs (Concl'd.)



Source: RBI supervisory returns and staff calculations.

2.43 After a significant improvement in March 2022, GNPA ratios of UCBs have worsened again for both SUCBs (from 7.5 to 9.1 per cent) and NSUCBs (from 11.6 to 15.8 per cent) in September 2022. Their NNPA ratios have also deteriorated in H1:2022-23 (Charts 2.23 d and e). Despite increase in provisions, there was a decline in PCR of NSUCBs and SUCBs to 47.3 per cent and 59.9 per cent, respectively (Chart 2.23 f). The concomitant

rise in CRAR and decline in PCR indicate lower provisioning relative to GNPA. Going forward, in the absence of improving profitability, additional provisioning to meet increase in NPAs would result in reduction of capital levels.

2.44 While net interest margin (NIM) remained steady in September 2022, profitability in terms of RoA and RoE ratios has improved continuously since March 2021 (Chart 2.23 g, h and i).

II.2.1 Stress Testing

2.45 Stress tests have been conducted on a select set of UCBs³⁰ 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 of September 2022.

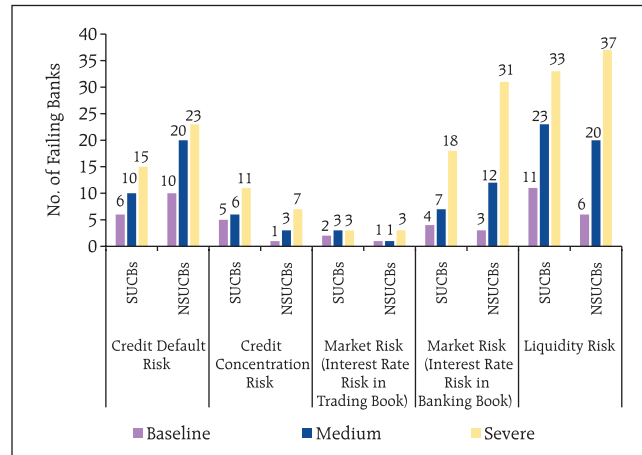
2.46 The results show that (a) in all the five parameters tested, a few banks failed even in the baseline scenario; (b) impact of credit default risk is higher than credit concentration risk in all three scenarios; (c) impact of shock on trading book is minimal; (d) severe stress on banking book would cause failure of a large number of UCBs and (e) liquidity shocks impact the largest number of UCBs (Chart 2.24). Under the severe stress scenario, system level CRAR diminishes by 349 bps, 337 bps and 90 bps for credit default risk, credit concentration risk and interest rate risk in trading book, respectively; while NII declines by around 20 per cent under the severe stress scenario for interest rate risk in banking book.

II.3 Non-Banking Financial Companies (NBFCs)³¹

2.47 Credit extended by NBFCs is picking up momentum, with the aggregate outstanding amount at ₹31.5 lakh crore as of September 2022. Loans to the services sector (share in outstanding credit being 14.7 per cent) and personal loans (share 29.5 per cent) recorded a healthy growth rate. Industry, the largest segment of the credit portfolio (share 37.5 per cent) saw a muted growth in Q2:2022-23 with Government owned NBFCs recording moderation (Chart 2.25).

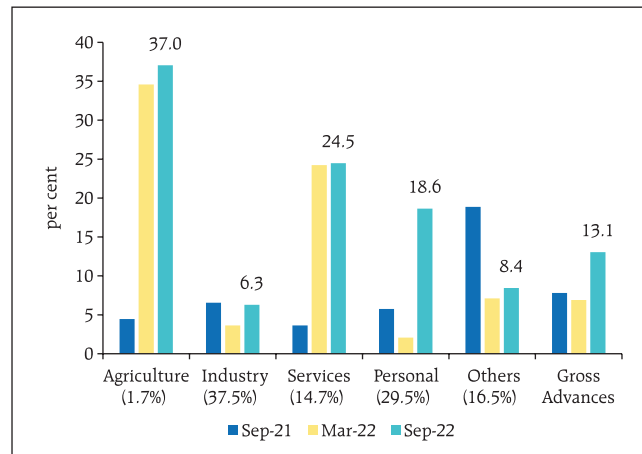
2.48 The GNPA ratio of NBFCs eased from the peak of 7.2 per cent recorded during the second wave of

Chart 2.24: Stress Test of UCBs



Source: RBI supervisory returns and staff calculations.

Chart 2.25: Sectoral Credit Growth of NBFCs (y-o-y)

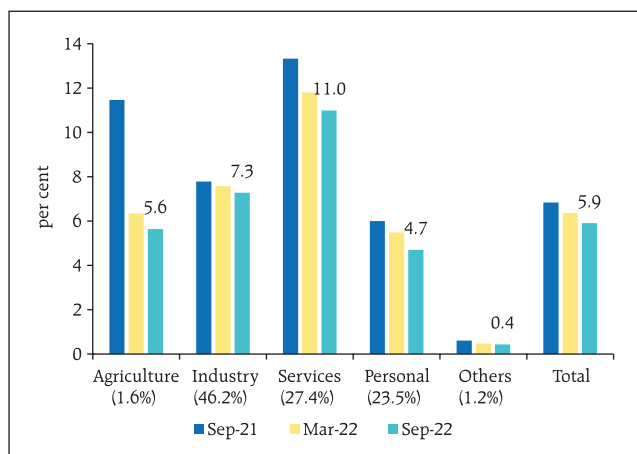


Note: Figures in bracket represent sectoral shares in outstanding loans in Sep-22.
Source: RBI supervisory returns and staff calculations.

³⁰ The stress test is conducted with reference to the financial position of September 2022 for select 109 UCBs (46 SUCBs, 63 NSUCBs) with asset size of more than ₹1,000 crore, excluding three banks under the Reserve Bank's All Inclusive Directions (AID). The detailed methodology used for stress test is given in Annex 2.

³¹ The analyses done in this section are based on deposit taking and non-deposit taking systemically important NBFCs' (including Core Investment Companies) data available as of November 24, 2022 which are provisional.

Chart 2.26: Sectoral GNPA ratio of NBFCs



Note: Figures in brackets represent sectoral shares in GNPA in Sep-22.

Source: RBI supervisory returns and staff calculations.

the pandemic to reach 5.9 per cent in September 2022, close to the pre-pandemic level. Although this softening was observed across sectors, the GNPA ratio of services sector remains in double digits (Chart 2.26). The aggregate NNPA ratio of NBFCs ebbed by 60 bps during H1:2022-23 to 3.2 per cent in September 2022 (Chart 2.27).

2.49 The capital position of NBFCs remained robust, with CRAR of 27.4 per cent as at end-September 2022. The decline of 20 bps from March 2022 was largely on account of increase in RWA as lending picked up. The return on assets (RoA) has recouped over successive half-years (Chart 2.28).

2.50 Borrowings constituted the largest source of funds for NBFCs, although their share has come down since March 2020 (Table 2.9). Their

Chart 2.27: Sectoral NNPA ratio of NBFCs

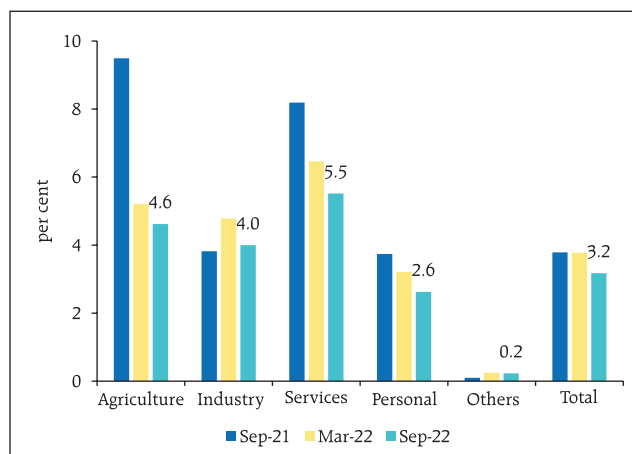
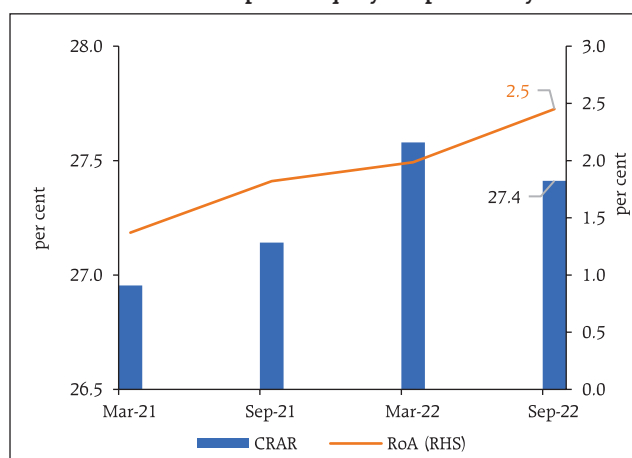


Chart 2.28: Capital Adequacy and profitability



Source: RBI supervisory returns and staff calculations.

Table 2.9: NBFCs' Sources of Funds

(per cent)

Item Description	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22
1. Share Capital, Reserves and Surplus	24.2	24.4	26.4	28.9	28.7	28.5
2. Total Borrowings	66.4	65.3	63.4	60.6	61.3	61.0
Of which:						
2(i) Borrowing from banks	20.3	19.7	19.9	18.5	20.5	21.3
2(ii) CPs subscribed by banks	0.5	0.5	0.4	0.3	0.4	0.7
2(iii) Debentures subscribed by banks	2.5	3.0	3.0	2.9	2.8	3.1
Total from banks [2(i)+2(ii)+2(iii)]	23.2	23.2	23.3	21.7	23.7	25.1
3. Others	9.3	10.3	10.2	10.5	10.0	10.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: RBI supervisory returns and staff calculations.

dependence on banks for funds had grown during H1:2022-23. Borrowing from banks (mostly term loans) constituted the major part of funding from banks.

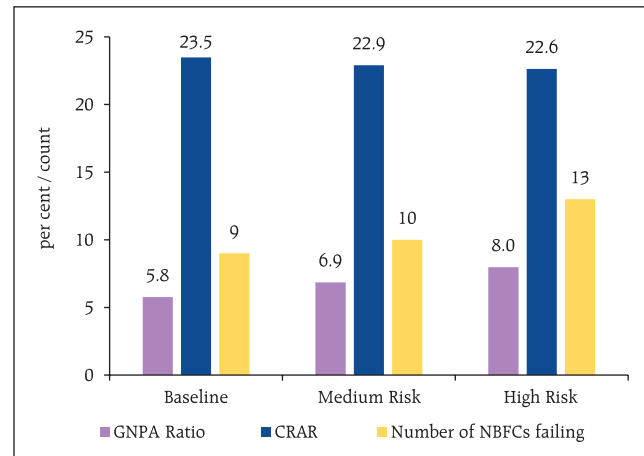
2.51 The Scale Based Regulation (SBR) introduced for NBFCs classifies them into four layers namely Base Layer (NBFC-BL), Middle Layer (NBFC-ML), Upper Layer (NBFC-UL) and Top Layer (NBFC-TL) based on their size, activity, and perceived riskiness. Recently, sixteen entities have been identified for categorisation as NBFC-UL under the framework. It is observed that the NBFC-UL group recorded higher credit growth (y-o-y) of 17.2 per cent and better GNPA ratio of 4.2 per cent as of September 2022 than the overall NBFC sector.

II.3.1 Stress Test³² - Credit Risk

2.52 System level stress tests for assessing the resilience of NBFC sector to credit risk shocks has been conducted for a sample of 152³³ NBFCs. The tests were carried out under a baseline and two stress scenarios – medium and high risk, with increase in slippage ratio by 1 SD and 2 SDs, respectively. The capital adequacy ratio of the sample NBFCs in September 2022 stood at 26.0 per cent and the GNPA ratio at 4.0 per cent. The baseline scenario is projected for one year ahead, based on assumptions of business continuing under usual conditions.

2.53 Under the baseline scenario, CRAR of nine NBFCs – comprising 4.7 per cent of total advances of the sample companies – are observed to be less than the minimum regulatory requirement of 15 per cent. Under a medium risk shock of 1 SD increase in the slippage ratio, the GNPA ratio increases to 6.9 per cent and the resultant income loss and additional provisional requirements reduce the CRAR by 58 bps

Chart 2.29: Credit Risk in NBFCs - System Level



Source: RBI supervisory returns and staff calculations.

relative to the baseline. Under the high-risk shock of 2 SDs, the capital adequacy ratio of the sector declines by 85 bps relative to the baseline to 22.6 per cent. The number of NBFCs that would fail to meet the minimum regulatory capital requirement of 15 per cent increases to 10 and 13 under medium and severe stress scenarios, respectively (Chart 2.29).

II.3.2 Stress Test - Liquidity Risk

2.54 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 and decrease in cash inflows³⁴. The baseline scenario uses the projected outflows and inflows as of September 2022. 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-

³² The detailed methodology used for stress tests for NBFCs is given in Annex 2.

³³ The sample comprised 8 deposit taking NBFCs and 144 non-deposit taking systemically important (NDSI) NBFCs of total advances ₹15.64 lakh crore as of September 2022, which forms around 92 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.

³⁴ Stress testing based on liquidity risk was performed on a sample of 198 NBFCs – which includes 7 deposit-taking NBFCs, and 191 NDSI NBFCs. The total asset size of the sample was ₹19.64 lakh crore, comprising 87.2 per cent of the non-government NBFCs.

risk scenarios stood at 8 (representing 1.9 per cent of asset size of the sample), 26 (9.3 per cent) and 47 (24.0 per cent), respectively (Table 2.10).

II.3.3 Interest Rate Risk

2.55 Interest rate risk for NBFCs³⁵ has been analysed under Traditional Gap Analysis (TGA) to estimate Earnings at Risk (EAR). At group level, NBFCs have shown to exhibit positive impact on earnings under scenarios of increase in interest rate due to their rate sensitive assets being higher than rate sensitive liabilities. At entity level, 4 deposit-taking and 35 NDSI NBFCs are projected to have some degree of negative impact on earnings from adverse movement of interest rate.

II.4 Insurance Sector

2.56 The solvency ratio of insurance companies assesses the ability of the insurer to meet its obligations towards policyholders. It is an effective indicator of financial stability of the sector - the higher the solvency ratio, the greater the ability of the insurer to meet its liabilities. As the insurance liabilities involve estimations of the future experience of contingent events, higher solvency ratio implies higher resilience of the insurer to withstand the uncertainties of the future. The Insurance Regulatory and Development Authority of India (IRDAI) has prescribed a solvency ratio of 150 per cent as the minimum threshold limit for all the insurers.

2.57 The consolidated solvency ratio for all insurers in both life and non-life sector over the past four quarters remains above the minimum threshold limit (Table 2.11).

II.5 Stress Testing of Mutual Funds

2.58 In order to strengthen risk management practices, and develop a sound framework that would evaluate potential vulnerabilities on account of plausible events and provide early warning signals,

Table 2.10: 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 (0.4)	2 (0.4)	2 (0.4)
Between 20 and 50 per cent	0 (0.0)	2 (0.5)	6 (1.5)
20 per cent and below	6 (1.5)	22 (8.4)	39 (22.1)

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

Source: RBI supervisory returns and staff calculations.

the SEBI mandated all open-ended debt schemes (except overnight schemes) to conduct stress tests as per the best practice guidelines of the Association of Mutual Funds in India (AMFI).

2.59 The stress testing is being carried out by AMCs on a monthly basis for all open-ended debt schemes (except overnight schemes) 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). The stress testing analysis carried out for all open-ended debt schemes (except overnight fund, gilt fund and gilt fund with 10-year constant duration) by top 10 mutual funds (based on AUM) for the months of March 2022 and September 2022 revealed no breaches of limits pertaining to these risks.

Table 2.11: Consolidated Solvency Ratio for All Insurers

Solvency Ratio as at	(per cent)	
	Life Insurance Sector	General & Health Insurance Sector
June-22	200	180
March-22	194	173
December-21	189	172
September-21	194	167

Source: IRDAI.

³⁵ Based on 17 deposit-taking NBFCs and 197 NDSI NBFCs (excluding Core Investment Companies).

2.60 As a part of liquidity risk management for open-ended debt schemes, two types of liquidity ratios, viz., (i) Redemption at Risk (RaR) which represents likely outflows at a given confidence interval and (ii) Conditional Redemption at Risk (CRaR) which represents the behaviour of the tail at the given confidence interval, are being used. All the AMC's have been mandated to maintain these liquidity ratios (LR-RaR and LR-CRaR) above the threshold limits, which are based on the scheme type, scheme asset composition and potential outflows (modelled from investor concentration in the scheme). Mutual funds are required to carry out back testing of these liquidity ratios for all open-ended debt schemes (except overnight fund, gilt fund and gilt fund with 10-year constant duration) on a monthly basis.

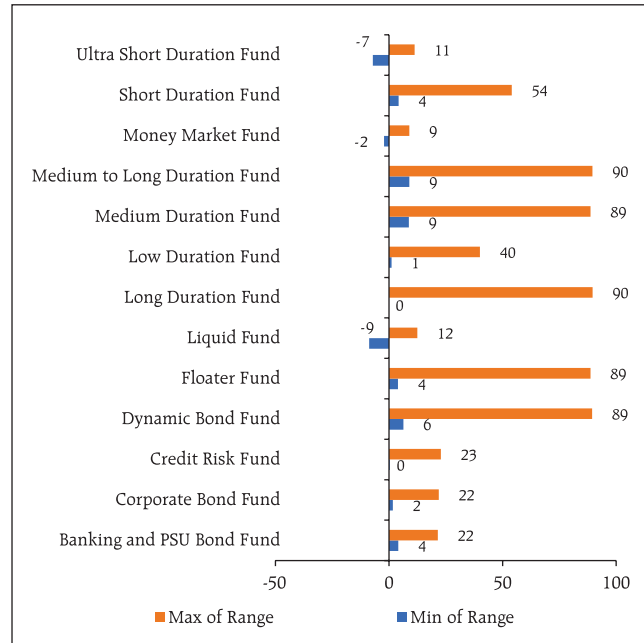
2.61 The LR-RaR and LR-CRaR ratios computed by top 10 mutual funds (based on AUM) for 13 categories of open-ended debt schemes for September 2022 were well above the respective threshold limits for most of the mutual funds. However, in a few instances, the ratios were below the threshold limits, mainly on account of redemptions, which were remedied by the respective AMC's within a few days (Chart 2.30 and Chart 2.31).

II.6. Stress Testing Analysis - Clearing Corporations

2.62 In order to enhance robustness of risk management framework at clearing corporations (CCs), the SEBI has issued granular norms related to core settlement guarantee fund (SGF), stress testing and default procedures. The stress testing methodology at CCs is carried out to determine the minimum required corpus (MRC) of the core SGF.

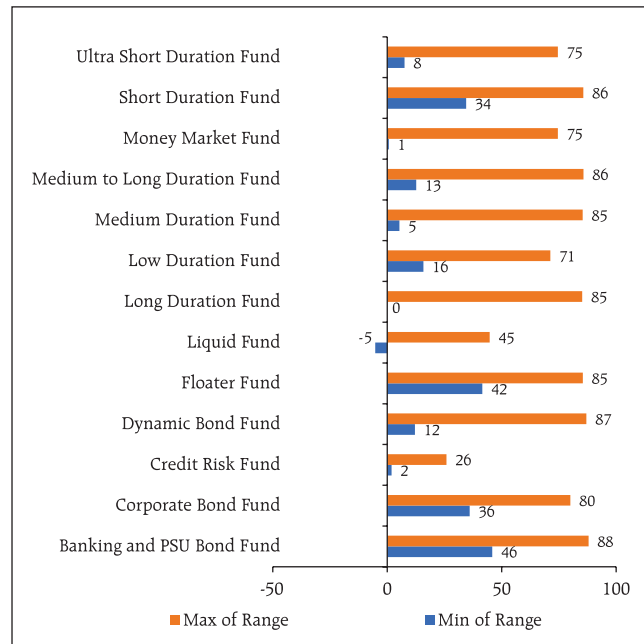
2.63 Determination of MRC of core SGF based on stress testing is carried out segment wise on a monthly basis. For determining the MRC for cash and equity derivatives segment, CCs calculate the credit exposure arising out of a presumed simultaneous default of top two clearing members (CMs). Credit exposure for each CM is determined by assessing the

Chart 2.30: Range (Surplus (+)/ Deficit (-)) of LR-RaR maintained by AMC's over AMFI prescribed limits (per cent)



Note: Data pertains to Top 10 AMC's based on AUM.
Source: SEBI.

Chart 2.31: Range (Surplus (+)/ Deficit (-)) of LR-CRaR maintained by AMC's over AMFI prescribed limits (per cent)



Note: Data pertains to Top 10 AMC's based on AUM.
Source: SEBI.

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 of the month and the actual MRC for any given month is determined as the higher of the MRC of the month and the MRC arrived at any time in the past.

2.64 Therefore, in line with the SEBI's recommendation, though the monthly calculated amounts of MRC {cash as well as futures and options (F&O) segments} at a major clearing corporation based on stress testing analysis varied during the period July-October 2022 as per the change in credit exposure of CMs, the actual MRC requirement (for cash and F&O segments) remained static across the months (Table 2.12).

II.7 Interconnectedness

2.65 A financial system can be visualised as a network with financial institutions as nodes and bilateral exposures as links joining these nodes. These links which could be in the form of loans to, investments in, or deposits with each other act as a source of funding, liquidity, investment and risk diversification, but could also transform in adverse conditions into channels through which shocks can spread, leading to contagion and amplification of systemic shocks. Understanding the nuances of such networks becomes critical for safeguarding macroeconomic and financial stability.

Table 2.12: Minimum Required Corpus of Core SGF Based on Stress Testing Analysis at a major Clearing Corporation

(Amount in ₹ crore)

Segments	July 2022	August 2022	September 2022	October 2022
Cash Market (CM)	172	148	149	155
Equity Derivatives Segment (FO)	961	991	1,147	1,296
Total (CM+FO)	1,132	1,139	1,297	1,451
Actual MRC requirement (CM+FO)	1,558	1,558	1,558	1,558

Source: SEBI

II.7.1 Financial System Network^{36 37}

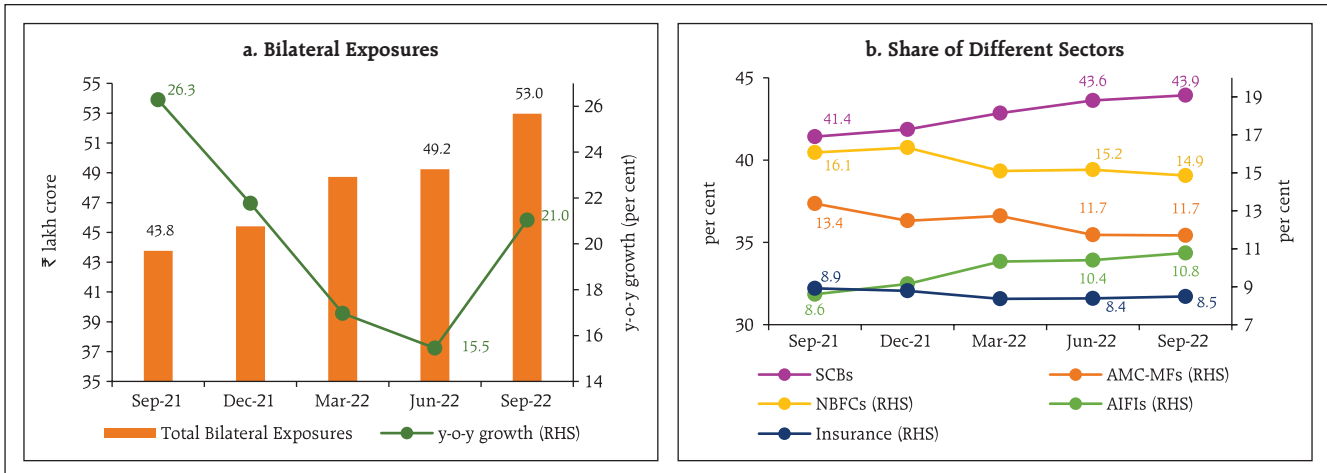
2.66 The total outstanding bilateral exposures³⁸ among the entities in the financial system maintained steady growth. The increase in September 2022 quarter was driven by higher borrowing requirement of SCBs and all India financial institutions (AIFIs) (Chart 2.32 a).

³⁶ The network model used in the analysis has been developed by Professor Sheri Markose (University of Essex) and Dr. Simone Giansante (Bath University) in collaboration with the Financial Stability Unit, Reserve Bank of India.

³⁷ Analysis presented here and in the subsequent part is based on data of 225 entities from the following *eight groups*: SCBs, scheduled UCBs (SUCBs), AMC-MFs, NBFCs, HFCs, insurance companies, pension funds and AIFIs. These 225 entities covered include 77 SCBs; 11 small finance banks (SFBs); 20 SUCBs; 25 AMC-MFs (which cover more than 98 per cent of the AUMs of the mutual fund sector); 40 NBFCs (both deposit taking and non-deposit taking systemically important companies, which represent about 70 per cent of total NBFC assets); 22 insurance companies (that cover more than 90 per cent of assets of the sector); 18 HFCs (which represent more than 95 per cent of total HFC asset); 7 Pension Funds (PFs) and 5 AIFIs (NABARD, EXIM, NHB, SIDBI and NaBFID).

³⁸ Includes exposures between entities of the same group. Exposures are outstanding position as on September 30, 2022 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 derivative instruments (excluding settlement guaranteed by CCIL).

Chart 2.32: Bilateral Exposures between Entities in the Financial System



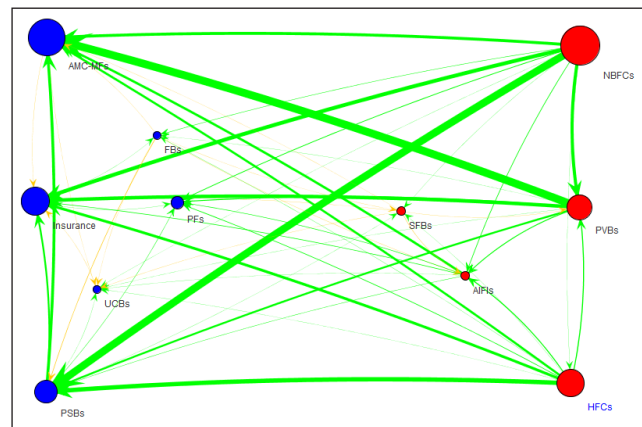
Note: Exposures between entities of the same group are included.
Source: Supervisory returns of various regulators and RBI staff calculations.

2.67 SCBs continued to have the largest bilateral exposures in the Indian financial system, reaching the pre-pandemic level in September 2022. The share of NBFCs and AMC-MFs declined on a y-o-y basis, while that of AIFIs increased (Chart 2.32 b).

2.68 In terms of inter-sectoral exposures³⁹, AMC-MFs, followed by insurance companies, were the biggest fund providers in the system, whereas NBFCs and HFCs were the largest receivers of funds, followed by PVBs. Among the bank groups, PSBs, FBs and UCBs had net receivable positions *vis-à-vis* the entire financial sector, whereas PVBs and SFBs had net payable positions (Chart 2.33).

2.69 Net receivables of AMC-MFs and insurance companies from the financial system increased during the period September 2021 to September 2022. On the other hand, net payables of PVBs, NBFCs and HFCs increased during the period. PSBs' role as a fund provider to the system has diminished as credit growth outpaced deposit growth for PSBs (Chart 2.34).

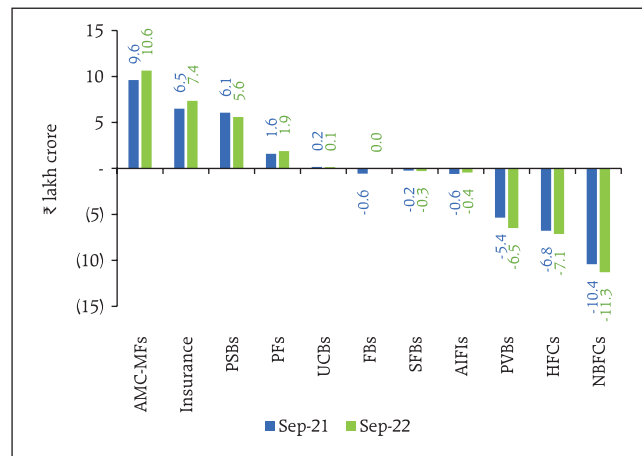
Chart 2.33: Network Plot of the Financial System - September 2022



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

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

Chart 2.34: Net Receivables (+ve) / Payables (-ve) by Institutions



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

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

³⁹ Inter-sectoral exposures do not include transactions among entities of the same sector in the financial system.

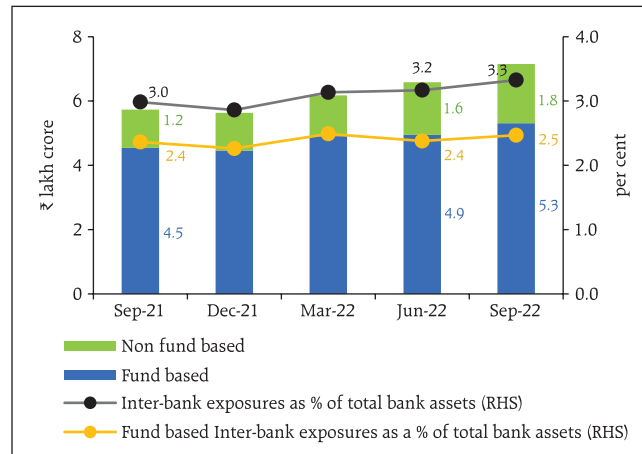
a. Inter-bank Market

2.70 Inter-bank exposures accounted for 3.3 per cent of the total assets of the banking system as of September 2022, with fund-based exposure constituting the major part (2.5 per cent). In absolute terms, both fund-based⁴⁰ and non-fund-based exposures⁴¹ continued to increase (Chart 2.35).

2.71 PSBs remained the dominant player in the inter-bank market, though their share decreased marginally in Q2:2022-23, while the share of PVBs and FBs increased marginally in the same period (Chart 2.36).

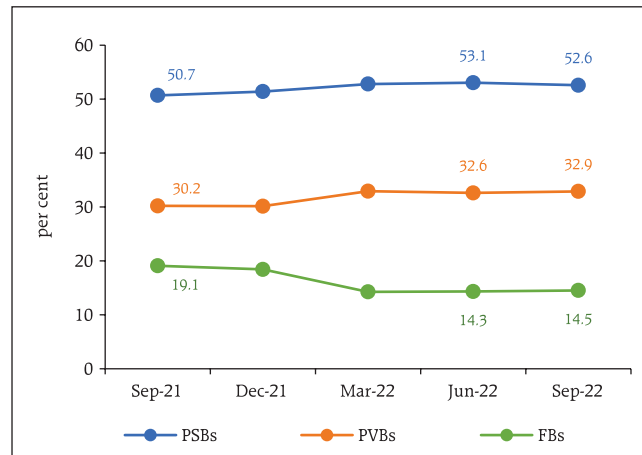
2.72 About 74 per cent of the fund-based inter-bank market was short-term (ST) in nature in which ST deposits had the highest share, followed by ST loans and call money market exposure. Long-term (LT) loans predominated in LT fund-based inter-bank exposures (Chart 2.37).

Chart 2.35: Inter-bank Market



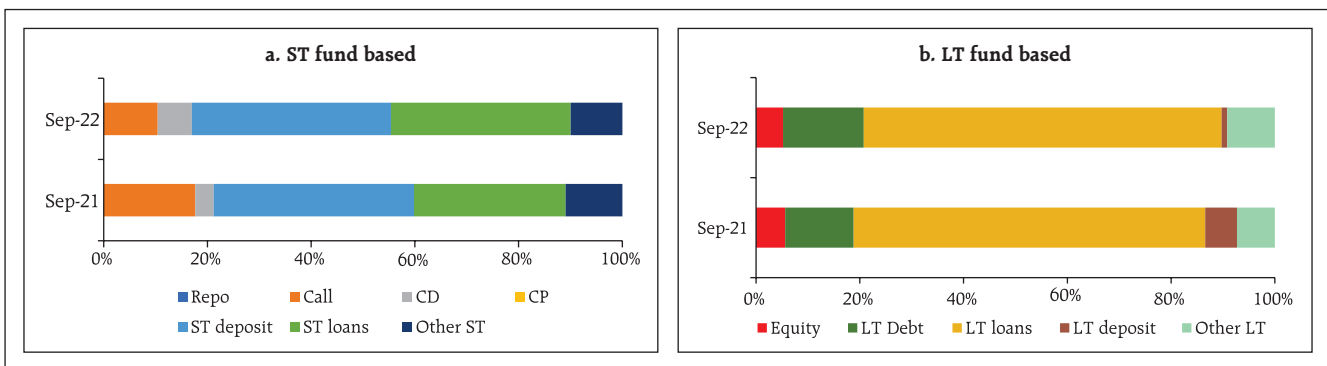
Source: RBI supervisory returns and staff calculations.

Chart 2.36: Different Bank Groups in the Inter-Bank Market - September 2022



Source: RBI supervisory returns and staff calculations.

Chart 2.37: Composition of Fund based Inter-Bank Market



Source: RBI supervisory returns and staff calculations.

⁴⁰ 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.

⁴¹ 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 CCLL).

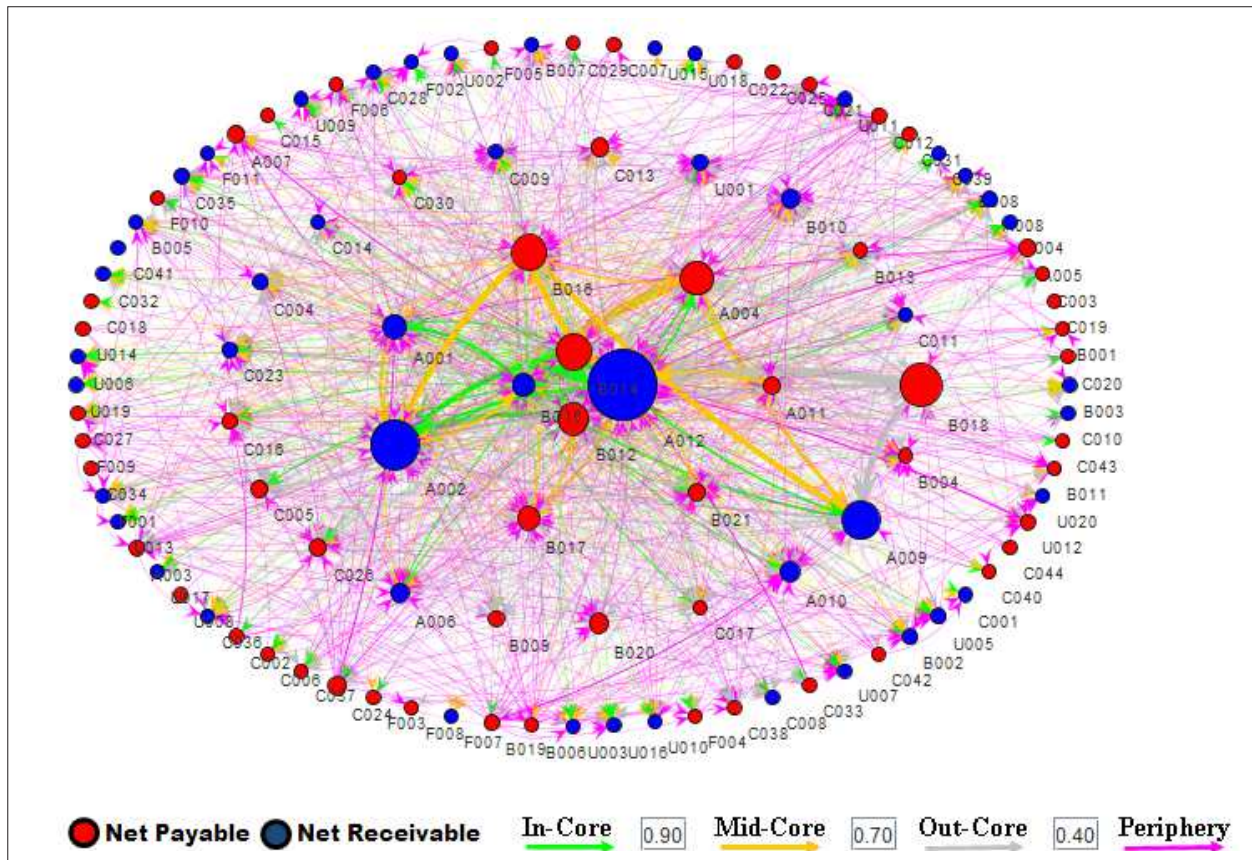
b. Inter-bank Market: Network Structure and Connectivity

2.73 The inter-bank market typically has a core-periphery network structure^{42,43}. As of end-September 2022, four banks were in the innermost core and seven banks in the mid-core circle. The four banks in the innermost core included one large public sector bank and three private sector banks. The banks in

the mid-core were PSBs and PVBs, while most of the old PVBs along with FBs, SUCBs and SFBs formed the periphery (Chart 2.38).

2.74 The degree of interconnectedness in the banking system (SCBs), as measured by the connectivity ratio⁴⁴, increased marginally from March 2022 to September 2022. However, the cluster coefficient⁴⁵ declined to 41.3 per cent in

Chart 2.38: Network Structure of the Indian Banking System (SCBs + SFBs + SUCBs) – September 2022



Source: RBI supervisory returns and staff calculations.

⁴² 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.

⁴³ 77 SCBs, 11 SFBs and 20 SUCBs were considered for this analysis.

⁴⁴ The *Connectivity ratio* measures the actual number of links between the nodes relative to all possible links in a complete network.

⁴⁵ *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.

September 2022 from 42.6 per cent in March 2022 (Chart 2.39).

c. Exposure of AMC-MFs

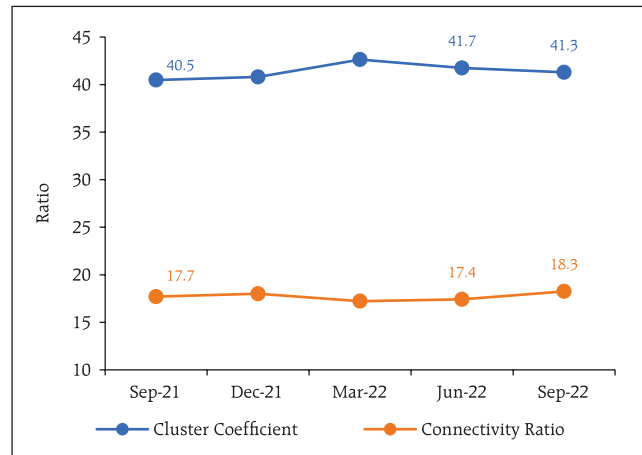
2.75 The gross receivables of AMC-MFs stood at ₹11.49 lakh crore (around 33 per cent of their average AUM) whereas their gross payables were ₹0.85 lakh crore as at end-September 2022. SCBs were the major recipients of their funding. Their receivables from AIFIs also increased, however receivables from NBFCs and HFCs declined (Chart 2.40 a).

2.76 In the asset composition of AMC-MFs, the share of equity holdings continued to increase as the equity inflow to MFs remained buoyant, while the shares of CDs and CPs maintained steady growth sequentially. Furthermore, the share of long-term (LT) debt continued to decline (Chart 2.40 b).

d. Exposure of Insurance Companies

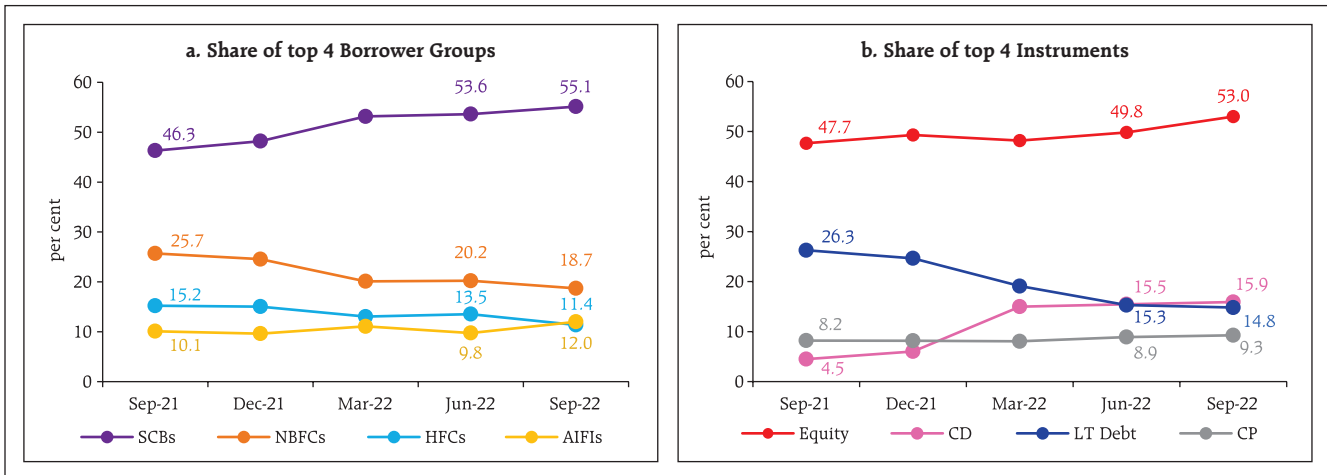
2.77 The gross receivables of insurance companies stood at ₹7.90 lakh crore and gross payables at ₹0.55

Chart 2.39: Connectivity Statistics of the Banking System (SCBs)



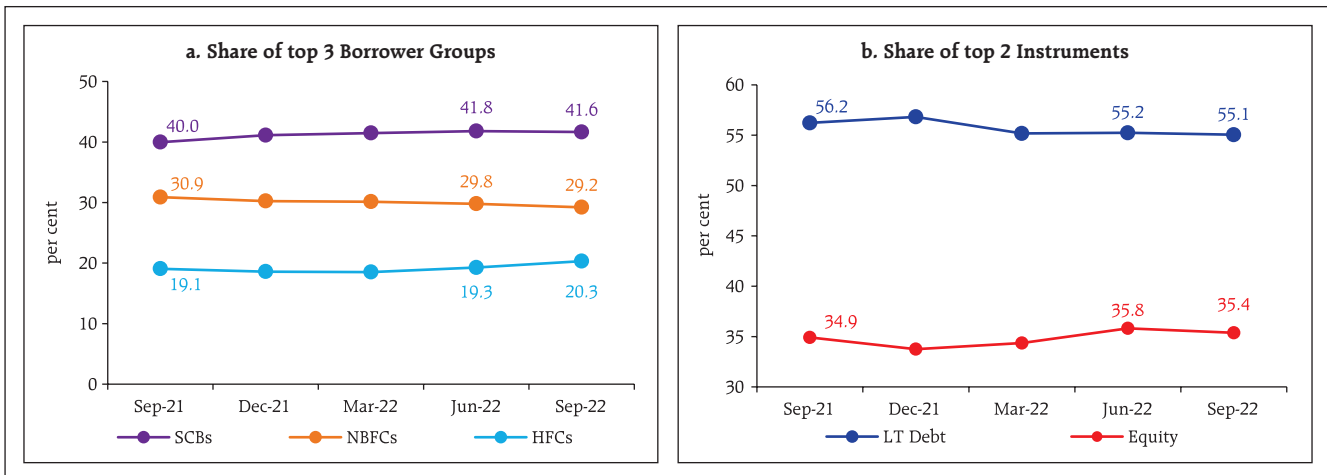
Source: RBI supervisory returns and staff calculations.

Chart 2.40: Gross Receivables of AMC-MFs from the Financial System



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

Chart 2.41: Gross Receivables of Insurance Companies from the Financial System



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

lakh crore in September 2022. SCBs were the largest recipients of their funds, followed by NBFCs and HFCs. More than 90 per cent of their assets were in the form of LT debt and equity (Chart 2.41 a and b).

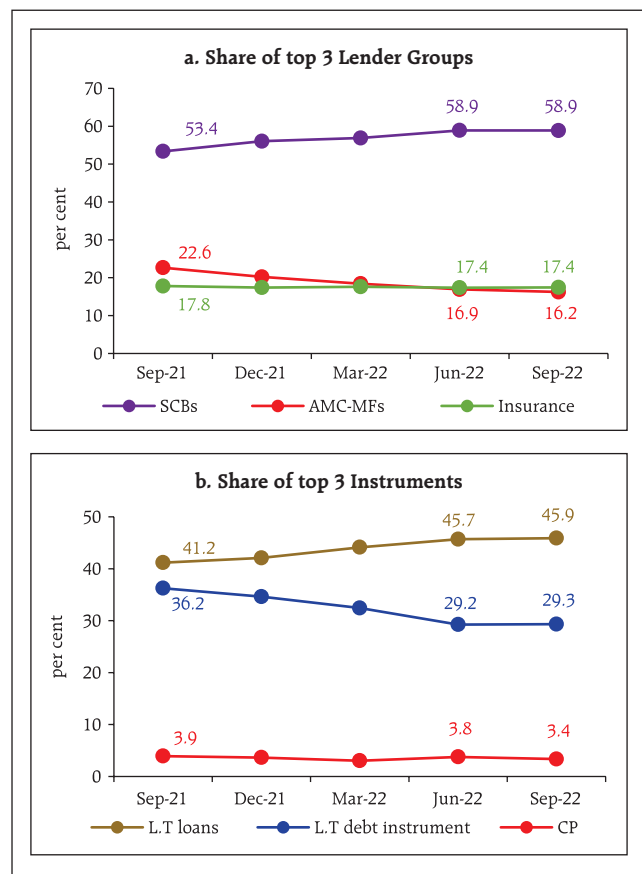
e. Exposure to NBFCs

2.78 NBFCs were the largest net borrowers of funds from the financial system, with gross payables of ₹13.22 lakh crore and gross receivables of ₹1.93 lakh crore as at end-September 2022. Over half of their borrowings were from SCBs and this share remained stable during Q2:2022-23 as their reliance on funding from AMC-MFs continued to reduce (Chart 2.42 a). Instrument wise, the NBFC funding mix saw a marginal rise in LT loans and LT debt instruments whereas the share of CPs declined during Q2:2022-23 (Chart 2.42 b).

f. Exposure to HFCs

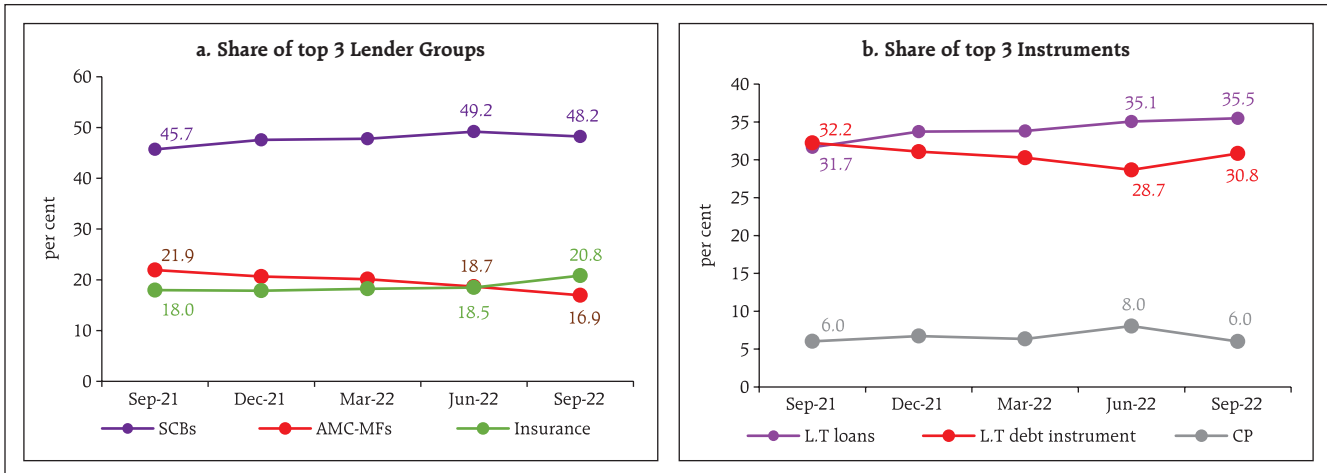
2.79 HFCs were the second largest net borrowers of funds from the financial system, with gross payables of ₹7.70 lakh crore and gross receivables of ₹0.57 lakh crore as at end-September 2022. As in the case of NBFCs, the reliance of HFCs on funding from SCBs has been high; however it declined marginally during the quarter. Their share of borrowings from AMC-MFs is on a declining trend while the share of insurance companies increased significantly in

Chart 2.42: Gross Payables of NBFCs to the Financial System



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

Chart 2.43: Gross Payables of HFCs to the Financial System



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

September quarter (Chart 2.43 a). The proportion of resource mobilisation through LT loans maintained steady growth sequentially. The share of funds mobilised through LT debt instruments and CPs varied through the year (Chart 2.43 b).

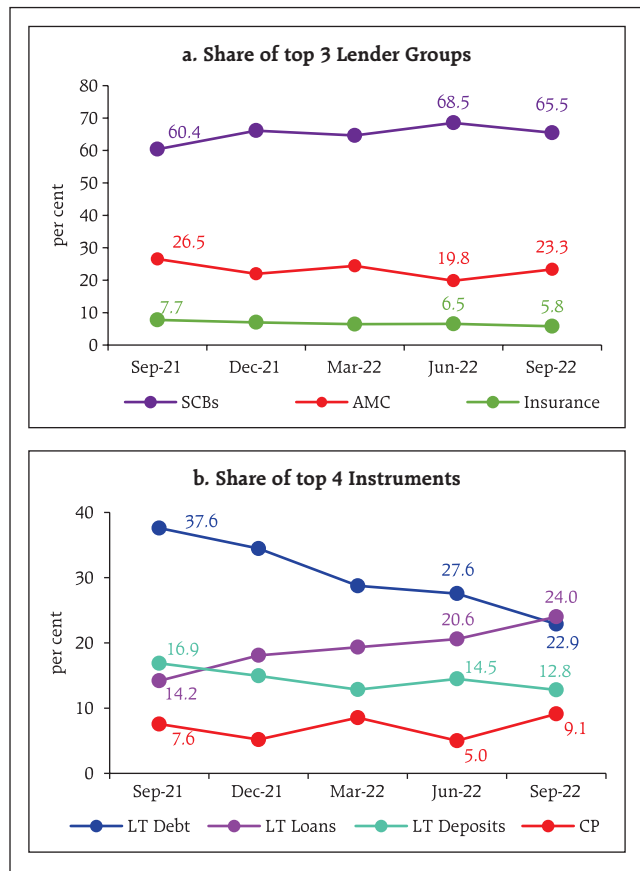
g. Exposure of AIFIs

2.80 AIFIs were net borrowers of funds from the financial system with their gross payables and gross receivables having increased to ₹5.91 lakh crore and ₹5.47 lakh crore, respectively, in September 2022. They raised funds mainly from SCBs (primarily PVBs), AMC-MFs and insurance companies (Chart 2.44 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 59.7 per cent from 68.7 per cent a year ago, and their mobilisation of funds through CPs increased in Q2:2022-23 (Chart 2.44 b).

II.7.2 Contagion Analysis

2.81 Contagion analysis uses network technology to estimate the systemic importance of individual banks. The failure of a systemically important bank leads to solvency and liquidity losses for the banking system. The scale of losses depends on the capital and liquidity positions of banks as well as the extent

Chart 2.44: Gross Payables of AIFIs to the Financial System



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

and nature of exposure (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 Solvency⁴⁶-Liquidity⁴⁷ Contagion Losses for SCBs due to Bank Failure

2.82 A contagion analysis of the banking network based on end-September 2022 position indicates that if the bank with the maximum capacity to cause contagion losses fails, it will cause a solvency loss of 2.49 per cent (as compared with 2.83 per cent in March 2022) of total Tier 1 capital of SCBs and a liquidity loss of 0.31 per cent (0.02 per cent in March 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 would not lead to the failure of any additional bank (Table 2.13).

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

2.83 The failure of any NBFC or HFC would also act as a solvency shock to their lenders depending on the extent of exposure, and solvency losses can spread through contagion.

2.84 By end-September 2022, the idiosyncratic failure of an NBFC with the maximum capacity to cause solvency losses to the banking system would have impacted bank's total Tier 1 capital by 2.63 per cent (as compared with 2.40 per cent in March 2022). In a similar scenario of an HFC failure, the impact on total Tier 1 capital would be 5.90 per cent (5.88 per cent in March 2022). In both cases, however, it would not lead to failure of any bank (Tables 2.14 and 2.15).

Table 2.13: Contagion Losses due to Bank Failure – September 2022

Trigger Code	% of Tier 1 capital of the Banking System	% of HQLA	Number of Bank defaulting due to Solvency	Number of Bank defaulting due to Liquidity
Bank 1	2.49	0.31	0	0
Bank 2	2.18	0.09	0	0
Bank 3	2.11	0.07	0	0
Bank 4	2.04	0.01	0	0
Bank 5	2.00	0.02	0	0

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

Source: RBI supervisory returns and staff calculations.

Table 2.14: Contagion Losses due to NBFC Failure – September 2022

Trigger Code	Solvency Losses as % of Tier 1 Capital of the Banking System	Number of Banks Defaulting due to solvency
NBFC 1	2.63	0
NBFC 2	2.33	0
NBFC 3	1.83	0
NBFC 4	1.79	0
NBFC 5	1.54	0

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

Source: RBI supervisory returns and staff calculations.

Table 2.15: Contagion Losses due to HFC Failure – September 2022

Trigger Code	Solvency Losses as % of Tier 1 Capital of the Banking System	Number of Banks Defaulting due to solvency
HFC 1	5.90	0
HFC 2	4.70	0
HFC 3	1.74	0
HFC 4	1.74	0
HFC 5	1.14	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.

⁴⁶ 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.

⁴⁷ 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.

c. Solvency Contagion Impact⁴⁸ after Macroeconomic Shocks to SCBs

2.85 The contagion from the 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.

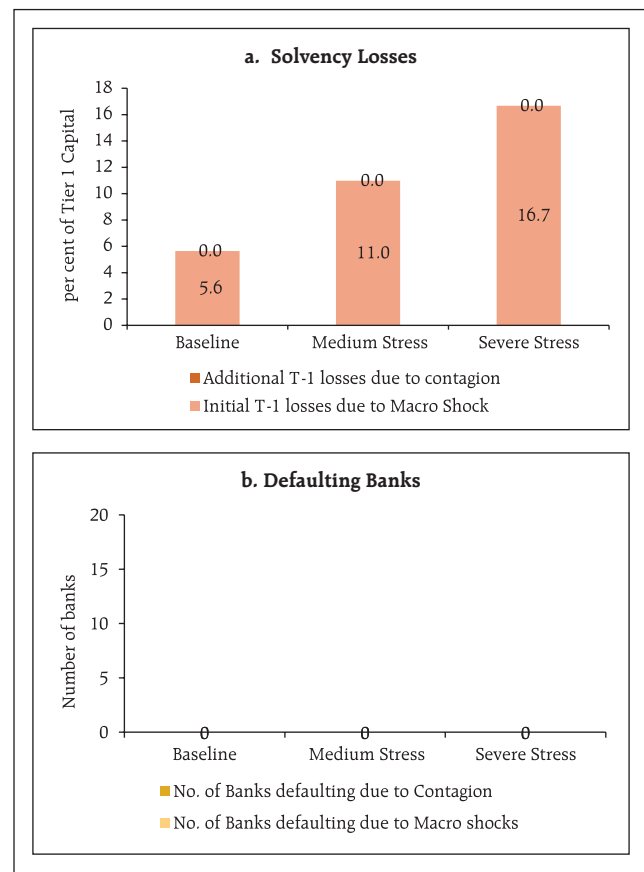
2.86 In the previous iteration, the shock was applied to the entity that could cause the maximum solvency contagion losses. In another iteration in which the initial impact of such a shock on an individual bank's capital is taken from the macro-stress tests⁴⁹, the initial capital loss due to macroeconomic shocks stood at 5.64 per cent, 10.98 per cent and 16.67 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 2.45).

Summary and Outlook

2.87 Keeping pace with the underlying momentum of domestic economic activity, financial sector entities have engaged in active intermediation to support the demand for funds. Lending has moved to a higher trajectory and has become broad based. Capital positions remain strong. The asset quality of banks and NBFCs has improved further, but some deterioration is evident for UCBs. Macro stress tests indicate that SCBs can withstand moderate to severe adverse macroeconomic circumstances without significant capital impairment.

2.88 Sensitivity analysis shows that PVBs and FBs would face lower erosion in CRAR than PSBs, if credit risk materialises, and credit concentration risk may not be substantial. Network analysis results suggest that contagion losses have declined marginally during H1:2022-23. In the case of macroeconomic shocks, there are no additional solvency losses to the banking system due to contagion.

Chart 2.45: Contagion impact of Macroeconomic Shocks (Solvency Contagion)



Note: The projected capital in September, 2023 makes a conservative assumption of minimum profit transfer to capital reserves at 25 per cent and does not take into account any capital infusion by stakeholders.

Source: RBI supervisory returns and staff calculations.

⁴⁸ Failure Criterion for both PSBs and PVBs has been taken as Tier 1 CRAR falling below 7 per cent.

⁴⁹ The contagion analysis used the results of the macro-stress tests and made the following assumptions:

- a) The projected losses under a macro scenario (calculated as reduction in projected Tier 1 CRAR, in percentage terms, in September 2023 with respect to the actual value in September 2022) were applied to the September 2022 capital position assuming proportionally similar balance sheet structures for both September 2022 and September 2023.
- b) Bilateral exposures between financial entities are assumed to be similar for September 2022 and September 2023.

Chapter III

Regulatory Initiatives in the Financial Sector

Global regulatory priorities have shifted back to consolidation of the regulatory framework and protecting the financial system from the knock on effects of an uncertain, volatile and hostile macroeconomic environment. Integrating climate risk into existing frameworks and mitigating the rising cyber risks are major areas of focus. Domestically, the emphasis is on improving the resilience of financial intermediaries, enhancing customer and investor protection, accelerating digitalisation, developing financial markets and strengthening the supervisory architecture. The Financial Stability and Development Council (FSDC) and its Sub-Committee remain steadfast in their commitment to develop a robust and efficient financial system for the Indian economy.

Introduction

3.1 As the global economy transitions through a period of multiple shocks, regulatory efforts are refocusing on building up the resilience of the financial system. Specifically, global regulatory initiatives aim to address fragilities in non-bank financial intermediation and certain segments of financial markets, leveraged lending, cyber risks and crypto assets. Efforts are also on to integrate climate risk into regulatory frameworks.

3.2 Against this backdrop, this chapter reviews the recent regulatory efforts made both internationally and in India to strengthen the stability and efficiency of the financial system.

III.1 Global Regulatory Developments and Assessments

III.1.1 Markets and Financial Stability

3.3 In the light of dislocations in sovereign debt markets, the FSB examined the liquidity, structure, and resilience of core government bond markets and observed that changes in market structure have rendered these markets susceptible to liquidity imbalances during periods of stress¹. According to the FSB, dealers' risk warehousing capacity to

support intermediation is lower than the magnitude of trade flows, especially during times of stress, and non-bank liquidity sources do not seem to enhance market making. Elevated debt levels and increased usage of government bonds by some investors for trading, hedging and liquidity management strategies may have made some investors more susceptible to shocks. Central bank interventions, though effective in alleviating market strains, come with a price and should not replace market participants' responsibilities towards managing their own risks. To improve market resilience, the FSB also suggests policy measures such as enhanced use of central clearing for cash and repo transactions and use of all-to-all (A2A) trading platforms to lessen the need for dealer intermediation.

3.4 Heightened market volatility experienced in March 2020 led to a spike in margin calls across the financial system, for both centrally and non-centrally cleared markets. There was significant dispersion in the size of increases in initial margins (IMs) across and within asset classes. Evidence suggests that transparency around IM models differs across CCPs and jurisdictions. In this context, the BIS and the International Organisation of Securities Commissions (IOSCO) reviewed margining practices²

¹ FSB (2022), "Liquidity in Core Government Bond Markets", October.

² BIS/ IOSCO (2022), "Review of margining practices", September.

and suggested areas for further policy work such as increasing transparency in centrally cleared markets through consistent metrics and disclosures concerning procyclicality. They also recommend improving disclosures about liquidity, identifying data gaps in regulatory reporting and streamlining variation margin (VM) processes in centrally and non-centrally cleared markets.

3.5 In its statement on financial reporting and disclosure during economic uncertainty³, the IOSCO has emphasised that auditors have the responsibility of establishing and maintaining effective internal controls over financial reporting, and providing transparent, entity-specific disclosures to investors about the current and future effects of economic uncertainty.

3.6 The FSB published a progress report on enhancing the resilience of non-bank financial intermediation (NBFI)⁴. This was aimed at assessing and addressing vulnerabilities in specific NBFI areas that may have contributed to the build-up of liquidity imbalances and their amplification in times of stress. These areas include money market funds, open-ended funds, margining practices, bond market liquidity and fragilities in USD cross-border funding. The policy proposals aim to: reduce liquidity demand spikes; enhance the resilience of liquidity supply in stress; and enhance risk monitoring and the preparedness of authorities and market participants. They involve largely repurposing existing policy tools rather than creating new ones, given the extensive micro-prudential and investor protection toolkit already available. The FSB will assess in due course whether repurposing such tools is sufficient to address systemic risk in NBFI, including the need to develop additional tools for use by authorities.

III.1.2 Climate Related Risks and Financial Stability

3.7 The FSB's final report on regulatory approaches to climate-related risks⁵ has highlighted the need for policy authorities to focus on defining, identifying, and gathering climate-related data and indicators that can help with monitoring and assessing climate risk as well as arrive at common definitions for different risks.

3.8 The report also notes that microprudential tools alone may not sufficiently address the cross-sectoral, global and systemic dimensions of climate-related risks. Authorities should take into account the possible extensive effects of climate-related risks on the financial system and develop macroprudential tools by expanding the use of climate scenario analysis and stress testing, with research and analysis on appropriate enhancements to regulatory frameworks.

III.1.3 Crypto Assets and Financial Stability

3.9 The FSB has proposed a framework for the international regulation of crypto assets activities⁶. It observed that the turmoil in crypto assets market highlights their intrinsic volatility and structural vulnerabilities whereas their interconnectedness with the traditional financial system is increasing. Its recommendations seek to promote international consistency on regulatory and supervisory approaches, which are grounded in the principle of "same activity, same risk, same regulation" approach. The framework proposes that authorities should have appropriate powers, tools and resources to regulate, supervise, and oversee crypto assets activities and markets, both domestically and internationally, proportionate to the financial stability risk they pose. In addition, the

³ IOSCO (2022), "IOSCO Statement on Financial Reporting and Disclosure during Economic Uncertainty", November.

⁴ FSB (2022), "Enhancing the Resilience of Non-Bank Financial Intermediation – Progress Report", November.

⁵ FSB (2022), "Supervisory and Regulatory Approaches to Climate-related Risks", April.

⁶ FSB (2022), "Regulation, Supervision and Oversight of Crypto-Asset Activities and Markets", October.

recommendations include, but are not limited to, promoting comprehensive governance and effective risk management frameworks, addressing financial stability risks that arise from interconnectedness and developing an appropriate disclosure framework.

3.10 The Basel Committee prescribed a global minimum prudential treatment for banks' exposures to crypto assets to mitigate the risk from crypto assets, which was endorsed by the Governors and Heads of Supervision (GHOS) on December 16, 2022⁷. Under the new standard, banks are required to classify crypto assets on an ongoing basis into the following two groups, where those in Group 2 will be subjected to newly prescribed conservative capital treatment effective from January 1, 2025:

- a. Group 1:
 - those including tokenised traditional assets; and
 - those with effective stabilisation mechanisms that are subject to capital requirements based on the risk weights of underlying exposures as set out in the existing Basel Framework; and
- b. Group 2:
 - those that pose additional risks compared with Group 1. This includes all unbacked crypto assets along with any tokenised traditional assets and stablecoins that fail certain classification conditions.

3.11 The new standard includes description of how the operational risk, liquidity, leverage ratio and large exposure requirements would be applied to banks' crypto assets exposure.

III.1.4 Financial Innovation and Financial Stability

3.12 The IOSCO report on innovation facilitators (IFs) has highlighted the use of financial technology to enhance risk management, compliance, and supervision⁸. It covers three types of IFs, *viz.*, innovation hubs, regulatory sandboxes and regulatory accelerators. Innovation hubs and regulatory sandboxes may provide regulators with additional market intelligence and can constitute a source for understanding potential risks and mitigating elements. While establishing IFs, authorities should undertake a comprehensive analysis of function, scope and structure along with potential impact on investor protection, market integrity and financial stability. Test scenarios, expected outcomes and the target audience should be properly defined, and authorities should engage with key stakeholders, industry associations and other relevant authorities to address regulatory barriers for beneficial innovations.

III.1.5 Cyber Risk and Financial Stability

3.13 The FSB's consultative document on cyber incident reporting has proposed greater convergence in cyber incident reporting (CIR) for enhancing cyber resilience of the financial system⁹. It has set out recommendations to address operational challenges arising from the process of collection of information as well as reporting of cyber incidents to multiple authorities, especially during the early stages of a cyber incident when confidence may be low about the cause and probable impact of the incident. The consultation also covers establishing common terminologies related to cyber incidents and the proposal to develop a common format for incident reporting exchange (FIRE). Harmonised CIR schemes necessitate a common language and common definition and understanding of what constitutes

⁷ BIS (2022), "Prudential treatment of cryptoasset exposures", December.

⁸ IOSCO (2022), "The Use of Innovation Facilitators in Growth and Emerging Markets", July.

⁹ FSB (2022), "Achieving Greater Convergence in Cyber Incident Reporting", October.

a cyber incident, so as to avoid over reporting of incidents. A review of incident reporting templates and stocktake of authorities' cyber incident reporting regimes indicated a high degree of commonality in the information requirements for cyber incident reports. Building on this, it is proposed to develop a common reporting format that could be further considered among financial institutions.

3.14 The BIS working paper on cyber risk in central banking has highlighted phishing and social engineering as the most common methods of cyber attacks related to central banks. The growing adoption of cloud based services as well as the shift to remote work has key implications for cyber security strategies¹⁰. In the absence of a well defined perimeter, one of the challenges of cloud adoption relates to information security being threatened by

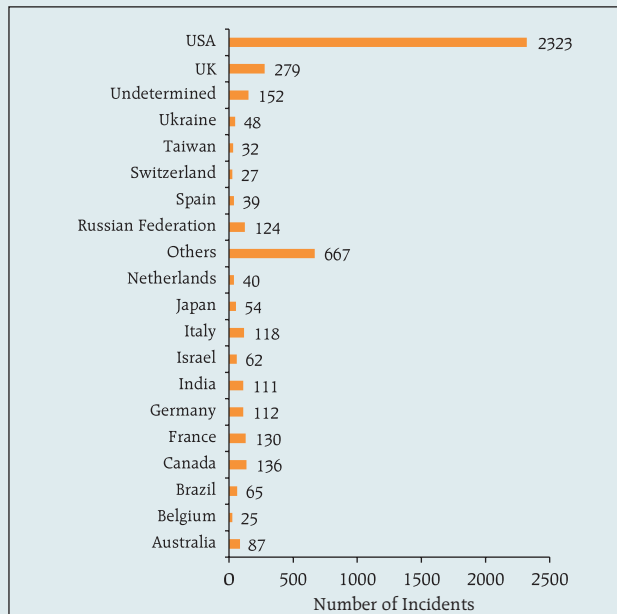
lack of consistently applied security controls. The BIS survey reveals that central banks have notably increased their investments in cyber security since 2020, giving priority to technical security control and resiliency and focussing on developing incident response plans. While integrated operational risk management and third-party vendor management are key concerns for AE central banks, addressing cyber security skills shortage is important among central banks in EMEs.

3.15 From a financial stability perspective, cyber risk involves both micro and macroprudential concerns as it could weaken financial intermediation. Major cyber shocks may exacerbate liquidity risk and consequent fire-sale of assets for firms. Thus, cybersecurity measures and regulations are receiving greater attention from policymakers (Box 3.1).

Box 3.1: Strengthening of Cyber Security Preparedness

Cyber attacks are increasing across the globe (Chart 1), as threat actors use increasingly advanced and malicious tactics to perpetrate cyber crimes.

Chart 1: Global Cyber Attacks Events: Country-Wise (2020-22)



Note: Data updated till November 18, 2022.
Source: University of Maryland CISSM Cyber Attacks Database.

Cyber incidents have several dimensions and can be broadly classified by type, motive and industry. The European Union Agency for Cybersecurity (ENISA) "Threat Landscape 2022" has observed that the attacks are mostly targeted towards public administration and digital service providers. In addition, consistent attacks on finance and health sector are observed to steal bank details and personal data. The Centre for International Security Studies at Maryland (CISSM) global database shows that cyber attacks are concentrated in centres associated with public administration, scientific and technical services, healthcare and educational services, where espionage, financial gains and sabotage are some of the common motives (Chart 2).

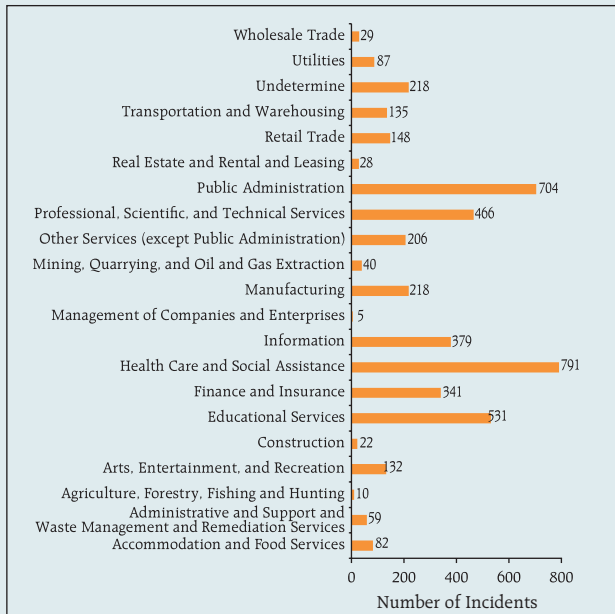
In India, financial motivation is observed as the primary driving force of cyber attacks, while exploitation of application server and data attack are among the most frequent types (Charts 3, 4 and 5). In many cases, the origin/ source of attack remains unknown, highlighting concerns about data gaps, incident reporting and imperfect judgement of the threat landscape.

Systemic cyber resilience stress tests and cyber mapping for identifying systemically important nodes can be

(Contd.)

¹⁰ BIS (2022), "Cyber risk in central banking", September.

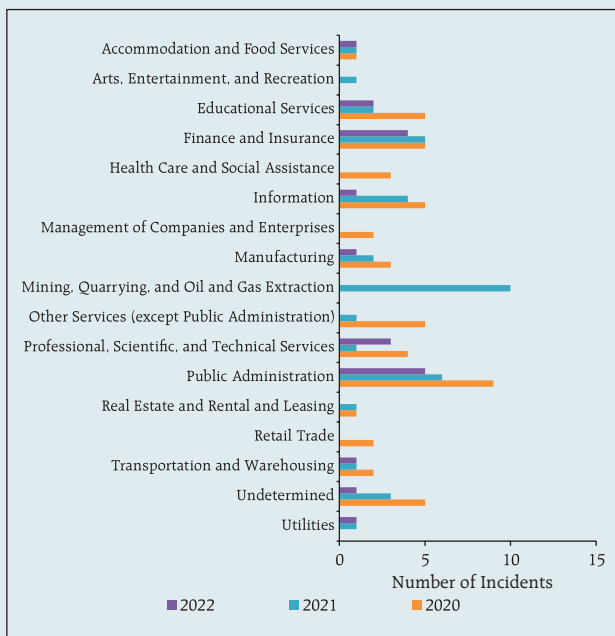
Chart 2: Global Cyber Attacks Events: By Industry (2020-22)



Note: Data updated till November 18, 2022.
Source: University of Maryland CISSM Cyber Attacks Database.

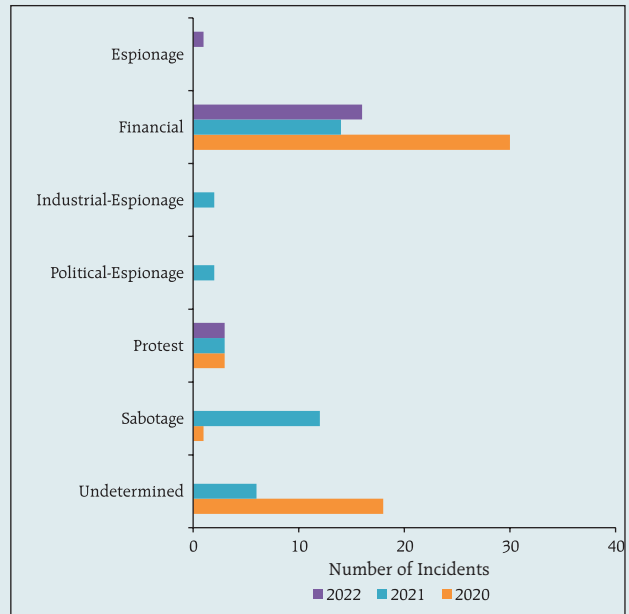
used to improve cyber resilience across industries when information is aggregated into a cyber resilience index (CRI). Remote work and adoption of cloud based services by financial institutions has created additional security challenges.

Chart 3: Cyber Attacks Events in India: By Industry (2020-22)



Note: Data updated till November 18, 2022.
Source: University of Maryland CISSM Cyber Attacks Database.

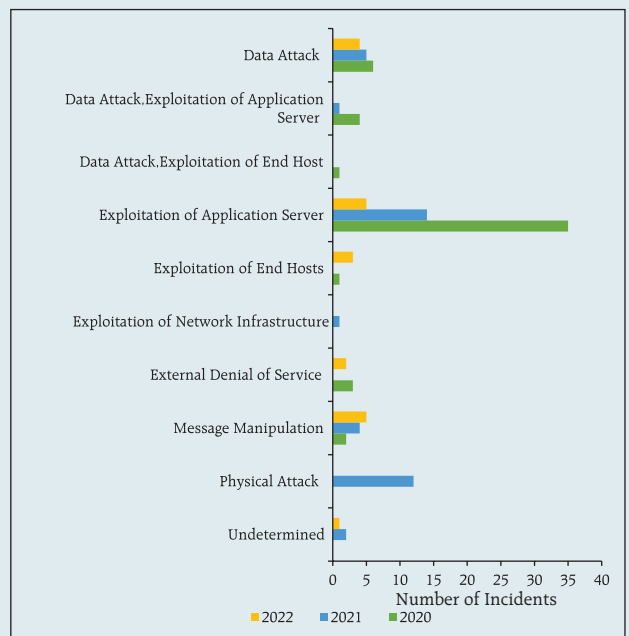
Chart 4: Cyber Attacks Events in India: By Motives (2020-22)



Note: Data updated till November 18, 2022.
Source: University of Maryland CISSM Cyber Attacks Database.

In the Indian context, the Reserve Bank has taken various initiatives to increase cyber resilience at both institutional and system-wide levels, including issuance of directions to supervised entities (SEs), timely guidance on tackling emerging cyber security challenges and threats:

Chart 5: Cyber Attacks Events in India: By Type (2020-22)



Note: Data updated till November 18, 2022.
Source: University of Maryland CISSM Cyber Attacks Database. (Contd.)

- (i) a master direction (MD) on digital payment security controls was issued on February 18, 2021 to Regulated Entities (REs), which provides minimum standards of security controls for digital payment products and services to help mitigate risks associated with digital transactions;
- (ii) a draft MD on the risk originating from exposure of financial institutions to service providers due to outsourcing of IT activities/ services was released for public comments on June 23, 2022 and feedbacks received is being examined;
- (iii) public comments have also been sought on a draft MD released on October 20, 2022 on information technology governance, risk, controls and assurance practices as part of operational risk management and feedback received is being examined.

Similarly, the Computer Security Incident Response Team-Finance Sector (CSIRT-Fin) is also identifying

gaps and systemic risks through incident analysis and providing recommendations to enhance resilience of financial sector.

As the frequency and sophistication of cyber attacks amplify in tune with accelerated digitalisation, continuous monitoring of emerging risks is vital. In this context, under India's G20 presidency, reporting framework for global cooperation for strengthening the cyber resilience of the financial sector remains a priority.

References:

- 1) European Union Agency for Cyber Security (2022), "ENISA Threat Landscape", November.
- 2) Harry, C., and Gallagher, N. (2018), "Classifying cyber events". *Journal of Information Warfare*, 17(3), 17-31.
- 3) BIS (2022), "Cyber risk in central banking", September.

III.2 Domestic Regulatory Developments

3.16 Since the publication of the June 2022 issue of the FSR, the Financial Stability and Development Council (FSDC), chaired by the Union Finance Minister, met once on September 15, 2022. The Council deliberated on early warning indicators for the economy, improving the efficiency of the existing financial/ credit information systems, issues of governance and management in systemically important financial institutions (SIFIs) including FMIs, strengthening the cyber security framework in financial sector, common know-your-customer (KYC) for all financial services and related matters, status of the account aggregator (AA) framework, issues relating to financing of the power sector, the strategic role of the International Financial Services Centre (IFSC) in India, inter-regulatory issues relating to Gujarat International Finance Tec-City (GIFT) - IFSC, and the need for utilisation of the services of registered valuers by all government departments. The Council noted that there is a need to monitor financial sector risks and market developments on a continuous basis to ensure appropriate and timely action for strengthening financial stability. The

Council also took note of the preparations in respect of financial sector issues to be taken up during India's G-20 Presidency.

3.17 In its 29th meeting held in November 2022, the FSDC Sub-Committee reviewed major global and domestic developments as also in various segments of the financial system. The deliberations covered regulatory issues, the activities of the technical groups under the Sub-Committee and the functioning of the State Level Coordination Committees (SLCCs) in various States/ UTs. Members resolved to remain vigilant and proactive to ensure that financial markets and financial institutions remained resilient amidst destabilising global spillovers.

III.3 Initiatives from Regulators/ Authorities

3.18 Regulators undertook several initiatives to improve robustness and resilience of the Indian financial system (Annex 3).

III.3.1 Reserve Bank of India (Unhedged Foreign Currency Exposure) Directions, 2022

3.19 Entities which do not hedge their foreign currency exposures can incur significant losses

during a period of heightened volatility in foreign exchange rates. These losses may reduce their capacity to service the loans taken from banks and increase their probability of default thereby affecting the health of the banking system.

3.20 To address the risk emanating from banks' exposure to entities having Unhedged Foreign Currency Exposure (UFCE), several guidelines / instructions were put in place starting from October 1999. A review of these guidelines was undertaken and consolidated as master directions to all commercial banks (excluding payments banks and RRBs). Some of the key changes incorporated in the directions *ibid.* to provide clarity/ reduce compliance burden are as under:

- a) Exemption from UFCE guidelines: Banks' exposures to entities arising from derivative transactions were exempted, provided such entities have no other exposures to banks in India. This exemption has been expanded to include factoring transactions.
- b) Alternative method for exposure to smaller entities: To reduce the compliance burden, the threshold for 'smaller entities' based on total exposure from banking system has been revised to ₹50 crore (up from ₹25 crore). For such entities, banks will not be required to periodically obtain hedging information.

III.3.2 Review of Regulatory Framework for ARCs

3.21 Asset reconstruction companies (ARCs) play a vital role in the management of distressed financial assets of banks and financial institutions. Based on the recommendations of a Committee set up by the Reserve Bank to undertake a comprehensive review of their working, the extant regulatory framework has been amended to strengthen governance norms, enhance transparency and disclosures, strengthen prudential requirement and increase the efficacy of ARCs. The guidelines *inter alia*

mandate an independent director as Chair of the Board, maximum continuous tenure of 15 years for the Managing Director (MD)/ Chief Executive Officer (CEO) and wholtime Directors, constitution of an Audit Committee and a Nomination and Remuneration Committee. ARCs are required to disclose the information about the track record, rating migration and engagement with rating agency of schemes floated by them over the last eight years.

3.22 From a prudential perspective, the minimum net owned fund (NOF) of ARCs has been increased to ₹300 crore. They are required to invest in security receipts (SRs) at a minimum of the higher of the 15 per cent of transferors' investment in the SRs or 2.5 per cent of the total SRs issued. ARCs are also permitted to act as resolution applicant under the Insolvency and Bankruptcy Code (IBC), 2016, subject to certain conditions. Lenders can now transfer all categories of special mention accounts to ARCs. Furthermore, the avenues for deployment of surplus funds have been broadened. Linking the collection of management fee/ incentive to the recovery effected from the underlying financial assets is expected to shift the focus of ARCs from a management fee mindset to resolution mindset.

III.3.3 Regulations Review Authority 2.0

3.23 The Regulations Review Authority 2.0 (RRA) was set up by the Reserve Bank in 2021 with the objective of *inter alia* enhancing the ease of compliance for regulated entities (REs). Based on internal and external review process, the RRA made recommendations on reduction of regulatory burden, rationalisation of reporting mechanism and streamlining of regulatory instructions and communication. For further ease of access to information, a 'Regulatory Reporting' portal has been created within the RBI website, which contains information relating to statutory, regulatory and supervisory returns at a single source. For dissemination among the REs and stakeholders, press releases recommending withdrawal of certain

regulatory instructions and discontinuation/ merger/ online submission of returns were issued.

III.3.4. Regulatory changes undertaken in respect of Urban Cooperative banks

3.24 The Reserve Bank had formed an Expert Committee on UCBs in 2021. The recommendations of the Committee have since been examined for implementation duly factoring in the feedback received. The major recommendations, which have been accepted/ accepted with modification include:

- (a) Adoption of a simple four-tiered regulatory framework with differentiated regulatory prescriptions aimed at strengthening the financial soundness of the existing UCBs. Specifically, 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) have been stipulated. The UCBs which do not meet the requirement, have been provided with a glide path to facilitate smooth transition to revised norms.
- (b) Revision of minimum CRAR to 12 per cent to strengthen the capital structure of Tier 2, Tier 3 and Tier 4 UCBs. UCBs which do not meet the revised CRAR have been provided with a glide path for achieving the same in a phased manner¹¹. For Tier 1 UCBs, CRAR is retained at 9 per cent.
- (c) Introduction of automatic route for branch expansion to UCBs which meet the revised financially sound and well managed (FSWM) criteria and permitting them to open new branches up to 10 per cent of the number of branches as at the end of the previous financial year,

subject to a minimum of one branch and a maximum of five branches. Apart from the above, the branch expansion through the approval route under the existing framework will also continue.

- (d) Assignment of risk weights for housing loans based on Loan to Value (LTV) Ratio alone, which would result in capital savings.
- (e) Inclusion of revaluation reserves in Tier I capital subject to applicable discount on the lines of scheduled commercial banks.

III.3.5 Appointment of Internal Ombudsman by the Credit Information Companies

3.25 With a view to strengthening and improving the efficiency of the internal grievance redressal mechanism of credit information companies (CICs), it has been decided to bring the CICs under the Internal Ombudsman (IO) framework. The Directions *inter alia* cover the appointment/ tenure, role and responsibilities, procedural guidelines and oversight mechanism for the IO. Under the mechanism, all complaints that are partly or wholly rejected by CICs will be reviewed by the IO before the final decision of the CIC is conveyed to the complainant. The IO will not entertain any complaint directly from the members of the public. The implementation of the IO mechanism will be monitored by the CIC's internal audit system, apart from regulatory oversight by the Reserve Bank.

III.3.6 Guidelines on Digital Lending

3.26 Based on the recommendations made by the Working Group on Digital Lending, the Reserve Bank issued guidelines on digital lending applicable to all commercial banks, primary (urban) co-operative banks, state co-operative banks, district central

¹¹ Tier 1 - All unit UCBs and salary earner's 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.

co-operative banks and non-banking financial companies, including housing finance companies (collectively referred to as REs). The guidelines seek to achieve transparency and fairness *inter alia* by (a) mandating flow of funds between lenders and borrowers only through their bank accounts without any pass-through account/ pool account of any third party; (b) ensuring loan service providers do not collect any fee/charges directly from the customer; (c) transparent disclosure of the key facts of the borrowing arrangement including the all-inclusive cost to a borrower; (d) ensuring need based collection of data with audit trails backed by explicit customer consent; and (e) putting in place an appropriate privacy policy with regard to customer data.

3.27 Further, it has been reiterated that the outsourcing arrangements entered by REs with a lending service provider (LSP)/ digital lending app (DLA) do not diminish the REs' obligations and they shall continue to conform to the extant guidelines on outsourcing. The REs shall ensure that the LSPs engaged by them and the DLAs (either of the RE or of the LSP engaged by them) comply with the guidelines.

III.3.7 Liberalisation of Forex Flows

3.28 The Reserve Bank has been continuously monitoring liquidity conditions in the forex market to ensure orderly market functioning. The following measures were announced to enhance forex inflows and to diversify the sources of forex funding, mitigate volatility and dampen global spillovers: (a) CRR and SLR exemption on incremental foreign currency non-resident (banks) accounts {FCNR(B)} and non-resident (external) account (NRE) term deposits¹²; (b) temporary relaxation in the restrictions with respect to interest rates on FCNR(B) and NRE deposits;

(c) regulatory changes to encourage FPI in debt instruments; (d) permitting authorised dealer (AD) banks' lending for a wider set of end-use purposes to facilitate foreign currency borrowing by a larger set of borrowers; and (e) doubling of limit under the automatic route of ECB and increase in the all-in cost ceiling for investment grade rating borrowers. These measures lapsed on October 31, 2022, except for the measure on ECB, which would be available till December 31, 2022.

III.3.8 International Trade Settlement in Indian Rupees

3.29 In order to promote trade with emphasis on exports from India and to support the increasing interest of the global trading community in INR, an additional arrangement has been put in place for invoicing, payment and settlement of exports/ imports in INR. Under the Foreign Exchange Management Act, (FEMA), 1999 the broad framework for cross border trade transactions in INR is: (a) all exports and imports under this arrangement may be denominated and invoiced in INR; (b) the exchange rate between the currencies of two trading partner countries may be market determined; and (c) settlement of trade transactions under this arrangement shall take place in INR. Accordingly, subject to prior approval from the Reserve Bank, Authorised Dealer (AD) banks in India are permitted to open Special Rupee Vostro Accounts of correspondent bank/s of the partner trading country for settlement of trade transactions, and Indian exporters may receive advance payment in INR against exports from overseas importers through this channel.

¹² CRR/SLR exemptions were valid for deposits raised till November 04, 2022.

III.3.9 Master Directions on Transfer of Loan Exposures and Securitisation of Standard Assets (Amendments)

3.30 Master Direction on Transfer of Loan Exposure was amended to *inter alia* permit overseas branches of specified lenders to (a) acquire only 'not in default' loan exposures from a financial entity operating and regulated as a bank in the host jurisdiction; (b) transfer exposures 'in default' as well as 'not in default' pertaining to resident entities to a financial entity operating and regulated as a bank in the host jurisdiction; and (c) transfer exposures 'in default' as well as 'not in default' pertaining to non-residents, to any entity regulated by a financial sector regulator in the host jurisdiction. Amendments have also been made in certain provisions related to minimum holding period (MHP), valuation of security receipts (SRs), transfer of stressed loans to ARCs, and credit/investment exposure of lenders. Additionally, the term 'Economic Interest' has now been explicitly defined as 'the risks and rewards that may arise out of loan exposure through the life of the loan exposure'.

3.31 In December 2022, the Reserve Bank, disallowed securitisation of loans with residual maturity of less than 365 days. Furthermore, it was clarified that the minimum holding period (MHP) for commercial or residential real estate mortgages shall be counted from the date of full disbursement of the loan, or registration of security interest with the Central Registry of Securitisation Asset Reconstruction and Security Interest of India (CERSAI), whichever is later. For the purpose of these directions, the said amendment has further explained that the minimum ticket size for issuance of securitisation notes refers to the size of investment by a single investor and shall be ₹1 crore.

III.3.10 Outsourcing of Financial Services - Responsibilities of regulated entities employing Recovery Agents

3.32 The Reserve Bank of India has been addressing the issues relating to recovery agents (RAs) engaged by the REs. Given the growing incidences of unacceptable practices followed by RAs, the Reserve Bank issued additional instructions to REs *inter alia* extending the scope of the guidelines to cover more REs and specifying permissible hours of calling borrowers for recovery of overdue loans. The REs were also advised to strictly ensure that they or their RAs do not resort to intimidation or harassment of any kind, either verbal or physical, against any person in their debt collection efforts, including acts intended to humiliate publicly or intrude upon the privacy of the debtors' family members, referees and friends, sending inappropriate messages either on mobile or through social media, etc. These instructions were made applicable to all commercial banks (excluding payments banks), AIFIs, NBFCs, UCBs, StCBs, CCBs, and ARCs. However, these instructions are not applicable to microfinance loans covered under 'Master Direction – Reserve Bank of India (Regulatory Framework for Microfinance Loans) Directions, 2022', dated March 14, 2022.

III.3.11 Identification of NBFCs in the Upper Layer

3.33 Considering the evolution of NBFCs in terms of size, complexity, and interconnectedness within the financial sector, the Reserve Bank had issued 'Scale Based Regulation (SBR): A Revised Regulatory Framework for NBFCs' on October 22, 2021 to align the regulations for NBFCs with their changing risk profile. The framework categorised NBFCs in Base Layer (NBFC-BL), Middle Layer (NBFC-ML), Upper Layer (NBFC-UL) and Top Layer (NBFC-TL) and stated that the Upper Layer shall comprise those NBFCs which are specifically identified by the Reserve Bank, based on a set of parameters and scoring

methodology as provided in the framework. The top ten NBFCs in terms of their asset size shall always reside in the Upper Layer. Accordingly, a list of sixteen NBFCs categorised as NBFC-UL was released on September 30, 2022.

III.3.12 Regulatory framework for NBFC - Account Aggregators (Amendments)

3.34 To facilitate cash flow-based lending to MSMEs, it has been decided to include the Goods and Services Tax Network (GSTN) as a Financial Information Provider (FIP) under the Account Aggregator (AA) framework. The Department of Revenue shall be the regulator of the GSTN for this specific purpose and Goods and Services Tax (GST) Returns *viz.* Form GSTR-1 and Form GSTR-3B, shall be the Financial Information.

III.3.13 Digital Rupee (e₹) – Wholesale and Retail

3.35 Digital Rupee (e₹), the CBDC in India, is similar to the physical currency in terms of being a legal tender, accepted as a medium of payment and a safe store of value. The e₹ will provide an additional form of money to be used by the public.

3.36 A pilot for e₹ in the wholesale segment (e₹-W) for settlement of secondary market transactions in government securities, was launched on November 1, 2022 with the participation of nine banks. It is expected to make the inter-bank market more efficient and reduce transaction costs by pre-empting the need for settlement guarantee infrastructure or for collateral to mitigate settlement risk. Based on the learnings from this pilot, other wholesale transactions and cross-border payments will be the focus of future pilots.

3.37 The first pilot e₹ in the retail segment (e₹-R) was launched on December 1, 2022 in select locations in a closed user group comprising customers and merchants across the country. The first phase has

begun with four banks, and more banks will join this pilot subsequently. The e₹-R pilot will provide the public with a risk-free medium of exchange as it represents a direct liability of the central bank, with features of physical cash like trust, safety and immediate settlement finality in digital transactions. During this pilot, use cases of person-to-person (P2P) and person-to-merchant (P2M) transactions in a closed user group are being tested. It will also test the robustness of the entire process of digital rupee creation, distribution and retail usage in real time. Based on the learnings from the current pilot, other features and applications of e₹ token and architecture may be tested in future pilots.

III. 3.14 Move towards frictionless credit - Pilot on digitisation of Kisan Credit Card

3.38 Considering the challenges associated with rural credit in India, digitalisation of its various aspects has emerged as an important objective for the Reserve Bank. To start with, a pilot project for end-to-end digitalisation of Kisan Credit Card (KCC) lending, has been developed by the Reserve Bank Innovation Hub (RBIH) under the Reserve Bank's guidance. The Digital KCC pilot aims to significantly reduce the turn around time (TAT) of KCC applications by automating and enabling end-to-end digitisation of key processes such as automation of a bank's loan origination system (LOS) and its integration with the state government's land record database through application programme interfaces (APIs) to enable the real-time verification of land record data.

3.39 The pilot is being carried out in select districts of two states, *viz.*, Madhya Pradesh and Tamil Nadu. Work to further scale up the pilot in other districts of these two states as also across more states in partnership with other banks is underway.

3.40 This pilot project on digitalisation of KCC lending is expected to play a pivotal role in facilitating

credit flow to the unserved and underserved rural population by making the credit process faster and more efficient. When fully implemented, this is expected to transform the rural credit delivery system of the country.

III.3.15 Enabling framework for Regulatory Sandbox

3.41 The Reserve Bank issued standard operating procedure (SOP) for Interoperable Regulatory Sandbox (IoRS) to facilitate testing of innovative products/ services whose business models/ activities/ features fall within the regulatory ambit of more than one financial sector regulator. The SOP for IoRS has been prepared by the Inter-Regulatory Technical Group on FinTech (IRTG on FinTech). The regulatory sandbox framework of the regulator under whose remit the 'dominant feature' of the product falls, shall govern it as 'Principal Regulator (PR)'. The regulator/s under whose remit the other features apart from the dominant feature of the product fall shall be the 'Associate Regulator (AR)'. The test design shall be finalised by the PR in consultation with the AR.

III.3.16 Customer Protection

3.42 The number of complaints received by the Offices of the Reserve Bank of India Ombudsman (ORBIOs) for the previous two quarters under the Reserve Bank – Integrated Ombudsman Scheme (RB-IOS), 2021 indicates that the complaints relating to loans and advances (including credit cards) constitute nearly 40 per cent of the total complaints received during Q1 and Q2 of 2022-23 (Table 3.1). Complaints relating to mobile/ electronic banking, deposit accounts, automatic teller/ cash deposit machines and debit cards also had a significant share. The number of complaints, however, as a percentage of total transactions/business was negligible.

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

Grounds of Complaint	April to June 2022		July to September 2022	
	No.	Share in per cent	No.	Share in per cent
1 Loans and Advances and Non-adherence to FPC	14,794	27.7	13,179	25.8
2 Mobile/ Electronic Banking	8,584	16.1	8,377	16.4
3 Opening/ Operation of Deposit accounts	8,155	15.3	8,264	16.2
4 Credit Card	7,190	13.4	7,493	14.7
5 ATM/ CDM/ Debit card	7,685	14.4	7,135	14.0
6 Other products and services	3,743	7.0	3,748	7.4
7 Pension	1,295	2.4	1,056	2.1
8 Para-Banking	652	1.2	635	1.2
9 Remittance and Collection of instruments	784	1.5	632	1.2
10 Others	605	1.1	493	1.0
Total	53,487	100.0	51,012	100.0

Source: RBI.

3.43 To protect the customers and general public from the increasing number of cyber and digital payment frauds, the Reserve Bank intensified its awareness initiatives under the RB-IOS, 2021 to safeguard consumers against such frauds. These include, but not limited to, Ombudsman Speak programs across multi-media channels in local and regional languages, Talkathon with media and intensive awareness campaigns across the nation.

III.3.17 Enforcement

3.44 During June - November 2022, the Reserve Bank undertook enforcement action against 105 regulated entities (four public sector banks; three private sector banks; eighty eight co-operative banks; two foreign banks; one small finance bank; one regional rural bank; and six non-banking financial companies) and imposed an aggregate penalty of ₹24.57 crore for non-compliance with/ contravention of statutory provisions and/ or directions issued by the Reserve Bank.

III.3.18 REITs and InvITs – Fund Raising and Future Outlook

3.45 Real Estate Investment Trusts (REITs) comprise of portfolios of commercial real assets a major portion of which is already leased out, while Infrastructure Investment Trusts (InvITs) comprise of portfolios of infrastructure assets such as highways and power transmission assets. REITs and InvITs facilitate real estate and infrastructure financing and investment in the country.

3.46 There are five registered REITs and 19 registered InvITs with the SEBI as on November 30, 2022. Till November 30, 2022, InvITs raised ₹79,483 crore, while REITs raised ₹15,250 crore (Table 3.2). The Union Budget of 2022-23 has allocated ₹7.5 lakh crore for infrastructure, which is 35.4 per cent more than the allocation in the previous year. The Government of India has also laid an added thrust on infrastructure development, with its focus on initiatives like PM Gati Shakti, National Infrastructure Pipeline, inclusive development and financing of investments.

III.4 Other Developments

III.4.1 Deposit Insurance

3.47 The insurance cover of the Deposit Insurance and Credit Guarantee Corporation (DICGC) for depositors in all commercial and co-operative banks

instils confidence in the banking system, thereby promoting financial stability. The number of registered insured banks as on September 30, 2022 stood at 2,034 comprising 141 commercial banks {including 43 RRBs, two local area banks (LABs), six payment banks and 12 small finance banks (SFBs)} and 1,893 co-operative banks. With the present limit of deposit insurance at ₹5 lakh, there were 267.1 crore fully protected deposit accounts (98.0 per cent of total) as at end-September 2022. In value terms, the insured deposits of ₹80.95 lakh crore formed 46.2 per cent of the total assessable deposits.

3.48 During H1:2022-23, the DICGC received ₹10,512.8 crore from banks as deposit insurance premium, of which 93.9 per cent was contributed by commercial banks and the remaining by co-operative banks. The Deposit Insurance Fund (DIF) stood at ₹1.55 lakh crore at the end of H1:2022-23, yielding a reserve ratio (*i.e.*, ratio of DIF to insured deposits) of 1.92 per cent (Table 3.3 and 3.4).

Table 3.3. Deposit Insurance Premium

(in ₹ crore)

Period	Commercial Banks	Co-operative Banks
2021-22 (H1)	8,939.1	621.6
2022-23 (H1)	9,872.1	640.7

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

Table 3.2. Fund Mobilisation by REITs and InvITs (Amount in ₹ crore)

Particulars	2019-20		2020-21		2021-22		2022-23 ^		Total
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	
Total funds mobilised by REITs	-	-	3	14,300	2	950	-	-	15,250
Listed REITs	-	-	3	14,300	2	950	-	-	15,250
Total funds mobilised by InvITs	4	11,496	2	40,432	9	21,195	6	6,360	79,483
Listed InvITs	3	7,744	1	25,215	7	16,025	3	2,596	51,580
Unlisted InvITs	1	3,753	1	15,217	2	5,170	3	3,764	27,904
Total funds mobilised by REITs and InvITs*	4	11,496	5	54,732	11	22,145	6	6,360	94,733

Note: * Includes funds raised through public issue, private placement, preferential issue, institutional placement, rights issue.

^ Partial financial year 2022-23 (April 1, 2022 to November 30, 2022).

Source: SEBI.

Table-3.4: Deposit Insurance Fund (DIF)

Period	Deposit Insurance Fund (in ₹ crore)	Reserve Ratio (per cent)
End-Mar 2022	1,46,842	1.81
End-Sep 2022	1,55,459	1.92

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

3.49 The settlement of claims in case of liquidated banks and banks under all inclusive directions (AID) during H1:2022-23 amounted to ₹479.8 crore, of which banks under AID accounted for ₹397.9 crore. Cash repayments (out of recoveries) of ₹58.1 crore were received during H1:2022-23 as against ₹267 crore in the corresponding period of the previous year. As on December 22, 2022, the insured deposits of banks under AID stood at ₹2,242 crore.

III.4.2 Corporate Insolvency Resolution Process (CIRP)

3.50 Since the inception of the Insolvency and Bankruptcy Code (IBC) in December 2016, 5,893 CIRPs had commenced by end-September 2022, of which

67 per cent have been closed. Of these, around 21 per cent were closed on appeal or review or settled, 19 per cent were withdrawn, 46 per cent ended in orders for liquidation and 14 per cent culminated in approval of resolution plans (Table 3.5).

3.51 Till September 30, 2022, 553 CIRPs have ended in resolution. Where the processes were initiated under section 7 of the Code, realisation by financial creditors (FCs) under resolution plans in comparison to liquidation value was 201 per cent while the realisation by them was 33 per cent of their claims. 46 per cent of the closed CIRPs yielded orders for liquidation, as compared to 14 per cent ending up with a resolution plan. However, more than 76 per cent of the CIRPs ending in liquidation (1349 out of 1774 for which data are available) were earlier with the Board for Industrial and Financial Reconstruction (BIFR) and/ or are defunct. The economic value of most of the corporate debtors that ended in liquidation had almost completely eroded even before they were admitted into CIRP. These

Table 3.5. 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	153	97	77	305	1064
2019 - 20	1064	1989	344	217	136	541	1815
2020 - 21	1815	536	91	162	121	350	1627
Apr - Jun, 2021	1627	141	12	36	34	75	1611
Jul - Sep, 2021	1611	192	26	40	18	67	1652
Oct - Dec, 2021	1652	263	19	48	52	114	1682
Jan - Mar, 2022	1682	289	46	47	39	84	1755
April - Jun, 2022	1755	361	34	59	34	96	1893
Jul - Sep, 2022	1893	221	26	34	23	84	1947
Total	NA	5893	846	740	553	1807	1947

Note: 1. These CIRPs are in respect of 5721 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 of the Code.

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

CDs had assets, on an average, valued at less than 8 per cent of the outstanding debt amount (Table 3.6).

3.52 53 per cent of CIRPs initiated by operational creditors (OCs) were closed on appeal, review, or withdrawal. Such closures accounted for about 72 per cent of all closures by appeal, review, or withdrawal (Table 3.7 and Table 3.8).

III.4.3 Insurance

3.53 Life insurance sector has been registering consistently high y-o-y growth in premium. The total premium collected by the life insurance sector

during the period from April-October 2022 was ₹4,11,474 crore, which was 21 per cent higher than the premium collection during the corresponding period of the previous year. During the same period, premium collection by the general and health insurance sector stood at ₹1,46,152 crore, which was 16 per cent more than the corresponding period of 2021-22. Among the business segments, motor and health insurance segments grew by 18 per cent and 21 per cent, respectively, and other segments too reported good growth.

Table 3.6. CIRPs Ending with Orders for Liquidation till September 30, 2022

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	585	619	145	1349
Resolution Value > Liquidation Value	105	60	38	203
Resolution Value ≤ Liquidation Value*	692	730	149	1571

Note: 1. There were 99 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 33 CIRPs is awaited.

Table 3.7. Outcome of CIRPs, Initiated Stakeholder-wise, as on September 30, 2022

Outcome	Description	CIRPs initiated by			
		Financial Creditor	Operational Creditor	Corporate Debtor	Total
Status of CIRPs	Closure by Appeal/ Review/ Settled	234	605	7	846
	Closure by Withdrawal u/s 12A	198	535	7	740
	Closure by Approval of Resolution Plan #	313	188	51	552
	Closure by Commencement of Liquidation	812	803	192	1807
	Ongoing #	974	877	93	1944
	Total	2531	3008	350	5889
CIRPs yielding Resolution Plans	Realisation by FCs as per cent of Liquidation Value	201.0	123.5	147.2	177.6
	Realisation by FCs as per cent of their Claims	33.0	16.5	18.3	30.8
	Average time taken for Closure of CIRP (days)	567	561	521	561
CIRPs yielding Liquidations	Liquidation Value as per cent of Claims	6.6	9.2	9.2	7.3
	Average time taken for Closure of CIRP (days)	457	429	388	437

Note: # This data excludes data in respect of Financial Service Providers admitted under section 227 read with Financial Service Provider Rules of the Code.

Table 3.8. Sectoral Distribution of CIRPs as on September 30, 2022

Sector	No. of CIRPs						Ongoing
	Admitted	Closed				Total	
		Appeal/Review/Settled	Withdrawal under Section 12 A	Approval of Resolution Plan	Commencement of Liquidation		
Manufacturing	2324	296	295	279	779	1649	675
Food, Beverages and Tobacco Products	303	33	37	32	96	198	105
Chemicals and Chemical Products	244	37	38	33	69	177	67
Electrical Machinery and Apparatus	169	22	14	9	75	120	49
Fabricated Metal Products	120	16	23	13	43	95	25
Machinery and Equipment	262	41	41	20	80	182	80
Textiles, Leather and Apparel Products	399	50	50	35	158	293	106
Wood, Rubber, Plastic and Paper Products	269	32	37	36	86	191	78
Basic Metals	387	44	31	77	124	276	111
Others	171	21	24	24	48	117	54
Real Estate, Renting and Business Activities	1227	230	181	73	313	797	430
Real Estate Activities	311	70	38	14	40	162	149
Computer and related activities	171	25	29	6	59	119	52
Research and Development	6	2	1	1	0	4	2
Other Business Activities	739	133	113	52	214	512	227
Construction	653	118	85	59	122	384	269
Wholesale and Retail Trade	588	72	55	36	230	393	195
Hotels and Restaurants	130	23	20	15	30	88	42
Electricity and Others	177	17	11	30	56	114	63
Transport, Storage and Communications	163	19	19	12	67	117	46
Others	631	71	74	49	210	404	227
Total	5893	846	740	553	1807	3946	1947

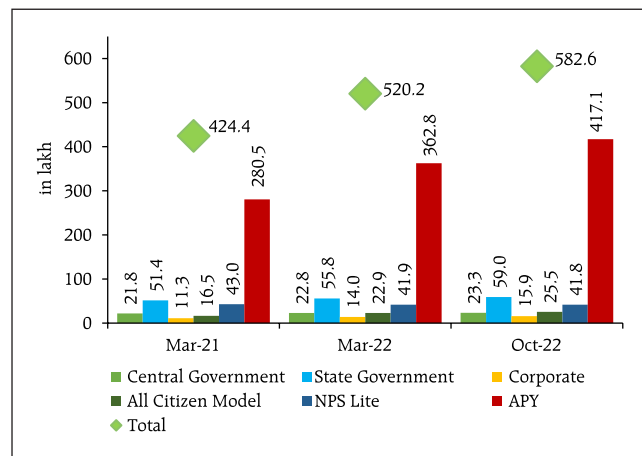
Source: Insolvency and Bankruptcy Board of India (IBBI).

III.4.4 Pension Funds

3.54 As on October 31, 2022, the National Pension System (NPS) and the Atal Pension Yojana (APY) recorded a 24.2 per cent and 21.1 per cent growth (y-o-y) in number of subscribers and their corpus, respectively (Chart 3.1 and 3.2).

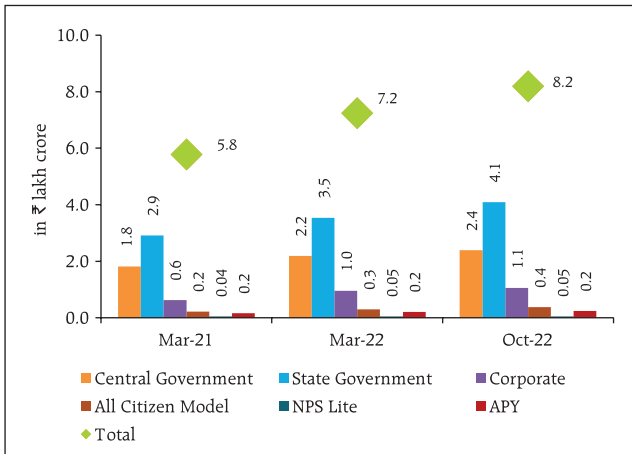
3.55 Both the NPS and the APY have continued to progress in terms of the total number of subscribers and AUM. Their combined subscriber base and AUM have reached 5.82 crore and ₹8,18,840 crore, respectively, of which APY has 71.6 per cent share in the number of subscribers (4.17 crore) and 2.9 per cent share in AUM (₹23,970 crore).

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).

Summary and Outlook

3.56 Financial sector regulation involves continuous assessment of risks with pro-active policy responses. In the current challenging global

environment, regulatory efforts are focused on addressing vulnerabilities in non-bank financial intermediation and core segments of financial markets. Protecting the financial system from the ill effects of climate risk is a major policy goal for regulators. The increasing threat of cyber risk is another key focus area for regulators, given its potential to increase vulnerabilities at institutional and system levels.

3.57 Domestically, the goal is to safeguard the domestic financial system from internal and external shocks while protecting customers and preserving financial stability. In this context, regulatory measures are aimed at improving the resilience of financial intermediaries, easing compliance, reducing regulatory costs, driving digitalisation, improving customer protection and access to finance. Regulators remain alert to the rapidly changing financial ecosystem with a view to enhancing its efficiency and ensuring its soundness and stability.

Annexure 1

Systemic Risk Survey

In the 23rd round of the Systemic Risk Survey, risks from global spillovers and financial market volatility rose further and remained in the 'high' risk category. General risks were perceived to have increased though they continued to be in the 'medium' risk category. Macroeconomic uncertainty was assessed to have moderated but continued to remain in the 'medium' risk category. Going forward, respondents' perception of risk to financial stability included: (a) strengthening of US dollar and volatility in the exchange rate; (b) increase in crude oil prices; (c) global economic slowdown; (d) tightening of global monetary and liquidity conditions; (e) lower corporate growth on account of slowdown in consumption and weak external demand; (f) rise in current account deficit and capital outflows; (g) increased price pressures due to higher commodity prices; (h) decline in corporate margins due to an increase in cost of raw materials; (i) geo-political risks due to continued war in Ukraine. More than half of the respondents assessed that the prospects of the Indian banking sector over a one-year horizon have improved.

The 23rd round of the Reserve Bank's Systemic Risk Survey (SRS) was conducted in November 2022 to solicit 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 captured (i) respondents' perception on risk to financial stability from external sector developments; and (ii) segments of the Indian financial system which are likely to be impacted by aggressive monetary policy tightening by advanced economies and (iii) respondents' views on the likelihood of global recession in 2023.

The feedback from 48 respondents is presented below.

- Risk perception from global spillovers and financial market volatility grew further and remained in the 'high' risk category. General risks were perceived to have increased though they continued to be in the 'medium' risk category. Institutional risks were perceived to have remained unchanged. Macroeconomic uncertainty, though remaining in the 'medium' risk category, was gauged to have moderated (Figure 1).

Figure 1: Systemic Risk Survey: Major Risk Groups

Major Risk Groups	May-22	Nov-22	Change in Risk Perception ¹
A. Global Risks	6.8	6.9	Increase
B. Macroeconomic Risks	5.6	5.4	Decline
C. Financial Market Risks	6.3	6.5	Increase
D. Institutional Risks	5.3	5.3	Unchanged
E. General Risks	4.8	5.2	Increase

Source: Systemic Risk Survey (May 2022 and November 2022)

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.

- Monetary tightening in advanced economies, geopolitical risks, global growth uncertainty and funding risk were perceived to be the major drivers of amplification in global risks (Figure 2).
- The rise in financial market risk emanated from tightening of financial conditions: foreign exchange pressure and liquidity tightening (Figure 2).
- Uptick in general risks primarily stemmed from cryptocurrencies, climate change and terrorism (Figure 2).
- Decline in risk perception on domestic growth and inflation, capital flows, fiscal deficit and sovereign credit rating resulted in moderation in overall macroeconomic risks, though risk perception remained elevated towards current account deficit (Figure 2).

Figure 2: Systemic Risk Survey: Risks Identified

Risk items		May-22	Nov-22	Change in Risk Perception
A. Global Risks	Global growth	7.0	7.6	Increase
	Sovereign risk / contagion	5.1	5.4	Increase
	Funding risk (External borrowings)	5.5	5.9	Increase
	Commodity price risk (including crude oil prices)	8.0	6.9	Decline
	Geopolitical risks	7.4	7.6	Increase
	Monetary tightening in advanced economies	7.7	7.9	Increase
B. Macroeconomic Risks	Domestic growth	6.0	5.7	Decline
	Domestic inflation	7.7	6.4	Decline
	Current account deficit	6.6	6.7	Increase
	Capital inflows/ outflows (Reversal of FIIs, Slowdown in FDI)	6.6	6.4	Decline
	Sovereign rating downgrade	4.4	4.3	Decline
	Fiscal deficit	6.0	5.5	Decline
	Corporate sector risk	5.1	5.2	Increase
	Pace of infrastructure development	4.5	4.7	Increase
	Real estate prices	4.7	4.9	Increase
	Household savings	5.5	5.4	Decline
	Political uncertainty/ governance /policy implementation	4.3	4.3	Unchanged
C. Financial Market Risks	Foreign exchange rate risk	6.3	6.6	Increase
	Equity price volatility	6.6	6.5	Decline
	Interest rate risk	6.7	6.5	Decline
	Liquidity risk	5.6	6.2	Increase
D. Institutional Risks	Regulatory risk	4.4	4.6	Increase
	Asset quality deterioration	5.5	5.4	Decline
	Additional capital requirements of banks	5.3	5.3	Unchanged
	Access to funding by banks	4.7	4.8	Increase
	Level of credit growth	5.4	4.9	Decline
	Cyber risk	6.0	6.5	Increase
	Operational risk	5.4	5.6	Increase
E. General Risks	Terrorism	3.9	4.2	Increase
	Climate related risks	5.7	5.9	Increase
	Social unrest (Increasing inequality)	5.2	5.2	Unchanged
	Cryptocurrency	4.4	5.5	Increase

Note:

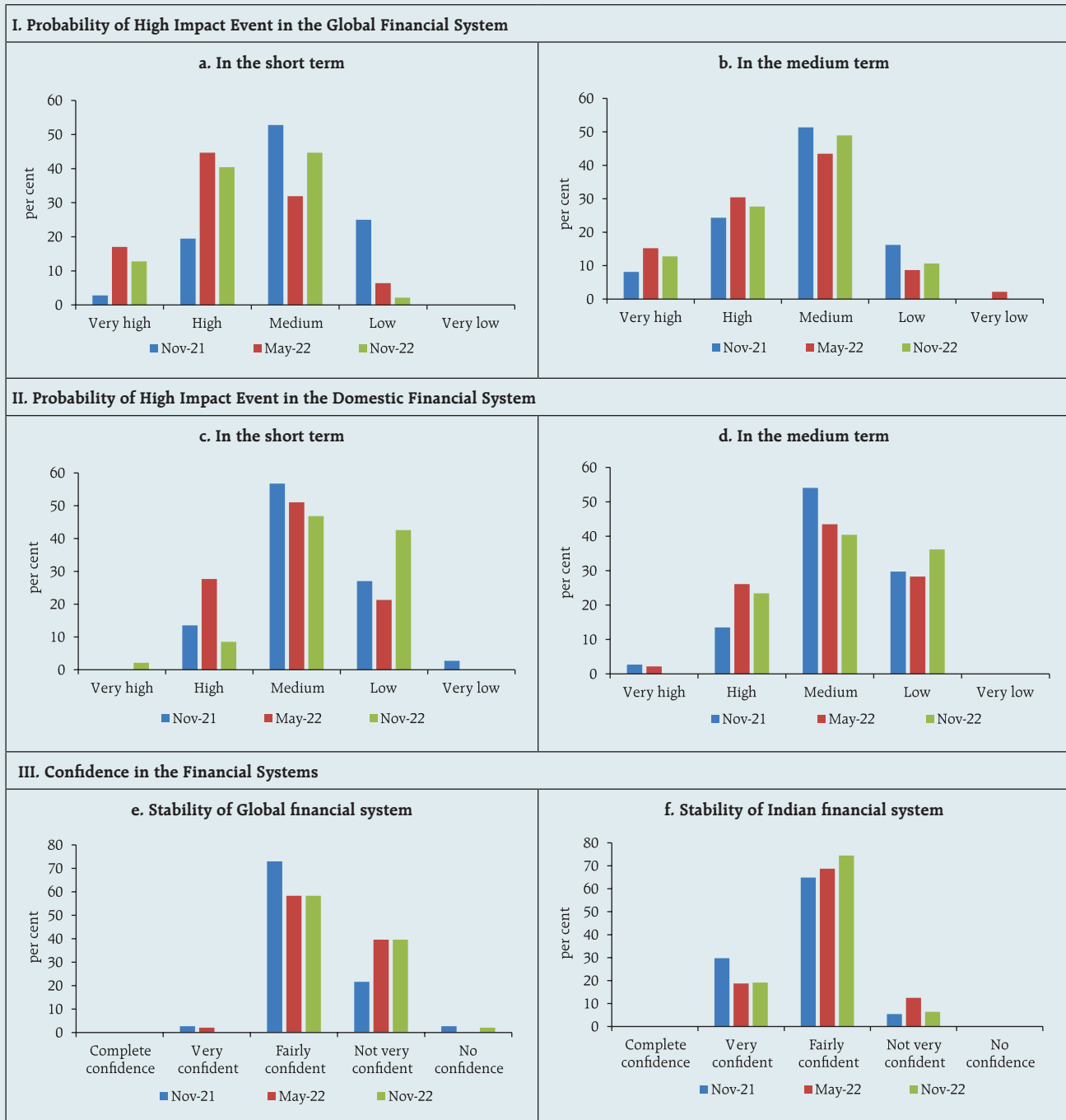
Risk Category

Above 8-10	Above 6-8	Above 4-6	Above 2-4	0-2
Very high	High	Medium	Low	Very low

- There is a 'medium' to 'high' probability of occurrence of a high impact event in the global financial system in the short run as well as medium term (Chart 1 a and b).
- There is a 'medium' to 'low' probability of occurrence of high impact event in the domestic financial system in both the short run and medium term (Chart 1 c and d).

Chart 1: Perception on Occurrence of High Impact Events in the Financial Systems

share of respondents (per cent)



- Confidence in the stability of the global financial system marginally declined during the last six months. In contrast, confidence in the Indian financial system further improved with 93.6 per cent of the respondents remaining fairly/highly confident of the stability of the Indian financial system (Chart 1 e and f).
- 52.1 per cent of the respondents expected that the Indian economy will be impacted somewhat/to a limited extent from global spillovers (Chart 2).
- Despite global headwinds posing risks to domestic macro-financial conditions, the impact of external sector developments remained moderate as 53.2 per cent of the respondents perceived it of medium impact (Chart 3).
- More than three-fourths of the respondents perceived that the aggressive monetary policy tightening by advanced economies would adversely impact the exchange rate, capital flows, foreign exchange reserves and bond yields. Less than 40 per cent of respondents viewed that banks' profitability and external debt would be adversely impacted (Chart 4).

Chart 2: Expectation of Instability in Global Financial System affecting Indian Economy

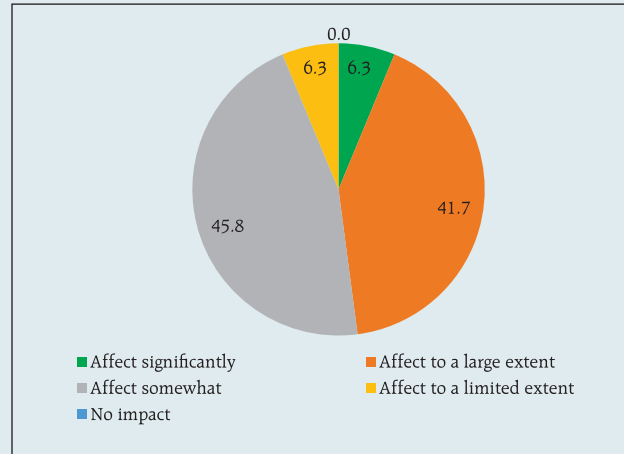


Chart 3: Risk to Financial Stability from External Sector Developments

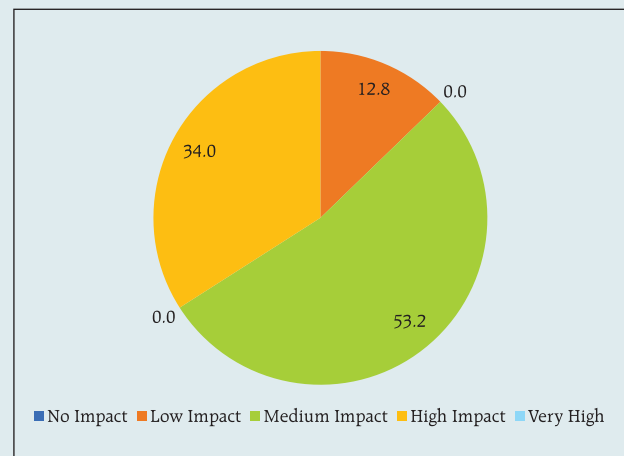
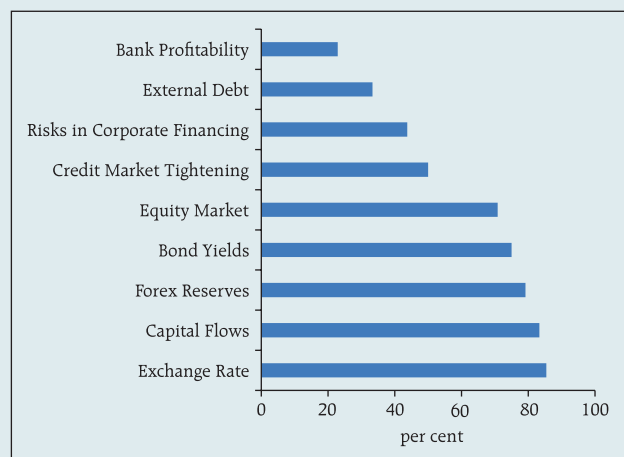


Chart 4: Impact of Aggressive Monetary Policy Tightening by Advanced Economies



- 57.8 per cent of the respondents assessed that the prospects of the Indian banking sector over a one-year horizon have improved and another 33.3 per cent of the respondents expected it to remain unchanged (Chart 5).
- Around 31 per cent of the respondents expected marginal improvement in banking sector asset quality over the next six months, and another 42.2 per cent expected it to remain unchanged attributable to factors such as economic recovery, pick up in credit growth, better underwriting standards of banks, improvement in credit profile of corporates, improved operating cashflows and credit guarantees to small enterprises (Chart 6 a).
- 66.7 per cent of the respondents expected marginal to considerable improvement in credit demand over the next six months on the back of recovery in economic activity, upturn in the investment cycle, strengthening of business sentiments, increased demand for working capital loans, higher public investment in infrastructure sector and export promoting production linked incentive (PLI) scheme by Government (Chart 6 b).

Chart 5: Prospects of Indian Banking Sector- Next One Year

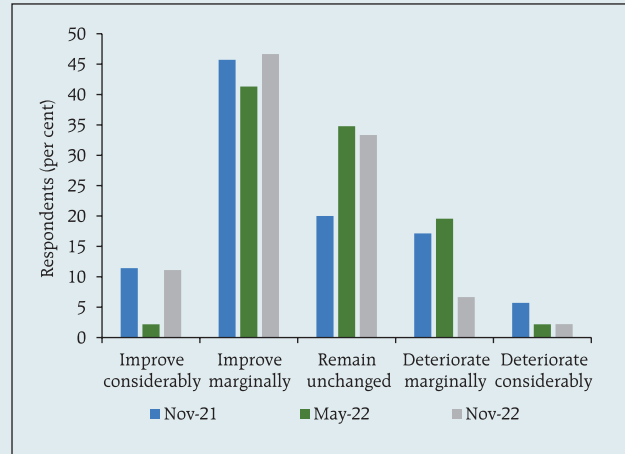
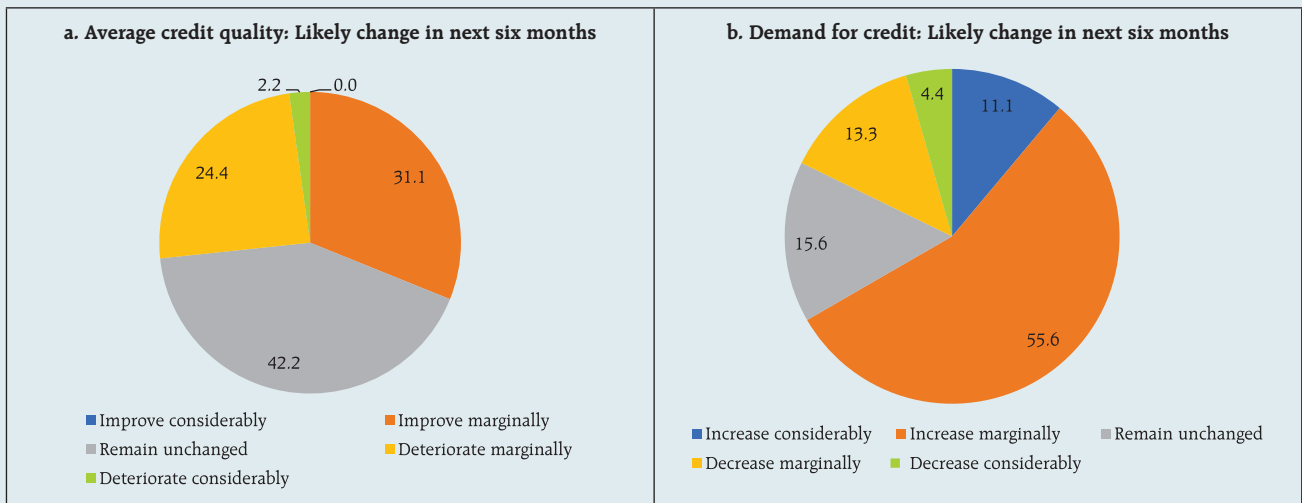
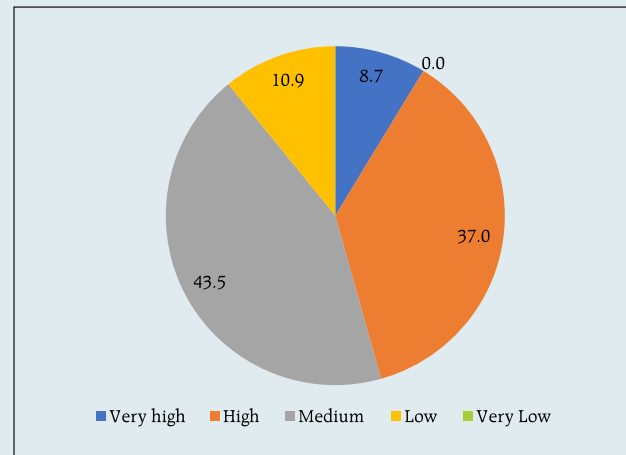


Chart 6: Indian Banking Sector – Outlook



- Global economic outlook remains clouded as the number of downside risks remained high even though markets are pricing in moderate policy rate hikes in future. As per the survey responses, global economy is facing a threat of recession in 2023. More than 89 per cent of respondents expected medium to high and very high chances of global recession in 2023 (Chart 7).

Chart 7: Chances of Global Recession in 2023



Risks to Financial Stability

Going forward, respondents identified the following major risks to financial stability:

- Volatility in the exchange rate and strengthening of US dollar;
- Increase in crude oil prices;
- Global economic slowdown;
- Global monetary and liquidity tightening and interest rate risk;
- Lower corporate growth on account of slowdown in consumption and weak external demand;
- Rise in current account deficit and capital outflows;
- Increased price pressures due to higher commodity prices;
- Decline in corporate margins due to an increase in cost of raw materials;
- Geo-political risks due to continued war in Ukraine.

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 forecasted 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

$$LGNPA_t = \alpha_1 + \beta_1 LGNPA_{t-1} - \beta_2 \Delta NGDP_{t-2} + \beta_3 RWALR_PSB_{t-1} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-2} + \beta_5 5y_BBB_Spread_{t-1} - \beta_6 ICR_{t-4} + \beta_7 \text{Dummy}$$

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

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

$$LGNPA_t = \alpha_1 + \beta_1 LGNPA_{t-1} - \beta_2 \Delta GDP_{t-2} + \beta_3 RWALR_PVB_{t-1} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-3} + \beta_5 10y_BBB_Spread_{t-3} - \beta_6 \left(\frac{Net\ Profit}{Sales} \right)_{t-3} - \beta_7 \Delta NIFTY_{t-3}$$

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

$$LGNPA_t = \alpha_1 + \beta_1 LGNPA_{t-1} + \beta_2 \Delta Oil_{t-1} + \beta_3 WALR_FB_{t-2} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-2} + \beta_5 10y_BBB_Spread_{t-2} - \beta_6 ICR_{t-3} + \beta_7 Dummy$$

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

$$NII_t = -\alpha_1 + \beta_1 NII_{t-1} + \beta_2 5y_TermSpread_{t-1} + \beta_3 \Delta NGDP_{t-4} + \beta_4 \left(\frac{Exp}{GDP} \right)_{t-1} + \beta_5 Spread_PSB_t - \beta_6 GNPA_PSB_{t-1}$$

$$\alpha_1, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 \text{ and } \beta_6 > 0$$

Here, 5y_TermSpread is the difference between 5-year G-Sec yield and 3-month T-Bill rate. Spread_PSBt 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:

$$OOI_t = \alpha_1 + \beta_1 OOI_{t-1} + \beta_2 10y_AAASpread_{t-1} + \beta_3 \Delta GDP_{t-2} + \beta_4 \left(\frac{CAB}{GDP} \right)_{t-1}$$

III.1.3 Projection of Operating Expense (OE)

The y-o-y growth of OE is modelled using the following ADL model:

$$OE_t = \alpha_1 + \beta_1 OE_{t-1} + \beta_2 OE_{t-2} + \beta_3 OE_{t-3} + \beta_4 \Delta CPI_{t-1}$$

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

$$Provisions_t = \beta_1 Provisions_{t-1} + \beta_2 GNPA_PSB_{t-1} - \beta_3 \Delta GDP_{t-2} + \beta_4 \left(\frac{GFD}{GDP} \right)_{t-3}$$

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

$$NII_t = \alpha_1 + \beta_1 NII_{t-1} + \beta_2 5y_TermSpread_{t-1} + \beta_3 \left(\frac{Exp}{GDP} \right)_{t-1} + \beta_4 Spread_PVB_t - \beta_5 GNPA_PVB_{t-1}$$

$$\alpha_1, \beta_1, \beta_2, \beta_3, \beta_4 \text{ and } \beta_5 > 0$$

Spread_PVBt 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:

$$OOI_t = \alpha_1 + \beta_1 OOI_{t-1} + \beta_2 \Delta GDP_{t-2} + \beta_3 \left(\frac{CAB}{GDP} \right)_{t-1}$$

III.2.3 Projection of Operating Expense

The y-o-y growth of OE is modelled using the following ADL model:

$$OE_t = \alpha_1 + \beta_1 OE_{t-1} + \beta_2 OE_{t-2} + \beta_3 OE_{t-3} + \beta_4 OE_{t-4} + \beta_5 \Delta WPI_{t-1}$$

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

$$Provisions_t = -\alpha_1 + \beta_1 Provisions_{t-1} + \beta_2 GNPA_PVB_{t-1} - \beta_3 \Delta GDP_{t-2} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-1}$$

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

$$NII_t = \alpha_1 + \beta_1 NII_{t-1} + \beta_2 \Delta NGDP_{t-2} - \beta_3 REER_{t-3} + \beta_4 Spread_FB_t - \beta_5 GNPA_FB_{t-1}$$

$\alpha_1, \beta_1, \beta_2, \beta_3, \beta_4$ 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:

$$OOI_t = \alpha_1 + \beta_1 OOI_{t-1} + \beta_2 \Delta GDP_{t-2} + \beta_3 \left(\frac{Exp}{GDP} \right)_{t-2}$$

III.3.3 Projection of Operating Expense

The y-o-y growth of OE is modelled using the following ADL model:

$$OE_t = \alpha_1 + \beta_1 OE_{t-1} + \beta_2 OE_{t-2} + \beta_3 \Delta WPI_{t-1}$$

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

$$Provisions_t = -\alpha_1 + \beta_1 Provisions_{t-1} + \beta_2 GNPA_{FB_{t-1}} - \beta_3 \Delta GDP_{t-1} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-1}$$

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 Probability of Defaults (PDs)

Sectoral PDs of 18 sectors/ sub-sectors (Table 2) are modelled using ADL models and are 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	Retail-Housing
7	Food Processing	16	Retail-Others
8	Gems and Jewellery	17	Services
9	Infrastructure	18	Others

The ADL models for sectoral PD projections are as follows:

1. *Engineering*

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GVA(Industry)_{t-3} + \beta_4 RWALR_{t-1} - \beta_5 \left(\frac{CAB}{GDP} \right)_{t-1} + \beta_6 REER_{t-1} + \beta_7 Dummy_t$$

2. *Automobile*

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

3. *Cement*

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

4. *Chemicals and Chemical Products*

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GVA(Industry)_{t-3} + \beta_4 WALR_{t-1} + \beta_5 REER_{t-2} + \beta_6 Dummy_t$$

5. *Construction*

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GDP_{t-3} + \beta_4 RWALR_{t-1} - \beta_5 \left(\frac{Exp}{GDP} \right)_{t-1} + \beta_6 REER_{t-3} + \beta_7 Dummy_t$$

6. *Textiles*

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GDP_{t-3} + \beta_4 \Delta REER_{t-2} - \beta_5 \Delta NIFTY50_{t-1} + \beta_6 Dummy_t$$

7. Food Processing

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta REER_t - \beta_3 \left(\frac{Exp}{GDP} \right)_{t-3} - \beta_4 ICR_{t-1} + \beta_5 \Delta WPI_{t-1} + \beta_6 Dummy_t$$

8. Gems and Jewellery

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-4} - \beta_3 \Delta GDP_{t-1} + \beta_4 REER_{t-1} - \beta_5 \left(\frac{Exp}{GDP} \right)_{t-3} + \beta_6 RWALR_{t-2}$$

9. Infrastructure

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-4} - \beta_3 \Delta GDP_{t-2} + \beta_4 REER_{t-2} + \beta_5 RWALR_{t-3} + \beta_6 Dummy_t$$

10. Basic Metal

$$PD_t = \beta_1 PD_{t-1} - \beta_2 PD_{t-2} - \beta_3 \Delta GVA(Industry)_{t-3} + \beta_4 REER_{t-3} - \beta_5 \left(\frac{Exp}{GDP} \right)_{t-1} + \beta_6 \Delta WALR_t + \beta_7 Dummy_t$$

11. Mining & Quarrying

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GVA(Mining)_{t-2} + \beta_3 REER_{t-2} - \beta_4 \left(\frac{Exp}{GDP} \right)_{t-2} - \beta_5 \Delta Credit_{t-1}$$

12. Paper & Paper products

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

13. Petroleum and Petroleum Products

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 \Delta Oilprice_{t-1} - \beta_3 \Delta Credit_{t-2} + \beta_4 RWALR_{t-4} - \beta_5 \Delta PFCE_{t-2}$$

14. Agriculture

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

15. Services

$$PD_t = \alpha + \beta_1 PD_{t-1} - \beta_2 \Delta GVA(Services)_{t-2} - \beta_3 \left(\frac{Exp}{GDP} \right)_{t-2} - \beta_4 \Delta NIFTY50_{t-1}$$

16. Retail Loan- Housing

$$PD_t = -\alpha + \beta_1 PD_{t-1} + \beta_2 (House\ price.\ to.\ Income)_{t-1} - \beta_3 NGDP_{t-4} + \beta_4 \Delta WALR_t$$

17. Retail Loan- Other than Housing

$$PD_t = \alpha + \beta_1 PD_{t-1} + \beta_2 RWALR_{t-3} + \beta_3 \Delta CPI_{t-3}$$

18. Other Sectors

$$PD_t = -\alpha + \beta_1 PD_{t-1} - \beta_2 PD_{t-3} - \beta_3 \Delta GVA(Industry)_{t-4} + \beta_4 RWALR_{t-1} - \beta_5 \left(\frac{CAB}{GDP} \right)_{t-4}$$

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:

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

$$CET1\ Capital\ Ratio_{t+1} = \frac{CET1_t + 0.25 * PAT_{t+1}}{RWA(credit\ risk)_{t+1} + RWA(others)_{t+1}}$$

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:

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

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

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

$$\begin{aligned} & \text{Capital requirement } (K_i) \\ &= \left[LGD_i \times N \left[(1 - R_i)^{-0.5} \times G(PD_i) + \left(\frac{R_i}{1 - R_i} \right)^{0.5} \times G(0.999) \right] - PD_i \times LGD_i \right] \\ & \times (1 - 1.5 \times b(PD_i))^{-1} \times (1 + (M_i - 2.5) \times b(PD_i)) \end{aligned}$$

where, LGD_i is loss given default of sector i, PD_i is probability of default of sector i, N(.) is cumulative distribution function of standard normal distribution, G(.) 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 PDs. 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 under the assumed shocks were considered to fall into sub-standard category only. 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.

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 in Banking Book (IRRBB) refers to the risk to a bank's capital and earnings arising from adverse movements in interest rates that affect banking book positions. 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 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 (MVE). 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 MVE is computed as $\Delta E / E = -[MDG]*RSA* \Delta i / E$, where Δi is change in interest rate and E is equity.

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: Shocks for sensitivity analysis

Domestic interest rates		
Shock 1	Overnight	+2.5 percentage points
	Up to 1yr	+1.5 percentage points
	Above 1yr	+1.0 percentage points
Domestic interest rates		
Shock 2	Overnight	-2.5 percentage points
	Up to 1yr	-1.5 percentage points
	Above 1yr	-1.0 percentage points
Exchange rates		
Shock 3	USD/INR	+20 per cent
Exchange rates		
Shock 4	USD/INR	-20 per cent

2.2 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 September 2022. 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 2020 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 analyzing upward movement of interest rates on AFS and HFT portfolio of UCBs.
- Due to absence of data with respect to Modified Duration (MD) for UCBs, the model used the Weighted Average MD of small finance 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 as below:

(per cent)

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

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

2.3 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 has 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 September 2022 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 $\kappa = \sum_{i=1}^N k_i$ and N as the total number of nodes, connectivity ratio is given as $\frac{\kappa}{N(N-1)}$.

- 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 TierI 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.

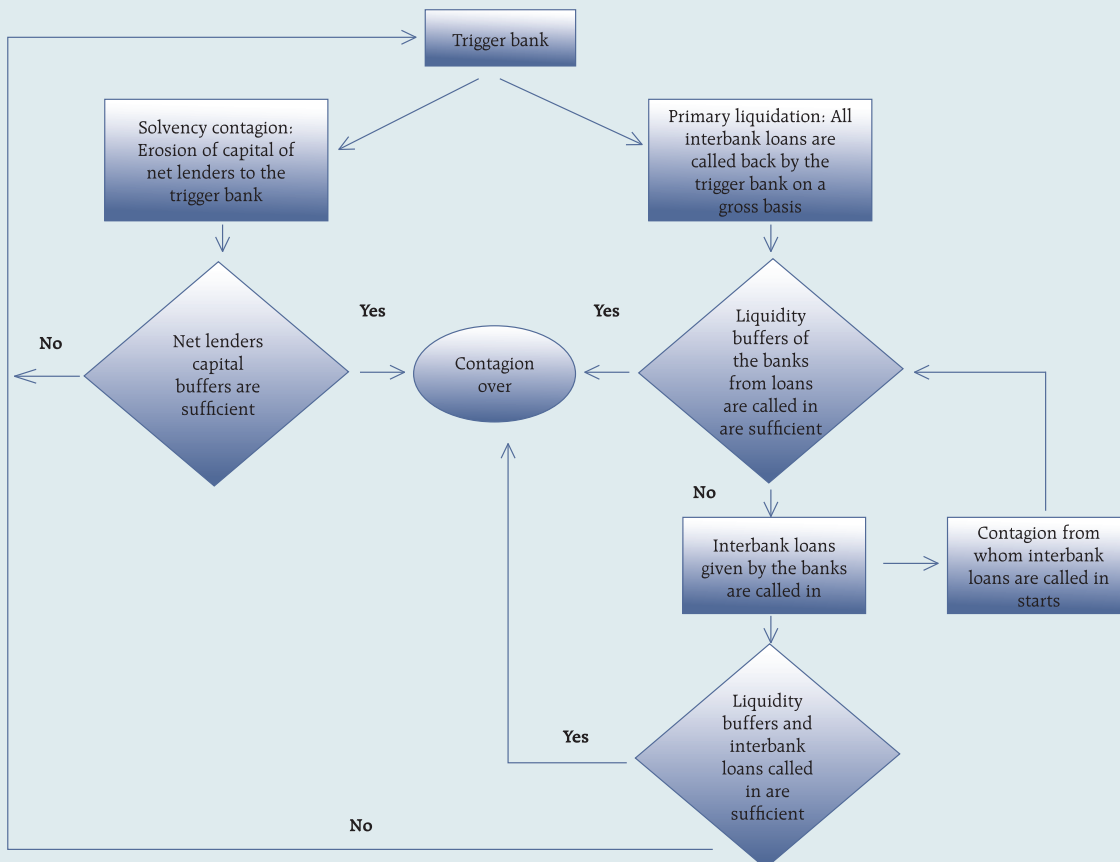
The basic assumption for the analysis is that a bank will initially dip into its liquidity reserves or buffers to tide over a liquidity stress caused by the failure of a large net lender. The items considered under liquidity reserves are: (a) excess CRR balance; (b) excess SLR balance; and (c) 18 per 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 crystallize in form of liquidity outflows for the counterparties of failed entities, they are not considered as callable in case of primary liquidation. Also, as the RBI guideline dated March 30, 2021 permits the bilateral netting of the MTM values in case of derivatives at counterparty level, exposures pertaining to derivative markets are considered to be callable on net basis in case of primary liquidation.

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

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

Annex 3

Important Regulatory Measures

1. Reserve Bank of India

Date	Regulation	Rationale
June 07, 2022	Branches of Indian Banks operating in the GIFT-IFSC - acting as Professional Clearing Member (PCM) of the India International Bullion Exchange IFSC Limited (IIBX): The instructions are applicable to domestic scheduled commercial banks (including foreign banks operating through a wholly owned subsidiary incorporated in India) which are authorised to deal in foreign exchange and have a branch in the GIFT-IFSC.	To provide a regulatory framework for the participation of Indian banks' branches in the GIFT-IFSC to provide clearing and settlement services on IIBX (as a PCM).
June 16, 2022	Processing of e-mandates for recurring transactions: Keeping in view the changing payment needs and safety of card transactions, it was decided to permit e-mandate framework with an additional factor of authentication (AFA) <i>inter alia</i> while processing the first transaction in case of e-mandates/standing instructions on cards, prepaid payment instruments and Unified Payments Interface. On a review, the per transaction limit for subsequent transactions (without AFA) was enhanced from ₹5,000 to ₹15,000.	To ease the customer experience and ensure convenience.
June 24, 2022	Restriction on Storage of Actual Card Data [i.e., Card-on-File (CoF)]: All entities in the card transaction/ payment chain, except card issuers and card networks, were required to purge the CoF data before October 1, 2022. Also, for ease of transition to an alternate system in respect of transactions where cardholders decide to enter the card details manually at the time of undertaking the transaction, some interim measures have been permitted. Appropriate penal action, including imposition of business restrictions, shall be considered by the RBI in case of any non-compliance.	To ensure privacy and security of customer data, guidelines were issued as availability of card details with different entities raises the risk of card data being compromised.

Date	Regulation	Rationale
July 06, 2022	Liberalisation of Forex Flows: The Reserve Bank undertook measures to enhance forex inflows, which includes- (a) exemption from CRR and SLR on incremental FCNR(B) and NRE term deposits; (b) relaxation on interest rates on fresh FCNR(B) and NRE deposits; (c) changes in regulation for FPI in debt; (d) liberalising foreign currency lending to constituents in India by authorised dealer category-I (AD Cat-I) banks; and (e) Increase in external commercial borrowings (ECBs) limit.	To further diversify and expand the sources of forex funding to mitigate volatility and dampen global spill overs.
July 07, 2022	Fully Accessible Route (FAR) for investment by non-residents in central government securities (G-secs)- additional specified securities: It has been decided that all new issuances of G-secs of 7-year and 14-year tenors, including the current issuances of 7.10% GS 2029 and 7.54% GS 2036, will be designated as specified securities under the FAR.	To increase the choice of G-secs available for investment by non-resident investors under the FAR as also to augment liquidity across the sovereign yield curve.
July 11, 2022	International Trade Settlement in Indian Rupees (INR): It has been decided to put in place an additional arrangement for invoicing, payment, and settlement of exports/imports in INR.	To promote growth of global trade with emphasis on exports from India and to support the increasing interest of global trading community in INR.
August 05, 2022	Extension of Reserve Bank - Integrated Ombudsman Scheme, 2021 (RB-IOS, 2021) to CICs: To address credit information related grievances and disputes, the credit information companies have been brought under the ambit of Reserve Bank – Integrated Ombudsman Scheme (RB-IOS), 2021 with effect from September 1, 2022.	To provide an avenue for cost free alternate grievance redress to customers of REs covered under the RB-IOS, 2021 for grievances against CICs.
August 08, 2022	AD Cat-I License eligibility for Small Finance Banks: It has been decided that all the scheduled SFBs, after completion of at least two years of operations as AD Cat-II, will be eligible for AD Cat-I license, subject to compliance with the eligibility norms.	To give more flexibility to SFBs to meet their customers' foreign exchange business requirement.

Date	Regulation	Rationale
August 08, 2022	<p>Rupee Interest Rate Derivatives (Reserve Bank) Directions – Review: Standalone Primary Dealers (SPDs) are also market-makers, like banks, in the onshore overnight indexed swap (OIS) market. It has been decided that SPDs, authorised under section 10(1) of FEMA, 1999, like AD Cat-I banks, shall also be eligible to offer foreign currency settled overnight indexed swap (FCS-OIS) to persons not resident in India as well as to other AD Cat-I banks and eligible SPDs.</p>	<p>To remove the segmentation between onshore and offshore OIS markets and improving the efficiency of price discovery.</p>
August 12, 2022	<p>Outsourcing of Financial Services - Responsibilities of regulated entities employing Recovery Agents (RAs): Considering growing incidences of unacceptable practices followed by RAs, the RBI has issued certain additional instructions to REs by extending the scope of extant guidelines and limiting the hours for calling borrowers on phone for recovery of overdue loans. These instructions will be applicable to all commercial banks (excluding payment banks), co-operative banks, NBFCs, ARCs and AIFIs. However, these instructions do not apply to microfinance loans covered under 'Master Direction – Reserve Bank of India (Regulatory Framework for Microfinance Loans) Directions, 2022', dated March 14, 2022.</p>	<p>To reemphasize that REs or their RAs should not resort to intimidation or harassment of any kind, limit the hours of calling borrowers on phone as also extend the scope of the instructions to cover more REs.</p>
September 15, 2022	<p>Rupee Drawing Arrangement - Enabling Bharat Bill Payment System (BBPS) to process cross-border inbound Bill Payments: Foreign inward remittances received through BBPS has been allowed under the Rupee Drawing Arrangement (RDA) for transfer to the KYC compliant bank account of the biller (beneficiary).</p>	<p>To facilitate NRIs to undertake utility, education, and other bill payments on behalf of their families in India.</p>

Date	Regulation	Rationale
September 19, 2022	<p>Compliance Function and Role of Chief Compliance Officer (CCO) - Urban Co-operative Banks: The UCBs under Tier 4 category (deposits with more than 10,000 crore) shall put in place a Board-approved policy and a Compliance Function, including the appointment of a Chief Compliance Officer (CCO), latest by April 1, 2023. The UCBs under Tier 3 (deposits of ₹1000 crore up to ₹10,000 crore) category shall implement the same latest by October 1, 2023.</p>	To improve the compliance function in UCBs as part of ensuring effectiveness of the overall structure of Corporate Governance.
October 03, 2022	<p>RBI launches (DAKSH) - Reserve Bank's Advanced Supervisory Monitoring System: Daksh is a web-based end-to-end workflow application through which the RBI shall monitor compliance requirements in a more focused manner. The application will enable seamless communication, inspection planning and execution, cyber incident reporting and analysis, provision of various MIS reports etc., through a platform which enables anytime-anywhere secure access.</p>	To further improve the compliance culture in Supervised Entities.
October 06, 2022	<p>Appointment of Internal Ombudsman (IO) by the CICs: All CICs holding a Certificate of Registration under sub-section (2) of Section 5 of the Credit Information Companies (Regulation) Act, 2005, to comply with the Reserve Bank of India (Credit Information Companies - Internal Ombudsman) Directions, 2022 by April 1, 2023.</p>	To strengthen and improve the efficiency of the internal grievance redressal mechanisms of CICs.
October 11, 2022	<p>Diversification of activities by standalone primary dealers (SPDs) – Review of permissible non-core activities: It has been decided to allow SPDs to offer all foreign exchange market-making facilities as currently permitted to Category-I Authorised Dealers, subject to prudential guidelines. Further, with effect from January 01, 2023 all financial transactions involving INR undertaken globally by related entities of the SPD shall be reported to the Clearing Corporation of India Trade Repository before 12:00 noon of the business day following the date of transaction.</p>	To strengthen the role of SPDs as market makers, on par with banks operating primary dealer business. This measure would give forex customers a broader spectrum of market-makers in managing their currency risk, thereby adding breadth to the forex market in India.

Date	Regulation	Rationale
October 11, 2022	Reserve Bank of India (Unhedged Foreign Currency Exposure) Directions, 2022: The Reserve Bank reviewed the extant guidelines on UFCE. The directions will come into effect from January 01, 2023. The key changes <i>inter alia</i> include: (a) exemption from UFCE guidelines and (b) increased in threshold limit for smaller entities.	To review and consolidate the extant guidelines on UFCE to provide clarity and reduced the compliance burden of banks.
October 11, 2022	Reserve Bank of India (Financial Statements - Presentation and Disclosures) Directions, 2021 - Disclosure of Divergence in Asset Classification and Provisioning: Commercial banks {excluding regional rural banks (RRBs)} are required to disclose details of divergence in asset classification and provisioning where such divergence assessed by the Reserve Bank exceeds certain specified thresholds. To further strengthen the compliance, one of the thresholds for disclosure of divergences has been revised downward and similar disclosure requirement has been introduced for the primary (urban) co-operative banks (UCBs). These instructions shall come into effect for disclosures in the notes to the annual financial statements of the year ending March 31, 2023. Further, these thresholds shall be revised downward for disclosure in the notes to annual financial statements of the year ending March 31, 2024, and onwards.	To strengthen compliance with income recognition, asset classification and provisioning norms.
October 11, 2022	Review of Regulatory Framework for Asset Reconstruction Companies (ARCs): The revised guidelines for ARCs <i>inter alia</i> include a comprehensive corporate governance framework and guidelines on one-time settlement with the borrowers, management fee, minimum NOF requirement, deployment of surplus funds, investment in SRs issued by the ARCs, permission to act as Resolution Applicant under IBC, transfer of stressed loans by lenders.	To enable ARCs to play a more meaningful role in the resolution of stressed assets by addressing some of the structural issues in the ARC sector.
October 12, 2022	Standard Operating Procedure for Inter-operable Regulatory Sandbox (IoRS): Inter-Regulatory Technical Group on FinTech (IRTG on FinTech)	To facilitate testing of innovative products/ services whose business models/ activities/

Date	Regulation	Rationale
	had been constituted under the aegis of the FSDC-SC. The terms of reference (ToR) of IRTG on FinTech include discussion on issues relating to hybrid product/ service falling under the regulatory ambit of different financial sector regulators for admission in regulatory sandbox (RS) and framing of standard operating procedure (SOP) for IoRS for hybrid products/ services.	features, fall within the regulatory ambit of more than one financial sector regulator. A Standard Operating Procedure (SOP) for IoRS has been prepared by the IRTG on FinTech.
October 31, 2022	Operationalisation of Central Bank Digital Currency-Wholesale (e₹-W) Pilot: The Reserve Bank announced the launch of the first pilot in the Digital Rupee - Wholesale segment (e₹-W) on November 1, 2022. The use case for this pilot is settlement of secondary market transactions in government securities in central bank money which would reduce transaction costs by pre-empting the need for settlement guarantee infrastructure or for collateral to mitigate settlement risk.	To make the inter-bank market more efficient and using this test-case for future pilots for different use-cases of e₹ including cross-border payments and other wholesale transactions.
November 01, 2022	Eligibility Criteria for offering Internet Banking Facility by Regional Rural Banks, 2022: Provides revised eligibility criteria for RRBs for internet banking facility offering.	To promote the spread of digital banking in rural areas.
November 23, 2022	Inclusion of Goods and Service Tax Network (GSTN) as a Financial Information Provider (FIP) under Account Aggregator (AA) Framework: GSTN and GST Returns, viz. Form GSTR-1 and Form GSTR-3B have been included as a FIP and Financial Information respectively under the AA framework.	To facilitate cash flow-based lending to MSMEs.
November 29, 2022	Operationalisation of Central Bank Digital Currency – Retail (e₹-R) Pilot: The Reserve Bank announced the launch of the first pilot for retail digital Rupee (e₹-R) on December 01, 2022. The pilot would cover select locations in closed user group (CUG) comprising participating customers and merchants. The e₹-R would be in the form of a digital token that represents legal tender. It would be issued in the same denominations as paper currency and coins. It would be distributed through intermediaries, i.e., banks.	To offer features of physical cash like trust, safety, and settlement finality in a digital format. As in the case of cash, it will not earn any interest and can be converted to other forms of money, like deposits with banks.

2. Securities and Exchange Board of India

Date	Regulation	Rationale
June 24, 2022	Introduction of Unified Payments Interface (UPI) mechanism for REITs and InvITs.	To provide an additional option to individual investors with a facility to block funds through UPI mechanism for application value up to ₹5 lakh.
June 09 and June 30, 2022 July 05, 2022	Intermediaries to report cyber incidents within six hours of noticing/ detecting such incidents.	To narrow the reporting timeline for cyber incidents so as to enable stock exchanges, depositories and the SEBI to act on it immediately.
July 27, 2022	Settlement of Running Account of Client's Funds lying with Trading Member.	To mitigate the risk of misuse of client's funds.
August 18, 2022	Block Mechanism in demat account of clients undertaking sale transactions.	To prevent movement of clients' securities from the client's account to stockbroker's pool account and to save time and cost for the investors.
August 25, 2022	Enhanced disclosures by Credit Rating Agencies (CRAs) and norms on rating withdrawals.	To disclose sharp rating action, if the rating change between two consecutive rating actions is more than or equal to three notches downward.
September 02, 2022	Performance/ return claimed by unregulated platforms offering algorithmic strategies for trading.	To prevent any act and instances of mis-selling by unregulated entities and to protect the interest of investors in the securities market.
September 19, 2022	Framework on Social Stock Exchange	To specify the detailed framework for social stock exchange pursuant to amendment to SEBI (Issue of Capital and Disclosure Requirements) Regulations, 2018, SEBI (Listing Obligations and Disclosure Requirements) Regulations, 2015 and SEBI (Alternative Investment Funds) Regulations, 2012.

Date	Regulation	Rationale
September 30, 2022	Two-Factor Authentication for transactions in units of Mutual Funds.	To prevent third party payments, mitigate risks and to promote secure environment for mutual fund investors.
October 13, 2022	Governing Council for Social Stock Exchange	To specify the aspects related to the governing council of the social stock exchange.
October 28, 2022	Reduction in denomination for debt securities and non-convertible redeemable preference shares from ₹10 lakh to ₹1 lakh.	To provide impetus to the secondary market for corporate bonds, viz., increased participation and enhancement of liquidity.
October 31, 2022	Restriction on the number of International Securities Identification Number (ISIN) of debt securities issued on private placement basis, maturing during a financial year.	To reduce fragmentation and deepen liquidity in the corporate bond market.
October 31, 2022	Standardisation of Rating Scales used by CRAs.	To standardize the usage of rating scales and descriptors used for specifying 'Rating Watch' and 'Rating Outlook'.

3. Insurance Regulatory and Development Authority of India

Date	Regulation	Rationale
August 01, 2022	Master Guidelines on Anti-Money Laundering/ Counter-financing of Terrorism (AML/ CFT), 2022: These guidelines mandate all insurers to conduct client due diligence at the time of commencement of account-based relationship, as well as periodically. It also prescribes <i>inter alia</i> requirements pertaining to record keeping, reporting obligations, KYC norms, monitoring of transactions.	To consolidate various circulars/ guidelines issued earlier.

Date	Regulation	Rationale
August 03, 2022	Amendments to Investment Norms: The eligibility criteria for "Approved Investments" were revised; Criteria for investments in mutual funds were amended to encourage diversification of investment portfolio of insurers in all types of mutual funds like Gilt/ G-sec/ Liquid/ Debt/ Income; Limit of exposure to Banking, Financial Services and Insurance was increased to provide more flexibility to insurers; Limits of Investment in REITs and InvITs have been increased.	To liberalize the extant investment norms and to boost policyholder returns.

4. Pension Fund Regulatory and Development Authority

Date	Regulation	Rationale
July 27, 2022	Subscriber Centric Services through DigiLocker: DigiLocker offers the following benefits to National Pension System (NPS) stakeholders- (i) Access of ePRAN card through DigiLocker for existing subscribers; (ii) Access to account statements through DigiLocker for existing subscribers; and (iii) Undertaking KYC for NPS account opening for prospective subscribers.	To provide subscriber centric services, central record keeping agencies appointed by the PFRDA have integrated their system with DigiLocker.
July 28, 2022	Responsible Innovation through Regulatory Sandbox: It is a formal regulatory program for market participants/ stakeholders to test new products/ modified variants, services, or creative business models with users in an environment, subject to certain safeguards, reasonable caution, and adequate oversight.	To promote efficiency by nurturing responsible innovation in financial/ pension/ retirement planning services, which eventually benefits the investors, subscribers, consumers, and users.
August 01, 2022	e-Investment Choice for Government sector subscribers: The central government NPS subscribers can choose pension funds (PFs) and investment options among the following: (a) active choice – 100 per cent allocation into government securities; (b) conservative auto choice – 25 per cent allocation in equity asset class; and (c) moderate auto choice – 50 per cent allocation in equity asset class.	To simplify the process in the interest of the subscribers, it has been decided to allow the change in Investment choice online, wherein the subscriber can submit the request directly in the CRA login.

Date	Regulation	Rationale
August 11, 2022	Voluntary Contributions under Direct Remit enabled through UPI: the PFRDA launched UPI handle for depositing contributions through direct remit for the benefit of subscribers. At present, the subscribers deposit their voluntary contributions under D-Remit into Tier I/II from the net banking account of the subscriber's bank account by using IMPS/ NEFT/ RTGS.	To further ease the process of depositing contributions.
August 25, 2022	Changes in the process flow of e-Nomination for the benefit of Government/ Corporate Sector Subscribers: the PFRDA had introduced an e-Nomination facility for the benefit of NPS Subscribers. The existing subscribers of NPS who wish to change their nomination in their PRAN can use 'e-Nomination' through their login credentials.	To revise the process flow regarding e-Nomination requests for reducing pendency in authorisation.
September 19, 2022	Reduction of Timelines for Withdrawal from T+4 to T+2 for the benefit of subscribers: The withdrawal requests of subscribers at the time of exit were hitherto executed on T+4 working/ settlement days (T being the day of authorisation of withdrawal request by nodal office/ PoP/ subscriber) and the timeline has been reduced to T+2.	To reduce the timelines of final exit from NPS for the benefit of the subscribers associated with the respective CRA.
September 29, 2022	Enabling the government and corporate subscribers to continue with their existing scheme choice: There are instances where subscribers under the corporate and government sectors have not exercised inter sector shifting (ISS) after leaving their employment, since the scheme/ investment option made available to the subscriber during their employment may not be available in case they shift to the 'All-Citizen' sector. It has been decided to permit such subscribers to continue with their existing investment pattern, on their shifting to 'All-Citizen' sector.	To broaden the spectrum of schemes/ investment options available to the subscribers.

Date	Regulation	Rationale
October 19, 2022	Handling NPS corpus of deceased subscribers meant for the purchase of annuity.	It was observed that in certain cases, subscriber has passed away post availing lump sum payment, but before issuance of annuity and the amount meant for annuity were in CRA system. For such cases, guidelines were issued.
October 20, 2022	Allowing the option to allocate 75 per cent of the subscriber's contribution in Asset E (Equity) in Tier I and 100 per cent in Tier II: Earlier, the limit of 75 per cent assets class used to get tapered off by 2.5 per cent every year and is re-allocated to government securities when subscribers attain 51 years of age. It has been decided by the Authority to allow the option to allocate 75 per cent of subscribers' contribution in Asset Class E (Equity) in Tier I under active choice without any conditions of tapering from the age of 51 years. It is also decided that to allow 100 per cent of the subscriber's contribution in Asset Class E (Equity) in Tier II under active choice without any conditions is tapering.	To improve the regulatory framework for the benefit of subscribers.

5. Insolvency and Bankruptcy Board of India

Date	Regulation	Rationale
July 04, 2022	IBBI (Insolvency Professional Agencies) (Amendment) Regulations, 2022.	To provide that disciplinary proceedings under the said regulations shall be conducted in accordance with the provisions of the IBBI (Inspection and Investigation) Regulations, 2017.
July 04, 2022	IBBI (Insolvency Professionals) (Amendment) Regulations, 2022: The amendment regulations <i>inter alia</i> provide that:- (a) The disciplinary proceedings shall be conducted in accordance with the provisions of the IBBI (Inspection and Investigation) Regulations, 2017; (b) An Insolvency	To facilitate IP monitoring activities of the Board by improving information disclosure requirements and invoicing requirements of professional fee charged by IPs.

Date	Regulation	Rationale
	Professional (IP) shall file all relationship disclosures in a timely manner with the insolvency professional agency (IPA) he is enrolled with; (c) An insolvency professional (IP) or insolvency professional entity (IPE) shall raise invoices in their own name towards fees and such fees shall be paid through banking channel; and (d) An IP shall not include any amount incurred on account of non-compliance of any provision of the laws while conducting the various processes under the Code in the insolvency resolution process cost (IRPC) or liquidation cost.	
September 13, 2022	IBBI (Insolvency Resolution Process for Corporate Persons) (Third Amendment) Regulations, 2022: The amendment regulations <i>inter alia</i> provide for (a) a range or matrix of minimum fee payable to an IP dependent on quantum of claims admitted in a case; (b) payment of a fee higher than the minimum fee payable depending on certain features of the corporate debtor; (c) a performance-linked incentive fee structure payable to an IP not exceeding ₹5 crore; and (d) manner of providing for payment of such fee from funds of corporate debtor or interim finance or payment by the applicant or committee of creditors.	To govern the fee charged by IPs for conduct of processes under the Code.
September 13, 2022	IBBI (Insolvency Professionals) (Second Amendment) Regulations, 2022: The amendment regulations prohibit an IP from accepting/ sharing any fees or charges from any professional and/ or support service provider who are appointed under the processes.	To regulate the fee charged by IPs for conduct of processes under the Code and improve transparency in the same.
September 16, 2022	IBBI (Insolvency Resolution Process for Corporate Persons) (Fourth Amendment) Regulations, 2016: The amendment regulations <i>inter alia</i> provide for: (a) re-issue of request for resolution plan to sell one or more of assets of the corporate debtor in cases where no resolution plan has been received for the corporate debtor as a whole; (b) allow a resolution plan to include sale of one or more assets of corporate debtor to one or more successful	To streamline the corporate insolvency resolution, reduce delays and maximize realisation for stakeholders.

Date	Regulation	Rationale
	<p>resolution applicants submitting plans for such assets; (c) formulating a strategy for marketing of assets of corporate debtor; and (d) enable the CoC to explore option of compromise or arrangement and file such recommendation with AA while applying to AA for liquidation order.</p>	
September 16, 2022	<p>IBBI (Liquidation Process) (Second Amendment) Regulations, 2022 and IBBI (Voluntary Liquidation Process) (Second Amendment) Regulations, 2022: The amendment regulations <i>inter alia</i> provide for the following: (a) The CoC constituted during CIRP shall function as stakeholders consultation committee (SCC) in the first 60 days. Post this period, the SCC shall be reconstituted based upon admitted claims; (b) SCC may propose replacement of liquidator to the AA and fix the fees of liquidator, if the CoC did not fix the same during CIRP; (c) If the CoC decides that the process of compromise or arrangement may be explored during liquidation process, the liquidator shall file application for the same before the AA within thirty days of the order of liquidation; and (e) SCC shall advise the liquidator, the manner in which proceedings in respect of avoidance transactions shall be pursued after closure of liquidation proceedings.</p>	To streamline the corporate and voluntary liquidation process to reduce delays and improve stakeholder participation.
September 20, 2022	<p>IBBI (Insolvency Professionals) (Third Amendment) Regulations, 2022: The amendment regulations provide for the following :- (a) To raise the application fee for registration (one time) and annual fees (5 yearly) payable to the Board by IPs and insolvency professional entities (IPEs); (b) To raise the annual fee payable to the Board by an IP or IPE as a percentage of the professional fee earned for the services rendered as an IP/ IPE in the preceding financial year; and (c) To provide for regulatory fee payable to the Board by the IP, calculated at the rate of one per cent of IRPC, excluding the fee of IRP/ RP, and any costs incurred for running the business of the corporate debtor as a going concern.</p>	To raise various fees paid by IPs and IPEs to the Board and introduce a regulatory fee payable to the Board for conduct of CIRP, to raise the financial resources of the Board.

Date	Regulation	Rationale
September 28, 2022	IBBI (Insolvency Professionals) (Fourth Amendment) Regulations, 2022: The salient features of the amendments are (a) an IPE, recognised by the Board, can seek registration as an IP with the Board; and (b) an IPE which is registered as an IP shall allow only its partner or director, as the case may be, who is an IP and holds a valid authorisation for assignment (AFA), to sign and act on behalf of it.	To allow IPEs to function as IPs under the Code to institutionalize the profession of IP, establish a better governance framework, and address limitations posed by IP being an individual in dealing with large and complex processes that require concurrent efforts and actions.
October 03, 2022	IBBI (Model Bye-Laws and Governing Board of Insolvency Professional Agencies) (Amendment) Regulations, 2022: The amendment regulations provided for consequential changes in the Model Bye Laws of IPAs, as provided in the Schedule of IBBI (Model Bye-Laws and Governing Board of Insolvency Professional Agencies) Regulations, 2016, in view of allowing IPEs to register as IPs with the Board and perform the functions of IP under the Code and regulations made thereunder.	To provide for consequential changes in the Model Bye-Laws regulations in view of allowing IPEs to register as IPs with the Board.

6. International Financial Service Centres Authority

Date	Regulation	Rationale
June 28, 2022	Refund of security deposit to Broker Dealers on surrender of membership	On approval of application for surrender of Broker Dealer's registration by the International Financial Service Centres Authority (IFSCA), the stock exchange shall release security deposit of the Broker Dealer (engaged in trading on behalf of clients) after twelve months from the date of approval of surrender application by the IFSCA.
June 28, 2022	Circular on Committees at Market Infrastructure Institutions (MIIs) in IFSC: The IFSCA (Bullion Exchange) Regulations, 2020 and the IFSCA (Market Infrastructure Institutions) Regulations, 2021 require various statutory Committees to be formed	To develop and regulate the financial products, financial services and financial institutions in the IFSC.

Date	Regulation	Rationale
	by the MIIs to ensure effective oversight on the functioning of MIIs. Vide circular <i>ibid.</i> , the IFSCA has mandated MIIs to constitute 3 Functional Committees and 5 Oversight Committees and provides for the overarching principles for composition and quorum of all the statutory committees.	
July 01, 2022	Angel Funds under the IFSCA (Fund Management) Regulations, 2022: Angel Funds bridge the gap between start-ups and angel investors, who are instrumental in providing mentoring and resources to the start-ups. In recognition of the same, the IFSCA has issued a framework for Angel funds under the IFSCA (Fund Management) Regulations, 2022.	To enable the regulatory framework for various activities related to fund management including schemes for investing in early-stage venture capital undertaking (start-ups).
July 01, 2022	IFSCA (Finance Company) (Amendment) Regulations 2022: Earlier, the regulations provided that a Finance unit can be set up for undertaking core activities only if the applicant entity, being an incorporated entity in its home jurisdiction, is undertaking a regulated financial services business in its home jurisdiction. However, under the amended regulations, this condition has been relaxed.	To enable an entity desirous to set up global/ regional corporate treasury centre and those carrying only non-core activities as a finance unit in the IFSC.
July 11, 2022	IFSCA (Banking) (Amendment) Regulations 2022: The amendment to the Banking Regulations <i>inter alia</i> provides for introduction of the Global Administrative Office (GAO).	To enable parent banks to undertake activities such as management, administration, coordination as well as support services from the IFSC without the need of opening a banking unit.
July 13, 2022	The IFSCA Banking Handbook Conduct of Business Directions- v 4.0 (COB)	To ensure that the IFSC Banking Units (IBUs) meet the minimum standards of conduct expected, particularly regarding the treatment of their clients, their dealings with counterparties and other market participants.

Date	Regulation	Rationale
August 05, 2022	Standard Operating Procedure for Qualified Jewellers (QJ) importing gold through the India International Bullion Exchange (IIBX).	To enable remote access to the IIBX for eligible QJs as limited purpose trading members (LPTM) for participation for 'buy' only trades on the IIBX. The SOP also provides the details of the process of purchase of bullion depository receipt (BDR) for import of gold and movement of gold from the IFSC for import to India (DTA).
August 16, 2022	Framework for Ship Leasing - Finance Company/ Finance Unit: The framework specifies the eligibility criteria for registration of lessor, permissible activities under ship operating lease and financial lease, requisite capital and prudential requirements and other general conditions.	To provide an enabling framework for development of Ship Leasing ecosystem in the IFSC.
August 18, 2022	Circular on 'Qualified Suppliers' for supply of bullion on the IIBX: Eligible overseas supplier entities are now allowed to participate on the IIBX for the limited purpose of 'selling' bullion, without having to set up an establishment at the IFSC.	To facilitate supply of bullion at the IIBX, encourage import by QJ and enable eligible overseas supplier entities to participate on the IIBX.
August 25, 2022	Issuance of Debit Cards by the IFSC Banking Units (IBUs).	To prescribe the terms and conditions for issuance of debit cards by IBU's including online payments, PoS terminal transactions and other such prescribed and permitted transactions.
October 11, 2022	IFSCA (Setting up and Operation of International Branch Campuses and Offshore Education Centres) Regulations, 2022: The regulations enable the foreign universities and foreign educational institution to establish international branch campuses and offshore educational centres respectively.	To bridge the gap for Indian students by providing accessibility to world-class foreign universities and institutions within India and to attract foreign students in the GIFT-IFSC.

Date	Regulation	Rationale
October 31, 2022	IFSCA (Anti Money Laundering, Counter-Terrorist Financing and Know Your Customer) Guidelines, 2022: Considering the varying risks posed by customers, products <i>etc.</i> , a detailed risk-based approach is mandated for REs. The guidelines have incorporated a principle-based approach for customer due diligence and other aspects, in line with the global practice.	To combat money laundering and terrorist financing, as these provide various checks and balances to be followed by REs while onboarding customers and in other scenarios.

